

Alternative fuels and vehicles: different aspects on current and future policy instruments

REPORT on the National Workshop SWEDEN



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Project Partner: Chalmers University of Technology

Location and date: Uddevalla, 3 March, 2010

A. General information

Title of the workshop: **Alternative fuels and vehicles – different aspects on current and future policy instruments**

Date of the workshop: **3 February 2010**

Location: **Uddevalla,
Bohusgården Conference Center**

Organisers: **Chalmers University of Technology**

Number of Participants: **24 + 1 own staff**

Number of invitations sent: **130**

B. List of participants

Nr ¹	Last name	Surname	Institution	Type ²
1	Grahn	Maria	Chalmers University of Technology	OS
2	Blom	Per Olov	Environmental committee, Region Västra Götaland (Western Sweden)	POL
3	Bunzek	Ingo	ECN, The Netherlands	R&D
4	Folkesson	Hans	Swedish Hybrid Vehicle Centre at Chalmers	R&D
5	Jerkefjord	Morgan	MPA Consultants	R&D
6	Kenamets	Henry	Göteborg Energy	ENC
7	Klintbom	Patrik	Volvo Technology Corporation, Fuels and Lubricants	VHP
8	Kviberg	Sören	Opposition counsellor, The Left Party	POL, MUN
9	Lagercrantz	Jakob	Swedish Association of Green Motorists	NGO, FLT
10	Mellander	Hugo	Traffic Safety Research and Engineering AB	R&D
11	Nyström	Ingrid	CIT Industrial Energy Analysis	R&D
12	Owe	Christer	Ekocentrum	NGO
13	Pettersson	Lennart	The Federation of Swedish Farmers – LRF Skaraborg	FUL
14	Pohjonen	Maria	Svenska Gasföreningen (Swedish Gas Association)	INA
15	Sprei	Frances	Chalmers University of Technology	AC
16	Thorell	Lave	Regional development secretariat/committee, Region Västra Götaland (Western Sweden)	POL
17	Thulin	Niklas	Viktoria institute	R&D
18	Toro	Felipe	Institute for Resource Efficiency and Energy Strategies, Germany	R&D
19	Tullin	Claes	SP Technical Research Institute of Sweden	R&D
20	Waldenby	Torbjörn	Vattenfall Power Consultant	ENC
21	Wernersson	Clas	Shell Refinery, Gothenburg	FUP, FUD
22	Williander	Mats	Connect Väst AB	NGO
23	Wolf	Sven	Hydrogen Sweden	INA
24	Ådahl	Anders	Göteborg Energy	ENC
25	Österlund	Tomas	Environmental committee, Region Västra Götaland (Western Sweden)	POL

1) Own staff are listed first

2) Stakeholder category (type): **OS**=own staff, **ENC**=energy company, **FUP**=fuel producer, **FUD**=fuel distributor, **AC**=academia, **INA**= Interest association, **FLT**=fleet, **POL**=policy maker, **MUN**=municipality, **NGO**=non-governmental organisation, **R&D**= research and development, **VHP**=vehicle (technology) provider, **VHD**=vehicle dealer.

C) AGENDA of the Workshop

11:00 Register

11:30 Lunch

12:30 Introduction

Maria Grahn, Chalmers. Project leader for the Swedish contribution to Alter-Motive.

12:45 Preliminary results from Alter-Motive.

Maria Grahn, Chalmers. Project leader for the Swedish contribution to Alter-Motive.

13:15 Which policy instruments has lead to increased energy efficiency for passenger cars.

Frances Sprei, Swedish Association of Green Motorists and Physical Resource Theory, Chalmers.

13:45 User-friendly web-based tool for stakeholders to find suggestions for policy instruments.

Ingo Bunzeck, ECN, The Netherlands. Project leader for WP5 in Alter-Motive.

14:15 Instructions for the discussion part of the workshop

14:30 Small group discussions

Brainstorm around all policy instruments that have been tested in Sweden/EU. Listing them and comment on their advantages and disadvantages.

15:30 Coffee

16:00 Questionnaire, WP5

Choose two successful policy instruments, and answer some detail questions on them. Also mention and comment what in your opinion is the least successful policy instrument.

16:15 Small group discussions

Brainstorm around suggestions for future policy instruments. List arguments.

17:15 – 18:15 Full group discussion

Summary of results and conclusion from today's activities.

19:00 Dinner

D. Short summary

The Swedish national workshop was successful in many ways. From the feedback questionnaires it was shown that all participants found the workshop as well as the discussions useful and constructive. Some of the participants also admitted that their views and opinions had been influenced during the discussion and that the understanding in a number of areas had been improved and updated. Further the invited speakers, Frances Sprei and Ingo Bunzeck, were given top marks and all participants found the given presentations informative. Positive feedback was also given to the chairman, Maria Grahn, for arranging and presenting the activities, leading the discussions and holding together the whole day. Finally the conference room, environment and food during the day was of highest quality and very appreciated.

A wide range of Swedish stakeholders within the area of alternative fuels and vehicles took part in the workshop. The participants represented energy companies, fuel producers, fuel distributors, vehicle providers, interest associations within fuels and fleets, local and regional policy makers, municipality representatives, NGOs within the environmental and innovation fields, academia as well as other research and development partners. The spectrum of the stakeholders present at the workshop was therefore defined as appropriate. However, it would have been interesting to involve also national policy makers, representatives from the Swedish Energy Agency and/or a representative from any of the large scale commercial biofuel producers.

Judging from the lively discussions at the workshop, the stakeholders showed great interest in the subject. During the discussion on policy instruments affecting fuels and vehicle technologies the participants agreed on that Sweden cannot develop a unique solution that is not compatible with the rest of Europe. It would also be very expensive for vehicle producers if they have to develop unique vehicle types for each country.

Regarding current Swedish policies, the majority of the stakeholders had difficulties to hide their irritation for one particular policy called the “pump law”, read more in section F “Overall Conclusions”. They agreed on that they want other EU member states to learn from this mistake and not implement such policy without first having a discussion with the national stakeholders. The overwhelming dissatisfaction that arose, from implementing “the pump law”, lead to a huge drawback for the entire alternative fuel acceptance, in Sweden.

Regarding the future all participants agreed on that the definition of a “green” car is extremely important. Currently many local benefits for “green” cars give rise to questions, e.g. why SUVs with a hybrid engine can have free parking and be exempted from congestions fees when it emits more than small conventional cars. Also the more “green” cars applying for the benefits, the higher the cost for the municipalities, leading to that the subsidies sooner or later must be phased out. If the clean vehicle definition instead was progressive and yearly strengthen up, the stakeholders were firmly convinced that it would solve many problems. A progressive definition could prolong the subsidies and it would also send clear signals to the car manufacturers.

The issues addressed:

- | | |
|---|------------|
| 1) Critical review of the state of the art | yes |
| 2) Recent and planned policy development | yes |
| 3) Action plan for an EU strategy towards a sustainable transport | no |
| 4) Coordination/harmonisation of the support systems | no |
| 5) Specific national requirements | yes |
| 6) Policy integration | yes |

E. Detailed report on the speakers' subjects and the debate

1) Speech given by Frances Sprei, Physical Resource Theory, Chalmers University of Technology on which policy instruments has lead to increased energy efficiency for passenger cars (in Swedish).

Frances presented her study that she has carried out for the Swedish Environmental Protection Agency. She has studied current policy instruments affecting car owners in Sweden and analyzed which policies has lead to increased energy efficiency. Some of the results were high news for many of the stakeholders. One example of such news was the effect of changing from one policy instrument to another. In Sweden customers buying a new eco-friendly car for private use have received 10,000 SEK in a governmental cash payback since April 2007. This cash payback has recently been replaced by another policy instrument, a five year tax exemption from the annual circulation tax. This new policy instrument applies to both private and legal persons (organizations, companies, etc.). The new policy, however, sends out peculiar signals to car buyers since the largest subsidy goes to the biggest and thirstiest car, see Table 1.

Table 1. Fuel consumption for three "green" passenger cars and the effect of the new policy instrument replacing 10,000 SEK in governmental cash payback.

	Fuel consumption	Annual circulation tax	5 years exemption from the annual tax leads to the following subsidy	The subsidy correspond to X% of purchase price, 2007
Toyota Aygo ^{a)}	4,5 l/100 km	540 SEK	2700 SEK	2.5% of 111200 SEK
Toyota Prius ^{b)}	4 l/100 km	440 SEK	2200 SEK	0.8% of 252900 SEK
Saab Biopower ^{c)}	9,2 l/100 km	1350 SEK	7650 SEK	2.5% of 288900 SEK

a) TOYOTA AYGO 1.0 VVT-i, Manual, 5 doors, 106 gCO₂/km.

b) TOYOTA PRIUS 1.8 Hybrid, 5 doors, 92 gCO₂/km.

c) SAAB 9-5 2.3t Aero BioPower HP, Manual, Station wagon, 218 gCO₂/km.

The earlier subsidy (10,000 SEK cash payback) applied equally on all "green" cars, but the example above shows that the new subsidy is approximately 3 times larger for a fuel intensive Saab Biopower than for a fuel efficient Toyota Aygo.

From studying the subsidy in relation to purchase price the table shows that the new subsidy is approximately 2.5% of the purchase price for both Saab Biopower and Toyota Aygo but for Toyota Prius, using a more expensive hybrid technology, the subsidy is only 0.8% of purchasing price. That is, new more expensive technologies that have the potential of radically reducing CO₂ emissions have been disadvantaged in the new policy.

Since the annual circulation tax are based on CO₂ emissions energy efficient cars have an advantage, but now with the new policy all “green” cars, no matter fuel intensity, are given five years tax exemption. Thereby the only Swedish policy instrument giving advantages for fuel efficient biofuel cars is omitted. The effect of this new policy instrument has been that large and thirsty biofuel cars are given advantaged over small efficient as well as electrified cars.

Frances report can be downloaded from:

<http://www.chalmers.se/ee/EN/research/research-divisions/physical-resource-theory/personnel/sprei-frances> or send her an email asking for the printed report. Frances’ email address is: fsprei@chalmers.se. Note that the report is in Swedish. The slides from her presentation can be down-loaded from www.alter-motive.org.

2) Speech given by Ingo Bunzeck, ECN the Netherlands, on the development of a user-friendly web-based tool for stakeholders to find suggestions for policy instruments.

Ingo Bunzeck presented his and Bas van Bree’s work on evaluation of policy effectiveness. Stakeholders and/or policy makers might want to know how the introduction of new technologies can be facilitated. If so, the web-based tool, currently under construction in Alter-Motive WP5, can help identifying in which stage those technologies currently are and find out which policy instruments are most effective depending on development phase. Objectives with the web-based tool are (i) to provide policy makers with means to choose right policy for a certain technology/goal, (ii) provide support for decisions on which policies are effective at which stage, (iii) address technology specific barriers and (iv) taking into account contextual factors of successful policies. It should, however, be noticed that the web-based tool has limitations. The tool is based on what has been successful for a certain country for a certain technology and may not be as successful under other circumstances. The tool can give valuable guidance but policy makers need to take other aspects into account.

The slides from Ingo’s presentation can be down-loaded from www.alter-motive.org.

3) Results from questionnaire on successful policy instruments

At the workshop time was set aside for the Swedish stakeholders to fill in the questionnaire on policies which will be used by ECN in WP5. Parts of the results are, however, also interesting to present in this report. Each stakeholder was encouraged to list the two policy instruments that they considered most successful as well as the policy instrument that they would not like to be transferred to other countries. The result is summarized (but not sorted or analyzed) in Table 2.

Table 2. Swedish stakeholders' choices of the two most successful and the least successful policy instruments affecting fuel and vehicle technology choices in the Swedish transport sector.

Anon- omus stake- holder	Successful policy instrument and the stakeholder's comment	Successful policy instrument and the stakeholder's comment	Unsuccessful policy instrument and the stakeholder's comment
1	CO2 tax. Increases the costs of fossil fuels and therefore benefit renewable fuels.	“The pump law”. Forcing fuel stations to offer at least one pump with alternative fuel has resulted in a rapid infrastructure expansion for renewable fuels.	-
2	CO2 based yearly vehicle tax. Such general taxes are easy to understand and accept. Benefits low-CO2 emitting vehicles.	Congestion fee. Reducing the number of cars in main cities. Promotes “green” vehicles by exemption from the fee.	“The pump law”. Fuel stations that can't afford investing in a pump for alternative fuels are forced to close down. This has already happened small stations on the country side.
3	Clean vehicle definition and benefits associated to the definition. Clarity, of what kind of car the society wants, opens up for actions also within the car manufacturers.	Purchasing requirements. National authorities are important car buyers and can create initial markets.	Clean vehicle definition since it is not progressive (not strengthen fast enough). If updated every year municipalities could continue to subsidize parking and congestion fees etc.
4	Reduced taxable value for an individual driving a company car ^{a)}. Economical policy instrument steering towards “green” company cars. Creates a push on effective but expensive new technology.	CO2 tax. Gives renewable fuels, exempted from CO2 and energy tax, an advantage compared to fossil fuels.	-
5	Reduced taxable value for an individual driving a company car ^{a)}. The majority of new sold cars are company cars. The level of subsidies can be flexible. Currently the taxable value on biogas cars is reduced by 40%.	-	-

6	Financial support for R&D. To speed up technology developments	Long-term rules. Industry innovations are more likely to occur when long-term goals are set for GHG-emissions and efficiency.	-
7	Reduced parking fees for “green” cars. People can justify the higher cost of purchasing “green” cars by the lower cost of parking.	Reduced taxable value for an individual driving a company car ^{a)}. The more “green” cars used by companies, the more of these cars will later come out on the second-hand market for private owners.	“The pump law”. It makes the competition between fuels (ethanol and biogas) uneven. The pump law must have been a result of the ethanol lobby organisation.
8	Reduced parking fees for “green” cars. Increases the number of eco-friendly cars.	“The pump law” Increases the number of fuel stations that supply alternative fuels.	-
9	CO2 tax. Society points out what is not wanted rather than points at specific technology solutions.	Research funding. Important to not point at specific technology solutions in advance instead keep the funding open for a broad range of technologies that can reduce GHG emissions.	Reduced parking fees for “green” cars. Not a sustainable subsidy. Increases the number of cars in city and will soon be too expensive for municipalities.
10	CO2 tax. Steers towards renewable fuels.	Cash payback when buying “green” cars. The 10 000 SEK in direct cash payback has been extremely successful in Sweden. Does however only apply to private buyers and not company cars.	“The pump law”. It was said to be technology neutral but only an ethanol infrastructure was built.
11	Reduced taxable value for an individual driving a company car ^{a)}. This economical policy instrument makes a big difference when choosing between “green” or conventional company car.	Reduced parking fees for “green” cars. Free parking makes life so much easier.	“The pump law”. A drawback for the entire alternative fuel acceptance.
12	Reduced taxable value for an individual driving a company car ^{a)}. Increases the numbers of “green” cars on the market.	Tax exemption on biofuels. Increases the use of biofuels.	Policy instruments steering towards biofuels without taking efficiency into account. Too many ethanol SUVs on the roads.

13	Clean vehicle definition and benefits associated to the definition. A clear definition facilitate for policy makers. Can increase the use of new technologies. Can create niche markets.	Low blending of ethanol in gasoline. Reduces CO2 emission at low cost without the need of new infrastructure or vehicle technologies. Also stimulates investments in biofuel production.	-
14	Local initiatives. For example Biogas West who has created a biogas market.	Small scale projects. For example Skaraborgsgas who has started local biogas production from manure and waste.	-

a) In Swedish this is called “förmånsvärde för tjänstebilar” (“förmån”=benefit, “värde”=value, “tjänstebil”=company car) meaning that if you have a company car which you can drive privately it is seemed as a benefit (comparable with salary) that you have to pay tax for. The more expensive car the higher the “förmånsvärde”. This is a well established system in Sweden but may not occur in other EU member states.

4) Debate: Swedish stakeholders’ views of policy instruments

One important part of the workshop was to get the Swedish stakeholders to brainstorm around all policy instruments that have been tested in Sweden/EU. List them and discuss/comment on their advantages and disadvantages. They were also encouraged to think about the future on what kind of policy instruments they would like to see and give arguments for their choices. The participants were divided in small groups and as a support in their brainstorm they were given the following matrix.

Policy matrix for CO₂ reduction in the transport sector

	Fuel	Vehicle	Traffic
Regulation	Fuel quality regulations	Vehicle standards	Zoning
Bans	Bans on certain fuels	Removal of the most polluting vehicles	Restricting traffic at certain times or zones
Price (tax)	Fuel taxes	Taxes or subsidies on vehicles	Tariffs for public transport
Information	Green labelling on fuels	Green labelling on vehicles	Green labelling on transportation services
Tradable emissions permits	Marketable permits	-	-
Public provision	-	-	Infrastructure investment (e.g. railways)

Source: Sterner, 2003, p.274

At the final full group discussion the small groups presented which policy instruments they had discussed and all participants had the possibility of filling in with their arguments. This full group discussion was taped and a transcript (in Swedish) can be found in Appendix 1. Swedish stakeholders' views on discussed policy instruments are to a large extent reflected in Table 2. Here is, however, a more detailed description on one of the most discussed policy instrument, "the pump law".

Regarding current Swedish policies, the majority of the stakeholders had difficulties to hide their irritation for the policy called "the pump law". This policy compels all fuel stations to offer at least one pump with alternative fuel. This has resulted in a rapid infrastructure expansion for renewable fuels, which was the aim of the policy, but vehicle manufacturers, fuel producers as well as fuel station owners are very disappointed in how the law was designed. The law was said to be technology neutral meaning that the government did not interfere in the fuel station owners' decision on which fuel was chosen. When the law proposal was sent out for consideration to the Swedish stakeholders a lot of comments were made on this ambition of technology neutrality and the government was informed about that this might lead to distorted competition. The current irritation might come from the fact that the government did not meet the comments and did not invite the stakeholders for a constructive discussion before the law was implemented. The pump law was implemented 2006 and has resulted in that some fuel stations (most often on the country side) that couldn't afford investing in a new fuel pump has been forced to close down. Since investing in a pump for ethanol costs about 30 000 EUR and a pump for biogas costs about 300 000 EUR, the majority of the new pumps turned out to be ethanol pumps.

The petroleum industry points out that the Swedish government usually pays for important infrastructure developments, but this time it was said that the fuel industry should take their responsibility as well as the expenses for building up an infrastructure for alternative fuels. It has been extremely costly and it might take long before any revenue. The petroleum industry says that they could have used the money for many other important investments in environmental improvement areas.

When the petroleum industry got the commission to invest in alternative fuel pumps it resulted in that some villages were judged too small to motivate the cost of investing in a new fuel pump. As a consequence these fuel stations were closed down. This has in many cases lead to that local politicians have complained to the government and as a result the government is now giving out financial support to these villages so they can build a pump for alternative fuels (and thereby keep their local fuel station). The fact that some fuel station owners have received governmental support and others have taken the cost is another breeding ground for frustration. It again comes back to the question of why the government did not listen and took the dialogue before the law was implemented. The governmental support that is now handed out could have been spread more equally.

The Swedish stakeholders agreed on that they want other EU member states to learn from the Swedish governments' mistake. How they have handled (or rather not handled) the feedback from the industry regarding costs, competition, technology neutrality etc. One of the participants also called the pump law for an enormous destruction of capital when many thousands fuel pumps are built without customers for the fuel. The majority of the stakeholders agreed on that the overwhelming dissatisfaction that arose, from implementing "the pump law", has lead to a huge drawback for the entire alternative fuel acceptance, in Sweden.

Regarding the future all participants agreed on that the definition of a “green” car is extremely important. Many local benefits for “green” cars give rise to questions, e.g. why SUVs with a hybrid engine can have free parking and be exempted from congestions fees when it emits more than small conventional cars. Also the more “green” cars applying for the benefits, the higher the cost for the municipalities, leading to that the subsidies sooner or later must be phased out. If the clean vehicle definition instead was progressive and yearly strengthen up, the stakeholders were firmly convinced that it would solve many problems. A progressive definition could prolong the subsidies and it would also send clear signals to the car manufacturers.

Conclusions drawn and recommendations that came out from the discussion are summarized in Section F and G.

F. Overall conclusions

From the discussion on policy instruments affecting transportation fuels and vehicles the following three main overall conclusions are drawn:

- The definition of a “green” car is extremely important. If the definition can be yearly strengthen, progressive, municipalities can continue to subsidize parking and congestion fees over a longer period. This would also lead to that car manufacturers would continue to improve “green” cars, e.g. towards increased energy efficiency.
- The pump law has lead to frustration and irritation. It was said to be technology neutral but since investing in a pump for ethanol costs about 30 000 EUR and a pump for biogas costs about 300 000 EUR, the majority of the new pumps turned out to be ethanol pumps. The petroleum industry has taken a huge cost, prioritizing necessary and when the government later gives support to some fuel station owners, and not to others, frustration grow.
- Sweden cannot develop a unique system that is not compatible with the rest of Europe. Drivers have to be able to fuel their cars also when going abroad. Due to production cost reasons, car manufacturer can neither develop country specific vehicles that differ too much from each other.

G. Recommendations for policy makers

The following points are taken from the Swedish stakeholders' notes during the small group discussions regarding FUTURE policy instruments. All participants agreed on that future policy instruments should

- be as technology neutral as possible.
- be stable over long-term time horizons (difficult to get investors if rules are changing).
- steer towards energy efficiency no matter fuel and technology (e.g., continue to strengthen the EU emission policy on a maximum gram CO₂ per km).

The recommendations were then divided into two tracks where one was focusing on that we cannot wait for the very best solution but need to make radical changes now. That the society should have the courage to take a decision and stand by it even if it later turns out to be a second best solution. Future policy instruments should then

- be very clear with the goal.
- stimulate a quick phase out of old cars (e.g., introduce a scrapping premium, take away current policy that cars older than 20 years are exempted from annual circulation tax).
- create niche markets (e.g., purchasing requirements for authorities).
- stimulate radical different innovations. Technologies that have the potential of replacing the entire use of gasoline and diesel.

The other track was more focusing on doing the changes as thoughtful as possible. Future policy instruments should then

- be transparent and progressive (easy to adjust).
- be as compatible as possible with other EU member states.
- be carefully tested in models before implemented (to avoid unwanted side effects).
- less focusing on specific new technologies. We have no idea what has not yet been invented.
- focusing on what we don't want in society (e.g., introduce a much higher cost on fossil fuels) and use the revenues to stimulate a broad range of innovations.
- encouraging a change towards lower transport demand or less amount of vehicles (e.g., allow longer vehicles in road freight sector, steer towards more compact cities, improved public transport systems, car pools etc.).
- avoid dictating an increased use of biofuels.