Regulation of Electricity Storage, Intelligent Grids and Clean Energies in an Open Market in Mexico

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Energy storage

The capability of:

- Storing electricity or
- Energy to produce electricity

AND

Releasing it for use during other periods when the use or cost is more beneficial.

Mexican Energy transition

- Energy storage has a relevant role to play in energy transition and to meet Mexican goals in regard to green house gas emissions reduction.
  - by 2018 25% of electricity has to be generated by renewable sources; by 2021 30%; and by 2024 35% (Article transitory 3 of the Energy Transition Law)
  - Reduction GHG emissions in 30% from the baseline by 2020 and 50% by 2024 . (Article transitory 2 of Climate Change Law)
- Technologies for storage has a relevant role on the use of:
  - intermittent renewable energy sources,
  - distributed generation and
  - in the efficient use of energy.

Electricity Storages Technologies

- Electricity cannot be storage efficiently as electricity.
- Electricity only can be stored if it is transformed into another type of energy.
- Storage systems:
  1. *Mechanical Storage*
  2. *Electrochemical Storage*
  3. *Chemical Energy Storage*
  4. *High Temperature Thermal Energy Storage*
  5. *Combustion Turbine Inlet Cooling Storage*
  6. *Electromagnetic Storage*

ES Projects in Mexico

Project of Energy Storage for the Photovoltaic Central of *Santa Rosalía II*

San Juanico Hybrid Power System (1980-1999)

Hydraulic pumping to complement wind generation in the State of Chiapas

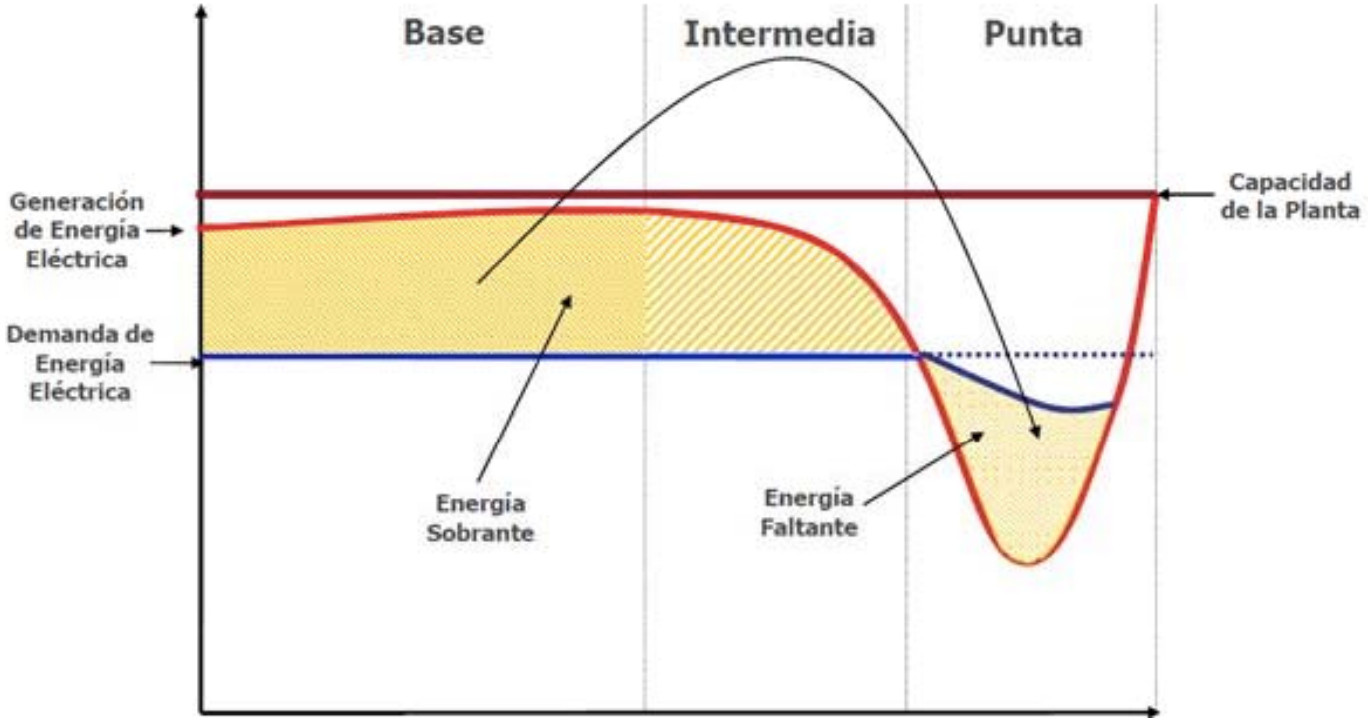
Flywheels in the airport of Mexico City (emergencies) 2014

Mechanical Energy storage systems in the Hydropower plant *Chicoasen II*

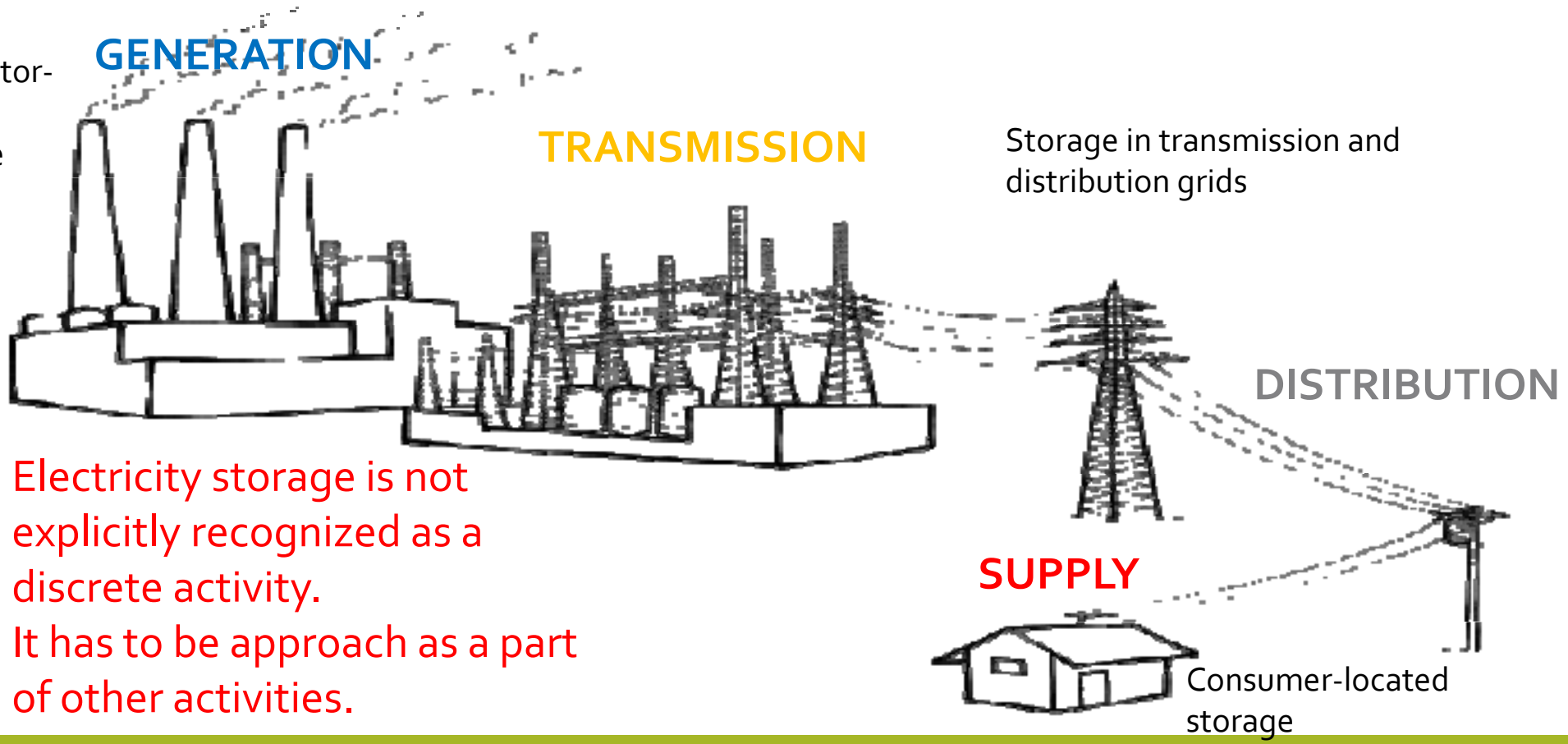
The Power Bank (2010)

It is an energy exchange mechanism that allows the "virtual storage" of energy generated in any time-period and not consumed by users, so that it can be "delivered" in other periods for up to 12 months.

Virtual storage consists of delivering the electricity surpluses received by Grid Operator (FCE) from any generator to another end users and them compensate this excess of electricity with future generator's deficits.

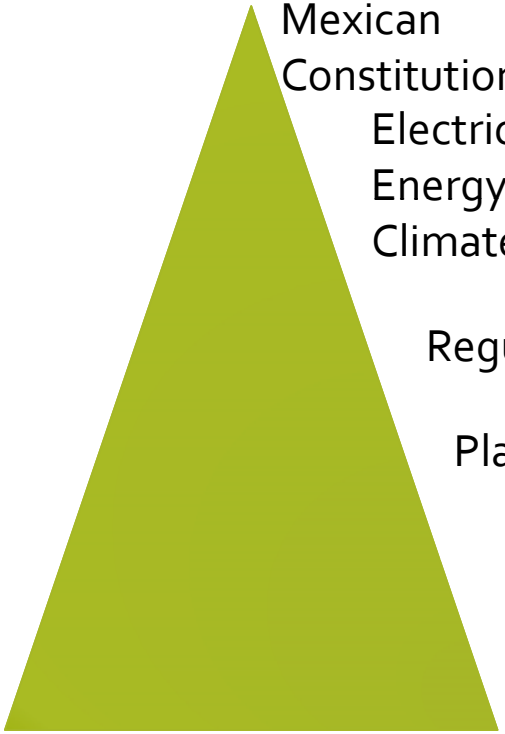

Base
Intermedia
Punta
Generación de Energía Eléctrica
Demanda de Energía Eléctrica
Capacidad de la Planta
Energía Sobrante
Energía Faltante

Location of ESS into the electricity supply chain



- Electricity storage is not explicitly recognized as a discrete activity.
- It has to be approach as a part of other activities.

ELECTRICITY INDUSTRY LEGAL FRAMEWORK



Mexican Constitution

Strategic and non-strategic activities

Electricity Industry Law, Energy Transition Law and Climate Change Law

Regulations under laws

Plans and Programs

Administrative regulations:

The Rules of the Market

- Basis for Electricity Market issued by RCE
- Operational regulations of the market issued by NCEC

Incorporation of Energy Storages in Programmes

2013

Transitory Article 18 of the constitutional amendment Decree required the Executive Power to incorporate into the National Program for Sustainable Use of Energy a *Transition Strategy* aimed at promoting the use of cleaner technologies and energies.

2014

The *Strategy of Transition for Promoting Use of Cleaner Technologies and Combustibles* was published.

2016:

The updated version of the *Strategy of Transition for Promoting Use of Cleaner Technologies and Combustibles* **refers to energy storage as a mechanism to support the operation of** electric vehicles and **grids working with intermittent sources such as renewables, and distributed generation**

Incorporation of ES in Mexican Electricity Regulations

- 2015. BEM: All energy storage equipment must be registered as generation plants and a generator must represent them into the electricity market
- **2015** The new Energy Transition Law was passed.

  .

  - Article 38, X:

    The *Program of Smart Grids* shall to identify, evaluate, design, establish and implement strategies, actions and projects in the field of electricity networks, among which the following may be considered:

    […]

    IX. The development and integration of advanced technologies for the *storage of electricity* and Technologies to meet peak demand.

Energy storage location

IN GENERATION

- *Basis for the Electricity Market (BEM)*:. "ESS have to be registered as generation plats and represented into th market by a generator."
- It does not fits into the concep of *generation plant* provided by EIL.
- An activity open to private investment.
- A permitr could be requiered.
- Regulated by RCE

IN TRANSMISSION

- According to EIL and LET,
- Linked to Smart Grids
- Strategy activity
- Regulated by RCE and CENACE

Energy storage as a separate licensed activity

- Energy storages does not fits well into the concept of generation plant.
- Considering ES has generation activity does not includes all storage technologies.
- If ES is considered as part of transmission activities, so it is an activity reserved to State Productive Corporations.
- Considering Building and Operation of Storages Systems as specific activity open to private investment and subject of regulation could contribute to legal certainty.

Conclusions

1. Regulation of energy storage in Mexico is unclear and contradictory. ES is associated to both generation and transmission and distribution activities and so, it can be considered at the same time as strategic and as non-strategy activity.
2. This lack of clarity is because administrative regulations equate energy storage systems with generation plants, while legislation seems to give more arguments in favour of linking energy storage with smart grids.
3. In addition, neither generation nor transmission and distribution legal regimens fully rule all the issues associated to this activity.
4. What is more, the currently in force regulations and laws does not consider that ES can be integrated at different levels of the electricity system.
5. This discussion, is for the moment only theoretical and has not been implemented in practice, but this potential controversy could be eliminated by simply modifying the Law of the Electricity Industry to include energy storage as a specific non-strategic activity subject to its own licensing system.