2nd Study on the North Sea - Baltic TEN-T Core Network Corridor

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Abstract

This Final Report presents the work performed during the study (Study) of the North Sea – Baltic TEN-T core network corridor (Corridor) between September 2015 and December 2017. The North Sea - Baltic corridor comprises 5,986 km of railways, 4,092 km of roads and 2,186 km of inland waterways and it is one of nine TEN-T core network corridors and the only one to be situated exclusively in the North of Europe.

The main focus of the Study was: the assessment of technical compliance of Corridor infrastructure with TEN-T Regulation requirements; identification of projects for further Corridor enhancement with respect to technical compliance and removing bottlenecks; clustering of identified projects; assessment of Corridor development impact on environment, jobs and growth.

The work accomplished during the Study was based on the interviews and discussions with projects stakeholders, Working Group meetings, Corridor Forums, development of project list and regular interaction with DG MOVE, as well as a special meeting with EIB.

The main Study results are reflected in the 2nd and 3rd Work Plan of the European Coordinator for the Corridor. The Final Report compliments the data included in the Work Plans and provides a summary of information included in different reports prepared during the Study.

Executive Summary

This Final Report (Report) presents the work performed during the study of the **North Sea – Baltic (NSB) TEN-T Core Network Corridor (Study)** between September 2015 and December 2017. The North Sea - Baltic Corridor comprises 5,986 km of railways, 4,092 km of roads and 2,186 km of inland waterways. It is one of nine TEN-T core network corridors, the only one to be situated exclusively in the North of Europe including The Netherlands, Belgium, Germany, Poland, Lithuania, Latvia, Estonia and Finland. The main Study results are reflected in the 2nd and 3rd Work Plan of the European Coordinator for the North Sea – Baltic TEN-T Core Network Corridor. This Report complements the information included in the Work Plans.

The work accomplished during the Study was based on interviews and discussions with projects stakeholders, Working Group meetings, Corridor Forums, development of the Corridor project list and regular interaction with DG MOVE, as well as a special meeting with EIB.

The Report includes an overview of all the main activities completed during the Study including regular cooperation with the project stakeholders. One of the main project activities was **Corridor Forums** in order to provide an interaction with different project stakeholders and to update project stakeholders on the Study results. Since the start of the Study seven Corridor Forum meetings have taken place. In addition, other meetings took place including five **Working Group** meetings on regions, urban nodes, ports, rail-road terminals, inland water ways and macro regions. Some of the Working Groups were organised in cooperation with other Core Network Corridors. Other events included participation and presentation at TEN-T Days 2016 in Rotterdam and a meeting with EIB on project financing.

The Report includes an analysis of **NSB Corridor transport infrastructure compliance** per Corridor Member State with the requirements included in Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU (Regulation). The information presented corresponds to the 3rd Work plan and provides an analysis of technical compliance per transport mode: rail, roads, inland waterways, inland ports, sea ports and maritime infrastructure and airports. In addition to technical compliance assessment, **Key Performance Indicators** (KPIs) have been **designed and applied to assess and monitor the evolution of the Corridor** in terms of compliance with Regulation requirements, interoperability and performance.

One of the main project activities was **identification of potential projects** at Member State level and cross-border projects which will contribute to the further development of the NSB Corridor by 2030. The project list was developed in 2016 and 2017 based on the project stakeholder consultations. The North Sea – Baltic project list as of July 2017 contains **530 projects** with a **total investment value of 96.1 billion EUR.**

Based on the high number of projects identified, **project clustering was performed** to better assess the projects' relevance to NSB Corridor priorities and project maturity. The project clustering was based on the final project list as of July 2017. The key objective of clustering was to analyse the planned Corridor investments based on predefined criteria. A common methodology was applied by all Core Network Corridors. According to clustering results of the project relevance evaluation out of the 530 NSB projects, 34% are considered as very relevant (cluster 1), while 28% of projects fall into the residual category.

The Corridor consultants undertook **an analysis of the growth and jobs created** that would be stimulated by the implementation of NSB Corridor projects. The analysis was performed based on the commonly approved guidelines applied by all corridors. Results show that the implementation of the identified projects will lead to an increase of GDP over the period 2016 until 2030 of 715 billion EUR in total. Further benefits will also occur after the year 2030. The investments in the projects will also stimulate additional employment. The direct, indirect and induced job effects of projects will amount to 2,061,000 additional job-years created over the period 2016 to 2030.

The Study also focused on the **market potential** of environment friendly transport modes with underutilised capacity, with rail and inland waterway transport modes being the most relevant for the NSB Corridor. Corridor is quite mature with respect to **innovation projects** and has many innovative projects (almost 25% of all projects), in comparison to other corridors, including 6 Radical innovation projects. Nevertheless, Catch-up innovation projects remain the largest category of innovative projects.

Over the last years, climate change has evolved into being one of the main working areas of the European Union and being amongst the 10 priority areas for the European Commission, therefore the Study included a **part on climate change resilience** and about **climate mitigation** of environment impacts. This EU Reference scenario shows that overall NSB Corridor Member States pattern (population, GDP, transport emissions and energy demand) is similar to the EU28 with the Corridor Member States accounting for approximately a 20-40% share of EU28-activity across the board. On the North Sea - Baltic Corridor there are 52 projects contributing directly to decarbonisation. The total cost of these projects is 6.2 billion EUR.

With the "Issues Papers" European Coordinators started an action aiming to advance newer components of TEN-T development and to **strengthen corresponding cross-corridor synergies**. For the NSB Corridor this initiative opened up three innovative flagship projects: alternative fuel, road safety and ITS flagship. The **alternative fuel pilot initiative** is an initiative to ensure uninterrupted, smooth travel using an alternative fuels vehicles between Helsinki and Lisbon. The flagship project for **road safety in Baltic States and Poland** was developed based on the need to reduce the number of road accidents and to provide safer car journey on Via Baltica and further on in Poland. The NSB **ITS flagship** project aims to support continuity and interoperability of road safety applications, real time traffic information services and freight management services.

Tiivistelmä

Tämä lopullinen raportti esittää North Sea – Baltic (NSB) TEN-T Core Network Corridor (tutkimus) – tutkimuksen aikana tehdyn työn vaiheet ja tulokset. Työ tehtiin syyskuun 2015 ja joulukuun 2017 välisenä aikana. North Sea – Baltic Corridor - pääväylä koostuu 5 986 kilometristä rautatietä, 4 092 kilometristä maantietä ja 2 186 kilometristä sisämaan vesiväyliä. Se on yksi yhdeksästä TEN-T -verkon pääväylästä ja ainoa, joka sijoittuu Pohjois-Eurooppaan.

Tutkimuksen pääasiallisena tarkoituksena oli arvioida liikennekäytävien infrastruktuurin teknisten säädösten noudattamista perustuen TEN-T:in sääntelyvaatimuksiin ja tunnistaa potentiaalisia hankkeita, jotka edistävät liikennekäytävän kehittämistä ja poistavat pullonkauloja. Lisäksi tarkoituksena oli tunnistettujen hankkeiden klusterointi ja liikennekäytävän ympäristö-, työllisyys- ja talouskasvuvaikutusten arviointi.

Tutkimuksen aikana suoritettu työ perustui haastatteluihin ja keskusteluihin projektin sidosryhmien kanssa, Working Group - tapaamisiin, Corridor – foorumeihin, väylähankkeen projektilistan kehittämiseen ja säännölliseen vuorovaikutukseen DG MOVE – Liikenteen ja liikkumisen pääosaston kanssa. Lisäksi järjestettiin erikoistapaamisia Euroopan investointipankin kanssa.

Tutkimuksen päätulokset on esitetty liikennekäytävän Euroopan koordinaattorin toisessa ja kolmannessa työsuunnitelmassa. Loppuraportti täydentää työsuunnitelmien tietoja ja sisältää yhteenvedon tutkimuksen aikana tehdyistä raporteista.

Yhteenveto

Tämä lopullinen raportti (raportti) esittää **North Sea – Baltic (NSB) TEN-T Core Network Corridor (tutkimus)** – tutkimuksen aikana tehdyn työn vaiheet ja tulokset. Työ tehtiin syyskuun 2015 ja joulukuun 2017 välisenä aikana. North Sea – Baltic Corridor - pääväylä koostuu 5 986 kilometristä rautatietä, 4 092 kilometristä maantietä ja 2 186 kilometristä sisämaan vesiväyliä. Se on yksi yhdeksästä TEN-T -verkon pääväylästä ja ainoa, joka sijoittuu Pohjois-Eurooppaan, sisältäen Hollannin, Belgian, Saksan, Liettuan, Latvian, Viron ja Suomen. Tutkimuksen päätulokset on esitetty North Sea – Baltic TEN-T – verkon Euroopan koordinaattorin toisessa ja kolmannessa työsuunnitelmassa. Tämä raportti täydentää työsuunnitelmissa esitettyjä tietoja.

Tutkimuksen aikana suoritettu työ perustui haastatteluihin ja keskusteluihin projektin sidosryhmien kanssa, Working Group - tapaamisiin, Corridor – foorumeihin, väylähankkeen projektilistan kehittämiseen ja säännölliseen vuorovaikutukseen DG MOVE – Liikenteen ja liikkumisen pääosaston kanssa. Lisäksi järjestettiin erikoistapaamisia Euroopan investointipankin kanssa.

Raportti sisältää yleiskatsauksen kaikista pääasiallisista toimista, jotka suoritettiin tutkimuksen aikana, sisältäen säännöllisen yhteistyön projektin sidosryhmien kanssa. Yksi projektin pääasiallisista hankkeista oli **Corridor - foorumeiden** järjestäminen, sillä niiden avulla tarjottiin mahdollisuus eri sidosryhmien väliseen keskusteluun ja pidettiin sidosryhmät ajan tasalla tutkimuksen tuloksista. Tutkimuksen alusta lähtien on järjestetty yhteensä seitsemän Corridor – foorumia. Lisäksi järjestettiin myös viisi **Working Group** – tapaamista, joiden aiheina olivat alueet, kaupunkialueiden solmukohdat, satamat, rautatieterminaalit, sisämaan vesiväylät ja makroalueet. Osa Working Group – tapaamisista järjestettiin yhteistyössä toisen pääväyläverkoston kanssa. Muut projektiin liittyvät tilaisuudet sisälsivät osallistumisen ja esiintymisen TEN-T – päivillä Rotterdamissa vuonna 2016 ja projektirahoitukseen liittyvän tapaamisen Euroopan investointipankin kanssa.

Raportti sisältää analyysin **NSB – liikennekäytävän liikenneinfrastruktuurien noudattamisesta** jokaisesta väylähankkeen jäsenvaltiosta, noudattaen Euroopan parlamentin asetuksen No 1315/2013 vaatimuksia ja Euroopan neuvoston 11. joulukuuta 2013 annettuja suosituksia koskien Euroopan laajuisen liikenneverkon kehittämistä, ja päätöksen No 661/2010/EU (asetus) kumoamista. Esitetty informaatio vastaa kolmatta työsuunnitelmaa ja tarjoaa analyysin teknisestä säädösten noudattamisesta eri liikennemuodoissa: rautateillä, maanteillä, sisämaan vesiväylillä, sisämaan satamissa, merenkulkuinfrastruktuureissa ja lentokentillä. Teknisen vaatimustenmukaisuuden arvioinnin ohella on suunniteltu ja sovellettu keskeisiä suorituskykymittareita (**Key Performance Indicators** (KPIs)), joilla **arvioidaan ja seurataan liikennekäytävän kehitystä** asetettujen vaatimusten, yhteensopivuuden ja suorituskyvyn suhteen.

Yksi projektin pääasiallisista toimista oli **tunnistaa potentiaalisia hankkeita**, jotka edistävät NSB – käytävän kehittämistä vuoteen 2030 mennessä. Näitä hankkeita oli sekä jäsenvaltiotasolla että rajat ylittävällä tasolla. Hankeluettelo kehitettiin vuosina 2016 ja 2017 perustuen hankkeiden sidosryhmien konsultaatioihin. Heinäkuun 2017 North Sea – Baltic - hankeluettelo sisältää **530 projektia**, joiden **yhteenlaskettu arvo on 96,1 miljardia euroa**.

Hankkeiden suuresta lukumäärästä johtuen **toteutettiin klusterointi**, jotta voitaisiin arvioida paremmin hankkeiden merkitystä NSB – liikennekäytävän painopisteille projektin eri vaiheissa. Hankkeiden klusterointi perustui heinäkuun 2017 lopulliseen hankeluetteloon. Klusteroinnin keskeisenä tavoitteena oli analysoida suunniteltuja liikennekäytäväinvestointeja ennalta määriteltyjen kriteerien perusteella. Samaa yhteistä menetelmää käytettiin kaikissa ydinverkoston liikennekäytävissä. 530 NSB -hankkeen relevanssin arvioinnissa klusteroinnin tulokset olivat seuraavat: 34% hankkeista katsottiin erittäin relevanteiksi (klusteri 1), kun taas 28% hankkeista kuului jäännösluokkaan.

Liikennekäytävien konsultit tekivät **analyysin talouskasvusta ja uusien työpaikkojen luomisesta**, joita NSB – liikennekäytävähankkeiden implementoiminen vauhdittaisi. Analyysi suoritettiin kaikkien liikennekäytävien yhteisesti hyväksymien suuntaviivojen mukaisesti. Tulokset osoittavat, että tunnistettujen hankkeiden implementointi johtaa yhteensä 715 miljardin euron kasvuun bruttokansantuotteessa vuosien 2016 ja 2030 välisenä aikana. Muita hyötyjä ilmenee myös vuoden 2030 jälkeen. Investoinnit hankkeisiin myös parantavat työllisyyttä. Suorat ja epäsuorat työllisyysvaikutukset ovat arviolta yhteensä 2 061 000 henkilötyövuotta vuosien 2016 ja 2030 välisellä ajanjaksolla.

Tutkimuksessa keskityttiin myös ympäristöystävällisten liikennemuotojen **markkinapotentiaaliin**, sillä siinä on käyttämätöntä kapasiteettia. Näistä liikennemuodoista rautatiet ja sisämaan vesiliikenne ovat relevanteimpia NSB – liikennekäytävien kannalta. Liikennekäytävä on melko vanha hanke verrattuna uusiin **innovatiivisiin** hankkeisiin. Silti se sisältää monia innovatiivisia projekteja (lähes 25% kaikista liikennekäytävän projekteista) verrattuna muihin väylähankkeisiin. Liikennekäytävä sisältää muun muassa kuusi radikaalia innovaatioprojektia. Tästä huolimatta, Catch-up (maiden välistä elintasoeroa kurovat) innovaatiot ovat edelleen suurin innovatiivisten projektien kategoria.

Viime vuosien aikana ilmastonmuutoksesta on tullut yksi Euroopan unionin tärkeimmistä toiminta-alueista ja se on Euroopan komission kymmenen tärkeimmän toiminta-alueen joukossa. Tämän takia tutkimus sisälsi myös **osa-alueen koskien ilmastonmuutoksen sietokykyä** ja **ympäristövaikutusten lieventämistä**. EU Reference scenario osoittaa, että NSB liikennekäytävän jäsenvaltioiden malli (väestö, bruttokansantuote, liikenteen päästöt ja energian kysyntä) on samanlainen kuin EU28, sillä liikennekäytäväjäsenmaiden osuus EU-28-toimista on noin 20 - 40%. North Sea – Baltic Corridor – väylän yhteydessä on 52 hanketta, jotka edistävät suoraan hiilidioksidipäästöjen vähentämistä. Näiden hankkeiden kokonaiskustannukset ovat 6,2 miljardia euroa.

”Issues Papers”:ien avulla Euroopan koordinaattorit käynnistivät toimia, joilla pyritään edistämään TEN-T kehityksen uudempia osia ja **vahvistamaan ristikkäisten liikennekäytävien synergiaetuja**. NSB liikennekäytävälle tämä aloite avasi kolme innovatiivista lippulaivaprojektia, jotka ovat: vaihtoehtoinen polttoaine, liikenneturvallisuus ja ITS lippulaivaprojekti. **Vaihtoehtoisen polttoaineen pilottihanke** on aloite, jonka tarkoituksena on varmistaa häiriötön ja sujuva liikenne vaihtoehtoisia polttoaineita käyttävillä ajoneuvoilla Helsingin ja Lissabonin välillä. **Baltian maiden ja Puolan liikenneturvallisuuden lippulaivahanke** kehitettiin vähentämään liikenneonnettomuuksia ja tarjoamaan turvallinen ajomatka Baltian läpi ja edelleen Puolaan. NSB:n **ITS lippulaivaprojektilla** pyritään tukemaan liikenneturvallisuussovellusten jatkuvuutta ja yhteensopivuutta, reaaliaikaisia liikennetietopalveluita ja tavaraliikenteen hallintapalveluita.

LÜHIKokkuvõte

Käesolev lõpparuanne annab ülevaate 2015. aasta septembri ja 2017. aasta detsembri vahel TEN-T Põhjamere-Läänemere põhivõrgukoridori (edaspidi: koridor) kohta läbiviidud uuringu raames tehtud tööst. Põhjamere-Läänemere koridor koosneb 5986 km raudteest, 4092 km maanteedest ja 2186 km siseveeteedest. See on üks üheksast TEN-T põhivõrgukoridorist ning ainuke, mis asub tervenisti Põhja-Euroopas.

Uuring keskendus järgmisele: koridori infrastruktuuri tehniline vastavus TEN-T määruse nõuetele, koridori tehnilise vastavuse edasise parendamise jaoks uute projektide leidmine ja kitsaskohtade kõrvaldamine, kindlakstehtud projektide klasterdamine, koridori arendamise mõju hindamine keskkonnale, töökohtadele ja kasvule.

Uuringu jooksul tehtud töö baseerub projekti sidusrühmadega läbiviidud intervjuudel ja aruteludel, töörühma koosolekutel, koridori foorumitel, koridori projektide nimekirja väljatöötamisel, regulaarsel suhtlusel liikuvuse ja transpordi peadirektoraadiga ning Euroopa Investeerimispangaga peetud erakorralisel koosolekul.

Uuringu peamised tulemused leiavad kajastust koridori Euroopa koordinaatori teises ja kolmandas töökavas. Lõpparuanne täiendab töökavades toodut ning võtab ülevaatlikult kokku erinevates uuringu käigus koostatud aruannetes esitatud informatsiooni.

Kokkuvõte

Käesolev lõpparuanne (edaspidi: aruanne) annab ülevaate 2015. aasta septembri ja 2017. aasta detsembri vahel **TEN-T Põhjamere-Läänemere põhivõrgukoridori kohta läbiviidud uuringu (edaspidi: uuring)** raames tehtud tööst. Põhjamere-Läänemere koridor koosneb 5986 km raudteest, 4092 km maanteedest ja 2186 km siseveeteedest. See on üks üheksast TEN-T põhivõrgukoridorist ning ainuke, mis asub tervenisti Põhja-Euroopas, läbides Hollandit, Belgiat, Saksamaad, Poolat, Leedut, Lätit, Eestit ja Soomet. Uuringu peamised tulemused leiavad kajastust TEN-T programmi Põhjamere-Läänemere põhivõrgukoridori Euroopa koordinaatori teises ja kolmandas töökavas. Käesolev aruanne täiendab töökavades toodud informatsiooni.

Uuringu jooksul tehtud töö baseerub projekti sidusrühmadega läbiviidud intervjuudel ja aruteludel, töörühma koosolekutel, koridori foorumitel, koridori projektide nimekirja väljatöötamisel, regulaarsel suhtlusel liikuvuse ja transpordi peadirektoraadiga ning Euroopa Investeerimispangaga peetud erakorralisel koosolekul.

Aruanne hõlmab ülevaadet uuringu käigus lõpule viidud põhitegevustest, sealhulgas regulaarsest koostööst projekti sidusrühmadega. Üks peamisi projekti tegevusi olid **koridori foorumid**, mis pakkusid võimaluse suhelda projekti erinevate sidusrühmadega ning hoida neid jooksvalt kursis projekti tulemustega. Uuringu algusest alates on toimunud seitse koridori foorumit. Lisaks on toimunud teisigi kohtumisi, sealhulgas viis **töörühma** koosolekut, kus käsitleti järgmiseid teemasid: regioonid, linnatranspordisõlmed, sadamad, raudtee-/maanteeterminalid, siseveeteed ja makroregioonid. Osad töörühmad organiseeriti koostöös teiste põhivõrgukoridoridega. Ülejäänud üritused hõlmasid osalemist ja esinemist 2016. aastal toimunud TEN-T päevadel Rotterdamis ning kohtumist projekti rahastamise osas Euroopa Investeerimispangaga.

Aruanne sisaldab analüüsi sellest, **kas Põhjamere-Läänemere koridori liikmesriikide transpordi infrastruktuur vastab** TEN-T määruses – Euroopa Parlamendi ja nõukogu 11. detsembri 2013. aasta määrus (EL) nr 1315/2013 üleeuroopalise transpordivõrgu arendamist käsitlevate liidu suuniste kohta ja millega tunnistatakse kehtetuks otsus nr 661/2010/EL – sätestatud nõuetele. Esitatud informatsioon vastab kolmandale töökavale ning annab tehnilise vastavuse analüüsi iga järgneva transpordiliigi kohta: raudteed, maanteed, siseveeteed, siseveesadamad, meresadamad ja meretaristu ning lennujaamad. Lisaks tehnilise vastavuse hindamisele **kavandati ja rakendati võtmetähtsusega tulemuslikkuse põhinäitajaid, et hinnata ja jälgida koridori arengut**, lähtudes määruse nõuete täitmisest, koostalitusvõimest ja tegevustulemustest.

Üheks peamiseks projekti tegevuseks oli tuvastada sellised ühe või mitme liikmesriigi territooriumit hõlmavad projektid (piiriülesed projektid), mis aitaksid panustada Põhjamere-Läänemere põhivõrgukoridori edasisse arengusse kuni aastani 2030. Projektide nimekiri koostati 2016. ja 2017. aastal projekti sidusrühmadega läbiviidud konsultatsioonide alusel. 2017. aasta juuli seisuga sisaldas Põhjamere-Läänemere koridori projektide nimekiri **530 projekti**, mille **koguinvesteeringu väärtuseks on 96,1 miljardit eurot**.

Projektide suure hulga tõttu viidi läbi **projektide klasterdamine**, et oleks võimalik hinnata paremini projektide asjakohasust, lähtudes Põhjamere-Läänemere koridori prioriteetidest ja projekti küpsusest. Klasterdamisel võeti aluseks 2017. aasta juuliks kokku kogutud projektide lõplik nimekiri. Klasterdamise peamine eesmärk oli analüüsida eelnevalt kindlaks määratud kriteeriumite alusel koridori planeeritud investeeringuid. Kõigi põhivõrgukoridoride puhul kasutati ühist metoodikat. Hinnates projektide asjakohasust moodustatud klastrite alusel, selgus, et 530-st Põhjamere-Läänemere koridori projektist on 34% väga asjakohased (klaster 1), samas kui 28% projektidest on marginaalse tähtsusega.

Uuringu raames **analüüsiti** ka Põhjamere-Läänemere koridori projektide rakendamisest tulenevat **võimalikku majanduskasvu ja uute töökohtade loomist**. Analüüs viidi läbi kõikide koridoride poolt heakskiidetud juhiste alusel. Tulemused näitavad, et projektide ellu rakendamine kasvataks ajavahemikus 2016–2030 SKP-d 715 miljardi euro võrra. Edasine kasu ilmneks ka peale 2030. aastat. Investeeringud antud projektidesse stimuleeriksid ka tööhõivet. Projekti otsesed, kaudsed ja kaasnevad mõjud tekitaksid aastatel 2016–2030 juurde 2 061 000 tööaastat.

Uuringus keskenduti alakasutatud keskkonnasõbralike transpordiliikide **turupotentsiaalile**. Sealjuures peeti Põhjamere-Läänemere koridori puhul kõige olulisemaks raudteed ja siseveeteid. Koridor on **innovatsiooniprojektide** poolest teiste koridoridega võrreldes üsna kaugele jõudnud, omades arvukalt uuenduslikke projekte (peaaegu 25% kõikidest projektidest), sealhulgas 6 radikaalset innovatsiooni projekti. Sellegipoolest moodustavad suurima osa innovatsiooniprojektidest projektid, mis on mõeldud teistele koridoridele järele jõudmiseks.

Viimastel aastatel on saanud kliimamuutus üheks Euroopa Liidu peamiseks töövaldkonnaks ning kuulub ka Euroopa Komisjoni 10 prioriteedi sekka. Seepärast käsitleti uuringus ka **kliimamuutustega toimetulemist ja negatiivsete keskkonnamõjude leevendamist**. Põhjamere-Läänemere koridori liikmesriikide üldine struktuur on siin võrdlemisi sarnane EL 28-ga. Koridori kuuluvate liikmesriikide tegevused moodustavad ligikaudu 20–40% kogu tegevustest. Põhjamere-Läänemere koridoris on 52 projekti, mis panustavad otseselt CO_2-heite vähendamisse. Nende projektide kogumaksumus on 6,2 miljardit eurot.

Teemadokumentide koostamisega alustasid Euroopa koordinaatorid tegevust, mille eesmärgiks on üleeuroopalise transpordivõrgu (TEN-T) uuemate komponentide arendamise edendamine ja **koridoridevahelise sünergia tugevdamine**. See algatus avas Põhjamere-Läänemere koridori jaoks kolm innovatiivset juhtprojekti: alternatiivsed kütused, liiklusohutus ja intelligentsed transpordisüsteemid. **Alternatiivkütuse pilootprojekt** on initsiatiiv selleks, et tagada alternatiivkütuste peal töötavate sõidukite katkematu ja sujuv liikumine Helsingi ja Lissaboni vahel. **Balti riikide ja Poola liiklusohutuse** pilootprojekt töötati välja vajadusest vähendada liiklusõnnetuste arvu ning tagada turvalisem autosõit Via Baltical ja Poolas. Põhjamere-Läänemere koridori **intelligentse transpordisüsteemi** pilootprojekti eesmärk on toetada liiklusohutusrakenduste, reaalajas liiklusteabe edastamise ja kaubaveo korraldamise teenuste haldamise järjepidevust ja koostalitusvõimet.

Īss izklāsts

Šis gala ziņojums sniedz ieskatu darbā, kas veikts Ziemeļjūras – Baltijas jūras TEN-T pamattīkla koridora (turpmāk "Koridors") pētījuma (turpmāk "Pētījums") laikā starp 2015.gada septembri un 2017.gada decembri. Ziemeļjūras – Baltijas jūras koridors ietver sevī 5,986 km dzelzceļu, 4,092 km autoceļu un 2,186 km iekšējo ūdensceļu, un tas ir viens no deviņiem TEN-T pamattīkla koridoriem un vienīgais, kas atrodas tikai Eiropas ziemeļos.

Galvenā uzmanība pētījuma laikā tika veltīta: Koridora infrastruktūras tehniskās atbilstības saskaņā ar TEN-T regulas prasībām novērtējumam; projektu noteikšana turpmākai Koridora uzlabošanai attiecībā uz tehnisko atbilstību un šķēršļu novēršanu; noteiktu projektu segmentēšana; Koridora attīstības ietekmes uz vidi, nodarbinātības un izaugsmes novērtējumam.

Pētījuma laikā paveiktais darbs ir balstīts uz intervijām un diskusijām ar projektā ieinteresētajām pusēm, darba grupu sanāksmēm, Koridora forumu sanāksmēm, Koridora projektu sarakstu izstrādi un regulāru, savstarpēji efektīvu sadarbību ar Eiropas Komisijas Mobilitātes un transporta ģenerāldirektorātu (EK DG MOVE), kā arī uz iegūto informāciju īpašās tikšanās laikā ar Eiropas Investīciju banku (EIB).

Galvenie Pētījuma rezultāti ir atspoguļoti Koridora Eiropas koordinatora Otrajā un Trešajā darba plānā. Gala ziņojums papildina darba plānos iekļautos datus un sniedz kopsavilkumu par informāciju, kas ir iekļauta dažādos Pētījuma laikā sagatavotos ziņojumos.

Kopsavilkums

Šis gala ziņojums sniedz ieskatu darbā, kas veikts **Ziemeļjūras – Baltijas jūras TEN-T pamattīkla koridora (turpmāk "Koridors") pētījuma (turpmāk "Pētījums")** laikā starp 2015.gada septembri un 2017.gada decembri. Ziemeļjūras – Baltijas jūras koridors ietver sevī 5,986 km dzelzceļu, 4,092 km autoceļu un 2,186 km iekšējo ūdensceļu, un tas ir viens no deviņiem TEN-T pamattīkla koridoriem un vienīgais, kas atrodas tikai Eiropas ziemeļos, kas iekļauj sevī Nīderlandi, Beļģiju, Vāciju, Poliju, Lietuvu, Latviju, Igauniju un Somiju. Galvenie Pētījuma rezultāti ir atspoguļoti Ziemeļjūras – Baltijas jūras TEN-T pamattīkla koridora Eiropas koordinatora Otrajā un Trešajā darba plānā. Šis ziņojums papildina darba plānos iekļauto informāciju.

Pētījuma laikā paveiktais darbs ir balstīts uz intervijām un diskusijām ar projektā ieinteresētajām pusēm, darba grupu sanāksmēm, Koridora forumu sanāksmēm, Koridora projektu saraksta izstrādi un regulāru, savstarpēji efektīvu sadarbību ar Eiropas Komisijas Mobilitātes un transporta ģenerāldirektorātu (DG MOVE), kā arī uz iegūto informāciju īpašās tikšanās laikā ar Eiropas Investīciju banku (turpmāk "EIB").

Ziņojumā var atrast visu Pētījumā laikā paveikto galveno aktivitāšu pārskatu, kas veiktas regulāri sadarbojoties ar projektā iesaistītajām pusēm. Viena no galvenajām projekta aktivitātēm bija **Koridora foruma sanāksmes**, lai nodrošinātu savstarpēju mijiedarbību starp dažādām projektā ieinteresētajām pusēm un iepazīstinātu tās ar Pētījuma rezultātiem. Kopš Pētījuma sākuma ir notikušas septiņas Koridora foruma sanāksmes. Ir notikušas arī citas papildu tikšanās, tostarp piecas **darba grupu sanāksmes** par reģioniem, pilsētu transporta mezgliem, ostām, dzelzceļa transporta termināļiem, iekšzemes ūdensceļiem un makro-reģioniem. Vairākas darba grupas tika organizētas sadarbībā ar citiem TEN-T pamattīkla koridoriem. Citi pasākumi ietvēra dalību un prezentāciju TEN-T dienās Roterdamā 2016.gadā un tikšanos ar EIB par projektu finansēšanu.

Ziņojumā ir iekļauta **Koridora transporta infrastruktūras analīze** par katras Koridora dalībvalsts tehnisko atbilstību prasībām, kas ir iekļautas Eiropas Parlamenta un Padomes 2013.gada 11.decembra Regulā (ES) Nr. 1315/2013 par Savienības pamatnostādnēm Eiropas transporta tīkla attīstībai, atceļoti lēmumu Nr. 661/2010/ES (Regula). Atspoguļotā informācija atbilst Trešajam darba plānam un parāda tehniskās atbilstības analīzi pa transporta veidiem: dzelzceļš, autoceļš, iekšzemes ūdensceļi, iekšzemes ostas, jūras ostas un jūras infrastruktūras, un lidostas. Papildu tehniskās atbilstības novērtējumam, ir izstrādāti un piemēroti **galvenie darbības rādītāji**, lai **novērtētu un uzraudzītu Koridora attīstību** atbilstoši regulas prasībām, sadarbspējai un veiktspējai.

Viena no projekta galvenajām aktivitātēm bija **iespējamo projektu noteikšana** dalībvalstu līmenī, kā arī pārrobežu projektu noteikšana, kas veicinātu Koridora turpmāku attīstību līdz 2030.gadam. Projektu saraksts tika attīstīts 2016. un 2017.gadā, ņemot vērā projektā ieinteresēto pušu konsultācijas. Koridora projektu sarakstā 2017.gada jūlijā bija **530 projektu ar investīciju kopsummu 96,1 miljarda eiro apmērā.**

Ņemot vērā lielo noteikto projektu skaitu, **tika veikta projektu segmentēšana**, lai vieglāk izvērtētu projektu atbilstību Koridora prioritātēm un projektu brieduma pakāpei. Projektu grupēšana tika balstīta uz gala projekta sarakstu 2017.gada jūlijā. Grupēšanas galvenais mērķis bija analizēt plānotās Koridora investīcijas, ņemot vērā iepriekš noteiktus kritērijus. Kopīga metodoloģija tika piemērota visiem deviņiem pamattīkla Koridoriem. Ņemot vērā 530 Koridora projektu atbilstības novērtēšanas rezultātus, 34% projektu tiek uzskatīti par īpaši būtiskiem (1.segments), savukārt 28 % projektu iekrīt atlikušajā kategorijā.

Koridora konsultanti veica **izaugsmes un radīto darba vietu analīzi**, ko varētu veicināt Koridora projektu īstenošana. Analīze tika veikta, ņemot vērā vispārpieņemtās pamatnostādnes, ko kopīgi lieto visi koridori. Rezultāti parāda, ka noteikto projektu īstenošana radīs IKP pieaugumu 715 miljarda eiro apmērā laika posmā no 2016. līdz 2030.gadam. Papildu ieguvumi būs arī pēc 2030.gada. Investīcijas projektos veicinās arī papildu nodarbinātību. Projekta tiešās, netiešās un izraisītās darba sekas būs 2 061 000 papildu darba gadu, kas tiks izveidoti laika posmā no 2016. līdz 2030.gadam.

Pētījuma laikā uzmanība tika pievērsta arī videi draudzīgo transporta veidu ar nepietiekami izmantotu jaudu **tirgus potenciālam**, dzelzceļa un iekšzemes ūdensceļu transporta veidiem kā vissvarīgākajiem Koridorā. Salīdzinot ar citiem pamattīkla koridoriem un attiecībā uz **inovāciju projektu attīstību** - Koridors ir pilnībā nobriedis un tajā ir daudz inovatīvo projektu (25% no visiem projektiem), ieskaitot sešus radikālus inovatīvus projektus. Neskatoties uz to, izlīdzinošie jeb "*catch-up*" inovāciju projekti joprojām ir lielākā novatorisko projektu kategorija.

Pēdējo gadu laikā klimata izmaiņas ir kļuvušas par vienu no galvenajām Eiropas Savienības darbības jomām, kā arī ir viena no pašreizējās Eiropas Komisijas desmit darba prioritātēm, tāpēc Pētījumā tika iekļauta **daļa par klimata izmaiņu noturību** un **klimata izmaiņu ietekmes mazināšanu** uz vidi. Šis ES prioritātes scenārijs uzskatāmi parāda, ka kopējais Koridora dalībvalstu modelis (ņemot vērā iedzīvotāju skaitu, IKP, transporta radīto emisiju daudzumu un enerģijas pieprasījumu) ir līdzīgs kopējam ES-28 skatam, jo Koridora dalībvalstis uzskaita apmēram 20-40% no kopējās ES-28 darbības. Pašreiz Koridora garumā ir 52 projekti, kas tieši veicina dekarbonizāciju. Šo projektu kopējās izmaksas ir 6,2 miljardu eiro.

Ar analītisko dokumentu "*Issues Papers*" palīdzību Eiropas Koordinatori uzsāka mērķtiecīgu darbību, lai sekmētu jaunākos TEN-T attīstības elementus un **stiprinātu atbilstošas koridoru sinerģijas.** Koridorā šī iniciatīva atvēra iespēju trīs inovatīviem vadošās lomas projektiem: alternatīvās degvielas, ceļu satiksmes drošības un ITS vadošo lomās projekts. **Alternatīvās degvielas izmēģinājuma iniciatīva** ir mēģinājums nodrošināt nepārtrauktu, mierīgu ceļošanu starp Helsinkiem un Lisabonu, izmantojot alternatīvo degvielu. **Ceļu satiksmes drošība Baltijas valstīs un Polijā** vadošās lomas projekts tika izstrādāts, pamatojoties uz nepieciešamību samazināt ceļu satiksmes negadījumu skaitu un nodrošināt drošāku ceļošanu pa autoceļu *Via Baltica* un tālāk Polijā. Koridora **ITS vadošās lomas projekta** mērķis ir atbalstīt ceļu satiksmes drošības lietojumu nepārtrauktību un sadarbspēju, nodrošinot reāllaika satiksmes informācijas pakalpojumus un kravu pārvaldības pakalpojumus.

Reziumė

Ši galutinė ataskaita apibendrina darbą, atliktą Šiaurės jūros – Baltijos TEN-T pagrindinio tinklo koridoriaus (toliau - Koridorius) tyrimo (toliau – Tyrimas) metu, vykusio nuo 2015 metų rugsėjo iki 2017 metų gruodžio mėnesio. Šiaurės jūros – Baltijos Koridorius susideda iš 5,986 kilometrų geležinkelio linijų, 4,092 kilometrų kelių ir 2,186 kilometrų vidinių vandens kelių. Jis yra vienas iš devynių TEN-T pagrindinio tinklo koridorių ir yra vienintelis išskirtinai esantis tik Šiaurės Europoje.

Pagrindinis dėmesys Tyrimo metu buvo skiriamas: techninių Koridoriaus infrastruktūros atitikčių su TEN-T reguliaciniais reikalavimais nustatymui; projektų, tolesniam Koridoriaus tobulinimui, atsižvelgiant į technines atitiktis ir šalinant kliūtis, nustatymui; nustatytų projektų grupavimui; Koridoriaus vystymo įtakos aplinkai, darbo vietoms ir augimui įvertinimui.

Tyrimo metu atliktas darbas buvo pagrįstas interviu ir diskusijomis kartu su projektų suinteresuotomis šalimis, darbo grupių susitikimais, Koridoriaus Forumais, Koridoriaus projektų sąrašo vystymu ir reguliariu bendravimu su DG MOVE, taip pat ir specialiais susitikimais su EIB.

Pagrindiniai Tyrimo rezultatai yra vaizduojami 2-ame ir 3-ame Europos koordinatoriaus Koridoriui darbo plane. Galutinė ataskaita pagrindžia duomenis darbo planuose ir pateikia informacijos, iš skirtingų ataskaitų paruoštų tyrimo metų, santrauką.

Santrauka

Ši galutinė ataskaita apibendrina, atliktos **Šiaurės jūros – Baltijos TEN-T pagrindinio tinklo koridoriaus (toliau - Koridorius) tyrimo (toliau – Tyrimas)** studijos rezultatą, vykusios nuo 2015 metų rugsėjo iki 2017 metų gruodžio mėnesio. Šiaurės jūros – Baltijos Koridorius susideda iš 5,986 kilometrų geležinkelio linijų, 4,092 kilometrų kelių ir 2,186 kilometrų vidinių vandens kelių. Jis yra vienas iš devynių TEN-T pagrindinio tinklo Koridorių ir yra išskirtinai vienintelis esantis tik Šiaurės Europoje, apimantis Nyderlandus, Belgiją, Vokietiją, Lenkiją, Lietuvą, Latviją, Estiją ir Suomiją. Pagrindiniai Tyrimo rezultatai yra vaizduojami 2-ame ir 3-ame, Europos koordinatoriaus Koridoriui, darbo plane. Galutinė ataskaita pagrindžia duomenis, esančius darbo planuose.

Tyrimo metu atliktas darbas buvo pagrįstas interviu ir diskusijomis kartu su projektų suinteresuotomis šalimis, darbo grupių susitikimais, Koridoriaus Forumais, Koridoriaus projektų sąrašo vystymu ir reguliariu bendravimu su DG MOVE, taip pat ir specialiais susitikimais su EIB.

Ataskaitoje pateikiama visų pagrindinių veiklų, atliktų Tyrimo metu, apžvalga, įskaitant nuolatinį bendradarbiavimą su projekto suinteresuotomis šalimis. Viena iš pagrindinių projekto veiklų buvo **Koridoriaus Forumai**, skirti sukurti sąveikumą tarp skirtingų projektų suinteresuotų šalių ir supažindinti juos su naujais Tyrimo rezultatais. Nuo Tyrimo pradžios buvo suorganizuoti septyni Koridoriaus Forumai. Taip pat buvo organizuojami ir kiti susitikimai, įskaitant penkis **Darbo Grupių** susitikimus regionuose, pagrindiniuose miestuose, uostose, geležinkelio terminaluose, vidinių vandenų tinkluose ir makro regionuose. Dalis darbo grupių buvo organizuojamos bendradarbiaujant su kitais Pagrindinio Tinklo Koridoriais. Kiti renginiai apėmė dalyvavimą ir pristatymą „TEN-T Days 2016“, vykusį Roterdame ir susitikimą su EIB dėl projekto finansavimo.

Ataskaitoje pateikiama **NSB Koridoriaus transporto infrastruktūros atitikties** analizė, kiekvienai Koridoriaus narei, kartu su reikalavimais, esančiais Europos Parlamento Reglamente (EU) Nr. 1315/2013, tarybos sprendimu įsigaliojusiame nuo 2013m. gruodžio 11 dienos, dėl Sąjungos tarp-europinio transporto tinklo vystymo ir anuliuojančiame sprendimą Nr. 661/2010/EU (reglamentą). Pateikta informacija atitinka 3-ajį Darbo Planą ir pateikia techninės atitikties analizę skirtingiems transporto metodams: geležinkeliams, keliams, vidinių vandenų keliams, vidiniams uostams, jūros uostams taip pat jūrinei infrastruktūrai ir oro uostams. Techninės atitikties nustatymui papildomai buvo **sukurti ir pritaikyti Pagrindiniai Veiklos Rodikliai**, siekiant **nustatyti ir stebėti Koridoriaus vystymosi procesą**, esant atitikčiai su Reglamento reikalavimais, suderinamumu ir našumu.

Viena pagrindinių projekto veiklų buvo **potencialių projektų nustatymo veikla** kiekvienos šalies (narės) lygmenyje, taip pat tarpvalstybinio masto projektų nustatymo veikla, tam, kad prisidėti prie tolimesnio NSB Koridoriaus vystymo iki 2030 metų. Projektų sąrašas buvo sudarytas 2016 ir 2017 metais, atsižvelgiant į konsultacijas bendradarbiaujant su suinteresuotomis šalimis. Šiaurės jūros – Baltijos projektų sąrašas, 2017 metų liepos mėnesį sudarė **530 projektų** su **bendra 96,1 milijardo investicijų verte**.

Atsižvelgiant į didelį nustatytų projektų kiekį, norint tinkamai įvertinti projektų aktualumą NSB Koridoriaus prioritetams ir projekto brandumui, **nustatyti projektai buvo grupuojami**. Šis grupavimas buvo pagrįstas galutiniu projektų sąrašu sudarytu 2017 metų liepos mėnesį. Pagrindinis grupavimo tikslas buvo, atsižvelgiant į iš anksto nustatytus kriterijus, išanalizuoti planuojamas Koridoriaus investicijas. Visiems pagrindiniams tinklo Koridoriams buvo taikoma bendra metodologija. Atsižvelgiant į projektų grupavimo rezultatus, iš 530 projektų, net 34% projektų buvo išskirti kaip labai aktualūs (1 grupė), 28% projektų pateko į likusią kategoriją.

Buvo atlikta **augimo ir naujai sukurtų darbo vietų analizė**, kurios būtų sukurtos įvykdžius NSB Koridoriaus projektus. Ši analizė buvo atlikta remiantis bendrai priimtomis nuostatomis, kurios taikomos visiems Koridoriams. Analizės rezultatai parodo, kad nustatytų projektų įvykdymas padidintų BVP 715 milijardų eurų, laikotarpiu nuo 2016 iki 2030 metų. Tolesnės naudos taip pat būtų jaučiamos ir po 2030 metų. Investicijos į projektus taip pat prisidėtų prie darbo lygio didėjimo. Projektų sukelti tiesioginiai ir netiesioginiai veiksniai sukurtų 2,061,000 papildomų darbo metų, laikotarpiu nuo 20160 iki 2030 metų.

Tyrimas buvo taip pat sutelktas ir į **rinkos potencialą** aplinkai nekenksmingiems transporto metodams, kurių pajėgumas nėra pakankamai išnaudojamas. Labiausiai NSB Koridoriui aktualūs metodai – geležinkeliai ir vidaus vandenų keliai. Koridorius yra gana brandus inovacinių projektų atžvilgiu ir turi daug novatoriškų projektų (beveik 25% visų projektų), palyginti su kitais Koridoriais, įskaitant 6 radikalius inovacijų projektus. Nepaisant to, patobulinimų inovaciniai projektai išlieka didžiausia inovacinių projektų kategorija.

Pastaraisiais metais, klimato kaita tapo viena iš pagrindinių Europos Sąjungos darbo sričių ir viena iš 10 Europos Komisijos prioritetinių sričių, todėl šis Tyrimas įtraukė **Klimato kaitos atsparumo** dalį, taip pat ir klimato kaitos poveikio mažinimą. ES atskaitos scenarijus nurodo, kad bendras NBS šalių modelis (populiacija, BVP, transporto emisijos ir energijos suvartojimas) yra panašus į ES-28, o koridorių valstybės narės sudaro apie 20-40% visos veiklos dalies. Iš viso yra 52 Šiaurės Jūros – Baltijos Koridoriaus projektai, tiesiogiai susiję su dekarbonizacija. Bendra projektų kaina yra 6.2 milijardo EUR.

Europos reikalų koordinatoriai siekdami paskatinti TEN-T plėtrą ir sustiprinti bendradarbiavimą tarp Koridoriaus narių, nurodė atitinkamas veiklas "Problemų dokumentuose". Šios iniciatyvos dėka NBS koridoriuje buvo pradėti net trys novatoriški projektai: alternatyvaus kuro, kelių eismo saugumo ir ITS. Alternatyviojo kuro bandomoji iniciatyva skirta užtikrinanti nepertraukiamą, sklandų transportavimą alternatyvaus kuro transporto priemonėmis tarp Helsinkio ir Lisabonos. Siekiant sumažinti nelaimingų atsitikimų kelyje skaičių **Baltijos šalyse ir Lenkijoje buvo paruoštas pavyzdinis projektas**, kuriuo buvo siekiama sukurti kuo saugesnes keliones keliu Via Baltica, toliau besitęsiančiu į Lenkiją. NSB Koridoriaus Intelektinių Transporto Sistemų (ITS) pavyzdinis projektas yra skirtas kelių eismo saugumo programų, realaus laiko eismo informacijos paslaugų ir krovinių valdymo paslaugų tęstinumui ir interaktyvumo palaikymui.

Abstrakt

W niniejszym Raporcie Końcowym zaprezentowano wyniki prac wykonanych podczas studium (Studium) Korytarza Morze Północne – Bałtyk (Korytarz NSB) Sieci Bazowej TEN-T przeprowadzonej w okresie od września 2015 roku do grudnia 2017 roku. Korytarz Morze Północne – Bałtyk obejmuje 5 986 km linii kolejowych, 4 092 km dróg oraz 2 186 km śródlądowych dróg wodnych. Jest to jeden z dziewięciu Korytarzy Sieci Bazowej TEN-T, przy czym jako jedyny obejmuje wyłącznie północną część Europy.

Głównym celem Studium było: ocena zgodności technicznej infrastruktury Korytarza NSB z wymaganiami Rozporządzenia TEN-T; identyfikacja projektów dla dalszej poprawy sieci TEN-T w kontekście zgodności technicznej oraz likwidacji jej „wąskich gardeł"; grupowanie zidentyfikowanych projektów; ocena wpływu rozwoju Korytarza na środowisko, miejsca pracy oraz wzrost gospodarczy.

Prace wykonane w trakcie Studium były oparte na rozmowach i dyskusjach z interesariuszami projektu, spotkaniach Grupy Roboczej, Forum Korytarza, rozwoju listy projektów Korytarza oraz bieżącym kontakcie z DG MOVE, jak również spotkaniem z Europejskim Bankiem Inwestycyjnym (EBI).

Zasadnicze wyniki Studium zostały odzwierciedlone w Drugim i Trzecim Planie Pracy Europejskiego Koordynatora ds. Korytarza. Raport stanowi dopełnienie danych zawartych w Planie Pracy oraz zawiera podsumowanie informacji zawartych w poszczególnych raportach przygotowanych podczas Studium.

Streszczenie

W niniejszym Raporcie Końcowym (Raport) zaprezentowano wyniki prac wykonanych podczas studium **Korytarza Morze Północne – Bałtyk (Korytarz NSB) Sieci Bazowej TEN-T (Studium)** przeprowadzonej w okresie od września 2015 roku do grudnia 2017 roku. Korytarz Morze Północne – Bałtyk obejmuje 5 986 km linii kolejowych, 4 092 km dróg oraz 2 186 km śródlądowych dróg wodnych. Jest to jeden z dziewięciu Korytarzy Sieci Bazowej TEN-T, przy czym jako jedyny obejmuje wyłącznie północną część Europy, w tym Holandię, Belgię, Niemcy, Polskę, Litwę, Łotwę, Estonię i Finlandię. Najważniejsze wyniki analizy znajdują się w Drugim oraz Trzecim Planie Pracy Europejskiego Koordynatora Korytarza Sieci Bazowej TEN-T Morze Północne – Bałtyk. Niniejszy raport dopełnia informacje zawarte w Planach Pracy.

Prace wykonane w trakcie Studium były oparte na rozmowach i dyskusjach z interesariuszami projektu, spotkaniach Grupy Roboczej, Forum Korytarza, rozwoju listy projektów Korytarza oraz bieżącym kontakcie z DG MOVE, jak również spotkaniem z Europejskim Bankiem Inwestycyjnym (EBI).

Raport zawiera przegląd wszystkich głównych działań wykonanych podczas Studium, w tym systematyczną współpracę z interesariuszami projektu. Jednym z głównych elementów projektu były spotkania Forum Korytarza, w celu umożliwienia interakcji z różnymi interesariuszami projektu, a także przedstawienia im aktualnych informacji o wynikach Studium. Od początku Studium odbyło się siedem spotkań Forum Korytarza. Ponadto odbyły się dodatkowe zebrania, w tym pięć zebrań **Grupy Roboczej** na temat regionów, węzłów miejskich, portów, terminali kolejowo-drogowych, śródlądowych dróg wodnych oraz makroregionów. Część posiedzeń Grup Roboczych zostało zorganizowane we współpracy z innymi Korytarzami Sieci Bazowej. Inne wydarzenia dotyczyły uczestnictwa oraz prezentacji na konferencji TEN-T Days 2016 w Rotterdamie, a także spotkania z EBI na temat finansowania projektów.

Niniejszy Raport zawiera **analizę zgodności Korytarza NSB z wymogami dla infrastruktury transportowej** w poszczególnych Krajach Członkowskich Korytarza, które są zawarte w Rozporządzeniu Parlamentu Europejskiego i Rady (UE) nr 1315/2013 z dnia 11 grudnia 2013 r. w sprawie unijnych wytycznych dotyczących rozwoju transeuropejskiej sieci transportowej i uchylające decyzję nr 661/2010/UE (Rozporządzenie). Przedstawione informacje odnoszą się do Trzeciego Planu Pracy oraz przedstawiają analizy technicznej zgodności z wymogami dla poszczególnych środków transportu: kolei, dróg, śródlądowych dróg wodnych, portów śródlądowych, portów morskich oraz infrastruktury morskiej i lotnisk. Oprócz analizy spełnienia wymogów technicznych **opracowano i zastosowano kluczowe wskaźniki efektywności** (*Key Performance Indicators*, **KPI**) celem **oceny oraz monitorowania rozwoju Korytarza** w zakresie zgodności z wymaganiami Rozporządzenia, interoperacyjności oraz efektywności.

Jednym z głównych zadań Studium była **identyfikacja potencjalnych projektów** na poziomie Państw Członkowskich oraz projektów transgranicznych, które przyczynią się do dalszego rozwoju Korytarza Morze Północne – Bałtyk do 2030 roku. Lista projektów została opracowana w latach 2016 – 2017 na podstawie konsultacji z interesariuszami Studium. Lista projektów Korytarza Morze Północne – Bałtyk według stanu na lipiec 2017 roku zawiera **530 pozycji** o **łącznej wartości inwestycji 96,1 mld EUR.**

Wychodząc od znacznej liczby zidentyfikowanych projektów, **przeprowadzono ich grupowanie** aby lepiej ocenić ich adekwatność do priorytetów Korytarza NSB, jak również ich dojrzałość. Grupowanie projektów przeprowadzono na podstawie

ostatecznej listy projektów z lipca 2017 roku. Główną zasadą grupowania była analiza zaplanowanych inwestycji związanych z Korytarzem oparta na określonych uprzednio kryteriach. Zastosowano wspólną metodologię do wszystkich Korytarzy Sieci Bazowej. Zgodnie z wynikami grupowania według oceny adekwatności, na 530 projektów, 34% uznano za bardzo istotne (Grupa 1), zaś 28% projektów uznano za mnie znaczące.

Zespół konsultantów Korytarza przeprowadził **analizę wzrostu gospodarczego oraz tworzenia miejsc pracy**, które byłyby stymulowane wdrożeniem projektów w Korytarzu NSB. Analiza została przeprowadzona na podstawie wytycznych zastosowanych do wszystkich korytarzy. Wyniki wskazują, że realizacja zidentyfikowanych projektów przyczyni się do wzrostu PKB w latach 2016-2030 o łącznej wartości 715 mld EUR. Dodatkowe korzyści będą występować również po 2030 roku. Inwestycje w projekty będą również stymulować rynek pracy. Pośrednie, bezpośrednie i indukowane efekty projektów przyczynią się do wykreowania dodatkowych 2 061 000 roboczo-lat w latach 2016-2030.

Przedmiotem Studium był również **potencjał rynkowy** dla przyjaznych środowisku środków transportu, które nie wykorzystują swoich możliwości. Dla Korytarza Morze Północne – Bałtyk szczególnie dotyczy to transportu kolejowego oraz wodnego śródlądowego. W stosunku do innych korytarzy Korytarz NSB cechuje dojrzałość w zakresie **projektów innowacyjnych** (stanowią one 25% wszystkich projektów). Obejmuje sześć bardzo innowacyjnych projektów. Niemniej, projekty „nadrabiające zaległości" w innowacji stanowią największy udział projektów innowacyjnych.

W ciągu ostatnich lat zmiany klimatyczne stały się jednym z kluczowych obszarów działań Unii Europejskiej, a także stały się jednym z dziesięciu priorytetów dla Komisji Europejskiej. Dlatego Studium zawiera **analizę odporności na zmiany klimatu**, a także analizę **łagodzenia efektów zmian klimatycznych dla środowiska**. Scenariusz Referencyjny UE wskazuje, że trendy Państw Członkowskich Korytarza NSB (populacja, PKB, emisje w transporcie i zapotrzebowanie na energię) są podobne do tych w całej UE28. Państwa Członkowskie Korytarza NSB odpowiadają za około 20-40% udziału w działalności UE28 w tych dziedzinach. Korytarz NSB obejmuje 52 projekty przyczyniające się bezpośrednio do dekarbonizacji. Całkowity koszt tych projektów wynosi 6,2 mld EUR.

Za pomocą Dokumentów o Zagadnieniach (*Issues Papers*) Europejscy Koordynatorzy rozpoczęli działania zmierzające do rozwinięcia nowych komponentów rozwoju TEN-T oraz do **wzmocnienia efektów synergii między korytarzami**. W Korytarzu NSB zidentyfikowano trzy innowacyjne projekty wiodące: paliwa alternatywne, bezpieczeństwo drogowe, oraz ITS. **Inicjatywa pilotażowa związana z paliwem alternatywnym** ma zapewnić nieprzerwaną, płynną podróż przy użyciu pojazdów napędzanych paliwem alternatywnym pomiędzy Helsinkami i Lizboną. **Projekt wiodący bezpieczeństwa drogowego w krajach bałtyckich i w Polsce** został opracowany w związku z potrzebą zmniejszenia liczby wypadków drogowych oraz w celu zapewnienia bezpiecznej podróży drogowej na trasie Via Baltica i dalej w Polsce. **Projekt ITS** ma na celu wsparcie ciągłości i interoperacyjności aplikacji związanych z bezpieczeństwem ruchu drogowego, usług informacyjnych w czasie rzeczywistym dotyczących ruchu drogowego, a także usług związanych z zarządzaniem ruchem i przewozami towarowymi.

Kurzbeschreibung

Der Abschlussbericht erläutert die Ergebnisse der Arbeiten, die im Rahmen der Untersuchung des TEN-V-Kernnetzkorridors Nordsee - Ostsee zwischen September 2015 und Dezember 2017 durchgeführt wurden. Der Nordsee-Ostsee-Korridor umfasst 5.986 km Schienenwege, 4.092 Straßenkilometer und 2.186 km Binnenwasserstraßen. Er ist einer von neun TEN-V-Kernnetzkorridoren und der einzige Korridor, der ausschließlich in Nordeuropa liegt.

Die Studie hat folgende Schwerpunkte: Die Bewertung der technischen Konformität der Korridorinfrastruktur mit den Anforderungen aus der TEN-V-Verordnung; die Identifizierung von Projekten zur weiteren Verbesserung des Korridors im Hinblick auf dessen technische Konformität und der Beseitigung von Engpässen; die Clusterbildung der identifizierten Projekte; die Bewertung der Korridorentwicklung hinsichtlich der Auswirkungen auf den Umweltschutz, für Beschäftigung und Wachstum.

Die während der Studie geleistete Arbeit basiert auf Interviews und Diskussionen mit den Projektebeteiligten, Arbeitsgruppensitzungen, Korridorforen, der Weiterentwicklung der Korridor-Projektliste und dem Zusammenwirken mit DG MOVE, sowie einer Sondersitzung mit der EIB.

Die wichtigsten Ergebnisse der Studie finden sich im zweiten und dritten Arbeitsplan der Europäischen Korridorkoordinatorin wieder. Der Abschlussbericht ergänzt die in den Arbeitsplänen enthaltenen Darstellungen und fasst die Informationen, der im Laufe der Studie erstellten Zwischenberichte, zusammen.

Zusammenfassung

Der Abschlussbericht erläutert die Ergebnisse der Arbeiten, die im Rahmen der **Untersuchung des TEN-V-Kernnetzkorridors Nordsee - Ostsee** zwischen September 2015 und Dezember 2017 durchgeführt wurden. Der Nordsee-Ostsee-Korridor umfasst 5.986 km Schienenwege, 4.092 Straßenkilometer und 2.186 km Binnenwasserstraßen. Er ist einer von neun TEN-V-Kernnetzkorridoren und der einzige Korridor, der ausschließlich in Nordeuropa liegt. Er befindet sich in den Niederlanden, Belgien, Deutschland, Polen Litauen, Lettland, Estland und Finnland. Die wichtigsten Ergebnisse der Studie finden sich im zweiten und dritten Arbeitsplan der Europäischen Korridorkoordinatorin wieder. Der Abschlussbericht ergänzt die in den Arbeitsplänen enthaltenen Informationen.

Die während der Studie geleistete Arbeit basiert auf Interviews und Diskussionen mit den Projektebeteiligten, Arbeitsgruppensitzungen, Korridorforen, der Weiterentwicklung der Korridor-Projektliste und dem Zusammenwirken mit DG MOVE, sowie einer Sondersitzung mit der EIB.

Der Report beinhaltet eine Übersicht aller während der Studie ausgeführten Aktivitäten, einschließlich der regelmäßigen Zusammenarbeit mit den Projektverantwortlichen. Um den Austausch zwischen den verschiedenen Projektverantwortlichen zu fördern und diese über die Ergebnisse der Studie auf dem Laufenden zu halten wurden, als eine der Hauptaktivitäten, **die Korridorforen** veranstaltet. Seit dem Beginn der Studie haben sieben Foren stattgefunden. Zusätzlich wurden weitere Veranstaltungen, wie zum Beispiel fünf **Arbeitsgruppen-**Meetings, die Themen wie die Regionen, urbane Knoten, Häfen, Umschlagterminals, Binnenwasserstraßen und Makroregionen behandelten, durchgeführt. Einige der Arbeitsgruppen wurden in Kooperation mit anderen Kernnetzkorridoren organisiert. Weitere Veranstaltungen waren die Teilnahme und Präsentation an den TEN-V Tagen 2016 in Rotterdam und ein Treffen mit der EIB über die Finanzierung von Projekten.

Der Report enthält für jeden Mitgliedsstaat **eine Bewertung der technischen Konformität der NSB Korridorinfrastruktur** mit den Anforderungen gemäß der Richtlinie (EU) Nr. 1315/2013 des Europäischen Parlaments und des Rates vom 11. Dezember 2013 über die Leitlinien für die Entwicklung der transeuropäischen Verkehrsnetze. Die Informationen entsprechen denen aus dem dritten Arbeitsplan und liefern eine Analyse der technischen Übereinstimmung je Verkehrsträger: Eisenbahnen, Straßen, Binnenwasserstraßen, Binnenhäfen, Seehäfen, maritime Infrastruktur und Flughäfen. Zusätzlich zur Beurteilung der technischen Übereinstimmung wurden **Leistungskennzahlen (KPIs) entwickelt und dazu genutzt, die Entwicklung des Korridors** bezüglich der Einhaltung der Rechtsvorschriften, der Interoperabilität und der Leistungsfähigkeit **zu bewerten und zu überwachen**.

Eine der Hauptaktivitäten war **die Identifikation von potentiellen grenzüberschreitenden Projekten** auf Länderebene, die zur weiteren Entwicklung des NSB Korridors bis 2030 beitragen. Die Projektliste wurde 2016 und 2017 in Zusammenarbeit mit den Projektverantwortlichen weiterentwickelt. Die Nordsee - Ostsee Projektliste (Stand Juli 2017) beinhaltet **530 Projekte** mit einer **Gesamtinvestitionssumme von 96,1 Mrd. Euro**.

Aufgrund der Vielzahl der identifizierten Projekte wurden **die Projekte zu Gruppen zusammengefasst**. Dies ermöglichte eine bessere Beurteilung der Projekte in Bezug auf deren Übereinstimmung mit den NSB Korridor Prioritäten und ihrem Reifegrad. Ausgangspunkt für die Bildung der Cluster war die endgültige Projektliste aus dem Juli

2017. Alle Kernnetzwerkkorridore haben dafür dieselbe Methodik angewandt. Gemäß der Eingruppierung der Projekte wurden von den 530 NSB Projekten 34% als sehr relevant eingestuft (Cluster 1), während 28% in die Restkategorie fallen.

Die für den Korridor zuständigen Beratungsunternehmen haben **die Auswirkungen auf Wachstum und Beschäftigung analysiert**, die im Falle der Umsetzung der NSB Projekte erreichbar sind. Für die Untersuchung wurden für alle Korridore gültige, einheitliche Richtlinien verabschiedet. Die Ergebnisse zeigen, dass die Umsetzung der Projekte im Zeitraum von 2016 bis 2030 zu einem Anstieg des Bruttoinlandsproduktes um 715 Mrd. Euro führt. Auch im Anschluss werden weitere positive Effekte eintreten. Darüber hinaus wird die Investition in die Projekte auch zu mehr Beschäftigung führen. Direkte, indirekte und davon abgeleitete Effekte führen im Zeitraum von 2016 bis 2030 zu 2.061.000 zusätzlichen Beschäftigungsjahren.

Die Studie richtet ihren Fokus ebenfalls auf **das Marktpotential** von umweltfreundlichen Verkehrsträgern mit nicht ausgelasteten Kapazitäten. Für den NSB Korridor sind die Verkehrsträger Schiene und Binnenschifffahrt relevant. Der Korridor ist im Hinblick auf **Innovationsprojekte**, im Vergleich zu anderen Korridoren, recht ausgereift und weist eine hohe Bandbreite an innovativen Projekten auf (fast 25% aller Projekte). Dabei handelt es sich in der Mehrzahl um sog. „Catch-up" Innovationen.

In den letzten Jahren hat sich der Klimawandel zu einem der Hauptarbeitsgebiete der Europäischen Union entwickelt und gehört zu den 10 vorrangigen Bereichen der Europäischen Kommission. Daher enthält die Studie auch **einen Teil über die Widerstandsfähigkeit gegen den Klimawandel und über die Minderung von Umweltauswirkungen**. Das Gesamtmuster der NSB-Korridormitgliedstaaten ist dem der EU28 sehr ähnlich, wobei die Korridormitgliedstaaten einen Anteil von ca. 20-40% an der Gesamttätigkeit ausmachen. Auf dem Nord-Ostsee-Korridor gibt es 52 Projekte, die direkt zur Kohlendioxidreduzierung beitragen. Die Gesamtkosten dieser Projekte belaufen sich auf 6,2 Mrd. EUR.

Mit den "Issues Papers" haben die europäischen Koordinatoren eine Aktion gestartet, die darauf abzielt, neuere Komponenten der TEN-V-Entwicklung voranzutreiben und **die entsprechenden Synergien zwischen den Korridoren zu stärken**. Für den NSB-Korridor hat diese Initiative zu drei innovativen Leuchtturmprojekten geführt: alternative Kraftstoffe, Verkehrssicherheit und ITS. Bei **der Pilotinitiative für alternative Kraftstoffe** handelt es sich um eine Initiative zur Gewährleistung einer ununterbrochenen, reibungslosen Fahrt mit Fahrzeugen mit alternativen Kraftstoffen zwischen Helsinki und Lissabon. Das Vorzeigeprojekt für **die Straßenverkehrssicherheit in den baltischen Staaten und Polen** wurde entwickelt, um die Zahl der Verkehrsunfälle zu verringern und eine sicherere Autofahrt auf der Via Baltica und weiter in Polen zu ermöglichen. Das Vorzeigeprojekt des **NSB Korridors-Intelligenten Verkehrssystems** zielt darauf ab, die Kontinuität und Interoperabilität von Verkehrssicherheitsanwendungen, Echtzeit-Verkehrsinformationsdiensten und Frachtmanagementdiensten zu unterstützen.

Samenvatting

Dit eindrapport presenteert de werkzaamheden die gedurende de studie naar de North Sea – Baltic TEN-T kernnetwerk corridor zijn uitgevoerd in de periode september 2015 - december 2017. De North Sea – Baltic corridor is één van de negen TEN-T kernnetwerk corridors en beslaat 5.986 km spoorweg, 4.092 km weg en 2.186 vaarweg. Het is de enige corridor die uitsluitend op Noord-Europees gebied is gelegen.

Het hoofddoel van de studie was: het beoordelen van de technische conformiteit van de corridor infrastructuur met de TEN-T regelementen vereisten; identificatie van projecten t.b.v. verbetering van de technische conformiteit van de corridor en het verhelpen van knelpunten; clusteren van geïdentificeerde projecten; het beoordelen van de corridor ontwikkelingsimpact op werkgelegenheid, milieu en economische groei.

De behaalde resultaten tijdens de studie zijn gebaseerd op interviews en discussies met stakeholders over projecten, Werk Groep vergaderingen, Corridor Fora, vorming van de corridor projectenlijst, regelmatige interactie met DG MOVE en een speciale vergadering met EIB.

De belangrijkste resultaten uit de studie zijn terug te zien in het 2e en 3e Werk Plan van de Europese Coördinator van deze corridor. Het eindrapport vult de in het Werk Plan opgenomen data aan en geeft een samenvatting van de informatie uit de verschillende rapportages die zijn uitgevoerd tijdens de studie.

Managementsamenvatting

Dit eindrapport presenteert de werkzaamheden die gedurende de studie naar de **North Sea – Baltic TEN-T kernnetwerk corridor zijn uitgevoerd in de periode september 2015 - december 2017.** De North Sea – Baltic corridor is één van de negen TEN-T kernnetwerk corridors en beslaat 5.986 km spoorweg, 4.092 km weg en 2.186 vaarweg. Het is de enige corridor uitsluitend gelegen op Noord-Europees gebied, waaronder de volgende landen: Nederland, België, Duitsland, Polen, Litouwen, Letland, Estland en Finland. De belangrijkste resultaten uit de studie zijn terug te zien in het 2^{e} en het 3^{e} Werk Plan van de Europese Coördinator van de corridor. Dit rapport is een aanvulling op de informatie uit de Werk Plannen.

De behaalde resultaten tijdens de studie zijn gebaseerd op interviews en discussies met stakeholders over de projecten, Werk Groep vergaderingen, Corridor Forums, vorming van de corridor projectenlijst, regelmatige interactie met DG MOVE en een speciale vergadering met EIB.

Dit rapport bevat een overzicht van alle hoofdactiviteiten die zijn afgerond gedurende de studie, waaronder de regelmatige samenwerking met de stakeholders m.b.t. de projecten. Eén van de hoofdactiviteiten waren de **Corridor Fora** gericht op interactie tussen verschillende stakeholders binnen de projecten en gericht op het up-to-date houden van stakeholders over de resultaten. Sinds de start van de studie hebben er zeven Corridor Forum vergaderingen plaatsgevonden. In aanvulling op deze vergaderingen zijn er vijf **Werk Groep** vergaderingen georganiseerd m.b.t. regio's, stedelijke knooppunten, havens, spoor- en wegterminals, binnenvaarwegen en macro regio's. Een aantal van de Werk Groepen zijn georganiseerd in samenwerking met andere kernnetwerk corridors. Overige activiteiten bestonden uit deelname en presentaties tijdens de TEN-T dagen 2016 in Rotterdam en een vergadering over projectfinanciering met EIB.

Dit rapport bevat ook een analyse per corridor lidstaat over de conformiteit van de NSBAL corridor transport infrastructuur met de vereisten uit regelement (EU) No 1315/2013. Dit regelen van het Europese Parlement en de raad van 11 december 2013 bevat de richtlijnen voor de ontwikkeling van het trans-Europese transport netwerk en herroeping van Beslissing No 661/2010/EU (Verordening). De gepresenteerde informatie in dit rapport komt overeen met het 3^{e} Werk Plan en geeft een analyse van de technische conformiteit per modaliteit: spoor, weg, binnenvaart, binnenhavens, zeehavens/maritieme infrastructuur en vliegvelden. In aanvulling op de beoordeling van de technische conformiteit zijn er **Key Performance Indicators** (KPIs) **ontworpen en toegepast om de ontwikkeling van de corridor samen te vatten en te monitoren** op het gebied van conformiteit met de Verordening, interoperabiliteit en prestaties.

Eén van de hoofdactiviteiten was het **identificeren van potentiele projecten** op zowel lidstatenniveau als grensoverschrijdende projecten die bijdragen aan de ontwikkeling van de NSBAL corridor tot en met 2030. De projectlijst is in 2016 en 2017 ontwikkeld, gebaseerd op overleg met stakeholders. Per juli 2017 bevat de projectenlijst **530 projecten** met een **totale investeringswaarde van 96,1 miljard euro**.

Gezien het hoge aantal geïdentificeerde projecten, zijn projecten geclusterd om de relevantie (m.b.t. de projectvoortgang en de prioriteiten van de NSBAL corridor) voor de NSBAL corridor vast te stellen. Het **clusteren van de projecten** is uitgevoerd op basis van de projectenlijst van juli 2017. Het hoofddoel van het clusteren was het analyseren van de geplande corridor investeringen gebaseerd op vooraf gedefinieerde criteria. Deze methode is toegepast op iedere corridor van het kernnetwerk.

De resultaten van het clusteren voor de project evaluatie laten zien dat van de 530 NSBAL projecten, 34% als zeer relevant wordt beschouwd (cluster 1). 28% van de projecten valt onder de overige categorie (cluster 4).

De corridor consultants hebben **onderzoek gedaan naar de economische groei en ontwikkeling van de werkgelegenheid** die door de implementatie van NSBAL corridor projecten in gang kan worden gezet. Deze analyse is gebaseerd op in gezamenlijke richtlijnen die binnen elke corridor zijn toegepast. De resultaten laten zien dat de implementatie van geïdentificeerde projecten leidt tot een toename in BBP van 715 miljard euro in de periode 2016 – 2030. Deze economische baten zullen ook na 2030 aanhouden. Daarnaast stimuleren de project gerelateerde investeringen werkgelegenheid. De directe en indirecte effecten op de werkgelegenheid leiden tot 2.061.000 miljoen extra baanjaren in de periode 2016 – 2030.

De studie heeft zich ook gericht op de **marktpotentie** van milieuvriendelijke vervoersmodaliteiten met onbenutte capaciteit. Hierin zijn de modaliteiten spoor en binnenvaart het meest relevant voor de NSBAL corridor. Door de vorderingen binnen de **innovatieve projecten** is het gemiddeld project op de corridor in een relatief vergevorderde fase van implementatie, vergeleken met de andere corridors. Ook kent de corridor een hoog aantal innovatieve projecten (circa 25% van alle projecten), waaronder 6 radicaal innovatieve projecten. De catch-up innovatieve projecten vormen echter de grootste categorie binnen het spectrum van innovatieve projecten.

De afgelopen jaren is klimaatverandering een belangrijk aandachtspunt geworden in de Europese Unie. Ook is klimaatverandering onderdeel van de 10 prioriteiten van de Europese Commissie. Dit is de reden voor het opnemen van **weerbaarheid tegen klimaatverandering en mitigatie van impacts van de corridor zelf**. Het algemene patroon voor de NSBAL corridor lidstaten is vrij identiek aan de EU28. De corridor lidstaten zijn verantwoordelijk voor ongeveer 20% tot 40% van de transportactiviteit in de EU, maar niet elk landsdeel van de lidstaten behoort tot de corridors. Op de North Sea – Baltic corridor zijn er 52 projecten die direct bijdragen aan decarbonisatie. De omvang van de kosten van deze projecten bedraagt in totaal 6,2 miljard euro.

Aan de hand van de “discussienota’s” zijn de Europese Coördinators in actie gekomen om nieuwe componenten van de TEN-T ontwikkeling te bevorderen en de **grensoverschrijdende synergie te versterken**. Dit initiatief heeft drie innovatieve flagship projecten toegankelijk gemaakt voor de NSBAL corridor: alternatieve brandstoffen, wegveiligheid en ITS flagship. Het **alternatieve brandstoffen pilot initiatief** is een initiatief dat moet zorgen voor ononderbroken en vloeiende reizen voor voertuigen met alternatieve brandstoffen tussen Helsinki en Lissabon. Het flagship project voor **wegveiligheid in de Baltische staten en Polen** is ontwikkeld op basis van de noodzaak om het aantal ongelukken te reduceren. Daarnaast moet het project zorgen voor veiliger gebruik van de auto op de Via Baltica en in Polen. Het **ITS flagship** project richt zich op het verschaffen van continuïteit en interoperabiliteit van wegveiligheidsapplicaties, real-time verkeersinformatieservice en vrachtmanagementservice.

RESUME

Ce Rapport Final présente les travaux effectués dans de cadre de l'étude du Corridor Mer du Nord-Baltique du réseau central RTE-T entre septembre 2015 et décembre 2017. Le Corridor Mer du Nord-Baltique comprend 5 986 km de voies ferrées, 4 092 km de routes et 2 186 km de voies navigables intérieures. Il est l'un des neuf corridors du réseau central RTE-T, le seul à être exclusivement situé dans le nord de l'Europe.

Les principaux objectifs de l'étude sont : l'évaluation de la conformité technique de l'infrastructure du Corridor aux exigences du règlement RTE-T; l'identification de projets poursuivant la progression du Corridor en matière de conformité technique et de suppression les goulots d'étranglement; l'analyse typologique des projets identifiés; évaluation de l'impact du développement du Corridor sur l'environnement, l'emploi et la croissance.

Le travail réalisé pendant l'étude consiste en des entretiens et échanges avec les acteurs des projets, en des réunions de Groupes de travail, en des Forums de Corridor, en l'élaboration de la liste des projets du Corridor, en une interaction régulière avec la DG MOVE ainsi qu'en une réunion spécifique avec la BEI.

Les principaux résultats de l'étude sont reflétés dans les 2ème et 3ème Plan de travail du Coordinateur européen pour le corridor. Le rapport final complète les analyses comprises dans les Plans de travail et fournit un résumé des informations contenues dans les différents rapports préparés pendant l'étude.

Résumé

Ce Rapport Final présente les travaux effectués dans de cadre de **l'étude du Corridor Mer du Nord-Baltique du réseau central RTE-T** entre septembre 2015 et décembre 2017. Le Corridor Mer du Nord-Baltique comprend 5 986 km de voies ferrées, 4 092 km de routes et 2 186 km de voies navigables intérieures. Il est l'un des neuf corridors du réseau central RTE-T, le seul à être exclusivement situé dans le nord de l'Europe, notamment aux Pays-Bas, en Belgique, en Allemagne, en Pologne, en Lituanie, en Lettonie, en Estonie et en Finlande. Les principaux résultats de l'étude sont reflétés dans les deuxième et troisième Plans de travail du Coordinateur européen pour le Corridor Mer du Nord-Baltique du réseau central RTE-T. Ce Rapport complète les informations contenues dans les Plans de travail.

Le travail réalisé pour l'étude consiste en des entretiens et échanges avec les acteurs des projets, en des réunions de Groupes de travail, en des Forums de Corridor, en l'élaboration de la liste des projets du Corridor, en une interaction régulière avec la DG MOVE ainsi qu'en une réunion spécifique avec la BEI.

Le Rapport contient un aperçu de toutes les tâches réalisées au cours de l'étude, notamment la collaboration constante avec ses acteurs. L'une des activités les plus importantes est les **Forums de Corridor**, qui permettent aux différentes parties prenantes du projet d'échanger et de s'informer des avancements de l'étude. Depuis le lancement du projet, sept Forums de Corridor sont organisés. Par ailleurs, d'autres réunions ont lieu, notamment cinq réunions des **Groupes de travail** sur les régions, les nœuds urbains, les ports, les terminaux rail-route, les voies navigables intérieures et les macro-régions. Certains de ces Groupes de travail sont organisés en coopération avec d'autres corridors du réseau central. Parmi les autres événements figurent la participation et la présentation aux Journées RTE-T 2016 à Rotterdam et une réunion avec la BEI sur le financement des projets.

Le Rapport comprend une analyse par État membre de la **conformité des infrastructures de transport** du Corridor Mer du Nord - Baltique avec les exigences du Règlement (UE) n° 1315/2013 du Parlement européen et du Conseil du 11 décembre 2013 sur les orientations de l'Union pour le développement du réseau transeuropéen de transport. Les informations présentées correspondent au troisième Plan de travail et livrent une analyse de la conformité technique par mode de transport : rail, routes, voies navigables intérieures, ports intérieurs, ports maritimes, infrastructures maritimes et aéroports. En plus de l'évaluation de la conformité technique, des **indicateurs clés de performance** sont conçus et appliqués pour **évaluer et suivre l'évolution du Corridor** en termes de conformité aux exigences réglementaires, d'interopérabilité et de performance.

L'une des tâches principales de l'étude est l'identification de projets potentiels au niveau des États membres ainsi que de projets transfrontaliers qui contribueront au développement du Corridor Mer du Nord - Baltique d'ici à 2030. La liste des projets est élaborée en 2016 et 2017 en étroite consultation avec les parties prenantes. Celle produite en juillet 2017 contient **530 projets** pour un investissement total de **96,1 milliards d'euros**.

Compte tenu de leur nombre élevé, les projets font l'objet d'une **analyse typologique** permettant de mieux évaluer leur maturité et leur pertinence par rapport aux objectifs du Corridor Mer du Nord - Baltique. Cette analyse est réalisée en s'appuyant sur la liste finale des projets en date de juillet 2017. Son objectif principal est d'analyser les investissements prévus sur le Corridor en fonction de critères prédéfinis. Une

méthodologie commune est appliquée pour tous les corridors du Réseau central. Selon ses résultats, sur les 530 projets du Corridor, 34% sont considérés comme très pertinents (groupe 1), tandis que 28% des projets entrent dans la catégorie résiduelle.

Les consultants du Corridor étudient les **effets sur la croissance et l'emploi** de la réalisation des projets du Corridor Mer du Nord - Baltique. Cette analyse repose sur une méthodologie convenue conjointement par tous les corridors. Ses résultats montrent que la réalisation des différents projets conduira à une augmentation globale du PIB de 715 milliards d'euro sur la période de 2016 à 2030. D'autres gains sont également attendus après 2030. Les investissements dans les projets stimuleront également l'emploi. Les effets directs, indirects et induits de la réalisation des projets sur la création d'emplois sont évalués à 2 061 000 emplois-années supplémentaires entre 2016 et 2030.

L'étude analyse également en détail le **potentiel commercial** des modes de transport respectueux de l'environnement dont la capacité est sous-utilisée. Les modes ferroviaire et fluvial sont identifiés comme étant les plus pertinents pour le Corridor. En ce qui concerne les **projets innovants**, le Corridor est relativement mûr et en comprend de nombreux (près de 25% de l'ensemble des projets) en comparaison avec d'autres corridors, dont 6 projets d'innovation « radicale ». Néanmoins, les projets innovants de « rattrapage » restent la catégorie la plus importante.

Ces dernières années, le changement climatique est devenu l'un des principaux domaines de travail de l'Union Européenne et figure parmi les 10 domaines prioritaires de la Commission Européenne. L'étude comprend donc une partie consacrée à la **résilience au changement climatique** et à **l'atténuation des impacts** environnementaux. Le scénario de référence de l'UE montre que de manière générale, la tendance observée pour les États membres du Corridor (en termes de population PIB, émissions liées aux transports et demande en énergie) est similaire à celle de l'UE28, les États membres du Corridor représentant environ 20 à 40% de l'ensemble de son activité. Sur le Corridor Mer du Nord - Baltique, 52 projets contribuent directement à la décarbonisation. Le coût total de ces projets est de 6,2 milliards d'euros.

Avec les "Issues Papers", les Coordinateurs européens prennent l'initiative de développer de nouvelles composantes au déploiement du RTE-T ainsi que de **renforcer les synergies associées entre les corridors**. Pour le Corridor Mer du Nord - Baltique, cette mesure permet d'engager trois projets phares innovants sur les carburants alternatifs, la sécurité routière et sur les nouvelles technologies de l'information et de la communication.

Le **projet phare sur les carburants alternatifs** est une mesure visant à assurer des déplacements sans interruption ni obstacle à l'aide d'un véhicule à carburants alternatifs de Helsinki à Lisbonne. Le **projet phare sur la sécurité routière** dans les États baltes et en Pologne repose sur la nécessité de réduire le nombre d'accidents de la route et d'assurer un trajet en voiture plus sûr sur la Via Baltica et sur le réseau polonais. Le **projet phare sur les nouvelles technologies de l'information et de la communication** vise à soutenir la continuité et l'interopérabilité des applications de sécurité routière, des services d'informations routières en temps réel et des services de gestion du fret.

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Acronyms and Abbreviations

BE	Belgium
CEF	Connecting Europe Facility
CNC	Core Network Corridor
DE	Germany
DEK	Dortmund-Ems-Canal
EC	European Commission
EDP	European Deployment Plan
EE	Estonia
EIB	European Investment Bank
EFSI	European Fund for Strategic Investments
ERTMS	European Rail Traffic Management System
ESIF	European Structural and Investment Funds
ETCS	European Train Control System
EU	European Union
FI	Finland
GDP	Gross Domestic Product
GHG	Greenhouse Gas
INEA	Innovation and Networks Executive Agency
ITS	Intelligent Transportation System
IWT	Inland Waterway Transport
IWW	Inland Waterway
KPI	Key Performance Indicator
LPG	Liquefied Petroleum Gas
LNG	Liquefied Natural Gas
LT	Lithuania
LV	Latvia
MFF	Multiannual Financial Framework
MoS	Motorways of the Sea
MS	Member State
NL	The Netherlands
NSM	North Sea-Mediterranean Corridor
NUTS	Nomenclature of territorial units for statistics
PL	Poland
PPP	Public Private Partnership
RAHA	Rotterdam, Antwerp, Hamburg, Amsterdam
RALP	Rhine-Alpine Corridor
RFC	Rail Freight Corridor
RHK	Rhine-Herne-Canal
RIS	River Information System
RRT	Rail–road Terminal
SESAR	Single European Sky ATM Research Joint Undertaking
TEN-T	Transeuropean Transport Network
TENtec	Information system of the European Commission to coordinate and support the TEN-T Policy
UIC	International Union of Railways
WDK	Weser-Datteln-Canal

1 Introduction

This Final Report (Report) presents the work performed during the study of the North Sea – Baltic TEN-T Core Network Corridor (Study) between September 2015 and December 2017. The main focus of the report is: the technical compliance of Corridor infrastructure; identifying a project list for further Corridor enhancement; project clustering based on the project list; identifying environment related issues; and the impact on jobs and growth.

The main Study results are reflected in Work Plan 2 and Work Plan 3. The Report compliments the data included in the Work Plans and provides a summary of information included in different reports. It should be noted that the Work Plans have been approved by Member States, however this Report, which complements the information included in the Work Plans, is to be considered as a working document as the Report has not been approved by the Member States.

The work accomplished during the Study was based on the interviews and discussions with projects stakeholders, Working Group meetings, Corridor Forums, development of project list and regular interaction with DG MOVE, as well as a special meeting with EIB.

The Final Report reflects the main parts covered by the Study and is structured as follows:

- **Information on the actions accomplished during the Study.** The information is included in **Chapter 2** and covers all the main activities completed during the Study including on-going work with the project stakeholders. The chapter also includes the information on **work done under additional activities (Task 6)** where all activities performed were agreed separately with DG MOVE.

- The Report includes **information about Corridor technical compliance and selected KPIs to monitor the Corridor evolution (Chapter 3).** The technical compliance assessment against TEN-T requirements is followed by a brief introduction of KPIs, as well as the calculation of the main KPIs.

- Over more than two years of extensive consultations with the different stakeholders the project list has been developed to reflect the main priorities of Member States and cross-border projects which will further develop Corridor and will ensure compliance with technical criteria. The **results of the Project List** analysis is included in **Chapter 4.**

- Based on the project list identified the Report includes the **results of project clustering (Chapter 5).** The project clustering was performed based on the latest project list and the common methodology applied by all Core Network Corridor consultants.

- The developed project list provides information on the **results of the analysis of the NSB Corridor actions impact on jobs and growth in the Corridor countries (Chapter 6).** The analysis is based on the updated project list and multipliers provided by MFIVE.

- The Report includes an outlook on the **market potential which is** presented in **Chapter 7.** This chapter presents the market potential of the environmental friendly transport modes with underutilised capacity, as well as the potential of modal shift, the intermodal transport versus trucking. The chapter provides results of the macro analysis of continental cargo study and measures to be taken into account to fulfil the market potential.

- The information about the **innovation projects,** including definitions and current situation, **is included in Chapter 8.** This chapter also presents results of the innovation deployment and examples of projects that are placed within the Corridor.

- The information about **climate change resilience** definitions and current situation **is included in Chapter 9.**

- The information about **climate mitigation of environmental impacts** definitions and current situation **is included in Chapter 10.** It presents a way how application of model was developed and the forecast was done, as well as provides general overview of EU 2016 Reference Forecast within the Corridor Member States.

- The information about NSB **innovative flagship projects** including alternative fuels, ITS, road safety in the Baltic States and Poland is included in **Chapter 11.**

2 Actions accomplished since the beginning of the Study

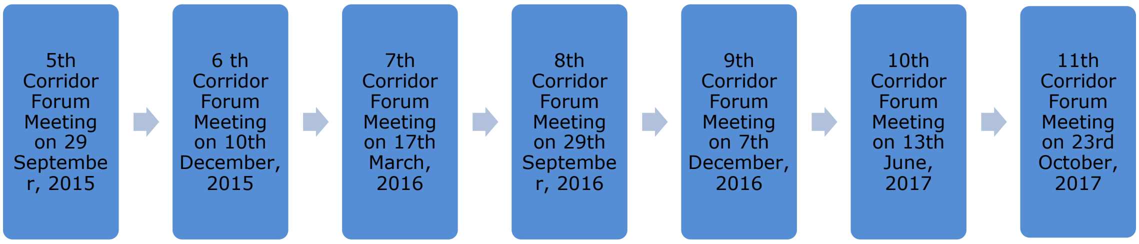
2.1 Actions accomplished

Over the duration of the project which started in September, 2015, studies on the TEN-T Core Network Corridor and support to the European Coordinator have been provided, including in total 22 activities: Corridor Forums, Working Group meetings, eight reports in accordance to the Technical Specifications and other activities.

2.2 Corridor Forums

The main purpose of the Corridor Forums was to provide an interaction with different project stakeholders and to update on the Study results. Since the start of the project seven Corridor Forum meetings (CFM) have taken place. The timeline of CFM is presented below.

Figure 1. The timeline of CFM since submission of the Report



The list of Corridor Forums held and the main discussion topics are presented below:

- **Fifth Corridor Forum of the North Sea – Baltic Core Network Corridor held on 29th September, 2015.** The meeting included an introduction to the events that have taken place since the 4th Forum meeting. INEA presented the outcome of the 2014 CEF call for the NSB corridor, the outlook on the next call and the overview on the Cohesion policy planning. Consultants presented planned work packages and objectives of the new contract for the 2nd phase of the Corridor Study.
- **Sixth Corridor Forum of the North Sea – Baltic Core Network Corridor held on 10th December, 2015.** The meeting included a presentation on the progress of the Corridor Study including the review of the 2014 Study and potential improvements, the final set of key performance indicators, as well as the common project data structure and collection of project data. The meeting also included: information on the North Sea - Baltic Rail Freight Corridor; a report on the Working Group of Regions; presentations on the CEF call for proposals 2015; and the EIB presentation on potential project financing.
- **Seventh Corridor Forum of the North Sea – Baltic Core Network Corridor held on 17th March, 2016.** The meeting included a presentation on the status of the Corridor Study including: information on the KPIs, glossary, project list, project fiche structure; results of the review of the project list; preliminary findings from the analysis of the investments towards and updated project list; as well as next steps towards updating the Corridor Work Plan. The meeting also included information on the Issues Papers prepared by the Commission, and a

report on the Coordinator's meeting with EIB, as well as with Brussels based Transport Associations / NGOs.

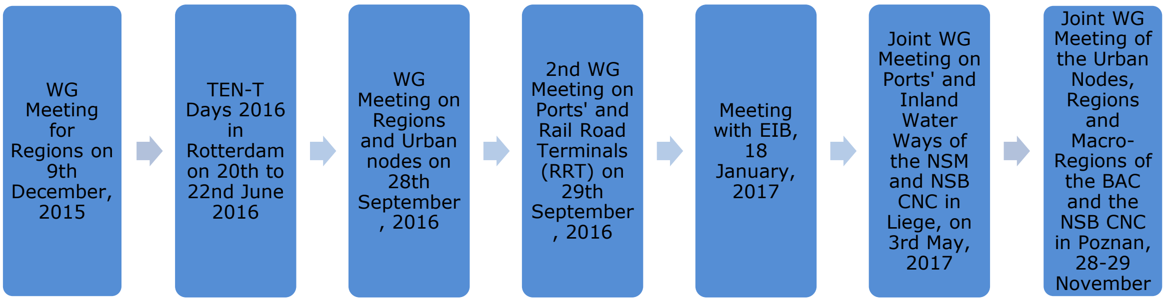
- **Eighth Corridor Forum of the North Sea – Baltic Core Network Corridor held on 29th September, 2016.** The meeting included: a presentation by INEA on the results of the CEF Call 2015; information on upcoming CEF calls; Consortium Consultants presentation on the status of the Corridor Study that included a presentation of the report on the project list; and the Preliminary Report on the elements of the Work plan. The European Coordinator of the NSB Corridor made a statement on the preparation of the second Work Plan.
- **Ninth Corridor Forum of the North Sea-Baltic Core Network Corridor held on 7th December, 2016.** The meeting included: a presentation on the Second Work Plan; Consultants presentation on the current status of the Corridor Study that included descriptions of technical parameters of the infrastructure, key physical, technical, administrative and operational barriers for the implementation of the corridors; as well as elaborating on the next steps within the Study, such as update and deepening of the project list, wider elements of the Work Plan.
- **Tenth Corridor Forum of the North Sea-Baltic Core Network Corridor held on 13th June, 2017.** The meeting included a presentation of Corridor consultants on updated project list, project clustering, information on wider elements of Work Plan (innovation, decarbonisation, and climate change adaption) and jobs and growth impact. Flagship projects were presented as a follow-up of the Issues Papers, followed by a presentation from NSB Rail Freight Corridor and the latest update on the Rail Baltica project.
- **Eleventh Corridor Forum of the North Sea-Baltic Core Network Corridor held on 23rd October, 2017.** The meeting included a presentation by the Corridor consultant on the work done during the Study. The European Coordinator presented the upcoming Third Work Plan, as well as information on a joint declaration of EU Coordinators on the future of TEN-T and CEF. INEA presented the 2016 CEF-Transport Call results, as well as reported on the 2017 "Blending Call" and the status of CEF projects on the NSB Corridor. In addition there was a presentation on status of Rail Baltica project.

All Corridor Forums contributed to better interaction between DG MOVE, the European Coordinator and national stakeholders.

2.3 Working Groups and Other Meetings

In addition to seven Corridor Forums other meetings took place including different Working Group (WG) meetings and a meeting with EIB on the project financing. The timeline of Working Group and other meetings is presented below.

Figure 2. The timeline of Working Group and other meetings since the submission of the Report



The list of the meetings and the main discussion topics is provided below:

- **Working Group Meeting for Regions on 9th December, 2015.** The meeting included: a presentation by the Contractor on KPIs; and project list update; feedback from Regions on the project list of 2014 Study. INEA provided an update on the 2nd CEF call, which was followed by the methodology for the "Issues Papers" prepared by several European Coordinators and ways for the Regions to contribute.

- **TEN-T Days 2016 in Rotterdam held from 20th to 22nd June 2016.** The event's general theme was Innovative Infrastructure for Smart and Sustainable mobility. Mrs. Catherine Trautmann, European Coordinator for NSB CNC, was the panellist for the session: "TEN-T Corridors: Forerunners of a forward-looking European Transport System". On the second day of the event the main theme was financing and investments in the transport sector. There were parallel sessions held with key messages by different sectors including shippers, railway undertakings corridor managers, infrastructure managers and European Rail Freight Association. NSB CNC presentation took place on 22nd June 2016.

- **Working Group Meeting on Regions and Urban nodes held on 28th September 2016.** The meeting included a presentation on the results of Working Group of Regions and Urban nodes, followed by a Consortium presentation on the status of the Corridor Study. INEA presented on the outcome of the 2nd CEF call. DG REGIO provided an update on the urban agenda and on the upcoming call on urban innovative actions (including sustainable urban mobility). EUREGIO in cooperation with other partners presented on the areas of cooperation along the NSB. The meeting included a discussion on the follow-up of the "Issue Papers" prepared by the European Coordinators.

- **Second Working Group Meeting on Ports' and Rail Road Terminals (RRT) held on 29th September 2016.** The Consortium presented: the status and the initial results of the Corridor Study with regard to Ports and RRT with an emphasis on description of the NSB multimodal infrastructure - with reference to section 6 of Regulation (EU) 1215/2013 and multimodal transport trends; the issues and opportunities to further enhancement of multimodality; and their performance of the North Sea-Baltic Corridor The Working Group meeting concluded with discussions on Ports and Rail-Road Terminals as actors of sustainable urban logistics, and problems and solutions for last mile delivery.

- **Meeting with the European Investment Bank held on 18th January 2017.** The main outcome of the meeting was the discussion with EIB about future project financing based on the Corridor's consultant's presentation on projects analysed by Member States, financing source and project's financial sustainability. During the meeting the EIB provided information on the first blending call which gives an opportunity to combine CEF grant together with loan from EFSI or other financial institution. MFIVE presented the methodology for growth and jobs assessment for different transport modes.

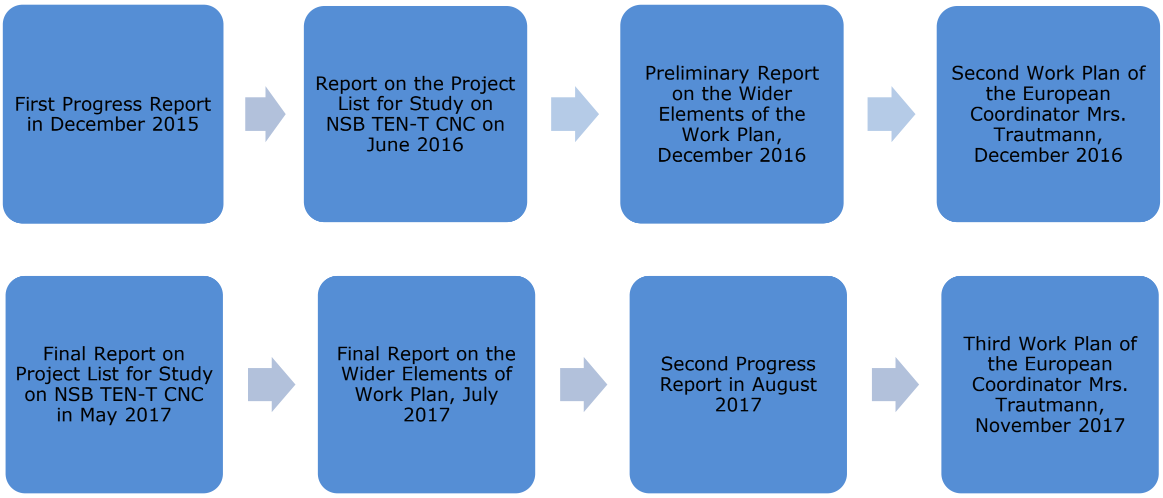
- **Joint Working Group Meeting on Ports' and Inland Water Ways of the North Sea-Mediterranean and the North Sea-Baltic Core Network Corridors in Liege on 3rd May, 2017.** The meeting was opened by both the European Coordinator for North Sea – Mediterranean Core Network Corridor - Mr. Peter Balazs and the European Coordinator for North Sea – Baltic Mrs. Catherine Trautmann. After the opening there was a presentation by Liege Port Authority on advantages of Liege Port, followed by presentation on Inland Waterways and Ports in Wallonia. EIB representative presented the challenges and opportunities of financing IWW projects Information about port of Venlo "Expanding the Port in Venlo by anticipating on climate change – Synergy by an integrated approach" was presented by the Municipality Venlo and TripleOre. Cas Willems from Smart Atlantis continued with presentation on traffic and transport information services that explained the role and importance of river information systems (RIS), as well as the next steps to be taken in further RIS development. The afternoon session was devoted to consultants' presentations on the status of NSM and NSB Core Network Corridors.
- **Joint Working Group Meeting of the Urban Nodes, Regions and Macro-Regions of the Baltic-Adriatic and the North Sea-Baltic Core Network Corridors in Poznan on 28 and 29 November, 2017.** The first day of the meeting was opened by the Marshal of Wielkopolska Region and by both European Coordinators of the respective Corridors, followed by a presentation on the Wielkopolska Region. Thereafter the BAC and NSB corridor study results - with regard to urban nodes - were presented by the respective Contractors. A presentation was then made on a study on the "alignment of last mile connection in the TEN-T core urban nodes in Poland", as well as the INTERREG project SUBNODES - "Connecting the hinterland via sub-nodes to the TEN-T core network".

All Working Groups and meetings: promoted interaction with Corridor stakeholders; promoted sharing of Corridor idea across involved parties; and facilitated information exchange on new projects and financing opportunities.

2.4 Study Reports

As part of the overall contract execution several reports have been prepared and submitted to the Commission based on the contractual obligations. The timeline of delivered reports since the beginning of the project is presented below.

Figure 3. The timeline of delivered reports since the submission of the First Progress Report



Listed below are the reports which have been prepared since the start of the project.

- **First Progress Report in December 2015.** The First Progress Report related to the review of the first study phase report with a special emphasis on the approach used for multi-modal transport market study, existing elements of Work Plan and technical compliance assessment.
- **Final Report on the Project List for Study on North Sea – Baltic TEN-T Core Network Corridor presented on June 2016.** The Final Report on the Project List was prepared based on the compiled project list that was completed with the help of national experts and project stakeholders. The report provides: an outlook on the approach and general methodology for project list update; the overall evaluation of the NSB project list; and more detailed information on transport modes, countries and financing needed.
- **Study on North Sea – Baltic TEN-T Core Network Corridor Preliminary Report on the Wider Elements of the Work Plan presented on December 2016.** The Preliminary Report on the Wider Elements of the Work Plan provides: an overview on the selected KPIs used to monitor the Corridor's evolution; the qualitative assessment of the Corridor; and specific assumptions made per mode of transport (e.g. road, IWW, rail) or country. The report also presents a qualitative assessment of the urban nodes within the North Sea - Baltic Core Network Corridor.
- **North Sea – Baltic Core Network Baltic Core Network Second Work Plan of the European Coordinator Catherine Trautmann published on December 2016.** The Second Work Plan gives an extensive report on critical issues within the Corridor, including cross-border links, bottlenecks, other issues and was prepared based on the previous study reports. The recommendations and the future outlook were presented by the European Coordinator. The European Coordinator provided an overview of planned projects and the status with respect to achieving targets. The European Coordinator delved into other possible issues and the next steps to be taken. The Second Work Plan has been

discussed and agreed with all Member States involved and the published version is available on internet.[1]

- **Final Report on the Project List for Study on North Sea – Baltic TEN-T Core Network Corridor presented in May/June 2017.** The Final Report on the Project List was prepared based on the compiled updated project list that was completed with the help of national experts and project stakeholders since submission of the previous report in June 2016. The report gives an outlook on the approach and general methodology for project list update, the overall evaluation of the NSB project list and more detailed information per transport modes, countries and financing needed.
- **Final Report on the Wider Elements of Work Plan in July 2017.** The Final Report on the Wider Elements of the Work Plan gives an updated overview on the selected KPIs used to monitor the Corridor's evolution, the qualitative assessment of the Corridor, and the specific assumptions made per mode of transport or country. The report also presents a qualitative assessment of the urban nodes within the North Sea - Baltic Core Network Corridor. It also presents the aspects of innovation deployment, climate change resilience and climate mitigation of environmental impacts within the Corridor.
- **Second Progress Report in August 2017.** The Second Progress Report presented all of the actions accomplished since the submission of the First Progress Report including an overview of all delivered reports, as well as organized Corridor Forums, Working Group and other meetings. It also gave an overview of the project clustering and provides a macro-analysis of the market potential of environmental friendly transport modes with underutilised capacity, container shift potential methodology etc. It also provides a summarized outlook of multiplier based growth and jobs analysis of all nine CNC.
- **Third Work Plan of the European Coordinator Mrs. Trautmann, November 2017.** The Third Work Plan, in addition to the information included in the Second Work Plan, addresses the challenges faced within the Corridor by providing an outlook on the innovation deployment, ERTMS deployment, external dimension, and the success stories from Member States. It also introduces the environmental and socio-economic effects of the Corridor, infrastructure funding and innovative financial instruments, as well as sets examples of innovative flagship projects. In conclusion recommendations and the future outlook is given by the European Coordinator by providing an overview of planned projects and achievement of Corridor technical compliance, and possible ways to combine grants with innovative financial instruments. The Third Work Plan will be agreed with all Member States involved and will be made publicly available.

Similarly to the meetings, the reports prepared as part of the Corridor Study have contributed to the promotion of NSB Corridor and, most importantly, to the identification of new viable projects and raised discussions about project financing.

2.5 On-going Consultation with the Project Stakeholders

Since the start of the project the initial list of project stakeholders has further expanded and stakeholders have been consulted at different events, such as Corridor Forums, TEN-T Days 2016 in Rotterdam and Working Group meetings.

[1] http://ec.europa.eu/transport/sites/transport/files/themes/infrastructure/news/doc/2015-05-28-coordinator-work-plans/wp_nsb_final.pdf.

Project stakeholders were in close contact with the national teams of experts of the Consortium and have been consulted with respect to the Work Plans and project list. During the preparation of Issues Papers, stakeholders were asked to provide their comments and remarks on the proposed topics in order for the European Commission and DG MOVE to seek possible solutions of transport infrastructure related issues across the TEN-T Core Network Corridors, including North Sea-Baltic Corridor.

2.6 Progress on Completion of Task 6

Since the start of the project many activities have taken place in relation to Task 6 which according to contract included additional activities to be agreed with DG MOVE. The main activities performed under Task 6 were the preparation of project maps for the production of the project fiches; meeting with EIB; additional elements of the market study; analysis of jobs growth; and flagship projects which are presented in the Third Work Plan.

3 Technical compliance and selected KPIs to monitor the Corridor's evolution

3.1 Compliance with the technical infrastructure requirements of the TEN-T Regulation

The Corridor has to comply with the technical requirements defined in Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU. The analysis below includes only those transport modes for which technical requirements are determined by Regulation (EU) No 1315/2013 and corresponds to the information included in 3rd Work Plan due to the need to agree with Member States the technical compliance status.

3.1.1 Rail

The total railway network of the Corridor is 5,986 km long. The table presents the summary of technical compliance for rail (year 2014) and detailed analysis of each technical requirement is provided below the table.

Table 1. Compliance with TEN-T requirements (2014): Railways

RAILWAYS		**All entries: Share of all sections fulfilling the respective standard**								
TEN-T parameters		**BE**	**NL**	**DE**	**PL**	**LT**	**LV**	**EE**	**FI**	***Corridor***
Length of all sections	Km	397	477	1 783	1 442	848	594	442	3	***5 986***
Electrification	Electrified	100 %	100%	97%	91%	18%	11%	17%	100%	***75%***
track gauge	1,435mm	100 %	100%	100%	100%	13%	0%	0%	0%	***76%***
line speed (core freight lines)	≥100km/h	80%	100%	100%	9%	25%	0%	0%	N/A	***61%***
Axle Load (core freight lines)	22.5t	100 %	100%	100%	99%	100%	100%	100%	N/A	***100%***
Train length (core freight lines)	min. 740m	100 %	100%	100%	38%	100%	100%	100%	N/A	***85%***
ERTMS/signalling system	YES	32%	43%	0%	0%	0%	0%	0%	0%	***7%***

Electrification

The whole Corridor is **electrified** in Belgium, the Netherlands, Germany, Finland and Poland, except for an approximately 60 km link between Oldenburg and Wilhelmshaven in Germany (that should be solved by 2022) and, in Poland, a 100 km section between Ełk and the Polish Lithuanian border. In Lithuania only the Kaunas – Vilnius line (about 105 km) is electrified. In Latvia and Estonia sub-regional lines for passenger transport around the capitals are electrified. Cross-border traffic between the Baltic States and Poland can currently run only using diesel traction. There are also different voltage systems across Member States, but this will not pose a cross-border problem if a locomotive is equipped with a relevant converter.

Track gauge

The rail technical compliance assessment for the Corridor is influenced by the exemption related to isolated networks in the Baltic States and Finland (1520 mm and 1524 mm networks).

The Corridor is equipped with three different track **gauges.** The Belgian, Dutch, German and Polish networks are all standard UIC gauge (1435 mm). Estonia, Latvia and Lithuania have the 1520 mm gauge, with the exception of the section in Lithuania between Kaunas and the Polish border (which has 115 km dual gauge/parallel tracking of 1520 mm and 1435 mm). Finland uniquely has the 1524 mm gauge. However, the Baltic States and Finnish networks are isolated networks as per Regulation (EU) 1315/2013, and thus are exempted from the compliance with its technical requirements.

Line speed

In the Netherlands, the requirement of the **maximum line speed** of 100 km for freight lines is fulfilled. In parts of the Belgian network receiving freight traffic are not compliant with line speed requirement. These parts include the sections: from Glons to the German border (39 km); from Angleur to Liège Guillemins (3 km); from Lier to Antwerp (10 km); and locally in the railway nodes of Aarschot (0,5 km) and Hasselt (2 km). In Germany, a small number of sections have been identified as being non-compliant, because these sections are mainly separate freight lines, links and bypasses in and around urban areas.

In Poland, the line speed compliance along the Corridor is at a low level, this is mostly caused by, firstly, the very low maximum speed on certain sections (especially Warsaw southern rail bypass and Rail Baltica close to the border with Lithuania) and secondly, several sections have mixed speed allowance resulting in lower average speed level. Several of the long sections are very close to meet the requirement: from Polish – German border to Warsaw (average speed is between 80 km/h to 99 km/h depending on the section); from Zielonka to Białystok (average speed is above 80 km/h). An upgrade to only these sections would raise the compliance level to well above 60%. Between Olecko and Białystok the speed limits are between 80 and 120 km/h and from Olecko until the Lithuanian border the speed is inadequate at 30-60 km/h but will be raised following modernisation. The Warsaw freight bypass also has an inadequate speed of 40 – 70 km/h, but plans are in place to solve this problem.

In the Baltic States not all lines are compliant with line speed requirements, but the Rail Baltica project, once completed, will be compliant. In Lithuania, the recently completed standard gauge 1435 mm railway along the existing 1520 mm alignment has a speed limit of 120 km/h (80 km/h for freight transport). However, if the line is upgraded, is equipped with ERTMS and is electrified, the speed of the line would increase. The isolated networks of 1520 mm gauge are exempt from the maximum line speed requirement.

Axe load

Only very limited sections of the network do not comply with the standard of the maximum 22,5t of **axle load.**

Train length

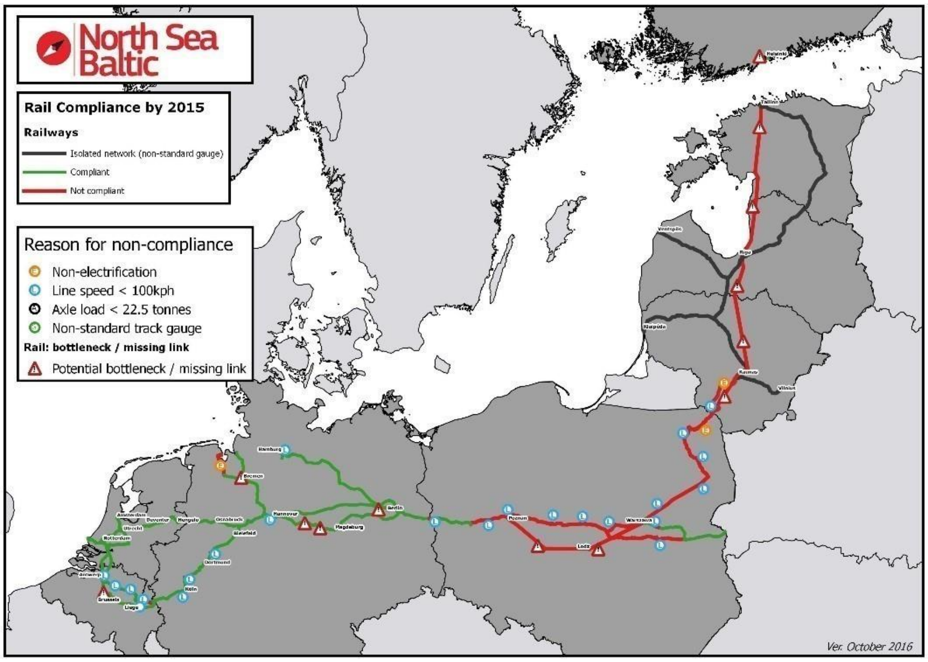
Most of the Corridor can accommodate the minimum **train length** of 740 m except for in Belgium due to the existing train length restrictions of 650 m during peak hours and in Germany where restrictions are common and 740 m trains can be operated at certain times in line with the timetable. The Baltic States 1520 mm network meets the requirements, though the Polish network currently does not comply with the E20 railway from Polish/German state border to Poznań, on the Poznań node, on the Warsaw node (partly) and on the Rail Baltica corridor. Such divergences between the different Member States creates a serious obstacle to seamless international freight traffic flows. In order to increase the train length a necessary condition is a sufficient number of side tracks - this would bring quick wins for an enhanced competitiveness of rail freight.

ERTMS

There is no ERTMS deployment in NSB so far except in The Netherlands the highest level **ERTMS implementation** with 43% of the Corridor covered. In Belgium 32% of the Corridor is covered. The ERTMS implementation in the different Member States and the timeline for deployment of ERTMS along the Corridor are described in "ERTMS European Deployment Plan[2]" and national deployment plans. Based on the notification from the relevant Member States, the European Commission has confirmed that the 1520 mm gauge railway lines of NSB Core Network Corridor will not be covered by the European Deployment Plan for ERTMS.

The summary of rail compliance with TEN-T requirements is presented in figure below[3].

Figure 4. Rail compliance by 2015[4]



3.1.2 Roads

The Corridor comprises 4,092 km of roads that connect the capitals of all the Member States on the Corridor. The table below presents the summary of compliance with technical requirements (year 2014).

Table 2. Compliance with TEN-T requirements (2014): Roads

Parameter	Requirement	BE	NL	DE	PL	LT	LV	EE	FI	Corridor
Road class	Roads have to be either an express road or a motorway by 2030	100 %	100 %	100 %	56%	55%	8%	7%	100 %	70%

2 https://ec.europa.eu/transport/modes/rail/ertms/ertms_deployment_en
3 The calculation of ERTMS implementation is based on operation of GSM-R and ETCS (all levels) and thus may differ from the ERTMS EDP 2016.

4 Line speed < 100kph: In Germany, these sections are mainly separate freight lines, links and bypasses in and around urban areas.

Parking areas along the roads, including their security level	Sufficient parking areas, at least every 100 km, by 2030	N/A	100 %	100 %	N/A	N/A	N/A	N/A	N/A	N/A
Availability of alternative fuels	Available by 2025	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100%

Road class

Although the existing road network in Belgium, the Netherlands and Finland meet the requirements of the TEN-T Regulation, there are congestion issues around the main urban nodes.

Almost all road sections on the Corridor in Germany are part of the German motorway system, except a short section of approximately 10km on the A30 near Bad Oeynhausen where the is no motorway, however it is under construction with expected completion by the end of 2018.

The Polish road network from the German border to Warsaw is a new four lane motorway, the A2. In Warsaw node, the Corridor road alignment splits in two directions: north-eastern to Baltic States and eastern to Belarus. Warsaw expressway ring road is completed when it comes to traffic towards Lithuania. However, only a first phase of the southern bypass is completed and in order to travel towards Belarus, one has to use the heavily congested internal city road network. The missing section of the ring road is being implemented through design and build contracts (construction should be completed in late 2020). In Poland, the connection from Warsaw to Lithuania (Via Baltica) is also mainly a two-lane national road. Due to Via Baltica recently being made a high priority, the whole connection is currently either under construction (sections closer to Warsaw and closer to Lithuania) or at the tender stage (central part). From Warsaw towards the Belarus border the A2 is a two lane national road with one motorway-class bypass of Mińsk Mazowiecki (close to Warsaw) along the future A2 motorway. Except for completing the connection from Warsaw to Mińsk Mazowiecki further extensions are put on hold due to budget constraints and only preparations for Mińsk Mazowiecki – Siedlce are ongoing.

The Baltic States' roads on the Corridor are not compliant with respect to road class requirements. The Via Baltica highway is the main artery for North-South traffic between Poland and the Baltic States and in many parts it is not compliant with technical requirements as it is not an expressway or a motorway.

In Lithuania, the Via Baltica road has two lanes, except for a section of 20 km north of Kaunas that has four lanes. The East-West connection from Klaipeda port through Kaunas to Vilnius is a four lane express road soon to be upgraded into a motorway. In Latvia the Via Baltica is a two lane road with capacity problems between the Riga bypass and Bauska, where some sections require widening from two lanes to four (including construction of bypasses). In Estonia compliance is below 10%. However, compliance issues in the Baltic States are treated as exception as there is no economic justification for expressways, therefore most of the issues identified relate to bottlenecks.

Parking areas along the road

The Netherlands and Germany are compliant. For the other Member States the technical requirement is not applicable as there are no road sections that run for 100 kilometres without the possibility to turn off the road.

Availability of alternative fuels

In relation to the **provision of alternative fuel sources** the Corridor has made significant developments and some implementation projects are ongoing for electricity, LPG or LNG refuelling stations. While the formal requirement of the TEN-T Regulation has already been met, there are discrepancies with regard to the type of alternative fuel provided and thus a lack of continuity across borders.

3.1.3 Inland waterways (IWW)

The Corridor has an effective IWW network stretching from the North Sea ports to Berlin. The table below presents an overview of compliance with technical requirements.

Table 3. Compliance with TEN-T requirements (2014): Inland waterways (IWW)

Parameter	Requirement	BE	NL	DE	PL	LT	LV	EE	FI	Corridor
CEMT Class	Class IV	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Length of vessels and barges	from 80-85m	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Maximum beam	from 9.50m	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Minimum draught	from 2.50m	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Tonnage	from 1,000-1,500t	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Minimum height under bridges	from 5.25m	100%	100%	70%	N/A	N/A	N/A	N/A	N/A	**86%**
Availability of alternative fuels	Indication of availability by 2030	100%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**N/A**

IWW network is almost compliant with all technical requirements in all Member States, except one parameter in Germany- the minimum height under bridges has not yet been reached on some sections of the Rhein-Herne-Kanal (RHK), the Dortmund-Ems-Kanal (DEK) and the river Weser. This leads to a score of 70% compliance for Germany and a score of 86% for the whole corridor.

In addition to the TEN-T requirements, an uprated target for the CEMT class has been calculated specifically for this Corridor. There is full compliance of the network with respect to class IV (as of 2014), therefore a higher target has been chosen: class Vb. For this target, 55% of the network was compliant in 2014.

3.1.4 Inland Ports

The Corridor has 20 inland ports mainly situated in Belgium, the Netherlands and Germany. The table below presents on overview of compliance with technical requirements.

Table 4. Compliance with TEN-T requirements (2014): Inland Ports

Parameter	Requirement	BE	NL	DE	PL	LT	LV	EE	FI	Corridor
CEMT class	Class IV connection	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Connection to rail	Core ports to be connected to rail by 2030	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**
Availability of clean fuels	Available in by 2025	33%	33%	0%	N/A	N/A	N/A	N/A	N/A	**15%**
Availability of at least one freight terminal open to all operators	in a non-discriminatory way and application of transparent charges	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	**100%**

All inland ports are compliant with IWT class IV access, besides Berlin and Hamm which have a CEMT class IV connection. All inland ports have class V and above waterway connection. All ports are also compliant to 'the availability of at least one freight terminal open to all operators' parameter but still have to implement clean fuels accessibility.

3.1.5 Seaports and maritime infrastructure

The Corridor has 12 core maritime ports and the table below presents an overview of Corridor's seaports and maritime infrastructure compliance with technical requirements.

Table 5.Compliance with TEN-T requirements (2014): Seaports and maritime infrastructure

Parameter	Requirement	BE	NL	DE	PL	LT	LV	EE	FI	Corridor
Connection to rail network, inland waterways and road network	Core ports to be connected to rail by 2030	100 %	100 %	100 %	N/A	100 %	100 %	100	100 %	**100%**
Availability of alternative fuels	Available by 2025	100 %	100 %	0%	N/A	100 %	0%	0%	0%	**42%**

Connection to rail network

Helsinki has three ports that form the combined Port of Helsinki. West Harbour and South Harbour are located in the city centre and serve mainly the passenger and *ropax* ferries, and have home freight capacity. They have tram connections for passengers but have no connection to heavy rail. The third port is the new Vuosaari cargo port to the east of the city, serving mainly cargo traffic. Vuosaari is connected to rail.

Estonia has two ports, which form the combined Port of Tallinn. One of them is the Tallinn Old Port (Vanasadam), which serves mainly the passenger traffic and *ropax* ferries, and also has some freight capacity. The Old Port does not have any rail or tram connections at the moment but the NSB project list includes a project for tram connection to the Old Port. The other port is the Muuga freight port, located to the East of the city. Muuga is currently connected to the 1520 mm rail network and in the future will also be connected to the 1435 mm Rail Baltica network.

The Freeport of Riga in Latvia is the largest port in the Baltic States and is connected to the rail network. Another Latvian port on the Corridor is the ice-free Freeport of Ventspils, which has convenient road and rail access.

In Lithuania, the ice-free Klaipeda State Port is the biggest Lithuanian transport node with well-developed hinterland connections on road and rail.

Germany has four seaports on the Corridor: Hamburg, Bremerhaven, Bremen and Wilhelmshaven and all ports have road and rail connections.

The ports in Belgium and The Netherlands i.e. Amsterdam, Rotterdam and Antwerp have direct road and rail access.

Availability of alternative fuels

The ports of Antwerp, Amsterdam and Rotterdam offer LNG as an **alternative fuel source** and LNG supplies in Antwerp are under construction.

In Germany, a first LNG-powered vessel is bound to start operating between the ports of Bremerhaven and Bremen during the course of this year. The general availability of alternative fuels in German ports is expected by 2025.

A floating LNG terminal anchored in Klaipeda port opened in November 2014, and there are plans to start services of providing LNG fuels to ships and shore-to ship LNG bunkering services by 2017. There are also plans to provide an alternative fuel source in the Latvian ports, expected to be realized via a private initiative. In Tallinn, no alternative fuel solutions have been provided yet, though LNG and LPG terminals are planned in the Muuga cargo port. LNG bunkering infrastructure and accessibility improvements (but not an LNG terminal) are also planned in the Helsinki's Vuosaari cargo port. Currently there is only one LNG-fuelled passenger ship Megastar (owned by Tallink) sailing between Helsinki. Tallinn is being refuelled in the West Port of Helsinki via trucks from Gasum.

3.1.6 Airports

There are 16 core network airports on the Corridor. Regulation (EU) 1315/2013 sets an obligation that certain **core network airports need to be connected by rail** (preferably high-speed) by 2050 and in the Corridor there are 8 airports which need to comply with this requirement. The table below presents the summary of technical compliance assessment (year 2014).

Table 6. Compliance with TEN-T requirements (2014): Airports

Parameter	Requirement	BE	NL	DE	PL	LT	LV	EE	FI	Corridor
Capacity to make available alternative clean fuels	Available (2014)	0%	0%	0%	0%	0 %	0 %	0 %	0%	**0%**
Connection to transport network	heavy rail or urban rail system and road network, certain airports have to be connected to heavy rail by 2050	100 %	100 %	100 %	100 %	N/A	0 %	N/A	100 %	**88%**

Capacity to make available alternative clean fuels

None of the airports of the Corridor is making **clean fuels available** for airplanes.

Connection to transport network

There are 8 core network airports along the Corridor with an obligation to connect to rail including Helsinki, Riga, Warsaw, Berlin, Brandenburg, Hamburg, Cologne, Brussels, and Amsterdam. All airports meet the requirement, except Riga, but there are plans to connect the airport to the railway system in parallel with the developments of the standard gauge Rail Baltica project thus ensuring the rail link to the airport before 2030.

3.2 Key Performance Indicators (KPIs)

In addition to technical compliance assessment, KPIs are being designed to assess and monitor the evolution of the corridors and the potential effects of individual projects or groups of projects upon infrastructure interoperability and performance. A common or 'generic' KPI framework has been developed for all nine corridors to allow comparability across the whole network. In some cases the KPIs defined correspond to technical criteria described in the previous chapters but there are additional KPIs and not all technical requirements are included as KPIs.

KPI framework

The KPI framework consists of two parts:

- A main part which consists of **generic KPIs** - these primarily describe the supply-side (infrastructure) together with selected demand-side characteristics, to be used in all nine corridors
- An additional **corridor specific part** which is tailored to the specific characteristics of a corridor, and contribute to the assessment of the corridor evolution. These are not new indicators, but rather higher target levels applied to generic KPIs in cases where there is an initiative to achieve a higher level of performance than the minimum specified in the Regulation.

As part of the same process, regional socio-economic background information was collected according to a common schema. These descriptive quantities are not considered to be KPIs.

The presentation of Key Performance Indicators is designed to provide broad information on the Corridor performance. The approach chosen involves 5 layers which are:

- **Background information;**
- **Generic supply-side KPIs;**
- **Generic demand-side KPIs;**
- **Modal split;**
- **Specific KPIs.**

Background information

Background information provides general information about the Corridor. It lists the number of kilometres of the rail, road and IWT networks and the number of nodes such as inland ports, seaports, Rail Road Terminals. It also provides information about the GDP and the employment within the catchment area of the corridor.

Generic Indicators

It should be noted that if the definition of the alignment of the CNCs is strictly followed some indicators do not apply to all nine corridors – for instance, KPIs related to IWW do not apply to those corridors that do not include any IWW network. Rail indicators do not apply to isolated networks, and certain indicators for rail freight do not apply on dedicated passenger lines.

Corridor Specific Indicators

The use of corridor specific indicators was originally proposed as a way to emphasise more localised questions. Since CEMT IV is already widespread and since the Member States involved are applying higher national standards, it was decided to add Corridor specific indicator for CEMT V and VI.

Data Availability/TENtec

KPIs have to be quantifiable and based on publicly available statistics. Moreover, since they are used to monitor the evolution of the Core Network Corridor, they need to be based on regularly updated statistics. TENtec database has been chosen as the primary data source as this system has been designated in the Regulation as the vehicle for storing information to allow for the monitoring of TEN-T progress.

TENtec was updated via three studies covering:

- Rail (substantial update), road (limited update), airports (limited update);
- Inland waterways and inland ports (substantial update);
- Seaports (substantial update within new MoS study).

3.3 KPIs calculation

Data collection

Following the approval of the KPI methodology, the data collection activities have started. Firstly data collected during 2014 Study was inventoried. Secondly TENtec data was obtained and analysed in detail including data quality checks and validation of data from other sources where TENtec data was missing or incorrect. For this exercise interviews were conducted with stakeholders, public data was consulted and other desk research activities were performed. Where available, similar data from the other corridors was harmonised.

In some cases specific assumptions per KPI were made to better reflect NSB situation or to make working definitions, for instance, the definition of isolated rail networks was elaborated.

NSB specific assumptions for KPI definitions

For some KPIs NSB specific assumptions were made. This was the case for:

- **Road motorway definition.** The road motorway definition for KPIs is twofold: there is the definition in the Regulation 1315/2013 "motorways, express roads or conventional strategic roads" Article 39 requires that roads in the core network corridor comply with the standards for motorway or express roads. And there is the definition based upon TENtec road parameters. "1=motorways, 5=Rural road with separate directions (Roads outside the boundaries of a built-up area)". Where possible the TENtec definitions were used, but in the case of road motorway definition the Regulation and TENTec definitions are not identical. This is apparent when looking at the roads of the Baltic States, there are rural roads with separated directions on the corridor, but these roads cannot be considered as express roads. For the KPI data collection the definition of the regulation 1315/2013 article 17.3 was used. Country experts have identified the sections that are expressways and not reported so in TENtec and this data has been taken into account for KPIs calculation and technical compliance assessment. The data source for the road motorway KPI was common knowledge or google maps when in doubt.

- **Road alternative fuels definition.** The number of alternative fuelling points on the expressway have been counted. The working definition states that:
  - "Number of fuel stations offering plug-in electricity, hydrogen, liquid biofuels, LNG/CNG, bio-methane or LPG along CNC road sections or within 10km from its junctions. (Units will be absolute number, not %)".
  - In the countries of Belgium and Poland it is not common to deviate 10kms to refuel. In countries such as the Netherlands or Germany it is not uncommon. The working definition of the KPI-Framework document was adapted for this corridor into: Number of fuel stations offering plug-in electricity, hydrogen, liquid biofuels, LNG/CNG, bio-methane or LPG directly accessible from the highway.

- For the nodes Ports, Airports and RRTs there is a parameter **"Availability of at least one terminal open to all operators in a non-discriminatory way and application of transparent, relevant and fair charges",** based upon Regulation 1315/2013, Article 25.1. For this parameter the assumption was made that most terminals are compliant and score 100% until there is "hard evidence" that this is not the case. In practice this means that if it is known that a terminal is operated by one operator only it is worth to look into this. Otherwise terminal accessibility was indicated via interviews or in some rare cases by looking at the geographical location.

- With regards to multiple terminals in one node location a methodology was used to find the **"best compliant terminal"** and to measure the characteristics of this terminal for the KPIs. For some designated nodes in the Regulation there can be the problem of multiple terminals. An airport can have multiple terminals or a RRT node can have multiple terminals. For NSB it was chosen that the "best compliant terminal" should represent that specific node.

- **Connection with rail for ports.** For the data collection it was assumed that definition allowed that ports which are nearby a rail connection can also be counted as a port connected to rail.

- **Isolated networks.** "Isolated network means the rail network of a Member State, or a part thereof, with a track gauge different from that of the European standard nominal track gauge (1435 mm), for which certain major infrastructure investments cannot be justified in economic cost-benefit terms by virtue of the specificities of that network arising from its geographic detachment or peripheral location;" (Regulation 1315/2013, Art 3(u)). KPI and technical compliance calculations have been carried for isolated networks at this stage of the study. This means for example that for the rail network, KPIs have been calculated even for the sections with larger track gauge.

3.4 KPI calculation results

Background information

The North Sea - Baltic corridor involves 8 countries on an axis East-West. GDP and employment is heterogeneous among the Corridor as the density of the network or the multimodal platforms. This highlights one of the particularity of this Corridor. The summary of Corridor background information is presented in the table below.

Table 7: Corridor background information

Indicator (2014)	Scope	BE	NL	DE	PL	LT	LV	EE	FI	Corridor
GDP (Mio Eur)	NUTS3 area	309 868	657 644	1 374 548	201 545	36 444	23 581	19 963	78 461	2 702 054
Employment (1000)	NUTS3 area	3 232	8 028	18 818	7 485	1 288	859	600	778	41 087
Population (1000)	NUTS3 area	7 924	16 829	40 294	16 963	2 943	2 001	1 316	1 585	89 856
Rail network (km)	CNC	397	477	1 783	1 442	848	594	442	3	5 986
Road network (km)	CNC	214	312	1 393	989	550	378	192	63	4 092
Inland waterway network (km)	CNC	192	995	900	0	0	0	0	0	2 087
Seaport	Seaports in CNC (Core)	1	2	4	0	1	2	1	1	12
Inland ports	Inland ports in CNC (Core)	0	0	0	0	0	0	0	0	20
Airports	Airports in CNC (Core)	3	6	11	0	0	0	0	0	16
RRTs	RRTs in CNC (Core)	2	2	5	3	1	1	1	1	17

Generic supply side KPIs

The summary of supply side KPIs are presented in the table below.

Table 8: Supply side KPIs of the NSB corridor

2014										
Mode	KPI	BE	NL	DE	PL	LT	LV	EE	FI	Corridor
Rail network	Electrification	100%	100%	97%	91%	18%	11 %	17 %	100 %	75%
	Track gauge 1435mm	100%	100%	100%	100%	13	0%	0%	0%	76%
	ERTMS implementation	32%	43%	0%	0%	0%	0%	0%	0%	7%
	Line speed>=100km/ in accordance with art. 39 para. 2. Item a) (ii) of the Regulation 1315/2013	80%	100%	100%	9%	25%	0%	0%	N/A	61%
	Axle load (>=22.5t)	100%	100%	100%	99%	100 %	100 %	100 %	N/A	100%
	Train length (740m)	100%	100%	100%	38%	100 %	100 %	100 %	N/A	85%
Inland waterway network	CEMT requirements for class IV IWW	N/A	100%	100%	N/A	N/A	N/A	N/A	N/A	100%
	Permissible Draught (min 2.5m)	N/A	100%	100%	N/A	N/A	N/A	N/A	N/A	100%
	Permissible Height under bridges(min. 5.25m)	N/A	100%	70%	N/A	N/A	N/A	N/A	N/A	86%

	RIS implementation (% of km on which the minimum requirements set out by the RIS directive are met)	N/A	85%	100%	N/A	N/A	N/A	N/A	N/A	N/A
Road network	Express road/ motorway	100%	100%	100%	56%	55%	8%	7%	100 %	70%
	Availability of clean fuels	100%	100%	100%	100%	100 %	100 %	100 %	100 %	100%
Airport	Connection to rail	100%	100%	100%	100%	100 %	0%	0%	100 %	88%
	Availability of at least one terminal open to all operators in a non-discriminatory way and application of transparent charges.	100%	100%	100%	100%	100 %	100 %	100 %	100 %	100%
	Availability of clean fuels	0%	0%	0%	0%	0%	0%	0%	0%	0%
Seaport	Connection to rail	100%	100%	100%	N/A	100 %	100 %	100 %	100 %	92%
	Connection to IWW CEMT IV	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	100%
	Availability of clean fuels	100%	100%	0%	N/A	100 %	0%	0%	0%	42%
	Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges	100%	100%	100%	N/A	100 %	100 %	0%	100 %	83%
	Facilities for ship generated waste	100%	0%	100%	N/A	100 %	100 %	100 %	100 %	83%
Inland ports	Class IV waterway connection	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	100%
	Connection to rail	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	100%
	Availability of clean fuels	33%	33%	0%	N/A	N/A	N/A	N/A	N/A	15%
	Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges	100%	100%	100%	N/A	N/A	N/A	N/A	N/A	100%
Rail Road Terminals (RRT)	Capability for Intermodal (unitised) transhipment	100%	100%	100%	100%	N/A	N/A	N/A	N/A	100%
	740m train terminal accessibility	0%	100%	0%	0%	N/A	N/A	N/A	N/A	12%
	Electrified train terminal accessibility	100%	100%	73%	0%	N/A	N/A	N/A	N/A	65%
	Availability of at least one freight terminal open to all operators in a non-discriminatory way and application of transparent charges	100%	100%	100%	0%	N/A	N/A	N/A	N/A	82%

The heterogeneous development of infrastructure between the Western and Eastern halves of the Corridor is explicit in the generic supply side KPIs calculation results. The most important examples relate to electrification, line speed and track gauge (for railway) and to the percentage of roads that are built to motorway or expressway standards. Generally low numbers are observed for ERTMS implementation and the availability of clean fuels. Below the country specific comments are provided.

Suggested specific supply side KPIs

The Corridor is divided in terms of compliance. The Baltic States are less compliant than Poland, Germany, the Netherlands and Belgium. There are numerous of exceptions to this, but this is the general representation, therefore higher targets were set only for Inland Waterways to have the uprated target of CEMT Vb class in addition to CEMT IV class. This means deeper waterways, wider waterways where applicable (for example in river bends) wider and longer locks, and more height under bridges. The suggested NSB specific KPI is presented in the table below.

Table 9: Suggested higher targets for specific supply side KPIs

Mode	KPI	TEN-T Target	Uprated Target	Unit	2014
Inland waterway network	CEMT Class for Inland Waterway	Class IV	Class Vb	%	55%
Seaports	CEMT Class for Inland Waterway connection	Class IV	Class Vb	%	86%

Generic demand side

Demand side KPIs show the dynamism of this Corridor with increases in three indicators over the 2013-2014 interval. Seaports passenger and freight flows have increased by 2% while airport passenger numbers have increased by 4%. Air freight flows have been stable. However inland waterways flows have decreased by 1%. The summary of demand side information is presented below.

Table 10: Demand side information

Mode	KPI	Unit	Baseline value (2013)	Index (Base=2013)	2014	Index (Base=2013)
CNC Inland waterway network	Total inland waterway freight flows	index (2013=100) (Tonne Kms)	N/A	100	69 476 952 658	
Core Seaports	Total passenger flows	index (2013=100) (Passengers)	23 899 800	100	24 488 531	102
	Total freight flows	index (2013=100) (Tonnes)	1 050 529 814	100	1 075 764 776	102
Core inland waterway ports	Total passenger flows	index (2013=100) (Passengers)	N/A	/	N/A	/
	Total freight flows	index (2013=100) (Tonnes)	422 458 095	100	419 900 789	99
Core Airports	Total passenger flows	index (2013=100) (Passengers)	166 765 226	100	172 612 675	104
	Total freight flows	index (2013=100) (Tonnes)	38 745 218	100	38 931 273	100

The projects described before will contribute to further development of NSB CNC and KPIs defined to be uses to monitor the progress made.

3.5 Urban nodes

3.5.1 Antwerp

Antwerp is situated on three corridors: the Rhine-Alpine, North-Sea Baltics and North-Sea Mediterranean corridors. It is a large port node, the second biggest port in Europe and the second largest urban area in Belgium. The node is linked to the road, inland waterways and (high-speed) rail networks.

The rail network has dense ramifications in the port area between the port terminals and the Corridor network. For some terminals the rail links could be improved as currently they do not accommodate 740m trains and some links are not electrified. The new North-South (including the Central Station upgrade) and Liefkenshoek rail connections have been built in the recent past to improve cross-city traffic and segregate freight and passenger itineraries. There is one major shunting yard in Antwerp north. The shunting yard, however, needs more capacity.

The inland waterway last-mile links have undergone upgrades in the last year with the opening of the new Deurganck lock. Mode switch to IWW is possible and widely used.

The road network is generally congested, especially the Antwerp Ring, affecting some itineraries at corridor-level but also local traffic.

There are over 20 freight terminals located in Antwerp to facilitate a mode switch on a journey. Most terminals are specialised in a certain type of cargo (dry bulk, liquid bulk, breakbulk or containers, etc.).

A number of projects and their planned investments will lead to improvements for rail, road and inland waterways. Two of the projects bringing improvements to the rail network by 2020 are the improvement of the last-mile connections in the port and the capacity upgrade of the shunting yard.

There are two other important projects that will bring substantial improvements to the movements of people and goods around the urban node. The Ring road of Antwerp will receive a capacity upgrade by 2023 - project that will cost more than 3 billion euros. The renovation of the Royer lock - vital for the transfer of IWW traffic within Antwerp - is expected to be completed in 2019.

3.5.2 Brussels

The Brussels node is part of the Rhine-Alpine, North Sea Mediterranean and North Sea Baltic corridors. The node encompasses rail (high speed), road and inland waterway links (the latter not in the alignment of the North Sea Baltic corridor) as well as Brussels Airport. Brussels is the largest urban area in Belgium and an important urban center for all three corridors.

Similarly to Antwerp, congestion on the road and rail networks reduces the quality of the last-mile connections. In general the lack of capacity on the rail network – especially in the North-South junction - diminishes the reliability of rail services, on some occasions even as far as at Corridor-level. A study on the increase of capacity of the North-South rail link is part of the project list. Diabolo – the rail connection to Brussels airport – is now operational and stands in the project list as an ongoing PPP.

The Brussels Ring road is also intensively used, as it lies at the center of the Belgian road network. In general, road congestion in Belgium has been under scrutiny for years as it is one of the direst of the OECD countries[5]. In Brussels, this translates into structural congestion that can have an impact on long-distance itineraries on top of the impacts on urban mobility. A project to improve the ring road capacity should be completed by 2022. The project will enable the separation of local and long-distance road traffic.

3.5.3 Amsterdam

The NSB, RALP and NSM corridors meet at Amsterdam. On this corridor Amsterdam is connected via waterways, road and rail. For this Corridor the relevant traffic directions are southbound towards Rotterdam and southeast towards Utrecht / Twente. Around the node there are other urban areas within short distance that have a sub-urban function due to their proximity. These are summarised as Zaandam, Haarlem, Almere and Amstelveen.

The node network is dense and, therefore, there are no specific issues that prevent the urban node from connecting to the core network, other than the local congestion. Most congestion is present (but not limited to) – at south of the city. At the moment, there are two passenger rail station upgrades: the central station and the south station Amsterdam-Zuid; the latter is expected to relieve pressure on the central station. The Schiphol air node is connected via rail to the Amsterdam node and from Amsterdam central station there are high-speed trains going in the southern direction, via Schiphol airport as well as high-speed trains going southeast towards Germany (via the RALP corridor route). Road congestion is present all around the city and multiple road projects are ongoing to increase capacity. These projects range from local solutions (junction based) to pan-regional solutions A1/A6/A9 Schiphol-Amsterdam-Almere. This last project costs around 5 billion euros.

The railway station upgrade is expected to be completed before 2020. The other projects should be finished in 2027 or later. The Schiphol rail passenger terminal upgrade completion date is unknown as it is in early stages.

3.5.4 Rotterdam

The urban node of Rotterdam, where the NSB, RALP and NSM corridors meet, contains a port, an airport and railroad terminals. The node is connected to the corridors by waterways, road and rail.

For this Corridor the relevant traffic directions are north-south towards Amsterdam/Antwerp and to the east for rail and IWW. To the west, the corridor stretches out towards the port area Maasvlakte, the tip of the port area. The port area has a length of about 35 km between the Maasvlakte and the Waalhaven. Throughout the entire urban node of Rotterdam there are terminals and sections important for inland freight transport. In the nearby area of Kijkfhoek there is a large shunting area at the end of the port railway line and on the junction of north-south and east-west traffic.

The passenger rail station was opened recently in 2015 and no major upgrades are needed in the near future. There are high speed rail connections in a north-south direction. There are no last mile connections missing barring access from the core network to the dense urban network of Rotterdam. There are two road projects to improve the last-mile access, currently hindered by congestion; that is the Blankenburg tunnel and A13/A16 bypass.

[5] http://www.keepeek.com/Digital-Asset-Management/oecd/economics/oecd-economic-surveys-belgium-2015/road-traffic-congestion-is-high_eco_surveys-bel-2015-graph41-en#page1

On the A16 north-south at Rotterdam connection there is a separate truck lane of 8 km long to separate trucks from cars. There are other initiatives such as positive peak hour bonuses on the A15 road to make better use of the road network and reduce peak hour congestion. The relevant road projects were completed in 2015 and 2016 to help reduce congestion. Other ongoing projects include the Theemswegtrace rail project. With respect to the airport a heavy or light rail connection is not economically viable under the current circumstances. Thus, no connection is foreseen other than the existing light rail-bus connection.

There are no synchronisation issues with respect to the project completion dates for Rotterdam.

3.5.5 Berlin

In Berlin the North Sea - Baltic, Orient East Mediterranean and Scandinavian Mediterranean corridors meet. There is no barrier for changing corridors within the urban node.

In Berlin four major passenger stations are located, an airport, one shunting yard, two freight terminals and three inland ports. The last-mile road connections face congestion. Rail links are without barriers. Inland waterway is also free-moving in the navigable rivers of Berlin. Some rivers in the city centre are used for passenger vessels rather than freight. The last-mile connections to the Berlin-Brandenburg International airport are complete, the airport itself has yet to become operational. The current international airport at Tegel will be closed once the new airport is operational.

The node has a motorway road ring around Berlin and a regional ring in the urban network. The rail has direct lines to the main station and a rail ring as well. Freight traffic has to use the rail ring outside the city centre. High speed rail lines have their start and end point in Berlin main station.

Mode switch options within the node are available and no projects are present on the project list to improve the time or quality of a mode switch.

Regional and long-distance rail passenger traffic faces congestion at the Spandau station and on the west-east connection (Stadtbahn, part of the North Sea - Baltic corridor). There is no project to solve this capacity issue. It can be solved by increasing the efficiency of the network (adjusting passenger transport concepts) and/or changing the transport routes and shifting the bottleneck. There are other capacity issues present today, but these are expected to reduce with the implementation of the 9 rail projects identified on the project list. There are four road capacity projects - total cost of 1.018 billion euros. The other projects on the project list are airport projects.

The completion date is not known for every project on the project list, but for the 8 projects where dates are known, 2021 is the latest date.

3.5.6 Bielefeld

Bielefeld is connected via rail on the Corridor and has a passenger station. It is not identified on the RFC 8 corridor as a freight node. The node is overlapping with other corridors.

There is no long distance rail traffic bypass at the node. The motorways are located such that there is a bypass around Bielefeld.

No projects have been identified on the project list concerning Bielefeld.

3.5.7 Bremen

Bremen is the start/end point of the North Sea - Baltic, Orient East Mediterranean (OEM) and Scandinavian Mediterranean corridors. The alignment of the NSB corridor overlaps with the OEM.

The urban area of Bremen includes the Bremerhaven and Willemshaven port areas. In addition, there is the Bremen inland port in the city, the city Rail-Road Terminal and the nearby airport. The node handles a large amount of containers which are often shipped to the hinterland by rail. There are issues present with respect to the rail as the western link to Willemshaven is not electrified. Recently projects were completed to further electrify the rail last-mile connection and to facilitate longer trains in the Bremerhaven area itself.

The rail passenger station of the SCM corridor is located in the city centre. This does not facilitate a quick transfer for long-distance traffic of the OEM or NSB corridor.

There is no rail bypass from the port area and the city centre. This creates a lack of capacity around the central passenger station. Within the urban node there is no restriction for IWW traffic, further south on the Weser River there is a restriction, which is analysed in the assessment of the network.

The remaining issue in the Bremen urban node is the lack of a rail bypass to separate passenger and freight. This creates a lack of rail capacity within Bremen. In addition, it is not certain if all rail bottlenecks to and from the ports of Bremen will be covered by projects.

In the NSB corridor project list there are nine projects at Bremen. The rail projects relate to the improvement between the rail nodes at the port area. Four road projects around the city are planned. One air passenger terminal upgrade project is also on the project list.

3.5.8 Hamburg

The corridors NSB, OEM and SCANMED meet in Hamburg. The SCANMED is oriented to a north-south alignment and the other corridors overlap with an east-west alignment. There are no restrictions for transfer between corridors other than occasional capacity problems.

The Hamburg node is one of the largest urban nodes on the Corridor. The port present at the node is the third largest port in the Corridor in terms of cargo handling. The last mile infrastructure characteristics are not an issue, but a lot of capacity is requested at the node for rail and road.

With respect to the rail a by-pass is absent and this creates capacity shortages. The road network offers two bypasses east and west of the city centre. The western road bypass is closely located to the port area. The mode switches for rail-road, port-inland waterways and air-rail transport are without any issues. There is a study underway on additional rail links to the Hamburg airport. There is a shunting yard located in Maschen south of Hamburg.

There are 30 projects identified at a cost of 3.8 billion EUR. Capacity road projects are on the project list - the objective to improve the situation on the east motorway. The western motorway relates the SCANMED corridor. In relation to the rail projects, there are around 26 infrastructure projects to improve capacity for passenger and freight. The freight capacity is expected to mostly improve in the port area itself. This includes the project to upgrade the Kattwyk Bridge. There is insufficient information available on the timing of projects to assess synchronised implementation of projects. For the projects where the completion date is known, the date ranges from 2017 to 2030. This implies that the capacity situation will be solved at the beginning of 2030. This is consistent with the calculations presented in the German national forecast.

3.5.9 Hannover

The corridors NSB, OEM and SCANMED meet in Hannover. Hannover urban node is connected to the Corridor via rail, inland waterways and road. The road and rail connections have adequate last-mile connections from the Corridor to the urban node network. The inland waterways last-mile connections are of similar quality as the Corridor network itself.

At the rail network around the city centre it is possible to change between corridors without problems, this is also the case for inland waterways and road. In addition the rail network offers a bypass functionality in the Celle-Lehrte - Hildesheim section. High-speed passenger services are offered in an all directions.

Hannover has four inland ports, three terminals, an airport, one major shunting yard and one central station. The nodes are all connected to the network and facilitate a mode switch without issues. The inks within the urban node are not without congestion, but other than that there are no further issues with bottlenecks inside the urban node.

Nine projects in total are identified within the node for the North Sea Baltic corridor. Two road projects are included on the NSB corridor project list, the other two corridors have more projects. All projects are expected to be completed by 2023, except for an initiative to create a Rail-Rail Terminal at Lehrte, with additional Rail-Road capacities - this project is expected to be completed by 2025. Three projects on the project list relate to the improvement of the terminal capacity at the airport and the improvement of road access to the Air Freight Terminal.

3.5.10 Cologne

The city is located on the North Sea - Baltic and Rhine-Alpine corridors. The waterway belongs only to the Rhine-Alpine corridor. The alignment is mostly overlapping and connectivity in between corridors coincides with the overall mode switch options of the urban node.

The city of Cologne (Köln) is located south of the Ruhr area. An area with a high population and a high number of industries with multiple connections to other urban nodes. The economic input and output of the Ruhr region is comparable to smaller EU countries.

The road network has a ring connection where a capacity upgrade is required. There are two parallel rail lines on the east and west bank of the Rhine river. In theory these could work as backup lines for each other, however their daily use is intensive.

The urban node contains passenger stations, freight terminals, shunting yards and an airport. Last mile rail connections are compliant and no projects are foreseen.

On the project list there are two IWW projects on waterway access to the inland port.

The projects are about capacity upgrades at the north section of the Cologne ring road. Two inland waterway projects are on the list to upgrade the ports itself. One rail capacity project is part of the RALP corridor, which has a beneficial effect on the NSB corridor of increasing capacity on the rail terminal. Overall when the projects are complete with a few remaining gaps in Cologne.

3.5.11 Warsaw

The Warsaw urban node is present on the NSB and BAC corridor. It includes also Rail-Road Terminals, a passenger railway station and two airports (Warsaw Chopin Airport and Warsaw-Modlin Airport. The latter one is not included in the CNC). There are overlaps in the alignments, so the connection between the corridors is not an issue.

The railway lines along NSB and BAC meet in the Warsaw Central Station in the city centre. They also enable a direct connection to Rail-Road Terminals situated in the metropolitan area. Warsaw has an outer (southern) railway bypass and inner (northern) railways mainly used for rail freight. All major railways in the node were, are or will be subject to major modernisation investments aimed at increasing capacity, service quality, and (to a lesser extent) speed. In the urban areas the speed will remain below 160 km/h.

The proposed high speed line "Y" (Warsaw – Łódź – Poznań / Wrocław) would substantially increase the node connectivity along the NSB corridor. This project is currently on hold due to insufficient funding.

The development of motorway / expressway network in the Warsaw node is still ongoing. An appropriate ring road has been completed only in the northern, western and, partially, southern part of the metropolitan area. Completion of the southern ring road is scheduled for 2020. Furthermore, there are two projects which will connect the node with eastern and north-eastern part of the corridor: the S8 Marki bypass (completion 2017/2018) and A2 motorway Warsaw – Mińsk Mazowiecki (2020). Four projects are aimed at improving the last mile connections inside the urban area.

These investments will ease the traffic congestion along the NSB corridor towards the north-east (Via Baltica) and east (Belarus). However, congestion in peak hours will remain an issue – especially on the bridges over Vistula.

New investments around Warsaw Chopin Airport are planned to improve service quality (road and public transport access). Additionally, a new air freight terminal is planned, including the connections to the road and rail network.

The latest project will be completed (other than the high speed line) in 2024, which does not present a synchronisation issue. There are 3 rail projects, two to be completed in 2018 and 1 in 2024.

3.5.12 Łódź

The city of Łódź is a BAC and NSB corridor node. It has an outer motorway ring road: the northern bypass (A2 motorway, along the NSB corridor) and a western bypass (A1 motorway, along the BAC corridor). The last mile connections to the motorways are through nearby national & regional road network. There are Rail-Road Terminals in Łódź and Stryków (close to A1/A2 motorway junction).

Łódź does not have any direct connection to railways along BAC & NSB railway network. The Conventional E20 main line offers only direct connection between Poznań and Warsaw. The proposed high speed line "Y" (Warsaw – Łódź – Poznań / Wrocław) would substantially increase the node connectivity along the NSB corridor for passenger traffic. This project is currently on hold due to insufficient funding.

The key project in Łódź is the construction of an underground diametrical railway line Łódź, which will improve local, regional and national accessibility to the urban node. The construction should begin in 2018. The project list also includes a number of public transport (trams), rail and road improvements. The end date for all Łódź rail projects is before 2022 - except for the completion of the high-speed line for which the date is unknown.

3.5.13 Poznań

The NSB corridor meets the Baltic Adriatic corridor in the Poznań node. There are a number of Rail-Road Terminals, an airport and a main passenger station. Most terminals are directly located on the Corridor lines with the exception of the container terminal Kobylnica.

The freight trains are diverted outside the city centre and an effective bypass is in operation. Issues in the node include slow train movement in terms of line speed and insufficient capacity. A major line capacity increase project is ongoing to the east of Poznań.

The proposed high speed line "Y" (Warsaw – Łódź – Poznań / Wrocław) would substantially increase the node connectivity along the NSB corridor. This project is currently on hold due to insufficient funding.

The only motorway is the A2, serving as southern bypass of Poznań, which has a last mile connection to the urban area. The eastern (S5 expressway) and western (S11 expressway bypasses are also present. There are two road modernisation projects on the project list.

The main passenger rail station is expected to undergo an upgrade to improve the passenger service quality. The projects for Poznań are expected to be completed by 2022 at the latest (except for the high speed line).

3.5.14 Vilnius

The Vilnius node has an airport, (main) rail station and a Rail-Road Terminal. The NSB corridor is the only corridor connected to Vilnius.

The main station is directly connected to the core network with working last mile connections to the terminal and airport. There is no motorway ring road in Vilnius. The railway's bypass and freight traffic is mostly east-west oriented and not north-south similar to the alignment of the Baltic States on the Corridor.

Due to the fact that there are three projects in Vilnius at medium costs, there is not much change expected in the current infrastructure situation. There is one project to electrify Vilnius railway junction by 2020. The other two projects will be completed before 2018 and 2021.

3.5.15 Riga

Riga is the central urban node in Latvia. The NSB corridor is the only corridor connected to Riga.

There are central junctions covering three principal modes of transport, a seaport which is the largest port in Latvia, an airport which is the largest international airport in the Baltic States and Central train station. These modes are all connected via last mile road and rail links, except for Riga International Airport where a rail link will be established with the completion of Rail Baltica project. There is a road ring around Riga that is one of the most intensely used main road sections in Latvia, however the northern section is missing. There is no freight train traffic bypass that would link port terminals on the left bank of river Daugava to the main marshalling yard (currently the trains use route via city center). Finally, airport terminal capacity could be improved and alternative fuel availability enhanced for all key junctions.

The projects from the overall corridor list address the issues mentioned above. One of the largest projects relate to an upgrade of the airport passenger terminal (to be completed by 2023). Other projects related to network capacity are with respect to improvement of the ring road by adding two-level crossings and additional lanes as well as constructing the Northern Bypass and the urban road network (including the connections to key junctions). In relation to the rail, there are two key projects: Riga rail junction and the port railway line to the northern port area Kundzinsala which will also improve the capacity of the infrastructure.

In terms of timing, the airport terminal capacity project is expected to be finished earlier than other multimodal connections (e.g., Rail Baltica project). The main ring road enhancement projects' completion date is anticipated to be between 2017 and 2034.

3.5.16 Tallinn

The urban node in Estonia is the capital city Tallinn. The NSB corridor is the only corridor connected to Tallinn.

Last mile links are required as the node is further developing the Muuga cargo port area and the Old Harbor passenger terminal area. The development needs often arise from connections to the new Rail Baltica cargo and passenger terminals and from the expected increase in passenger and cargo traffic. For road and rail there is a further need for bypasses or ring road/rail networks. Options to change modes can be improved at the Ülemiste multimodal passenger terminal.

Congestion is present at the road network, especially in the Tallinn Ring Road and the access road to the Old Harbor. While congestion is not an issue for the rail network, a city bypass is required for the dangerous cargo. Finally, there is the possibility to improve the city center environment.
The project list covers all of the improvements needed for the last mile links. With respect to the roads, there is the Tallinn Ring road project and the new road connection to the Old Harbor. In relation to the rail, with the exception of the 1435mm Rail Baltica, the largest project relates to the city bypass connection to Paldiski City. The terminals necessary to change modes in the project list are Muuga, the Old harbor, Ülemiste and the Tallinn airport passenger terminal. In addition there is a project to improve the city center public space. Most projects are expected to be completed by 2020, exceot for the Muuga port freight terminal (2030). The upgrade of the last mile connections is expected by 2020 which will lead to additional demand, and as a result the Muuga freight terminals would require a capacity upgrade.

3.5.17 Helsinki

The Helsinki node overlaps with the SCM corridor. The rail connection of the two corridors at the west of the city can be improved.

Helsinki consists of an airport, several ports for passengers and freight, rail stations, including a shunting yard. An upgrade of the last-mile connections, long distance connections and improvement within the urban nodes are necessary. The current last mile rail connections to the ports, the airport and the urban area are not sufficient. The ring road lacks capacity and improvements are also needed. Extra facilities to provide multimodal transport are needed for the maritime port terminals (port of Helsinki West, South and Vuosaari). The quality of the railway lines within the node can be improved for the Helsinki shunting yard.

The mentioned issues at Helsinki node are all covered by projects. There are two shunting yard projects, one project for a port terminal upgrade and two projects with new railway lines in the urban area. The Rail joker line is, as well, a project to connect the east-west urban rail to long distance rail, the airport and the port. Furthermore, the Rail joker line is expected to improve the connection between the NSB and SCM corridors. Finally, two road projects will improve the ring road of Helsinki.

The main issue with the Helsinki projects is funding as opposed to timing. There is not sufficient budget foreseen to complete all the necessary works. This will also have impact on timing. Currently there are seven projects foreseen to be completed by 2020 or earlier. The latest project is the Helsinki freight yard is expected to be completed by 2025.

4 Project list analysis

The project list – including planned projects by transport mode, member state or cross border – was developed in 2016 and 2017. The project list was developed during the Corridor Study based on project stakeholder consultations. The project list analysis – for which stakeholders where consulted in May 2017 - is presented in this chapter.

The project information is analysed within the context of: infrastructure compliance; technical requirements; and KPIs described in the previous chapter because the projects contribute to the further development of Corridor.

4.1 Overview of the projects

Number of projects and planned investments

The North Sea – Baltic project list of July 2017 contains **530 projects** with a **total value of 96.1 billion EUR.**

Figure 5. Number of projects per category

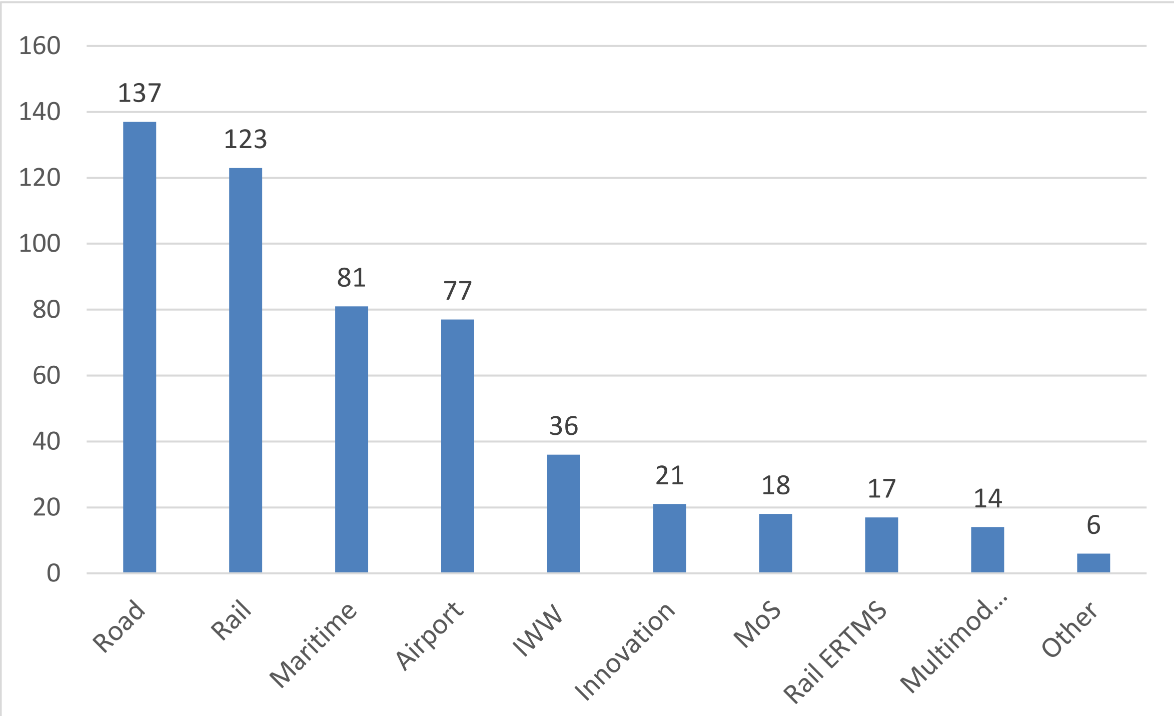
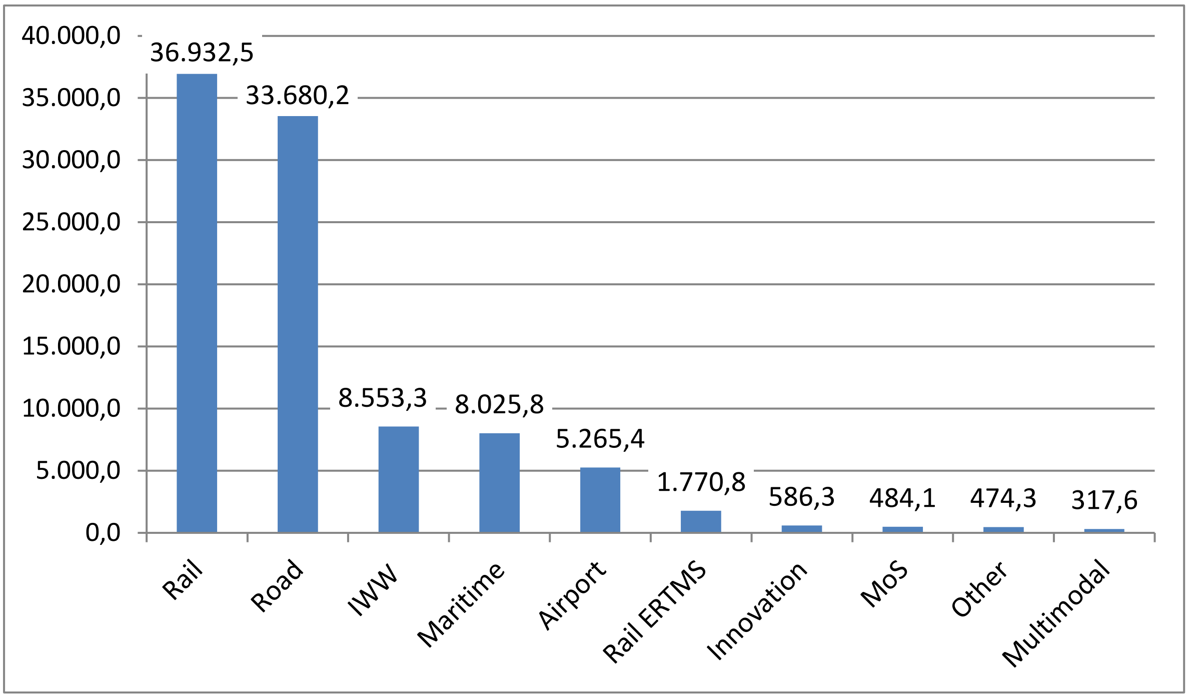


Figure above shows the investments per category. More detailed analysis about investments per major investment categories is provided below.

Figure 6. Investments per category [M EUR]



Investments in rail

The planned investments per transport mode highlight the importance of the railway development on the NSB corridor. **Rail** is the largest proposition. **36.9 billion EUR** (+ 1.8 billion EUR for Rail ERTMS projects) out of a **total of 96.1 billion EUR** or 38% is assigned to the development of new rail connections and to the elimination of bottlenecks.

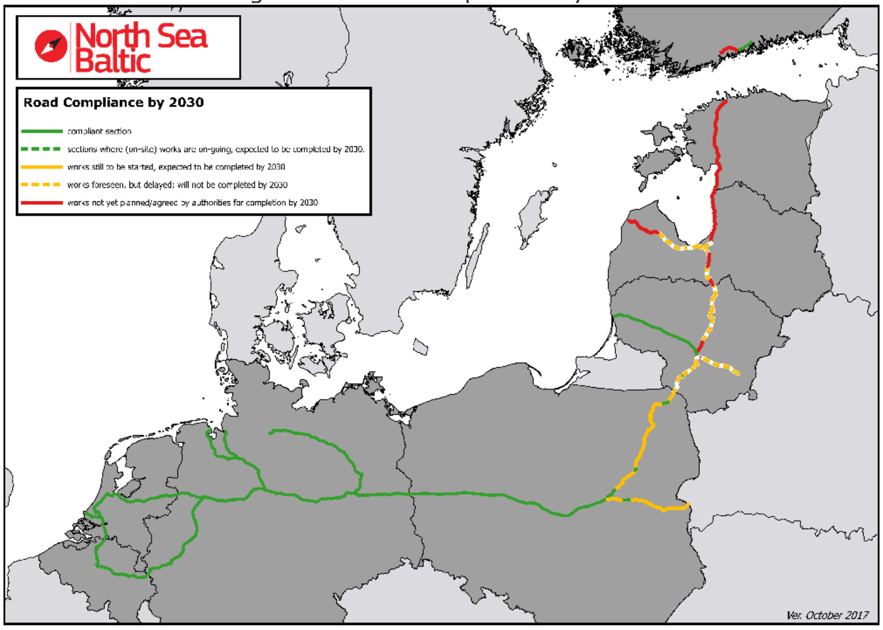
The need for such a significant investment is highlighted in the technical compliance with certain requirements of the TEN-T Regulation. Investments relate to: the Rail Baltica project (5.9 billion EUR); electrification of lines in the Baltic States (outside Rail Baltica project, close to 1 billion in LV and LT); new and upgraded lines in Poland (8 billion EUR); electrification, speed and capacity issues in Germany (9 billion EUR); speed, interoperability and capacity issues in Belgium (1.7 billion EUR); and connection to the airport and other projects in Helsinki (1.7 billion EUR).

Investments in road

The portion for Road is **33.7 billion EUR** or 35% of the total investments. This is because most road projects are dealing with the upgrade of already existing infrastructure, such as adding additional lanes or renewing bridges, which require significant investments. However, the required financing is an intermediate observation as there is missing information on the investments of 34 projects (6%).

The planned investments will help solve congestion problems in Germany (9 billion EUR), The Netherlands (8 billion EUR), Belgium (3 billion EUR). The project list covers the existing gaps in the east of Poland which will enable a connection to the Baltic States via motorway. Significant improvements are also planned in Latvia amounting to 3 billion EUR focusing on the Riga urban node and the improvement of some part of Via Baltica, as well as in Lithuania amounting to 736 million EUR. The works do not coincide time-wise with: the Polish sections which are expected to be completed by 2020; Lithuanian sections which are expected to be completed by 2022; and the remaining Baltic States' sections which are expected to be completed, by possibly, 2030. Additional investments would be needed in the Baltic States to reach compliance with the TEN-T standards for expressways by 2030.

Figure 7. Road compliance by 2030

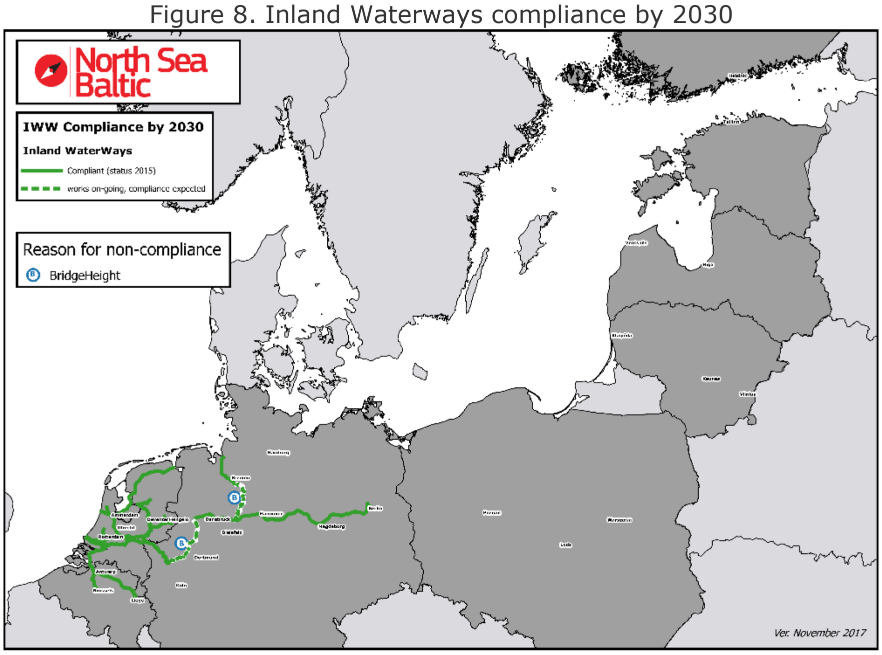


Investments in IWW

The largest investments in IWW will be made in Germany (5 billion EUR) and will mainly address compliance issues and in The Netherlands (2 billion EUR).

Given that projects in Germany have commenced – to achieve bridge height compliance - the IWW network is projected to be fully compliant with the TEN-T Regulation requirements by 2030, as demonstrated in the map below.

Figure 8. Inland Waterways compliance by 2030



Beyond compliance, there are eight projects covering a CEMT V upgrade. Two of the projects are Zaandam and the Twente Canal. Assuming that the CEMT IV projects are finished by 2022-2024 and taking into consideration the time required to complete the rest of the CEMT Va projects, the earliest the corridor is foreseen to be CEMT Va compliant is 2026-2028- based on the existing project list. The last project to finished is the IJssel section.

Investments in Maritime

The investments in the maritime sector mostly relate to investments in ports in: Estonia (1 billion EUR, port of Tallinn); ports in Latvia (2 billion, ports of Riga and Ventspils); ports in Germany (5 billion EUR); and the Netherlands (1.3 billion EUR).

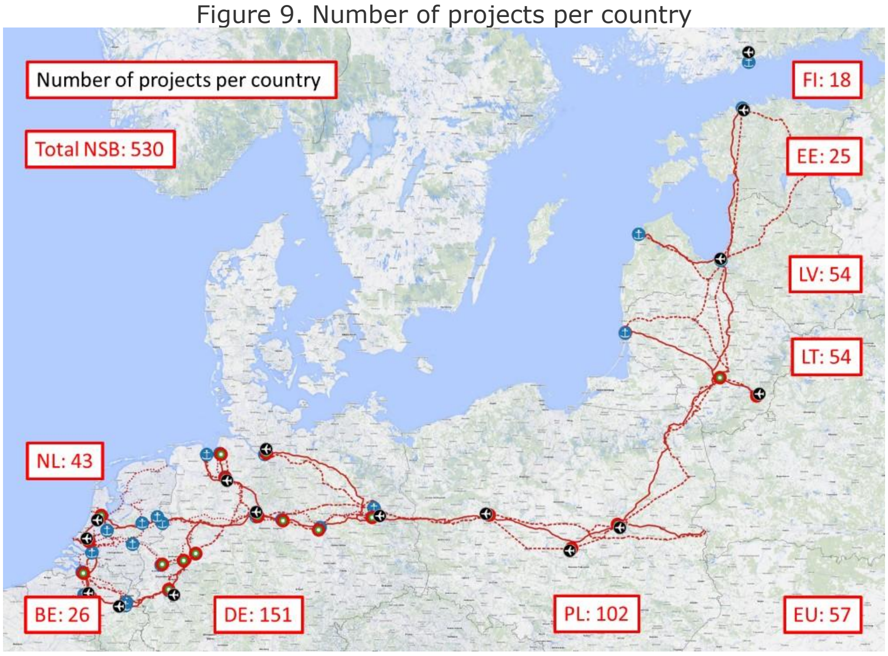
Investments in Airports

The investments in airports mostly relate to investments in airports in: Finland (3.1 billion EUR[6]); Germany (0.66 billion); and Poland (0.37 billion).

Project distribution across NSB corridor countries

As shown in the figure below, the distribution of projects across the countries located on the Corridor is unbalanced. Germany (28%) and Poland (19%) combined is already almost 50% of the total number of projects.

Figure 9. Number of projects per country

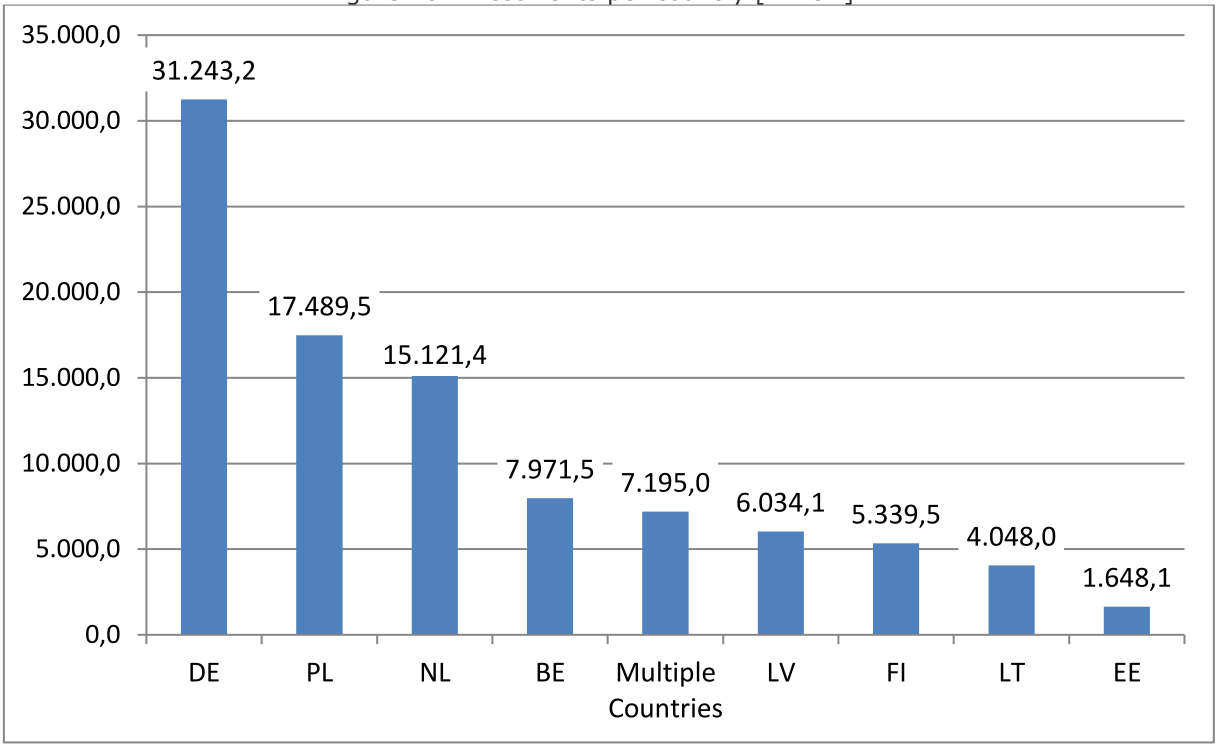


The number of Multiple Country projects is significant and amounts to 57 projects, many of which have received support via the 2015-CEF Transport Call for Proposals. The midfield is formed by: Latvia (54 projects or 10%); Lithuania (54 projects or 10%); and The Netherlands (43 projects or 8%). Last but not least there is: Belgium (26 projects or 5%); Estonia (25 projects or 5%); and Finland (18 projects or 3%).

The figure below presents the investments planned per country across the NSB Corridor.

[6] 773 million EUR from the project have already been completed.

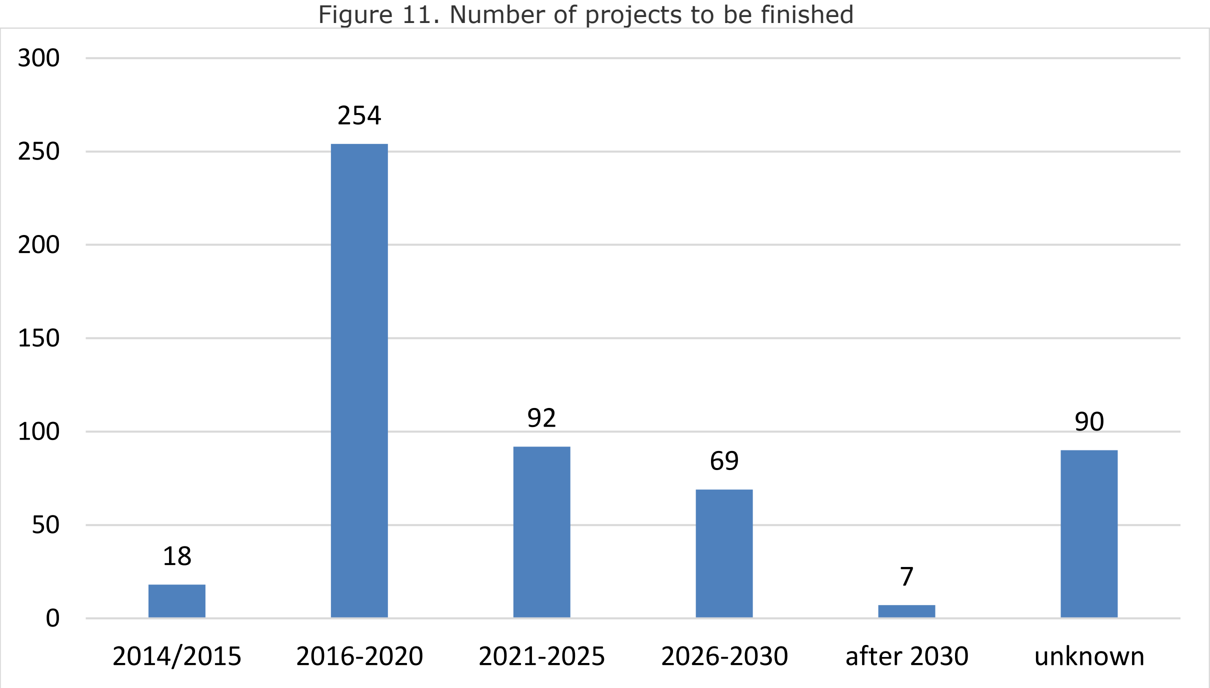
Figure 10.Investments per country [M EUR]



The timeline of planned investments

As shown in the figure below, more than half of the total number of projects in the project list will be implemented by the end of 2020 (51%). This clearly shows that the realisation of a large number of projects is already ongoing. Another 30% will be finished by 2030, which is just in time for the fulfilment of the TEN-T technical compliance requirements.

Figure 11. Number of projects to be finished



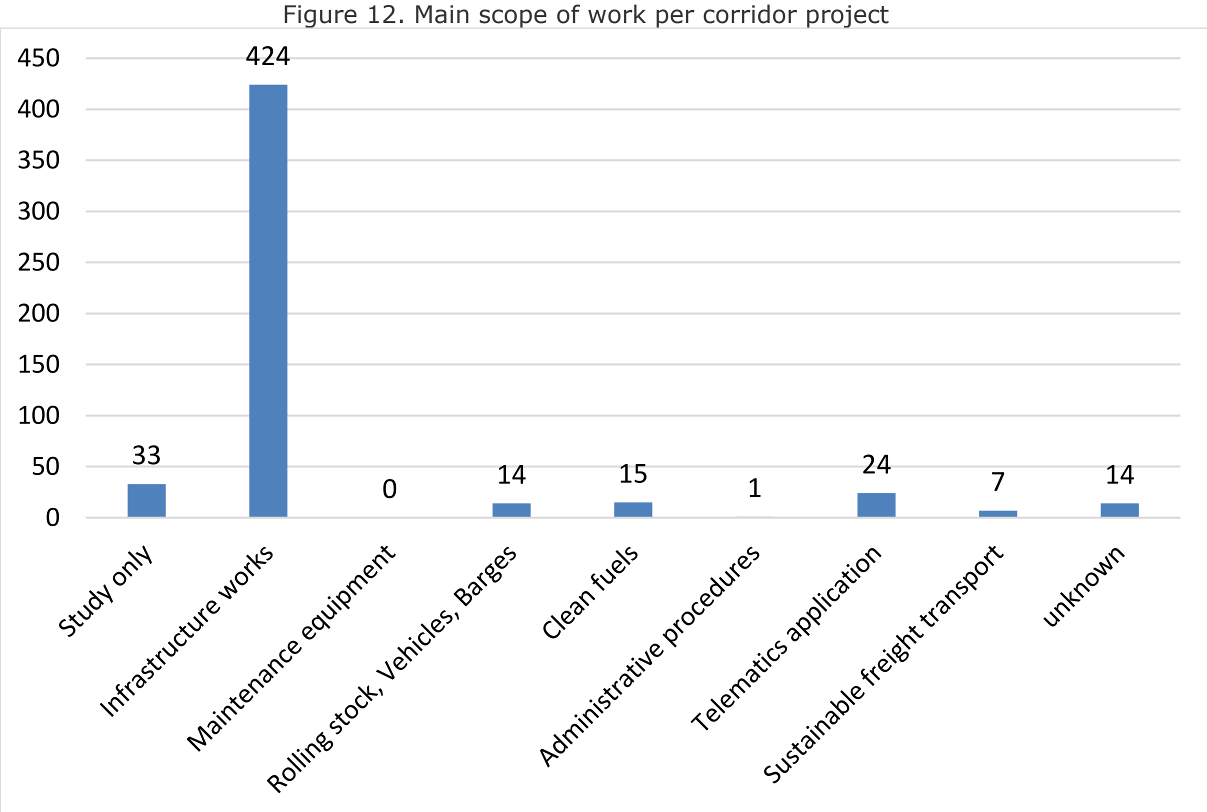
Only five road projects and two maritime projects will not be finished by 2030. The road projects would improve the KPI Express road/motorway and therefore should be speeded up in order to complete them by 2030 at the latest. The two maritime projects do not influence the achievement of the TEN-T Regulation requirements for the NSB corridor because all the projects are to improve sections which already fulfil the requirements.

Furthermore, there are 90 projects (17%) where the end-date of the project is not yet known. This missing information is partially due to actual uncertainty about the end date ("open") and partially due to unavailability of data.

Project allocation by scope of work

According to expectations the vast majority of **424 projects** (80%) deal with **infrastructure works** (rehabilitation and/or upgrade and/or new construction, partially combined with other scopes of work). Pure Telematics projects mostly deal with ERTMS, ITS applications, RIS or SESAR, depending on the respective category. Rolling Stock projects predominantly refer to the equipment of locomotives with ETCS components. Next to these "work oriented" activities, 33 (6%) of the NSB projects focus on providing a study. For an overall overview, the scope of work for the NSB projects is displayed in the figure below.

Figure 12. Main scope of work per corridor project

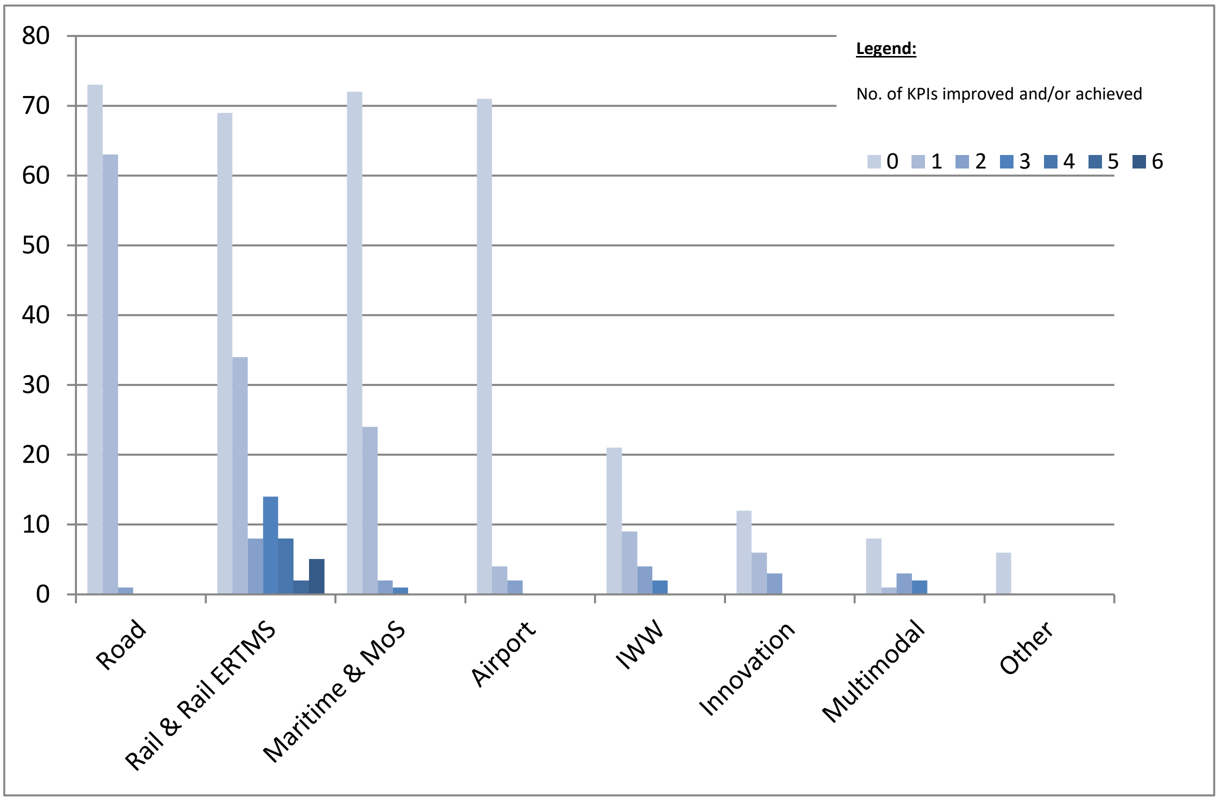


Project contribution to Corridor's compliance with technical criteria defined in TEN-T Regulation

Many of the projects will contribute to the technical infrastructure compliance with the requirements set in TEN-T Regulation and to KPIs defined to measure the development of all core network corridors. **198** of overall 530 projects (37%) **contributed to at least one KPI** (achieved and/or improved). As the figure below visualises, Rail projects particularly feature a high contribution rate with up to six KPI contributions. Within this context, four or more KPIs mostly are an indicator for (totally or partially) new built rail lines.

In contrast, only a few airport projects improved or achieved the KPIs targets. This is due to the fact that the majority of the airport infrastructure did not need any additional projects in order to fulfil most TEN-T requirements, thus the respective projects provided no progress with respect to achievement of these target values.

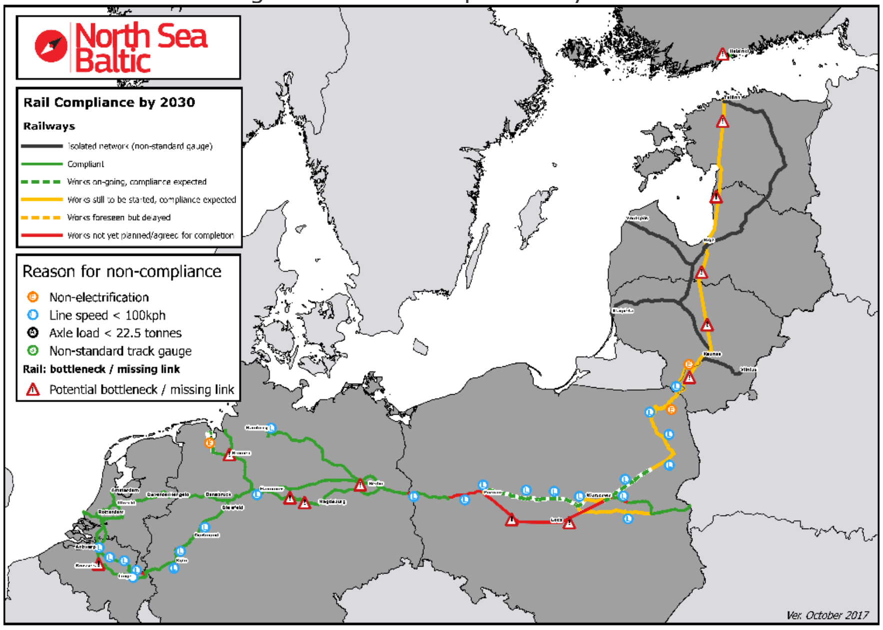
Figure 13. Contribution of NSB projects to the KPIs by category



The fact that about 63% of all NSB projects showed no KPI contribution does not mean that these projects have no relevance for the Corridor development. They do not match the selected KPIs but instead, they have an impact on other criteria, particularly on capacity, safety, high-speed rail connections or noise reduction.

Almost 100 projects requiring 30 billion EUR investment will contribute significantly to the improvement of technical compliance issues. This shown in the map below which demonstrates the projected compliance situation by 2030 based on the current project list.

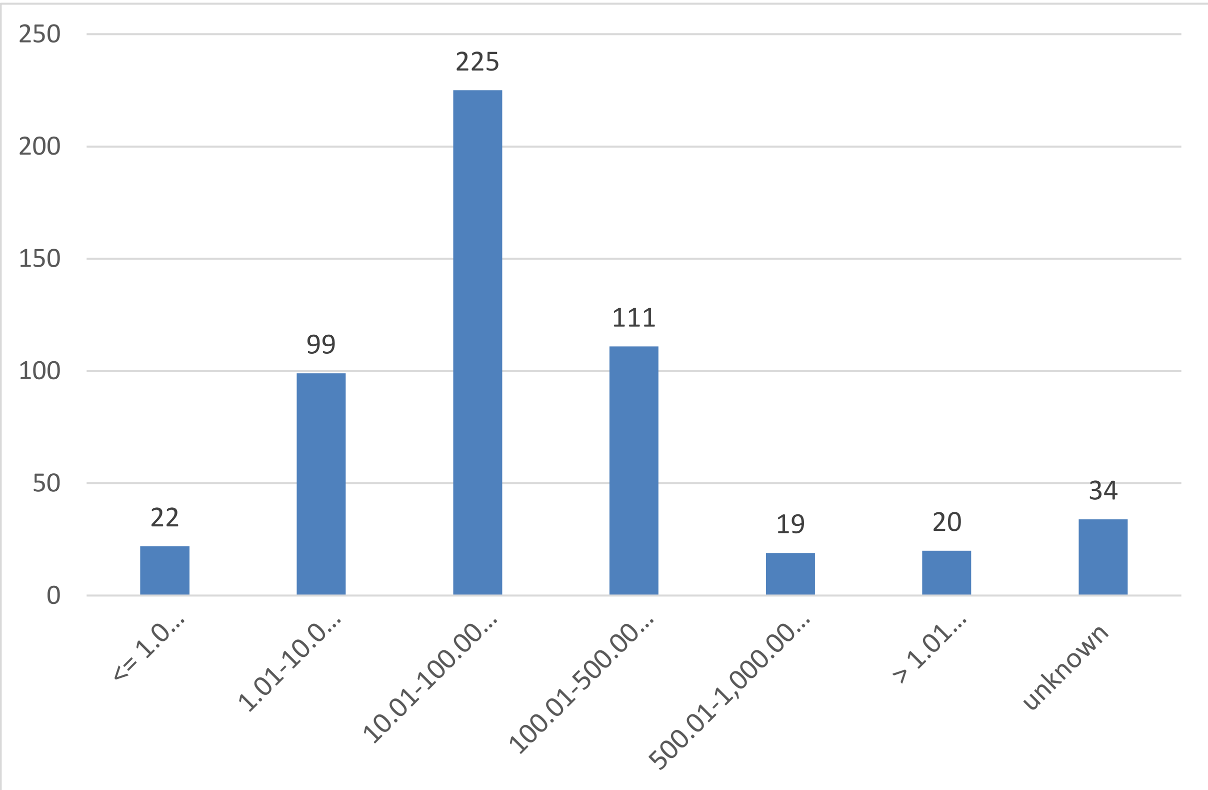
Figure 14. Rail compliance by 2030



Projects per investment class

The project specific costs show a large variety, ranging from 10,000 EUR for a small study up to 5.8 billion EUR for the Rail Baltica new construction project (this figure does not include upgrades in Poland and specifies the investment in the Baltic States only). As the figure below points out, most of the projects are attributed to the classes "10-100 M EUR" (42%), "100-500 M EUR" (21%) and "1-10 M EUR" (19%).

Figure 15. Number of projects per investment class (M EUR)



5 Project clustering

5.1 Clustering methodology applied

Project clustering was performed to better assess the current status of project relevance and maturity. The project clustering was based on the project list. The key objective of clustering was to analyse the planned Corridor investments based on a predefined criteria. Common methodology was applied by all Core Network Corridors using two criteria groups.

- **Project relevance - in relation** to the purpose of the intervention and its capacity to meet TEN-T and EU priorities, as set by Regulations 1315/2013 and 1316/2013 (reflected by the technical parameter and bottlenecks tackled by the intervention). Project relevance accounted to 60 % from the overall rating.

- **Project maturity -** as derived from the assessment of project's technical and institutional readiness, financial/economic maturity and social/environmental maturity. Project relevance accounted to 40 % from the overall rating.

Greater weight has been assigned to **project relevance,** given that the aim of the exercise was to assess the contribution on Corridor development as defined by the Regulation. Project **maturity** also has a significant weight, since the actual progress in Corridor development is strictly related to the full readiness of the projects, since the amount of time available for their completion is now relatively limited if compared to the typical multi-year time span needed to achieve the full project cycle from the planning stage to work finalization. Projects already concluded and project containing only studies were not included in the scope of clustering exercise.

Project relevance

The identification of Project Clusters meets the need to **classify the projects** belonging to the CNC projects list into **homogenous categories** with respect to the requirements of the Reg. (EU) N°1315/2013 and to map them accordingly. Each Cluster is conceived as a set of projects capable to address different levels of technical requirements and likely to produce a certain level of impact on the CNC infrastructure per each transport mode.

As a **general rationale** for the clustering exercise, which is valid for all transport modes, the following **key-drivers** need to be underlined:

- **Clustering exercise is based on the transport mode.** For each project, related to a specific transport mode, 3 clusters have been identified (together with a residual cluster) which mainly reflect the project relevance according to TEN-T priorities stated by the Regulation. In order to maintain their visibility, new technologies and innovation projects (according to Article 33 of Regulation 1315/2013) will be assessed in a separate clustering exercise, avoiding any connection with any transport mode.
- **Cluster 1** generally includes **pre-identified projects** (as listed in Regulation 1316/2013 Annex I-part II) **and last mile rail/IWW links** to RRT, Airports, Seaport and Inland ports; as well as ERTMS, MoS and SESAR Projects.
- **Cluster 2** regroups other telematics applications (VTMIS, RIS, ITS etc.), depending on the transport mode.
- **Cluster 3** includes projects with specific criteria to each transport mode (see table hereafter).

- **Residual Cluster** includes projects not specifically addressed by any requirement of the Regulation.

The clusters per transport mode are defined below.

Table 11. Rationale for the clustering exercise per transport mode

Transport mode	Cluster 1	Cluster 2	Cluster 3	Residual cluster
RAIL and ERTMS	PRE-IDENTIFIED PROJECTS ERTMS Deployment Achievement of compulsory technical parameters	Projects eliminating current or expected capacity bottlenecks (according to TMS carried out in 2013)	Projects contributing to the achievement of technical parameters others than compulsory ones (e.g. gauge etc.)	Remaining projects
IWW and inland ports	PRE-IDENTIFIED PROJECTS ECMT Class >= IV Last mile rail connection to inland ports	RIS deployment & projects contributing to good navigation status	Capacity expansion & safety interventions	Remaining projects
Road	Pre-identified projects Upgrading to express road/motorway Creation of rest areas/parking spaces	ITS	Upgrading/new construction within or bypassing an urban node	Remaining projects
Airports	Pre-identified projects Horizontal priority for air (SESAR) Last mile connection to core rail network	Last mile rail and road connections to other core airports	Airport capacity expansion	Remaining projects

Seaports	Pre-identified projects) MoS Last mile connection to core rail + IWW network	VTMIS Seaports capacity expansion within the port area	Last mile connection to road	Remaining projects
Multimodal	Pre-identified projects Projects contributing to RRT rail or IWW accessibility	Projects contributing to RRT Road accessibility	Projects contributing to RRT capacity	Remaining projects

The identification of Clusters has a progressive approach: projects belonging to Cluster 1 cannot be considered for Cluster 2 and so on. Finally, the Residual Cluster will contain a list of all those projects that don't belong to cluster 1, 2 or 3.

A separate clustering exercise was carried out on Projects related to new technologies and innovation including all innovation projects with the exclusion of ERTMS, VTMIS, ITS, SESAR, RIS which will be assessed on the basis of their respective transport mode.

Calculation of the project relevance

The main aim of clustering exercise is to allocate each project to one of the four defined clusters, based on the agreed criteria; whereas the highest relevance belongs to cluster 1 and decreases linearly up to cluster 4, which presents the projects with the lowest relevance.

Project maturity

Project maturity represents the **second criteria group** to be evaluated for the project prioritization. All the projects resulting as "recommended" for CEF funding were considered mature *ipso facto*. This consideration reflects the fact that projects submitted and approved for CEF funding generally must have a high maturity level.

Then, all the remaining projects, proposed or not recommended for CEF funding were assessed in terms of project maturity through the evaluation of the following criteria:

- **Technical readiness:** showing high maturity if all necessary technical steps for project implementation (i.e. Detailed Design/Detailed Implementation Plan/Administrative Permits and Licences) have been concluded. Medium maturity was given by the completion of the preliminary technical analysis (i.e. Preliminary project analysis/ Feasibility studies). Remaining projects were considered not mature.
- **Institutional readiness:** all projects included in the Project list shall be considered as mature in terms of institutional readiness. This was due to the fact that such projects have been proposed/revised/suggested by the relevant institutions involved in Corridor implementation.

- **Financial/Economic maturity:** high maturity rate if projects have a CBA completed and full financing is guaranteed, medium maturity rate if only one of two conditions is met, not mature in all the remaining cases.
- **Social/Environmental maturity:** set according to the presence/absence of the Environmental Impact Assessment (EIA): high maturity is given on case of complete/approved EIA, medium maturity in case of EIA under preparation, low maturity in case of no EIA.

To evaluate each of the project maturity criteria – technical (**Tm**), institutional (**Im**), financial (**Fm**), environmental (**Em**) – it was necessary to rate and award points for each project according to the **following levels:** Low maturity level= 0; Medium maturity level= 0.5, High maturity level=1. The general assumption was that each maturity criteria has the same relative importance and accordingly following simple calculation can be applied:

Equation 1. Project Maturity Indicator Calculation

$$Project\ Maturity\ Indicator = \frac{Tm + Im + Fm + Em}{4} \leq 1$$

LEGEND - Tm: Technical Maturity; Im: Institutional Maturity; Fm: Financial Maturity; Em: Environmental Maturity

5.2 North Sea – Baltic corridor project list clustering results

For the North Sea - Baltic Corridor, project prioritization was applied to all 530 projects included in the final version of the project list. Out of this number, 118 projects are innovation projects and 412 projects are transport mode related projects.

The clustering results are presented in the table below, including information as per transport mode on number of projects, share of projects per transport mode and related projects total amount in million euros.

Table 12. Number and amount of projects by transport mode Cluster

		Number	%	Million €	%	% in total amount
Air	Cluster 1	5	8%	313,30	8%	0,33%
	Cluster 2	1	2%	9,97	0%	0,01%
	Cluster 3	15	24%	1.046,86	26%	1,09%
	Residual Cluster	27	44%	147,16	4%	0,15%
	Completed projets	13	21%	2.471,05	62%	2,57%
	Studies only	1	2%	-	0%	0,00%
	Sub-total	62	100%	3.988,34	100%	4,15%
IWW	Cluster 1	16	67%	6.506,12	90%	6,77%
	Cluster 2	1	4%	39,50	1%	0,04%
	Cluster 3	5	21%	689,17	10%	0,72%
	Residual Cluster	0	0%	-	0%	0,00%
	Completed projets	1	4%	9,50	0%	0,01%
	Studies only	1	4%	2,20	0%	0,00%
	Sub-total	24	100%	7.246,49	100%	7,54%
Multimodal	Cluster 1	1	8%	43,50	14%	0,05%

	Cluster 2	3	25%	10,00	3%	0,01%
	Cluster 3	6	50%	251,00	81%	0,26%
	Residual Cluster	1	8%	2,00	1%	0,00%
	Completed projets	0	0%	-	0%	0,00%
	Studies only	1	8%	3,81	1%	0,00%
	Sub-total	12	100%	310,31	100%	0,32%
Rail	Cluster 1	86	66%	28.888,64	78%	30,06%
	Cluster 2	9	7%	5.958,36	16%	6,20%
	Cluster 3	0	0%	-	0%	0,00%
	Residual Cluster	17	13%	1.328,82	4%	1,38%
	Completed projets	12	9%	823,19	2%	0,86%
	Studies only	6	5%	18,66	0%	0,02%
	Sub-total	130	100%	37.017,67	100%	38,52%
Road	Cluster 1	31	27%	12.006,38	48%	12,49%
	Cluster 2	1	1%	1.500,00	6%	1,56%
	Cluster 3	22	19%	2.657,33	11%	2,77%
	Residual Cluster	56	48%	8.602,51	34%	8,95%
	Completed projets	5	4%	239,01	1%	0,25%
	Studies only	1	1%	-	0%	0,00%
	Sub-total	116	100%	25.005,23	100%	26,02%
Maritime	Cluster 1	11	17%	526,96	8%	0,55%
	Cluster 2	13	20%	2.355,79	34%	2,45%
	Cluster 3	7	11%	589,28	9%	0,61%
	Residual Cluster	23	36%	2.916,34	43%	3,03%
	Completed projets	10	16%	444,95	7%	0,46%
	Studies only	0	0%	-	0%	0,00%
	Sub-total	64	100%	6.833,32	100%	7,11%
Innovation	Cluster 1	30	25%	3.147,75	21%	3,28%
	Cluster 2	30	25%	3.152,76	21%	3,28%
	Cluster 3	13	11%	1.343,25	9%	1,40%
	Residual Cluster	26	22%	7.042,06	46%	7,33%
	Completed projets	16	14%	541,40	4%	0,56%
	Studies only	3	3%	32,20	0%	0,03%
	Sub-total	118	100%	15.259,41	100%	15,88%
Other		4		429,52		0,45%
TOTAL		530		96.090,30		100,00%

The table below summarizes the results of the project relevance evaluation. Out of the 530 NSB projects, 34% are considered as very relevant (cluster 1), and 28% of projects fall into the residual category.

Table 13. Results of the project relevance evaluation by Cluster

Prioritization of NSB CNC Projects – summary		
Project relevance score (0.25-1)		Project relevance score (%)
1.00 (cluster 1)	**180**	**34%**
0.75 (cluster 2)	**58**	**11%**
0.50 (cluster 3)	**68**	**13%**

0.25 (residual)	**150**	**28%**
Not applicable	74	14%
Total	530	100%

Project maturity assessment

The project maturity assessment was highly dependent on the quality of project information included in the project list. The common methodology applied by all Corridor consultants to define the project maturity is presented in the table below.

Table 14. Framework for Maturity assessment

Dimensions for the Project maturity evaluation	Relevant data to be assessed	Status	Maturity level	Points awarded
Technical readiness	Environmental Impact Assessment (EIA) / Detailed Design / Detailed Implementation Plan / Administrative Permits and Licenses	Concluded	High	1
	Preliminary project analysis/ Feasibility studies	Concluded	Medium	0,5
	Planning stage / pre-feasibility studies	Concluded	Low	0
Institutional readiness	/	/	High	1
Financial/Economic maturity	CBA & Financing sources	CBA performed & Full financing Assured	High	1
		CBA performed OR Full financing Assured	Medium	0,5
		CBA not performed AND Full financing not Assured	Low	0
Social / Environmental maturity	Environmental Impact Assessment (EIA)	Completed OR Approved	High	1
		Under preparation	Low	0

The results of analysis performed for NSB Corridor projects is presented in the tables below, including an analysis for each project maturity assessment criteria.

Table 15. Results of project maturity assessment

Prioritization of NSB CNC Projects						
Project Maturity assessment of the 456 projects that belong to a cluster						
Project maturity score (0-1)	**Technical readiness**	**Institutional Readiness**	**Financial / Economic maturity**	**Social / Environmental maturity**	**Project Maturity Indicator (0-1)**	
1.00	89	456,00	143	147	[0.75-1.00]	91
					[0.50-0.75]	121
0.50	90	-	159	2	[0.25-0.50]	123
					[0.00-0.25]	109
0.00	277	-	154	307	0.00	12

Project maturity score (0-1)	Technical readiness	Institutional Readiness	Financial / Economic maturity	Social / Environmental maturity (%)	Project Maturity Indicator (0-1)	
1.00	19%	99%	31%	32%	[0.75-1.00]	20%
					[0.50-0.75]	26%
0.50	20%	0%	35%	0%	[0.25-0.50]	27%
					[0.00-0.25]	24%
0.00	60%	0%	33%	67%	0.00	3%
						100%

Results per transport mode *(Innovation projects excluded from the analysis)*

Transport modes with the highest **average rank** are IWW (0,79) and Rail (0,76), followed by Road (0,55), Maritime (0,54), Multimodal (0,52), while the lowest average rank is given to Airport (0,39).

Rail has the largest number of high-priority projects (i.e. score comprised between 1,00 and 0,75) compared to the other transport modes. 63 projects out of the 135 which fall into the cluster 1 belong to the rail transport mode. Rail is followed by Road and IWW in the Cluster 1.

Rail also is the mode that has the largest number of projects (33) in the second highest priority rank (Cluster 2), while Road is the transport mode with the highest number of projects in the lowest categories, which explains the relatively low average rank for this mode.

More than half of the IWW projects are assigned to Cluster 1 (13 out of 22 projects) and Cluster 2. The results of project clustering exercise are presented in the table below with first table presenting the number of projects and second presenting planned investments in EUR.

Table 16: Overall project ranking; results per transport mode

	Average rank	Number of projects					
		Cluster 1 [1,00-0,75[	Cluster 2 [0,75-0,50[	Cluster 3 [0,50-0,25[	Cluster 4 [0,25-0,00[	Clustering not applicable	TOTAL
Airport	0,39		9	31	8		48
Innovation	0,61	20	53	16	10		99
IWW	0,79	13	6	3			22
Maritime	0,54	11	16	17	10		54
Multimodal	0,52	1	4	5	1		11
Rail	0,76	63	33	7	9		112
Road	0,55	27	18	50	15		110
Clustering not applicable						74	74
TOTAL	**0,60**	**135**	**139**	**129**	**53**	**74**	**530**
		Amount in million euros					
		Cluster 1	Cluster 2	Cluster 3	Cluster 4		TOTAL

	[1,00-0,75[	[0,75-0,50[	[0,50-0,25[	[0,25-0,00[	Clustering not applicable	
Airport		347,38	1.156,68	13,23		1.517,29
Innovation	1.893,94	5.863,17	6.825,17	103,55		14.685,82
IWW	6.339,39	695,23	200,17			7.234,79
Maritime	676,52	2.540,43	2.426,57	744,85		6.388,37
Multimodal	43,50	146,00	115,00	2,00		306,50
Rail	27.822,11	7.377,51	713,75	262,45		36.175,82
Road	12.638,38	2.896,97	8.401,55	829,33		24.766,23
Clustering not applicable					5.015,48	5.015,48
TOTAL	**49.413,84**	**19.866,69**	**19.838,89**	**1.955,40**	**5.015,48**	**96.090,30**

6 Jobs and growth

6.1 Summary of multiplier-based growth and jobs analysis of the nine CNC

The Corridor consultants undertook an analysis of the growth that would be stimulated by the implementation of CNCs projects and of the job-years then created - based on a guideline developed by the consulting company MFIVE. The methodology of this analysis followed the approach developed and applied in the study on the *Cost of Non-Completion of the TEN-T*[7]. At the core of the method is the application of multipliers provided by MFIVE to the most up to date project list.

The results of the growth and jobs analysis is divided into two categories:

- Impact of an **individual CNC**: these results refer to the growth and job impact of each CNC individually.
- Impact of the **nine CNC together**: to generate these results each CNC only included the projects contained in their project list for which the corridor Consortium is responsible to complete and update the data on a specific project.

The following tables summarize the results of each category for all nine CNCs. The first table presents the impact of each CNC based on planned investments of corridors over the period 2016 to 2030.

Table 17. Investment and growth and job impact of individual CNC – including overlaps

2016 to 2030	Unit	ATL	BAC	MED	NSB	NSMED	OEM	RALP	RHD	SCM
Investment	bn €2015	43.6	74.5	102.8	96.0	52.4	69.9	99.6	87.7	191.0
GDP created	bn €2015	419	535	622	715	356	517	743	725	1,468
JOB-years created	#1000	1,092	1,566	1,967	2,061	1,068	1,494	2,139	2,002	4,176

The second table lists -for each CNC- only the values of projects for which the CNC study team is responsible for collecting the data, thus the overlapping projects between different CNC are counted only once. These numbers enable the calculation of the aggregated impact of the 9 CNCs but are less meaningful with respect to the interpretation of the impact of a specific CNC.

Table 18. Investment and growth and job impact of without overlaps and total impact of all 9 CNC

2016 to 2030	Unit	ATL	BAC	MED	NSB	NSMED	OEM	RALP	RHD	SCM	Total
Investment	bn €2015	29.4	53.1	88.5	64.8	17.8	31.7	91.9	58.9	170.6	**606.9**
GDP created	bn €2015	220	367	540	533	166	263	678	444	1,339	**4,551**
JOB-years created	#1000	633	1,093	1,702	1,475	438	726	1,962	1,273	3,777	**13,077**

[7] Schade W., Krail M., Hartwig J., Walther C., Sutter D., Killer M., Maibach M., Gomez-Sanchez J., Hitscherich K. (2015): "Cost of non-completion of the TEN-T". Study on behalf of the European Commission DG MOVE, Karlsruhe, Germany.

NSB jobs and growth assessment

The impact analysis for NSB growth and jobs based on projects to be completed was done by applying a multiplier methodology. For the analysis the projects included in the up to date project list were divided into three mutually exclusive categories:

- **Cross-border projects;**
- **Innovation projects;**
- **Other** and thus average projects.

The three categories also present a hierarchy. If a project is marked in the project list as cross-border it is included in the first category. If not, it is checked if it belonged to an innovation category. If not, it will be treated as other project. With respect to mixed rail and ERTMS projects 10% were allocated to innovation projects and the reminder as average projects. The only projects considered were those that were not complete prior to 2016.

The investment amounts and multipliers used are presented in the table below and they were applied to estimate the total growth and job impacts of the Corridor over the period 2016 to 2030.

Table 19. Multipliers used for the growth and jobs analysis derived from the study of Cost of non-completion of the TEN-T (2015)

	Type of investment			
Categories	**Average**	**Cross-border**	**Innovation**	**Unit of measurement**
GDP-Multiplier	4,35	16,8	17,7	bn€-GDP / bn€-INV
JOB-Multiplier	16.300	37.000	38.700	FTE-JobY / bn€-INV

The projects for which cost estimates are available and that plan to be implemented over the period 2016 until 2030 amount to an investment of 96 billion EUR. The implementation of these projects will lead to an increase of GDP over the period 2016 until 2030 of 715 billion EUR in total. Further benefits will also occur after the year 2030.

The investments will also stimulate additional employment. The direct, indirect and induced job effects of these projects will amount to 2,061,000 additional job-years created over the period 2016 to 2030. It can also be expected that further job-years will be created by the projects after 2030.

7 Market potential

7.1 Market potential of environmental friendly transport modes with underutilised capacity

From environment friendly transport modes with underutilised capacity the rail and inland waterway transport modes are the most relevant for this Corridor. The focus of the analysis of the underutilised capacity was on current transport flows. Future flows are considered in other sections.

Inland waterways

The 2014 Study shows that the Corridor inland waterways have ample capacity to take up transport from roads. An inland waterway vessel does not take up much space on a waterway and a barge at a length of 110 m can transport around 120 TEU. If transported by trucks this would create a series of 60 trucks with a length of 960 m. In addition these trucks would need a buffer space of 1200m (60 trucks*20m) which is more than what an inland waterway vessel needs. Freight inland waterways rarely face congestion due to passenger transport or, if they do face congestion, it is to a to a much lesser degree compared to road and rail transport.

It should be noted that the capacity per vessel is increasing. In recent years the total fleet capacity has increased for all cargo types. This increased capacity has led to low transport prices as transport supply is available in great quantities and transport demand has a more **stable** pattern. In case of the North Sea Baltic Corridor 100 million tonnes or more of additional capacity would be available.

Rail transport

Rail transport analysis is based on the 2014 Study results, German BVWP data and NSB RFC data. The most recent and fairly complete data is the RFC data. NSB rail path is approximates 3200 km. The sections of the Baltic States are not included in the NSB RFC data but Rail Baltica project will ensure the required capacity to align with the rest of network.

The NSB Rail Freight Corridor publishes its reserve capacity every year[8]. This covers all UIC gauge corridor sections. This reserve capacity indicates the capacity available per day of the year per section. Below, the NSB RFC data and accompanying analysis is presented.

Table 20. Rail Freight Corridor 8 reserve capacity 2017

Country	Corridor section	Average capacity per day in trains, per direction 2017	Average capacity per day in trains, per direction 2016	Length of CNC corridor section in km*
NL	Rotterdam port - Meteren	2	1	136
NL	Amsterdam port – Amersfoort	2	no RFC data	78
NL/DE	Amersfoort - Hannover	no RFC data	no RFC data	330
BE	Antwerp - Montzen	1.8	1.8	153
BE/DE	Montzen - DE border	1.7	1.9	6
DE	DE border - Aachen	0.8	1	6
DE	Aachen - Hanover	0.8	1	354

[8] http://rfc8.eu/our-offer/reserve-capacity/

DE	Bremen - Hanover	1	1	130
DE	Hanover - Magdeburg	1	1	148
DE	Hamburg - Magdeburg	1.0	1	280
DE	Magdeburg - Frankfurt Oder	0.6	0.9	240
PL	Frankfurt Oder - Poznan	1	1	180
PL	Poznan - Warsaw - LT border	1	1	628
PL	Poznan - Warsaw - BY border	1	1	502

For each section, there is approximately one to two daily train paths available on the Corridor in each direction This means that there is capacity to add one to two trains extra per day to the Corridor – a total length of 3200km (which also means that 2999 train km are available[9]). Alternatively 6 daily trains could be added to the Corridor with a trip length of 500 km - meaning 12 daily trains in both directions and 4366 trains per year[10].

Since a train can transport around 75 TEU, this means the Corridor currently has the reserve capacity to move 327,000 TEU per year on the Corridor, or 3.3 million tonnes of freight volume. To put this in perspective, the 2014 TMS results indicate that in 2010 the total freight volume on the corridor was 363.8 million ton, of which 18.8 was rail at a modal split of 6%.

Table 21: Derivation of available capacity in tonnes

Unit	Year 2017	Year 2016	Assumption
train / day at 500 km interval	6.0	5.7	
train / day at 500 km interval, both directions	12.0	11.5	
train / year at 500 km interval	4366	4174	
TEU per year	327,449	313,035	75 TEU per train
tonnes per year	3,274,485	3,130,346	10 tonnes per TEU

As stated above in the rail section, in the Baltic States there is no NSB RFC data available to indicate a lack of capacity.

Preliminary conclusion on capacity available

The NSB Rail Freight corridor data implies that the Corridor currently has the reserve capacity to move 327,000 TEU per year on the Corridor, or 3.3 million tonnes of freight volume.

With respect to IWW there is no explicit restriction of capacity and the fleet has surplus capacity. This leads to the preliminary conclusion that inland waterway transport is an environmental transport mode with underutilised capacity, therefore macro analysis will focus on inland waterways and in particular on goods that can be containerised. These are goods currently transported by road that can be containerised and bundled into multiple container loads, ready to be transported by ships (including pre/end haulage by road).

[9] The product of average trains available and length per section is 2999 trainkm available. 2999 trainkm / 500 km is 6 daily trains every 500 km.
[10] Commonly trains do not operate 365 days per year, but since the capacity is available 365 days this is assumed in the calculation. This leads to an overestimation of capacity.

Bulk goods are not part of this analysis, as inland waterway and railways already have a high share of bulk goods being transported. The reason some bulk goods are not transported by IWW or rail is normally because of specific market conditions. For example time-sensitive bulk goods, goods that have a lack of shipment size or lack of consistent cargo flows, the cargo flows can also be fragmented, meaning again that the shipment size is too small, goods can have special needs for transport (agricultural goods e.g. potatoes, livestock).

Based on the availability of inland container terminals,[11] combined with existing and planned barge services, a hub and spoke network is foreseen as the most promising to link O/D's and branches of the network. This approach uses the possibility to connect multiple branches and individual / separate barge services together through a hub and spoke network.

7.2 Modal shift potential

The main objective of the 'analysis of modal shift potential' for IWW is to identify individual transport flows that, once bundled, could bring enough volume to operate a liner service between two (or more) Inland Terminals. This is done for the European waterways, including the NSB waterways. A top-down approach has been used to determine the multimodal market potential. Thereafter, the step-by-step methodology and the specifications behind the model are explained. A number of selection criteria have been used in order to further determine the multimodal potential:

- **All regions** that are connected to the CEMT class IV inland waterway network (TEN-T + all other waterways) have been selected. This includes both interconnected and isolated waterway regions. Moreover, non-connected regions that are within a range of 100 kilometres from a CEMT IV waterway have been included.

- **Containerized goods have been selected.** These goods are suitable to be transported in containers, however not all goods necessarily need to be transported in containers. They are mostly goods that are currently being transported by road, but it for example excludes specifically living animals and the already captive IWT markets of crude oil, coal, iron ore and dry bulk, sand and gravel.

- **Two distance criteria** have been applied:
  - In regards to the selection of relevant regions for a potential model shift to IWT the regions that have been selected are those which have **access to the IWT network** using pre-/end haulage over a distance of maximum 100 km.
  - The OD transport distance for **road haulage should be at least 200 km.** If the origin and destination are both located directly along waterways ("wet locations") at transport distances of 20 km and above then IWT can be competitive compared to road haulage. However, if locations are situated further away from waterways (i.e. "dry locations") pre-/end haulage is needed resulting in an increase of break-even distance. For dry-dry locations the break-even distances are between 180 to 200 km[12].

[11] Ibid

[12] Based on extensive research on door-to-door costs for several types of transport chains for IWT for the situation in The Netherlands, a country with a high density waterway network. Source: NEA and Policy Research Corporation, 2006, Market Study IWT.

The selection results in a more refined road OD matrix presents information according to the following dimensions:

- Origin (NUTS-3 level);
- Destination (NUTS-3 level);
- Tonnage transported of containerized goods between selected regions;
- Region types: IWT-connected regions both on isolated as on interconnected waterways.

The resulting selection of transport between OD pairs was assigned to the existing network to help identify the study areas for multimodal potential. The service network for the transport of containers via IWT has been designed based on the existing and, possibly, planned barge services[13].

Based on the availability of inland container terminals[14], combined with existing and planned barge services, a hub and spoke network is foreseen as the best option to link O/D's and branches of the network. This approach creates the possibility to connect multiple branches and individual / separate barge services together through a hub and spoke network.

7.3 Potential intermodal transport vs. direct trucking

In order to determine the potential modal shift from direct trucking to intermodal transport via barge for containerized cargo for every O/D pair as selected in the scope - a comparison must be made whether intermodal transport is less expensive than direct trucking. If this is established, then there is a potential for modal shift.

Adding terminals to the network

The cost model is set up by assigning a selection of (inland) container terminals to the IWT networks (closed + EU Interconnected) where containers can be transhipped from inland shipping to road transport and vice versa. In addition planned inland container terminals have been taken into account. For model simplicity, in certain NUTS-3 regions where there is a high density of (inland) container terminals (along the Rhine and in The Netherlands and Belgium) not all possible terminals have been considered. For neighbouring terminals within the same NUTS-3 region the differences in transport costs to and from all destinations in that region are considered to be relatively small.

Waterway and ship characteristics

For determining inland waterway transport costs for all container barge services the characteristics of each waterway corridor / channel / river have to been taken into consideration.

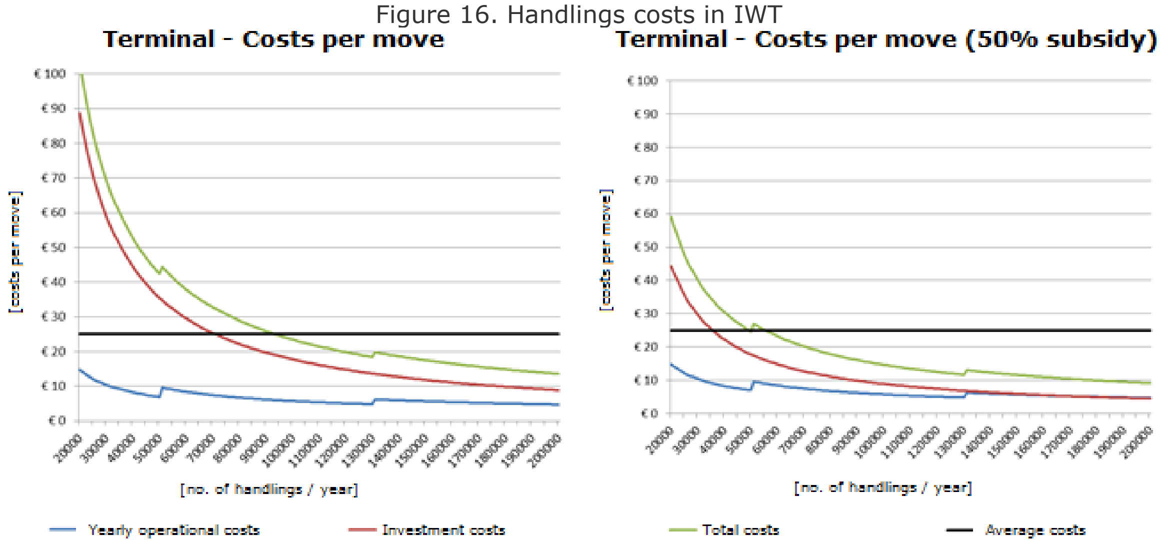
Handlings costs and rental container

Based on the network of barge services, the number of transhipments made per O/D pair has been determined. Every transhipment (move) is multiplied by 25 EUR. No distinction is made between terminals or the various countries. For additional transhipments, besides the origin or destination, an additional transhipment of 25 EUR per move has been added- for example for terminals with hub functions in the network.

[13] ETISplus terminal database (2010), completed with information from IDVV, VNF, NPI (Navigation, Ports et Intermodalité) and Schiffahrt, Hafen, Bahn und Technik.
[14] Ibid

In general, two moves are needed at terminals with a hub function (ship – shore and shore – ship). Hacon and KombiConsult indicate 20 - 32.5 EUR as a range for handling costs.[15]

Figure 16. Handlings costs in IWT



The cost for the rent / use of containers is assumed to be 15 EUR per container[16]. Hacon and KombiConsult indicate 12 to 20 EUR for the rental of containers per trip.[17]

Pre- and end haulage

Costs for pre/end haulage to and from the container terminals in the are based on the distances of the road network in ETISplus. The model uses the distance from industrial areas within NUTS-3 regions to/from the terminals. The costs for pre/end haulage are determined by a cost function based on these distances. It should be noted that variable costs add up from 0,47 to 0.65 EUR per kilometre.

The costs for trucks are based on the variable and fixed costs for trucks plus fixed costs of drivers originating from the country where the terminal is situated. Information about costs originates from the Panteia costs models. A different time-distance relationship is specified in the costs-function, making direct road transport cheaper than intermodal road transport for the same distance.

Direct trucking costs

For direct trucking per O/D pair the model choses the lowest costs based upon several truck and driver combinations. If it consists international traffic, the cheapest truck and the cheapest driver of the two countries involved is selected. For more details on costs, see Panteia costs models[18].

7.4 Macro analysis results of cargo study

The preliminary results of the transport flow analysis show that for the largest transport flows, inland waterway transport is an environmental transport mode with capacity,

[15] This includes subsidy by governments on terminal investment costs. See: KombiVerkehr – Entwicklungskonzept, Hacon et al. (2011).
[16] Panteia et al. (2014) – Hub en Spoke in de Container Binnenvaart, Annex Report.
[17] KombiVerkehr –Entwicklungskonzept, Hacon et al. (2011)

therefore the macro analysis will focus on inland waterways and in particular to goods that can be containerised.

The scenarios use constant costs (including pre/end haulage) for the intermodal option, but the direct road option is varied. The three assumptions/scenarios for direct road haulage are:

- No return load - **low road efficiency** (50%), leading to high road costs - this scenario has a low likelihood and therefore IWW potential is called low.
- Return load in 80% of the cases, 20% no return load (EU average based on Eurostat statistics) – **medium road efficiency**, leading to medium IWW potential.
- Return load in 100% of the cases – **high road efficiency** (100%), meaning low road costs. Whatever IWW potential cargo flow can compete with road at these low road costs level is called high IWW potential.

If a traffic flow is cheaper by waterway when compared to highly efficient road operations (100% back-loads) then it is classified as having high potential for switching to waterway. Conversely, if a traffic flow is only competitive by waterway if direct road is relatively inefficient, then it is considered as having a low potential for switching to inland waterway.

The calculation results are presented in the table below.

Table 22. NSB corridor volume that can be shifted to IWW according to macro analysis (in million tonnes)

Regions	Low potential	Medium potential	High potential
Total NSB corridor	212.8	88.1	31.5

For NSB Corridor there is a remarkable high potential identified because the freight intensive triangle, Antwerpen-Rotterdam-Ruhr area, is in the Corridor. This region has high volumes and a dense terminal network which allow efficient containers services.

The table below presents information on the maximum of the potential per scenario chosen per commodity group.

Table 23. NSB corridor volume that can be shifted to IWT per commodity type (in million tonnes)

Regions	Low potential	Medium potential	High potential
Agricultural and food products	55.1	21.6	7.8
Energy products and chemicals	40.5	16.8	5.9
High end building materials	24.3	6.7	1.9
End products & other	92.8	43.1	15.9
Total NSB corridor	212.8	88.1	31.5

The largest commodity group with potential is "End products & other" - included in this group are also products already containerised in road transport. In addition there are semi-finished metal products, all types of machinery and equipment and all types of end products. The second largest group is agricultural and food products which consists of raw agricultural materials, hops, animal foods, wood and cork, beverages and foodstuffs.

7.5 Measures to fulfil market potential

This section identifies general and mode specific measures for multimodal transport. It also describes the practical steps on planning and achieving market potential.

Multimodal measures

Promoting industrial locations near ports and terminals

Multimodal transport is defined by pre and / or end haulage. The actual distance between a terminal and a port defines the costs of pre and end-haulage, therefore measures to promote industrial locations on the Corridor are of great benefit if more market potential is to be unlocked.

To do this, firstly an inventory of companies in the catchment area of the ports and terminals is needed. These companies should be examined, identified and approached. This includes existing businesses and future projects planned to build industry.

Once companies are contacted they should be engaged. Promotion activities should offer information to the companies on logistic benefits in a customer oriented manner. This information ranges from the initial planning or design phase of business locations to providing up to date information on the state of the (corridor) infrastructure.

Sufficient bridge maintenance

Multimodal road transport takes place from the terminal to the end haulage point or vice versa. This is characterised by a short distance trip which means that the local infrastructure plays a large role in the quality of the pre and end haulage transport that is, compared to direct trucking. In direct trucking the driver plans a long-distance trip and can, beforehand, circumnavigate local bottlenecks. Local bottlenecks can be out-of-order bridges or road congestion around urban areas.

Regular maintenance is needed for bridges, despite the relative long life span of a bridge (>10 year). If this is not performed it will result in emergency ad-hoc repairs which leads to unforeseen downtime of the infrastructure and protracted diversion routes for local traffic with short distance trips. Very often seaports and inland ports are located near bridges and rail terminals are closely located to water, due to the location of railway tracks near the rivers. Therefore, proper bridge maintenance is an important part of multimodal transport and is also a way to ensure a modal shift, as bridge maintenance affects multimodal transport more than direct trucking.

Sufficient inland terminal capacity for peak transport demand

In global shipping there is an ongoing trend of using larger sea vessels. The sea vessels can move more cargo per trip and are cost efficient - per transported volume. Larger sea vessels, as opposed to a steady flow of small sea vessels, create peak transport demand.

Peak transport demand means that a large volume has to be transferred within a short time, since cargo is time-sensitive. Ports have to handle this peak transport demand in three ways, firstly sea-side terminal capacity, secondly inland terminal capacity to transfer to rail or IWW inland modes and finally hinterland capacity. In case of congestion there is a risk that sea vessels go first - these are the largest customers of the port and delay of their cargo can be costly. This leaves the inland transport potentially with waiting times at terminals.

Rail measures

One crucial measure, for rail, is to increase capacity on the Corridor - for this, 740 meter trains, successful ERTMS implementation and in some minor cases axle load are needed. ERTMS is a medium term project in the whole of Europe. 740 meter trains in itself is a medium to short term project, depending on the situation it can be realised in a number of years. The same is true for axle load.

The other set of measures is to increase rail competitiveness. The following are the recommendations of the previous Corridor work plans: remove rail bottlenecks and missing links; increase cross-border efficiency; and decrease travel time. Cross-border efficiency includes break of rail gauge, but is not limited to this.

IWW measures

Create and publish freely accessible information about inland navigation

Neutral platforms focusing on specific and promising market segments have turned out to be stimulating for inland navigation in Europe and are appreciated by the sector. Offering a framework for the development of cooperation possibilities and information and knowledge exchange for all players in corridor logistics is crucial for the enhanced usage of waterways. Freight forwarders or shipping companies value the information on the possibilities, chances and strengths of inland navigation which they previously did not consider due to lack of coherent information.

The measure proposed is to implement cooperation platforms on national and international basis with thematic focus on the promotion, positioning and raising of awareness of inland navigation.

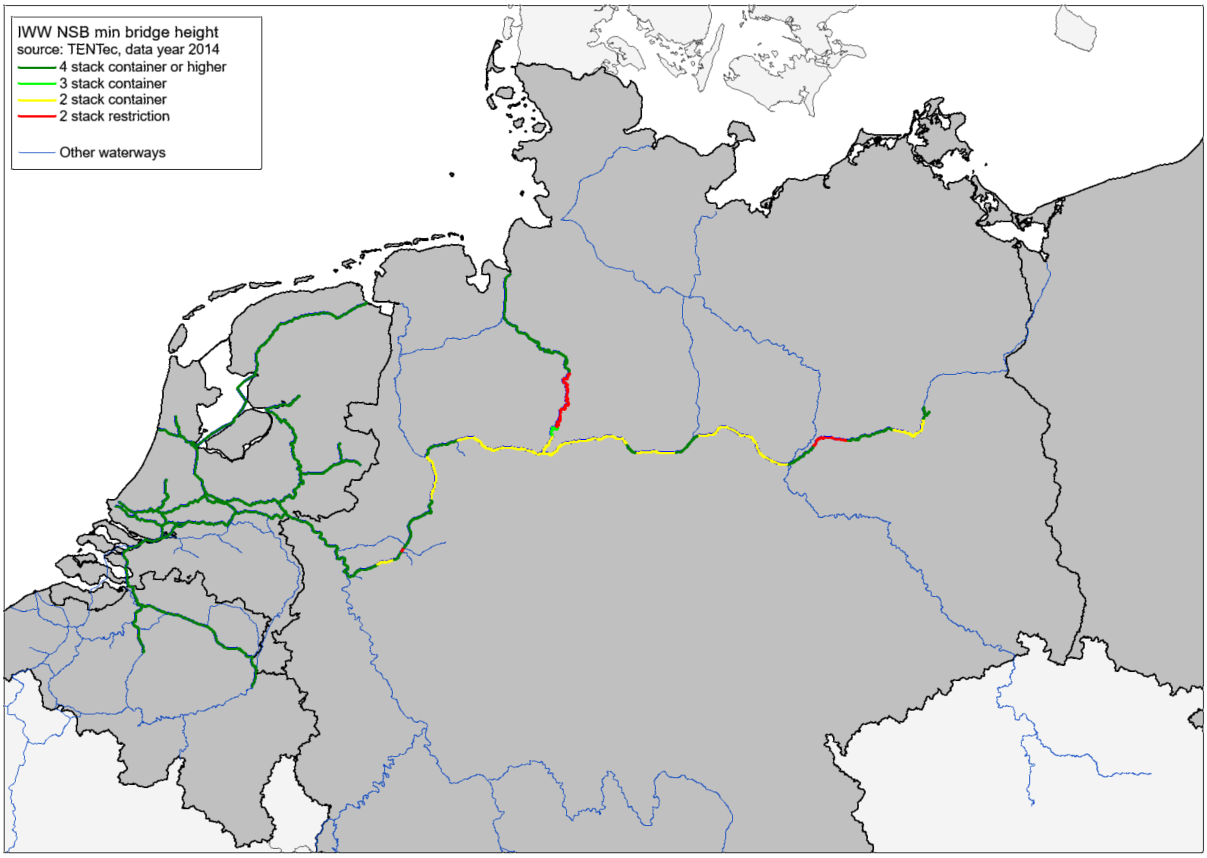
Lack of information regarding IWW logistics is a constraint for all modes of transport. Information regarding existing shipping and forwarding companies, ports services in terms of handling equipment, storage capacities, contacts, etc. should be published in a user friendly way and updated regularly. A unique platform with all relevant data for (potential) users of waterways at one spot should ensure a high qualitative and transparent collection of information. In particular, this information is essential for the industry when searching and identifying transportation providers. The RIS technology creates an opportunity to distribute real-time information, but it should not be limited to only that.

Bridge height upgrades

The CNC compliance standard for bridge height is a clearance of 5.25 m. This allows 2 stacks of containers to be transport in normal circumstances (i.e. no extreme water-levels or unconventional stacking techniques of containers). This is either possible on the Corridor or there are ongoing projects to realise this height of 5.25 m. For more cost efficient container barge transport 3 or 4 stacks of containers are needed -this means a bridge clearance of 7 or 9.25 m. On some sections of the corridor catchment area this is not possible. This is visible in the figure below. Note that on the Bremen section a height upgrade project is ongoing, in accordance with the information presented in the compliance analyses.

To this end, bridge height upgrades greatly improve the chances of success of capturing the market potential of inland waterway transport.

Figure 17. 2014 bridge height situation BE, DE, NL



Source: TENtec, PANTEIA

8 Innovation projects

8.1 Innovation definition

Since the start of the 21st Century innovation has become one of the key policy areas of the European Union, notably after the Lisbon European Council of March 2000 which set as the new strategic goal for the EU to become the most competitive and dynamic knowledge-based economy in the world[19]. Over the last number of years innovation has been reflected across European policies, including those targeting transport infrastructure.

The Regulation 1315/2013 (CEF Guidelines, Regulation) notes in Article 47 that the European Coordinator shall support Member States in implementing the Work Plan - in particular with regards to defining measures aimed at promoting the introduction of new technologies in traffic and capacity management. In addition, Articles 31, 32 and 33 of the Regulation defines which new technologies and innovations which shall be deployed across the Union and which implementation should be encouraged within the comprehensive network.

The first step regarding the coordination of activities on innovation deployment is to agree on a common definition for innovation, the proposal was to use Articles 31, 32 and 33 of Regulation 1315/2013 as a basis for a common definition and classification of innovation deployment projects. As a result, three innovation deployment areas have been considered:

- **Deployment of Telematic** applications as defined by Article 31st;
- **Deployment of Sustainable freight transport services** as defined by Article 32nd;
- **Deployment of other new technologies** and innovation addressing the aims outlined in Article 33rd (including low carbon fuels and propulsion systems).

Most aspects listed in the Regulation are defined broadly so another way of classifying innovative projects is:

- **Catch-up innovation:** something existing but being new for a (or part of a) corridor;
- **Incremental innovation:** something new providing minor improvements;
- **Leap frog or disruptive innovation:** those that will make the difference in the future for modal competition.

The table below provides a list of the relevant fields for deployment of innovation identified in the above mentioned Articles.

Table 24. Innovation Fields identified in Regulation 1315/2013

Innovation Area	Relevant Mode(s)	Specific Innovation Field
Telematic Applications	Railways	ERTMS, possibly also future wireless systems
	Inland waterways	RIS
	Road transport	ITS
	Maritime transport	VTMIS
		e-Maritime services, including single-window services such as the maritime single window, port community systems and relevant customs information systems

19 Lisbon European Council 23 and 24 March 2000. Presidency Conclusions.

	Air transport	Air traffic management systems, in particular those resulting from the SESAR system
	All	Applications that enable traffic management and the exchange of information within and between transport modes for multimodal transport operations and value-added transport-related services, improvements in safety, security and environmental performance, and simplified administrative procedures- e.g. logistic single window
Sustainable freight transport services	All	Measures aiming to improve sustainable use of transport infrastructure, including its efficient management
		Measures aiming to promote the deployment of innovative transport services, including through motorways of the sea, telematic applications and the development of the ancillary infrastructure necessary to achieve mainly environmental and safety- related goals of those services, as well as the establishment of relevant governance structures
		Measures aiming to facilitate multimodal transport service operations, including the necessary accompanying information flows, and improve cooperation between transport service providers
		Measures aiming to stimulate resource and carbon efficiency, in particular in the fields of vehicle traction, driving/steaming, systems and operations planning
		Measures aiming to analyse and provide information on fleet characteristics and performance, administrative requirements and human resources
		Measures aiming to improve links to the most vulnerable and isolated parts of the Union, in particular outermost, island, remote and mountain regions
Other new technologies and innovation	All	Measures aiming to support and promote the decarbonisation of transport through transition to innovative and sustainable transport technologies
		Measures aiming to make possible the decarbonisation of all transport modes by stimulating energy efficiency, introduce alternative propulsion systems and fuels, including electricity supply systems, and provide corresponding infrastructure
		Measures aiming to improve the safety and sustainability of the movement of persons and of the transport of goods
		Measures aiming to improve the operation, management, accessibility, interoperability, multimodality and efficiency of the network, including through multimodal ticketing and coordination of travel timetables
		Measures aiming to promote efficient ways to provide accessible and comprehensible information to all citizens regarding interconnections, interoperability and multimodality

		Innovative Measures aiming to reduce external costs, such as congestion, damage to health and pollution of any kind including noise and emissions
		Innovative Measures aiming to introduce security technology and compatible identification standards on the networks
		Innovative Measures aiming to improve resilience to climate change
		Innovative Measures aiming to further advance the development and deployment of telematic applications within and between modes of transport.

As it could be seen from the table above this classification has two potential problems:

- **Categories are defined too broadly:** for example, ERTMS or ITS can include activities that are either catch up innovations or disruptive innovations. In order to ensure that the analysis focus specifically in the most relevant innovations, it is important to distinguish those.
- **There are duplications between categories:** for example, measures to promote decarbonisation can be included in any of the main categories listed. For instance, a motorway toll system which differentiates charges according to CO2 emissions levels of the truck can be seen as a telematics/ITS application, a measure stimulating resource and carbon efficiency under Sustainable freight transport services and a measure aiming to support and promote the decarbonisation of transport under other new technologies and innovation (especially if it creates an explicit incentive for alternative fuelled trucks).

In order to ensure an optimised use of resources, it was proposed to classify innovations using the following criteria:

Table 25. Approach for classification of innovation

Innovation Category	Relevant Innovation area(s)	Relevant mode(s)	Innovation Field	Corridor(s)
Catch-up innovation **Incremental innovation** **Leap frog or disruptive innovation**	Telematic applications Sustainable freight transport services Other new technologies and innovation	Railway Inland waterways Road transport Maritime transport Air transport Multimodal	Provide short description of activity	List corridor(s) affected by the activity

8.2 Innovation Deployment Results

In the NSB Corridor there are 530 projects, of which 114 have been identified as innovative. Of the innovative projects, 88 projects have been categorised as "Catch-up innovation". Radical and Incremental innovation account for 25 projects. In the NSB there are 6 radical innovation projects which, due to their innovative nature, are further described in the table below.

Table 26. Radical innovation projects on the corridor

2372	Finnish Estonian Transport Link (FinEst Link): A feasibility study of the Helsinki-Tallinn fixed link.

5041	NEXTCHARGE - The next level of European charging Corridors
6305	Models for economic hydrogen refuelling infrastructure
3871	Sustainable LNG Operations for Ports and Shipping - Innovative Pilot Actions (GAINN4MOS)
1356	Poznan Airport - Photovoltaic Power Plant
1357	Poznan Airport - Station pre-treatment with rainwater distribution system

Innovative projects account for 19% of all the total costs for all projects in the Project List. The majority of these costs (>95%) are attributed to Catch-up innovation. Road projects account for 42% of the total innovation costs, followed by air innovation projects (27%). Only a negligible amount of the innovation costs (<0,5%) is attributed to Rail ERTMS and Multimodal projects.

Data sharing, ITS and other telematics applications are the most common telematics projects. There is no VTMIS project classified as innovative. Low carbon and decarbonisation is addressed most often in the innovation type projects. Almost half of the innovative projects address decarbonisation directly (46%) - by the adaptation of natural gas or biofuels. There is a relatively low amount of innovative transport services addressed when it comes to sustainable freight services.

The funding is the most common enabler for innovative projects. In particular, existing public/private funding for implementation of the innovation idea has been listed as a reason for 49 projects. Lack of sufficient public support remains the largest obstacle for projects in the NSB Corridor.

NSB Corridor is quite mature with respect to innovation projects and has many innovative projects (almost 25% of all projects), in comparison to other corridors. Further evidence of its maturity is the fact that there are 6 Radical innovation projects present. Nevertheless, Catch-up innovation projects remain the largest category of innovative projects. Apart from the project category Innovation, the second most innovative of all project categories is Motorways of the Sea (MoS). This is a common observation in all corridors and this is supported due to the fact that most of the MoS projects are in several countries and hence in several corridors.

The summary of innovation projects per transport mode including number of projects and costs is presented in the table below.

Table 27 Breakdown of costs of the innovation results

	Airport	Innovation	IWW	Maritime	MoS	Multimodal	Rail	Rail ERTMS	Road
Number of projects	14	19	11	22	9	2	8	1	24
Costs BEUR	1.1	5.1	1.3	1.2	0.3	0.0	1.5	0.0	8.0
Cost %	6%	27%	7%	6%	2%	0%	8%	0%	43%

The most common services that the NSB innovative projects deliver relate to decarbonisation. Decarbonisation has the most important impact as well.

The innovative projects encompass almost a fourth of all projects with costs representing 19% of the total costs for all projects. However, funding remains the main enabler and barrier for the projects in this Corridor.

9 Climate change resilience

9.1 Climate change resilience definition

Impact of climate change on existing infrastructure

Over the last years' climate change has evolved into being one of the main working areas of the European Union and being amongst the 10 priority areas for the European Commission. After an initial focus on mitigation (i.e. reducing GHG emissions) significant attention is now placed on 'adaptation. The reason for this is the fact that scientific evidence increasingly demonstrated the potential consequences of climate change

This is reflected not only on European climate policies, which have now adapted a solid framework, but also at a global level, with both the Intergovernmental Panel on Climate Change (IPCC) and the recently signed Paris climate agreement which devotes extensive attention to adaptation issues.

This overall policy framework has filtered through and impacted other European policy areas. Accordingly, it does not come as a surprise that in 2013 European policy makers introduced, in the revised Connecting Europe Facility Regulations, provisions addressing the way infrastructure should deal with adaptation issues. In particular Regulation 1315/2013 establishes in its Article 47 that the work plan shall include an analysis of: (d) the possible impacts of climate change on the infrastructure and, where appropriate, propose measures to enhance resilience to climate change.

The analysis performed firstly aims to analyse the extent to which infrastructure within the Core Network Corridors is threatened by potential consequences of climate change (i.e. identify potential hazards) and the levels of exposure and vulnerability to such consequences. In other words, it aims to apply a risk assessment methodology to the corridors to identify weak points. The second objective is to assess measures that enhance resilience to climate change.

9.2 Climate change resilience results

This chapter presents the main climate change risks of the NSB Corridor and will link the project list with the climate change resilience. The complete set of climate change resilience tables per Member State are presented in Annex 1.

Qualitative risk assessment

The North-Sea Baltic Corridor stretches from a temperate oceanic climate in the West to a gradually more (temperate) continental climate in the East. Belgium, Germany, and Poland will experience a relatively high (but not extreme) increased vulnerability of road pavement to heat stress in the period up to 2100. The Netherlands and the Baltic States are less affected due to the tempering effect of the sea.

Southern Germany will experience an average increase in rail buckling vulnerability. However, for the whole Corridor, there is no large increase of the vulnerability expected.

Bridges in the Baltic States (in particular Estonia and Latvia) are expected to encounter a significantly increased scour risk. Up to 2050, the Corridor area will become wetter and after this period Belgium, the Netherlands, and Western Germany will contain more areas affected by drought due to climate change. The North Sea sea level will most likely increase more than the Baltic Sea's sea level.

The project list and climate resilience

The North-sea Baltic project list has four identified projects on climate change resilience.

Two of identified projects are linked to RIS. A fully operational RIS system helps shippers deal with the effects of climate change in the short term. For example, knowing in advance the change of water allows shippers to adjust their load and ship depth to make an economically viable and safe journey. The outcome of the system is information - not physical constructions to deal with climate change on the inland waterways. Long term measures against climate change are not included in RIS. To a lesser degree, ITS for road also provides information that helps resilience to climate change in the short term.

Two other projects related to climate resilience are airport projects, including Łódź and Poznań Airport, with respect to pre-treatment of the rainwater distribution system. It will contribute to the airports independence when it comes to urban storm water.

Climate resilience tables of the Corridor

The tables representing the climate change adaption for the countries in the NSB corridor could be seen in Annex 1.

10 Climate Mitigation of Environmental impacts

The European Commission is also keen to reduce other negative environmental impacts of transport, in particular noise.

This policy area is reflected in Regulation 1315/2013, both through a reference to sustainable development targets, including a minimum 20 % reduction of greenhouse gas emissions compared to 1990 levels in the General Objectives (Article 3) and a request that Work Plans include an analysis of measures to be taken in order to mitigate greenhouse gas emissions, noise and, as appropriate, other negative environmental impacts (Article 47). The same article also notes that the European Coordinator shall support Member States in implementing the work plan, in particular with regard to: (b) defining measures aimed at promoting the introduction of new technologies in traffic and capacity management and, where appropriate, reducing external costs, in particular greenhouse gas emissions and noise.

The objectives of the analysis were - firstly, to identify measures to address the environmental impacts of transport and secondly, to revise experience from implementing such measures to depict possible recommendations for Member States.

10.1 Climate mitigation definition and influencing factors

Climate mitigation of environment impacts assessment depends on: an analysis of traffic flows along the Corridor; the modal split; the growth potential; and the likelihood of modal shifts occurring, therefore two issues affecting the analysis are:

- The **definition of the traffic flows / sets** being considered
- The **overlaps between the existing corridors.** Actions taken within one corridor can influence traffic on overlapping or parallel corridors. Projects being implemented on overlapping sections ought to be analysed the same way on every affected corridor.

Several different approaches towards defining **traffic sets** are possible, for example:

- **Analysing the corridors as sets of countries**, and including all the national and international traffic belonging to them. This method is feasible due to the wide availability of comparable statistics for all modes, but imprecise because aggregated (national) statistics cannot easily be related to specific investments.

- **Analysing the corridors as the flows,** or even the cross-border flows occurring upon the selected network links. This is generally likely to be feasible from a statistical perspective, but often it is only possible to measure traffic counts, and not possible to link those traffic counts to O/Ds. Analysing modal split based on corridor sections is also biased by the corridor definition. In addition analysing modal shift and impacts may be problematic if the wider network is not considered.

- **Analysing the corridors with a transport network model.** Using a model which relates O/D flows to link flows potentially solves the above problems, partly by taking a more comprehensive approach to analysing flows on and around the corridor, and partly by putting the corridor in the context of a complete network. addressing overlaps as well as the interactions with the rest of the network. It is based upon estimated patterns of demand rather than aggregated statistics.

The approach being developed combines the top-down (aggregate) and bottom-up (network model). It is recognised that: transport statistics for all modes, passenger and freight only exist in comparable form for all corridor MS at this level; network analysis is necessary in order to address the local nature of the investments; and there is a need to separate the corridor impacts from the rest of the traffic set, and to handle the corridor overlaps in a consistent way.

10.2 Application of model developed

Following the initial steps which were applied in the 2014 Study - where the NEAC10 model was used to apply a conventional TEN-T transport network modelling methodology (TEN-STAC, ETIS-Base, Transtools, Worldnet, ETISplus) to three adjacent corridors; Atlantic, North-sea-Med, and Rhine-Alpine -the model has been expanded to include corridor definitions for rail, road, and waterways for:

- Atlantic Corridor;
- North Sea-Med Corridor;
- Rhine Alpine Corridor;
- North Sea-Baltic Corridor;
- Orient East – Med Corridor;
- Rhine Danube Corridor.

Using the corridor and comprehensive networks it is possible to assign traffic across the whole network in one iteration, and then to derive internally consistent traffic estimations, or shifts for all corridors at once.

Application of Reference Forecast

Each corridor contains regions in which the corridor is overlapping to a greater or lesser degree with other corridors. In analysing traffic flows, modal shares, growth projections and climate change impacts it is necessary to ensure that quantifications are consistent across the corridors, across different transport modes, freight and passenger transport, and in relation to national forecasts. Even in cases where corridors are not directly overlapping through the sharing nodes or sections of infrastructure, they may be interdependent as they may offer competing routes.

Given these considerations- and the need to estimate climate change impacts per corridor in a way that allows consistency across the whole set of corridors and MS- it is proposed to use the 2016 EU Reference Forecasts[20] as the basis, and then to use a European network model (containing the full TEN-T network) to analyse traffic along sections. The main advantages of the EU Reference Forecasts are:

- Recently published data (2016);
- Includes EU forecasts (Energy, Transport and Climate Action DGs);
- Covers passenger and freight traffic, and most modalities;
- Consistency for all EU MS;
- Models demographic, economic, transport, energy, and emission data;
- Provides forecasts for 2030 and 2050;
- Based on accepted EU methodology (PRIMES model).

However, the published results do not permit analysis at network level, as required by the corridors, and nor do they allow for the analysis of traffic shifts resulting from the corridor plans. The approach therefore is to use the EU Reference Forecast as national forecast for the corridor MS, with indicators for:

- GDP at national level;
- Population growth;
- Freight and passenger traffic growth;
- Reference modal shares;

20 https://ec.europa.eu/energy/en/news/reference-scenario-energy

- Transport/Energy efficiency; and
- Emission factors.

After applying the EU Reference Forecast, the network model (NEAC10) is used to analyse corridor shares for indicators and project-list related impacts.

10.3 EU 2016 Reference Forecast – General Overview

Based on the methodology described above the high level results for the EU reference scenario (EU28 level) are presented in the table below.

Table 28. EU 2016 Reference Scenario (EU28)

Reference	2000	2005	2010	2015	2020	2030	2050
Population (in million)	484	492	500	505	510	516	522
GDP (in 000 M€)	11231	12351	12895	13427	14550	16682	22526
Passenger transport activity (Gpkm)	5964	6295	6449	6735	7152	7880	9053
Public road transport	549	541	528	546	570	604	667
Private cars and motorcycles	4466	4721	4843	5001	5255	5676	6279
Rail	450	464	499	540	591	693	878
Aviation	458	528	539	608	693	860	1177
Inland navigation	42	42	40	40	43	46	52
Freight transport activity (Gtkm)	2295	2612	2556	2704	2981	3457	4051
Heavy goods and light commercial vehicles	1589	1853	1809	1915	2109	2446	2835
Rail	405	416	394	428	482	580	724
Inland navigation	300	343	354	361	389	432	492
Energy demand in transport (ktoe)	341525	364526	359402	358062	350945	341463	355025
CO2 Emissions (energy related)							
Transport (MT of CO2 eq)	1001.7	1079.8	1036.6	1023.4	983.7	946.9	956.5

Some important data to be taken into account when considering the changes between 2015 and 2030:

- Population grows from 505 million to 516 million (average of 0.1% year on year growth);
- GDP grows from 13,457 billion Euros to 16,682 billion Euros (average of 1.5% year on year growth);
- Passenger transport activity grows from 6,735 billion passenger km to 7,880 billion (average of 1.1% year on year growth);
- Freight transport activity grows from 2,704 billion tonne km to 3,457 billion (average of 1.7% year on year growth);
- Energy demand related to transport activity falls from 358,062 KTOE (kilo-tonnes of oil equivalent[21]) to 341,463 (average of 0.3% year on year decrease);
- Greenhouse gas emissions related to transport fall from 1,023.4 million tonnes of CO_2 equivalent to 946.9 million tonnes (average of 0.5% year on year decrease).

Based on the information provided above the background forecast at EU level is characterised by: moderate growth in transport indicators; a low level of decrease in energy consumption related to transport; and a low decrease in the rate of greenhouse

21 1 Tonne of oil equivalent = 107 kilocalories, or 41.86 GJ (Gigajoule)

gas emissions. Thus, the forecast expects continuing decoupling between transport and energy indicators.

10.4 EU 2016 Reference Forecast – NSB MS

In the table below the EU Reference Forecast is analysed (for all indicators) for NSB MS (BE, NL, DE, PL, LT, LV, FI and EE).

Table 29. EU reference forecast (NSB MS)

	2000	2005	2010	2015	2020	2030	2050
Population (in million)	159	160	159	159	160	159	152
GDP (in 000 M€13)	3684	3901	4213	4484	4834	5415	6824
Passenger transport activity (Gpkm)	1748	1830	1894	2004	2095	2274	2539
Public road transport	168	162	148	152	160	168	179
Private cars and motorcycles	1335	1413	1475	1550	1607	1712	1842
Rail	149	147	157	172	184	219	278
Aviation	87	99	107	122	135	166	230
Inland navigation	8	8	8	8	8	9	10
Freight transport activity (Gtkm)	850	946	1022	1094	1213	1403	1612
Heavy goods and light commercial vehicles	539	615	681	732	812	942	1063
Rail	189	212	216	231	260	307	374
Inland navigation	122	120	124	131	141	154	174
Energy demand in transport (ktoe)	105693	105099	109512	111924	108616	103782	104944
CO2 Emissions (energy related)							
Transport (MT of CO2 eq)	304.8	306.6	312.3	316.7	303.4	286.7	280.4

The overall NSB MS pattern is quite similar to the EU28 picture - with the Corridor MS accounting for approximately a 20-40% share of activity across the board, depending on the preferred indicator.

However, for this region of Europe, there are some differences when compared to the EU28 picture for the period 2015-2030:

- GDP growth per annum is lower (1.3% instead of 1.5%);
- Passenger transport growth per annum is lower (0.8% instead of 1.1%);
- Energy demand in transport decreases faster (-0.5% instead of -0.3%);
- GHG emissions from transport decrease faster (-0.7% instead of -0.5%).

Based on the data reviewed it could be concluded:

- EU Reference Forecast figures are similar to the Pocketbook[22] figures for: bus and coach, cars and rail;
- Aviation is included in the EU Reference Forecast, but excludes extra-EU flights and it apportions the traffic between countries of origin and destination;
- Inland navigation is included in the EU Reference Forecast, but this category also includes national maritime traffic.

[22] EU Statistical pocketbook. EU Transport in figures 2017: https://ec.europa.eu/transport/sites/transport/files/pocketbook2017.pdf

Thus, overall, the EU Reference Figures are around 8-10% higher in terms of total km than the pocketbook statistics. The difference between the two data sources could be described as follows:

- Rail figures are identical (or close) for both sources. It should be noted that the most recent pocketbook figures are for 2014, and not 2015;
- Road figures in the pocketbook are from the data series showing traffic flows on the national territory which is the indicator most closely aligned with the other modes and with network model results. The data sources differ by around 3% from the reference forecast data, but the trend is similar. The gap is due to the inclusion of light commercial vehicles.
- Inland waterway figures in the pocketbook are similar to the inland navigation statistics in the reference forecast. The difference due to the reference forecast indicators including national maritime transport.

10.5 NSB Corridor – Reference Forecast

By applying the shares derived from the network model to the national figures, it is then possible to estimate equivalent indicators at Corridor level. This takes into account the fact that the proportion of national traffic accounted for by Corridor sections differs greatly by country and by mode. The network model (NEAC10) was used to derive these percentages.

The Corridor sections account for a high share on inland waterway transport - but a relatively low share of road transport - this is due to the fact that the majority of important waterways are included in the corridor alignment and many of the important national motorways and supporting network are left out.

Table 30. NSB Corridor main indicators

Main Indicators NSB Corridor	2000	2005	2010	2015	2020	2030	2050
Passenger transport activity (Gpkm)	109.43	115.12	119.99	129.09	136.59	152.68	180.48
Public road transport	8.15	7.79	7.13	7.36	7.74	8.12	8.66
Private cars and motorcycles	64.84	68.28	71.44	75.15	77.86	82.93	89.31
Rail	14.78	14.59	15.59	17.09	18.28	21.71	27.52
Aviation	21.66	24.45	25.83	29.49	32.71	39.91	54.98
Inland navigation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Freight transport activity (Gtkm)	165.73	183.91	197.07	212.98	234.43	270.71	319.28
Heavy goods and LCV	61.60	69.65	76.94	83.08	92.33	107.91	123.14
Rail	62.52	71.13	73.60	78.79	87.73	102.14	125.67
Inland navigation	41.61	43.13	46.53	51.11	54.37	60.66	70.47
Energy demand in transport (ktoe)	9600.96	9554.83	9950.43	10353.56	10404.40	10408.14	10946.65
Passenger Transport	6495.66	6250.38	6426.69	6638.35	6473.40	6236.21	6481.94
Freight Transport	3105.30	3304.45	3523.74	3715.21	3931.00	4171.94	4464.72
CO2 Emissions (energy related)	28.44	28.79	29.41	30.31	30.03	29.74	30.34
Passenger Transport	19.27	18.86	19.08	19.49	18.82	17.96	18.07
Freight Transport	9.17	9.92	10.33	10.82	11.21	11.79	12.27

It is assumed that between 2015 and 2030, the Corridor shares will be constant and therefore the patterns of growth are similar to the national level forecasts. Where there are differences is because the modal share ratios in the Corridor are different to the national mode share ratios. Therefore, for example, if Inland Waterway traffic is relatively more important in the Corridor than at national level, its growth rate has a greater impact on the overall Corridor statistics.

Overall, the Corridor is estimated to account for: 7% of passenger/km; 19% of freight/km, with around 10% of energy demand (for transport); and 10% of CO2 emissions (from transport).

An overview, based on the analysis performed in overview, at Corridor level is as follows:

- Passenger traffic on the Corridor is forecast to grow at 1.1% per annum;
- Freight traffic is forecast to grow at 1.6% per annum;
- Energy demand is forecast to stay stable. A small growth is foreseen, but less than 0.0% per annum;
- Greenhouse gas emissions are forecast to decrease by 0.1% per annum.

Below the results for 2015, 2030, and 2050 are presented and indicate passenger km, freight tonne km and vehicle km.

Table 31. NSB Corridor Traffic 2015

Traffic	Current situation: 2015				
	Passenger	Freight	Pax. Veh.	Freight Veh.	Total Veh.
	bpkm	btkm	pvkm	fvkm	vkm
Road	82.51	83.08	56.13	7.90	64.03
Rail	17.09	78.79	0.09	0.16	0.25
IWT	0.00	51.11		0.11	0.11
Maritime					
Aviation	29.49				
TOTAL	**129.09**	**212.98**	**56.22**	**8.17**	**64.38**

Table 32. NSB Corridor Traffic 2030

Traffic	2030 Situation -EU reference				
	Passenger	Freight	Pax. Veh.	Freight Veh.	Total Veh.
	bpkm	Btkm	pvkm	fvkm	vkm
Road	91.05	107.91	61.94	10.26	72.20
Rail	21.71	102.14	0.11	0.20	0.32
IWT	0.00	60.66		0.13	0.13
Maritime					
Aviation	39.91				
TOTAL	**152.68**	**270.71**	**62.05**	**10.59**	**72.65**

Table 33. NSB Corridor Traffic 2050

Traffic	2050 Situation - EU reference				
	Passenger	Freight	Pax. Veh.	Freight Veh.	Total Veh.
	bpkm	Btkm	pvkm	fvkm	vkm
Road	97.97	123.14	66.65	11.71	78.35
Rail	27.52	125.67	0.14	0.25	0.39
IWT	0.00	70.47		0.15	0.15
Maritime					
Aviation	54.98				
TOTAL	**180.48**	**319.28**	**66.79**	**12.11**	**78.90**

The results showing the impact with respect to CO2 emissions are presented below - including the implied emission factor ratios (grams of CO2 per passenger km, grams of CO2 per freight tonne km).

Table 34: NSB Corridor GHG Emissions 2015

GHG	Current situation: 2015				
	Passenger	Freight	Passenger	Freight	Total
	MT of CO2 eq	MT of CO2 eq	gCO2/pkm	gCO2/tkm	MT of CO2 eq
Road	9.27	9.19	112.30	110.67	18.46
Rail	4.41	0.55	257.79	7.02	4.96
IWT	0.00	1.07		20.96	1.07
Maritime					
Aviation	5.82				5.82
TOTAL	**19.49**	**10.82**			**30.31**

Table 35: NSB Corridor GHG Emissions 2030

GHG	2030 Situation -EU reference				
	Passenger	Freight	Passenger	Freight	Total
	MT of CO2 eq	MT of CO2 eq	gCO2/pkm	gCO2/tkm	MT of CO2 eq
Road	7.45	9.95	81.87	92.21	17.41
Rail	4.71	0.62	216.96	6.03	5.33
IWT	0.00	1.22		20.10	1.22
Maritime					
Aviation	5.79				5.79
TOTAL	**17.96**	**11.79**			**29.74**

Table 36: NSB Corridor GHG Emissions 2050

GHG	2050 Situation - EU reference				
	Passenger	Freight	Passenger	Freight	Total
	MT of CO2 eq	MT of CO2 eq	gCO2/pkm	gCO2/tkm	MT of CO2 eq
Road	6.86	10.22	70.07	83.03	17.09
Rail	4.68	0.67	170.03	5.30	5.35
IWT	0.00	1.38		19.62	1.38
Maritime					
Aviation	6.52				6.52
TOTAL	**18.07**	**12.27**			**30.34**

10.6 NSB Reference Forecast – observations

Corridor traffic has been defined in different forecasts as the total passenger/km and the total tonne/km per Corridor section, including all geographical categories; cross-border; inter-regional; and intra-regional. To date no equivalent feasible methodology that include maritime traffic has been identified and in addition certain smaller categories such as air-freight and passenger/recreational inland waterway traffic are also excluded from the results. However, data for key short-sea maritime sectors is included in the market analysis.

The EU Reference Forecast predicts a gradual growth in demographic, economic and transport activity but with reduction of energy consumption and CO2 emission factors.

Overall, the Corridor is estimated to account for the growth of 7% of passenger/km, 19% of freight/km with around 10% of energy demand (for transport) and 10% of CO2 emissions (from transport).

Passenger traffic, as anticipated in the market analysis, is dominated by road and aviation. Freight has more equal balance between inland waterway and rail. However the shares for rail and especially inland waterway are quite variable across different regions of the Corridor and not only due to the IWW focus on the western part of the Corridor.

Passenger traffic is forecasted to increase from 129 billion passenger / km today to 153 billion passenger / km by 2030 (road, rail and aviation). Road and aviation account for 86% of the total. The fastest growing sector is forecasted to be aviation (at 2.0% per annum).

Freight traffic is forecasted to increase from 213 billion tons / km today to 271 billion tons / km by 2030 (road, rail, and inland waterway). Road has 40% share of corridor traffic and rail has 38%. Rail is forecast to grow at the fastest rate (3.2% per annum) overtaking road ton/km during the period 2030-2050.

Energy efficiency is forecasted to increase over the 2015 – 2030 time period and emission factors are estimated to fall. Total GHG emissions are expected to fall from 30.3 million tonnes of CO2 equivalent to 29.7 million tonnes across the selected traffic flows by 2030 although they are expected to increase back again to 30.3 million tonnes by 2050 due to further traffic growth. Most of the 2030 decrease in CO2 is attributable to greater efficiency in the passenger road sector where relatively low expected growth is outweighed by increases in efficiency. In the freight sectors and in aviation traffic growth outweighs efficiency gains.

In 2015, it is estimated that for the Corridor: 60% of GHG emissions will arise from road (30% from passenger road and 30% from road freight); and 20% attributable to rail and inland navigation. By 2050 the three highest emission sectors will still account for 95% but the share is expected to change with passenger aviation accounting for 22%, passenger road accounting for 23% and road freight accounting for 30%.

10.7 Results of the Mapping of Projects

In addition to NSB reference forecast the analysis was performed at a project level.

On the North Sea - Baltic Corridor there are 52 projects contributing directly to decarbonisation. The total cost of these projects is 6.2 billion EUR. Out of 52 projects: 18 contribute to electricity or hydrogen alternative fuels for all modes of transport; 23 projects relate to LNG and/or CNG alternative fuels; and 10 projects contribute to vehicle efficiency. Finally one project contributes directly to modal shift. It should be noted that a number of projects cover with multiple areas.

11 Innovative flagship projects

With the "Issues Papers" European Coordinators started, in addition to their geographically-based corridor work, also an action aiming to advance newer components of TEN-T development and to strengthen corresponding cross-corridor synergies. This initiative opened up a process which ensures that rapidly changing transport and mobility patterns go along with appropriate infrastructure development. The future of the European transport system requires close interaction between infrastructure and transport policy therefore through the innovative pilot initiatives across different TEN-T corridors and Member States the innovative and necessary projects have started cooperating closely - between transport policy and infrastructure stakeholders from different countries.

11.1 Innovative flagship on Alternative fuel infrastructure

Directive 2014/94 on alternative fuels infrastructure clearly sets out minimum requirements for alternative fuels infrastructure development in Member States, to be implemented through mandatory National Policy Frameworks. However, there is a variety of approaches taken. Levels of ambition differ and in case of no additional action infrastructure gaps will remain in parts of the EU. The Corridor can contribute to achieve continuity of provision of alternative fuels across borders.

The Alternative Fuel (AF) pilot initiative is an initiative to ensure uninterrupted, smooth travel using an alternative fuels vehicles between Helsinki and Lisbon. Due to the wide geographic coverage the pilot initiative requires the coordination of four Core Network Corridors, NSB, NSMED and ATL.

Objective and scope of the flagship project

The aim of the pilot initiative is to facilitate coherent deployment of alternative fuel infrastructure covering four types of alternative fuel - electricity, compressed natural gas (CNG), liquefied natural gas (LNG) and hydrogen (H2). The geographical scope is road trips from Helsinki to Lisbon, for both passenger and freight transport. The deployment approach will include: an analysis of fuel demand by fuel type; the influence of vehicles technology on the deployment strategy, assessment of financing needed; possibility to develop private and public infrastructures or joint infrastructures by applying PPP models; and other implementation related topics.

Pilot initiative development

The current situation analysis includes a review of the existing EU and national regulatory framework, the data regarding existing infrastructure and the near-future existing infrastructure. The review also includes an assessment of potential benefits and the financial support required for each fuel type, anticipating a stronger vehicle demand in the future. Information gathering from stakeholders is an essential last step required to elevate the research from a pilot initiative to a specific project that facilitates the rollout of alternative fuel on the Helsinki – Lisbon route.

Current Situation

Based on the current situation analysis, including information available at EU and national level and CEF projects of the 2016 call, initial needs and benefits for financial support have been identified per alternative fuel type as detailed below:

- **Electric charging** (public fast charging station near the highway) is a fuel type with a high level of deployment. The pilot initiative focus would be on adding the missing regions on the route Lisbon – Helsinki to ensure an uninterrupted journey. This could involve, for instance, adding electric charging points in Poland

and Lithuania or in the cross border sections of Portugal and Spain. It would also help prepare the route for a potentially quick in demand for infrastructure.

- **CNG, similar to electricity,** is fuel type with a high level of deployment. The focus on this fuel type will be on the gaps around the peripheral areas - these are the areas furthest away from the Corridor urban nodes. In most cases there is CNG infrastructure at urban nodes and therefore no specific actions are planned at urban node level.
- The use of **LNG** could be explored further in the regions where this fuel type is available. For example, France could strengthen the Lisbon – Helsinki route with LNG road fuelling points.
- The **Hydrogen** fuel type is in its earliest stage of development. The region of Benelux and Northern Germany is the most mature with respect to H2, therefore other regions would benefit from more H2 fuelling points in the scope of this pilot initiative.

A very wide range of stakeholders has been identified in relation to the clean fuels pilot initiative, including CEF project beneficiaries, car manufacturers, alternative fuel providers, local authorities, port authorities and others - the list of contacts is evolving all the time.

11.2 Road safety in the Baltic States and Poland

The flagship project for **road safety in Baltic States and Poland** was developed based on the need to reduce the number of road accidents and to provide safer car journey on Via Baltica and in Poland. The proposed solution took into account the different tools available that have been developed by international non-profit organisations to increase road safety and good practice examples in different Member States.

Based on the current situation analysis the possibility to develop a joint project by all four Member States – Poland, Lithuania, Latvia and Estonia has been explored. These Member States would assess the current situation on Core Network Corridor roads using internationally recognised road safety classification, identify the main road sectors where improvements are needed, quantify investment needs by this allowing better and targeted planning both at national budget level and also in the framework of the new EU Multiannual Financial Framework.

11.3 NSB ITS Corridor

In the Member States along the Corridor, ITS-related investments are already ongoing.

The NSB ITS flagship project aims to support continuity and interoperability of road safety applications, real time traffic information services and freight management services. The work will be done accordingly to priority areas for the development and use of specifications and standards foreseen in Article 2 of the 2010/40/UE Directive, along the TEN-T Corridors including urban nodes.

The enhancement of road operations and traffic management services is required along this very important connection from Western and Central Europe to Belorussia and Russia - road transport is the dominant mode in the countries along the Corridor. This initiative will help to promote continuous ITS solutions by enhancing traffic flows and safety, by linking and extending the existing coverage of interoperable services across the NSB Corridor and by establishing common understanding and operating principles with the neighbouring ITS corridors.

Special attention will be paid to road safety including information on road works, hazards, travel times and real-time traffic information services as well as for intelligent truck parking which will help the professional drivers better comply with resting times. Cross border improved interaction will be achieved by implementing traffic management plans to ensure smooth operations and continuity of service.

The project will use synergies with other relevant projects such as the EU EIP East–West Corridor project and national programmes such as the CEF-supported National Traffic Management System (NTMS) project in Poland. It will assess the existing solutions, will identify gaps and most importantly will suggest solutions on how to overcome them. When looking forward into deploying C-ITS services and applications the corridor will consider the C-ROADS Platform specifications and the ongoing National initiatives within that framework to support the link between the vehicle and the transport infrastructure, in particular in the Western part of the Corridor where traditional ITS services are already well developed.

As a practical result of the innovative flagship project there will be a clear vision and plans for NSB ITS which will help to identify relevant projects with a focus on cross-border ITS issues ensuring the continuity and interoperability of service. The flagship project will be implemented in close cooperation with the innovative flagship project on road safety with a focus on Poland and the Baltic States as those countries will be key players in the development of a fully interoperable NSB ITS Corridor.

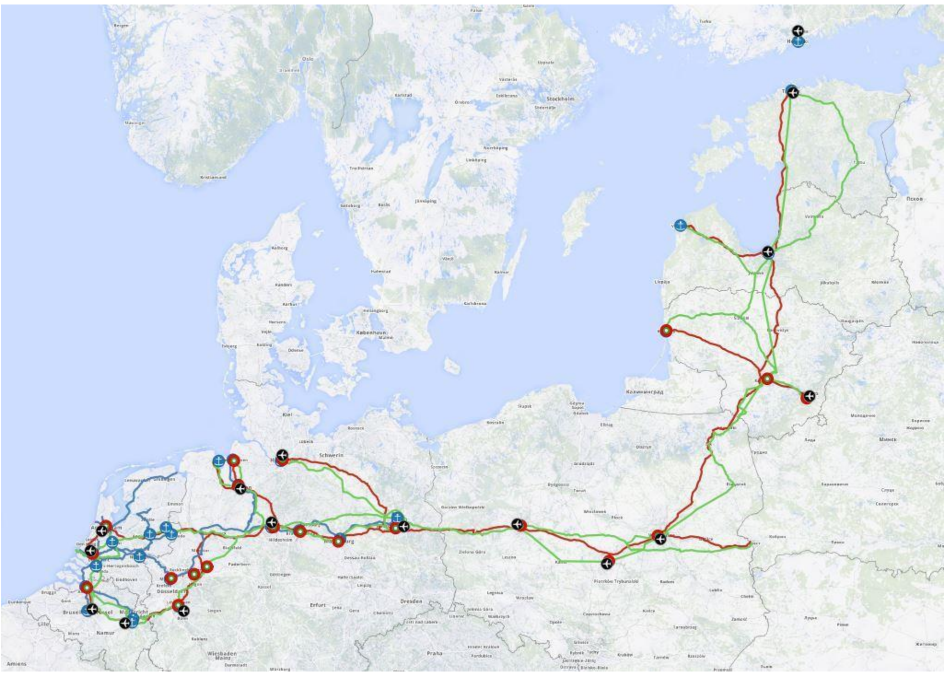
Annexes

Annex 1 - Description of the North Sea-Baltic Corridor

The North Sea-Baltic Corridor (Corridor) comprises 5,986 km of railways, 4,092 km of roads and 2,186 km of inland waterways. It is one of nine Core Network Corridors and the only one to be situated exclusively in the North of Europe. The Corridor is a clear example of a principal objective of the new TEN-T policy by connecting east with west and improving the accessibility of the eastern Member States. It is the northern-most Corridor connecting the Western and the Eastern markets. It joins the Baltic Sea Region with the low countries of the North Sea Region by way of Helsinki, the Baltic States, Poland and Germany.

The figure below presents the North Sea Baltic corridor map including urban nodes and transport interconnections. The main transport modes covered by the Corridor are rail, road, inland waterways, with interconnections at inland ports, seaports, railroad terminals and airports.

North Sea-Baltic corridor map showing different Urban Nodes and transport interconnections by mode



One of the main Corridor objectives is to use untapped economic potential in the northern and eastern parts of the Corridor. The Corridor can provide a way to develop global transport routes and a platform for dialogue with industrial stakeholders, by taking into account interests of the 40 regions along the North Sea-Baltic corridor as well as civil society affected by the projects of common interest.

The Corridor provides a direct connection from Western and Central Europe to Belorussia and Russia, furthermore Finland and the Baltic States serve as a hub for the terrestrial connections to the eastern and northern markets in China, Asia and beyond.

There is also the possibility of connecting in the North to the developing ideas of the Northern Dimension Policy and to the Arctic area, the growing potential of which has been recognised by the recent joint Communication of the High Representative for Foreign Affairs and the Commission on "An integrated European Union policy for the Arctic".

A core objective of the Corridor is to achieve compliance of the transport infrastructure for all transport modes with the technical requirements by 2030 set in the Regulation (EU) No 1315/2013 of the European Parliament and of the Council of 11 December 2013.

Corridor integration and cross border sections

The North Sea-Baltic Corridor links capitals of the eight Member States part of the Corridor and it crosses eight national borders (1 maritime: FI-EE and seven terrestrial: EE-LV; LV-LT; LT-PL; PL-DE; DE-NL; NL-BE; DE-BE). Cross border sections have a high priority in the work to be carried out on the Corridor.

Also, the North Sea-Baltic corridor links four older Member States with four newer Member States. There remain substantial divergences, in terms of transport infrastructure as well as economic and social, between the Eastern and Western parts of the EU. Those divergences need to be tackled in order to achieve a fully integrated European transport infrastructure network.

Bridging missing links in the rail network

A strong strategic component in the North Sea-Baltic Corridor is to create new traffic flows in a North/South direction on the eastern shore of the Baltic Sea and connect them to the well-established West/East flows between the North Sea ports, Berlin and Warsaw. The Rail Baltica project is a missing link to ensure that there is no gauge break between different Member States. The new 1435 mm standard gauge rail connection from Tallinn to Warsaw is not only an alternative to the predominant traffic flows from Russia and Belorussia, but will strengthen the Baltic platform serving as a hub.

Rail-road Terminals (RRT)

In Finland, the Corridor features a trimodal terminal in the port of Helsinki. Similarly to Finland, in Estonia, rail-road terminals (RRTs) exist in ports, but not on a stand-alone basis without the port. There are two RRT’s completed in Lithuania in 2015 – Vilnius and Kaunas intermodal terminals.

The network of RRTs in Poland includes three core areas designated for RRT localisation are the urban nodes of Poznań, Łódź and Warsaw. All are conveniently located at the crossroads of two TEN-T corridors (Baltic-Adriatic corridor and NSB).

There are both rail-road and tri-modal terminals in the port areas in The Netherlands, including Amsterdam and Rotterdam. In Belgium, RRTs are located at the port of Antwerp.

Airports

There are 16 core network airports on the Corridor of which 8 airports with an obligation to connect to rail (Helsinki, Riga, Warsaw, Berlin, Brandenburg, Hamburg, Cologne, Brussels, Amsterdam).

Connecting the ports with the hinterland

The North Sea-Baltic Corridor is linking some of the most important ports in Europe and the objective is to link these ports not only by sea, but by all available transport modes including rail, roads, inland waterways and air, ensuring multi-modal links including relevant traffic and information management systems. The North Sea ports also provide maritime access to the Americas and the rest of the global trading network and possibilities for enhanced competitiveness and better connections with the Member States in the Eastern part of the Corridor.

The Corridor has 12 core maritime ports connecting the Baltic Sea ports of Helsinki (FI), Tallinn (EE), Riga, Ventspils (LV) and Klaipeda (LT) with the North Sea ports of Hamburg, Bremen, Wilhelmshaven (DE), Amsterdam, Rotterdam, Moerdijk (NL) and Antwerp (BE). The start and the end points of the Corridor are the Finnish port of Helsinki at the eastern end and the Belgian port of Antwerp and the Dutch ports of Amsterdam and Rotterdam in the West.

Inland waterways (IWW)

The Corridor has an effective IWW network stretching from the North Sea ports to Berlin, including 20 inland ports mainly situated in Belgium, The Netherlands and Germany.

Efficient urban nodes

An important characteristic of the North Sea-Baltic Corridor is the presence of urban nodes that are the multi-modal connecting points (hubs) with other corridors. Helsinki connects with the Scandinavian-Mediterranean corridor, Warsaw and Poznań connect with the Baltic - Adriatic corridor, while Berlin and Hannover connect with both the Orient-East Mediterranean and the Scandinavian-Mediterranean corridors. Further west, Cologne, Nijmegen, Liège intersect with the Rhine-Alpine corridor and at its western end points, Antwerp, Brussels, Rotterdam and Amsterdam connect with the Rhine-Alpine and the North Sea-Mediterranean corridors.

Developing the transport interconnectivity of the key urban nodes is a vital objective for the efficiency of the Corridor. These nodes of high economic importance are recognised as having a crucial importance not only to this Corridor, but also to the rest of the network.

New technologies

The North Sea-Baltic corridor will provide the basis for the large scale deployment of new technologies and innovation which can help to enhance the overall efficiency of the European transport sector and help to reduce its carbon footprint, for instance, well developed ITS in different parts of the Corridor. New technologies are especially important in the context of ports, Motorways of the Sea and logistics.

Corridor Alignment

The information below presents the North Sea Baltic Corridor alignment and the core network transport nodes attributed to the NSB corridor.

According to Annex I of Regulation (EU) No 1316/2013 the **North Sea – Baltic corridor alignment** is defined as follows:

- Helsinki – Tallinn – Rīga
- Ventspils – Rīga
- Rīga – Kaunas
- Klaipėda – Kaunas – Vilnius
- Kaunas – Warszawa
- BY border – Warszawa – Poznań – Frankfurt/Oder – Berlin – Hamburg
- Berlin – Magdeburg – Braunschweig – Hannover
- Hannover – Bremen – Bremerhaven/Wilhelmshaven
- Hannover – Osnabrück – Hengelo – Almelo – Deventer – Utrecht
- Utrecht – Amsterdam
- Utrecht – Rotterdam – Antwerpen
- Hannover – Köln – Antwerpen

According to *ANNEX II of* Regulation (EU) No 1315/2013 the identified **core network airports, maritime ports, inland ports, rail-road terminals and urban nodes** are included in table below.

Node name and Member State	Core network airports		Core network maritime ports		Core network inland ports		Core network rail-road terminals		Core network urban nodes	
	Regulation	TENtec	Regulation	TENtec	Regulation	TENtec	Regulation	TENtec	Regulation	TENtec
FI										

Helsinki	x	x	x	x					x	
EE										
Tallinn	x	x	x	x					x	
LV										
Riga	x	x	x	x					x	
Ventspils			x	x						
LT										
Kaunas							x	x		
Vilnius	x	x					x	x	x	
Klaipeda			x	x			x	x		
PL										
Warsaw	x	x					x	x	x	
Lodz	x	x					x	x	x	
Poznan	x	x					x	x	x	
DE										
Berlin	x	x			x	x	x	x	x	
Magdeburg					x	x	x	x		
Braunschweig					x	x	x	x		
Hannover	x	x			x	x	x	x	x	
Bielefeld									x	
Hamburg	x	x	x	x	x	x	x	x	x	
Bremen	x	x	x	x	x	x	x	x	x	
Bremerhaven			x	x	x	x		x		
Wilhelmshaven			x	x						
Cologne	x	x			x	x	x	x	x	
Duisburg						x		x		
Dortmund					x	x	x	x		
Hamm					x	x		x		
NL										
Hengelo					x	x				
Almelo					x	x				
Deventer					x	x				
Utrecht					x	x				
Amsterdam	x	x	x	x	x	x	x	x	x	
Rotterdam	x	x	x	x	x	x	x	x	x	
Nijmegen					x	x				
Moerdijk					x	x				
BE										
Antwerp			x	x	x	x	x	x	x	
Brussels	x	x			x	x			x	
Liège	x	x			x	x				

Annex 2 - Climate resilience tables of the Corridor

1. Belgium

Member State	Mode of Transport	Climate Impact	Observations	Vulnerabilities	Qualitative Risk Assessment (T, E, C)
Belgium	Roads	Increased summer temperature	All BE inland roads	Rutting of roadways	Low (M, L, L)
		Increased winter temperature	All BE inland roads	Less damage due to frost and the use of salt	Low (L, L, L)
		Increased Precipitation and Floods	All BE inland roads	Damage to the substructure of roadways Corrosion of bridges and other infrastructure More water evacuation in tunnels Erosion and higher chances of mud drum due to the instability of slopes and embankments	Medium (L, M, M)
		More sleet precipitation in winter	All BE inland roads	Need of more snowploughs	Low (M, L, L)
		Extreme weather	All BE inland roads	Damage to electronics of traffic management and information Acceleration of the aging of the bitumen: more longitudinal cracks, fraying and oily spots	Low (M, L, L)
		Change of seasonal precipitation patterns	All BE inland roads	Impact on noise pollution: wet roads produce more noise.	Low (M, L, L)
	Aviation	Increased Precipitation and Floods	Applicable to Antwerp and Oostende airports	Improving the water drainage of the runways	High (H, H, M)
		Increased and more frequent extreme winds, change of wind direction	All BE airports	Impact on runway capacity, especially for airports with one runway Impact on noise pollution	High (H, H, M)
		Higher number of frostdays	All BE airports	More frequent de-icing of planes and of the infrastructure	Low (L, L, M)
		Increased summer temperature	All BE airports	Deformation of runway asphalt	Medium (M, H, M)
	Rail	Extreme weather situations	All BE railways	Impact on electric installations and cables Impact on the ballast bed and railway bars	High (M, H, H)
		Frost	All BE railways	Impact on switches	High (M, H, H)
	Inland navigation	More frequent droughts	All BE inland waterways	Impact on capacity	Medium (M, M, H)
		Increased Precipitation and Floods	All BE inland waterways	Higher flow rates can lead to temporary closure of the	Medium (M, M, H)

				network due to safety reasons but also to allow the evacuation of floods in the surroundings The Port of Brussels is used as a storm basin Higher flow rates increase the water level and impact the headroom under bridges Higher flow rates impact manoeuvrability, including mooring, loading and unloading	
		Sea Level Rise	All BE inland waterways	Corrosion of locks	Medium (L, M, M)
		Stimulation of the flora	All BE inland waterways	Flora development has to be avoided in the network More sediments means more frequent dredging	Medium (M, M, H)
		Increase of temperature	All BE inland waterways	Recreative pressure on the network that could lead to conflicts In the winter, lesser use of salt for towpaths and structures By higher temperatures, moving parts of bridges and locks could be impacted due to deformation of materials. Locks are usually cooled by the water but the bridges are especially vulnerable.	Low (L, L, M)
	General impact	Climate change in general		Change in transport demand for goods and tourism Congestion and disruption of traffic: impact on modal split and costs	Medium (M, M, M)
		Higher temperatures		Comfort in vehicles would require additional air conditioning that would impact the principles of mitigation of greenhouse gases emissions	Not Applicable

2. Estonia

Member State	Mode of Transport	Climate Impact	Observations	Vulnerabilities	Qualitative Risk Assessment (T, E, C)
Estonia	Roads (incl bridges, tunnels)	Increased summer temperature	All EE inland roads	Rutting of roadways	Low (L, M, L)
		Increased winter temperature, Permafrost degradation and thawing, Change in frequency of Winter Storms	All EE inland roads	Less damage due to frost and the use of salt Winter storms (traffic interruption and de-icing) Winter conditions may severely affect the road pavement, and after winter season maintenance represents a high maintenance & repairing cost.	Low (L, L, L)
		Extreme weather, cold winters for short time periods, extreme storm events	All EE inland roads	Damage to electronics of traffic management and information Acceleration of the aging of the bitumen: more longitudinal cracks, fraying and oily spots More downtime of infrastructure More congestion and more accidents (passenger and transport) Damage on infrastructure; roadside trees/vegetation can block roads	Medium (M, H, M)
		Heavy rains and/or heavy winds and/or lightning	All EE inland roads	More downtime of infrastructure due to extreme weather More congestion and more accidents (passenger and transport) Damage on infrastructure (e.g. pavements, road washout); road submersion, scour to structures, underpass flooding, overstrain drainage systems, overstrain drainage systems, instability of embankments	High (H, H, M)
		Change of seasonal precipitation patterns	All EE inland roads	Impact on noise pollution: wet roads produce more noise	Low (M, L, L)
		in general	All EE inland roads	speed reduction; road closure or road safety hazards; disruption of "just in time" delivery of goods; welfare losses;	Medium (M, H, L)

				higher reparation and maintenance costs.	
	Aviation	Increased precipitation and floods	Tallinn International Airport	Damage to the structure of the runways Impact on runways capacity More delays or accidents flood damage to runways and other infrastructure; water runoff exceeds capacity of drainage system.	High (H, H, H)
		Increased and more frequent extreme winds, change of wind direction	Tallinn International Airport	Impact on runway capacity Impact on noise pollution More delays or accidents wind damage to terminals, navigation, equipment, signage, detours and risks of accidents	High (H, H, H)
		Extreme weather and heavy rains and/or lightning, Change in frequency of Winter Storms	Tallinn International Airport	More downtime of infrastructure due to extreme weather More delays or accidents	High (H, H, H)
		Higher number of frostdays, Permafrost degradation and thawing	Tallinn International Airport	More frequent de-icing of planes and of the infrastructure More delays or accidents Airport operations (clearance of movement Surfaces)	Medium (L, H, M)
		Increased summer temperature	Tallinn International Airport	Deformation of runway asphalt More delays or accidents	Low (L, L, M)
		in general	Tallinn International Airport	interruption and disruption to services supplied and to ground access; periodic airport closures; higher maintenance costs.	Medium (M, M, M)
	Rail	Extreme weather, heavy rains and/or heavy winds and/or lightning	All EE railways	Impact on electric installations and cables Impact on the ballast bed, roadbeds and railway bars Damage on infrastructure such as signals, power cable etc. (e.g. due to falling trees, etc.) leading to more downtime of infrastructure due to extreme weather More congestion and more accidents	Medium (H, M, M)

				(passenger and transport) Disruptions of electricity supply to electrical railways	
		Frost / snowstorms, Permafrost degradation and thawing	All EE railways	Impact on switches ice on trains and catenary; thawing After winter season maintenance represents a high maintenance & repairing cost.	Medium (M, H, M)
		Summer heat	All EE railways	Impact on railways infrastructure (deformation of railways tracks, etc.)	Low (L, L, M)
		in general	All EE railways	welfare losses; reduced safety; increased cost for reparation and maintenance; disruption of "just in time" delivery of goods and passengers.	Medium (M, M, M)
	Maritime	Extreme weather (e.g. heavy rains, storms, heavy winds, etc.)	All EE ports	Smaller windows for cargo transhipment in case of storms or heavy winds Delays of the passage of the vessels in case of storms or heavy winds Risks for the safe passage of larger vessels / port infrastructure due to increasing size of vessels in case of storms or heavy winds More sediments means more frequent dredging	High (H, M, H)
		Less days below freezing	All EE ports	reduce problems with ice accumulation on vessels, decks, riggings and docks; occurrence of dangerous ice fog.	Medium (H, M, M)
		in general	All EE ports	disruption of "just in time" delivery of goods; welfare losses; increased cost for reparation and maintenance.	Medium (M, M, M)
	General impact	Climate change in general		Change in transport demand for goods and tourism Congestion and disruption of traffic: impact on modal split and costs Transport uses more ICT solutions which are more vulnerable to extreme weather due to its reliance on	Not Applicable

				power and telecom grid	
		Higher temperatures		Comfort in vehicles would require additional air conditioning that would impact the principles of mitigation of greenhouse gases emissions	Not Applicable

3. Germany

Member State	Mode of Transport	Climate Impact	Observations	Vulnerability	Qualitative Risk Assessment (T, E, C)
Germany	Road	more frequent/ more intensive rainfall	local occurrence	affects road traffic, e.g. through poor vision and wet roads; landslides and undercutting lead to destabilisation and destruction of road sections; increasing soil moisture can affect stability of bridges and tunnels	Medium (H, M, M)
	Road	more frequent/ more intensive storms	local occurrence	damage on roads	Medium (M, M, M)
	Road	increasing thunderstorms	local occurrence	failure of or damage on signals or other electronic traffic management systems	Low (L, M, L)
	Road	prolonged heat in summer, drought	all regions	damage on material and structure of road surface; forest and embankment fires; affect on stability of bridges (thermal expansion)	Medium (M, H, M)
	Road	rising temperatures in winter	all regions	less frequent and less serious frost damage to roads and bridges	High (H, H, M
	Road	flooding	especially in places with little difference in level between road and water surfaces		Low (L, L, L)
	Rail	more frequent/ more intensive rainfall	local occurrence	landslides and undercutting lead to destabilisation and destruction of rail sections; increasing soil moisture can affect stability	Medium (H, M, M)

			of bridges and tunnels	
Rail	more frequent/ more intensive storms	local occurrence	damage on railway tracks and power lines	Medium (L, H, M)
Rail	increasing thunderstorms	local occurrence	failure of or damage on signals or other electronic traffic management systems	Medium (M, M, H)
Rail	prolonged heat in summer, drought	all regions	damage on material and structure of rails; forest and embankment fires; affect on stability of bridges (thermal expansion)	Low (L, L, M)
Rail	flooding	especially in places with little difference in level between railway and water surfaces		Medium (H, L, M)
Maritime	rising sea level	German coastal areas	static stress and damages on port facilities; interruption of port operations	High (H, H, M)
Maritime	increasing storm surges	German coastal areas	damages on port facilities	Medium (M, H, M)
IWW	increased variation of water levels	all IWW, particularly free-flowing rivers	limited usability and decreasing reliability of IWW transport	High (H, H, H)
IWW	changes in water supply	all IWW, particularly free-flowing rivers	limited usability and decreasing reliability of IWW transport	High (H, H, H)
Aviation	prolonged heat in summer	all regions	damage on material and structure of runways	Low (H, L, L)

4. Latvia

Member State	Mode of Transport	Climate Impact	Observations	Vulnerabilities	Qualitative Risk Assessment (T, E, C)
Latvia	Roads	Increased summer temperature	All LV inland roads	Rutting of roadways	Low (L, M, L)
		Increased winter temperature	All LV inland roads	Less damage due to frost and the use of salt	Low (L, L, L)
		Extreme weather, cold winters for short time periods	All LV inland roads	Damage to electronics of traffic management and information Acceleration of the aging of the bitumen: more longitudinal cracks, fraying and oily spots More downtime of infrastructure More congestion and more accidents (passenger and transport)	Medium (M, H, M)
		Heavy rains and/or heavy winds and/or lightning	All LV inland roads	More downtime of infrastructure due to extreme weather More congestion and more accidents (passenger and transport)	High (H, H, M)
		Change of seasonal precipitation patterns	All LV inland roads	Impact on noise pollution: wet roads produce more noise	Low (M, L, L)
	Aviation	Increased precipitation and floods	Riga International Airport	Damage to the structure of the runways Impact on runways capacity More delays or accidents	High (H, H, H)
		Increased and more frequent extreme winds, change of wind direction	Riga International Airport	Impact on runway capacity Impact on noise pollution More delays or accidents	High (H, H, H)
		Extreme weather and heavy rains and/or lightning	Riga International Airport	More downtime of infrastructure due to extreme weather More delays or accidents	High (H, H, H)
		Higher number of frostdays	Riga International Airport	More frequent de-icing of planes and of the infrastructure More delays or accidents	Medium (L, H, M)
		Increased summer temperature	Riga International Airport	Deformation of runway asphalt	Low (L, L, M)

				More delays or accidents	
	Rail	Extreme weather, heavy rains and/or heavy winds and/or lightning	All LV railways	Impact on electric installations and cables Impact on the ballast bed, roadbeds and railway bars More downtime of infrastructure due to extreme weather More congestion and more accidents (passenger and transport) Disruptions of electricity supply to electrical railways	Medium (H, M, M)
		Frost / snowstorms	All LV railways	Impact on switches	Medium (M, H, M)
		Summer heat	All LV railways	Impact on railways infrastructure (deformation of railways tracks, etc.)	Low (L, L, M)
	Maritime	Extreme weather (e.g. heavy rains, storms, heavy winds, etc.)	All LV ports	Smaller windows for cargo transhipment in case of storms or heavy winds Delays of the passage of the vessels in case of storms or heavy winds Risks for the safe passage of larger vessels / port infrastructure due to increasing size of vessels in case of storms or heavy winds More sediments means more frequent dredging	High (H, M, H)
	General impact	Climate change in general		Change in transport demand for goods and tourism Congestion and disruption of traffic: impact on modal split and costs Transport uses more ICT solutions which are more vulnerable to extreme weather due to its reliance on power and telecom grid	Not Applicable
		Higher temperatures		Comfort in vehicles would	Not Applicable

				require additional air conditioning that would impact the principles of mitigation of greenhouse gases emissions	

5. Lithuania

Member State	Mode of Transport	Climate Impact	Observations	Vulnerabilities	Qualitative Risk Assessment (T, E, C)
Lithuania	Roads	Increased summer temperature	All LT inland roads	Rutting of roadways	Medium (M, M, L)
		Increased winter temperature	All LT inland roads	Less damage due to frost and the use of salt	Low (L, L, L)
		Increased precipitation and floods	Mainly Western LT inland roads (i.e. in Panemunė region)	Damage to the substructure of roadways Corrosion of bridges and other infrastructure Erosion and higher chances of mud drum due to the instability of slopes and embankments	Medium (H, M, L)
		Extreme weather, cold winters for short time periods	All LT inland roads	Damage to electronics of traffic management and information Acceleration of the aging of the bitumen: more longitudinal cracks, fraying and oily spots More downtime of infrastructure More congestion and more accidents (passenger and transport)	Medium (M, H, M)
		Heavy rains and/or heavy winds and/or lightning	All LT inland roads	More downtime of infrastructure due to extreme weather More congestion and more accidents (passenger and transport)	High (H, H, M)
		Change of seasonal precipitation patterns	All LT inland roads	Impact on noise pollution: wet roads produce more noise	Low (M, L, L)
	Aviation	Increased precipitation and floods	All LT airports	Damage to the structure of the runways Impact on runways capacity More delays or accidents	High (H, H, H)
		Increased and more frequent extreme winds, change of wind direction	All LT airports	Impact on runway capacity Impact on noise pollution More delays or accidents	High (H, H, H)
		Extreme weather and heavy rains and/or lightning	All LT airports	More downtime of infrastructure due to extreme weather	High (H, H, H)

				More delays or accidents	
		Higher number of frostdays	All LT airports	More frequent de-icing of planes and of the infrastructure More delays or accidents	Medium (L, H, M)
		Increased summer temperature	All LT airports	Deformation of runway asphalt More delays or accidents	Low (L, L, M)
	Rail	Extreme weather, heavy rains and/or heavy winds and/or lightning	All LT railways	Impact on electric installations and cables Impact on the ballast bed, roadbeds and railway bars More downtime of infrastructure due to extreme weather More congestion and more accidents (passenger and transport) Disruptions of electricity supply to electrical railways	Medium (H, M, M)
		Frost / snowstorms	All LT railways	Impact on switches	Medium (M, H, M)
		Summer heat	All LT railways	Impact on railways infrastructure (deformation of railways tracks, etc.)	Low (L, L, M)
	Maritime	Extreme weather (e.g. heavy rains, storms, heavy winds, etc.) Number of days per year in Klaipėda port, when wind is stronger than 20 m/s, have very small tendency to increase in the last few years, however number of days when wind is 14-20 m/s is stable / slightly decreases in the last few years, therefore this risk is very minor.	Klaipėda Port	Smaller windows for cargo transhipment in case of storms or heavy winds Delays of the passage of the vessels in case of storms or heavy winds Risks for the safe passage of larger vessels / port infrastructure due to increasing size of vessels in case of storms or heavy winds More sediments means more frequent dredging	High (H, M, H)
	General impact	Climate change in general		Change in transport demand for goods and tourism	Not Applicable

				Congestion and disruption of traffic: impact on modal split and costs Transport uses more ICT solutions which are more vulnerable to extreme weather due to its reliance on power and telecom grid	
		Higher temperatures		Comfort in vehicles would require additional air conditioning that would impact the principles of mitigation of greenhouse gases emissions	Not Applicable

6. The Netherlands

Member State	Mode of Transport	Climate Impact	Observations	Vulnerabilities	Qualitative Risk Assessment (T, E, C)
The Netherlands	Road	Heavy rains and/or heavy winds and/or lightning	Applicable for whole NL corridor network.	More downtime of infrastructure due to extreme weather. More congestion and more accidents (passenger and transport)	Medium (H, L, M)
		Extreme weather, colder winters for short time periods	Applicable for whole NL corridor network.	Current asphalt in NL is safe and efficient in rain conditions. For snow conditions the asphalt is less suited. More downtime of infrastructure. More congestion and more accidents (passenger and transport).	Medium (L, M, M)
	Rail	Heavy rains and/or heavy winds and/or lightning	Applicable for whole NL corridor network.	More downtime of infrastructure due to extreme weather. More congestion and more accidents (passenger and transport). Electricity supply.	High (H, M, H)
		More extreme water levels lead to higher risk of river flooding.	Applicable for Betuwelijn. Part of RALP and NSBAL corridor.	Railway lines are located near inland rivers. Increased exposure.	High (H, H, H)
	IWW and inland ports	Lower water levels due to droughts in NL or other inland countries (hinterland)	Applicable for whole NL corridor network. Rhine (RALP,NSBAL) and Meuse (NSMED) rivers especially.	European IWW fleet is has been moving towards bigger vessels the past decades. This trend continues. Impact on economic benefits for this low-carbon mode of transport.	Medium (M, M, H)
		More local precipitation (sea area) and less in inland areas. This means less water in rivers further away (Rhine Germany). Lower water levels, or more unpredictable water levels as a result	Applicable for whole NL corridor network. Rhine and Meuse rivers especially.	European IWW fleet is has been moving towards bigger vessels the past decades. This trend continues. Impact on economic benefits for this low-carbon mode of transport.	Medium (M, M, H)
	Maritime	Port flooding & Heavy rains and/or heavy winds and/or lightning	Ports NL	Flooding mostly under control. Smaller windows for cargo transhipment in case of storms or heavy winds.	Medium (H, L, M)
		Port flooding & heavy winds	Amsterdam port (has a	Storms etc. will hinder safe passage of vessels, leading to delay.	Low

			sealock acces to the sea).	Situation is improving due to new sealock construction	
	Aviation	Heavy rains and/or heavy winds and/or lightning	Corridor airports NL	More downtime of infrastructure due to extreme weather More delays or accidents	High (H, H, M)
		extreme weather, colder winter for short time periods	Corridor airports NL	More downtime of infrastructure More delays or accidents	Low (L, L, M)
	Innovation	Extreme weather in general.	Entire corridor NL	Innovatiative transport uses more ICT solutions. Dependent on a reliable power and telecom grid. Digital is more vulnerable to extreme weather compared to analogue.	Medium (future development uncertain)

7. Poland

Member State	Mode of Transport	Climate Impact	Observations	Vulnerabilities
Poland	Rail	Increased summer temperature (Progressive warming process)	Applicable to the whole country, slightly higher to sections E65 Warszawa – Katowice; CE 65 Bydgoszcz – Katowice; E59 Szczecin - Poznań – Wrocław – Opole; E20 DE border – Poznań – Warszawa – Zambrów	Rail buckling Fires of rail facilities may increase Work conditions and comfort of travel will deteriorate
		Increased Precipitation and Floods (Heavy rains, that cause flooding and landslides)	Applicable to the whole country, slightly higher in southern areas of Poland (Katowice – Bielsko-Biała – state border) as well as Mazurian lakes area (nearby Ełk)	Damage in rail infrastructure elements Disturbs the transport smoothness
	Road	Increased and more frequent extreme winds (Strong winds and hurricanes)	Applicable to the whole country, slightly higher in Warsaw area as well as southern areas of Poland (Katowice – Bielsko-Biała – state border) and north-eastern part of Poland (Białystok - Suwałki)	Damage in rail infrastructure elements (e.g. signals, power cables) Disturbs the transport smoothness
		Increased summer temperature (long-lasting heat periods)	Applicable to the whole country, slightly higher to central and southern part of Poland (S7 Nidzica – Warszawa; A1 Włocławek – CZ state border; S3 Szczecin – Legnica, A4 Legnica – Wrocław - Katowice); S8 Warszawa - Ełk	Affect negatively both vehicles and road infrastructure elements Pavement deterioration and subsidence Reduced life of asphalt road surfaces (e.g. surface cracks) Increased wildfires can damage infrastructure
		Increased Winter Temperatures (More frequent occurrence of temperatures close to zero in winter - multiple passage through the point of 0°C in the absence of snow cover)	Applicable to the whole country, slightly higher in the north-eastern part of Poland (S8 Ostrów Mazowiecka – LT state border) as well as in the central part of Poland (S7 Nidzica – Warszawa; A2 Warszawa – Łódź); less increase affecting other sections of the corridor.	Escalated occurrence of fog, which, by reducing the visibility, will have a negative impact on road transport Rapid degradation of the surface
		Increased Precipitation and Floods (rapid rainfall and snowfall)	Applicable to the whole country, slightly higher for northern part of S7 Gdańsk- Olsztyn; north-eats part of S8 Ełk - Suwałki as well as southern part of Poland: A1 Częstochowa – state	Damage of infrastructure Road submersion Scour to structures Underpass flooding Overstain drainage systems Risk of landslides Instability of embankments

			border with especially high probability for S1 section Katowice - state border	Disturbs the transport smoothness
		Increased and more frequent extreme winds	Applicable to the whole country, with increasing trend occurring in the southern part of Poland (A1 Łódź – state border; S1 Katowice – state border)	Blocked roads and damaged road infrastructure and vehicles
	Maritime	Sea Level Rise and sea storm surges	Applicable to Ports' road infrastructure (Gdańsk, Gdynia, Szczecin and Świnoujście)	Damage infrastructure Coastal erosion
		Increased and more frequent extreme winds	Ports of Gdańsk, Gdynia, Szczecin and Świnoujście	Devastation of infrastructure Impact on the level of implemented transshipments and the possible development of these ports
		Sea Level Rise and sea storm surges	Ports of Gdańsk, Gdynia, Szczecin and Świnoujście	Devastation of infrastructure Impact on the level of implemented transshipments and the possible development of these ports
	Airport	Increased summer temperature	Applicable to the whole country, slightly higher for Warszawa, Łódź, Szczecin, Poznań, Wrocław airports	Greater need for ground cooling Degradation of runways
		Increased Precipitation and Floods	Applicable to the whole country with slightly higher trend for Katowice Airport	Flood damage to runways and other infrastructure Water runoff exceeds capacity of drainage system
		Increased and more frequent extreme winds (strong winds and icing as well as problem of fogs)	Applicable to the whole country with slightly higher trend for Łódź, Wrocław and Katowice Airport	Wind damage to terminals, navigation, equipment May periodically completely stop the possibility of transport by air

Annex 3 – Review of used references

European Union legal documents

ID #	Title of Study	Organisation funding document	Document author	Publication date	Status	Time period covered by the study / document	Project type	Project coverage	Transport Mode	Website link
EU.1	Regulation (EU) 1315/2013 - Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EU	European Partilament, European Council	European Partilament, European Council	20/12/2013	Public	n/a	Regulation	Macro-regional	General	http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2013:348:FULL&from=EN
EU.2	Regulation (EU) 1316/2013 - Connecting Europe Facility, amending Regulation (EU) No 913/2010 and repealing Regulations (EC) No 680/2007 and (EC) No 67/2010	European Partilament, European Council	European Partilament, European Council	20/12/2013	Public	n/a	Regulation	Macro-regional	General	http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=OJ:L:2013:348:TOC
EU.3	Commission Regulation COM(2011) 650 of 19 October 2011 - Union guidelines for the development of the Trans-European Transport Network	European Commission	European Commission	07/2010	Public	n/a	Guidelines	Macro-regional	General	http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV:tr0043
EU.4	Regulation 913/2010 of the European Parliament and the Council of 22 September 2010 - Concerning a European rail network for competitive freight	European Partilament, European Council	European Partilament, European Council	09/2010	Public	n/a	Regulation	Macro-regional	Railways	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:276:0022:0032:en:PDF
EU.5	Regulation (EC) No 300/2008 of the European Parliament and of the Council of 11 March 2008 - Common rules in the field of civil aviation security	European Partilament, European Council	European Partilament, European Council	2008	Public	n/a	Regulation	Macro-regional	Air	http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:tr0028

EU.6	Council Regulation (EC) 219/2007 - Joint Undertaking to develop the new generation European air traffic management system (SESAR)	Council of European Union	Council of European Union	2007	Public	n/a	Regulation	Macro-regional	Multi-modal	http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32007R0219
EU.7	Regulation (EC) No 552/2004 of the European Parliament and of the Council of 10 March 2004 Interoperability of the European Air Traffic Management network (the interoperability Regulation)	European Partilament, European Council	European Partilament, European Council	2004	Public	n/a	Regulation	Macro-regional	Air	http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV:l24070
EU.8	Regulation (EC) No 551/2004 of the European Parliament and of the Council of 10 March 2004 - Organisation and use of the airspace in the single European sky (the airspace Regulation)	European Partilament, European Council	European Partilament, European Council	2004	Public	n/a	Regulation	Macro-regional	Air	http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV:l24046
EU.9	Regulation (EC) No 550/2004 of the European Parliament and of the Council of 10 March 2004 - Provision of air navigation services in the single European sky (the service provision Regulation)	European Partilament, European Council	European Partilament, European Council	2004	Public	n/a	Regulation	Macro-regional	Air	http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV:l24034
EU.10	Regulation (EC) No 549/2004 of the European Parliament and of the Council of 10 March 2004 - Framework for the creation of the single European sky (the framework Regulation)	European Partilament, European Council	European Partilament, European Council	2004	Public	n/a	Regulation	Macro-regional	Air	http://eur-lex.europa.eu/legal-content/LV/TXT/?uri=URISERV:l24020
EU.11	Directive 2012/34/EU of the European Parliament and of the Council of 21 November 2012 - Single European railway area	European Partilament, European Council	European Partilament, European Council	2012	Public	n/a	Directive	Macro-regional	Rail	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2012:343:0032:0077:en:PDF

EU.12	Directive 2010/65/EU of the European Parliament and of the Council of 20 October 2010 - Reporting formalities for ships arriving in and/or departing from ports of the Member States and repealing Directive 2002/6/EC	European Partilament, European Council	European Partilament, European Council	2010	Public	n/a	Directive	Macro-regional	Maritime	http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0065&from=EN
EU.13	Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 - Framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport	European Partilament, European Council	European Partilament, European Council	2010	Public	n/a	Directive	Macro-regional	Road	http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0040&from=EN
EU.14	Europe 202: A European strategy for smart, sustainable and inclusive growth h	European Commission	European Commission	2010	Public	2010-2020	Strategy	Macro-regional	General	http://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf
EU.15	EU Strategy for the Baltic Sea Region	European Commission	European Commission	2009	Public	2010-2020	Strategy	Macro-regional	General	http://ec.europa.eu/regional_policy/sources/docoffic/official/communic/baltic/com_baltic_en.pdf
EU.16	White paper: Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system	European Commission	European Commission	2011	Public	2011-2050	Strategy	Macro-regional	General	http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0144&from=EN
EU.17	CEF 2014 transport call related data	European Commission	European Commission	2014	Public	n/a	Project data	Macro-regional	General	https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/apply-funding/2014-cef-transport-calls-proposals
EU.18	REGULATION (EU) No 913/2010 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 September 2010	European Partilament, European Council	European Partilament, European Council	2010	Public	n/a	Regulation	Macro-regional	Rail	http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:276:0022:0032:en:PDF

	concerning a European rail network for competitive freight									
EU.19	DECISION No 884/2004/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2004 amending Decision No 1692/96/EC on Community guidelines for the development of the trans-European transport network	European Partilament, European Council	European Partilament, European Council	2004	Public	n/a	Decision	Macro-regional	General	http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32004D0884&qid=1448634974256&from=EN
EU.20	Corrigendum to Decision No 884/2004/EC of the European Parliament and of the Council of 29 April 2004 amending Decision No 1692/96/EC on Community guidelines for the development of the trans-European transport network	European Partilament, European Council	European Partilament, European Council	2004	Public	n/a	Decision	Macro-regional	General	http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1448634974256&uri=CELEX:32004D0884R(01)
EU.21	Corrigendum to Decision No 884/2004/EC of the European Parliament and of the Council of 29 April 2004 amending Decision No 1692/96/EC on Community guidelines for the development of the trans-European transport network	European Partilament, European Council	European Partilament, European Council	2004	Public	n/a	Decision	Macro-regional	General	http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1448634974256&uri=CELEX:32004D0884R(02)
EU.22	COMMISSION STAFF WORKING DOCUMENT on the state of play of the implementation of the ERTMS Deployment Plan	European Commission	European Commission	2014	Public	n/a	Working paper	Macro-regional	General	http://ec.europa.eu/transport/modes/rail/ertms/doc/edp/swd(2014)48-ertms-deployment-plan.pdf
EU.23	National Development plans for ERTMS implementation	European Commission	European Commission	2008	Public	n/a	Working paper	Macro-regional	General	http://ec.europa.eu/transport/modes/rail/ertms/edp_map_en.htm
EU.24	Open Method of Coordination - Geographical Information System Glossary: Technical* Data	European Commission	European Commission	2014	Public	n/a	Glossary	Macro-regional	General	http://ec.europa.eu/transport/themes/infrastructure/tentec/doc/manuals/2014_02_06_omc_glossary_corridor_studies_short.pdf
EU.24	Rail Freight Corridor 8 Corridor Information Documents	European Commission	European Commission	2015	Public	n/a	Information Documents	Macro-regional	Rail	http://rfc8.eu/customer/corridor-information-document

Finland

ID #	Title of Study	Organisation funding study / document	Study / Document author	Publication date	Status	Time period covered by the study / document	Document type	Document coverage	Transport Mode	Website link
FI.1	National Transport Policy	Ministry of Transport and Communications	Ministry of Transport and Communications	n/a	Public	n/a	Policy	National	General	http://www.lvm.fi/web/en/transport_policy
FI.2	Finland's National Strategy for Intelligent Transport	Ministry of Transport and Communications	Ministry of Transport and Communications	06/2009	Public	n/a	Strategy	National	General	https://www.lvm.fi/docs/en/440554_DLFE-10001.pdf
FI.3	Maritime Transport Strategy for Finland 2014-2022	Ministry of Transport and Communications	Ministry of Transport and Communications	2014	Public	n/a	Strategy	National	Maritime Transport	https://www.lvm.fi/docs/en/3082161_DLFE-23508.pdf
FI.4	Finland's Air Transport Strategy 2015-2030	Ministry of Transport and Communications	Ministry of Transport and Communications	3/2015	Public	n/a	Strategy	National	Air Transport	https://www.lvm.fi/docs/en/3759144_DLFE-26373.pdf
FI.5	Finnish Railway Network Statement 2016	Finnish Transport Agency	Finnish Transport Agency	04/2014	Public	2016	Statement	National	Rail	http://www2.liikennevirasto.fi/julkaisut/pdf8/lv_2014-04_finnish_railway_web.pdf
FI.6	Competitiveness and well-being through responsible transport: Government Report on Transport Policy submitted to the Parliament of Finland	Ministry of Transport and Communications	Ministry of Transport and Communications	04/2012	Public	n/a	Report	National	General	https://www.lvm.fi/docs/en/1986563_DLFE-16973.pdf
FI.7	Robots on land, in water and in the air: Promoting intelligent automation in transport services	Ministry of Transport and Communications	Ministry of Transport and Communications	07/2015	Public	n/a	Study	National	Multimodal	http://www.lvm.fi/c/document_library/get_file?folderId=3759144&name=DLFE-27748.pdf&title=Julkaisuja%2014-2015
FI.8	Towards a new transport policy - Intelligence in Transport and Wisdom in Mobility: Finland's Second Generation Intelligent Strategy for Transport	Ministry of Transport and Communications	Ministry of Transport and Communications	02/2013	Public	n/a	Strategy	National	General	http://www.lvm.fi/c/document_library/get_file?folderId=2497124&name=DLFE-20007.pdf&title=Intelligence%20in%20Transport%20and%20Wisdom%20in%20Mobility%20Finlands%20Second%20Generation%20Intelligent%20Strategy%20for%20Transport

FI.9	Planning assumptions (Finnish)	Finnish Transport Agency	Finnish Transport Agency	n/a	Public	n/a	n/a	National	General	http://www.liikennevirasto.fi/hankeprosessi/suunnittelun-lahtokohdat#.VksBgXbhCM_
FI.10	Project planning steps (Finnish)	Finnish Transport Agency	Finnish Transport Agency	n/a	Public	n/a	n/a	National	General	http://www.liikennevirasto.fi/hankeprosessi/hankkeiden-suunnittelun-vaiheet#.VksB4HbhCM-
FI.11	Impact assessment (Finnish)	Finnish Transport Agency	Finnish Transport Agency	n/a	Public	n/a	n/a	National	General	http://www.liikennevirasto.fi/hankeprosessi/vaikutusten-arviointi#.VkWrDXbhCM8
FI.12	Liikenneviraston toiminta- ja taloussuunnitelma 2015 - 2018 liikenne- ja viestintäministeriölle (Finnish)	Finnish Transport Agency	Finnish Transport Agency	2013	Public	2015-2018	n/a	National	General	http://www2.liikennevirasto.fi/julkaisut/pdf3/lr_2013_liikenneviraston_tts_2015-2018_web.pdf
FI.13	Ratahankkeiden arviointiohje. Päivitetty lokakuussa 2015 (Finnish)	Finnish Transport Agency	Finnish Transport Agency	2013	Public	2015	n/a	National	General	http://www.liikennevirasto.fi/documents/20473/34253/lo_2013-15_ratahankkeiden_arviointiohje_web_p%C3%A4ivitetty+21.10.2015.pdf/131f6513-265e-41c5-92cb-b278b0062b33
FI.14	Vesiväylähankkeiden arviointiohje (Finnish)	Finnish Transport Agency	Finnish Transport Agency	2013	Public	n/a	n/a	National	General	http://www.liikennevirasto.fi/documents/20473/34253/Vesivaylahankkeiden_arviointiohje.pdf/0370d284-f03a-4d85-aaf0-20e6522d1905
FI.15	Tiehankkeiden arviointiohje Päivitetty lokakuussa 2015 (Finnish)	Finnish Transport Agency	Finnish Transport Agency	2013	Public	n/a	n/a	National	General	http://www.liikennevirasto.fi/documents/20473/34253/lo_2013-13_tiehankkeiden_arviointiohje_web_p%C3%A4ivitetty+21.10.2015.pdf/2a9aa525-0d9b-4602-9a5b-067b52312e55
FI.16	Liikenneväylien hankearvioinnin yleisohje (Finnish)	Finnish Transport Agency	Finnish Transport Agency	2011	Public	n/a	n/a	National	General	http://www.liikennevirasto.fi/documents/20473/34253/Liikennev%C3%A4ylien+arvioinnin+yleisohje.pdf/e23f7991-7b74-4325-b420-7dcc9676e5e8
FI.17	CEF Funding instrument	Finnish Transport Agency	Finnish Transport Agency	2015	Public	n/a	n/a	National	General	http://www.liikennevirasto.fi/web/en/transport-system/ten-t/cef-funding-instrument#.VkWtVHbhCM9

FI.18	Rail Baltica Growth Strategy	Keinänen Olli, Paajanen Malla (eds.)	Rail Baltic Growth Corridor project, coTfinanced by the Baltic Sea Region Programme Interreg)	2013	Public	2010-2013	Strategy	National	Rail	http://www.rbgc.eu/media/rail-baltica-growth-strategy-version-1.1.pdf
FI.19	Why Do Open Rail Freight Markets Fail to Attract Competition? Analysis on Finnish Transport Policy	Miika Mäkitalo	EJTIR 11 1), p. 1 T19	2011	Public	n/a	Study	National	Rail	http://www.ejtir.tudelft.nl/issues/2011_01/pdf/2011_01_00.pdf
FI.20	Promoting Information Exchange with a Port Community System - Case Finland.	Posti, A., Häkkinen, J. & Tapaninen U.	In: Kersten, W., Blecker, T. & Jahn, C. (eds.): International Supply Chain Management and Collaboration Practices, Proceedings of Hamburg International Conference of Logistics, 8T9.9.2011, pages 455 – 474. Josef Eur Verlag, Köln	2011	Public	n/a	Study	National	Port	http://www.merikotka.fi/mopo/tiedostot/Posti_Hakkinen_Tapaninen_HICL_2011_MOPO.pdf
FI.21	PreTfeasibility study of the Helsinki - Tallinn Fixed Link produced by Harju County (EE) and City of Helsinki (FI)	n/a	EUSBSR Seed Money Facility	2015	Public	2003-2080	n/a	Helsinki-Tallin connection	General	https://harju.maavalitsus.ee/documents/182179/6378904/TALSINKIFIX_FINAL+REPORT_150216.pdf/a887ab54-d2c2-491b-8dfc-48840e0b093d
FI.22	Helsinki and Tallinn on the Move	Tapaninen Ulla (ed.)	H-TTransplan final report	2012	Public	n/a	Report	Helsinki-Tallin connection	Maritime	https://www.tlu.ee/UserFiles/Eesti%20Tuleviku-uuringute%20Instituut/1.%20HTTransplan%20project%20final%20report.pdf
FI.23	CARGO TRAFFIC ON THE HELSINKI-TALLINN ROUTE	Pekka Sundberg, Antti Posti, Ulla Tapaninen	University of Turku	2011	Public	n/a	Study	Helsinki-Tallin connection	Maritime	http://mkkdok.utu.fi/pub/A56-Cargo%20Traffic%20Helsinki-Tallinn.pdf
FI.24	Economic flows between Helsinki-Uusimaa and Tallinn-Harju regions	Seppo Laakso & Eeva Kostiainen, Tarmo Kalvet & Keio Velström	Kaupunkitutkimus TA Oy, Ragnar Nurkse School of Innovation and Governance Tallinn University of Technology	2013	Public	n/a	Study	Helsinki-Tallin connection	General	http://www.kaupunkitutkimusta.fi/wp-content/uploads/2013/12/Helsinki-Tallinna+talousvirrat.pdf

FI.25	Competing Transportation Chains in Helsinki-Tallinn Route: Multi-Dimensional Evaluation.	Hilmola, O. (ed.)	Lappeenranta University of Technology, Department of Industrial Management, Research report 243	2012	Public	n/a	Study	Helsinki-Tallin connection	Rail, Maritime	http://www.rbgc.eu/media/articles/researchreport_243_massver.pdf
FI.26	Joint Barents Transport Plan: Proposals for development of transport corridors for further studies	The Barents Region Expert Group	Torbjørn Naimak (ed.) The Barents Euro.Arctic Region	2013	Public	n/a	Report	Finland, Sweden, Norway, Russia	General	https://www.barentsinfo.fi/beac/docs/Joint_Barents_Transport_Plan_2013.pdf
FI.27	Competitive position of the Baltic States Ports	Movsisjana, A., Masane/Ose, J., KPMG Baltics SIA	KPMG Baltics SIA	2013	Public	n/a	Report	Finland, Russia, Estonia, Latvia, Lithuania, Poland, Germany, Denmark, Sweden	Port	https://www.kpmg.com/LV/lv/IssuesAndInsights/ArticlesPublications/PresesRelizes/Documents/Ports_Final_version_FINAL.pdf
FI.28	Analysis and Classification of Logistics Centre in Global Supply Network	Jarkko Rantala, Jenni Echhard	University of Southampton	2011	n/a	2010-2011	Study	Finland	n/a	http://www.otalib.fi/cgi-bin/thw/trip/?$%7BBASE%7D=vttjure&$%7BHTML%7D=wwwrecordfi&$%7BOOHTML%7D=wwwrecordfi&$%7BTRIPSHOW%7D=form=wwwabstractfi&$%7BFREETEXT%7D=R%3D72903
FI.29	Helsinki, Tallinn and travelling people - a leisure perspective	Pekka Mustonen	Helsinki Quarterly, City of Helsinki Urban Facts	2012	Public	n/a	Report	Helsinki-Tallin connection	General	http://www.hel.fi/hel2/tietokeskus/julkaisut/pdf/13_01_11_Quarterly.pdf
FI.30	Spatial Mobility between Tallinn and Helsinki in Mobile Positioning. Datasets. Statistical Overview	Siiri Silm, Rein Ahas, Magus Tiru	Department of Geography of University of Tartu	2012	Public	n/a	Study	Helsinki-Tallin connection	General	https://www.emt.ee/pictures/pildid/dokumendid/spatial_mobility.pdf
FI.31	Tallinn-Helsinki business development report	n/a	BDA Consulting OÜ	2012	Not public	n/a	n/a	n/a	n/a	n/a
FI.32	Survey of people travelling between Tallinn and Helsinki – air passengers	n/a	TuruTuuringute AS	2011	Public	2004-2010	Study	Helsinki-Tallinn connection	Air	http://www.rbgc.eu/media/articles/air-passengers-survey-report.pdf

FI.33	Twin-city in making: integration scenarios for Tallinn and Helsinki capital regions	Erik Terk (ed.)	University of Tallinn	2012	Public	Until 2040	Report	Helsinki-Tallinn connection	General	https://www.tlu.ee/UserFiles/Eesti%20Tuleviku-uuringute%20Instituut/twin_city_veebi.pdf

Estonia

ID #	Title of Study	Organisation funding study	Study author	Publication date	Status	Time period covered by the study / document	Document type	Document coverage	Mode	Website link
EE.1	Transport Development Plan 2014-2020 (Estonian)	Majandus- ja Kommunikatsioon iministeerium	Majandus- ja Kommunikatsioo niministeerium	2013	Public	n/a	Development Plan	National	General	https://www.mkm.ee/sites/default/files/transpordi_arengukava.pdf
EE.2	Maritime Policy 2012-2020 (Estonian)	Majandus- ja Kommunikatsioon iministeerium	Majandus- ja Kommunikatsioo niministeerium	2011	Public	2012-2020	Policy	National	Maritime	https://www.mkm.ee/sites/default/files/merenduspoliitika.pdf
EE.3	Road development and maintenance plan 2014-2020	Majandus- ja Kommunikatsioon iministeerium	Majandus- ja Kommunikatsioo niministeerium	2014	Public	2014-2020	Development and maintenance plan	National	Road	https://www.mkm.ee/sites/default/files/riigimaanteede_teehoiukava_aastateks_2014-2020_muutmine.pdf
EE.4	Üleriigiline planeering „Eesti 2030+" (Estonian)	Estonian Ministry of Interior	Estonian Ministry of Interior	2012	Public	Up to 2030	Planning document	National		https://eesti2030.files.wordpress.com/2014/07/eesti2030.pdf
EE.5	Public Transportation Implementation Plan (Tallinn's Public Transportation Development Plan (Estonian))	Tallinn City Council	Tallinn City Council	08/2011	Public	2011-2020	Implementation Plan	National	Public transport	http://www.tallinn.ee/est/Tallinna-uhistranspordi-arengukava-2011-2020-projekt
EE.6	Estonian National Traffic Safety Program for 2003-2015 (the amended version) (Estonian)	Majandus- ja Kommunikatsioon iministeerium	Majandus- ja Kommunikatsioo niministeerium	2012	Public	2003-2015	n/a	National	n/a	https://www.mkm.ee/sites/default/files/liiklusohutusprogramm.pdf
EE.7	Transport Infrastructure Development Investments Plan for 2014-2020 (Estonian)	Vabariigi Valitsuse korraldus	Vabariigi Valitsuse korraldus	n/a	Public	n/a	Development Investments Plan	National	n/a	https://www.riigiteataja.ee/aktilisa/3260/2201/5013/93klisa.pdf
EE.8	Pre-feasibility study of the Helsinki - Tallinn Fixed Link produced by Harju County (EE) and City of Helsinki (FI)	n/a	EUSBSR Seed Money Facility	2015	Public	2003-2080	n/a	Helsinki-Tallin connection	General	https://harju.maavalitsus.ee/documents/182179/6378904/TALSINKIFIX_FINAL+REPORT_150216.pdf/a887ab54-d2c2-491b-8dfc-48840e0b093d

EE.9	Helsinki and Tallinn on the Move – Helsinki and Talling on the Move Flows of Goods, People and Capital	Tapaninen Ulla (ed.)	H-TTransplan final report	2012	Public	n/a	Report	Helsinki-Tallin connection	Maritime	http://www.transgovernance.eu/media/308836/7_tapaninen_221111_final.pdf
EE.10	CARGO TRAFFIC ON THE HELSINKI-TALLINN ROUTE	Pekka Sundberg, Antti Posti, Ulla Tapaninen	University of Turku	2011	Public	n/a	Study	Helsinki-Tallin connection	Maritime	http://mkkdok.utu.fi/pub/A56-Cargo%20Traffic%20Helsinki-Tallinn.pdf
EE.11	Economic flows between Helsinki-Uusimaa and Tallinn-Harju regions	Seppo Laakso & Eeva Kostiainen, Tarmo Kalvet & Keio Velström	Kaupunkitutkimus TA Oy, Ragnar Nurkse School of Innovation and Governance Tallinn University of Technology	2013	Public	n/a	Study	Helsinki-Tallin connection	General	http://www.kaupunkitutkimusta.fi/wp-content/uploads/2013/12/Helsinki-Tallinna+talousvirrat.pdf
EE.12	Competing Transportation Chains in Helsinki-Tallinn Route: Multi-Dimensional Evaluation.	Hilmola, O. (ed.)	Lappeenranta University of Technology, Department of Industrial Management, Research report 243	2012	Public	n/a	Study	Helsinki-Tallin connection	Rail, Maritime	http://www.rbgc.eu/media/articles/researchreport_243_massver.pdf
EE.13	Helsinki, Tallinn and travelling people - a leisure perspective	Pekka Mustonen	Helsinki Quarterly, City of Helsinki Urban Facts	2012	Public	n/a	Report	Helsinki-Tallin connection	General	http://www.hel.fi/hel2/tietokeskus/julkaisut/pdf/13_01_11_Quarterly.pdf
EE.14	Spatial Mobility between Tallinn and Helsinki in Mobile Positioning. Datasets. Statistical Overview	Siiri Silm, Rein Ahas, Magus Tiru	Department of Geography of University of Tartu	2012	Public	n/a	Study	Helsinki-Tallin connection	General	https://www.emt.ee/pictures/pildid/dokumendid/spatial_mobility.pdf
EE.15	Tallinn-Helsinki business development report	n/a	BDA Consulting OÜ	2012	Not public	n/a	n/a	n/a	n/a	n/a
EE.16	Survey of people travelling between Tallinn and Helsinki – air passengers	n/a	TuruTuuringute AS	2011	Public	2004-2010	Study	Helsinki-Tallinn connection	Air	http://www.rbgc.eu/media/articles/air-passengers-survey-report.pdf
EE.17	Twin-city in making: integration scenarios for Tallinn and Helsinki capital regions	Erik Terk (ed.)	University of Tallinn	2012	Public	Until 2040	Report	Helsinki-Tallinn connection	General	https://www.tlu.ee/UserFiles/Eesti%20Tuleviku-uuringute%20Instituut/twin_city_veebi.pdf
EE.18	Proposed technical design options for a Rail Freight Terminal at Pohjaranna tee, Muuga	Kats, Jeroen	TBA (logistics design, NL)	n/a	Not public	n/a	n/a	n/a	n/a	n/a

EE.19	A Study for county plans, detailed plans, strategic environmental assessment, environmental impact assessment and sketch technical designs of the Rail Baltic in Harju, Rapla and Pärnu counties in Estonia	n/a	Commissioned by the Estonian Ministry of Economy and Transport	n/a	Not public	n/a	n/a	n/a	n/a	n/a

Latvia

ID #	Title of Study	Organisation funding study	Study author	Publication date	Status	Time period covered by the study / document	Document type	Document coverage	Mode	Website link
LV.1	Contracting scheme for RailBaltica project	RB Rail	PWC	2015	Ongoing	n/a	Contracting scheme study	National	Rail	n/a
LV.2	DETAILED TECHNICAL STUDY AND ENVIRONMENTAL IMPACT ASSESSMENT OF THE LATVIAN SECTION OF THE EUROPEAN GAUGE RAILWAY LINE RAIL BALTICA"	Ministry of Transport	RB Latvia	2014	Ongoing	n/a	Environmental impact assessment	National	Rail	http://railbaltica.info/informacija/ietekmes-uz-vidi-novertejums/
LV.3	Integration of Rail Baltica railway line within the Riga central multimodal public transportation hub - elaboration of the technical solution	Ministry of Transport	Aecom	2015 -	Ongoing	n/a	Technical implementation study	National	Rail	http://www.sam.gov.lv/sm/content/?cat=385
LV.4	Rail Baltica dzelzceļa līnijas intermodālā kravu loģistikascentra Latvijā darbības plāna un tehnisko risinājumu izstrāde (Latvia)	Ministry of Transport	Aecom	2015 -	Ongoing	n/a	Technical implementation study	National	Rail	http://www.sam.gov.lv/sm/content/?cat=385
LV.5	Technical assessment of realization of EU funded projects "Infrastructure development on Krievu island, for transfer of port activities from city centre" and "Increasing depth capacity of port of Liepāja"	Ministry of Transport	VIP konsultācijas	2014	Ongoing	n/a	Technical implementation study	National	Maritime / Ports	http://www.sam.gov.lv/images/modules/items/DOC/item_5278_ostu_ekspertu_iepirkums_tehniska_specifikacija_(2).doc

LV.6	Transport Development guidelines 2014-2020	Ministry of Transport	Ministry of Transport	2013	Public	2014-2020	Development guidelines	National	General	http://polsis.mk.gov.lv/view.do?id=4607
LV.7	Road safety plan 2014-2016	Ministry of Transport	Ministry of Transport	2014	Public	2014-2016	Development plan	National	Road	http://www.sam.gov.lv/images/modules/items/DOC/item_4629_Celu_sat_dros_plans_2014-2016.doc
LV.8	Electromobility Development plan 2014-2016	Ministry of Transport	Ministry of Transport	2014	Public	2014-2016	Development plan	National	General	http://polsis.mk.gov.lv/view.do?id=4659

Lithuania

#	Title of Study	Organisation funding study	Study author	Publication date	Status	Time period covered by the study / document	Document type	Document coverage	Mode	Website link
LT.1	National programme on the development of transport and communications for 2014–2022	Ministry of Transport	Ministry of Transport	N/A	Public	2014-2022	Programme	National	General	https://www.e-tar.lt/portal/lt/legalAct/501ff610723211e3bd0ecaffd80c672a
LT.2	Long term (until 2025) development strategy of the Lithuanian transport system	Ministry of Transport	Ministry of Transport	N/A	Public	2005-2025	Strategy	National	General	http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=287044
LT.3	Lithuanian logistics market analysis and logistics centers in the region competitiveness survey	N/A	Vilnius Gediminas Technical University	2008	Public	N/A	Feasibility study	Regional	General	N/A
LT.4	Lithuanian transport system modernization and development opportunities through publicTprivate partnership financing model	N/A	Vilnius Gediminas Technical University	2008	Public	N/A	Feasibility study	National	General	N/A

LT.5	A feasibility study of a standard gauge separate railway line in Estonia, Latvia and Lithuania: Vilnius - Kaunas spur	Co-financed by European Union (TENT-T)	AECOM	2014	Public	N/A	Feasibility study	Regional	Railways	N/A
LT.6	Development of passenger transportation by railroad from Lithuania to European States	N/A	Butkevičius J.	2007	Public	N/A	Feasibility study	Regional	Railways	N/A
LT.7	Analysis of the possibilities of building the railway Rail Baltica in Lithuania	N/A	Jonaitis J. & Butkevičius J.	2005	Public	N/A	Analysis	Regional	Railways	N/A

Poland

ID#	Title of Study	Organisation funding study	Study author	Publication date	Status	Time period covered by the study / document	Document type	Document coverage	Mode	Website link
PL.1	Transport Development Strategy till 2020 (with perspective till 2030)	Ministry of Infrastructure and Development	Ministry of Infrastructure and Development	n/a	Public	2013-2020 (2030)	Strategy	National	General	https://www.mir.gov.pl/strony/zadania/transport/rozwoj-transportu-w-polsce/
PL.2	Implementation Document do Transport Development Strategy	Ministry of Infrastructure and Development	Ministry of Infrastructure and Development	n/a	Public	2013-2020 (2030)	Implementation document	National	General	https://www.mir.gov.pl/strony/zadania/transport/rozwoj-transportu-w-polsce/
PL.3	National Railway Program	Ministry of Infrastructure and Development	Ministry of Infrastructure and Development	n/a	Public	2013-2020 (2030)	Programme	National	Railways	http://mir.bip.gov.pl/strategie-transport/strategie-transport.html
PL.4	National Roads Construction Programme	Ministry of Infrastructure and Development	Ministry of Infrastructure and Development	n/a	Public	2014-2023 (2025)	Programme	National	Roads	https://www.mir.gov.pl/strony/zadania/transport/drogi/program-budowy-drog-krajowych/
PL.5	Airport Network and Aerodrome Equipment Development Program (under review regarding compatibility with Transport Development Strategy)	Ministry of Infrastructure and Development	Ministry of Infrastructure and Development	n/a	Public	2007-2020	Development Program	National	Airport	https://www.mir.gov.pl/strony/zadania/transport/lotnictwo/program-rozwoju-lotnictwa-i-urzadzen-naziemnych/

PL.6	Republic of Poland Marine Policy till 2020 (with perspective till 2030)	Ministry of Infrastructure and Development	Ministry of Infrastructure and Development	n/a	Public	2013-2020 (2030)	Policy document	National	Maritime	https://www.mir.gov.pl/media/2747/Polityka_morska.pdf
PL.7	Operational Programme Infrastructure and Environment and Regional Operational Programmes	Ministry of Infrastructure and Development	Ministry of Infrastructure and Development	2013	Public	2014-2020	Operational Programme	Regional	General	https://www.mir.gov.pl/strony/zadania/fundusze-europejskie/wytyczne/wytyczne-na-lata-2014-2020/#
PL.8	The Act of 10 April 2003. on special rules for the preparation and realization of investments in public roads (aka "Special Road Act")	Ministry of Infrastructure and Development	n/a	2003	Public	n/a	National legal act	National	Roads	http://isap.sejm.gov.pl/DetailsServlet?id=WDU20030800721
PL.9	Act of 3 October 2008 on provision of information about the environment and its protection, public participation in environmental protection and environmental impact assessments	Ministry of Enviroment	n/a	2008	Public	n/a	National legal act	National	General	http://isap.sejm.gov.pl/DetailsServlet?id=WDU20081991227
PL.10	The Act of 29 January 2004. Public Procurement Law	Public Procurment Office	n/a	2004	Public	n/a	National legal act	National	General	http://isap.sejm.gov.pl/DetailsServlet?id=WDU20040190177
PL.11	National Roads Construction Programme	Ministry of Infrastructure and Development	Ministry of Infrastructure and Development	2010	Public	2011-2015	Programme	National	Roads	https://www.mir.gov.pl/strony/zadania/transport/drogi/program-budowy-drog-krajowych/
PL.12	Act of 27th October 1994. On Toll motorways and National Road Fund (Polish)	Ministry of Infrastructure and Development	n/a	1994	Public	n/a	National legal act	National	Road	http://isap.sejm.gov.pl/DetailsServlet?id=WDU19941270627
PL.13	Act of 12th January 2007. On special purspose road companies (Polish)	Ministry of Infrastructure and Development	n/a	2007	Public	n/a	National legal act	National	Roads	http://isap.sejm.gov.pl/DetailsServlet?id=WDU20070230136

Germany

ID#	Title of Study	Organisation funding study	Study author	Publication date	Status	Time period covered by the study / document	Document type	Document coverage	Mode	Website link

DE.1	BMVI: Aktionsplan Güterverkehr und Logistik - nachhaltig und effizient in die Zukunft / Entwurf Stand 28.09.2015 (German)	Bundesministerium für Verkehr und digitale Infrastruktur	Bundesministerium für Verkehr und digitale Infrastruktur	2010	Public	n. a.	Strategic Concept	National	General	https://www.bmvi.de/SharedDocs/DE/Anlage/VerkehrUndMobilitaet/aktionsplan-gueterverkehr-und-logistik-anlage.pdf?__blob=publicationFile
DE.2	BMVI: Sachstandsbericht Verkehrsprojekte Deutsche Einheit / Stand Juni 2014 (German)	Bundesministerium für Verkehr und digitale Infrastruktur	Bundesministerium für Verkehr und digitale Infrastruktur	2014	Public	Since 1991	Investment Program	National	General	https://www.bmvi.de/SharedDocs/DE/Anlage/VerkehrUndMobilitaet/sachstandsbericht-verkehrsprojekte-deutsche-einheit-stand-juni-2014.pdf?__blob=publicationFile
DE.3	BMVI: Grundkonzeption für den Bundesverkehrswegeplan 2015 (long version) / Stand 2014 (German)	Bundesministerium für Verkehr und digitale Infrastruktur	Bundesministerium für Verkehr und digitale Infrastruktur	2014	Public	2015-2030	Government Program	National	General	https://www.bmvi.de/SharedDocs/DE/Anlage/VerkehrUndMobilitaet/bvwp-2015-grundkonzeption-langfassung.pdf?__blob=publicationFile
DE.4	BMVI: Grundkonzeption für den Bundesverkehrswegeplan 2015 (short version - German)	Bundesministerium für Verkehr und digitale Infrastruktur	Bundesministerium für Verkehr und digitale Infrastruktur	2015	Public	2015-2030	Government Program	National	General	https://www.bmvi.de/SharedDocs/DE/Anlage/VerkehrUndMobilitaet/bvwp-2015-grundkonzeption-kurzfassung.pdf?__blob=publicationFile
DE.5	BMVI: Verkehrsinvestitionsbericht für das Berichtsjahr 2013 / Stand Juli 2015 (German):	Bundesministerium für Verkehr und digitale Infrastruktur	Bundesministerium für Verkehr und digitale Infrastruktur	2013	Public	2013	Natinal Legal Act	National	General	http://www.bmvi.de/SharedDocs/DE/Publikationen/G/verkehrsinvestitionsbericht-2013.pdf?__blob=publicationFile
DE.6	BVU/ITP/IVV/Planco: Verkehrsverflechtungsprognose 2030 Schlussbericht Los 3 / Stand 11. Juni 2014 (German)	Bundesministerium für Verkehr und digitale Infrastruktur	Bundesministerium für Verkehr und digitale Infrastruktur	2014	Public	2030	Prognosis	National	General	http://www.bmvi.de/SharedDocs/DE/Anlage/VerkehrUndMobilitaet/verkehrsverflechtungsprognose-2030-schlussbericht-los-3.pdf?__blob=publicationFile
DE.7	BMVI: Überblick zur metodischen Weiterentwicklung des Bewertungsverfahrens für den BVWP 2015 / Stand: März 2014 (German)	Bundesministerium für Verkehr und digitale Infrastruktur	Bundesministerium für Verkehr und digitale Infrastruktur	2014	Public	2015-2030	Government Program	National	General	http://www.bmvi.de/SharedDocs/DE/Anlage/VerkehrUndMobilitaet/bvwp-2015-kurzbeschreibung-methodik.pdf?__blob=publicationFile

The Netherlands

#	Title of Study	Organisation funding study	Study author	Publication date	Status	Time period covered by the study / document	Document type	Document coverage	Mode	Website link
NL.1	Infrastructure and Spatial Planning Structure Plan	Ministry of Transport and Environment.	Ministry of Transport and Environment.	2014	Public	2008-2040	Strategic	National (with global outlook)	All / General	https://www.rijksoverheid.nl/documenten/rapporten/2012/03/13/structuurvisie-infrastructuur-en-ruimte

NL.2	Nieuwe WLO scenarios	ILT	Significance	2016	Public / Not yet published	2010-2050	Strategic forecast	National (with global outlook)	All / General	-
NL.3	MIRT book of projects 2014	Ministry of Transport and Environment.	Ministry of Transport and Environment.	2014	Public	2014-2030 (approximately)	National information on projects	National	All	mirt2014.mirtprojectenboek.nl/mirt_2014/
NL.4	MIRT book of projects 2015	Ministry of Transport and Environment.	Ministry of Transport and Environment.	2015	Public	2015-2030 (approximately)	National information on projects	National	All	mirt2015.mirtprojectenoverzicht.nl/
NL.5	National Martket and Capacity Analysis	ILT	ILT	2011	Public	Up to 2028	Strategic assesment	National (with European outlook)	All	https://www.rijksoverheid.nl/documenten/kamerstukken/2011/06/14/nationale-markt-en-capaciteitsanalyse-nmca
NL.6	Studies on the accessibility of the Port of Amsterdam from the North Sea	DG move	Directorate-General (DG) and Public Works Noord Holland	2012	Public	Up to 2030	Project study	National/Regional	Sea	https://ec.europa.eu/inea/ten-t/ten-t-projects/projects-by-country/netherlands/2010-nl-93302-s
NL.7	Studies on the extension of the Beatrix locks	DG move	Rijkswaterstaat	2014	Public		Project study	National/Regional	IWT	https://ec.europa.eu/inea/en/ten-t/ten-t-projects/projects-by-country/netherlands/2011-nl-94111-s and https://ec.europa.eu/inea/ten-t/ten-t-projects/projects-by-country/netherlands/2011-nl-93112-s
NL.8	Quick Scan of Economic Feasibility of Twente/Mittelland Canal	DG move	Panteia, Planco	2013	Public	2030/2050	Project study	International/Regional	IWT	http://www.corridor2.eu/uploads/media/EN_Quick_Scan_feasibility_study_TMK_original.pdf
NL.9	Studies on the freight rail link between the Betuwe Railway and Twente						Project study	National/Regional	Rail	
NL.10	National railway improvement scheme	Ministry of Transport and Environment.	Ministry of Transport and Environment.	2015	Public	2015	Project study	National	Rail	http://mirt2015.mirtprojectenoverzicht.nl/MIRT-Projectenoverzicht%202015.pdf page 63
NL.11	Implementation Plan RFC1 Zeebrugge/Antwerp/Rotterdam/Duisburg/[Basel]/Milan/Genoa	Relevant Infastructure managers	Relevant Infastructure managers	2014	Public	2014-2030	RFC	European	Rail	http://www.corridor-rhine-alpine.eu/downloads.html

NL.12	RFC2 Rotterdam/Antwerp/Lyon/ Basel, Corridor Information Document and Implementation Plan, Timetable 2015	EEIG	EEIG	2015	Public	2014-2030	RFC	European	Rail	http://www.rfc-northsea-med.eu/pages/book-v-implementation-plan
NL.13	Studies on container terminals in the hinterland	KiM	KiM	2012	Public	2010-2020-2030	Strategic assesment	National/Port related	IWT/Rail/Road	http://kimnet.nl/sites/kimnet.nl/files/multimodale-achterlandknooppunten-in-nederland-.pdf
NL.14	Studies on the Incentive for Dynamic Inland Waterway Transport Management	Rijkswaterstaat	Rijkswaterstaat, Panteia,	2014	Public	2014	Programme	National	IWT	https://staticresources.rijkswaterstaat.nl/binaries/IDVV-brochure_tcm21-59374.pdf and http://www.beterbenuttenvaarwegen.nl/Rapporten+en+publicaties/RP+Eindrapporten/314970.aspx?t=Resultaten+onderzoeksprogramma
NL.15	Study on the transport connection between Antwerp and Rotterdam	Ministry of Transport and Environment.	TNO, Buck Consultants	2010	Public	2040	Future vision document	Cross-Border (NL and BE)	All (freight)	https://www.tno.nl/media/1300/mirt-var-logistieke-delta-rotterdam-antwerpen.pdf
NL.16	High/frequency rail transport (PHS)	Ministry of Transport and Environment.	Prorail	2010-2015	Public	Up to 2028	Programme	National	Rail	https://www.google.nl/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&cad=rja&uact=8&ved=0ahUKEwjQkJbrzrjJAhXBYw8KHbefBr8QFgg7MAQ&url=https%3A%2F%2Fwww.rijksoverheid.nl%2Fbinaries%2Frijksoverheid%2Fdocumenten%2Fkamerstukken%2F2010%2F06%2F04%2Frapportage-en-voorkeursbeslissing-programma-hoogfrequent-spoorvervoer%2Fvoorkeursbeslissing-phs.pdf&usg=AFQjCNGjG8Wer54uvRR65XpORSzOtDGpHA and https://www.google.nl/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&cad=rja&uact=8&ved=0ahUKEwjQkJbrzrjJAhXBYw8KHbefBr8QFghDMAU&url=https%3A%2F%2Fwww.rijksoverheid.nl%2Fbinaries%2Frijksoverheid%2Fdocumenten%2Frapporten%2F2014%2F06%2F17%2Finformatiedocument-programma-hoogfrequent-spoorvervoer-goederenroute-oost-nederland%2Finformatiedocument-programma-hoogfrequent-spoorvervoer-goederenroute-oost-nederland.pdf&usg=AFQjCNGzrkT3p1l-UfyKicakj7Ih94ZqWQ

NL.17	Dutch policy framework for rail freight transport								Rail	
NL.18	Studies on a Rail Freight Corridor between Poland and the Netherlands	Ministry of Transport and Environment.	Panteia	2010-2015	Public		Strategic	International	All (freight)	
NL.19	Multi/modal inland hubs in the Netherlands	Ministry of Transport and Environment	KiM	2012	Public	2008-2030	Strategic	National	All (freight, containers)	http://www.kimnet.nl/en/publication/multimodal-hinterland-hubs-netherlands-study-container-transhipment-terminals-hinterland
NL.20	Hinterland congestion and the role of freight traffic by sea and inland waterways for the Mainport of Rotterdam	Ministry of Transport and Environment	KiM	2010	Public	2008-2040	Strategic	National	All (freight, containers)	http://kimnet.nl/sites/kimnet.nl/files/achterlandcongestie-en-de-rol-van-vervoer-over-water.pdf
NL.21	Quick Scan of Euregio East/West Corridor	Euregio	Institut für Verkehrswissenschaf	2011	Public	2011-2025	Strategic	Cross-border/Regional	All	http://www.corridor2.eu/uploads/media/QuickScan_EUREGIO_-_NL_02.pdf
NL.22	Quick Scan of Bottlenecks in International Corridors	Ministry of Transport and Environment	Panteia	2013	Public	Up to 2030	Strategic	International	All (freight)	https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/rapporten/2013/12/05/quick-scan-bottlenecks-internationale-corridors/quick-scan-bottlenecks-internationale-corridors-eindversie-5-maart-2014.pdf.
NL.23	Implementatietoets TEN-T	Ministry of Transport and Environment / KiM	Panteia	2014	Public	2030 (2050 where applicable)	Compliance analysis	National	All	http://www.panteia.nl/Nieuwsoverzicht-Panteia/~/media/7%20Panteia/Files/rapportage-kennisinstituut-voor-mobiliteitsbeleid-inzake-implementatietoets-ten-t-netwerk.ashx
NL.24	Progress report 2014 - Havenvisie 2030	Port of Rotterdam	Port of Rotterdam	2014	Public	2014	Strategic	National/International	All (freight)	https://www.portofrotterdam.com/sites/default/files/Voortgangsrapportage-havenvisie-2030_0.pdf
NL.25	Havenvisie 2030 Rotterdam	Port of Rotterdam	Port of Rotterdam	2011	Public	2030	Strategic	National/International	All (freight)	https://www.portofrotterdam.com/en/the-port/port-vision-2030
NL.26	Havenvisie 2030 Amsterdam	Port of Amsterdam	Port of Amsterdam	2008-2015 (ongoing)	Public	2030	Strategic	National/International	All (freight)	http://www.havenvisie.nl/

NL.27	Quick Scan of Economic Feasibility of Twente/Mittelland Canal	DG move	Panteia, Planco	2013	Public	2030/2050	Project study	International/Regional	IWT	http://www.corridor2.eu/uploads/media/EN_Quick_Scan_feasibility_study_TMK_original.pdf

Belgium

ID#	Title of Study	Organisation funding study	Study author	Publication date	Status	Time period covered by the study / document	Document type	Document coverage	Mode	Website link
BE.1	Etude de potentiel et de faisabilité d'une offre ferroviaire urbaine dans les agglomérations de Liège et Charleroi	Service Public de Wallonie	Cellule Ferroviaire de la DGO2	January 2014	Public	n/a	Pre-feasibility study	Regional	Rail	http://mobilite.wallonie.be/home/politiques-de-mobilite/politique-ferroviaire/les-rapports.html
BE.2	Etude d'Incidences relative à la construction et à l'exploitation d'un railport (gare TGV) sur le site de l'aéroport de Liège	Liege Carex	Stratec	November 2014		n/a	Impact study	Local	Air/Rail	n/a
BE.3	Plan-MER R11 bis en A102	Wegen en Verkeer	Antea	2015	Public	2020	Impact study	Local	Road	http://www.lne.be/merdatabank/uploads/merkennis3743.pdf
BE.4	MKBA van een derde Scheldekruising te Antwerpen	Beheersmaatschappij Antwerpen Mobiel	Rebel Advisory	2014	Public	2013-2050	CBA	Local	Rail/Road	https://www.vlaanderen.be/sites/default/files/documents/1453-003-50_mkba_owv_rapport_0.pdf
BE.5	Plan MER van een derde Scheldekruising te Antwerpen	Beheersmaatschappij Antwerpen Mobiel	Antea	2014	Restricted	2022	Impact study	Local	Rail/Road	n/a
BE.6	Onderzoeken naar een tweede spoorontsluiting van de Antwerpse haven	Infrabel	Infrabel	2014	Restricted	2022	Pre-feasibility study	Local	Rail/Road	n/a
BE.7	Plan MER uitbreiding E313	Wegen en Verkeer	Arcadis Belgium	2014	Restricted	n/a	Impact study	Local	Road	n/a
BE.8	Rail Freight Corridor 2 – Implementation Plan	RFC2	RFC2	2014	Public	2016	Pre-feasibility study	International	Rail	http://www.rfc-northsea-med.eu/sites/rfc2.eu/files/rff/documents/rfc2_cid_book_i_tt_2016_v12012015.pdf
BE.9	Rail Freight Corridor 1 – Implementation Plan	RFC1	RFC1	2013	n/a	n/a	Pre-feasibility study	International	Rail	n/a

BE.10	Vlaamse Spoorstrategie	Vlaamse overheid Departement Mobiliteit en openbare werken	Vlaamse overheid Departement Mobiliteit en openbare werken	2013	Public	2030	Pre-feasibility study	Regional	Rail	http://www.mobielvlaanderen.be/pdf/persberichten/2013-02-08-beleidssamenvatting.pdf
BE.11	Le transport ferroviaire : un atout structurant pour la Wallonie	Service public de Wallonie	TRITEL	2012	Public	2030	Pre-feasibility study	Regional	Rail	http://mobilite.wallonie.be/home/politiques-de-mobilite/politique-ferroviaire/les-rapports.html
BE.12	Streefbeeldstudie R11bis A103	Wegen en Verkeer	Wegen en Verkeer	2011	Restricted	n/a	Pre-feasibility study	Local	Road	n/a
BE.13	Masterplan ETCS 2010-2025 – Mise en œuvre sur le réseau ferroviaire belge	Infrabel	Infrabel	2011	Restricted	n/a	Pre-feasibility study	National	Rail	n/a
BE.14	Etude concernant l'évolution territoriale des flux de transports en Belgique et à la disponibilité attendue de l'infrastructure de transport	SPF Mobilité et Transports	Tritel	2011	Restricted	n/a	Trafic study	National	Multimodal	n/a
BE.15	Study exploiting the possibility of creating a rail freight corridor linking Belgium and Poland	Infrabel	NEA	2010	Public	n/a	Pre-feasibility study	International	Rail	http://ecms.infrabel.be/DMS/ds/en/12166567
BE.16	Studie voorwaardenscheppend kader ingebruikname ijzeren rijn voor de kempen	Intercommunale Ontwikkelingsmaatschappij voor de Kempen IOK	Technum Ressource Analysis Tritel	2010	Public	n/a	Pre-feasibility study	International	Rail	http://www.wakkervandeijzerenrijn.nl/downloads/website/20100114_onderzoekiokbelgischlimburg_kader-ijzrijn-kempen.pdf
BE.17	Etude sur le projet de connexion air TGV route	Liège Carex asbl	ADPI	2010	Restricted	n/a	Pre-feasibility study	Local	Air/Rail	n/a
BE.18	Social Cost Benefit analysis Iron Rhine	European Commision	TMLeuven	2009	Public	2030	CBA	Local	Air/Rail	http://www.tmleuven.be/project/ijzerenrijn/Report_SCBA_Iron_Rhine_v13022009b.pdf
BE.19	Plan «Passages à niveau 2008–2015»	Infrabel	Infrabel	2009	Restricted	n/a	Pre-feasibility study	Regional	Road/Rail	n/a

BE.20	Plan MER ontwikkeling bedrijventereinen Economisch Netwerk Albertkanaal	Provinciale Ontwikkelingsmaatschappij Antwerpen Provinciale Ontwikkelingsmaatschappij Limburg	Arcadis Belgium	2008	Public	n/a	Impact study	Regional	IWW	http://www.lne.be/merdatabank/uploads/merntech791.pdf
BE.21	Vervoerprognoses Ijzeren Rijn	Infrabel	TMLeuven	2007	Public	2020	Trafic study	International	Rail	http://www.tmleuven.be/project/ijzerenrijn/Vervoersprognose_IJzerenRijn_8_mei_2007b.pdf
BE.22	Transportprognoses en Capaciteitsplanning IJzeren Rijn bevinding en advies COD	Ministerie Verkeer en Waterstaat Nederland Federale Overheidsdienst Mobiliteit en Vervoer België)	n/a	2007	Public	n/a	Trafic study	International	Rail	http://www.wtnw.nl/mediapool/83/833483/data/Opdrachtomschrijving_COD_br.9409..pdf
BE.23	Vervoersprognoses IJzeren Rijn	Infrabel	NEA Universiteit Antwerpen	2007	Public	n/a	Trafic study	International	Rail	http://www.wakkervandeijzerenrijn.nl/downloads/website/vervoersprognoses_ijzeren_rijn_uva_april2007_pdf
BE.24	Aéroport de Liège Etude de faisabilité d'une intermodalité air/fer à partir de l'axe ferroviaire à grande vitesse	Liège Airport SA	Eernst & Young	2007	n/a	n/a	Pre-feasibility study	Local	Air/Rail	n/a

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