Feasibility Study - Pilot Region Andalucia

1 Executive Summary

2 Thesis: Electro Mobility and the Energy Vector Hydrogen

Future generations might call the raising of the Electro Mobility:
The 3rd Technology Revolution.
The Main challenge for the Electro Mobility is the efficient distribution (Smart Grids) of electrical energy from increasing Sustainable Energy Resources all over Europe to end-consumers (public and private) while simultaneously optimizing the storage of these energy capacities for delayed mobile applications.
There are various approaches to enable the European Rollout of the Electro Mobility, as a common Investment into the local market Development and prototyping dedicated for future global Application.
The "Via Azul Europe 10" is a promising one of them..!

The 'Via Azul Europe 10' is an initiative concept for an European Highway Network of a new Filling Station generation, providing facilities to reload energy storage utilities in vehicles with Electric (Batteries and Fuel Cells) and Internal Combustion (ICE-H2) Propulsion. These Filling Stations will be wired by a Smart Grid.

The Smart Grid will be realized through Highway Cables, a reasonable mixture of HVCD (high-voltage, direct current) and HVAC (high-voltage, alternating current) power transmission technology, connecting the Fuelling Stations with ever-growing Sustainable Energy Resources (Solar Thermal Power plants, Wind Power plants, Hydro Power plants, Biomass Power plants etc), distributed all over Europe. The Smart Grid will be extended by an Energy Dispatching WAN-IT-Network, to assure real-time information exchange about decentralize energy generation vs. local demands, to enable an anti-cyclic consumption optimization corresponding to the networks electrical energy capacities.

The name Via Azul (Azul = Blue: Stands for "Blue" Hydrogen) was derived from the Filling Station Network capability, to act within the Smart Grid as Point of Local Energy Storage. The Energy Storage will follow the concept "Energy Vector Hydrogen", realized through local Electrolysers, transforming the Electrical Energy (Smart Grid) into locally stored Hydrogen (Chemical Energy).

If the Energy Transformation will be performed preferably during daily Energy overcapacity periods on the Smart Grid, this will enable reliable and Best Prices for the combustible Hydrogen, used in Long Distance Electro Vehicles with Hybrid propulsion (Fuel Cell) and in Long Distance Vehicles with Internal Combustion Engines (ICE-H2).

For Short Distance Electro Vehicles with propulsion based on standardized batteries only, the Via Azul fuelling station network will provide a sufficient number of continuously maintained and charged standard batteries for local exchange. For the recharging of the standard batteries in highly automated fuelling station service points, there will always be two options to select from, corresponding to temporary local Smart Grid electricity prices:

- During high energy demand times:
  The Hydrogen stored Energy can be provided as well, through stationary Fuel Cells at the Fuelling Stations.

- During low energy demand times:
  The electricity can be provided directly by the Smart Grid.

The Energy Vector Hydrogen combined with intelligent Smart Grid Dispatching facilities will enable a stable Energy Equilibrium for the European Transportation Sector - based on continuously balanced Electrical (Smart Grid) and Chemical (Hydrogen storage) Energy.

The BENEFITS FOR EUROPEAN ECONOMIES will be tremendous, not only in AUTOMOTIVE AND THE SUSTAINABLE ENERGY SECTOR, but overwhelming in the SECTOR OF TRANSPORTATION, the bloodstream for each economy. The common benefits would be even more groundbreaking, when the Smart Grid will be connected with DESERTEC resources, providing high pike energy generation cycles during shifted time zones.

3 Applied Services

3.1 Via Azul Europe 10

3.2 Pilot Region Andalucia

3.3 Málaga (Initial HQ and first nucleus of the project)

3.4 Conclusions

4 Technology – Electro Mobility key components

4.1 Energy Resources

4.1.1 Fossil

4.1.2 Nuclear

4.1.3 Sustainable

4.2 Smart Grids

4.2.1 HVDC (high voltage direct current)

4.2.2 HVAC (high voltage alternating current)

7 Business Model

7.1 Establish Energy Strategy Transportation

7.1.1 Regional

7.1.2 National

7.1.3 European

7.2 Main concepts

7.2.1 No more moving of fuels – moving/transmission of electricity only!

7.2.2 10 Main Highways

7.2.2.1 European Acceleration initiative for balanced application of Hydrogen Technology

7.2.2.2 To be extended by national sub-highway network initiatives

7.2.3 Separate Highway SmartGrid concept, connected to alternative long distance grids (i.e. DESERTEC) and crossing sub grids (i.e. Interchange (connection) with Fast and Metropolitan Train Networks)

7.2.3.1 To distribute sustainable energy from South to North (CSP) and North to South (Wind Off Shore)

7.2.3.2 To balance local and temporary energy overcapacities all over Europe

7.3 Economic Benefits

7.3.1 Andalucía

7.3.1.1 Prospering Spanish Community (European Kuwait)

7.3.1.2 Energy provider (European Transportation and potential DESERTEC Nucleus Region)

7.3.1.3 Technology leadership => Energy Efficiency (H2/CSP/HVDC), Fueling/Vehicle Techn./Service

7.3.1.4 Establishment of local production capacities of selected Solution Modules/components => Extended Labor (engineering, construction, services etc.)

7.3.1.5 International Show Window H2 Technologies => More Commercial Visitors and Tourists

7.3.1.6 Others to be identified

7.3.2 Spain

7.3.2.1 Balanced national Economy through increased labor and income taxes as well as corresponding Debt consolidation