

Harnessing Clean Energy Projects in Mexico: The Case of the Jalisco 1 Solar Plant and the LED lighting in Zapopan

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1. Introduction

As it has been commonly agreed by both politicians and scientist, energy and cities hold the two most important keys in the fight against climate change. Energy production currently accounts for two thirds of global GHG emissions. Additionally, Cities – habitat of 50% of the population - are responsible for 70% of global emissions and 60% of the total energy consumption. However, due to a global shrinking in public budgets and spending due to the 2008 economic recession, cities have been compelled to finance their own energy project, even though they usually lack the technical and financial capacity. Based on this, it is urgent for local governments to develop effective financial mechanisms, such as public-private partnerships (PPP) and Energy Saving Performance Contracts (ESPC), to close their financial gaps. Otherwise, it will be impossible for governments to cover the cost of large scale infrastructure projects, nor unlock its environmental benefits.

Within this context, Fortius Electromecánica business ventures have set an invaluable example of innovative and sustainable private-sector partnering with the three levels of government (national, state and municipal). Through the development of two groundbreaking energy projects, one on renewable energy and another in energy efficiency, this company has demonstrated that It is possible to engage in profitable opportunities that also can promote positive social, economic, and environmental impacts at the local level.

The following paper seeks to serves as a depository of the best practices implemented by Fortius, as well as an account of its impacts in relation to the Mexican and the world's sustainability goals. Based on these objectives, the paper has been divided in two main sections. The first part will provide the reader with the general background of the Mexican Energy reform, how it related to PPA and ESPC, and how it has been leveraging by Fortius; while the second will focus in the social, economic, and environmental challenges and impacts the projects implemented projects.

2. Background

Thanks to the Mexican Energy Sector reform that's was approved in 2013, which among other things allowed the direct intervention of the private sector in the production and distribution of energy (including renewables), Mexico had for the first time in decades an enabling legal formwork that allowed companies to harness the great potential the country has in relation to solar energy production. Furthermore, thanks to the subsequent financial stimulation packages that were released by the National and State Governments, energy companies, including Fortius, were able to significantly reduce installation costs, and therefore incentivizing investment. Some examples of the incentives provided include land endowments, fiscal breaks, and PPA.

¹ Founded by Eduardo Rigüero Escoto and Sergio Alcalde Delgado, Fortius and Power is a consortium of energy related companies lead by Fortius Electromecanica S.A. de C.V. and Power Iluminare S.A de P.I. de C.V., that together with Biocap S.A de C.V, SAPI de CV and Comercializadora Bioluminación S.A. de C.V., is one of the most important energy consortiums in the West of Mexico. Its business model is based in providing sustainable energy services and solutions through electromechanical installations and renewable energy alternatives at the forefront of technology. It is headquartered in Guadalajara Jalisco, Mexico.

Regarding energy efficiency projects, while ESPC should be a common practice, due to the lack of trust between the private and public sectors, these projects are still rare since they usually need to sign agreements that transcend the administrations natural terms. To overcome this challenge, the public procurement process launched are usually required to incorporate international transparency and legal principles in order to guarantee a fair selection; as well as to promote a clear negotiation with the municipal government in order to make the contact binding on both sides.

The first main initiative implemented in Fortius was bidding in one of the first energy auctions enacted in the context of the energy reform by the Federal Governments during 2015 for the concession to produce solar energy. After being awarded with the permit to supply energy to national grid through a PPA), Fortius further negotiated with the national, state, and municipal governments a grants package that helped it reduce the installation costs of one of the first large-scale solar plant in the state of Jalisco (worth 14 million USD). Today, the project denominated “Jalisco 1” harness the excellent geographical Jalisco for solar energy for the production of 8 Megawatts of electracry (the equivalent to 16,000 average households) through 25 thousand PV panels distributed in 14.4 hectares on arid land.

The second initiative consisted in an 18 years’ public-private partnership (PPP) between the Municipal Government of Zapopan, Fortius, and Power Iluminare (creating Fortius&Power) in order to finance a US \$15 million-worth renovation project for the 70,000 street lights of the city with LED efficient bulbs. However, instead of required an immediate repayment, an ESPC was agreed with the government of Zapopan. In this way, the municipal government will use part of their energy savings to repay the LED lights, as well as the installation and O&M related costs for the duration of the contract. Based on this, the ESPC signed was able to overcome the main challenges local energy project face, regarding a difficult relationship with the government.

These projects are two of the largest energy efficient and clean energy production deals achieved in the history of Jalisco and Zapopan and have a set an example for other states and cities in Mexico on the benefits of public private partnerships for the development of the clean energy. While certainly the scale is not the largest, these projects are competing with energy giants such as Grupo Dragon or Enel. The only difference is that, while the other projects benefit companies abroad, fortius, a 100% Mexican company, is helping to directly strengthen and incentivize the domestic market.

2. Challenges

The main challenge was to create trust among the multiple actors without any third-party involvement that could secure the investment. To overcome this challenge, the first factor of success was the existence of financial incentives from the public sector, as well as an enabling legal framework that provided security. The second factor was to have a clear and transparent communication among the participants, where expectation and objectives were openly defined. On this point, the biggest challenge was to secure the long-term investment of the National Government and Zapopan, given the risk that a new administration might not honor the agreement. To solve this, clear rules were set from the beginning, while also establishing an agreement regarding pricing and supply in order to guarantee the best outcome for both parts. The third factor was the identification of a clear demand, and the opportunities that existed as suppliers. Finally, the factor of having a regulated, yet fair, market was decisive. As time advances, it is highly probable that new companies will start emerging; however, having financial and legal security was crucial for the private sector to do the investment.

3. Social Benefits

In the case of the solar project, the supply of low cost clean energy for the population of Jalisco is directly contributing to lower emissions and consequently improve the general health of the population and the environment. Moreover, thanks to the government's support, there was no increase in prices; on the contrary, prices have decreased (the energy produced by Jalisco 1 is between 20 and 25% cheaper), nor required a tax increase. Furthermore, it generated 200 temporary jobs and 100 Permanent jobs, benefiting more the 45 households.

In relation to the replacement of the street light with LED bulbs, besides the savings in energy which can add up to 60% less consumption, this will be an important step in order to help increase public safety through better lighting - particularly for women -, as well as to allow business to expand their hours of service. Consequently, the 1.2 million people living in Zapopan will be able to have access to improved public lighting services.

Other by-products of these projects are the professionalization of the local work force in order to satisfy the growing demand to work on clean and smart energy projects; strengthening the public-sector capacity and trust to undertake similar projects; encourage the private sector to engage in similar business ventures; and to change the perception of civil society on the public investment in environmentally-friendly projects (there is a general negative perception of governments engaging in long-term projects). Furthermore, it significantly contributes to the expansion of the market in Mexico, which as it was already mentioned, has great potential to grow.

4. Economic Benefits

Thanks to the attraction of capital through the various government incentives that help reduce installation cost and provides security, the Jalisco 1 solar plant currently has a stable rate of return of 20%. For the next years. As a result, in less than a year, the Jalisco 1 solar plant was up and running at full capacity since its inauguration in April 2017. Moreover, the expansion plans have already started in order to double the capacity of the plant to 16 MW.

On the other hand, the establishment of a public-private partnership between Forties and power (F&P) in 2017 with the Municipal Government of is a perfect example of how local governments can access energy efficiency technology with no upfront cost. Moreover, while F&P will obtain the returns of its investment calculated in 9.7%, they will also be able to profit from the use of the light posts.

Finally, these two projects are a great starting point for the Mexican economy to start diversifying into clean energy production projects and large-scale energy efficiency installations. Due to the lack of opportunities before the 2013 Mexican Energy, there are not many examples of private ventures. However, the liberalization of the market has without doubt open a huge market that needs to be quickly tackled in order to help Mexico achieve its climate commitments.

5. Environmental Benefits

In the specific case of the solar project, this project is already providing 16 GWh/year of clean energy to 16,000 households, directly contributing to Mexico's a energy independent. In this regard, it is important to note Mexico's main source of energy is still heavy oil; therefore, diversification of energy sources is one of the country priorities.

On the topic of climate change, through the introduction of solar energy to the Mexican grid (which currently accounts for 3% of the total energy produced), Fortius is helping to reduce 10,000 tons of CO₂e to the atmosphere per year. Furthermore, this reduction will be strengthening once the 70,000-street light of Zapopan are replaced by LED bulbs. This exercise will significantly contribute to Mexico's NDC goals, as well as to the fulfillment of Sustainable Development Goal 7 (targets 7.2 and 7.3) and 13.

While this project does not necessarily address adaptation issues per se, it is an excellent example on how large-scale infrastructure projects can be financed through public-private partnerships that help reduce investment burdens on all sides. Furthermore, despite the project's main environmental contribution will help Mexico's mitigation efforts, it also sets a precedent for future investment in clean energy production and energy efficiency technology implementation.

5. The Relevance of Partnerships

Both initiatives were made possible thanks to the power of partnership. Regarding the public sector, the federal government provided the enabling legal and political environment. This included the guarantee of a stable energy consumption rate, initial financial incentives, and the possibility to use energy transportation and related infrastructure. Additionally, the State Government of Jalisco, mainly through its recently created state energy agency, offered technical support and financial incentives. Finally, in the case of the solar plant, thanks to the intervention of the municipal of Zacualco (jurisdiction where the plant is located), it was possible to secure the land rights. For the energy efficient public lighting project, the municipal government of Zapopan – the star partner of the initiative - provided the financial sustainability through a long-term use agreement.

Regarding the other sectors, the private sector, represented by Fortius and partner companies, supplied the technical capacity and covered the investment gap. Moreover, civil society also played a key indirect role as consumers, together with local academic institutions as provide the labor force that supports the development of the project. In exchange for their support, Fortius has opened its facilities to encourage researcher and field-trips for interested students/academics in learning about the work that is being developed.

6. Replicability

Both projects are completely scalable. As an example, the solar plant "Jalisco 2" is already under construction, which will add 8MW of capacity to "Jalisco 1", doubling the environment and social impacts of the original plant. Nonetheless, in the case of the LED project, while this one is still under development and cannot be scalable in the strict sense of the word since it is limited by the political boundaries of the municipality, it is easily replicated in the municipalities in the Guadalajara Metropolitan Area, as well as in any municipality in Mexico as long as there is political will.

7. Lessons Learned

The most important lesson learned was the economic value investing in alternative financial mechanism. It was only through this type of initiatives that the projects came to realization. It was also learned the value of a well-structured cooperation agreement between the public and private sector, which can enable impactful prospects.

While PPA and ESPC are not a novelty worldwide, its implementation in Mexico is a significant milestone towards the development of more clean energy and energy efficiency projects. In this sense, Fortius and Power are pioneer companies by applying these financial instruments in order to open a whole new market. Finally, both companies have been very careful in selecting the latest technology that guarantee the biggest potential, without sacrificing cost or quality.

According to the World Bank, the three main ways an energy project can be financed with a PPP is only through a PPA, ESPC or a CEC. Moreover, despite great investment from the international community in support of these initiatives, these types of cases remain being scarce due to the multiple challenges they face. Based on this, the story of Fortius is extremely valuable from a research perspective, since not only were they able to successfully implement one tool, but all of them in one single region. This proves that it is possible to apply these mechanisms in the global south with the same result, or better, than in developing countries.