Successful examples of market incentive projects and innovative applications

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Application description
Injecting pre-treated biogas into an existing gas grid, used for distribution of natural gas. This biogas can be reserved by costumers who would like to fuel their vehicles with the most environmentally friendly vehicle fuel, biogas.

What makes the application innovative?
Using the existing infrastructure for natural gas to distribute biogas as a fuel for vehicles.

Target group(s)
The target group for injecting biogas into an existing gas grid is biogas plants that upgrade their produced biogas. A basic condition is that there is a short distance to the gas grid.

Existing example of the application in use
Biogas is being fed to the gas grid at biogas plants in Helsingborg, Laholm and Bjuv in the south of Sweden.

The applications potential
The techniques potential is large. All biogas produced close to a gas grid can be distributed in the grid to costumers using it as a vehicle fuel.

Participants/Entrepreneurs
Gas net owners, owners of biogas plants and upgrading facilities.

Contacts
Owe Jönsson, E.ON Gas AB
Staffan Ivarsson, E.ON Gas AB
**Application description**

By using a mixture of methane and hydrogen (Hythane®) in existing commercial buses, the fuel consumption have been reduced with 20-30 percent. Together with a reduced carbon content in the fuel a total reduction of CO₂-emissions by approximately 35 percent is accomplished. The drivability of the vehicles has also been improved through the hydrogen addition.

**What makes the application innovative?**

The use of hydrogen with satisfaction in the existing transport system is a beginning for a market for hydrogen. Is this the first step towards “the hydrogen society”?

**Target group(s)**

Primary owners of vehicle fleets, where the vehicles are heavier and use engines based on spark-ignition.

**Existing example of the application in use**

During a hythane®-project two buses in Malmoe covered 160 000 km without operational problems caused by the hydrogen addition. The project finished in December 2005, but the buses have continued using a blend of natural gas and hydrogen. There are also plans to convert a share of the buses in Malmoe to run on hythane®

**The applications potential**

Using hythane® in buses can to a great extent replace fossil fuels in the transportation system.

**Participants/Entrepreneurs**

E.on, Lund University’s Faculty of Engineering (LTH), public-transport authority of Skåne (Skånetrafiken), Swedish Gas Centre (SGC), the Engineering firm Ingemar Carlson, Carl Bro AB, Raufoss Alternative Fuel Systems, Volvo Technology AB and Volvo Aero AB

**Contacts**

Owe Jönsson, E.ON Gas AB (former SGC)
Application description
Digestion of “new” biomasses such as seaweed and biomasses from ditch banks. This means that another stream of substrates contributes to an increased potential for biogas production. Digesting these new biomasses in a biogas reactor can also solve problems with unwanted “natural waste” from the environment.

What makes the application innovative?
The use of new sources of biomass for digestion and production of biogas.

Target group(s)
Primary municipalities and companies who operates biogas production plants.

Existing example of the application in use
The waste company SYSAV, is carrying out a project where seaweed is digested to produce biogas.

The applications potential
No studies have been done in this field within the SEA region.

Participants/Entrepreneurs
The idea to crop seaweed and biomasses from ditch banks is not used commercial, so there are no entrepreneurs on the market for this yet.

Contacts
SYSAV Utveckling AB (a associated company to one of the regional waste management companies)
www.sysav.se
Application description

- Build up biogas upgrading plant within an existing sewage plant.
- Used basic material: organic waste.
- Feed in the upgraded bio-methane into the natural gas distribution system of Leoben.
- Capacity: 100 – 150 m³/h bio-methane

What makes the application innovative?

- New technology based on chemical (absorption) process
- Largest and first plant within Styria

Target group(s)

- The bio-methane will be feed in into the natural gas distribution system and can be used as fuel (CNG) as well as for heating (natural gas burner).

Existing example of the application in use

The chemical absorption process is normally used for industrial processes (e.g. cleaning of natural gas) and not for upgrading of biogas to bio-methane.

The applications potential

- Bio-methane, as a CO2 neutral gas, can substitute or supplement natural gas in different uses
- The bio-methane will be feed in into the natural gas distribution system and can be used as fuel (CNG) as well as for hating (natural gas burner).

Market actors/Entrepreneurs

- Natural Gas service provider (Steirische Gas-Wärme GmbH)
- Gas grid operator (Stadtwerke Leoben)
- Operator of the sewage plant (Reinhalteverband Leoben)
- Scientific partner
- Machinery and equipment manufacturer

Contacts

Norbert Machan (Project Manager Biogas), Steirische Gas-Wärme GmbH, Gaslaternenweg 4, A-8041 Graz
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**Application description**

Ecotransit Ltd. (a subsidiary of Organic Power Ltd.) are in the final planning stages for the installation of Wincanton's first CNG refuelling facility which will also be the UK’s first facility that utilises bio-methane produced from organic waste. The facility will be primarily based on a familiar CNG set up, incorporating two gas compressors, high pressure CNG storage banks and an electronic fuel dispenser. Access to the facility will be controlled by a number plate recognition system. The facility differs from the norm in that the inlet gas will be supplied from two sources, the existing natural gas network, and an additional bio-methane supply brought to site in purpose built storage units, filled from Organic Power’s own Anaerobic Digester Plant, a short distance from the facility. As well as refuelling a small local fleet, the facility will be used to demonstrate what is possible to potential customers wishing to opt for a renewable and greener alternative fuel.

**What makes the application innovative?**

The facility will be the first in the UK to use Bio-Methane as a vehicle fuel, which EcoTransit hopes will be the first step to 100% Bio-Methane refuelling facilities.

**Target group(s)**

Ecotransit have targeted a small number of local companies including organic food delivery and chilled food distributors to be the first to use the facility as well as refuelling its own vehicles. Future target areas will include companies that produce large amounts of organic waste, who would benefit from having their own on site anaerobic digester, utilising the biomethane produced to fuel their own and third party vehicles. As part of this initiative Organic Power has set up a management team whose task is to identify and initiate large scale projects utilising anaerobic digesters to provide a solution for a company’s organic waste output, which in turn would give the potential for a biomethane refuelling facility.

**Existing example of the application in use**

There are no existing CNG refuelling facilities that utilise biomethane in the UK, but the small number of facilities that utilise fossil natural gas have been operating with no major issues for over ten years.

**The applications potential**

There are countless companies in the UK producing massive amounts of organic waste, each of which provide a potential site for the production of biomethane. As well as catering for the large waste producers, one of Organic Power’s aims is to develop a digester that is affordable for the smaller business / farm and to build a network of organic waste producers each having their own digester. The biogas produced by these sites would be collected and delivered to a central site, having its own gas upgrading and refuelling facility.
It was estimated that the UK produced 36 million tonnes of municipal waste in 2004 / 2005, [http://www.wasteonline.org.uk/resources/InformationSheets/WasteDisposal.htm](http://www.wasteonline.org.uk/resources/InformationSheets/WasteDisposal.htm) which if converted to biogas by anaerobic digestion would produce 3.6 billion m³ of gas. (based on 100 m³ of bio-gas produced from 1 tonne of MSW - SEPA 2003 report). This equates to 1.64 billion Kgs of compressed bio-methane providing enough fuel for the annual consumption of 73,565 dual fuel heavy goods vehicles covering a distance of 75,000 miles per year or 1,368,000 cars covering a distance of 12,000 miles per year.

**Market actors/Entrepreneurs**

Organic Power Ltd., Ecotransit Ltd. - Project Initiators
Blue Mountain Foods, Riverford Organic Food Deliveries Superplants - Customers
Energy Savings Trust - Government Funding
Compair, Gas Container Services - Equipment Suppliers.

**Contacts**

Christopher Maltin - Organic Power Ltd.
Susan Moore - Organic Power Ltd.
Glenn Mercer - EcoTransit Ltd.
Application description

A home re-fuelling station is an individual device for fuelling an NGV in the garage or carport. Its concept is the same as the one at regular fuelling stations and rather simple: The device is connected to the natural gas grid. A small compressor (running on electrical power) compresses the gas and fills the storage tank of the NGV. Since the compressor is rather small, filling the storage tank of the NGV usually takes several hours (depends on the mileage of the car and the actual use).

What makes the application innovative?

The main innovative character of the application is the convenience character. It allows any home owner with access to the natural gas grid to easily refill her/his NGV – independent from the distance to the next fuelling station. In areas with low fuelling station coverage (with natural gas pumps) this might become a strong push for NGVs in these areas.

Target group(s)

Individual home owners, commuters with significant distance to the next fuelling station Generally, fleet owners (taxis, etc.) are also a target group, however due to the low compression capacity, one device per NGV is needed.

Existing example of the application in use

The local Berlin gas supply company GASAG has undertaken tests through their service company Begatech.

The applications potential

> 75 % of all commuters into & out of Berlin fit the target group (technical potential)
> 75 % of the SMEs fit into the target group (technical potential)

Actual deployment depends strongly on their willingness-to-pay for the application and the running costs (gas & electricity) and the opportunity costs for not having to drive to a re-fuelling station.

Market actors/Entrepreneurs

Local gas supply company (GASAG, Berlin)
Application provider (phill, Canada)

Contacts

Mr. Markus Buggisch, GASAG, mbuggisch@gasag.de
Application description
The large-scale municipalities in cooperation with “Autotrade” Inc. (car operating company), the gas providing companies initiated a broad information campaign for popularization of sustainable mobility in 2007. The campaign was promoted for convincing the local communities towards sustainable use of RES in places where gas filling stations were constructed. The municipalities were engaged to provide areas for implementation of the campaign activities and the local gas distributors developed and disseminated the promotion materials. The campaign itself offered the possibility of 10 reservoirs free of charge gas filling for each newly bought Volkswagen Caddy.

What makes the application innovative?
The innovative approach is based on the environmental mobility mode and the economic profit of the consumers. The private company, “Autotrade” Inc. promoted the purchase of the new methane driven Volkswagen Caddy in cooperation with the gas filling companies. It is an innovative application for the region as it encourages the environmental and economic awareness of the end consumers.

Target group(s)
The target groups of the application encompassed the local business (gas filling, car selling companies) and the potential customers of the innovative gas driven cars.

Existing example of the application in use
Due to the information campaign the society has been shown the usage of the alternative fuels i.e. the methane. Currently the action mostly applies to the taxi drive companies and other big car companies like speditor, transportation companies, etc.

The applications potential
The application is available mainly in the cities with built gas filling stations (24 cities in total for the country). It is necessary a strong state policy for the substantial petrol-methane transformation in the transport sector which could is to consider the people’s attitude toward the bio-gas as alternative fuel to be implemented at national level.

Market actors/Entrepreneurs
- State institutions: the Ministry of transport, the Ministry of regional development and public work
- Nationally and locally presented private companies: Overgas, Gastech
- NGOs operating in the Bulgarian Black Sea Region: the Black Sea Regional Agency for Energy Management (North region), the Bourgas Regional Agency for Energy Management (South region

Contacts
Bourgas Regional Agency for Energy Management
Application description

The Biogas Plant in Kalmar was built in 1998. The plant is dimensioned for production of gas from 50 000 tons organic disposal such as offal and dung. Today the plant receives approx. 25 000 tons. The digestion is done Thermopile at approx. 55°C. The Biogas is collected in a Gasometer. The production today in Kalmar Biogas plant is approx. 1.1 mil Nm³ Biogas, approx 67% methane.

Together with the public cleansing plant is the production 1.7 milj Nm³ Biogas. The gas is used for internal heating 41% and heating of Kalmar Hospital, 45% and 14% for vehicle gas, 200 000 Nm³. The rest product, Bio dung is well suited for use on arable land. The Bio dung from Kalmar is certified according to SPCR 120. The equipment at the plant is limiting the production of vehicle gas.

What makes the application innovative?

The Production of Biogas that after upgrading can be used as vehicle gas and thereby decreases the use of fossil fuel.

Target group(s)

The Local Transport Authority’s buses.

Existing example of the application in use

Presently some vehicles in and around Kalmar are using Biogas. The development is hindered as the filling station only accept cards issued by Kalmar Vatten AB. This makes it impossible for traffic that is passing through to use the filling station.

The applications potential

How extensive is the potential for disseminating the application? Which impact on the use of gas as a fuel for vehicles could the full potential result in?

Market actors/Entrepreneurs

The construction and extension of the plant have been initiated and conducted by Kalmar Vatten och Renhållning AB without external support.

Contacts

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Project description
In Kristianstad, a medium sized municipality in the south of Sweden, two biogas plants (Waste water and Co-digestion) supplies a local gas grid with 47 GWh biogas per year. About one third of the gas is pre-treated (upgraded) to be used as fuel for vehicles. The rest of the gas is burnt to produce district heating. Some of the pre-treated biogas is exported to nearby cities where there is no local production of biogas or access to natural gas to supplies vehicles with fuel.

Aim and target
Using local sources of biomass to produce the most environmentally friendly fuel for vehicles and heat production.

Project outcome (measurable, in figures)
- two biogas plants with a yearly biogas production of 47 GWh.
- 15 GWh is pre-treated and used as fuel in vehicles
- 2 biogas filling stations in Kristianstad
- all the city buses in Kristianstad are CNG-buses
- a number of personal cars an light transport vehicles fuelled with gas

Success factors
The main factors which are responsible for the success with the biogas project in Kristianstad are the fact that there has been a successful forward-looking work with environmental issues in the municipality with political support.

Barrier/obstacles
The interest in buying NGVs has not fully penetrated the broad population of the municipality. One obstacle that can be identified is the car resellers who have not shown the interest in selling NGVs.

Participants
The municipality Kristianstad, it’s administrations and the municipal companies C4 Teknik and KRAB. Farmers in the surroundings of Kristianstad and the regional bus company Skånetrafiken.

Contacts
Lennart Erfors, Municipality of Kristianstad, lennart.erfors@kristianstad.se
http://www.kristianstad.se/templates_custom/PageInternational___11450.aspx
Project description

Biogas Syd is a regional collaboration project/network for those with an interest in biogas (business world, organisations and government authorities). The purpose with the project is to develop all perspectives of the subject area, from biogas production to end use of the produced biogas. The project works with the biogas matter within the business world, environment, techniques, economy, agriculture and information. There are also connections to research. The project board assembles representatives from all areas (business world, organisations and government authorities), both on local and regional level.

Aim and target

The project participants will work together towards a common goal, an increasing demand and production of biogas. This will serve economic growth and the environment as well. A prerequisite for this development is a wider knowledge in the biogas area.

Project outcome (measurable, in figures)

At today’s date, there are 17 active participants in the network. The participants are private companies, a public authority, a county council, municipal companies, one university, two interest organisations and one regional energy agency. During the passed years, there have been several courses and biogas seminars arranged by Biogas Syd. Increasing the knowledge in all aspects of the field of biogas is one of the targets with the project. Biogas Syd has also taken part at exhibitions during the past year. The knowledge of biogas in the region is increasing, but the outcome is impossible to measure.

Success factors

The function of Biogas Syd has been to act as a venue for participants from the different parts of the biogas area. At this venue knowledge and experience has been transferred between participants from different areas of the biogas area. This fact is the main success factor of the project.

Barrier/obstacles

Stakeholders have had difficulties to see their part in, and potential profit within the subject area. The financing has therefore been a barrier for the development pace of the project.

Participants

Region Skåne, LRF Skåne, E.ON, Vågverket, Skånetrafiken, NSR AB, Malmberg Water AB, Kommunförbundet Skåne, Hässleholms kommun, Hushållningssällskapet Kristianstad, Malmö Stad, Energikontoret Sydost, Lunds Energikoncernen AB, Öresundskraft, LTH Bioteknik

Contacts

Gabriella Eliasson, project manager, gabriella.eliasson@biogassyd.se
Anna Hansson, fertilizer and biogas in general, anna.hansson@biogassyd.se
Kjell Christensson, biogas connected to agriculture, kjell.christensson@biogassyd.se
Johan Rietz, utilisation of biogas, johan.rietz@biogassyd.se
Mårten Johansson, marten.johansson@biogassyd.se
**Project description**
Cars driven by gas are free to park in four cities within the SEA-region. At a low cost (5-20 €) one can get a parking license, connected to one car, which is valid in one city for one year. Those who drive cars with less negative environmental effect, according to a definition, can attain the licence.

**Aim and target**
The target of the system with free parking for environmentally friendly cars is to increase the number of cars powered by renewable fuels, or fuel-efficient cars with CO₂-emissions below 120 g/km

**Project outcome (measurable, in figures)**
There has been a big increase in the sales of environmentally friendly cars. However, how big part of the increase that can be related to the “free parking system” is hard to tell. No evaluation of the “free parking system” has been carried out yet.

**Success factors**
Because there has not been any evaluation of the system, it is hard to tell which its success factors are.

**Barrier/obstacles**
There is no national definition for environmentally friendly cars. The result is that the definition of environmentally friendly vehicles differs between different regions and cities, which can result in difficulties for car buyers.

**Participants**
The municipalities, Malmö, Kristianstad, Ystad and Helsingborg.

**Contacts**
Mårten Johansson, Skåne Energy Agency, marten.johansson@kfsk.se
Project description

The idea was to present different NGVs and other alternative fuelled and environmentally friendly vehicles to the broad public for information and awareness raising. The green car salon was organized in the Styrian community Weiz. People should get the chance to inform about NGVs, talk directly to the car dealers, immediately test drive the desired vehicle along a certain route and compare the vehicles regarding driving comfort, noise etc. All regional car dealers were invited to present a vehicle. Additional to the car exhibition the participants of the green car salon could get general information about NGVs and about the fuelling station network in Styria. In total there were 17 companies presenting more than 25 vehicles (serial CNG cars but also conversions). Additional eye catchers (e.g. biomethane Pinzgauer, CNG Rally Golf) to raise public interest were placed.

Aim and target

- Increase the number of NGVs in Austria
- Show fuelling station network in Styria
- Information and advice from car dealers
- Test drive possibility
- Press conference
- Awareness raising
- Networking and follow up events

Project outcome (measurable, in figures)

Even though the event was in the mid of October, several hundred visitors were interested and took the chance to get informed at one event. Famous politician opened the event.

Success factors

One major success factor for this event was the test drive possibility and that all cars were shown together at one spot. NGV interested people did not have to go to each car dealer separately.

Barrier/obstacles

One obstacle was the motivation of the car dealers. Some said they do not have a vehicle. At the end it was nearly possible for every car dealer to organize a vehicle for the exhibition. As the green car salon was not in a big city but in an urban area it is very important to place several announcements and invitations as well as to distribute flyers so that the event will be well attended.

Participants

GEA organized the event together with the community of Weiz and the Weizer Stadtmarketing.

Contacts

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Project description
Co-operation between a fleet operator, a car importer and an energy supplier to make a demonstration project about the use of NGVs. The Austrian Post AG has been attracted by the Steirischen Gas-Wärme to use gas driven cars for postal delivery. Furthermore VW Nutzfahrzeuge also participated on this project. The project started in June 2007 – were the first 10 cars have been put in operation on 5th of October – and will take until end of 2009.

Aim and target
- Increase the numbers of NGVs in the Austrian region
- Create a show case
- Accompanying measures (e.g. press activities)

Project outcome (measurable, in figures)
- The Austrian Post AG ordered 50 gas driven cars (VW Caddy) and put already 10 of them in operation (Graz). Begin of 2008 further 10 cars are going to put in operation in the region of Styria.
- Good press coverage

(The detailed figures of the outcome will be available after the test phase.)

Success factors
- Ecological and economic advantages of gas driven cars
- The intention of the fleet manager to use ecologically friendly cars.

Barrier/obstacles
- Costs and delivery time of the cars

Participants
- Österreichische Post AG
- Porsche Austria GmbH – VW Nutzfahrzeuge
- Steirische Gas-Wärme GmbH

Contacts
Heimo T. Blattner (Project Manager NGV / CNG), Steirische Gas-Wärme GmbH, Gaslaternenweg 4, A-8041 Graz
Mail to: heimo-t.blattner@e-steiermark.com
Gas supply Infrastructure

There is a well established natural gas infrastructure in the UK, varying in pressure and quality. Older parts of the network suffer from water ingress which lead to expensive gas drying prior to use for vehicle fuel.

CNG Stations

There has been around 25 to 30 stations in the UK but at present there are around ten CNG facilities with a mixture of private and public use, varying in throughput from 21m3/hour to 450m3/hour. All sites are served direct from the grid. Stations are gradually closing as the core user’s vehicles come to the end of life and no replacements are available. Additionally homefill units numbering fifty plus were installed throughout the country but again due to vehicle availability the majority have been decommissioned.

Vehicles

Vehicles historically using the sites range from forklift trucks, through to cars and light commercials and on to heavy commercial vehicles and buses. The current vehicle availability is minimal with no passenger vehicles and limited light and heavy commercials and no buses. There are a number of enquiries from people wishing to use alternative fuels but the lack of vehicle availability puts an end to their hopes.

Biogas

There are no current vehicle refuelling facilities utilising bio-gas in the UK, but Organic Power will shortly be opening the first which will use a proportion of bio-methane. The main use for bio-gas in the UK is electric generation and CHP.

Market Incentives

To date UK market incentives have been restricted to government grants and reductions in duty and charges which have not stimulated the market for alternative fuelled solutions.

UK incentives for alternative fuels are as follows

1. Road Fuel Duty Reduction - Historically operators were uncertain about the length of the period the reduction would last for and were not comfortable making decisions on new vehicles with the possibility of duty on alternative fuels rising within a few years. Additionally, within the UK, bus operators benefit from the Bus Service Operators Grant which provides duty rebates on diesel fuel, in effect negating any duty benefit they would gain from running alternatively fuelled vehicles.

2. Government Grants - Grants were available to operators for a percentage of the add on cost of purchasing alternatively fuelled vehicles. There was, at times, a lot of uncertainty regarding the availability, and changes to the system often made operators delay or eventually decide not to go ahead with the purchase of AF vehicles. This uncertainty continued and eventually the grants for purchasing AF vehicles were removed in favour of aid for driver training and similar schemes.

3. London Congestion Charge Exemption - This incentive did create a considerable interest especially from courier companies, who had a large number of vehicles travelling into the congestion zone on a daily basis. Unfortunately this exemption has now been replaced by the CO2 emissions related scheme. The last day for registration to the old scheme will be February 2008 and the Alternative Fuels exemption for existing vehicles registered to the scheme will cease in July 2009.
Project description

Starting in 2000, the project “1,000 eco-cabs for Berlin” has aimed at supporting the purchase of gas-driven vehicles for taxi fleets and driving schools. The incentives were provided until the end of 2006 and consisted of purchasing co-finance through a demonstration fund from the Federal Ministry for the Environment, Nature and Nuclear Safety and a fuel promotion by the local gas supplier GASAG.

Aim and target

Through the project TUT, the local government was aiming at pushing more alternative transport fuels into the market. Not only was this based on environmental goals but also targeted at reducing the import dependency on fossil fuels for transport. The TUT initiative in particular was designed to contribute to the reduction of particulate matter and nitrogen oxides in the city of Berlin. The target of the project was to increase the number of gas-driven vehicles in Berlin by 1,000 in 6 years. Stimulate the demand for gas at fuelling stations, thus extending the supply. Stimulate the market for NGV production, thus extending the range of cars being offered by suppliers.

Project outcome (measurable, in figures)

Status as of 31.12.2006:

- 976 (888 taxis, 88 cars for driving schools) have been purchased through the purchasing scheme leading to a total market volume of around 2,500 NGV in Berlin city.
- The density of fuelling stations offering natural gas has increased to around 13 in Berlin city.

Success factors

Interest along the whole value chain: vehicle producers, consumers (drivers), gas suppliers.
Strong political support and media coverage
Gas and fuel prices (opportunity costs)
Financial support scheme from the government
Continuous expansion of the infrastructure (filling stations)

Barrier/obstacles

(German) Customers were/are hesitant to buy NGV vehicles (cultural barrier)
Lack of existing infrastructure (natural gas filling stations)

Participants

The Federal Ministry for the Environment, Nature and Nuclear Safety (state)
The Berlin Senate for Urban Development & the Berlin Senate for Economics (local policy makers)
Verbundnetz Gas AG (gas wholesaler)
e-on Ruhrgas (gas supplier)
GASAG (gas supplier)

Contacts

http://www.tut-berlin.de
Any of the participants stated above.
Project description

The government of the Czech Republic approved in 2005 the support program for introduction of natural gas as alternative fuel in transport. The ultimate goal of this initiative is to increase, in line with the EU long-term goals, the share of compressed gas on the motor fuels consumption in the country by the year of 2020 at 10 %, at minimum.

To implement the Program the government obliged itself to:

- conclude a voluntary agreement with natural gas distribution utilities;
- stabilize the level of excise tax for compressed and liquefied natural gas as a motor fuel at the minimum level as prescribed by the EU regulations;
- try to preserve a financial support provided since 2004 to public transport operators for procurement of NG-driven buses beyond 2007 and
- carry-out a technical-economic analysis assessing usage of all possible alterative fuels in transport in the conditions of the Czech Republic.

The voluntary agreement was concluded in 2006 and on the one hand obliged gas utilities to construct a certain minimum number of gas filling stations in the country and also to provide marketing, financial as well as technical support for accelerated penetration of natural gas-driven vehicles, primarily in public transport.

The State on the other hand promised to actively cooperate on the successful implementation of the Program providing financial backing (as mentioned above) and also taking the lead in introduction of NGVs in fleets of state organizations.

Furthermore, in late 2006, also the second obligation was realized by approving temporary exemption from excise tax for NG if used as a motor fuel (see below).

Aim and target

The aim of the initiative is to accelerate natural gas use in transportation and to reach by 2020 the minimum 10 percent share of CNG on total motor fuels consumption. The public sector should on the one hand help in increasing the number of NGVs, the gas utilities on the other are obliged to take the responsibility for extension of necessary infrastructure (increasing the number of filling stations around the country).

Project outcome (measurable, in figures)

If the ambitious Program is implemented as planned, at least 100 gas filling stations and about 300 thousand cars running on CNG are estimated to be in operation in the country by 2020.
Success factors
Among the factors which are seen as crucial to the successful implementation of the program are primarily introduction of sufficient financial incentives which will secure a better economic efficiency of natural gas-driven cars compared to conventional ones.
For this purpose, following the stipulations of the Program, there has been approved by the Government and consequently Parliament in 2006 the amendment to the Act on taxation of energy products introducing from January 1, 2007 no excise tax on natural gas if used in transport. This exemption will remain valid till 2012 after which the tax will gradually grow to reach in 2020 once again the minimum level as prescribed by the Council Directive 2003/96/EC (2.6 EUR/GJburnt).

Another financial support is planned to come from the State program for modernization of bus fleets of public transport operators, and also from the State program for support of energy efficiency and renewable energy sources use. The precondition is the re-notification of both of them by the EC as they are partially in contradiction with EU regulations limiting state support.

Barrier/obstacles
One of the main obstacles is the higher purchase price of CNG cars in comparison with conventional petrol- or diesel-based cars. But while in case of passenger cars or LDVs the additional procurement costs of a CNG variant can be repaid from savings in fuel costs after driving 80-100 thous. kilometres, in case of buses and HDVs, it is not usually realizable during the whole expected lifetime (due to a higher fuel consumption among other). Therefore, a further financial support is necessary in order to persuade the car owner(s) to prefer an NGV-type.

Participants
On behalf of the gas utilities: RWE Transgas, all 7 regional distribution companies, and Czech Gas Association.

Contacts
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Project description

At the beginning of 2007 the Natural Gas Vehicle Association was established in Lithuania. Later, on 11-12 June, there was organised the meeting for alternative fuel used for transport. This meeting was organised by Klaipėda municipality, JSC “Klaipėdos keleivinis transportas” (public transport of Klaipėda), Lithuanian Innovation Centre and by the Technical Assistance Information Exchange Instrument of the European Commission (TAIEX).
Director of JSC “Autoideja” Mr. Laimonas Dapšys was presented information about natural gas used for transport perspective plan in Lithuania.

Aim and target

The Lithuania has enough good outspread of the natural gas network (Annex 1). This circumstance takes a good opportunity for development of gas driven market – compressed natural gas and biogas fuelled vehicles.
According to Lithuanian Sustainable Development Strategy Lithuania commits to increase the usage of alternative fuels not less than 15 % of all fuel used by road transport by 2020.

Project outcome (measurable, in figures)

In near future the Natural Gas Vehicle Association is planning to build about 5 natural gas filling station in Lithuania. In this case the Vilnius public transport is planning to purchase 100 special buses and create an necessary infrastructure for natural gas (biogas) storage and filling; Klaipėda has 5 special buses; the JSC “Kauno svara” is consider a financial contribution to support this project.
Is planning to evaluate the biogas plant construction by biggest waste water treatment plant and big pigs farm for biogas production.

Success factors

In Lithuania there are use fuels with 2 % of RME and bioethanol addition to fuels. But there are not enough factors for more successful development of the similar projects, apart some governmental political decisions.

Barrier/obstacles

During the project were bureaucratic obstacles and financial barriers. It is difficult to find methods to overcome them (without financial support and EC Directives). The amount of biogas production in 4 biogas plant is to skimpy for transport use.

Participants

The leading partner in the project was Natural Gas Vehicle Association, which are most interesting on the successful in similar projects. Other companies, associations (economic and non profit), government authorities etc. play less important role.

Contacts

A list of persons with crucial knowledge about project may be presented late.
Project description

New CNG buses are purchased for Rzeszow city transport, similar projects undertaken in Przemyśl and Inowrocław cities, but with much worse economic effect.

Aim and target

To replace half of the buses fleet with CNG buses until 2011. The second half will run on oil to ensure further operation of the company in case the gas prices rise.

Project outcome (measurable, in figures)

Currently there are 40 CNG buses in Rzeszow City, new buses are purchased every year (the intention was to buy min. 5 buses a year, but thanks to an agreement with EkoFundusz – about 1 million Euro refund, 10 buses were purchased in 2006 and 8 in 2007)

Success factors

Cooperation between the public transport company and the gas supplier.

Barrier/obstacles

1. The costs of gas driven buses, service infrastructure and especially gas filling stations were high, and with low rate capital growth, it was impossible to replace a large amount of buses in a short period.

To solve this problem, the public transport company started to cooperate with the gas supplier, as also interested to develop the gas infrastructure. The bus company was only obliged to build service stations and buy buses, while the gas supplier built the gas filling stations.

Participants

MPK Rzeszow Sp. z o.o. - Investor,
Karpacka Spolka gazownictwa – Gas supplier,
Ekofundusz - polish debt for environment swap,
Polskie Autobusy Sp. z o.o. – CNG bus manufacturer,
Solaris Bus & Coach S.A. – CNG bus manufacturer.

Contacts

Marek Filip – Assistant Technical Director – MPK Rzeszow
Wiesław Pomianek – Director – MPK Rzeszow
Project description
A congestion tax is imposed on Swedish registered vehicles driving into and out of the Stockholm inner city zone on weekdays (Monday to Friday) between 6.30 a.m. and 6.29 p.m.

Vehicles are registered automatically at “control points” during the times when the tax is charged. Each passage into or out of the inner city zone costs SEK 10, 15 or 20, depending on the time of day.

Cars that run on ethanol and biogas are exempted from the congestion tax till 2012.

Aim and target
The aim of the tax is to decrease the number of cars that drive in Stockholm. Thereby the queues of cars will be reduced and the air quality will improve. The exception for ethanol and biogas cars will stimulate the market for environmental cars.

Project outcome (measurable, in figures)
During the Stockholm trials 22 August 2005 - 31 July 2006 the congestion tax was tried out. During this period an extensive measurement program was conducted. The result showed that:

- The traffic to and from the city decreased by 20-25%
- The time that the drivers had to spend in queues decreased by 30-50% inside and close to the city
- The emissions decreased by 14% in the city
- The amount of biogas sold to vehicles in Stockholm increased dramatically from 1 million Nm³ 2004 to 5 million Nm³ 2006.

Success factors
Democratic support. In September 2006 a popular vote was taken in Stockholm to indicate if the congestion tax should be permanent. The people in the municipality of Stockholm voted yes, which was decisive when the Swedish Government made the tax permanent.

Barrier/obstacles
The number of biogas cars has not risen as fast as it could have due to unreliable supply of biogas. There are several different actors in the biogas supply chain in Stockholm. The cooperation between these actors has not been without friction. A Biogas East is now under consideration. Biogas East will probably, in line with Biogas West and Biogas South, stimulate the market forces to a better cooperation.

Participants
The municipality of Stockholm
The Swedish Road administration

Contacts
See http://www.vv.se/templates/page3____17154.asp
Project description
In 2005 the production of biogas for vehicles was started in Västerås, Sweden. The plant is fed with source-separated household waste, grease trap removal waste and ley crop. Including the sewage treatment plant in Västerås, the total production is 23 GWh of vehicle gas annually. 17 farmers are involved in the biogas production in three ways. First, they produce the ley crop, secondly they receive digestion residues that are used as a fertiliser, and thirdly they own 20 % of the plant.

Aim and target
The Västerås project has multiple objectives: 1) to produce a climate friendly fuel, 2) to provide farmers with an ecolabelled fertiliser, 3) to promote ley-cropping that improves soil fertility, 4) to improve air quality in Västerås, 5) to build and evaluate a modern waste treatment system.

Project outcome (measurable, in figures)
The biogas is enough to run the bus fleet in Västerås (40 buses), 10 refuse-collection vehicles and 500 private cars. At the moment biogas is sold to Stockholm.

Success factors
- Early involvement of farmers
- The careful implementation of the source separation system (=high quality of waste)
- Strategic building of knowledge at the company by involvement and support of waste research
- Large European network

Barrier/obstacles
- Input of ley crop to the digester. Solved by installation of new technology.
- The financing of the investment (total 16 million €). Solved by financial contribution from the Swedish Government and the European Union
- The suspicious attitude at ecological farmers associations towards the biomanure due to the household waste. Solved by a long and fruitful dialogue

Participants
Farmers
Waste handling company (Vafabmiljö)
Energy company (Mälarenergi)
Municipalities in Västmanland county

Contacts
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Per-Erik Persson (per-erik.persson@vafabmiljo.se)
Project description

MPK, the public transport operator in Cracow, has developed the strategy for fleet renewal and exchange. The strategy assumes a substitution of old buses by ecological vehicles constructed in accordance with official Euro environmental standards. It is planned to introduce CNG technology into bus fleet of PT operator.

The measure focuses on the development of long term strategy for bus fleet exchange and transition towards clean vehicles. It is planned to conduct a comprehensive analysis of economical and exploitation factors connected to daily operation of different types of clean vehicles. The results of the study will be a good research base for further decisions about the purchase of new ecological bus fleet.

In order to have real exploitation data MPK will introduce CNG vehicles (up to 15 buses) for daily transport operation. It is also planned to gain a hybrid bus for exploitation tests. All demonstration activities will enable to gain practical experience in using various clean vehicles based on different technologies and to compare chosen exploitation indicators.

The information on introduction of new CNG vehicles will be disseminated locally and also on national scale in press and PT-related publications. The overall image of PT in Krakow will be improved by environment focused activity of local PT operator.

Citizens’ opinions on new CNG technology in Krakow will be gathered.

Aim and target

- To research and test new solutions in the field of alternative fuels and innovative feed engine system for the purpose of its further introduction into bus fleet on a bigger scale.
- To purchase and test CNG buses (up to 15 vehicles).
- To gain and test a hybrid bus.
- To withdraw by the end of the year 2007 old buses which are not constructed in accordance with environmental Euro norms and substitute them for environment friendly vehicles
- To decrease noise emitted by PT vehicles.

Project outcome (measurable, in figures)

The new type of bus - Jelcz M121 CNG was officially presented to citizens of Krakow, politicians and local media in November 2006. 5 new CNG vehicles were delivered in late December 2006 and early January 2007. Two groups of selected drivers participated in training sessions focused on daily operation of new CNG vehicles with particular attention paid on fuelling up at chosen external CNG station. Organizational and technical preparations of vehicles maintenance and services support units were curried out.

In summer 2006 results of research conducted on Krakow’s households confirmed the citizen’s general acceptance for the idea of CNG buses introduction. A similar survey, but with more detailed questions concerning the CNG vehicles in Krakow was repeated in June 2007.
In Cracow is one big station (Ownership of gas industry works) and second small AUTOGAS company related agreement with gas industry works. They have executed from current early January of year on lines of city communications September 298,000 km to the end.

**Success factors**

As a result of measure implementation it is expected to get a good comparative analysis of operational efficiency levels for clean buses as for conventional vehicles, to obtain an increase of PT passenger-km in CIVITAS area where clean vehicles are used, to decrease a level of noise emitted by PT as well as to improve an overall image of PT transport.

**Barrier/obstacles:**

Wybudowanie nowej stacji CNG przez dostawców gazów tylko pod warunkiem podpisania umowy przez MPK na odbiór xxx mln km3 gazu przez xxx lat.

Nie znana jest przyszłość floty CNG w Krakowie jeżeli nie nastąpi rozwój rynku CNG m.in. stacji tankowania.

**Contacts**

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Wrobel Ryszard
Marian Lesiak
Magdalena Drobiñak - Saliitra
**Project description**

Project of using gas in public transportation was put into operation in 1996, with LPG as a fuel for buses. Good experience in using LPG, development of new CNG technologies for car engine and initiative of Podkarpackaj Spółka Gazownicza (PSG) (Podkarpackie Gas Company) to build a fuel filling station was strong signal to open new way. Other turning point was inability of purchasing new low-floor buses powered by LPG. All those conditions caused that MKS Ltd. (city public transport company) decided in 2005 about gradual exchange of whole fleet of buses. First part of this task was financed from investment credit and from their own financial sources. Gained sources was used for workshop modernization and purchase with adaptation of new buses. Finally PSG Tarnow Division built filling station - financed from their own sources.

**Project outcome (measurable, in figures)**

From initiative of PSG Tarnow Division there was built network of CNG filling stations: one in MKS Ltd. in Dębica. At this moment there are 6 buses powered by CNG, in this number there is 5 adapted and 1 new factory-made powered by CNG.

**Success factors**

**Good sides**

Economical aspects:
Gained alternative fuel for diesel fuel (Pb-free, detonation resistant, easy to mix with air and easy bus engine start in winter, quite stable price-about 50% of diesel fuel, safety of using comparable to petrol,)
- time between vehicle check-up/repairs increased
- elimination of diesel fuel injection caused decrease cost of bus exploitation

Ecological aspects:
- there is no visible smoke, and there is no soot effect and other harmful substances are eliminated
- after modifications and new engines fulfill harmful substances emission restriction EURO4
- loudness of engines decreased about 4-5 dB comparing to diesel engine

**Bad sides**

Economic sides
- unstable - continuously raising price of CNG delivery - commercial barrier for cost return in economically reasonable time
- high cost of adaptation of normal buses to CNG powered
• 20% higher cost of new bus powered by CNG, comparing to diesel powered same class bus
• no financial support (in taxes, assurance, and others) from the reason of using clean fuel in public transport
• large difficulties to gain financial support for adaptation of buses to CNG

Barrier/obstacles:
Main barriers
• There is no support from government, local authorities and non-government ecological organizations in promotion of NGV
• Unstable price of CNG delivery
• No financial support

Participants
1. NGV AUTOGAS Kraków – deliverer of technology and main contractor of CNG bus installations
2. GASPOL S.A. Warszawa – contractor of workshop adaptation for check-up and repairs gas powered buses (LPG) and deliverer of LPG filling station
3. MKS Ltd. Debica – implementation of the project

Contacts
Public Bus Transport Company Ltd. in Debica
PL 39-200 Debica st. Sandomierska 3 tel. +48 14 6823292 in.34
Chief of the Board HENRYK JURASZEK

MIEJSKA KOMUNIKACJA SAMOCHODOWA SP. Z O. O. W DĘBICY
39 - 200 Dębica, ul. Sandomierska3, Tel. +48 (14) 6823292, wew. 34
Prezes Zarządu - Henryk Juraszek
Project description

The beginning of using gas fuel in public transport company MKS Ltd in Dębica is dated for 1996. From two available alternative fuels (LPG and CNG) the LPG was chosen as good solution. The source of founding was authority of city Debica (necesery part for foundation) and WFOSiGW (voivodship fundation for enviroment protection and water management) in Tarnow City authority financed workshop modernization and LPG filling station.

The main reasons of chosing LPG:
- Accessibility, and more advanced and checked technology of using LPG as enigne fuel.
- Lower costs of buses adaptation and filling station for LPG
- Limited ways of financement
- Accessibility of LPG filling stations
- Economic and ecologic effect
- Absence of CNG filling station and high costs of built of new one
- High cost of buses adaptation for CNG using

Project outcome (measurable, in figures)

At the process of project implementation there was 22 buses adapted to use LPG fuel for MKS Ltd. Debica

Success factors

Effects of using LPG
Economic: decrease of fuel costs, engine oil, repairs by increasing time between normal check-up.
Ecologic: decrease of engine noise about 4-5 dB and emission of harmful substances was decreased to limitations of EURO3

Barrier/obstacles

There is no possibility of buying new busses powered by LPG and finally initiative of PSG (distributor of CNG ) to built new CNG filling station, made MKS Ltd to decision about gradual exchange whole fleet to buses powered by CNG

Participants

1. NGV AUTOGAS Kraków – deliverer of technology and main contractor of buses adaptation to LPG fuel
2. GASPOL S.A. Warszawa – contractor of modernization and adaptation of worksop for needs of buses poered by LPG.
3. MKS sp. z o. o. w Dębicy – implementation of project – user and owner of buses

Contacts

Public Bus Transport Company Ltd. in Debica
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Chief of the Board HENRYK JURASZEK

MIEJSKA KOMUNIKACJA SAMOCHODOWA Ltd. in DEBICA
39 - 200 Dębica, ul. Sandomierska3,
President of the board - Henryk Juraszek
Project description

Przemysl was the first polish city where was buses powered by CNG. At the end of 80’s - Przemysl, MZK was interested about utilization as fuel earth gas for city buses. However in the latter part years 90 - Przemysl MZK (city public transport company) began the exploitation of buses powered by CNG till now. The Institute of Oil and Gas in Krakow was the originator of idea. Przemysl MZK was the one of fastest transport companies introducing buses powered by CNG on wider scale. At the beginning there was 3 adapted buses Jelcz – Berliet, after this there was another 11 adapted and 5 new buses powered by CNG. The example of Przemysl shows that implementation of CNG is easy when area of company is limited to the one city.

Project outcome (measurable, in figures)

The highest number of buses powered by CNG it was 22. The main part of CNG fleet are modernized Jelcze M11 with engines Raba – MAN (9 buses) as well as factory corresponsive Jelcze M120M /4 with engines Mielec MD 111M6 CNG(7 buses). Company administers fleet 16 CNG gas buses at present.

Success factors

The main factor success of MZK Przemysl is fact that Przemysl city “lies” practically on gas resource. In close neighborhood of the parking for buses witch belong to company there is a intake of earth gas, which after filtering and the desiccation be brought to two - grade compressors about 600m3/h efficiency, which they fulfill the tanks of buses. The time of refueling each bus is 14-20 minutes. The distributor has no counter and the quantity of gas has to be enumerated from table of quantity - difference of pressures. The low number of private CNG cars then the gas consumption too (in Przemyśl the vehicles CNG fuel using only practically the MZK) makes economic irrational to invest in expensive measurement aperture. One should to underline exceptional in scale of Poland the location of MZK vehicles depot lies on the safely opened gas deposit, which be characterizes high pressure on exit and close neighborhood Auto Gaz from Krakow which gives support technical to the enterprise.

Barrier/obstacles

Vehicles adapted to admission CNG deliver the operator of numerous problems - crack the heads of engines and spark-plugs as well as different connected with high temperature of running of engine faults appear. In vehicles corresponsive to CNG by factory the considerable number of defects like appears the faults of step- engines and ignition modules. The company struggles with problem the aspect of low turns of engine and also the unexpected fall of engine power. Moreover it - miscarried to control effect the high temperature of running of engine still all the time problem it is with vulcanization of high voltage conductors. Moreover president MZK, says that whole activity connected with service of station CNG, her supervision after their side is and maintenance. MZK Przemysl is going to built the net of refueling on positions of halting buses on company parking which will make available the night refueling and is going to buy distributor and the same to unlock for all interested the station as well as to others. Next steps assume that with financial help environment protection foundations continuously fleet of CNG buses will grow.

Participants

MZK Przemysl – public bus transport company
Association of Polish Engineers and Technicians of Transport in Krakow
Auto Gaz Krakow

Contacts

Miejski Zakład Komunikacji Sp. z o.o.- public bus transport company
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Vice-director MZK Wojciech Dudzik
Project description

Rzeszow as a third city in Poland introduced buses powered by CNG for public transport. In 2003 carrier got strong support for investing in CNG infrastructure from local authorities especially from President of Rzeszow. Other impact to development of CNG was that Karpacka GAS Company declared proposal of co-operation and proposition to built filling CNG station from their own sources (cost). At the same year the intention letter was signed between Karpacka GAS Company and public transport company - MPK Rzeszow. Foundations were accepted that refuelling station will be built on the area of MPK and was equipped in three quick position of refuelling. The cost of 1m3 CNG was foreseen for 50% of 1 liter of diesel fuel. MPK take a 10 years plan of purchase of buses on CNG, lodging the purchase of minimum 5 arts of buses annually. For faster start of using CNG buses there was 2 buses JELCZ 120M adapted to run on CNG. In May 2004 there was bought 5 low-floor type JELCZ 125M/4/CNG buses and next five buses from Jelcz arrived to Rzeszow in 2005.

Project outcome (measurable, in figures)

In a few years MPK Rzeszow tested different types buses powered by CNG powered: Iris Agora with engine Iveco COURSOR8CNG, Solaria Turbino 15CNG with engine MAN E 2876LUH01, MAN Lion’s City LL powered by same engine as Solaris, Kobus BN12 with engine Cummins. Nowadays in Rzeszow there are 32 buses powered by CNG In this number there are only 2 buses adapter to CNG. 30 of them these are factory buses powered by CNG. At the November 2007 another 8 CNG buses will join to the fleet. The MPK Rzeszow since 11 March 2004 has a CNG filling station. At the beginning there was compressor with capacity 30m3/h. With such fleet of buses the modernization was necessary. Since July of 2004 capacity was increased to 300m3/h and later up to 600m3/h. This is generally accessible stations.

Success factors

Exploitation of CNG buses is 20-30% cheaper than buses running on diesel fuel. When fleet will be strengthen by new 8 buses, yearly savings on fuel will attain 600 thousand PLN(160 thousand €)

The purchase of factory (new) CNG buses is available thanks to financial support of EKOFUNDUSZ foundation. That money allows to cover the difference between price of diesel powered buses and CNG buses. Using CNG in MPK Rzeszow it also ecology. Rzeszow City in this year won an award for most energy efficient municipality in Poland. In next years MPK Rzeszow is going to have a 100 buses powered by CNG.

Barrier/obstacles:

- Main barrier: buses powered by CNG is much expensive than normal buses
- The price of CNG is unstable.
Participants

- RGK Sp. z o.o. MPK Rzeszów - city public transport company
- Karpacka Spółka Gazownictwa Sp. z o.o. - deliverer of CNG
- Zakład Gazowniczy w Rzeszowie – distributor of CNG
- Miasto Rzeszów - City Authority
- Ekofundusz – Foundation with support pro ecological initiatives

Contacts

Rzeszowska Gospodarka Komunalna Spółka z o.o. Miejskie Przedsiębiorstwo Komunikacyjne (city public transport company)
Trembeckiego Street 3, 35-234 Rzeszow, Poland
Mr. Marek Filip - assistant director's MPK Rzeszow
**Project description**

The public transport in the city of Varna is considerably well-developed; however the public buses are outdated and old fashioned. The fuel consumption for the public buses is meant to be significantly high hence the CO2 emissions remain high. Currently the average fuel consumption of the diesel driven buses in Varna is 40-45 litres/100km.

The municipality of Varna in cooperation with Italian transport private company has developed a pilot project for introduction of methane driven buses for the services of the public transport. The results of a feasibility study show that the buses of the “Gradski transport” municipal company could be adjusted for methane driven purposes. After preliminary investigation and examination in a working environment, a specific bus has been selected for the purpose of the project.

**Aim and target**

The main targets of the action are the following: (i) reduce public transport costs in the municipal budget; (ii) enhance the RES utilization at local level; (iii) improve the measures for environmental protection; (iv) reduce the harm emissions caused by the public transport.

**Project outcome (measurable, in figures)**

The pilot methane driven bus has been operating since Autumn 2007 to meet the necessity of the public transport in Varna. 10 more gas driven buses of the company are to be operating till the end of 2007.

**Success factors**

The company which realized the re-installation committed its engagement in building the first gas filling station in the city of Varna, which meets the needs of the public transport. The costs of such operation is relatively high however the estimated saving ensures good profitability.

**Barrier/obstacles**

The estimated figures show that the savings due to the methan installation equals to 30% per 100 km in comparison with the diesel fuel, as the methan is environmental and polution free.

**Participants**

The participants in the current project were as follows:
- “Gradski transport” public entity which provided the bus stock (Business)
- Varna municipality, the Standing Committee of Architecture and Transport (Local authority)
- The Standing Committee of transport in the Municipal Council (Local authority)
- Italian private transport company (Business)
- The Black Sea Regional Agency for Energy Management (NGO)

**Contacts**

Eng. Todor Tonev  
Senior expert  
Black Sea Regional Agency for Energy Management
**Project description**
Identify existing and potential biogas production plants that can be upgraded to gas for vehicles as well as expanding the biogas production.

**Aim and target**
To produce relevant information to be able to take decisions on how to continue with gas production for vehicles in the following community’s: Borgholm, Hultsfred, Ljungby, Mönsterås, Vimmerby and Västervik.

**Project outcome (measurable, in figures)**
Not clear at this moment

**Success factors**
That someone has taken the responsibility or guaranteed a complete responsibility from production via distribution to end user/Gas vehicle. That the decisions have been taken on a long term basis.

**Barrier/obstacles**
The infrastructure for vehicle gas requires extensive investments which in turn require a secured customer base and demand for the production. The unsecure situation for the availability of gas and the development of the price has created insecurity among the potential customers who tend to adopt a wait and see policy regarding purchase of gas driven vehicles. To be able to get around this situation the customers have to be committed to the investment in order to secure customers and demand for vehicle gas before the investment decision can be taken.

**Participants**
The community’s mentioned above, Car dealers, company’s and private persons who are prepared to buy gas driven vehicles e.g. gas/energy company’s, Biogas consultants, Local Transport Authority’s, The federation of Swedish Farmers etc.

**Contacts**
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**Project description**

The public transport company “Linz Linien” has 500 employees and is based in Linz, Upper Austria, the third biggest city in Austria. The company has changed their fleet of 81 buses to monovalent natural gas vehicles. In addition, a natural gas station was constructed, which is supplied with natural gas and up to 53% sewage gas from the purification plant in Linz. As soon as available, the station can also be supplied with up to 33% biogas. The project costs amounted to EUR 33.719.800,-. The project was subsidized by the federal province of Upper Austria.

**Aim and target**
- reducing emissions
- improving the quality of life in Linz

**Project outcome**
- 81 new gas driven buses
- Reduction of CO₂ emissions by 4,091 t/a. The use of two thirds biogas and sewage gas will reduce CO₂ emissions by another 3,213 t/a in the future.

**Success factors**
- Active involvement and support of the company management
- Cooperation with the Linz gas utility and purification plant
- Subsidy from the federal province of Upper Austria and the Linz gas utility

**Barrier/obstacles**
- Costs for the new bus fleet and for the construction of the gas station

**Participants**
Linz Linien GmbH  
Linz AG Gas/Wärme GmbH (gas utility)  
Linz AG Service GmbH (purification Plant)  
Land Upper Austria

**Contacts**
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**Project description**

The Vienna-based energy utility “Wien Energie” started to switch its company fleet to natural gas driven vehicles in 2005. At present, around 150 vehicles, which represent half of the fleet, are natural gas vehicles. Another 90 diesel vehicles will be replaced with natural gas vehicles by 2009. The City of Vienna supports the purchase of the first 1,000 natural gas vehicles with a subsidy of 600 euros each.

In addition, Wien Energie has developed a Third-Party Financing (TPF) Model for the construction of natural gas stations, which is directed at companies with fleets and public fuel stations. The package includes the planning and construction of a natural gas station including the supply pipelines, official applications, the required natural gas supply, system management and maintenance. These services will be charged via the natural gas quantities purchased.

**Aim and target**
- reducing emissions

**Project outcome**
- 150 new natural gas driven vehicles
- Construction of 4 new natural gas stations using the Third-Party Financing Model

**Success factors**
- Active involvement and support of the company management
- Cooperation of various branches of the Wien Energie energy utility
- Support of the City of Vienna

**Barrier/obstacles**
- Costs for the new fleet and for the construction and operation of the natural gas stations

**Participants**
Wien Energie Vertrieb GmbH & Co KG
Wien Energie Gasnetz (gas utility)
Wien Energie Erdgas Mobil (TPF)
City of Vienna

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Project description
The tarpaulin manufacturing company “Bellutti Planen Innsbruck” has 87 employees and is based in Innsbruck, Tyrol. The company has changed their company fleet (13 cars and transporters) to monovalent natural gas vehicles. The company is based in Tyrol, where an area-wide natural gas station network exists. The project costs amounted to EUR 250,000.

Aim and target
- Cost savings:
  - minus 37% for diesel cars
  - minus 50% for petrol cars
- reducing emissions

Project outcome
- 13 new natural gas driven vehicles
- Reduction of CO₂ emissions by 18 t/a

Success factors
- Active involvement and support of the company management
- The area-wide natural gas station network in Tyrol

Barrier/obstacles
- Costs for the new car fleet

Participants
The tarpaulin manufacturing company “Bellutti Planen Innsbruck”

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