

DOSSIER

The reduction in greenhouse gas emissions from travel: where do alternative fuels and transportation technology stand?

Alternative fuels and transportation technology: a relative but real point of action

The transportation sector is the most polluting sector with regard to GHG¹ emissions (32% in the Rhône-Alpes region), with the percentage of greenhouse gas emissions produced by passenger road transport amounting to 69%, far more than goods transportation (26%). Despite this known state of affairs, this tendency continues to rise and the car has retained its primordial place as the number one means of transport. On the one hand, controlling urban distancing and on the other hand, significantly developing public transport and communication actions regarding public transport are the areas to be developed in order to overcome this phenomenon. Only drastic banning measures for car use (via taxes, physical access restrictions, etc.), which are very difficult to achieve, could make public transport a real "competitor" to the autonomy represented by private vehicles. Initiatives have however been taken in an attempt to reduce the domination of cars in the travel industry:

- by improving town functioning and highlighting some of the physical advantages of public transport via forward planning and in particular Urban Travel Plans (PDU - Plans de Déplacements Urbains),
- by suggesting, in a very confidential manner, carpooling and fuel-efficient driving training programmes.

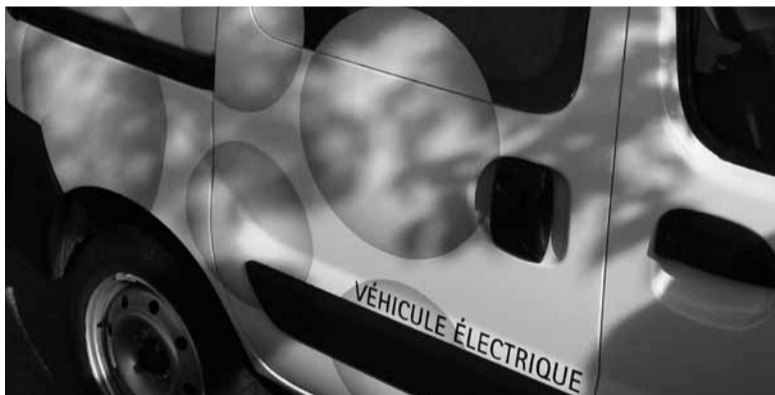
At the same time, the increasing awareness to sustainable development, economic restrictions, the petrol crisis and constant fuel price increases, in conjunction with the increasing distances travelled by car owners have incited drivers to reduce vehicle consumption. For their part, the oil companies and new producers have also proposed less polluting fuels. Alternative fuels and transportation technology therefore represent only one of the possible means of countering GHG emissions. With regard to sustainable development, it must be noted that this field of action does not produce the level of results that could be obtained by a reduction in consumption due to a reduction in distance travelled. Nevertheless, when dealing with the depletion of public financial resources (for public transport), the complexity involved in leading an urbanism-related action, and with the current high level of cultural resistance from the population, the use of alternative fuels and transportation technology remains a real and accessible means for action.

Moving towards decarbonised vehicles?

A new approach is emerging with the development of the notion of "decarbonised" vehicles.

These vehicles are electric or hybrid vehicles, emitting less than 60 g of CO₂/km (definition adopted by the Mov'eo competitive cluster), i.e. a level of consumption of less than 3 litres/100 km.

In addition to the nature of the fuel used, the technical characteristics have also been optimised (reduction in mass, which brings into question the issue of comfort and safety, aerodynamics works, recovery of lost energy due to braking, reduction in auxiliary consumption, heating and air conditioning, etc.).



What alternative offers have been developed in France?

Beyond the larger projects and perspectives relating to the field of research, three large families of alternative fuels and transportation technology exist in France, with highly varying fuel, vehicle or fuelling infrastructures.

Electric or hybrid vehicles

In France, the offer relating to electric cars, outside of being a hypothesis and very costly import in an isolated capacity, is inexistent with only a few dozen vehicles in use today. The promises related to the production of more or less electrified vehicles (from the battery vehicle to the hybrid, rechargeable vehicle) are multiplying in the wait for an announced date of availability at the end of 2010 for the first French vehicles. On the other hand, the offer is never-ending for smaller commercial vehicles, and new buses (and minibuses) are already available².

However, there are numerous points slowing down this area of development (cost, autonomy, lack of recharging infrastructures, origin of the supply power) and some manufacturers have made the choice of developing hybrid cars instead. The offer, although very small and rather up-market, is already in place for these types of vehicles. Perspectives for development of rechargeable hybrid vehicles do exist. They could represent an intermediary solution in the wait for a market for battery-powered electric vehicles.

Natural gas vehicles NGV³

The offer (catalogue offer) for NGVs is real and fairly significant in size. The almost entire lack of additional costs makes this option financially accessible, however the lack of regional stations (less than a dozen operational in the Rhône-Alpes region) does not help its development. In addition, this method still involves the use of a fossil fuel, even if its CO₂ impact is estimated to be 25% lower than that of petrol. Moreover, the natural gas can also be produced from organic material or biogas, which can be used in the same manner in an NGV. This is a very promising perspective for development.

The example of Villard-de-Lans (38) and Peaugres (07)

Since the end of 2008, the parish of Villard-de-Lans and the Peaugres Safari Park have been working on acquiring electric buses either for transporting tourists from the car parks to the ski slopes in winter, or for transporting Safari Park visitors in summer. In both cases, the bus consumption (50 seats) would be compensated by the equivalent production in electricity from solar energy. Different options have been considered from the installation of basic photovoltaic panels producing an energy equivalent to the bus' consumption, to a sized installation of such that the income produced by the production of electricity eventually compensates the entire cost of the bus.



The example of Grenoble (38)

One third of the stock belonging to the City of Grenoble has been equipped with NGVs since 1996 (220 NGVs in all categories excluding heavy good vehicles). The current vehicles are 'factory' equipped and the mechanics in Grenoble have developed a true knowledge base in this field. The financial savings made in fuel amount to approximately 40% with regard to diesel. The city plans on acquiring an additional supply of 100 vehicles, i.e. totalling an annual reduction of 11 tons of CO₂.

EDITORIAL



Roger Léron,
Chief Executive Officer of
RhonAlpEnergie-Environnement

Even after a harsh winter, the reality of climate change is well founded. Its effects

are displayed in an evident manner. Uncertainties regarding storms, annual average temperatures on the rise, heat waves and summer droughts becoming more and more the norm, modification of the fruit ripening and vine harvesting dates and the economic adaptation of ski stations are all evident symptoms of this transformation that is already underway in our region. The causes are also known, and among these numerous sources, travel occupies the number one spot. It should be noted that, despite the necessity to act within this field, the Grenelle laws remain withdrawn, without truly getting to the bottom of the question. The few measures suggested regarding freight or passenger rail transport support, although moving in the right direction, do not tackle the two main points, which are:

- the requirement to reduce urban distancing of towns, which, by extending over larger distances, make public transport policies more and more difficult or even disproportioned,
- the requirement for real communication and mobilisation campaigns for the population in order to persuade them to reduce car use and develop less polluting means of transport such as public transport.

A new type of urbanism, an alternative to travel and mass mobilisation in favour of bicycle and pedestrian transportation, and public transport guarantee the significant reduction in greenhouse gas emissions with regard to travel.

FILE CONTINUED

Organic fuels

Rhône-Alpénergie-Environnement suggests uniting the first generation "bio-fuels" (VOME⁴, PVO⁵, recovered edible oils or E85 ethanol), second generation organic fuels (BTL⁶, gasification of ligneous material) and third generation organic fuels (hydrocarbon production from algae) under the same, generic, neutral term "organic fuels".

The organic fuels group together very different realities:

– **E85**: a small offer⁷ existing with vehicles on the French market with the initial objective of 500 stations, which has just been achieved (547 in February 2010, including 50 in the Rhone-Alps region).

– **VOME**: known under the name of biodiesel or ecolium, this is only accessible to dedicated fleets and sold with a B-30 type mix. It can be used as it is in practice without any vehicle or distribution modifications required.

– **PVO** (see below)

The European Union has suggested promoting biofuels, whose impact in terms of a reduction in GHG emissions would be more than 30%. Rhône-Alpénergie-Environnement has suggested setting up a PVO environmental certification system, which was signed by a dozen partners in the Rhône-Alpes region.

Finally, the use of organic waste has, until now, been a minor means for producing organic fuels (ethanol, VOME or biogas), which, however represents a very promising perspective, and does not conflict with biodiversity protection or supply.

The alternative fuels and transportation technology thus constitute one of the partial and rather transitory tools for reducing GHG emissions with regard to travel, providing that their use does not cause any negative social or environmental effects.

1. Greenhouse Gas - 2. All of the available electric vehicles are at your disposal from Rhône-Alpénergie-Environnement and on the European project website www.CO2neutralp.eu - 3. Natural Gas Vehicle - 4. Vegetable Oil Methyl Ester - 5. Pure Vegetable Oil - 6. Biomass to Liquid - 7. Refer to the following website for the offer: www.sugre.info - 8. Fédération Régionale des Coopératives d'Utilisation de Matériel Agricole (Regional Federation of Cooperatives for the Use of Agricultural Material)

Contact: Rhône-Alpénergie-Environnement, Laurent Cogérino (laurent.cogerino@raee.org)

Pure vegetable oils

The approach made by this chain in the Rhône-Alpes region represents a more global vision than just that of energy. It illustrates the involvement of farmers and local governments in a strong environmental action focusing on innovation and progress. The FRCUMA⁸ is leading this action, supported by the Regional Council, Europe and Rhône-Alpénergie-Environnement through a regional programme and the 2ndVegOil European project.

Four production units are located in the Rhône-Alpes region:

– CUMA in Cormoz (01): 4 farmers with a production capacity of 150,000 litres/year on a fixed oil press.

– CUMA in Feurs (42): 25 farmers with a production capacity of 200,000 litres/year.

– CUMA Verte Prairie (38, 69): 25 farmers with a production capacity of 200,000 litres/year on a mobile oil press.

– CUMA Agrinerie (38): approximately a dozen farmers with a production capacity of 20,000 litres/year on a fixed oil press.

These CUMA use the oil cakes and oil in short circuits in their breeding, and approximately 20 of their tractors are partially or fully powered with PVOs.

Other uses:

– the CUMA in Faverges (38) is equipped with two tractors fully powered with PVOs,

– the City of Lyon (69) has equipped three lawnmowers and one tractor to run 100% on oil for its green spaces,

– the City of Romans (26) has adapted two packer bodies to run on biofuels,

– the community of parishes of the Grand Roanne (42) is studying transferring its fleet of packer bodies.

Contact: Rhône-Alpénergie-Environnement, Dominique Jacques (dominique.jacques@raee.org)

EXPERIENCE

Anaerobic digestion in the Rhône-Alpes region: a booming chain

The use of biogas originating from the anaerobic digestion of organic waste plays its role in the fight against the greenhouse gas effect (the methane contained in the biogas has a higher "greenhouse gas effect" than CO₂), and in producing and selling local energy: sale of heat and/or electricity, fuel in situ or soon, remotely via injection into the natural gas network. The development of anaerobic digestion in the Rhône-Alpes region therefore tackles a significant energy, environmental and economic issue, and will pass by the step of developing the means of making use of the biogas produced by Ultimate Waste Storage Centres (CDSU - Centres de Stockage des Déchets Ultimes), wastewater treatment plants, by the treatment of fermentable fractions of household waste and agricultural

For more information

– www.biogasregions.org : this website displays the results achieved by the European "Biogas Regions" project, of which RAEE is the coordinator, and for which the objective is to promote anaerobic digestion in seven European regions.

– www.biogazrhonealpes.org : for any information relating to anaerobic digestion in the Rhône-Alpes region and to sign up for the electronic newsletter on "Anaerobic Digestion in the Rhône-Alpes Region".

– www.oreges.rhonealpes.fr : any information relating to biogas production in the Rhône-Alpes region will soon be available on the Rhône-Alpes Energy and Greenhouse Gas Regional Observatory's (OREGES - Observatoire de l'énergie et des gaz à effet de serre de Rhône-Alpes) website.

– **Biogas, anaerobic digestion: more than just an opportunity for regions!**: a document drawn up by the RAEE with support from the Rhône-Alpes Region, the ADEME (Agence de l'Environnement et de la Maîtrise de l'Énergie - Environment and Energy Management Agency) and the European Commission

organic matter. The anaerobic digestion on farms or centralised projects still requires support for defining, assembly and facility

monitoring operations. This step foreshadows the maturity of the chain. foreshadows the maturity of the chain.

Contact: Rhône-Alpénergie-Environnement, Valérie Borroni (valerie.borroni@raee.org)

**Example of application in the Rhône-Alpes region: EARL Mercier - Esserts Blay (73)**

Since January 2010, the anaerobic digestion unit of the EARL Mercier agricultural enterprise (Esserts Blay, Savoie), has been using effluents from agricultural exploitation (bovine farming) and various organic waste materials originating from the company's cheese factory.

The unit comprises a digester which transforms the organic material into biogas and digestate. The latter contains fertilising material and will be treated and then spread over the fields.

The biogas, after being treated, will power a cogeneration engine, which will continuously produce heat and electricity. This production will enable the significant heat energy

requirements of the dairy to be met using renewable energy. The sale of electricity will diversify the exploitation income.

The environmental advantages are significant with 360 tons/year of CO₂ emissions saved, with local processing operations and without having to transport the effluents. RAEE supported the client from the project phase to the unit's operation.

Key figures

- Project making use of all of the energy produced
- Biogas cogeneration of 104 kWe
- Expected production:
 - 810 MWh/year of electricity sold over the EDF network (French national electricity provider)
 - 830 MWh/year of heat used to maintain the digester at 39°C, produce domestic hot water, supply the cheese-making and hay drying processes.
- Overall energy efficiency of 80%
- 8,200 tons/year of organic material used

Example of a project in the Rhône-Alpes region, Siper, Bourg de Péage (26)

The SIPER anaerobic digestion unit project in Bourg-de-Péage involves several farmers. This large-scale regional project presents innovative technical and organisational aspects:

- Expected energy production of 1,300 housing-equivalents (decentralised electricity production that will generate more than 80% of the income).

– Development of a public heat network powered by SIPER cogeneration.

- Treatment of several types of input without on-site storage, with hygienisation and introduction via dosing modules.

– Treatment and use of the digestate in the composting plant (separation and filtration).

– Supply of organic material for the project controlled over a radius of 30 Km, enabling the impact from GHG1 emissions to be substantially reduced with respect to the current processing chains.

The ICPE2 comprising the public enquiry has begun. Works should start before the end of 2010. The system should begin operation at the end of 2011. RAEE has been supporting the client since the beginning of the project.

Contact: SIPER siper@orange.fr – Rhône-Alpénergie-Environnement, Lionel Tricot (lionel.tricot@raee.org)

Key figures

- Regional project making use of all of the energy produced
- Biogas cogeneration of 1,500 kWe
- Expected production:
 - 12,000 MWh/year of electricity
 - 13,000 MWh/year of heat
- Overall energy efficiency of 80%
- 42,000 tons/year of organic material used
- Provisional investment: 7,500 k
- Expected grants: Rhone-Alps Region, ADEME, Council of La Drôme, Ministry of Agriculture, etc.
- CO₂ economy: approximately 8,000 tons/year

