



PV & Wind Framework Assessment in Argentina Preliminary results for wind power

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PV & Wind Framework Assessment for Argentina

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PV & Wind Framework Assessment for Argentina

Project basic information

SUPPORT

Financed by the German Foreign Office (March to Sept. 2017)





PARTNERS

eclareon, BWE, CADER, Secretaría de Energía de Salta, BSW-Solar













PV & Wind Framework Assessment for Argentina

Objectives and Activities

OBJECTIVE

Contribute to the deployment of RES in Argentina

ACTIVITIES

- Identify viable business models for wind power and PV
- Analyze the legal and administrative process flows for identified business model
- Detect the existing barriers hindering the implementation of business models
- Formulate concrete recommendations for removing these barriers, based on the experience of private sector actors
- Strengthen cooperation and transfer of knowledge between relevant stakeholders







Project Development Procedure

Project Development

Site selection & Preparation of the project proposal

Identification of renewable energy resource and potential grid connection points for site selection. Signing of the land contract.

Wind or Solar prefeasibility study Electricity prefeasibility study

Environmental Impact Assessment (EIA) - Environmental Impact Declaration (DIA)

Projected average energy output of the RES plant

Preliminary financial studies and CAPEX

Due diligence to become MEM agent

In parallel to the preparation of the prefeasibility studies and EIA, the generator must conduct the due diligences according to Phase I of the "Procedures of CAMMESA" to become an agent of the "Wholesale Electricity Market" (MEM).

Subsequently, the ME&M should approve by means of resolution the request to become generator agent of the MEM.

Connection permit & grid access

Once approved a new MEM generator agent, the latter asks for a connection permit to the local grid. The local TSO issues a preliminary decision and submits it to CAMMESA.

CAMMESA evaluates the preliminary decision of the TSO and submits it to ENRE. The latter issues a final resolution on the electricity grid access. With this final resolution, the MEM generator has the commercial qualification.

Public auction

Submission of the offer to RenovAr auction rounds and bid selection PPA & financial closure

The projects that have been awarded in the auction rounds must sign the PPA contract and then obtain the required financing to start the construction of the RE plant.



Business Model: Auctions with PPA

Too high cost of capital/ weakness of FODER Guarantee Low prices under RenovAr auction rounds **Barriers Import taxes uncertainty** 3 High turn-key costs for wind power systems (logistics) 4

Analysis data based on interviews with Argentinean experts

Project Overview

| Project Parameters | | | | |
|--------------------------|----------|------------|--|--|
| System Size | MWp | 50 | | |
| Capacity Factor | % | 45% | | |
| Specific System Cost | USD/MWp | 1.500.000 | | |
| Investment Subsidy | USD | - | | |
| Total System Cost | USD | 75.000.000 | | |
| Fixed Operation Costs | USD p.a. | 2.437.500 | | |
| Variable Operation Costs | USD/kWh | : | | |

| Investment | | | | |
|--------------------------|-----|-------|------------|--|
| Project Duration | | Years | 20 | |
| Equity | | USD | 30.044.764 | |
| Debt (Gearing) | 70% | USD | 52.500.000 | |
| Loan Tenor | | Years | 8 | |
| Interest Rate (Year 1-3) | | % | 8,00% | |
| Interest Rate (Year 4+) | | % | 7,00% | |
| Discount Rate | | % | 2,0% | |

| Business Model | | | | | |
|-------------------|-------------|---------|---------|--------|--|
| Cat | egory | Share | Unit | Price | |
| Feed-in Tari | ff | - | USD/kWh | - | |
| PPA Tariff | | 100% | USD/kWh | 0,0533 | |
| | Fees | | USD/kWh | - | |
| Overysupply Price | | USD/kWh | - | | |
| | Undersupply | Penalty | USD/kWh | - | |

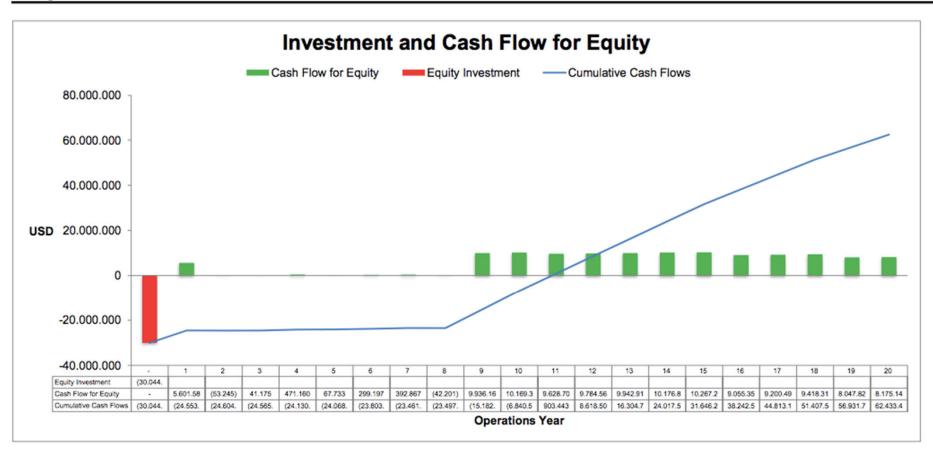
| Results | | | | |
|---|---------|------------|--|--|
| Net-Present Value | USD | 59.572.463 | | |
| Project IRR | % | 8,51% | | |
| Equity IRR | % | 10,51% | | |
| Payback Period | Years | 11,88 | | |
| LCOE* (w/o subsidy) | USD/kWh | 0,05 | | |
| LCOE (w subsidy) | USD/kWh | 0,05 | | |
| Min DSCR** | X | 0,99 x | | |
| Min LLCR*** | x | 1,00 x | | |
| * LCOE: Levelized Cost of Electricity ** DSCR: Debt Service Coverage Ratio *** LLCR: Loan Life Coverage Ratio | | | | |



Business Model: Auctions with PPA

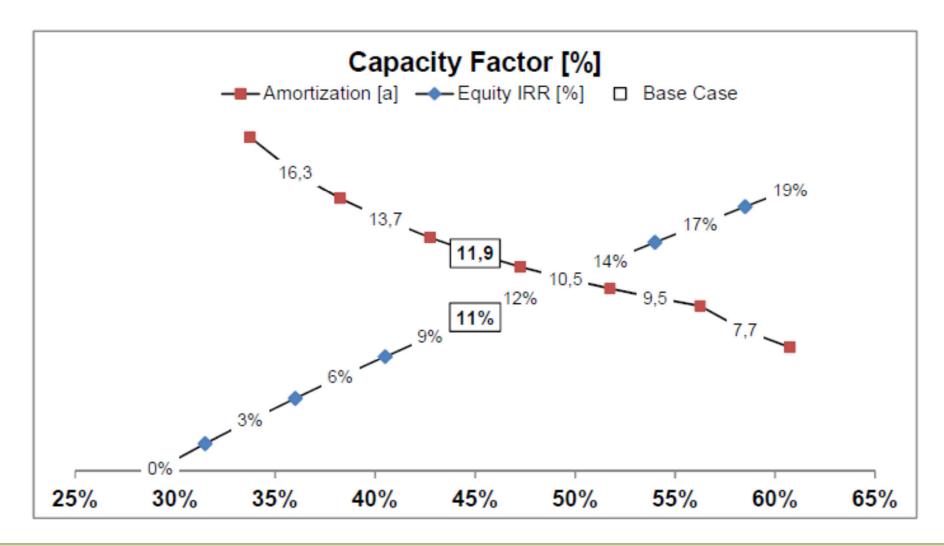
Profitable investments after 11.9 years

Project Cash Flows



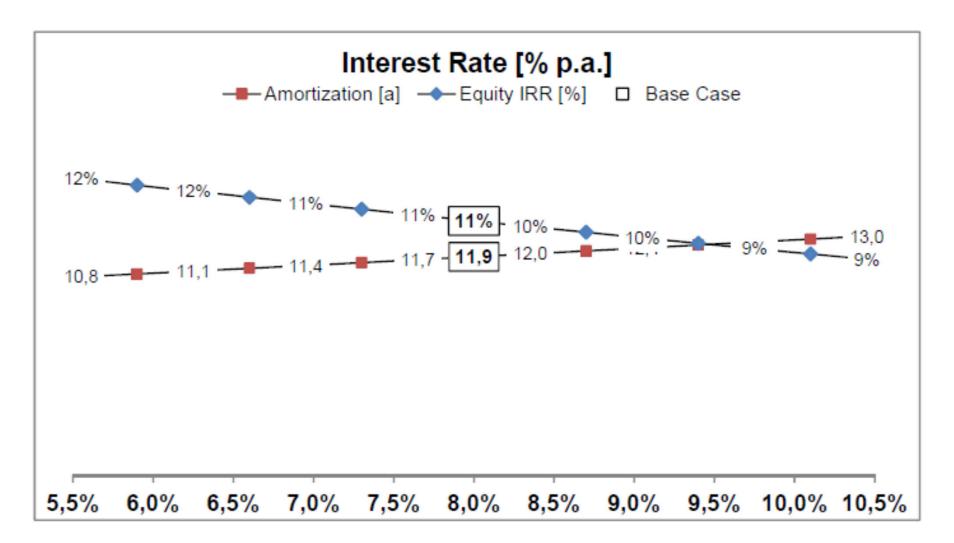


Capacity factor decisive for successful wind power project



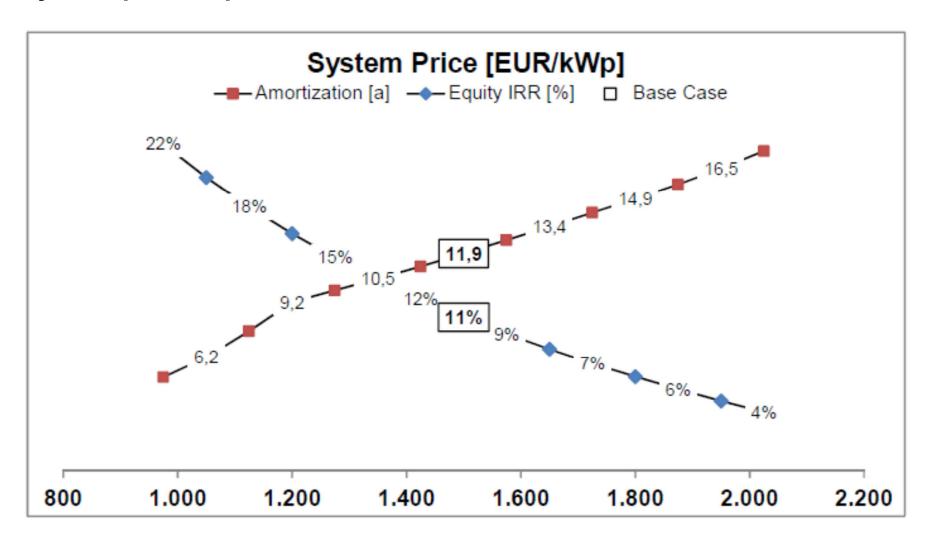


Potential in reduction of interest rate





System price important factor









Investments in Wind Energy in Argentina

Significantly conditioned by

Low auction result in challenging market

Low system costs important component

 Cost of capital & innovative logistics possible approaches



ideas into energy.