

DEPLOYMENT STRATEGIES FOR HYBRID, ELECTRIC AND ALTERNATIVE FUEL VEHICLES

A Report of the IEA Project „Deployment Strategies for Hybrid, Electric and Alternative Fuel Vehicles“

THE TASK FORCE

Sigrid Kleindienst Muntwyler
Engineering Office Muntwyler
Operating Agent Implementing Agreement
„Hybrid&Electric Vehicles“
P.O.Box 512, CH-3052 Zollikofen, Switzerland
Phone +41 31 9115061, FAX +41 31 9115127
e-mail: muntwyler@solarcenter.ch

Martijn van Walwijk
INNAS
Operating Agent Implementing Agreement
„Advanced Motor Fuels“
Nikkelstraat 15, NL-4823 AE Breda, Netherlands
Phone +31 76 5424080, FAX +31 76 5424090
e-mail: mvwalwijk@innas.com

Antonio Mattucci
Ente per le Nuove Tecnologie ENEA
leader Sub-task I „Fleet Tests“
Via Anguillarese 301, I-00060 Roma, Italy
Phone +39 06 30484394, FAX +39 06 30486315
e-mail: mattucci@casaccia.enea.it

Stephan Rieder
INTERFACE Politikstudien
leader Subtask II „Government Support and
Regulations“
Seidenhofstrasse 12, CH-6003 Luzern, Switzerland
Phone +41 41 4120712, FAX +41 41 4105182
e-mail: rieder@interface-politikstudien.ch

Tommy Månsson
EnEN Miljökonsult
leader Sub-task III „Stakeholders“
Toppvägen 36A, S-17740 Järfälla, Sweden
Phone + FAX +46 8 58034506
e-mail: tommy.mansson@enen.se

Michaela Kargl
Leader Sub-task IV „Market Introduction“
Austrian Mobility Research FGM-AMOR
Schönaugasse 8A, A-8010 Graz, Austria
Phone +43 316 810451 15, FAX +43 316 810451 75
e-mail: kargl@fgm-amor.at

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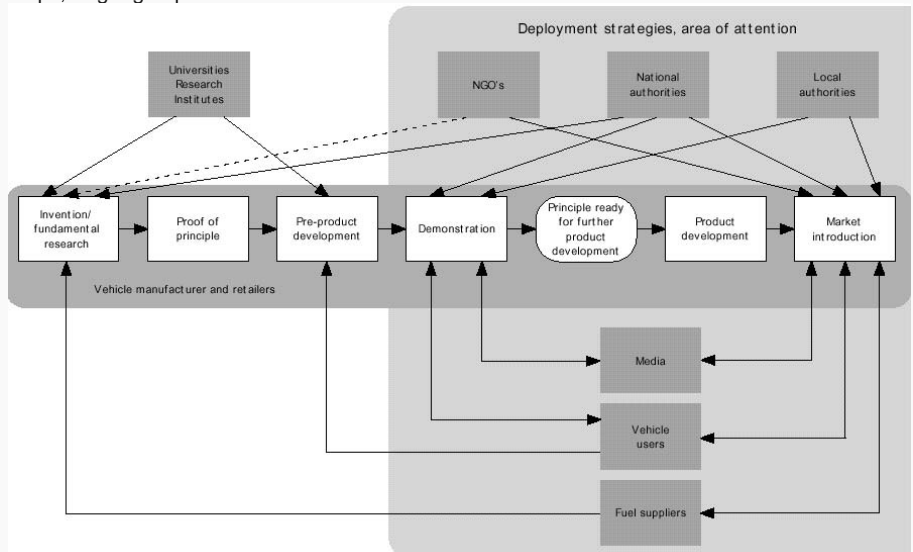
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GOVERNMENT DEPLOYMENT STRATEGIES EXAMINED

In the last years the harmful effects and the greenhouse gases resulting from the use of conventional vehicles created many concerns on continuing in the same direction. Hybrid or electric vehicles and alternative fuels like natural gas, ethanol or hydrogen are considered an essential element in reducing urban pollution and greenhouse gases. But only a wide dissemination of „clean vehicles and fuels“ can have noticeable effects on the environment. Therefore governments, in addition to the support of research and development, more and more implement measures with the aim of promoting the market introduction of these new vehicle technologies – with different approaches and various effects. Between 2000 and 2002 an international task force collected information on more than 100 programmes run in 18 countries. Evaluations and analyses of case studies showed that some approaches are successful, but they also identified weaknesses which are often repeated. The report elaborated by the task force provides recommendations on the base of conclusions drawn by the analyses. They will help government officials responsible for administering fleets, incentives and regulations with assessing the most promising strategy for their country for the market introduction of hybrid, electric and alternative fuel vehicles.

REPORT STRUCTURE

Market introduction of clean vehicle technologies needs strategies including the identification of steps, target groups and stakeholders.



To come up to the above shown complexity of the interdependencies of stakeholders and their activities, the report is divided into four parts:

Part 1 „Fleet Tests of Hybrid, Electric and Alternative Fuel Vehicles“

describes fleet tests and gives recommendations addressed to government officials, operators and other stakeholders responsible for administering fleet test programmes of hybrid, electric and alternative fuel vehicles

Part 2 „Government Support and Regulations“

defines the role of governments and government promotion activities, evaluates the effectiveness of incentives and gives recommendations for government support and regulations. It is addressed to government policy advisors responsible for transportation energy issues and government policy advisors responsible for air pollution and greenhouse gas issues.

Part 3 „Stakeholders, Local and City Administrators“

defines the role of fuel/energy providers and other stakeholders (utilities, gas companies, EV associations, etc.) and the role of city administrations, and elaborates recommendations for stakeholders.

Part 4 „Market Introduction“

describes and analyses the results of market introduction programmes in various countries. The emphasis is on the identification of successful market introduction strategies and promising market niches for hybrid, electric and alternative fuel vehicles

PART I: FLEET TESTS

The evaluation of fleet tests has identified three critical phases where improvements should be made:

DESIGN PHASE

In the design phase maximum attention should be paid to a quantitative definition of the main objectives and the identification of an easily controllable operating context (including limited geographic dimensions, information on features that can impact the result, availability of maintenance and service, adequate assistance of manufacturers and suppliers, motivation of all stakeholders, deployment of adequate human and economic resources, and availability of sufficient time).



EVALUATION OF THE MAIN RESULTS

Evaluation is the most important but most neglected activity within fleet tests. Evaluations must cover

1. the determination of the level of success for every objective and, where deviations are found, the identification of the reasons of the failure
2. the identification of important side effects
3. the identification of the technical and/or organisational improvements needed for the market introduction of the technologies
4. the estimation of the impact of a wider scale technology application (environmental benefits, user's behavioural changes, weak aspects of the technologies with indication of possible solutions)
5. the identification of the most adequate measures and contexts for the creation of market niches, in particular economic (subsidies, incentives, reduction of taxes, facilitation for the market of second hand vehicles, etc.), legislative (national and local standards, constraints of use for the traditional technologies, etc.), logistic (availability of infrastructures and services, spare parts, etc.) and formative and informative (courses, seminars, specialised magazines, demos, etc)

FOLLOW-UP PHASE

In the follow-up-phase it is necessary to fully inform all stakeholders involved in a transparent and complete way. This will allow them to become aware of the main features of the technologies without excessive efforts, and will enable them to proceed with follow-up initiatives for market growth. Obviously an additional effort will be required for the team involved in the fleet test, in order to supply each stakeholder with the information of interest.

Furthermore the activity should be continued for a significant period after the conclusions of the technology testing. This allows a proper evaluation of the next step necessary for a market deployment of the relevant technology.

This also means that the phases of evaluation and dissemination of the results must not be reduced even if fleet tests have to face budget constraints, and activities have to be cut. Where the resources are deemed to be insufficient for the project, a reduction of the original targets should be preferred. Consequently a revision of the cost-benefit evaluation should verify whether the effectiveness of the test remains adequate, i.e. enough benefits are gained

PART II: GOVERNMENT SUPPORT AND REGULATIONS

The role of the government in the transport field is dependent on the concept of governance: The „steering state model“ assumes a strong state having the resources (know-how, money, legal authority) to steer the action of the target groups; the „network state“ acknowledges its lack of resources and takes the role of a facilitator, network manager or moderator. The evaluations show that proponents of clean vehicles rely on the strong state model; and the scope of policy instruments is accordingly „traditional“: Direct state regulations and financial incentives are dominant. In fact the governments lack financial resources as well as know-how to steer the transport market effectively. This is reflected by the evaluation of case studies. The recommendations for government support and regulation therefore are:

1. Give priority to network management as an instrument to prepare the market introduction of clean vehicles;

i.e. inclusion of manufacturers, local dealers and fuel suppliers in a network to come to a common and economically viable strategy that favours the introduction of clean vehicles into the mass market, although this strategy may seem to be too time-consuming and modest regarding the goals.

2. To support the network-management, an appropriate framework is needed.

The national environmental policy is such a framework for deployment strategies for clean vehicles and fuels. An important element in this context are vehicle emission standards. They have the main advantage that they are independent of a certain technology. Market players decide which technologies meet the standards best.

3. Financial incentives can play an important but only complementary role to standards and network management.

Financial support for P+D-projects is useful to adapt technology and/or test market acceptance. General subsidies for a vehicle or a kind of fuel (tax reductions) are only useful if

- used in combination with network management and standards,
 - the technology is marketable and has a high potential of market acceptance,
 - subsidies are limited to a certain period and/or are bound to a certain degree of market penetration of corresponding clean vehicle types.
- Flexible bonus-malus-models seem to be an adequate instrument in this respect.

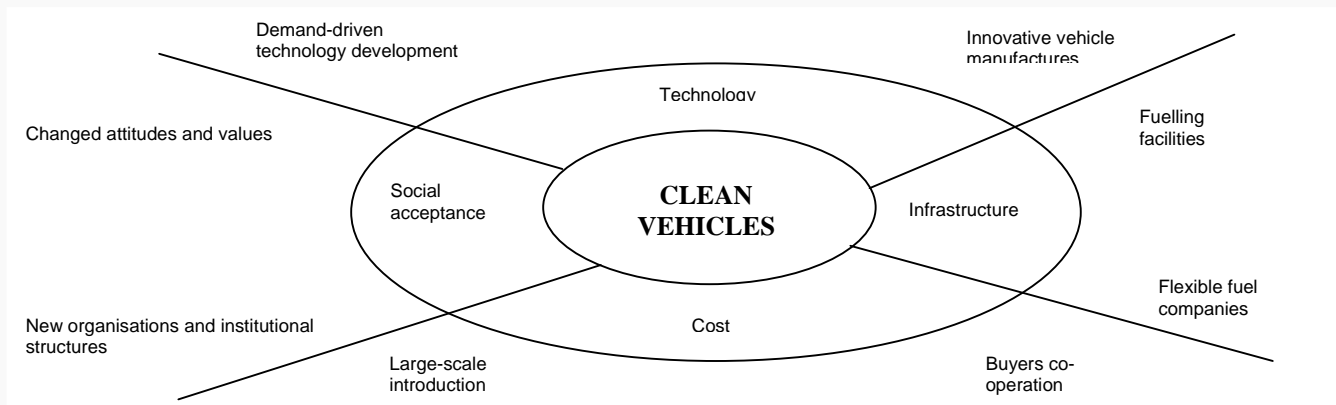
4. Focus deployment strategies, especially direct market intervention, to marketable technologies that need no or little change in user behaviour (fit-fit-technologies like LPG). Perhaps electric two-wheelers are such a technology.

5. Programmes should be evaluated at least at the end. An ongoing evaluation of the programmes that provides elements to improve follow-up programmes is even better.

It is the lack of reliable data which made it very difficult to compare the programmes under study. Especially the substitution-effects of new technologies were of high importance. In the framework of an environmental policy only technologies with a substitution-effect for vehicles run on fossil fuel make sense.

PART III: STAKEHOLDERS

Many of the case studies show that cities, local and regional authorities play an important role in case they have the competences to adapt local regulations and framework conditions (environmental zoning, parking regimes, local transport advisors, etc.). Nevertheless the chance to promote the market introduction increases if they act within networks (for example the „Clean Cities“ network in the United States). Such partnership can cover all fields in which stakeholders are active:



The strongest market impact at least at local level has been achieved by procurement programmes. Nevertheless the question of a „critical mass“ is still open; and the „bottom-up“ approach of networking on local and regional levels has to be accompanied by incentives from national or even international level. In addition the scope has to be broadened including a closer look at non-technical measures aiming at providing more guidance for governments.

PART IV: MARKET INTRODUCTION

The instruments for the market introduction have been identified:

Supporting measures for the market introduction of clean vehicles and fuels	
Command and Control Instruments	<ul style="list-style-type: none"> • Standards • Emission-regulations • Licensing • Quality Contracts • Mandates • Exemptions from certain restrictive regulations
Economic Instruments	<ul style="list-style-type: none"> • Direct investment • Pricing policies • Subsidies • Tax incentives • Financing schemes
Procurement Instruments	<ul style="list-style-type: none"> • Green procurement • Leadership by example • Common procurement
Collaborative Instruments	<ul style="list-style-type: none"> • Network-management and co-ordination • Certification and labels • Voluntary agreements • Public-private partnerships • Private-private partnerships
Communication and Diffusion Instruments	<ul style="list-style-type: none"> • External information • Marketing • Vehicle buyers' guides and vehicle labelling • Internal information • Education and training measures • Persuasion and lobbying activities

WHAT DOES „MARKETABLE PRODUCT“ MEAN?

Markets demand „marketable“ products. In the field of clean vehicles, „marketable“ often is reduced to the satisfactory functioning of the technology. In the highly competitive vehicle market „marketable“ includes

- licensing, compliance with national technical standards
- a purchasing process with reasonable conditions for the customers (including the purchase price)
- the reliability and safety of the technology
- easy access to fuels or other forms of required energy (in an area in line with the range of the vehicles)
- service facilities within a reasonable distance
- trained staff at the service facilities
- availability of driving lessons (if necessary)
- access to information on performance, operation, best application of the vehicles



TEN COMMANDMENTS FOR THE MARKET INTRODUCTION OF CLEAN VEHICLES

1. Analyse the framework conditions thoroughly before starting a market introduction programme, and don't forget to include social, cultural and behavioural issues as well as technical and infrastructure issues.
2. Learn from others' experiences, from the success and failure of previous market introduction programmes in order to find out the most feasible way to promote clean fuelled vehicles and clean fuels – but don't forget to keep in mind, that the adaptation of a successful concept to the unique framework conditions of your target market is absolutely necessary.
3. Do not try to bring technologies on the market, that are not mature - bad experiences will determine peoples attitudes for a long time.
4. Either choose vehicles/fuels that can compete with conventional technologies in terms of performance, or select a market niche where the targeted vehicles/fuels are competitive to existing technologies:
keep in mind: market introduction of a technology that requires (substantial) behavioural changes from the users is really a challenge - such technology must offer outstanding advantages to the users, otherwise they will not accept it.
5. Work hard to bring aboard all relevant stakeholders - don't forget to include stakeholders (misleadingly) perceived to be 'unimportant'.
6. Large scale market introduction of the targeted vehicles/ fuels must bring advantages (or at least no dis-advantages) for all relevant stakeholders - in the majority of cases modification of framework-conditions will be necessary to comply with this condition:
use supporting measures to 'shape' the framework conditions favourable - and design the applied bundle of supporting measures tailored to the (unique) framework conditions of your target market.
7. Include into the programme-design continuous monitoring throughout the entire term of the programme - regular independent assessment of the programme results, regular analysis of (rapidly changing) framework conditions and regular adjustment of the applied measures is absolutely necessary.
8. Set a high value on information, awareness, education and marketing activities since the success of a market introduction programme strongly depends on social change and on behavioural change.
9. Set a high value on the quality of after sales service, since the customers (i.e. vehicle-purchasers) will also set a high value on this issue - and they will spread their experience...
10. When selecting a market niche, keep in mind that it is wise to try one thing at a time: try to introduce a new mobility concept using mature technology or try to introduce new technology using well-known concepts.

... and do not forget to keep in mind, that market-introduction of clean vehicles and fuels will take time ...

NICHE MARKETS FOR ELECTRIC VEHICLES

Many market introduction programmes aim/aimed at the introduction of electric vehicles into market niches.

Possible niche markets for EVs may be:

- 'City Cars'
- shared cars
- self-service systems for short-time and short-range vehicle-rental
- delivery vans and service vehicles
- cycles, scooters, mopeds and motorcycles



An important lesson that should be learned from experiences in several niche-market introduction programmes is, that:

- only marketable technologies should be used when introducing a new mobility concept
- well-known concepts should be used for the introduction of new technologies.

Therefore, first the innovative mobility-concept (e.g. car sharing,...) must be introduced and then, if the 'market-introduction' of the mobility-concept has been successful and people are already familiar with the concept, the introduction of new vehicle technologies into this niche market may be started.

WHAT ABOUT PRESCRIPTIONS?

Working in markets always means dealing with such a great variety of framework conditions and market forces that programme prescriptions can only give general guidelines comparable with the „Ten Commandments“. The report gives a lot of considerations and observations which also result in recommendations in line with the relevant field (e.g. fleet tests, government support etc.). You can find them at the end of each part. What should be observed for every promotion activity for clean vehicles can be summarized as follows:

- **be flexible:** Markets are complex and changing. Measures promoting market introduction must take this into consideration.
- **evaluate:** The complexity of the market forces makes effects of deployment measures unpredictable. Only continuous evaluation ensures that the necessary adaptations can be made.
- **learn by doing:** Market studies however perfect they seem mirror theoretical approaches. Only practice reveals weaknesses in technology and real effects of the market forces.
- **learn from others:** Much experience has been gained by worldwide market introduction programmes. It is a waste of money to repeat failures that occurred elsewhere.
- **inform:** Learning processes only can happen if informations on successes and failures are available.
- **think markets:** The smartest technology will fail in case it is not accepted by the customers. Learning from marketing specialists may be more helpful in some stages of market deployment than to polish the technology.

The report is available in 2 versions:

Synthesis Report: 50 p

Full Report: 132 p

For ordering please contact:

Sigrid Kleindienst Muntwyler
Engineering Office Muntwyler
P.O.Box 512, CH-3052 Zollikofen
Phone: +41 31 9115061, FAX +41 31 9115127
e-mail: muntwyler@solarcenter.ch

Martijn van Walwijk
INNAS
Nikkelstraat 15, NL-4823 AE Breda
Phone +31 76 5424080, FAX +31 76 5424090
e-mail: mvwalwijk@innas.com

Implementing Agreement Hybrid&Electric Vehicles
Secretariat
Frans Koch
Canotec Road Unit 53, Ottawa Ont. K13 9G3
Phone +1 613 7457553, FAX +1 613 7470543
e-mail: fkoch@gvsc.on.ca
<http://www.ieahev.org>

Implementing Agreement Advanced Motor Fuels
Secretariat
Claes Pilo
SDAB, Roslagsvägen 54, S-11347 Stockholm
Phone +46 8 151190, FAX +46 8 151191
e-mail: pilo.sdab@swipnet.se
<http://www.iea-amf.vtt.fi>

International Energy Agency
9 Rue de la Fédération
F-75739 Paris cedex
<http://www.iea.org>