

Long-Term Clean Energy Auctions - process and results

- ▶ The auctions were successful for CFE, with the purchased of 5.3 M of CELs, 5.4 TWh of energy and 0 MW of capacity, which represents 84.9% of energy, 84.6% of CELs and 0% of capacity out of the CFE maximum demand
- ▶ The solar PV technology represented 75% out of the total MW of capacity, which will enable a diversified clean energy market. The other 25% was wind farm technology
- ▶ Record low prices were set for the solar PV technology

I. Auctions Context

A. As part of the energy reform and to attract private investment, Mexico organized its first renewable energy auctions

1. Key aspects

- ▶ Multi-energy tender
- ▶ A complex bid evaluation process with regional adjustment of bid prices
- ▶ Choice of payment indexation on Mexican inflation or on a combination of Mexican inflation, US inflation and MXN/USD FX rate
- ▶ Bidders offer packages of up to 3 different products
- ▶ Bidders offer a global package price for the totality of its offered products

2. Products auctioned

- ▶ **Capacity:** 500 MW of firm capacity at max price of MXN 10,000 / MW through 15-year indexed PPA
- ▶ **Energy:** 6.36 TWh at max price of MXN 884 / MWh through 15-year indexed PPA
- ▶ **CELs:** 6.36 M units at max price of MXN 444 / CEL through 20-year indexed PPA

3. Participants in auction

- ▶ **Offtaker:** CFE subsidiary (Basic service supplier)
- ▶ **Clearing House:** corporate entity that shall administrate all contracts awarded through auctions
- ▶ **Bidders:** foreign and local private investors alongside CFE and Pemex (State productive companies)

4. Offers submitted to prequalification

- ▶ 103 companies
- ▶ 468 bids
- ▶ Capacity: 830 MW vs. 500 MW required
- ▶ Energy: 102 TWh vs. 6.3 TWh required
- ▶ CELs: 109m CELs vs. 6.3m required

5. Important dates

- ▶ **March 28th 2016:** Sales offers bids
- ▶ **March 29th 2016:** Iterations process (if triggered)

- ▶ **March 30th 2016:** Final ruling
- ▶ **June 24th- July 12th 2016:** Contract subscription

B. Three main products were auctioned

1. Cumulative clean energy

Electricity delivered in the Real Time Market over a one-year period, measured in MWh, at the interconnection points of each Power Plant, from Power Plants with a right to receive Clean Energy Certificates (CELs)

Key concepts of Power

- ▶ Power zones:
 - o Power zones consist of a set of P nodes interconnected together
 - o They are defined only where there is a need for local generation

▶ Nodes

- o Nodes that do not belong to any power zone can participate in the market for balancing power system

2. Capacity

Refers to supplier commitments to maintain installed capacity and provide energy using that capacity in the short-term energy market

Key concept of capacity

- ▶ Availability of physical production:
 - o Availability of Physical Production will be based on the average availability of generation for the 100 critical hours in the corresponding Power zone

3. Clean Energy Certificates (CELs for its acronym in spanish)

CEL is a title issued by the CRE certifying the production of a certain amount of electricity from clean energy and serves to meet the requirements associated with the consumption of the load centers

Key concepts of CELs

- √ The Energy Transition Law established the goals of the percentage of clean energy out of the total electricity consumption; for 2018 rate is 25%, which increases to 30% in 2021, and 35% in 2024.

- ✓ CEL is a **title issued by the CRE** certifying the production of a certain amount of electricity from **clean energy** and serves to meet the requirements associated with the consumption of the load centers
- ✓ The price of CELs is an incentive that drives the market entry of clean power plants required to achieve the goal of clean generation, since the sale of certificates provides an additional price of energy and power income. **The price of CEL in the market depends on the balance of supply and demand, and the expectation in the medium term for the availability of certificates**

PPA revenues are based on the offered package price, annually indexed on a mix of US and MEX inflation, adjusted with unbalances and hourly adjustment payments

C. PPA revenues are based on the offered package price, annually indexed on a mix of US and MEX inflation, adjusted with unbalances and hourly adjustment payments

TOTAL PPA REVENUE FOR THE PROJECT = PACKAGE PRICE ± (B) UNBALANCES ± (C) HOURLY ADJUSTMENT FACTORS

(A) PACKAGE PRICE

- ▶ **Package price (PP):** Bidders will offer an annual price corresponding to the fixed annual quantities of products they offered
- ▶ **Notional prices:** Without capacity, 1/3 of the PP is allocated to CELs payments and 2/3 is allocated to energy
- ▶ **Indexation:** The package price will annually be indexed on USD or Pesos. Indexation starts at PPA signing.
 - ▶ If USD indexation is chosen: The PP will be 90% indexed on USD/MXN FX rate, 20% on US inflation and 10% on Mexican inflation
 - ▶ If MXN indexation is chosen, the PP will be 30% indexed on Mexican inflation

(B) UNBALANCES

- ▶ **Capacity:** If the seller produces more capacity than contracted, the seller can dispose of this capacity. In the opposite scenario the seller shall be responsible for the sanctions imposed by the CRE. (No more information is available at the moment)
- ▶ **Energy:** If the energy balance is in deficit, the seller shall pay to the buyer the deficient amount of energy at the maximum between the average Local Marginal Price (LMP) for the annual period and the seller's notional price of energy. Otherwise, the buyer shall pay the seller the exceeding balance at the annual average production-pondered LMP
- ▶ **CELs:** In the scenario in which the CEL's balance presents a deficient position the seller shall pay the buyer the deficient amount of CEL's at the annual spot price. Otherwise the seller can dispose of its excess quantity of CELs to its best interests, i.e. sell them on the spot market

(C) HOURLY ADJUSTMENT FACTORS

Under Cumulative Energy contracts, Suppliers with intermittent clean sources shall receive a monthly payment equal to the Schedule Hourly Adjustment Factors multiplied by the number of MWh of energy produced on a per-hour basis

HOURLY-ADJUSTEMENT PAYMENTS = Number of MWh of cumulative energy produced per hour × Scheduled hourly adjustment factors provided by CENACE

D. The offtaker CFE, currently losing money but with stable ratings, is going through a complete reorganization

1. New organization

Under of the new reform, CFE will be split into several divisions:

1. CFE TRANSMISSION
2. CFE DISTRIBUTION
3. CFE BASIC SUPPLY
4. CFE QUALIFIED SUPPLY
5. CFE GENERATION (4)
6. INDEPENDENT : will attend power independent producer
7. SELF SUPPLY: will attend all the self-supply producer
8. CFE INTERNATIONAL: will compete in the international market to generate power and buy/sell gas
9. CFE ENERGY: will attend self-supply producer

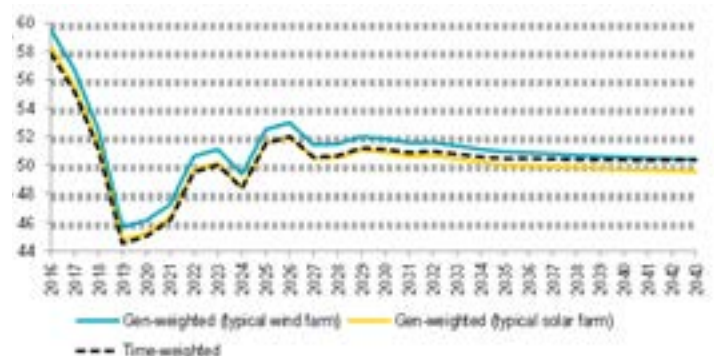
2. Guarantees

- ▶ Based on the contract established between the two parties: from the operation date, CFE will have the obligation to issue a bill within the first 10 business days of each month specifying :
 - a. The amount they will pay
 - b. The amount of product delivered during the period
 - c. Adjustment needed to reconcile the payment
- ▶ There is significant likelihood of Mexican government support in the case of distress for several reasons, including the company's status as a major government-owned entity, and its strategic importance to the country's economy overall

3. CFE ratings and outlooks

- ▶ CFE is respectively rated A- / BBB+ / Baa1 by Fitch, S&P and Moody's
- ▶ The issuers ratings take into account the following four input factors:
 - a. Baseline credit assessment (BCA) of ba1 as a measure for the rated entity's standalone creditworthiness
 - b. The A3 rating of the Mexican government as the support provider
 - c. Very high degree of implied government support in the case of financial distress
 - d. Very pronounced default dependence between CFE and the Mexican government
- ▶ The outlook on the ratings is **stable**.

E. Spot prices are expected to converge toward an estimated 50 USD/MWh as the results of upward pressure from demand growth and higher gas prices, and downward pressure from lower costs of generation



- ▶ EY spot market trend analysis shows a slight increase in the short term due to expected gas prices rise
- ▶ Then all modeled scenarios show decline and convergence toward a flat price slightly lower than 2015 average price
- ▶ The variations in the CENACE price forecast are an outcome of the specific generation mix
- ▶ The reduction in prices over the first five years is largely due to expensive oil-fueled power plants being replaced with renewable energy and natural gas power plants
- ▶ The price rise to 2023 is due to a relative stall in renewable energy installations while the gas price continues to rise.
- ▶ The relatively flat trajectory in EY's extended forecast for 2033-2043 is a result of the downward pressure on prices from increasing clean energy penetration and upward pressure from increasing gas prices being of similar magnitude and counteracting each other.

II. Total bids at prequalification stage amount to 15 times CFE's purchase offers (6.3 TWh of clean energy and 6.3 M of CELs)

1. Offers received for the prequalification process

TECHNOLOGY	MW	MWh	CEL's
COMBINED CYCLE	250	-	-
EFFICIENT COGENERATION	-	201,480.00	2,285,951.00
WIND	132	47,166,420.20	48,200,662.00
GEOTHERMAL	-	199,369.00	199,369.00
HYDRO	-	531,032.00	2,661,459.00
SOLAR	449.4	54,510,817.80	55,797,704.00
TOTAL	831.4	102,609,119.00	109,145,145.00

Comments on the offered quantities of products:

- ▶ The amounts of products are difficult to analyze since the bidders were allowed to offer several bids and also combined and excluding conditions
- ▶ Were offered more CELs than clean energy, mostly from Cogeneration and Hydros power plants showing that these Power producers might already bilateral contracts agreements and might offer very competitive price for CELs

III. Key risks considered by financing institutions

Risk	Description
Technology	Renewables resources: Important meteorological variations (wind, sun and rainfall) may affect the amount energy produced
Construction and maintenance	1. Contractor: experience and credit rating 2. Design, engineering, equipment and proper maintenance
Interconnection / Transmission	1. The existence of the substation that the power plant plan to be interconnected and/or possible reinforcements of the substation or transmission line 2. The congestion/curtailment in the interconnection substation or transmission line
COD date	The COD date must be up to 6 months after the COD defined by CENACE (March 28, 2018) . With an early completion, the merchant sales might be paid at the spot price. With a late completion, the project might result in a PPA termination
Offtake risk	The PPA agreement: -Seasonality factors of the renewable energy might affect the delivery obligation in a monthly basis -The effect of the intermittence of the renewable energy may be amplified by the Hourly Adjustment Factors on each month -A deficit in the delivery of the products contracted results in cost of replacement plus the sanction and/or fine if applicable
Merchant risk	Uncertainty resulting from excess generation or from energy sales after 15 from COD due the volatility of the wholesale market.

IV. Final bids

- A. Were purchased 5.3 M of CELs, 5.4 TWh of energy and 0 MW of capacity

Distribution of energy awarded (GWh) by technology, state and company



Awarded bids- 18 packages* from 11 companies

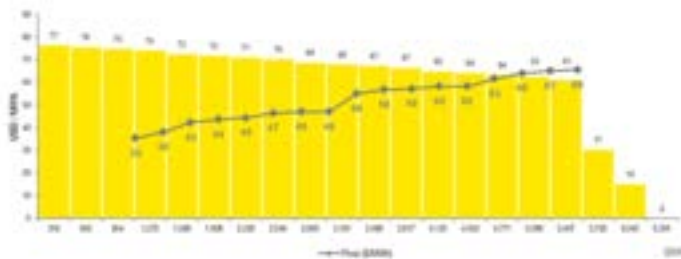
Technology	Parent company	Energy (MWh)	CEL	\$ per MWh+CEL (USD)	\$ per MWh (USD)	\$ per CEL (USD)	State	ED	Cap. (MW)
Solar	Photoemeris	54,979	53,477	\$67.5	\$45.0	\$22.5	Yucatán	-22.0	30
Wind	Consorcio Energía Limpia	291,900	291,900	\$66.9	\$44.6	\$22.3	Yucatán	-22.0	76
Wind	Vive Energía	275,502	275,502	\$65.9	\$43.9	\$22.0	Yucatán	-22.0	90
Solar	Jinko Solar	48,748	48,748	\$63.3	\$42.2	\$21.1	Yucatán	-22.0	18
Wind	Grupo Aldesa	153,199	153,199	\$59.7	\$39.8	\$19.9	Yucatán	-22.0	30
Wind	Grupo Aldesa	127,689	127,689	\$59.7	\$39.8	\$19.9	Yucatán	-22.0	30
Solar	Vega Solar	246,832	241,925	\$58.6	\$39.1	\$19.5	Yucatán	-22.0	500
Solar	Jinko Solar	176,475	176,475	\$58.2	\$38.8	\$19.4	Yucatán	-22.0	70
Solar	Vega Solar	493,303	483,313	\$56.3	\$37.5	\$18.8	Yucatán	-22.0	500
Solar	Canadian Solar	140,970	140,970	\$47.9	\$31.9	\$16.0	Aguascalientes	2.7	63
Solar	Sol de Insurgentes	60,365	60,318	\$47.8	\$31.9	\$15.9	Baja California Sur	-34.3	23
Solar	Jinko Solar	277,490	277,490	\$47.2	\$31.5	\$15.7	Jalisco	1.4	100
Solar	Enel Green Power	339,034	339,034	\$45.1	\$30.0	\$15.0	Oaxaca	1.2	207
Solar	Sunpower	269,155	263,315	\$44.2	\$29.5	\$14.7	Oaxaca	1.2	100
Wind	Acciona	585,731	585,731	\$42.8	\$23.0	\$19.8	Tamaulipas	5.0	168
Solar	Enel Green Power	737,998	737,998	\$38.3	\$23.5	\$14.8	Coahuila	3.4	270
Solar	Enel Green Power	972,915	972,915	\$35.4	\$23.6	\$11.8	Coahuila	5.4	330

*The two packages of ENERGIA RENOVABLE DEL ISTMO II were merged, since the amount of CELs and the MWh of energy in each package were the same, making them complementary.

FX rate: 17.33 MXN/USD on 28 March, 2016 (Source: Banxico)

- ▶ The winners of the Mexican auctions are: ENEL GP (41.6% of the energy awarded); Vega Solar (13.7%); Acciona (10.8%); Jinkosolar (9.3%); Consorcio Energía Limpia 2010; Energía Renovable de la Península, SunPower (JV with Total) each one with 5%; Aldesa; Recurrent, Sol de Insurgentes and Photoemeris with less than 5% each.
- ▶ Two of ENEL's bids set a record low price for PV. (35.4 and 38.3 USD for MWh + CEL)
- ▶ Projects were awarded between 35.4 and 67.5 USD for Energy + CELs
- ▶ The expected difference in Mérida (-22) played a major role, since the awarded bids had the greatest prices (between 67.5 and 56.3 USD) and 1,819 GWh (34% out of total purchased) is located in Merida

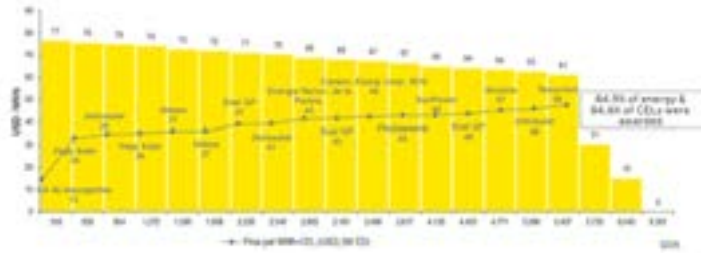
Demand curve of CFE with cap prices (per MWh+CEL) for the 6.3 TWh with bids awarded of energy and CELs



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Without taking into consideration the expected differences, the three latest packages shouldn't have been awarded since they are above the cap prices set by the CFE. The next graph shows how the prices of the 17 offers (taking into consideration the expected differences) are below the cap prices of the CFE.

Demand curve of CFE with cap prices (per MWh+CEL) for the 6.3 TWh with bids awarded of energy and CELs (considering the Expected Differences)



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B. Final conclusions

1. Solar was more competitive than wind

Distribution of the generation (MWh) purchased by technology



2. The Expected Differences made a big difference

Mérida and La Paz were the nodes most favored in terms of Expected Differences:

- ▶ La Paz -34.28
- ▶ Mérida -22

Which had a major implication for the projects allocated in those nodes; principally for Yucatán: where was allocated 1.3 GW of clean capacity.

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