New International Study: Electric Vehicles Ready to Enter the Market but Significant Barriers still block the Road

Demand for Electric Vehicles (EVs) is significantly higher than supply, but it is still a bumpy road before necessary political vision will to pave the way for EV introduction, even though solutions are ready at hand. This is the clear message from a number of regions around the world, a new study reveals.

The study has been conducted by the International Cleantech Network (ICN[1]) in the network's eight partner regions around the globe (see textbox) and shows that the introduction of EVs at a market-competitive price would solve a range of challenges at regional and national level.

Study participants
Colorado Clean Energy Cluster, USA
North Carolina Research Triangle Cleantech Cluster, USA
Singapore Sustainability Alliance, Singapore
Copenhagen Cleantech Cluster, Denmark
Oslo Renewable Energy and Environment Cluster, Norway
Eco World Styria, Austria
Basque Country's Environmental Industry's Cluster Association, Spain

However, this is still far from becoming reality in the regions of the survey respondents, as the barriers to meeting the demand for EVs are significant. All of the regions can potentially benefit in various ways from the conversion of the vehicle market to EVs, but only a few of the possible solutions to promoting the introduction of EVs have been applied in the regions. However, some good examples are Norway, committed fully to supporting the EV market has come out as one of the world's most progressive regions with regard to EVs; and North Carolina, concentrating efforts into becoming global smart grid hub, is laying the foundation of an effective EV infrastructure.

What to gain?

EVs are of particular interest to the energy market, as they can solve two major challenges. Firstly, the vehicles can contribute to the storing of the surplus energy from renewable energy sources and thus help the investors in e.g. wind energy get better returns. As the production of renewable energy is continuously rising, introduction of EVs would result in immediate and increasing benefits. Secondly, the first steps towards conversion to EVs would help cities and regions reach their respective goals and obligations of cutting CO2-emissions.

The regions participating in the study all stress EV introduction as a critical path forward. For the respondents in the U.S., the reasons to speed up EV introduction to the American

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About the ICN

ICN is an international partnership consisting of visionary and proactive cleantech clusters from all over the world. The network was founded in 2009 by the Copenhagen Cleantech Cluster and Colorado Clean Energy Cluster. The mission of the network is to establish a strong and innovative platform for collaboration across borders so as to create growth and add value to the stakeholders in the clusters.

market are mainly to reduce dependence on oil imports and thus improve energy security; to cut fuel costs (EV fuel is estimated to be offered at a price up to four times lower than petrol); to improve energy storage and better utilize wind and nuclear energy; to enhance economic development; mitigate climate change and attract creative class talent. Moreover, it is mentioned in the study that EVs offer enhanced performance and reduced maintenance and that EVs are more energy efficient, particularly in stop-and-go traffic (in cities) because the engine does not run if the car is not moving, and braking energy can be recovered to recharge the battery.

Barriers still challenge market penetration
With such a large number of benefits possible from the introduction of EVs, why are the streets in progressive regions around the globe not yet filled with petrol-free vehicles? In Denmark, one of the largest barriers to introducing EVs is the price, which is still significantly higher than that of regular vehicles, and this is the case in the rest of Europe, Asia and North America as well. Although Denmark comes in as one of the top countries in the world with regard to consumer attitudes towards EVs, the demand is still for cars that have a driving distance, comfort and user friendliness comparable to regular cars but without the higher prices.

Another issue slowing down the introduction of EVs is charging standards. The study clearly exposes the need for the availability of charging for parked cars in the residential, private and public sectors, but varying degrees of infrastructure development in the regions and a general uncertainty about standards and financial aspects of charging infrastructure are still the reality in most regions. Limited infrastructure is also reported to be a problem in the U.S., Singapore, Spain and Austria.

Finally, the study makes it clear that in spite of a readiness among vehicle manufacturers in all the regions to commence EV production, a number of factors make the market an uncertain one to enter, the lack of public infrastructure development plans to support the vehicles being one of them. Apart from this, the technical challenges of electrical grid management to prevent instability are part of what needs to be solved before manufacturers are likely to trust the market and begin mass production of cheaper EVs. Almost all the regions in the study are thus expressing problems due to the lack of sufficient political support – they need economic incentives for buyers and public institutions to take the lead in developing the infrastructure quickly and efficiently.

But solutions are readily at hand
In spite of the rather large barriers to EV introduction on the European, North American and Asian markets, the study shows that a broad range of different attempts to solve the challenges posed by high prices and the absence of infrastructure are being made.

Oslo in Norway proves to be the region with the most profitable framework conditions for EVs, and they have already seen results: Oslo has the world's highest concentration of EVs per inhabitant. Almost 4,000 EVs, most of them based in the capital, silently zoom along the roads of the oil-dependent country thanks to a determined policy which includes

free parking, no charging at toll stations, no VAT on EVs, no purchase tax, reduced annual fees and little incentives for the car owners such as the right to drive in lanes reserved for public transport. The public authorities are also efficiently targeting the challenge posed by infrastructure: charging is mainly financed by governmental institutions, and the official aim is to make Oslo number one in the world in terms of the number of public chargers per capita.

The incentives for owning private EV cars have thus become so attractive that demand is considerably higher than supply, and manufacturers are struggling to keep up. The international EV study, however, reveals that Norway still lacks improved tax schemes for company cars to reach all parts of the market.

In the U.S., larger commuting distances make EV introduction trickier than in smaller European countries, where charging can be mainly restricted to cities and housing estates. At the same time, there is a need to better inform consumers about the qualities of EVs. The incentives and programs aimed at advancing the EV market differ from state to state, North Carolina being one of the most progressive. To address the outlined challenges and speed up the adoption of EVs, the state offers various incentives to buy EVs including a plug-in electric vehicle high occupancy vehicle (HOV) lane exemption, emissions inspection exemption, hybrid electric vehicle (HEV) loan programs, and several universities and cities have started the practice of offering free charging during this initial period of encouraging customer acceptance. These incentives combined with the Federal $7,500 dollar bonus depreciation provision (tax credits) per purchased car are encouraging market adoption.

Moreover, North Carolina has initialized a forward-looking strategy in the form of a project (NC Get Ready!) addressing the issues surrounding electric vehicle mass commercialization in NC, the U.S. and globally. It comprises stakeholder working groups to identify opportunities and explore/resolve issues and to educate consumers on the viability of EVs and overcome misconceptions or concerns that hinder the adoption of new technologies. Also, the project aims to help establish a sound infrastructure, develop relationships with manufacturers and ensure the availability of electric and plug-in hybrids, as well as explore opportunities for economic development among vendors and manufacturers seeking a viable and forward-thinking location to grow their business. In Colorado, there are few public incentives for EVs, but the region is experimenting with an ambitious concept of energy storage to avoid grid overload.

In Singapore, a special Green Vehicle Rebate has been introduced to support the EV market. It provides buyers of e.g. EV passenger cars with a discount of 40 % of the vehicle’s Open Market Value.

Austria is approaching the challenge of EV financing by making available leasing models for EVs, providing tax reductions for buyers and reducing annual fees. Moreover, EVs park for free, a public charger grid is under development and the public chargers will receive governmental subsidies.

So far, Denmark has adopted a variety of these solutions to the significant challenges that need to be solved before the country can reap the potential benefits of having EVs on Danish roads. Up to 2015, EV buyers are exempt from vehicle taxation, and in Copenhagen they can park and charge for free. The infrastructure is under development, and like in several of the other regions participating in the recent study, publicly funded demonstration projects are aiming to enhance consumer receptiveness to EVs.

The road forward

The challenges of introducing EVs that have come to light in the study and the solutions applied by regions around the world, make it clear that public support at all levels is critical if the regions and countries in question are to gain all the possible benefits of conversion to EVs, namely energy security, CO2 emission decreases, economic development and improved energy efficiency.

The question remains – are the decision makers ready to realize this potential? Only future will tell!

Region	Gains	Challenges	Solutions
All regions	• Reduce CO2 emissions • Improve energy security by reducing oil import dependency • Optimize the use of renewable energy sources • Enhance economic development • Attract creative class talent • Contribute to more energy efficient transport • Cut fuel costs	• EV price higher than regular cars • Charging standards (limited infrastructure). The EU is in the process of setting common charging standards • Grid overload	
Copenhagen	• Contribute to the storage of the rising amount of surplus energy from wind turbines and thus contribute to better returns for investors. • Help Copenhagen reach its goal of being the first CO2-neutral city in the world		• Up to 2015, buyers of EVs are exempt from vehicle taxation • Free parking and charging at public charging stations in Copenhagen • Publicly funded test and demonstration projects
Colorado		• Large driving distances = charging challenge	• Developing a concept for energy storage to offset the incremental load • Federal $ 7,500 bonus depreciation provision (tax credit) when purchasing an EV
North Carolina		• Large driving distances	• Project NC Get Ready!:

		= charging challenge • Consumers not yet sufficiently educated about EVs	Targets challenges and works to promote EVs in the region • Plug-in electric vehicle high occupancy vehicle (HOV) lane exemption • Emissions inspection exemption • Hybrid electric vehicle (HEV) loan programs • Free parking at universities and in a range of cities • Federal $ 7,500 bonus depreciation provision (tax credit) when purchasing an EV
Singapore			• Special Green Vehicle Rebate provides buyers of EVs with a discount of up to 40 %
Oslo		• Still lacks improved tax schemes for company cars to reach all parts of the market	• Free parking • No charge at toll stations, no VAT on EVs • No purchase tax • Reduced annual fees • Legal to drive in lanes designated for public transport • Charging is mainly financed by governmental institutions
Styria			• Leasing models available from the banks • Tax reductions for buyers • Reduced annual fees • Free parking • Governmental subsidies for public chargers • Capital of Styria chosen as an e-mobility core region, and over the next few years the infrastructure will be set up and traffic concepts will be developed
Basque Country			• Implementation of Smart Grids in two cities • Public institutions are developing charging infrastructure to cover all Basque region • Public support for EV production in the Basque area • Public effort to create a critical mass of vehicles in circulation in order to advance the market breaking point

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