



# **Transmission Expansion Advisory Committee Meeting**

## **2010 Market Efficiency Analysis Input Assumptions**

March 10, 2010

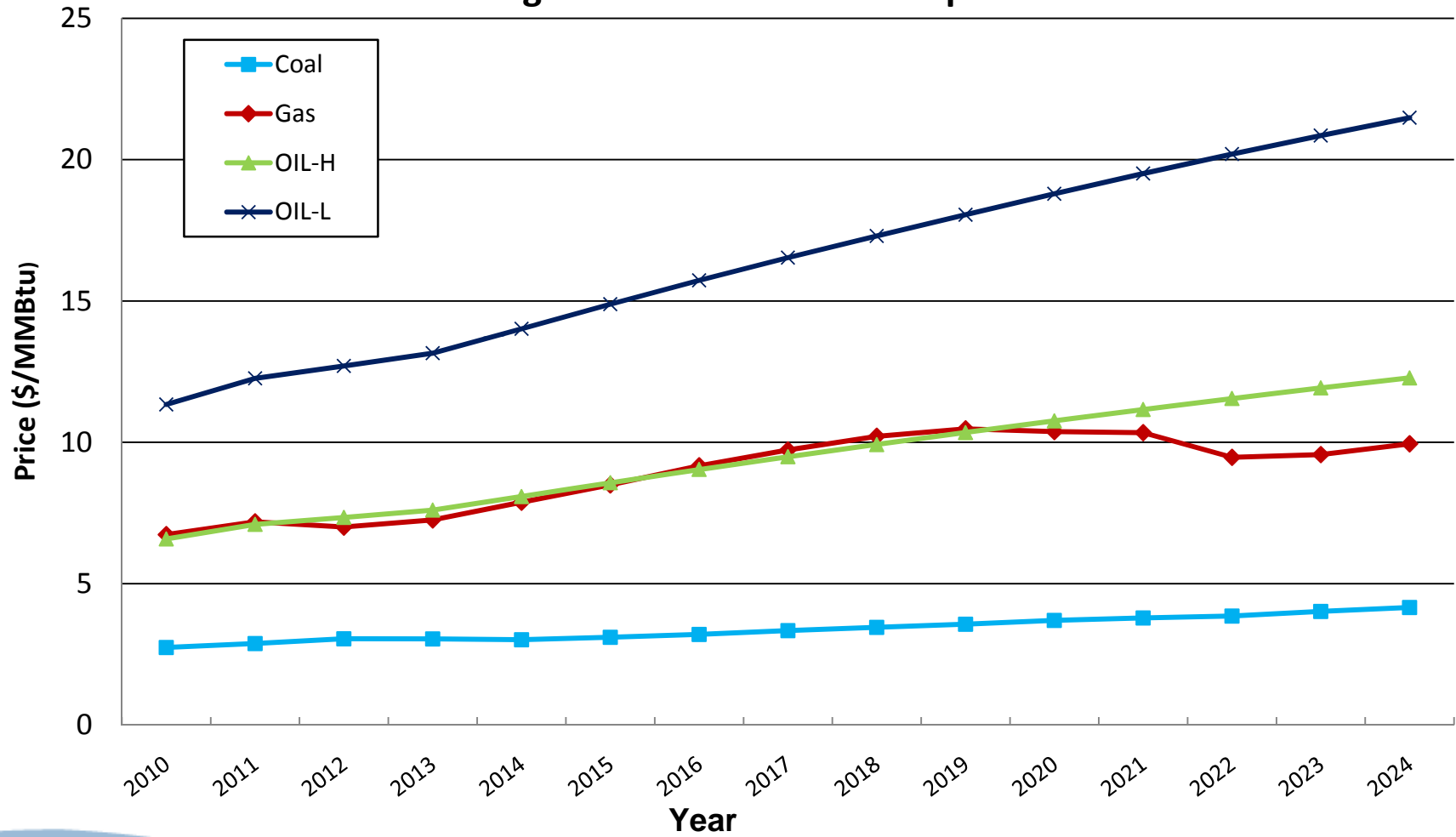


## Market Simulation Input Data

- Study years: 2010, 2013, 2016, 2019, 2024
- PROMOD IV model from Ventyx
- Underlying input data contained in PROMOD Powerbase (February 2009 update)
  - Updated fuel and emission costs as well as verified generating units based on November 2009 PROMOD Powerbase update.
- Powerflow Cases
  - 2010 power flow case to represent today's "as-is" system
  - 2014 RTEP power flow case to represent future system

- Fuel prices
- Load and energy
- Demand Response
- Future generation scenario
- Emissions prices
- Transmission topology
- Carrying charge rate and discount rate

## Figure 1 - Fuel Price Assumptions





## Load & Energy Input Data

- PJM zonal peak and zonal energy forecast from PJM 2010 Load Forecast Report
- Historical zonal hourly loads used to develop zonal hourly load shape

Table 1 – Forecast PJM Peak and Energy\*

	<b>2010</b>	<b>2013</b>	<b>2016</b>	<b>2019</b>	<b>2024</b>
Peak (MW)	147,791	160,082	166,854	172,320	180,387
Energy (GWh)	784,166	847,046	887,033	912,472	957,144

\*ATSI Load included in all years and values reduced by cleared Energy Efficiency from RPM



## Demand Response Input Data

- Model zonal demand response consistent with Table B-7 of the 2010 Load Forecast Report with the addition of any cleared FRR resources

Table 2 – Forecast PJM Demand Response

	<b>2010</b>	<b>2013</b>	<b>2016</b>	<b>2019</b>	<b>2024</b>
Demand Response (MW)	4,360	7,296	7,296	7,296	7,296



## Future Generation Scenarios

- generation model includes all existing in-service generation plus active queue generation with executed ISA minus expected future deactivations
- installed reserve requirement is met through study year 2013
- To meet installed reserve requirement for study years 2016, 2019 and 2024, 3,300 MW, 8,000 MW and 17,300 MW of new generation will be added to model, respectively
- New generation will be added to PJM regions in proportion to the regional location and regional generation type of future generation projects in Generation Interconnection Queues through Queue V



Figure 2 - PJM Market Efficiency Reserve Margin

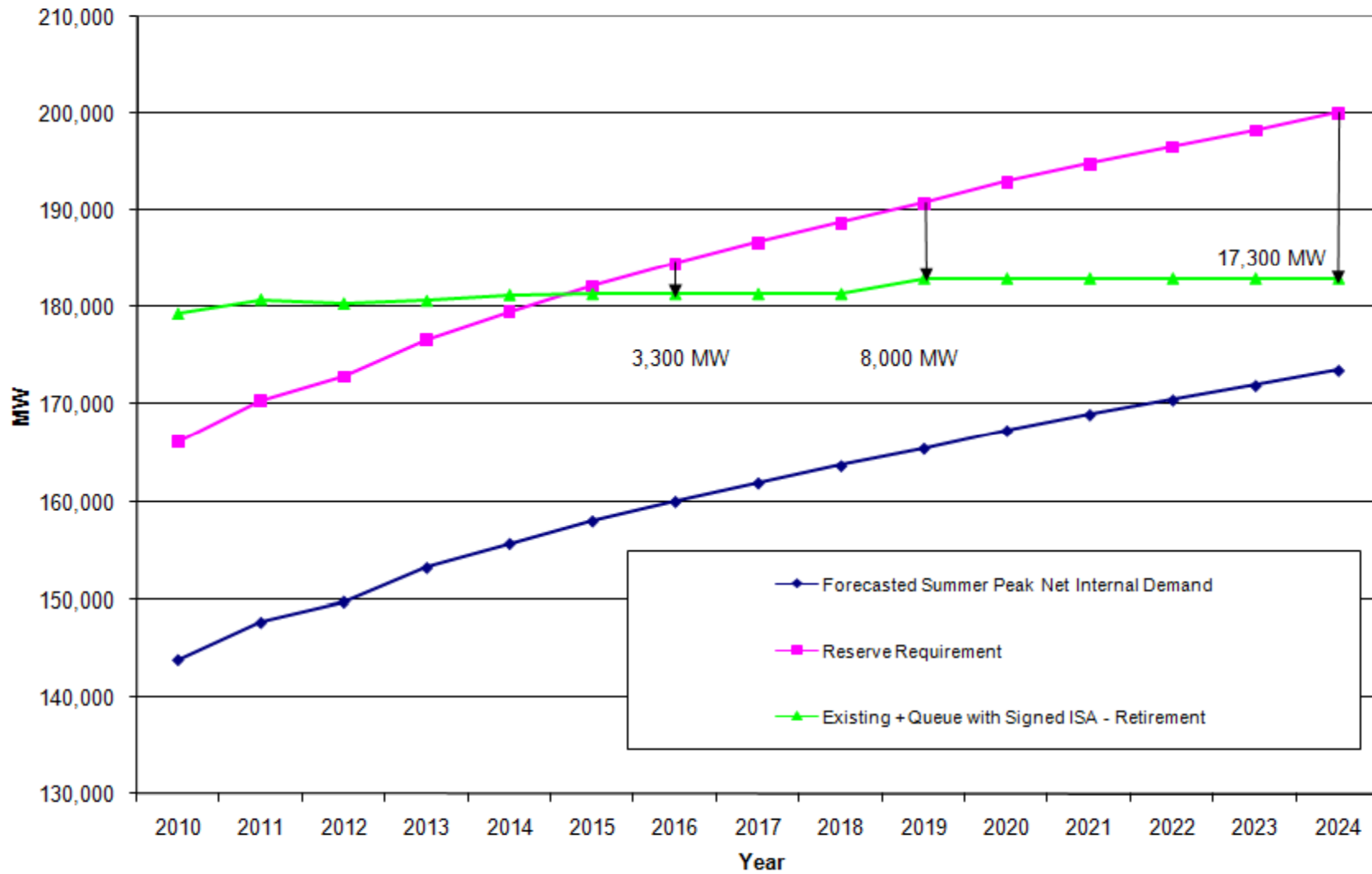


Table 3 – Location and Generator Type to Maintain Reserve Margin

Region	Nuclear	Coal	Gas	Oil	Wind	Other Renewables	Total Region
AECO/DPL/JCPL/PECO/PSEG	1.1%	0.0%	16.8%	0.3%	0.6%	1.0%	19.8%
AEP/APS/ATSI/COM/DAY/DUQ	0.6%	10.0%	14.1%	0.0%	18.4%	2.3%	45.4%
BGE/PEP	5.1%	0.0%	7.5%	0.0%	0.0%	0.4%	13.0%
DOM	0.0%	0.0%	9.6%	0.0%	0.1%	0.8%	10.5%
ME/PN/PPL	5.1%	0.4%	2.3%	2.5%	0.8%	0.3%	11.3%
Total By Fuel	12.0%	10.4%	50.2%	2.7%	19.9%	4.7%	100.0%

Figure 3 - SO2 Emission Allowance Price Assumptions

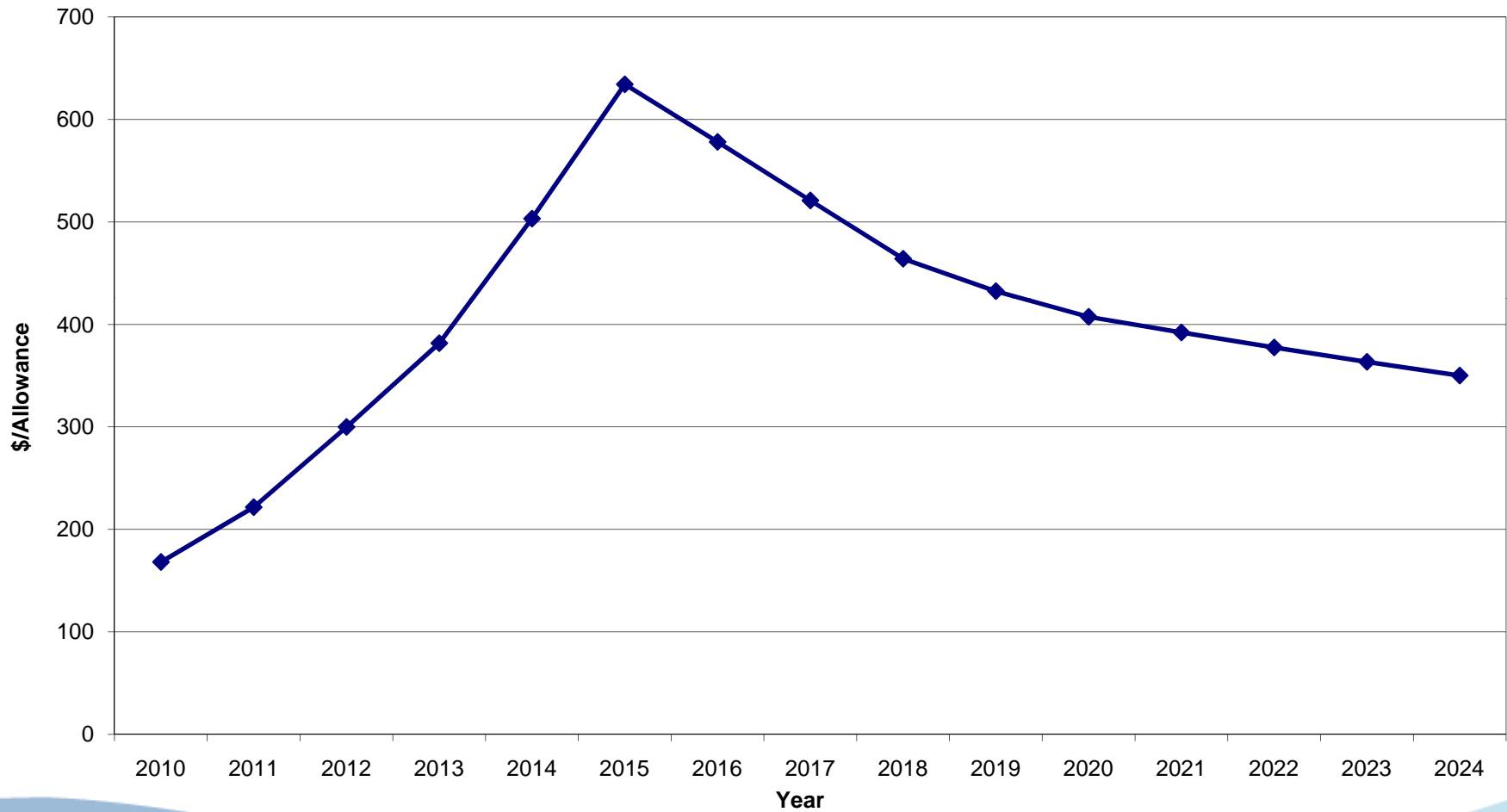


Figure 4 - NOx Emission Allowance Price Assumptions

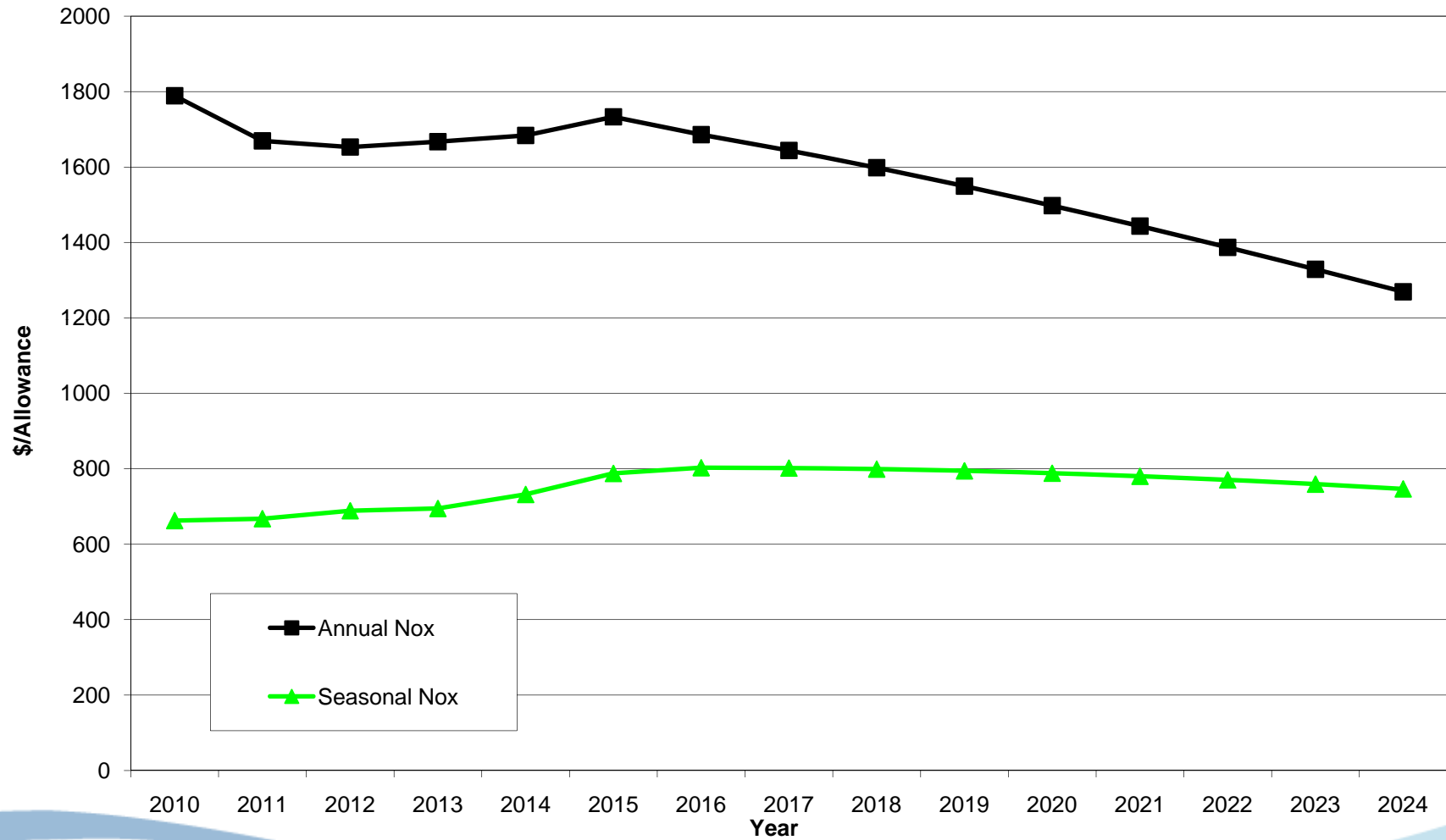
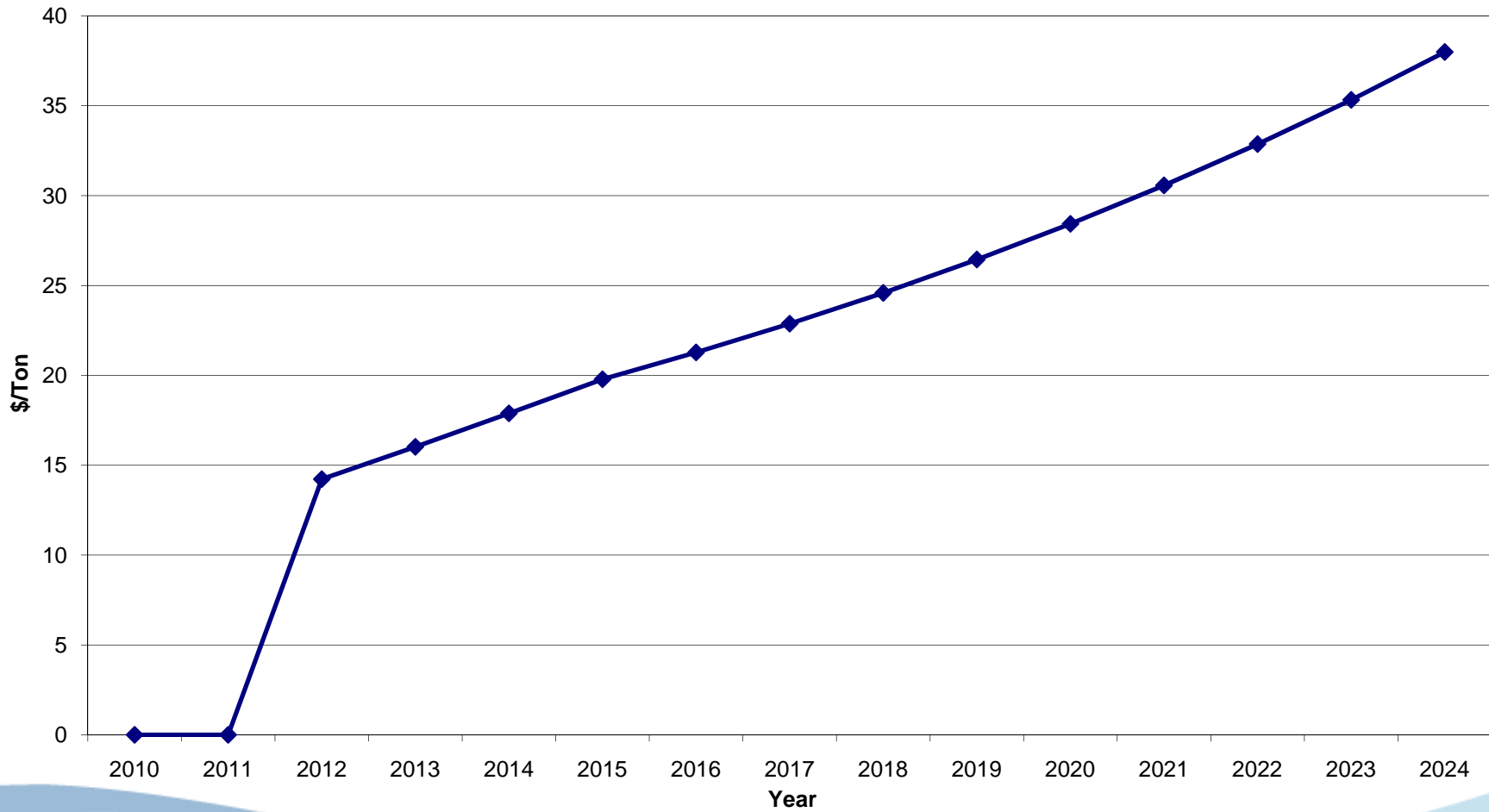


Figure 5 - CO2 Emission Assumptions





# Transmission Topology and Constraints

- Powerflow Cases
  - 2010 power flow case to represent today’s “as-is” system
  - 2014 RTEP power flow case to represent future system
- Thermal Constraints
  - monitor/contingency pairs
  - NERC Book of Flowgates
  - Planning study results
  - Historical PJM congestion events
- Voltage Constraints
  - PJM reactive interface limits
  - MW limits based on historical values for “as-is” case adjusted for future upgrade impacts in 2014 case



## Carrying Charge Rate and Discount Rate

- Discount rate and levelized carrying charge rate developed using information contained in TO Formula Rate sheets posted on PJM web site
- Discount rate based on weighted average after-tax embedded cost of capital (average weighted by TO total capitalization)

Discount rate = 7.7%

- Levelized annual carrying charge rate based on weighted average net plant carrying charge (average weighted by TO total capitalization) levelized over an assumed 45 year life of project

Levelized Annual Carrying Charge Rate = 19.1%

- PJM Board approval of input assumptions in June
- Begin analysis with regular updates to TEAC