

# Session 2 – Hidden Value Missing Money & Electricity Markets

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- Alberta Market
  - Market model has successfully delivered low price, reliable electricity.
  - “If it isn’t broken, don’t fix it”
    - ✓ Trying to focus on the “additional” value may lose sight of the success achieved in the framework.
  - “Bad markets are better than good regulation” (Kahn)
    - ✓ Always use markets as first choice in monetizing value within policy framework
- Discussion
  - Storage – supply alternative
  - Coal / Carbon policy – environmental

# Tradeoffs – changing the objective

- Asking the market to do something it wasn't designed to do doesn't always work.



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## Energy

- Real-time spot market
  - Interconnected grid
  - No capacity mkt / no load obligations
  - Dispatch for all demand in the province
  - Single pool price
  - High load factor / industrial

## Ancillary Services

- Operating Reserves market
- Contract for other AS

## Transmission Access

- Connections
- Planned by ISO, congestion free targets
- Allocated on dispatch
- Tariffs

- Energy
  - Reliability driven
  - Fuel neutral
  - Manage ramp with merit order / AS
- Ancillary Services, with separate market for OR
- Transmission unconstrained means less focus on non-wires / optimized
- Is it Missing?
  - Pay for ramp value?
  - Pay for GHG offset / renewable value?
  - Pay for Transmission deferrals?
  - Tariff – value for grid reliability product?

# Where's the problem? Simply externalities or a case of missing money?

Climate Change

## Energy

- Real-time spot market
  - Interconnected grid
  - Dispatch for all demand in the province
  - Single pool price

## Ancillary Services

- Operating Reserves

## Transmission

- congestion free
- Allocated on dispatch

Storage /  
Batteries

- What is the driver for AESO?
  - Alternative supply source? Developer Economics?
  - Shaped by Technology Fund pilot projects
  - Potential renewable mandate in future?
- What is the driver for the developer?
  - Brattle categories – Definite value for developer to capture – but maybe not directly from AESO market.
    - Energy Market Arbitrage, **AS**, **Reducing AS needs**, Reducing Production costs, Avoiding Gen Investments, Deferring of T&D, Increasing Customer Reliability, Increasing Power Quality, Integrating Intermittent Renewable Resources, Reducing Cycling of Conventional Gen, Reducing Emissions, Reducing Line Losses.

- Tradeoffs in evaluation
  - Want to ensure a level playing field for supply options – so don't want to introduce a “subsidy” for storage
  - Yet may in doing so not fully “value” storage on the grid
  - But how do we incorporate this in a model that is premised on unconstrained
    - Continued evaluation as there are tradeoffs
    - Solution may leave some value on the table – as NO model can pay for every piece of value without eroding the price signals in other areas – example paying for ramping changes energy price signals

What are the broader efficiency tradeoffs to consider?

- Starting in 2012 the AESO saw increasing interest in storage in Alberta, driven in part by Climate Change and Emissions Management Corporation (CCEMC) funding initiatives
- To-date 5 storage projects have applied to the AESO for connection
  - 2 were canceled (Suncor/Teck 3 MW battery and Turning Point Generation 150 MW pumped hydro)
  - 1 Compressed Air (Rock Mountain Power 150 MW)
  - 1 battery (AltaLink 14 MW)
  - 1 battery associated with a wind facility (10 MW of storage, not yet publicly visible in our connection queue)
- CCEMC will announce results from latest RFP early June 2015. (TransAlta, AltaLink and Enercon have made funding applications related to storage projects)

# AESO Recommendations for Next Steps on Storage



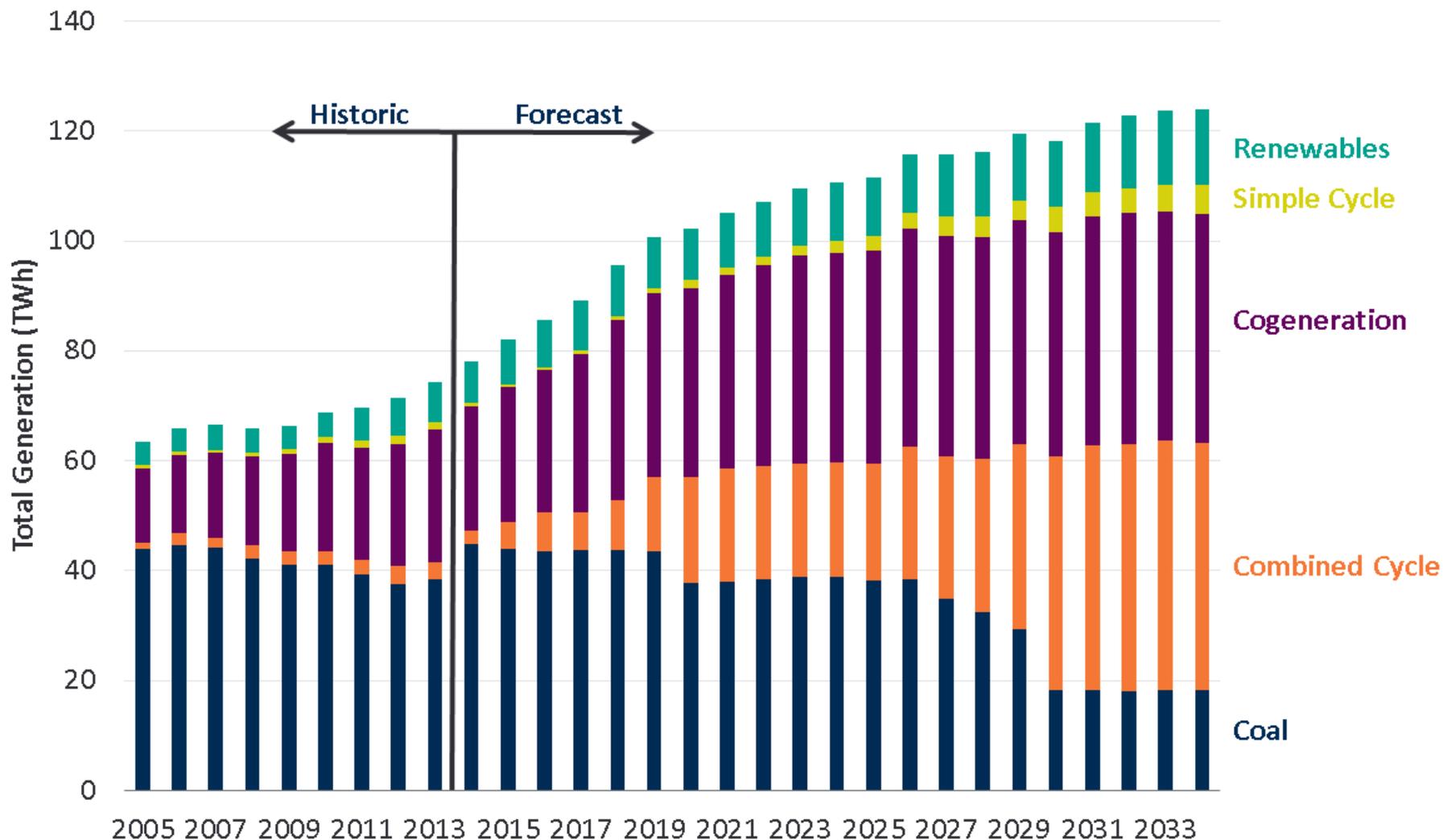
## AESO Priorities are:

- Technical requirements for battery storage to connect and operate
- Tariff treatment
  - reflect nature of supply and load requirements
- Technical requirements for the provision of operating reserves
  - Maintain the minimum size requirement for regulating reserve (RR) (15 MW range) and for spinning reserve (SR) (10 MW)
  - Ensure no rule discrimination
- Recommendations are developed to be consistent with existing market structure and maintain technological neutrality. Ensure no barrier.

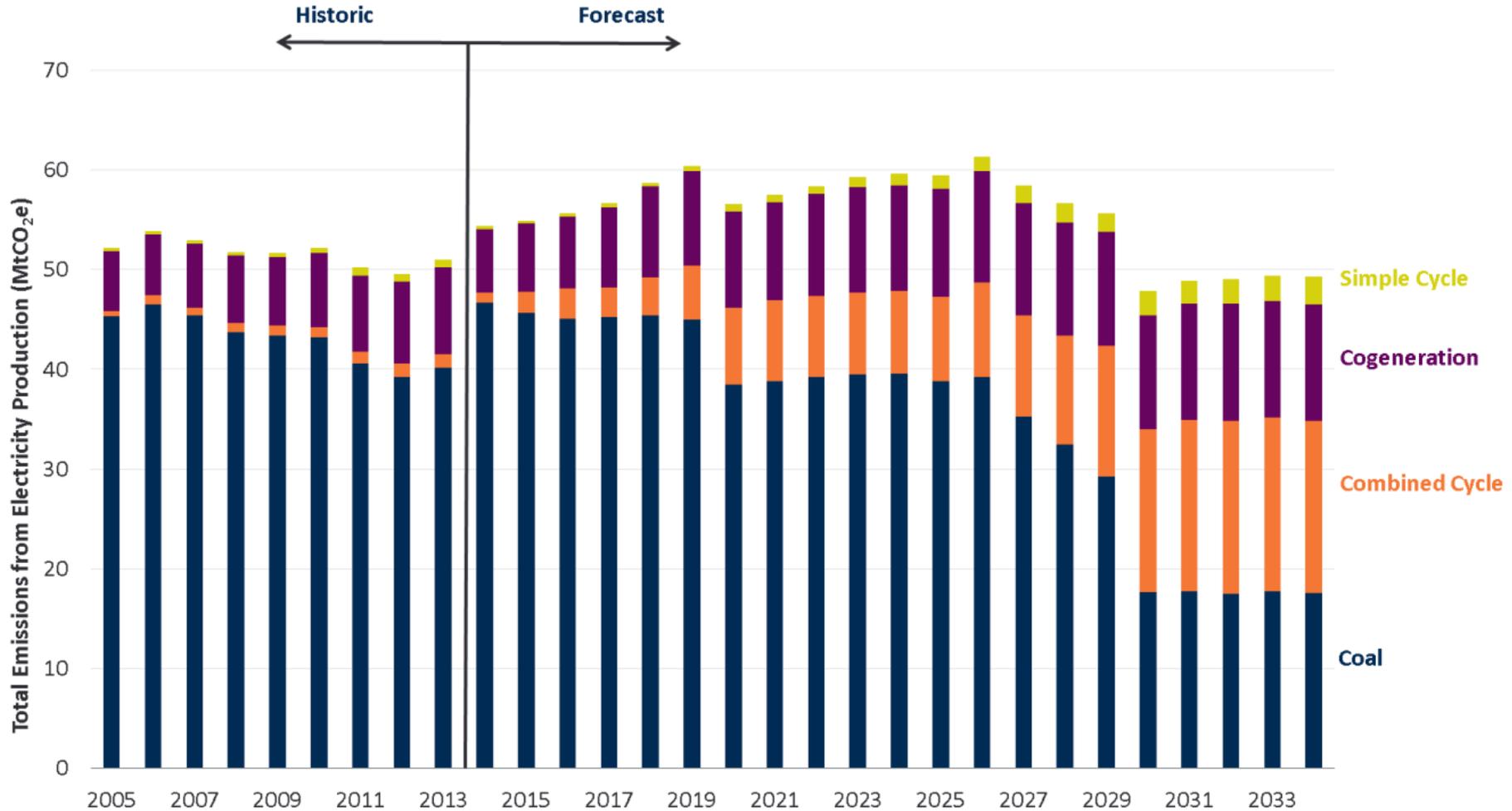
- Electricity market is fuel neutral and does not dispatch or plan based on environmental considerations.
- Policy focused on technology improvements
- Is this a problem?
  - Data shows limited impact in electricity sector, though aware of social license questions related to oil (aka Keystone pipeline)
  - Coal phasing out through Fed regulations; but it is an issue if other “fossil fuels” replace coal?
  - If climate change initiatives introduced separately, how would we implement? Would we be guided by other market examples?
    - Renewable Portfolio Standards?
    - Carbon Tax ?

# Projected Annual Electricity Generation

## Coal is diminishing

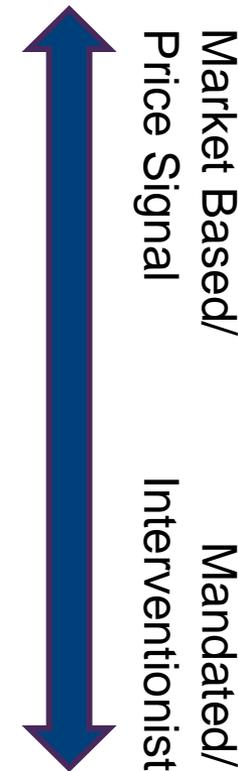


# Projected Annual Emissions from the Electricity Sector Remain Relatively Constant



# What to do? Policy external to Electricity.

- Environment objectives often external to electricity, however have a large impact
- Spectrum of policy options to consider:
  - Price on carbon
  - Cap and trade
  - Offset programs
  - Time-of-use pricing
  - Feed-in-tariff
  - Prohibitive emission intensity standard (Fed Reg)
  - Efficiency as a resource
  - Renewable Standards
- Still question of HOW to implement
- Options are “interventionist, increasingly so in market” vs “favor market approach”



- Very Market Based
  - Where is the missing money in the production of electricity and associated ancillary services?
    - Operating reserves a function of system need – Why would we introduce new products? What impact would this have on the energy market pricing?
    - All fuel types could argue that there is value not compensated in un-optimized system (ramping, baseload, etc)
  - Can climate change objectives remain an externality to the market – with impact only on fleet and possibly pricing of carbon
    - Change in policy (Fed and Provincial) possible
      - Elimination of fossil fuels by end of century?
      - GHG targets / coal mandates?

*Maybe leaving more questions than answers.*

**Thank you**