Long Term ESI Planning Considerations

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Closing Plenary Session

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Speakers

- Bryan Hannegan, Holy Cross Energy
- Lisa Giang, HECO
- Derek Stenclik, GE
- Ken Donohoo, Electric Power Engineers
- Sandip Sharma, ERCOT
- Debbie Lew, GE, ESIG DER Working Group Chair

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Reflections WDH

- Long-term planning of energy systems should take into account two aspects:
  - from a societal point of view (embodied by the authorities, at least in principle), the energy trilemma should be equilibrated: reliable, affordable and clean energy provision.
  - from an investor/operational point of view: somebody must be willing to invest in equipment, infrastructure and operate them.
    - Even if this is to occur in a regulated environment or under state control, it should still be done with an eye on *economic efficiency* and a 'justified' rate of return for investors, a 'reasonable' remuneration for the operators and 'acceptable' rates for the consumers.
    - In deregulated/liberalized free market context, companies must be allowed to run a *profitable 'business'*, subject to certain regulatory constraints.

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Reflections WDH

- The electric power system deserves particular attention because:
  - Electric energy is still not cheaply storable in bulk quantities;
  - Since about a decade or so, and to continue over the next decades, the electric power system will be massively “perturbed” by the injection of intermittent/variable renewables wind and PV solar.

- But due to expected massive overcapacities (because of limited CFs of the VRE) other sectors such as heating and transportation will have to be considered as well.

- The following concentrates on the electric power system.

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Reflections WDH

- For long-term planning (with main focus on infrastructure, but also market design) the following elements enter the discussion:
  - Planning requirements will be different for different systems (e.g., VRE deployment will be different due to meteorological conditions);
  - What is the planning horizon? 10-20-30 years?
  - Future planning always starts from a brownfield context: there is a legacy of (generation, transmission, distribution, …) assets. Expropriation or phasing out of certain technologies is not to be excluded, however. Although gradual taxing of external costs should be preferred.

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Reflections WDH

- Define clearly what are the objectives of the future planning are or should be
  - Security of Electric Power Supply (SoEPS) / Reliability & Resilience
  - Environmental quality: low emission or 'pollutants' and of CO_2 → these externalities should be internalized (i.e., penalized/taxed);
  - Cost minimization
- Prepare to be able to deal with whatever situation that arises because of other legal requirements (like an imposed VRE share), initiatives by prosumers, etc, environmental building constraints, etc
- Realize that the regulated/deregulated market environment requires different planning approach ("symphony" versus "jazz");

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- What type of power 'plant' investment is needed?
  - Are the *investments "naturally" forthcoming* in liberalized markets?
    - Dispatchable units?
    - VRE? And which type?
  - Are there *regulatory penalties or support or requirements*?
    - Is there a CO_2 penalty (e.g. RGGI)?
    - Is there financial support for non-emitters?
    - Is there a min share of VRE requirement (picking technologies)?
- What kind of HV grid transmission?
  - Possible interstate or regional connections?
  - Connecting the Western with the Eastern systems (and Ercott)?

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- Distribution grid modernization (towards “smart grids”) & roll out of smart meters?
- Regulatory planning and Market Design:
  - How to foresee/stimulate a market environment and incentives for *Active Demand Response and Sector Coupling* (freedom for aggregators; time shifting of industrial manufacturing; voluntary industrial load shedding; …);
  - How *stimulate flexibility options* (to be ‘decided’ by market actors)?
- How are the assets that are planned affected by a dynamic context (faster/slower VRE deployment, Electric Vehicles, …)? Risk for stranded assets?

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