

Positive energy territories and electromobility: Highlights from EVER Monaco 2020

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The decarbonization of both power and mobility sectors are two main goals established during international environmental summits. Those two sectors contribute together with 66% of all greenhouse gas emissions on the planet. Fossil fuels used to produce electricity in power plants account for 42% of the total CO₂ emissions and internal combustion engines in vehicles account for more 24%.

EVER Monaco and the International Association for Energy Economics (IAEE), organized discussions in round table format about "*Positive energy territories and Electromobility.*" Various stakeholders from different fields of expertise, such as automakers, regulators, original equipment manufacturers (OEM), and grid operators, all contributed to the debate.

These round tables took place on September 10 and 11, 2020 at the Grimaldi Forum located in the Principality of Monaco, under the High Patronage of H.S.H. Prince Albert II of Monaco.



Several protective measures like a mask-wearing obligation, a limited number of people allowed, and social distance were mandatory during presentations. After a confinement period post-COVID-19, all the events and scientific conferences were postponed, including EVER Monaco, or had an online format. In

the end, EVER Monaco could safely take place being one of the first events to happen after that unexpected period.



Different topics were addressed during round tables regarding positive energy territories and electromobility:

- conditions of successful implementation;
- synergies between electric vehicles (EVs) and the grid; governance;
- finance and regulation;
- technology and energy efficiency.

Conditions of successful implementation

The "*positive energy territories*" aim to reduce their energy needs as much as possible, through energy efficiency and cover them with local renewable energy over the year. However, achieving this final goal needs effective coordination between energy suppliers, policymakers, and consumers. According to Mr. **Alexandre Roesch**, general delegate of the French Renewable Energy Union (SER), public investments in renewable energy have a leverage effect in the French scenario. According to his data, each 1€ invested in renewables will create 2.1€ of added value in the territories benefiting all the regions. All territories are eligible for at least one adapted renewable solution making the investment possible. Besides the public support as a condition, the solidarity between regions is also an important aspect that could accelerate renewables' development. For instance, the biomass and heat network domains could benefit from shared infrastructures and costs between territories.

Moving towards the electromobility perspective, it is known that French people would substitute their internal combustion engine cars for electric or hybrid vehicles. However, the lack of information about

charging infrastructures, public subsidies, and the lack of diversity in the offer of car models slow their adoption. Mr. **Clément Molizon** from the National Association for Electric Mobility Development (AVERE-France), argues that communication toward the public is indeed a critical condition to success. In this matter, public awareness campaigns are already being done mostly by energy unions and the collectivity in the territory, but more actors should get involved. The key message should be that the whole ecosystem of electric mobility (cars, two-wheels, boats, etc.) is a trigger for rethinking the entire mobility around and its synergies.

Synergies between electric vehicles and the grid

EVs raise special attention from the grid operators due to the rise in electricity consumption, especially in power demand during peak periods. To avoid critical damages to the grid, mainly to the distribution grid, coordination between the grid and the vehicles must be put in place. Automakers and original equipment manufacturers influence the synergy by modulating the offer of car models and charging stations on the market over the years.



A top-bottom approach makes possible to analyze the synergy starting from the grid operators until the end-customers. The first actor involved is the distribution system operator (DSO), who has all the EVs directly connected to their grid. All the projects for charging station installation should have their approval in some sort. Mr. **Régis Le Drezen**, responsible for electromobility studies at ENEDIS, the largest French and worldwide distribution system operator, confirms that all projects having their involvement since the conceptualization part guarantees the project's smooth running. Their main goal is to work with all stakeholders involved in the energy transition and propose innovative solutions to manage the grid more efficiently. For him, the new smart meter Linky will allow dynamic pricing, vehicle-to-grid, renewable generation coupling and smart charging. Linky is allowing ENEDIS to have essential information about the load of each part of their grid in real-time. Those improvements will prepare the distribution grid to cope with the uptake of vehicles connected, avoiding congestion issues. Another DSO delegate, Mr. **Thomas Vanquaethem**, director of evZen development at the

Monegasque Society of Electricity and Gas (SMEG), raised attention to EVs' flexibility opportunity. Although they are expected to increase maximum demand to risky values during specific charging periods, they can also help integrate renewables via smart charging and vehicle-to-grid.

The physical interface between the electric grid and vehicle is mainly the charging infrastructure. **Philippe Adam**, group vice president global executive account at ABB, affirmed that welcoming renewables are linked to bidirectional solutions once they can restore the energy produced intermittently, and ABB is ready to feed the market with those products. Electromobility goes beyond private cars. That's why OEMs like ABB invest in electric trucks and electric ferry charging infrastructure as well. Technologies are there, but there is a high dependence on grid (transmission and distribution) robustness to introduce the products massively.

The last physical element of the synergy to be analyzed is the vehicle. **Vincent Salimon**, president of BMW-France, stated that the entire value chain for vehicle construction should be more efficient regarding CO₂ emissions. This is the way EVs could achieve its highest potential to reduce emissions since their production. Their goals rely on lowering emissions from three sectors: production, replenishment of car parts, and final usage. The first step is to minimize the factories' emissions by 80% over ten years, using only renewable energy. Then, lower 20% more of the parts sector by manufacturing battery cells in Europe using only hydropower. Finally, the electrification of 50% of the fleet market offer by 2030 will contribute with a 40% decrease in final usage compared to today's emission levels. Even if the group does not fully achieve the established goals, looking into EVs' whole supply chain is essential to reduce its carbon footprint.

In France, the great majority of the electric distribution grids are property of local public bodies or municipalities, which in most cases grants the exploitation rights to a DSO. Representing the energy unions in this round table, Mr. **Laurent Favreau**, the vice-president of the Vendée department energy union (SyDEV), affirmed that their objective is twofold: invest in innovative experiments and communication. The small scale of a department is an adapted ecosystem to test innovative projects linked to renewables and electromobility. For example, solar photovoltaic parking lots with charging stations using solar energy and public charging stations connected to the public lighting electric grid. The communication role done by them is crucial to passing the messages coming from DSOs, OEMs, automakers to the general public in a simplified way.

Governance: From actors to users

The second day of discussion was opened by H.E Mr. **Bernard Fautrier**, plenipotentiary Minister, reaffirming the importance of having meetings like EVER. He argues that fueling the discussions to create a better environment for future generations should be the priority. The governance was tackled

in two complementary forms: two academic-oriented presentations and two testimonies from the action field.



As co-organizer the Mr. **Christophe Bonnery**, Executive Vice-President of IAEE and director of economics and prospective at ENEDIS thanked the Government of Monaco to host this event. Mr Bonnery stated that academic studies should systematically help decision-makers to support their actions based on elaborated scientific models. Those models can find mobility patterns, optimal charging infrastructure location, optimal subvention programs, adapted electricity tariffs, etc. Mr. Bonnery presented a gravity-based model adapted to the mobility sector to estimate travel needs in French communities. The results showed disparities between territories in the country regarding average distance traveled per inhabitant, and total distance traveled per municipality. Consequently, the governance to build an adapted infrastructure for electric vehicles should take these disparities into account.

EVs in a positive energy territory will continuously interact with other distributed energy resources (DER) like batteries and photovoltaic panels. The second academic work by Mr. **Icaro Silvestre Freitas Gomes**, Ph.D. student at Paris-Saclay University and PhD-researcher at VEDECOM focused on those interactions and possible consequences. He argued that the synergy should be analyzed multidimensionally, considering technical, economic, and societal aspects. From his simulation model, he concluded that the electricity tariff design is the most appealing aspect to reformulate in the short term rapidly. Thanks to his research, he shows that, as DERs create cost-shifting issues from users who have not them installed and those who have, the classical way electricity is charged

today around the world needs to be upgraded to efficiently tackle this synergy.

The field experiences show that local users and municipalities are generally the most interested in investing in renewable energies or charging stations. Mrs. **Alice Alessandri** from Energie Partagée, a citizen association created to invest in renewable energy projects, and communicate about their importance, defended the governance of locally driven investments. Citizens from a particular municipality can collaborate with a joint fund to invest in wind or solar farms using local labor. The selling of this green energy will bring profit to local shareholders, which will benefit the local community and boost the economic fabric of the territory. Finally, **Jean Noël Laury**, the president of the Yonne Departmental Energy Union (SDEY), shared his point of view about the union's governance-related role. The experimentations on the field carried out by the unions in many territories are the adapted governance since the local syndicate knows the needs and the particularities of their environment. Projects, including charging stations, multi-service stations using hydrogen and power-to-gas concepts, are present in the Yonne department to help the development in other communities with the lessons learned.

Finance and regulation

There are several ways to finance a renewable project in French territory. It can be via a citizen fund using crowdfunding methods like the one used by Energie Partagée, or it can be implemented benefiting from bank loans. Mr. **Richard Curnier**, regional director of the Territories Bank, raised attention to the importance of climate financial plans to accelerate companies' and regions' environmental transition. Those plans boost the economy by investing and following greentech companies that innovates a lot in the field. On top of that, Mr. **Adrien Fourmon**, a lawyer from Jantet Associated Lawyers, explored renewable energy support regulation. A system of additional remuneration has been replacing the contracts stating purchase obligation by the public utility of the electricity produced by one renewable power plant. These systems rely on the wholesale market price of electricity to reach the electrical installation's break-even point. The public utility intervenes with financial help in case the power plant does not reach this point. Once the system is in place, the aggregators appear to manage the contracts for the producers, while the banks transfer part of the project's uncertainty to this new entity. Moving to the public sphere, Mrs. **Virginie Haché-Vincenot**, responsible for the Monaco principality's energy transition, insisted on the importance of public regulation to incite new technologies. In Monaco, for example, subventions for electric vehicles have been present since 1994, contributing to the EVs' rapid development at the principality.

Technology and energy efficiency.

The last round table was about the relation between the new technologies and their efficiency from a societal point of view. From the Agency for Ecological Transition (ADEME) mobility studies department, Mrs. **Ariane Rozo** pointed out that technological progress should be carefully followed to avoid more damage to the environment. For example, the battery size increases when battery cells become cheaper, which can be harmful to the ecosystem due to their production process. The focus should be on changing behaviors and think about mobility as a myriad of choices (carsharing, two-wheels, scooters, etc.). The general public must keep in mind that EVs are different from combustion cars, so their behavior should be different as well. Then, Mrs. **Cécile Goubet**, general secretary of the National Association for Electric Mobility Development (AVERE-France), states several propositions about public policies to incite new technologies. In the electromobility sector, a French pilot aware of the national market's specificities should be created to explore smart charging and vehicle-to-grid concepts. They also should allow non-discriminatory data diffusion from electric vehicles,

electric networks, and third part buildings and engage standardization initiatives.

Conclusion

Each round table could have been the main theme for discussion for the whole event because of their complexity and importance nowadays. In conclusion, there is no universal answer and receipt to develop positive energy territory and electromobility quickly. The issues should be tackled on several fronts at the same time by different stakeholders like it was done in the event. The EVER Monaco 2020 event served well the purpose of being an environment where academics, industrial players and regulators can exchange information, experiences and contribute to the clean mobility evolution. Bringing together renowned experts during a conference around the decarbonization of the mobility sector concomitantly with the power one is an example to be followed to make a sustainable future for everybody.

Mr Christophe Bonnery, and the plenipotentiary Minister of Monaco, H.E. Bernard Fautrier, announced next year EVER conference will take place in May 2021 in collaboration with IAEE.