

## PEPESEC Study Visit Report

# Murcia

16<sup>th</sup> – 17<sup>th</sup> October 2008

## Summary

*Over 2 days in October 2008 PEPESEC project partners visited the city of Murcia to gain an appreciation of the local energy planning context and to view practical examples of sustainable energy plan, projects and initiatives in the municipality of Murcia.*

The visit highlighted the innovative projects and energy management in different aspects in the city of Murcia. Also the economic context in the sector of construction and housing development in Spain and especially in the city of Murcia was analysed.

A number of different developments were visited. The main issues to be faced by the city administration in the next years were presented to the attendees of Murcia Study visit, especially those regarding traffic and alternatives means of transport. The new plans for urban public transport, bike promotion, new tram lines, and alternative fuels for public buses projects were shown during the first part of the visit. Some of the plans for city development were explained in this meeting.

## Official Welcome

Mrs Fátima Barnuevo, Deputy Mayor for Culture and European Programs, Murcia City Council. Mrs Barnuevo welcomed the visitors from overseas, highlighted the importance of energy efficiency, rational energy planning and wished everyone in the PEPESEC project to have a fruitful meeting.

## A) Presentations, 16<sup>th</sup> October

### 1) Sustainable Urban Mobility in Murcia

**Presentation by José Luís Giménez Montero. Director of the Public Thoroughfares Area. Murcia City Council.**

An overview was given of relevant characteristics of the borough: territorial dimension, borough and city centre, population and settlement, social and economic dimension, extensive complex road network and motorization. Those characteristics lead the city to some consequences for mobility. The City Council has devoted itself to developing mobility policies (2000 – 2007):

- Development of new roads, to increase capacity.
- Development of underground car parks (mainly for residents) and off-street parking (based on rotation)
- Development of areas for loading and unloading goods.
- Converting large areas in the city centre into pedestrian areas.
- Accessibility programmes (driveways, traffic lights, rehabilitation of sidewalks, reserved parking areas, PMR card...)
- Programmes for improving urban and TAXI transport.
- Modification of city-planning schemes: bicycle platforms
- Road Safety Studies.

These policies have the following plan objectives:

- Reduce traffic jams and their pollutant effects
- Promote clean fuels and energy
- Reduce travelling time and improve urban transport
- Improvements in accessibility conditions, creating pedestrian areas, renovating public spaces.
- Promoting travel on foot and by bicycle.
- Policies for equipping and controlling car parks and parking spaces.
- Road safety policies

The expectations, costs and terms of the plan

- A plan that will serve to articulate and give meaning to all municipal activities taken regarding mobility
- The cost of the plan is 370,000 EUR (not including VAT)
- The execution term is 10 months (Dec 2008 – Sep 2009)

## 2) Public Transport strategies in Murcia

**Presentation by José Luís Giménez Montero. Director of the Public Thoroughfares Area. Murcia City Council.**

The ACTION PLAN and OBJECTIVES for improving public transport in the borough of Murcia were presented with two **OVERALL OBJECTIVES**:

A. Respond to the main concerns regarding the existing system:

- Growing demand for services and service quality.
- Correction of the fares system and fare updating system.
- Transport operating and management systems.

B. Respond to the main concerns regarding mobility and transport:

- General mobility and transport systems
- New infrastructures
- New mobility and transport modes.
- Management systems and sharing responsibility among the different administrations.

The AREAS OF ACTIVITY of the mobility plan are

1.1. sustainable urban mobility:

- global perspective and planning strategies.
- creation of pedestrian areas. accessibility
- bicycles management plan.
- transport infrastructures and services.
- reserved platforms.
- parking, loading and unloading of goods.

## 1.2. new transport systems:

- new public transport structure model.
- tram, line 1.
- tram, studies on new lines.

## 1.3. new management systems:

- local transport consortium.
- concession model, programme contract.
- comprehensive fares and updating of fares

### **3) BIO – NETT project region de Murcia. Pilot project of Ayuntamiento de Murcia (Murcia City Council)**

**By Francisco Javier Sánchez Velasco, Energy Engineer, Agencia Local de Energía y Cambio Climático de Murcia, Ayuntamiento de Murcia**

The frame and scope of bio - net project region de Murcia is the following: validity of the agreement is 1 de abril de 2008. The decision-making was assumed by the technical commission. The territorial frame is one urban public bus line, licensed by the City Council of Murcia. The temporal frame is 2 months for the kick-off of the experience, extended during the whole period of the agreement. The operative frame means to use of bio-diesel mixed at 10% or 20% with diesel (b-10/b-20) potential extension of the number of vehicles.

#### **WORK AND DECISIONS OF THE TECHNICAL COMMISSION.**

- **SURVEY PHASE:** Norm UNE EN 14214. Lessons learnt from other cities and Agencies. Recommendations and limitations from the busses manufactures. Supply and quality of the bio-diesel. Bus lines available for the experience. Required facilities. Pre and Post experience inspections of the vehicles.
- **DECISION MAKING PHASE:** rule out of the minibuses lines for the experience. Selection of urban line 4. Election of 3 buses man nm-223-f. Provisional bio-diesel tank. Pre-experience inspections and election of 3 buses for the cross-comparison analysis. Chemical analysis of the oil and dust in filters at Polytechnic University of Cartagena. Advertisements of the experience in the buses.
- **BUDGET AND FINANCING OF THE EXPERIENCE:** ARGEM finances 9.000 euros which will be used to pay: the bio-diesel tank of 5.000 l, the advertisement on the 3 buses, the edition of the 3000 flyers, LATBUS finances 6.000 euros which will be paid for the preparation of the vehicles and enhancement of the inspections, the increase of cost by transport and loss of diesel grants, the laboratory analysis. LATBUS will afford also the loss of incomes due to the lack of publicity in the buses.

**4) Implementation of cycling as an alternative to motorized transport in the city of Murcia**  
**Presentation by Francisco Carpe Ristol, Head of the Environment Department, City Council of Murcia.**

During this presentation some information about the topography of Murcia was given, showing the feasibility of city of Murcia for the use of bicycle, due to the flat surface in the middle of the valley, the scarcity of rain and warm temperature. The bicycle in Murcia was very used in the past, especially for those who lived in semi urban areas.

At present there is heavy reliance on cars to other means of mobility. Only 15.7% of Murcian people use public transport. To get to work 71% of the people use a private car.

The length of the cycle lane has been increasing since 1996. In 1996 there were no cycle lanes. Network construction started in the year 2000 with the 2 first Kilometres, with a strong launch in the year 2008, of 53,6 Km. The plan for the year 2010 is to have 180 Km of cycle lanes built in the city and the connection of the city centre to the Universities in the city

The General Urban Plan adopted in 2001 establishes the obligation to design the new partial bike lanes when the sidewalk is wider than 3 m. Some public rental systems for bikes will be established in the city for citizens and tourists. There will be a minimum of 5 points for renting a bike in the city and each point will have a minimum of 100 bikes. The estimated budget for this action is 200.000 €/year. It is foreseen to have this system working in September 2009.

The Director Plan for the Bike will be written by a specialist enterprise. The budget for this action is 100.000 €. And the period for this study is 12 months.

The main objective of this Plan is to encourage sustainable patterns of mobility, also to design in the municipality of Murcia a network of cycle paths, promotion of cycling as a mean of transport in the normal displacement, facilitate public access to the bicycle, ensuring the safety of users of bicycles and pedestrians, to encourage intermodality between public transport, cycling and pedestrians and the development proposals for the integration of space for bicycle in the forward planning.

**5) Programs promoting renewable energy in the town of Murcia.**  
**Presentation by Francisco Carpe Ristol, Head of the Environment Department, City Council of Murcia.**

During this presentation, some actions regarding networks and political commitments in the field of environment protection and energy saving were introduced.

1998: Adhesion to Letter of Aalborg

1999: Participation in the Program Terra, for studying sustainable development applied to urban planning.

2001: Elaboration of the Diagnosis ad Environmental Action Plan of the Municipality

2000 y 2001: Participation with the Spanish Federation of Municipalities and Provinces in the preparation of the Environmental Good Practices Guidelines for the elaboration of the Agendas Local 21

2004: Agenda Local 21 chosen by UN as an example of environmental good practices.

2004: UN selected Murcia as an economic, environmental protection and social development model.

2005: Adhesion to Red de Ciudades por el Clima.

2006: EU cofinancement for the creation of Agencia Local de la Energía y el Cambio Climático, ALEM.

2007: Adhesion a la Red Biodiversidad 2010

2007: Approval of the Local Strategy against Climate Change

2008 Covenant of Mayors signed

The objective of the *Local Strategy against Climate Change* is to reduce short-term (period 2008 - 2012) by 20%, CO<sub>2</sub> emissions produced as a result of urban activity, taking as reference data for the year 2004. This would reduce CO<sub>2</sub> emissions by 0.24 Mt.

The plan consists on the following phases:

1. Obtaining data on climate change
2. Reducing emissions of greenhouse gases
  - 2.1 Residential
  - 2.2 Industry and trade
  - 2.3 Activity municipal
  - 2.4 Waste
  - 2.5 Urban Mobility
3. Measures to minimize the effects of climate change
  - 3.1. Increase greenhouse gas sinks
  - 3.2. Adapting to the greenhouse effect
4. Information and public awareness

The homes of the housing developments approved after 2002 should have solar thermal for 60% of hot water. More than 15,000 homes with solar thermal installations planned for 2006, this measure assumed obligation under the CTE in advance.

Fiscal Incentives and subsidies for those who decide to install renewable energy systems in their houses or business, and also for energy efficiency actions in households. Budget 150.000 €/year.

From 2002 to 2007: 192 incentives were given for solar thermal, 82 for PVs and 121 for energy efficiency. 5 PVs systems of 5 KW have been installed in shelters in some streets and squares in the city as demonstrative projects. There are 15 PVs plants in the city with a total amount of Power of 24 MW. 19 plants are in the license step.

2004: Bonus Building Tax in 50% of the cost of installing solar thermal or photovoltaic energy for consumption. 2008: tax incentives are extended to hybrid vehicles and ecologic ones (30% bonus first 3 years).

Biogas from waste plant 14.460 MWh obtained in 2006. It is the equivalent energy to that one consumed by 40% of street lighting in one year. Also Biogas from sewage station is used for cars. Some actions in the field of raising awareness in schools were shown in this presentation.

## B) Study Tour

All study visit attendees were taken on the bus to visit different buildings and facilities spread all over the borough of Murcia featuring energy efficiency and renewable energy technologies.

### 1) Solar thermal system for the production of hot sanitary water, cooling and heating at the University of Murcia

Moreover, the current absorption systems, which are fed with hot water, have cooling capacities that are too high for the needs of a small solar installation. However, the Rotartica machine features 4.5 kW of cooling power, which is enough power to meet the needs of one home.

For this project in particular, a surface area of 24 m<sup>2</sup> of flat captors have been installed at the UMU in order to generate hot water which is accumulated in a 1500 l tank and this hot water has three purposes:

- In the summer, it feeds the absorption machine which generates cold water that is then piped through a Fan-Coil type air conditioning unit that controls the climate of an office.
- In the winter, it directly feeds the Fan-Coil, thus providing the office with heat.
- Throughout the year, it provides hot water to meet the sanitary needs of animal herds.

The installation is monitored in order to establish the ACS, cold and hot air consumption provided to the centre from a distance.

### 2) Micro-wind energy Part at University of Murcia

Part of the Sustainable Campus project was to study a possible project that would place wind generators in the junction at the Murcia-Molina dividing line. Based on this, the idea was devised for a Wind Energy Park with 20 wind generators, 5 Kw each. The first phase includes 9 wind generators.

There are basically three objectives sought: information through a demonstration programme in real time for elementary schools, secondary schools, etc., and the community in general; research and studies on how these turbines operate and their electrical production through University research groups; training university students interested in the topic.

More than 360,000 Euros have been invested in installing the nine Vento 5000 wind mill generators built by WINDECO, with which energy power is obtained even with low intensity winds.

### 3) CEMACAM, Bioclimatic Building.

This is a building that is integrated into the environment. It is equipped with thermal insulation throughout the building foundation and to the passive air capture, cooling and penetration systems which minimizes the consumption of energy for climate control. The air, which is pre-cooled several degrees below the outside temperature, provides constant flow, exchange and renovation as it heats. The type of arch structure and the roof-top air shafts enable the air to evacuate and the circulation of the new fresh air that enters.

The main lighting system is natural light that penetrates the buildings by reflecting on its walls through the skylights, which are equipped with automatic light regulation systems. When the natural light descends, it is progressively compensated with artificial light, thereby obtaining the same light threshold both day and night.

#### 4) Waste Treatment Plant, Cañada Hermosa

Installation of the first biogas motor: It is the first of three motors the biogas plant is currently equipped with. It is an element that is needed to control the emission of gases, thus favouring their elimination and preventing methane bags from being created in the ground. It is a 1.0 MW Jenbacher motor. Year installed: 1999. Investment: € 1.58 million

Installation of the second biogas motor: It is a 1.0 MW Jenbacher motor and it is the second of the three motors the biogas plant is equipped with. Year installed: 2000. Investment: € 0.66 million

Implementation of selective container, paper/cardboard and glass collection. Year installed: 2001. Investment: € 3.1 million

Installation of a light container selection plant: the different types of containers are selected and classified with modern, complex machinery, which by applying automatic, mechanical and manual processes, separates the containers according to their composition into seven different groups: aluminium, ferric, brick, PET plastic, PEAD plastic, film plastic and PVC containers. Year installed: 2001. Investment: € 1.6 million

Installation of a sludge mix compost plant: the organic material recovered from the remaining fraction, along with waste from plant remains and sewage plants are mixed and transformed into compost by applying a fermentation system that consists of placing the waste in three large digesters for an accelerated decomposition under strict humidity, temperature, odour and leach controls. Year installed: 2003. Investment: € 18.7 million

Installation leach treatment plant: at this plant, leaches are treated by thermally exploiting the exhaust gases from the motors that are installed at the biogas plant. Year installed: 2003. Investment: Included in the investment made for the sludge mix compost plant.

Installation of the third biogas motor: it is a 1.2 MW Jenbacher motor and it is the last of the three motors the biogas plant is equipped with. Year installed: 2003. Investment: € 0.95 million

Awareness campaigns: these campaigns include student visits to installations, advertising spots, signs distributed throughout the city, awareness reports in the media, explanatory brochures, sponsorship of public events related to waste treatment and environmental care. Year of execution: Continuously since 1994. Investment: 1.5% of the award amount. Currently, in absolute terms, this figure is around €600,000/ year.

## 5) Aguas de Murcia, Biogas plant at the sewage station.

Aguas de Murcia (Emuasa) designed and started up a plant where biogas is cleaned and later transformed into an ecological automotive fuel at its Murcia East Sewage Plant called Bio-gás de Depuradora (Bioedar), for use by company vehicles.

Biogas, which is a mix of gases from the anaerobic digestion of organic materials, can be used as a renewable energy source and therefore, the Aguas de Murcia plant takes it through several stages to eliminate its harmful substances.

The plant separates the main biogas components in the final stage and obtains methane and carbon dioxide. To monitor the different compounds, the engineering personnel developed specific analytic methods to qualify and quantify the composition of the biogas.

Produced by:

- Murcia Municipality