



CLEAN FUELS CONSULTING REPONSE TO:

Public Consultation on the Communication on a Sustainable Future for Transport

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INTRODUCTION

Clean Fuels Consulting is pleased to respond to the European Commission's Public Consultation on a Sustainable Future for Transport. This response will be limited to comments and concerns about fuel alternatives to the status quo petroleum fuels (gasoline and diesel). This contribution advocates the creation of a comprehensive European Alternative Fuel Policy within the context of an overall policy that addresses the wide range of potential programs designed to create a sustainable future for transportation.

What are the Alternatives?

The portfolio of alternative fuels (or 'energy carriers') has been more -or-less identified:

- **Liquid biofuels:** ethanol and biodiesel;
- **Gaseous fuels:** hydrogen, natural gas (fossil gas compressed, liquefied natural gas and biogas upgraded to biomethane); and liquefied petroleum gas (LPG);
- **Hybrid vehicles:** using various technical strategies and 'backup' fuels (often petroleum-based)
- **Electricity:** or 'pure electric' plug-ins otherwise reliant on battery energy storage.

All these vehicle technologies are more expensive than their petroleum - based counterparts and all suffer from concerns about fuel storage (and, thus, vehicle range). All need to modify or develop a supporting fuelling infrastructure. Only LPG and natural gas are cheaper than petroleum.

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The overriding approach to the policy recommendations are based upon the following 'philosophical' considerations:

- All the alternative fuels have their positive attributes as well as technology and/or cost elements that remain a challenge to commercialization.
- In 'politics' the different alternative fuel stakeholders should be partners in striving for the best, most transparent policies that advance the group of alternative fuels. This more-or-less 'transparent' approach is one that must be consistent among government policy makers at all levels. There are no 'fuel panaceas', which infers that a fundamental balance must be achieved in the development of policies that encourage the commercial growth of the various fuel alternatives so that, ultimately, the private and public sector customers can make the best, informed decision possible about which of these fuels and technologies to adopt.
- Policy makers' approach should be oriented toward policies and actions that tend to be take an 'integrated' and systemic (or holistic) view in helping to create a sustainable future for existing and new transport modes and fuels. This means creating policies and market opportunities that often may require the integration and balancing of economic, tax, environmental, energy, security, and transportation policies. It also will include consideration of agricultural policies, urban development, and management of various urban and rural waste management activities that are intended to capitalize opportunities for energy efficiency, energy conservation, and renewable resources.

The Previous Approach : 'Fuel du Jour' Alternative Fuels Policies

Since the early 1980s alternative fuel 'favorites' have changed significantly as policy makers and technologists grapple to find the 'silver bullet' vehicle and fuel option.

- The 1980s saw intense excitement and heavy funding for electric battery vehicles.
- The panacea of fuel cells running on hydrogen made from renewable electricity, emitting only water was the focus of unprecedented funding from the EU, U.S. and Japan throughout the 1990s and, though now more tempered, remains popular for extensive government funding.
- Hybrid vehicles are gaining popularity at the turn of the 21st century although, before the initial market success of the Toyota Prius, most car manufacturers viewed hybrids as the 'three 2s': two drive-trains; too complicated; too expensive.
- Renewable-based liquid biofuels – ethanol and biodiesel – became the rage with support from the farm industry to produce fuel additives to

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petroleum. Though liquids are more compatible with status -quo petroleum fuels than gaseous fuels or electricity, questions about ‘sustainability’ (affects on the food chain balance, impact on land use, supply potential, economics, etc.) may reduce European or Member States long term financial subsidies as well as lowering the target quantities to replace petroleum.

- LPG, natural gas and now renewable bio -methane continue to make steady in-roads in the global transport sector, but historically have suffered in Europe from a lack of funding and wide -spread EU-level political support, despite their fit with energy security and environmental policy objectives.¹

The Time is Right to Achieve a Balanced, European Alternative Fuel Vehicle Policy

The motivations for a European policy focused on clean alternative transportation fuels – and cleaner traditional fuels – have been based on overriding concerns about energy security, environmental protection, climate change mitigation, and energy efficiency. The EU wants to rely less on imported petroleum and more on sustainable, renewable transportation fuels. Increasingly strict emissions regulations and other policies are driving down vehicle exhaust pollution. Concerns about global warming have resulted in CO₂ being added to the list of regulated emissions.

The key question is: Can the EU develop a balanced, sustainable, and effective alternative fuels policy (with measureable results) that fulfills the objectives of energy security and commitment to environmental protection?

THE FRAMEWORK AND TOOLS FOR SUCCESSFUL POLICY DEVELOPMENT

The European Commission and the European Parliament have done an admirable job tackling the very complex and diverse issues related to alternative fuels in the transport sector. But the approach has been disjointed to the degree that different alternative fuels have been addressed in different directives with policies for some fuels included, some overlapping between directives, and others ill-addressed or, in some cases, hardly addressed at all. Thus, in its review of sustainable transportation fuels into the future, now should be the time for the EU policy makers to look more holistically and systematically at a single Alternative Fuels Policy Directive that provides improved balance in supporting the various fuel alternatives.

¹ Parts of this introduction are taken from, “What’s the Alternative?”, Jeffrey Seisler, Parliament Magazine, 7 September 2009, Brussels.

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The potential policies can be categorized in three principle areas that represent the important elements involved in commercializing clean fuels, as shown in Figure 1, Balance of AFV (Alternative Fuel Vehicle) Commercialization :

- Customer demand;
- Original Equipment Manufacturer (OEM) Production; and
- Alternative Fuel Infrastructure.

Within the triangle formed by these three elements the 'external factors' (i.e. independent variables) most important to the growth of AFVs are:

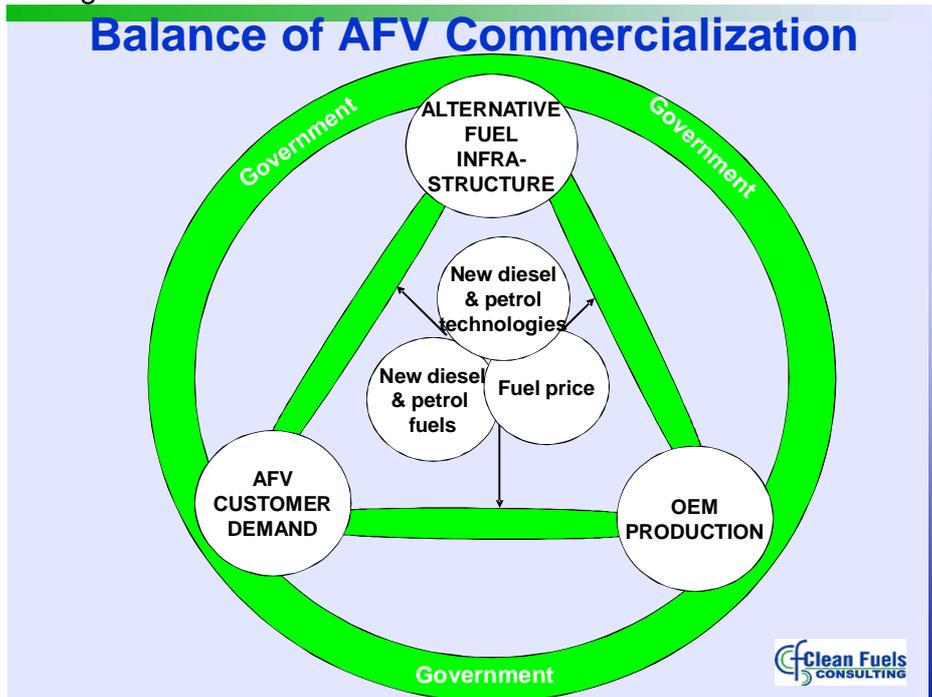
- The price of diesel and petrol (the 'petroleum' fuels);
- New diesel and petrol fuel formulations (i.e. low sulphur or so called 'clean' gasoline or diesel); and
- New diesel and petrol technologies.

These elements are the benchmarks against which all the alternative fuels and transportation technologies are measured, as to: the cost (fuels and vehicles), fuel efficiency, performance (including range), and environmental quality/performance.

But the key message in Figure 1 is that 'government' encompasses all of these elements and touches upon each of the critical market sectors represented by each corner of the triangle. Creating policies that demonstrate and enhance the benefits of the alternatives to petroleum to each of these sectors becomes the challenge to creating a successful alternative fuels policy for Europe (or a Member State). Also, balancing out the differences between the alternative fuels and the petroleum fuels and technologies through creative policy making allows the OEM sector to thrive with their traditional products, yet become incentivized to create new alternative fuelled vehicles that will help sustain them into the future.

(continue on the next page)

Figure 1: Balance of AFV Commercialization



The Policy Tools (or Instruments)

Government has a relatively fixed number of tools that can be used to incentivize alternative fuel and alternative fuelled vehicle (AFV) development. These include:

- Incentives (financial & others)
- Mandates
- Development of Standards
- Funding of Research & Development
- Leadership by Example
- Public relations (PR) & Communications

But the challenge for government decision makers is to create, implement and enforce the policy instruments in such a way that they help create and even sustain the markets for clean alternative fuels. Too often policies developed by well-intentioned decision makers are not completely successful or even fail because they are too aggressive (usually in terms of targets), too short term to provide positive signals to the market, or too disjointed and not in balance with other existing laws/policies,

Market Based financial incentives for fuels and vehicles can be applied in the several categories. For governments, the most critical concern normally is the revenue impact on governments to implement these incentives.

Mandates are another form of providing a forced incentive, and can be useful in changing consumer behavior. But experience has shown that:

- Mandates work best with incentives.
- A transition approach is most likely to achieve success (i.e. gradual increase of % procurements of vehicles over time).
- Mandates *must* be enforceable *AND* enforced.
- Financial ‘carrots’ help ensure compliance

Development of harmonized European standards are an essential to providing a pathway for commercial development of reliable and safe technology. The EU has taken a relatively pro-active role in developing standards (leading to regulations) that have included a wide range of alternative fuel and technology stakeholder input.

Likewise, EU support of research, demonstration and development projects are critical and important in funding work that might not be afforded by the private sector. Unfortunately, in the transportation policy sector, the past decade and a half of RD&D has focused on fuels and technologies that are perceived as ‘long term’ prospects, namely hydrogen fuel cells, electric batteries, and most recently so called second generation liquid biofuels. There has been very little focus on RD&D for those alternatives that provide a pathway between today and the future, namely natural gas and LPG. Most of the technology development for natural gas vehicles (NGVs) and LPG vehicles has been sponsored by the private sector in Europe, with very little or no support from the EU. Meanwhile, these technologies could have made dramatic leaps in quality even if only a small amount of funding were provided by the public sector. This remains a gap to be filled.

Leadership by example – whereby government leaders drive alternative fuel vehicles – can be an excellent way to demonstrate the value of these technologies. The idea that government should “Do as I do, not just do as I say,” creates a more forceful example for consumers. The October 2008 Clean and Efficient Vehicle Directive is one good way of highlighting the need for government to follow their own leadership by driving clean fuel vehicles. The implementation and enforcement phase of this policy will determine to what degree governments are serious about being innovators in transportation technology.

Public relations and communications are effective tools to change behavior and cause changes in driving patterns and the use of alternative fuels and vehicles. There are vast opportunities in the modern media networks to reach out to consumers, in particular, to shape behavior and belief structures as to the value of using cleaner fuels and vehicles.

Opportunities for success in establishing the markets for alternative fuels are fairly clear based upon many experiences with government policy initiatives:

- The decision process and policy outcomes should be positive-sum (win-win) approach for all the stakeholders, to the best extent possible.
- Stakeholder input (hopefully consensus) is best for long term policy sustainability.
- *All* tools and instruments should be promoted to ensure long-term sustainability of political strategies aimed at commercializing clean fuel vehicles.
- Reporting & feedback mechanisms to gauge the results of policy implementation allow for mid-stream corrections, improvements & sustainability.

Likewise, there are many lessons that have been learned in the development and implementation of clean fuel vehicle policies about what *NOT* to do. It is important that, as the European Union looks ahead in its vision to 2050 and beyond that they can learn to avoid past mistakes and learn from the creative successes of their own work and that of the Member States. Some of the lessons include, but certainly are not limited to the following:

- Policies should be long term and consistent ('knee jerk' reactive decisions kill the market)
- Rewarding early adopters works (see example in Annex I).
- Reductions of incentives should be gradual rather than end at one terminus date.
- Incentives should be linked to market share of the fuels or technologies, thus allowing for a smooth transition to commercial development.
- Credits & deductions should be on cost *differential* of the vehicle/fuel station, and not on the *full* cost.
- Exemptions from traffic & pollution restrictions work well (and are economic for government). Things such as free parking for clean fuel vehicles and special 'clean vehicle' access lanes costs little and pays off very well.

Annex I of this document includes a small sample of various government policies that demonstrate success for alternative fuel vehicles within the above framework.

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The important question is, can the EU create a comprehensive alternative fuels policy that helps reduce the first costs of vehicles and simultaneously solves the critical ‘chicken and egg’ fuel infrastructure issue confronting *all* the cleaner, alternative fuels? And, can such a policy result in a balance of fuel and vehicle development that is no longer skewed to one or two ‘pet’ technological hopes at any given time?

DEVELOPMENT OF A EUROPEAN ALTERNATIVE FUELS POLICY

With Figure 1 in mind, it is appropriate to craft an alternative fuels policy that addresses the key concerns of each of the main groups of stakeholders: the consumers who will buy and drive the vehicles; the fuel suppliers who will help to build the fuelling infrastructure; and the OEMs who must find an economically viable pathway to develop and sell clean fuel vehicles that can be embraced by consumers who can easily find adequate fuelling on a European scale. Additionally, concerns must be addressed to take into consideration other important societal priorities such as: reducing the negative impacts of climate change, reducing environmental impacts of vehicle pollution, and addressing the need to move more to renewable resources and reducing reliance on nearly 100% petroleum in the transportation sector. Incorporating concerns of other integrated urban problems such as waste and water quality management adds another benefit to a well-conceived alternative fuels policy.

Elements of an Alternative Fuels Policy: Focus on the Consumer

For the consumer the key motivator in purchasing a clean fuel vehicle is the cost and economics of the car and the fuel. While there is a strong attraction for many consumers to be environmentally conscientious (as demonstrated by the innovators) for private sector, commercial or public sector consumers the overall economics is the most important aspect of a vehicle purchase decision. Financial incentives, therefore, typically are tax-based initiatives that act positively on reducing the cost of purchasing, fuelling or using the vehicle. Thus, financial incentives directly affecting consumers (i.e. taxpayers) tend to be:

- Tax ‘relief’ in the form of:
 - Incentives (subsidies)
 - Reduced payments or penalties
 - Exemptions
- Three main options in the transport sector are:
 - Fuel taxes
 - Vehicle taxes (sales, import, registration, ownership, etc.)
 - Vehicle use taxes (i.e. road tolls, parking)

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- *Tax credits or tax deductions*
 - \$/€ 5000 *deduction* from the consumer's taxable income at 50% tax = \$2,500
 - \$/€5000 *credit* from taxes owed by the consumer = \$/€5,000.

Exemptions for clean fuel vehicles from traffic restrictions (i.e. from congestion charging or access to car pool lanes and bus/taxi lanes), restrictions due to pollution, and the use of express lanes for clean fuel taxis at airports and railway stations are further examples of creative policies that are relatively low cost to government, provide high visibility, and are an attractive economic advantage motivating consumers to purchase cleaner , alternative fuelled vehicles.

With incentives in place, favorable economics for the vehicles coupled with favorable fuel prices will begin to drive the market for AFVs. An Alternative Fuels Policy also would have to focus on specific customer entities beyond the average commuter, including the high fuel consuming, price sensitive commercial sector.

- *Airports.* Nearly every country has airports, which tend to be areas of large amounts of visible pollution from planes but also from the wide range of vehicles located there. These tend to be fleet vehicles that use a great deal of fuel, both within the airport operations (inside the 'apron') as well as vehicles that travel to the airport regularly, such as taxi cabs and hotel shuttles. Operational vehicles include: Security; fueling; tugs; maintenance; shuttles; rental cars; waste management; catering; concession suppliers; lift trucks; airlines; taxi/limo services; hotel shuttles. As such, airports are central to urban area activity, normally located near urban centers, and have high visibility.

An alternative fuel program aimed at US airports resulted in more than 24 members of the group that expanded alternative fuel use in airports. Initially funded by the US Department of Energy, this program proved highly successful at introducing a wide range of AFVs. In Europe several airports have developed AFV programs: Amsterdam Schiphol uses NGVs. Munich installed a hydrogen fuelling station for demonstration buses. But there has not been much attention to these facilities and, as actively engaged parts of urban life, focus on AFVs could yield substantial positive results

- *Seaports.* Ports are another valuable focal point for urban activities and are locations where pollution is a continual problem. Some 4,600 container ships travel the seas internationally and provide a backbone of

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commercial activity, much of which eventually centers around ports. But pollution from these vessels takes a large toll on the coastal habitat, as well as affecting air and water quality in and around port areas. Additionally, large trucks travel to and around sea ports to transport cargo and many other vehicles service these vessels and the accompanying commercial activities at the port.² In the US, the Port of Long Beach and Los Angeles are using natural gas and LNG for their port vehicles. Currently countries like Norway are operating ferries and transport ships on liquefied natural gas in order to reduce pollution. Thus, great opportunities exist for ships and vehicles servicing European ports to take advantage of various alternative fuels for their operations. Leadership from government could help motivate such activities.

- *Civitas*. The Civitas program has been one of the most highly visible and successful urban programs involving AFVs and should be continued as one of the excellent examples of stakeholder cooperation to formulate energy and fuel policies that benefit urban areas. The counterpart program in the US, Clean Cities, has resulted in displacing 412 million gallons of gasoline in 2008, a 14% increase over results in 2007. The US program includes nearly 90 participating communities.³ As part of a European Alternative Fuels Policy the activities of Civitas should be expanded. Consideration should be given to duplicate the US DOE work to quantify the impacts and results of the Civitas actions, which lends further credence to expanding and sustaining this program. Also, the EC could provide a cross-community training program so that there are more specific opportunities to improve technical competences as well as share the successes of Civitas partners with other new and incoming members of the Civitas ‘family.’

Elements of an Alternative Fuels Policy: Focus on the OEMs

The automobile and vehicle manufacturing industries (trucks, buses, engines, and related parts) are struggling financially as they simultaneously are being regulated to reduce vehicle emissions and fuel consumption. Additionally they must satisfy demanding customers by providing a consistent level of performance and comfort at an affordable price.

The emergence of fuel alternatives to diesel and petrol adds another dimension to the demands upon OEMs. OEMs have shown varying degrees of willingness to develop cleaner fuel technologies, however, they and the

² “U.S. Container Ports and Air Pollution: A Perfect Storm”, James Cannon, Energy Futures, Boulder Colorado, 2008.

³ *Clean Cities Annual Metrics Report 2008*. NREL/TP-540-46424, National Renewable Energy Laboratory, US DOE, September 2009

petroleum fuel suppliers are understandably reluctant to move away from the status quo liquid fuels, which is the foundation of their business. OEMs are being increasingly mandated to build lower emission vehicles but if there was an added benefit to producing AFVs then it is in their interest to consider alternative fuels and drive-trains.

Liquid fuel additives – ethanol, biodiesel, and others – are *relatively* compatible to the existing engine technology and liquid blends can be more easily incorporated into the existing liquid petroleum fuelling infrastructure, although not without specific costs and technical considerations. Gaseous alternative fuels represent a paradigm change away from liquids although the internal combustion engine can be adapted fairly easily to suit natural gas and LPG. Fuel cells represent yet another kind of paradigm change away from the internal combustion engine *and* require the building of an accompanying hydrogen fuel production capacity, delivery system and fuelling infrastructure. Electric battery vehicles also change the internal combustion engine paradigm and require a different kind of ‘fuel’ infrastructure. Hybrid vehicles seem to have found their niche since most of them maintain their link to the petroleum basis and maintain at least a partial tie to the existing petroleum fuel infrastructure.

An alternative fuels policy will have to provide a tangible incentive for OEMs to develop and build any of these vehicles unless consumer demand can be motivated sufficiently to sustain a major change in an OEM’s product line. Consumer demand for NGVs in a growing number of countries and to a lesser extent with LPG vehicles (which still rely mostly on converting existing petrol vehicles) has been driving OEMs worldwide to produce gaseous fuel -capable vehicles. Hybrid electric vehicles are making their way into the consumer market but not without some degree of subsidy by either governments or the OEMs themselves.

Within this context, incentives for OEMs that relieve pressure on them to rapidly (in their time-frame) construct low CO₂ and related ‘super clean’ petroleum fuelled vehicles could be a way to incentivize the production of more AFVs. Credits toward reducing CO₂ emissions in OEMs’ vehicle fleets by building alternative fuelled vehicles could be one substantial motivator to more seriously engage OEMs to produce AFVs. Currently there is credit given to OEMs making 50 gram per kilometer cars but this is focused clearly on electric vehicles. Such a concept, also to focus on *non-petroleum* fuelled low CO₂ cars would be highly beneficial and would fulfill additional energy and environment mandates of the European Union.

Financial support for the R&D required to develop AFVs would further relieve OEMs from costs incurred in exploring various fuel and technology

options. New options need to be provided for OEMs under the auspices of a European Alternative Fuels Policy.

Some countries also provide incentives to OEM dealerships to sell AFVs, which further enhances the opportunity to reduce the cost to get AFVs into the hands of customers. These should be advanced as another motivator to support the development and commercialization of OEM AFVs.

Elements of an Alternative Fuel Policy: Focus on the Fuel Suppliers

Fuel suppliers provide the backbone of any alternative fuel vehicle program. They are one of the keys in solving the 'chicken and egg' syndrome: which comes first, the vehicles or the fuel? But a critical mass of vehicles is needed to create a fuelling infrastructure to support the introduction of new fuels, and particularly gaseous fuels and electricity. Fuelling stations for ethanol, biodiesel, and other alternative liquid fuels that are marketed as additives in gasoline or diesel also need modification, although these are less costly than building new facilities such as compressor stations for natural gas or hydrogen.

A European Alternative Fuels Policy should either provide directly or advocate Member States to financially support fuelling infrastructures through investment tax credits, extended amortization periods, tax deductions, or other related types of financial instruments to encourage the building of fuelling stations compatible with the growth of new AFVs in any country.

In the case of municipalities, there are a growing number of cities across Europe that now are investing in renewable waste management strategies that create methane or ethanol from urban and agricultural waste. The European Commission-funded Biogasmax program is one example where some support was provided for demonstration programs using biomethane (upgraded biogas) to fuel urban vehicles. But funding for this was in the €7 million range; very low compared to electric battery or hydrogen fuel cell programs supported by the EC. As such, more focus needs to be given to urban infrastructure development for biomass and biogas processing. Such integration of urban/agricultural problems (solid waste disposal; water purification; agricultural waste disposal, etc.) with the transportation sector should be part of an overall European plan. Focus by government on the 'environmental closed loop' process whereby waste is converted to energy to run clean, low CO₂ transport vehicles should be a critical part of an integrated EU strategy that helps solve a diverse set of urban problems. There are a growing number of European cities now starting to deploy such integrated energy and transport strategies but more support from the EU would speed this process. Development of a considerable European

infrastructure for biomass/biogas production could result in displacing as much as 20% of the petroleum fuel in the transport sector by 2030.⁴

As AFV fuelling infrastructures develop, more focus and incentives also need to be given to creating AFV/clean fuel corridors along national and internationally connected highways so that consumers and commercial fleet operators can more easily transit across Europe in their various AFVs. A European Alternative Fuels Policy could provide the international cooperation required to develop a pan-European network of clean fuels.

Within the context of a European AFV strategy, there needs to be a re-thinking of current efforts to subsidize and incentivize fuel producers, particularly those fuels whose production might have impacts on the food chain and the use of rain forest resources that might otherwise have a positive effect on controlling climate change. The Dutch learned in 2006, for example, that their subsidy for the production of palm oil as a diesel substitute was causing fuel producers in Indonesia to cut down large portions of the rain forest in order to supply palm oil. These 'knock on effects' of government fuel subsidy strategies must be mitigated in advance or fuel production incentives need to be more limited in scope.

INCORPORATING PRINCIPLES OF SUBSIDIARITY : EU VERSUS MEMBER STATE AUTHORITY TO TAKE ACTION

Clearly some of the opportunities, suggestions and programs mentioned above may not be practical for implementation at the EU level. Providing tax incentives, for example, typically becomes the domain for Member States and not the EU. But intellectual leadership as well as examples of successful AFV incentives and programs can provide a framework of activity for Member States from the EU through Directives. Typically Member States do not want to "re-invent the wheel" and would rather duplicate programs using examples of existing successful programs.

The EU can take direct actions by creating an Alternative Fuel Policy that, at the EU level provides support for:

- Research, development and demonstration funding, in a balanced way so that all the stakeholder developing fuel alternatives and new technology (including OEMs) can mitigate some of the costs and risks for their activities.
- Standards and regulations is best done at the European level, even if some of these also trickle down to the Member States for use in national

⁴ Analyse und Bewertung der Nutzungsmöglichkeiten von Biomasse, Wuppertal Institute, 2005
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regulations. But European leadership is required to create standards, interface with other international standards bodies (i.e. International Standards Organization [ISO]), and participate in the creation of international regulations at the United Nations level. Much of this is done already, however, creating a specific, long term strategy supporting the development of standards is beneficial and even critical.

- Leadership by example can be accomplished by the EU institutions, all of which currently use vehicles to transport executives, staff, mail, and various goods and services that are distributed throughout the EU institutions in Brussels and Strasbourg. Likewise, employees of the EC/EP and elected members of the European Parliament should be encouraged to use alternative fuel vehicles. In that regard, there should also be a program to provide alternative fuel stations in and around the EU institutional buildings, thus enhancing the opportunity to play a direct role in reducing pollution and achieving less reliance on important petroleum.
- Public relations and communications is a principle function of the EU, and they do a very good job of incorporating stakeholders into important networking events throughout the year. But more could be done to sponsor generic advertising independently or with member states collaboratively to promote the use of cleaner fuels.
- Coordination of actions among various Directorate Generals. An Alternative Fuels Policy would involve a variety of DGs, including those engaged in energy, transport, environment, climate change, research, and taxation. It is important that interaction between these various entities is fostered in the development of a coordinated AF policy and that mechanisms for on-going inter-departmental relations are prescribed.

As for other incentives and mandates, European harmonization can be fostered on behalf of Member States within European Directives that lay out 'menus' of activities or actual complete strategies, as recommendations to be followed by the Member State governments. Specific reporting functions, as is required in many Directives, may have to be satisfactory in order to monitor national government progress toward the goals of achieving more widespread use of AFVs. But an ongoing program of data collection and verification of the use of AFVs, installation of fuelling stations, and emissions/CO2 impacts certainly provide further evidence that programs are effective (or not) and create additional opportunities for improvement into the future.

ANNEX I

Examples of Successful AFV Incentives and Programs

These examples were developed from research by Clean Fuels Consulting, and presentations to various audiences over a number of years. There are many more examples that can be provided in support of new legislative initiatives for clean, alternative fuels.

Low Cost (to government) Market Based Incentives

- Exemptions from 'Bad-Air' day traffic bans or limitations (Milan, Paris, etc.)
- Exemptions from congestion charges (London, Stockholm)
- 'No-Wait' taxi zones at airports & train stations (i.e. Goteborg & other Swedish cities)
- Exemptions from time-of-day traffic restrictions (i.e. access to carpool lanes...United States, mainly) (*1 hr/day saved in traffic = 6.25 weeks of work equivalent per year*)
- (California) No bridge tolls in car pool lane .

Market Based Incentives: U.S. Tax Provisions

- Energy Policy Act of 1992: tax *deductions* for conversions (\$2000 for LDVs; up to \$50,000 for HDVs) and up to \$50,000 for fuelling station construction.
- Tax deductions (and credits) reduced gradually over time (very important strategy!)
- U.S. Energy Policy Act of 2005 provides tax *credits* for qualified medium & heavy duty alternative fuel vehicles (CNG, LNG, hybrid, LPG) from \$2000 - 32,000
- Tax advantages must be offered for the cost *differential* between the AFV & petroleum vehicle, not for *FULL* value of the vehicle!

Market Based Incentives for NGVs: Austria

- The City of Vienna, with the support of OMV, offered €600 incentive for the first 1000 customers who buy an NGV
- OMV provided €200 incentive to OEM sales people *and* a monetary incentive to owners of the dealerships to sell NGVs .

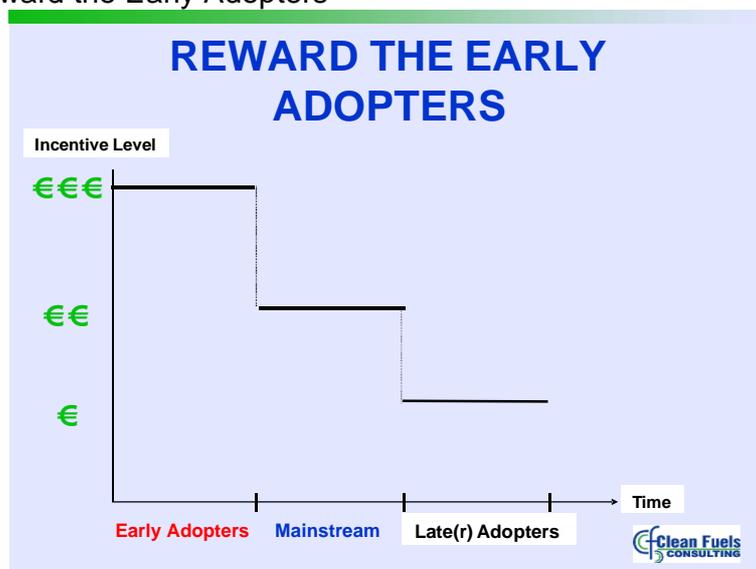
Market Based Incentives: German Tax Rules for NGVs and LPG

- 1996-2009 CNG tax reduced from DM 47.6 kWhr – DM 18.7 kWhr (- 61%)
- 2002 benefits extended to 2020
- March 2006 tax rules provide break for LPG and CNG: to 2009 for LPG; 2020 for CNG
- June 2006 Bundestag adapts law to make both tax breaks apply through 2018.
- Government policies need to be consistent and stable to assure customers of long term market initiatives

Berlin Taxi Program “TUT”: 1000 natural gas taxis 2001

- First 400 purchasers of Euro 4 taxis (2005 standard) received € 3068
- Second 300 purchases received € 2567
- The last 300 purchasers received € 2045
- Local gas company provided fuel vouchers ranging from €1534 to €1043 for early to later purchasers

Figure 2: Reward the Early Adopters



Market Based Incentives: Creative Financing in Egypt NGV Program

- Egyptian 'shared savings plan' organized by government & Nassar Bank
- No cost 'loans' provided to taxi drivers to convert vehicles: conversions provided 'free'.

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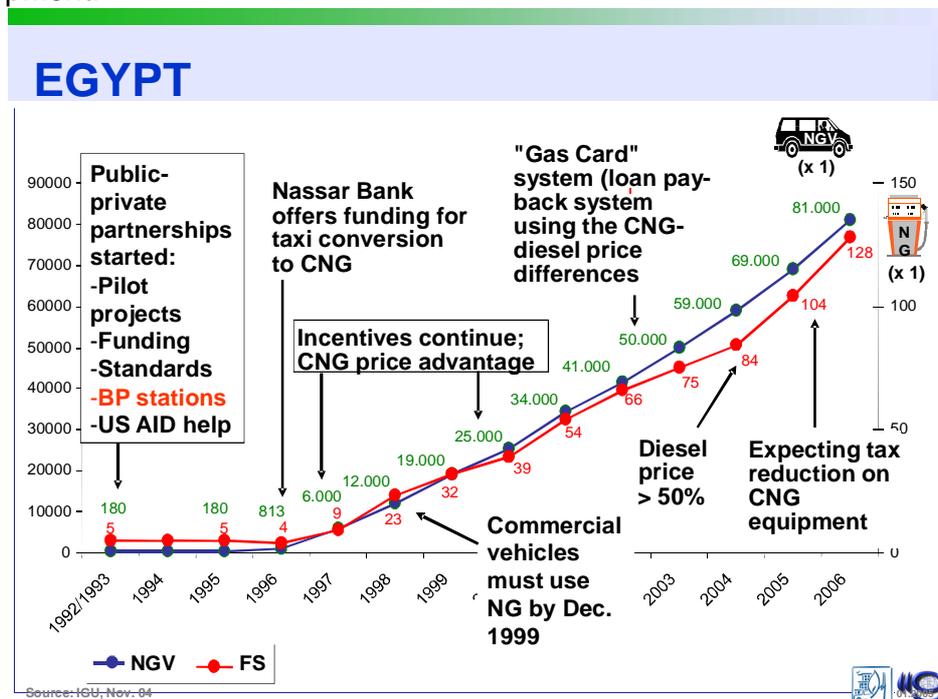
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- Cost repaid by paying petrol price for natural gas until loan is repaid, then fuel costs drop by 50%.
- Cash flow back to bank/government is continual and can be 'recycled' back to new customers.
- Cleaner air contribution is immediate and growing.
- Revenue impact = time value of money loaned.

Figure 3. Impacts of government incentives on NGV sales & fuel station development.



(International Gas Union Triennium Report on Natural Gas Vehicles, November 2006.)

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