Sustainable Philippine Electricity Supply for Increased End-User Demand

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Goal of Presentation

- Review Philippine Energy Plan 2017-2040.
- Review Restructuring of Electricity Enterprise.
- Offer suggestions for alternative future.

Sources of Energy

- Primary (fuel)
  - Fossils (oil, coal, natural gas)
  - Renewables (hydro power, geothermal, solar, wind, biomass)
  - Nuclear (Uranium-235)
- Secondary
  - Electricity

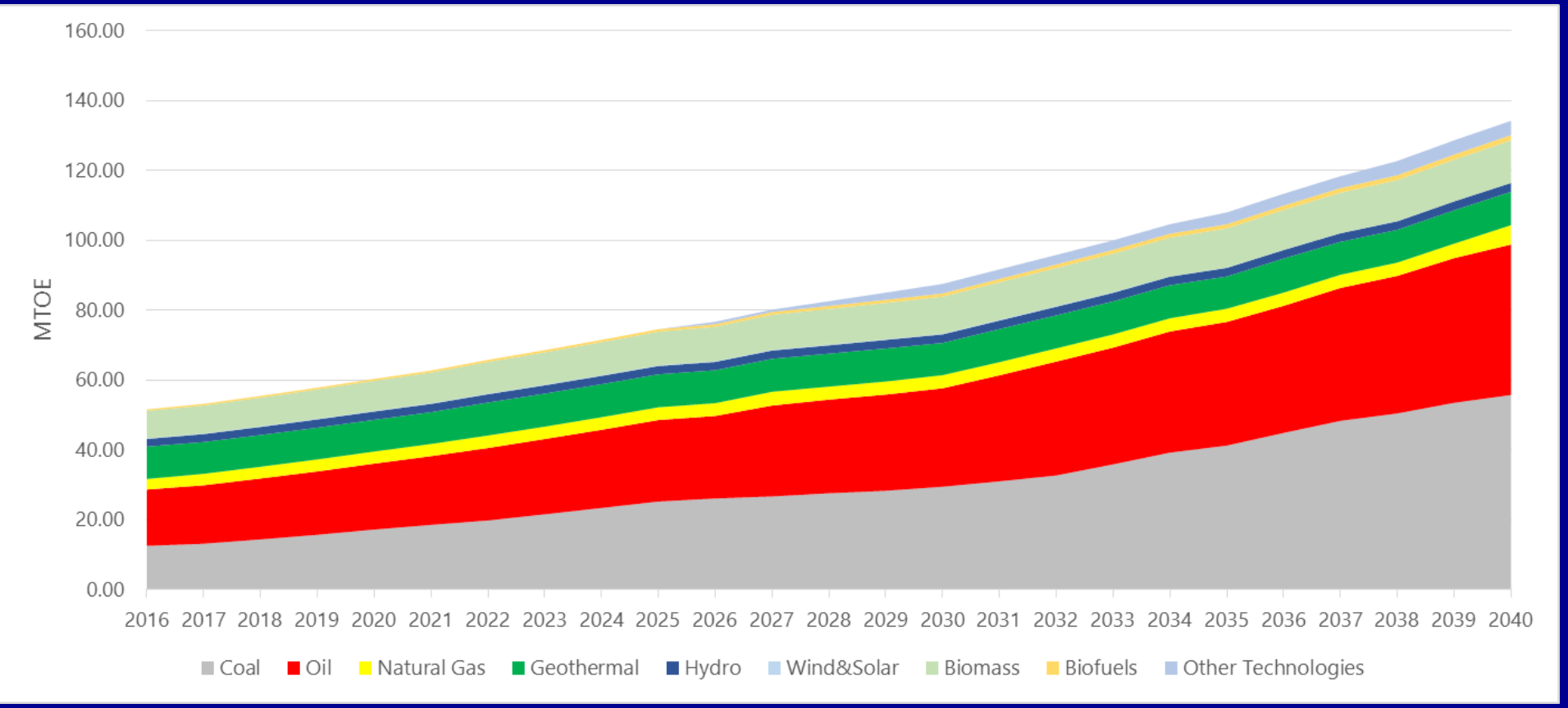
2016 Indigenous Energy Source, 55.3%

- Geothermal 17.9%
- Biomass 14.1%
- Coal 11%
- Natural gas 6%
- Hydro 3.8%
- Oil 1%
- Solar/wind 0.3%, biofuels 0.6%

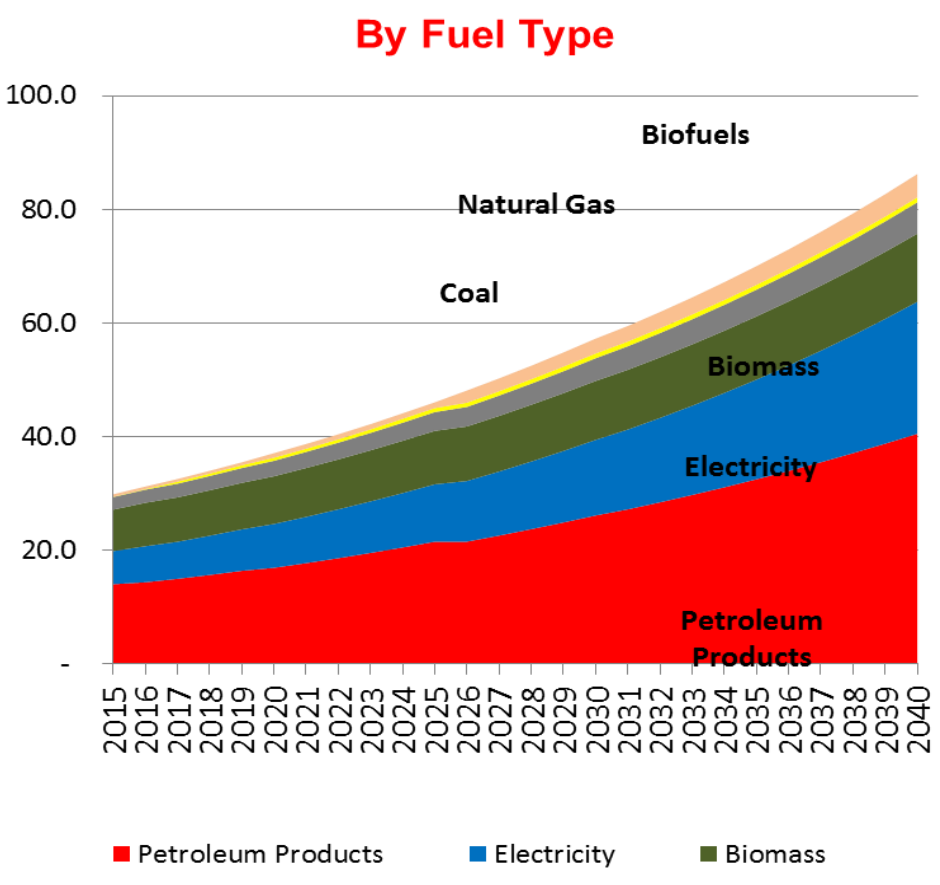
2016 Imported Energy Source, 44.7%

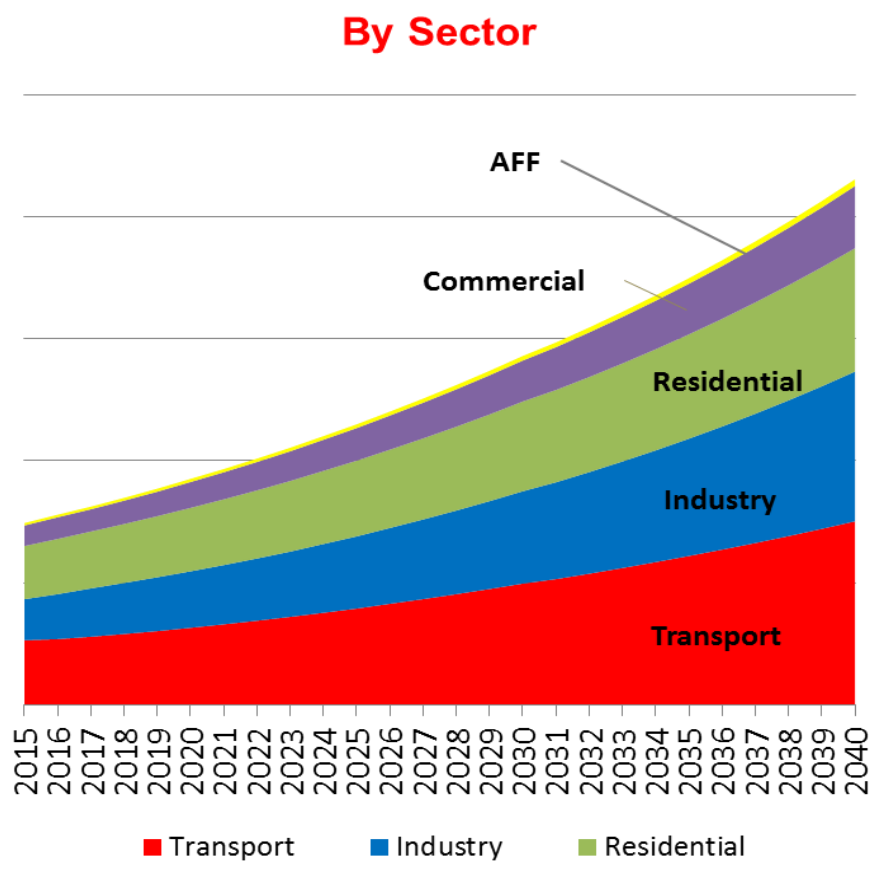
- Oil 33.4%
- Coal 10.8%
- Biofuels 0.8%

Philippine Energy Supply Outlook
PEP 2017-2040

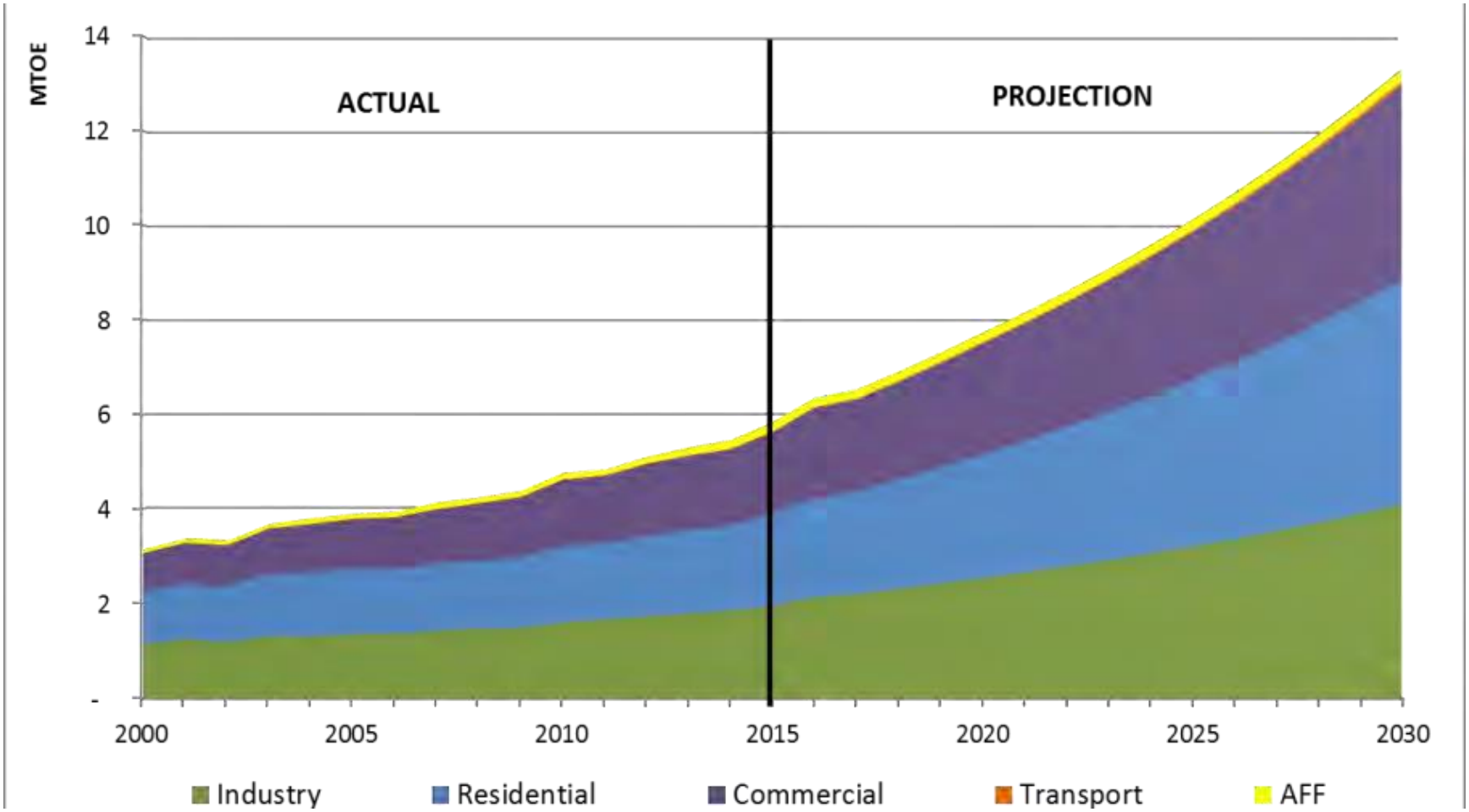


Energy Demand Outlook from PEP 2017-2040





Electricity Consumption, PEP 2016-2030



Burning 1 million metric tons of oil per year translates to 1,326 MW of power

Electricity Supply Profile
from PEP 2016-2030

- **70 percent baseload capacity** from coal, geothermal, big hydropower, natural gas, nuclear and biomass (during availability of feedstock)

Electricity Supply Profile -2

from PEP 2016-2030

- **20 percent mid-merit capacities** from natural gas
- **10 percent of peaking capacities** from oil-based plants and variable renewable energy such as solar photovoltaic (during daytime) and wind

End User Comparison

- For the same amount of energy consumption, electricity uses much less than 10% oil compared to consuming oil directly, as in transportation and other sectors.

New Pollution Control Technologies for Electric Power Plants

- Commercially available air pollution control devices can reduce carbon emissions significantly.
- US DOE is now pilot testing use of chemical looping in large electric power plants.
- Chemical looping is capable of producing negative carbon footprints.

PEP Projected Sector Demands

- End-user projected demand for Transportation is largely for petroleum products (largely imported), about 40 MTOE by 2040, 35.6%.
- Industrial, residential, and the commercial sectors have substantial demands for oil and coal.

Bloomberg New Energy Finance Forecast

"EVs are on track to accelerate to 54% of new car sales by 2040. Tumbling battery prices mean that EVs will have lower lifetime costs, and will be cheaper to buy, than internal combustion engine (ICE) cars in most countries by 2025-29."

Proposed Future PEP Plans

- DOE should revise future PEPs in consultation with NEDA, DOST, DOTr.
- NEDA, DOST, DOTr, DOE should push for more electric and/or hybrid electric railways.
- DOE should accelerate conversion of buses and jeepneys to natural gas.

Changes in Future Transportation

- What if the Metropolitan Railway Transit (MRT) is expanded? It uses electric motors.
- What if we include electric vehicle demand forecast in planning?
- What if we plan for more electric vehicle use in the future?

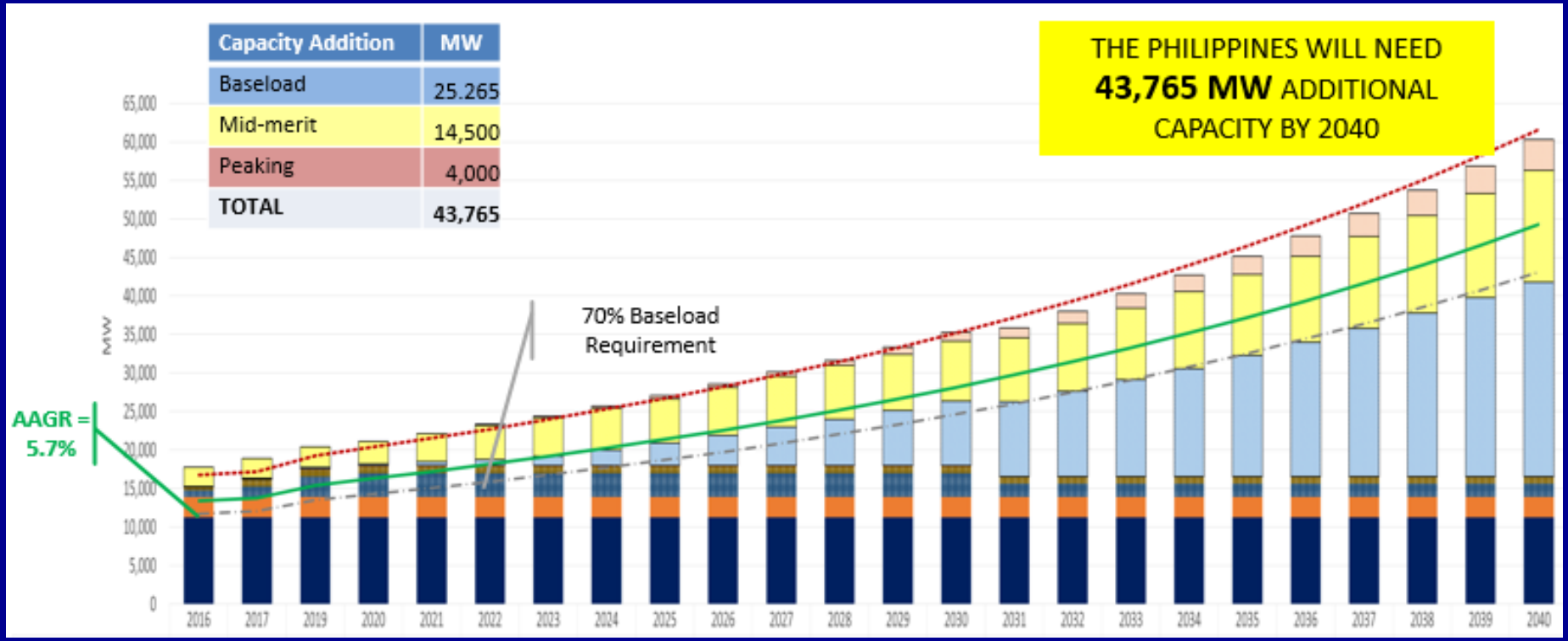
Changes in Future Transportation - 2

- If we plan electric vehicles to take 25% of transportation demand by 2030, and 50% by 2040, we need 20 MTOE or 26,520 MW of electric power for transportation by 2040 and less than 13,500 MW by 2030.

Impact of Changes in Future PEP Plans

- Drastic reduction in oil imports.
- More reliance on indigenous fuel.
- Shift to more demand for electricity.
- Significant reduction on carbon emissions and compliance with allowed emission standards.

Additional Electric Power Capacity, PEP 2017-2040



Electric Power Industry Reform Act of 2001 (EPIRA, Republic Act 9136),

- Privatization of the National Power Corporation (NPC)
- Creation of National Transmission Corporation (TRANSCO)
- Creation of Power Sector Assets and Liabilities Management Corporation (PSALM)
- Creation of Energy Regulatory Commission

Reorganization of Electric Power Industry

- PSALM to hold all assets of NPC for eventual privatization
- With exceptions, generating assets will be private.
- Privately owned National Grid Corporation of the Philippines (NGCP) selected for 25-year concession of TRANSCO and 50-year franchise as public utility.

Electricity Supply Enterprise

- Generation
- Transmission/System Operator
- Distribution
- Supply

Supply Alternative Future?

- DOE (with NEDA) could investigate feasibility of providing incentives or more incentives for reducing supply cost of electricity to:
  - ✓Generation sector
  - ✓ transmission sector (utility)
  - ✓distribution sector(utilities), IPPs

Supply Alternative Future – 2?

- Enhance collaboration and cooperation among the stake holders of the electricity supply enterprise to ensure a safe, reliable, and affordable electricity supply.

Demand Alternative Future?

- Encourage usage pattern to reduce peak demand and provide incentives to
  - ✓Residential aggregators
  - ✓Industrial consumers
  - ✓Commercial consumers
- Integrate transportation demand with traditional demand

Demand Alternative Future - 2

- Encourage consumers to install RE generation to sell back to supply enterprise
- Provide Smart metering to
  - ✓Residential aggregators
  - ✓Industrial consumers
  - ✓Commercial consumers

Concluding Remarks

- Future PEPs could incorporate projected technological advances more aggressively.

Concluding Remarks-2

- EPIRA is now 17 years old. It could be more responsive to medium term changes in the PEP.

Concluding Remarks-3

- The electricity enterprise could have a greater role in reducing dependence on foreign oil and future PEPs could reflect this.

Concluding Remarks - 4

- The electricity enterprise, with a shift of transportation and other sector demands to natural gas and electricity, could play a key role in air pollution compliance, reduction of global warming, and improve sustainability.

End of Presentation

- Thank you!
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