

21st Century Energy Plan: Modeling Results

SIEMENS

September 26, 2006



Energy Business Solutions

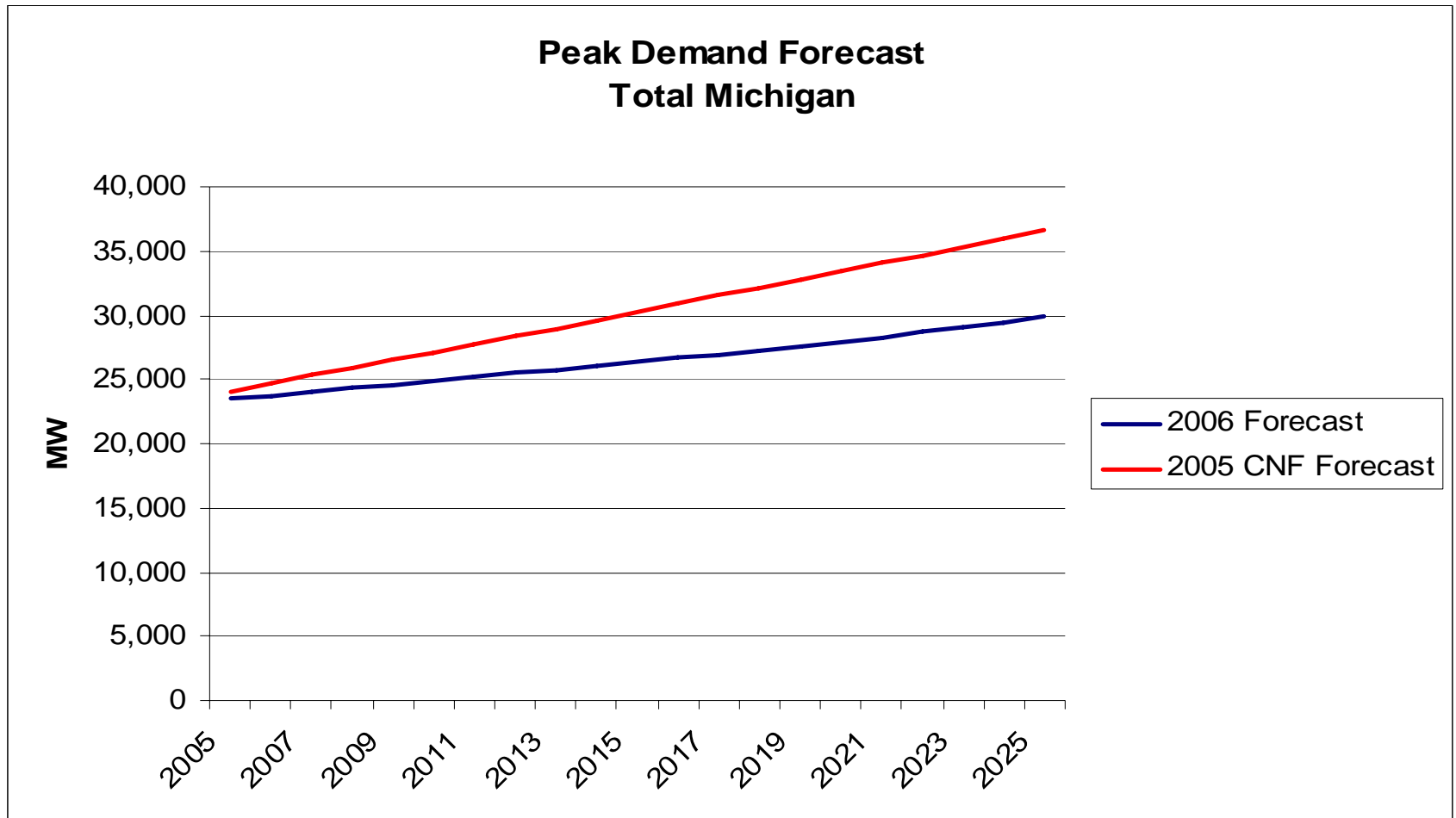
- **Review of Key Input Assumptions**
- **Modeling Results**
- **Scenario Summary**



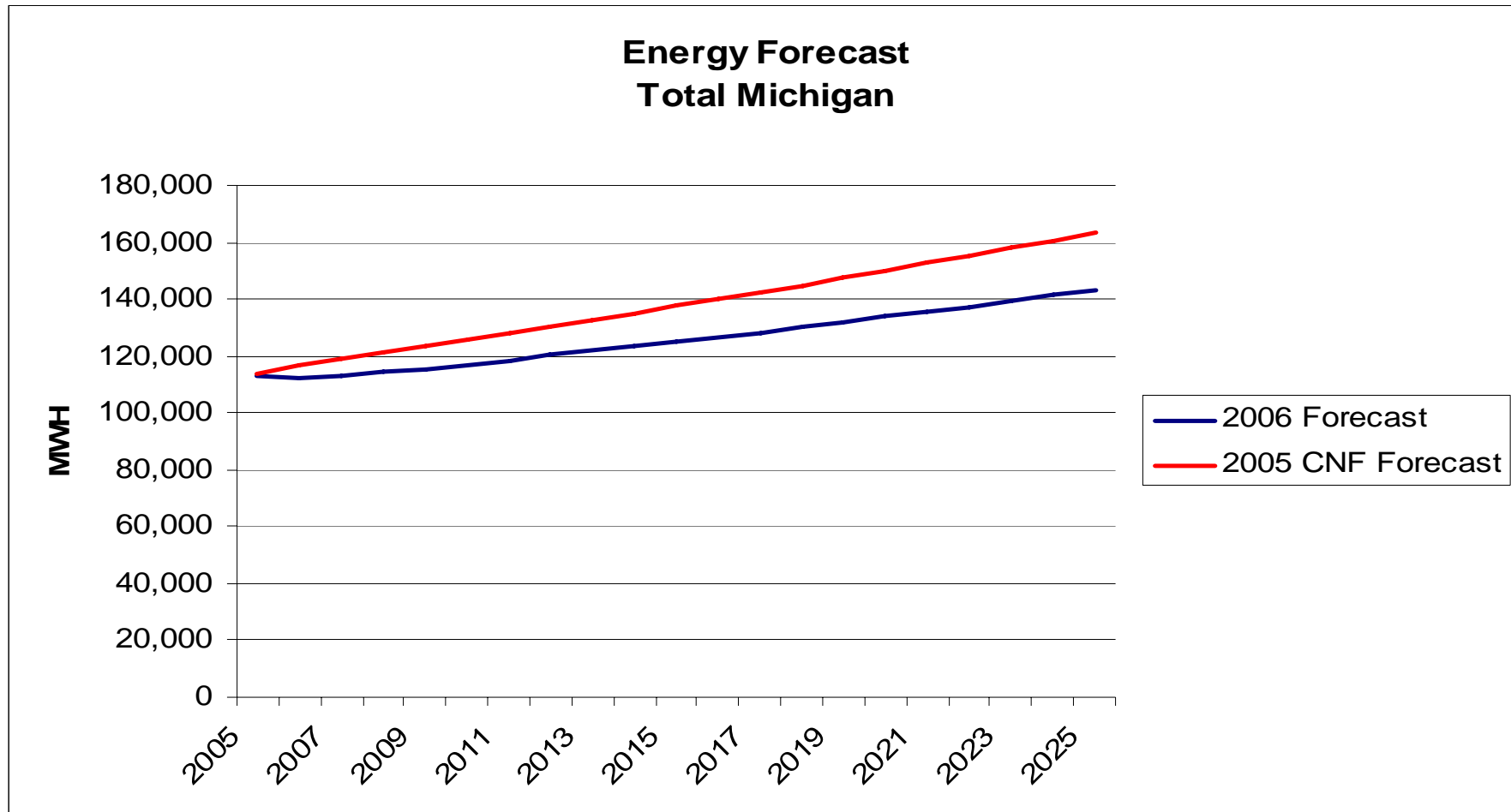
Input Assumptions



- Demand forecast is 6,300 MW, or 18%, lower than 2005 CNF Forecast by 2025

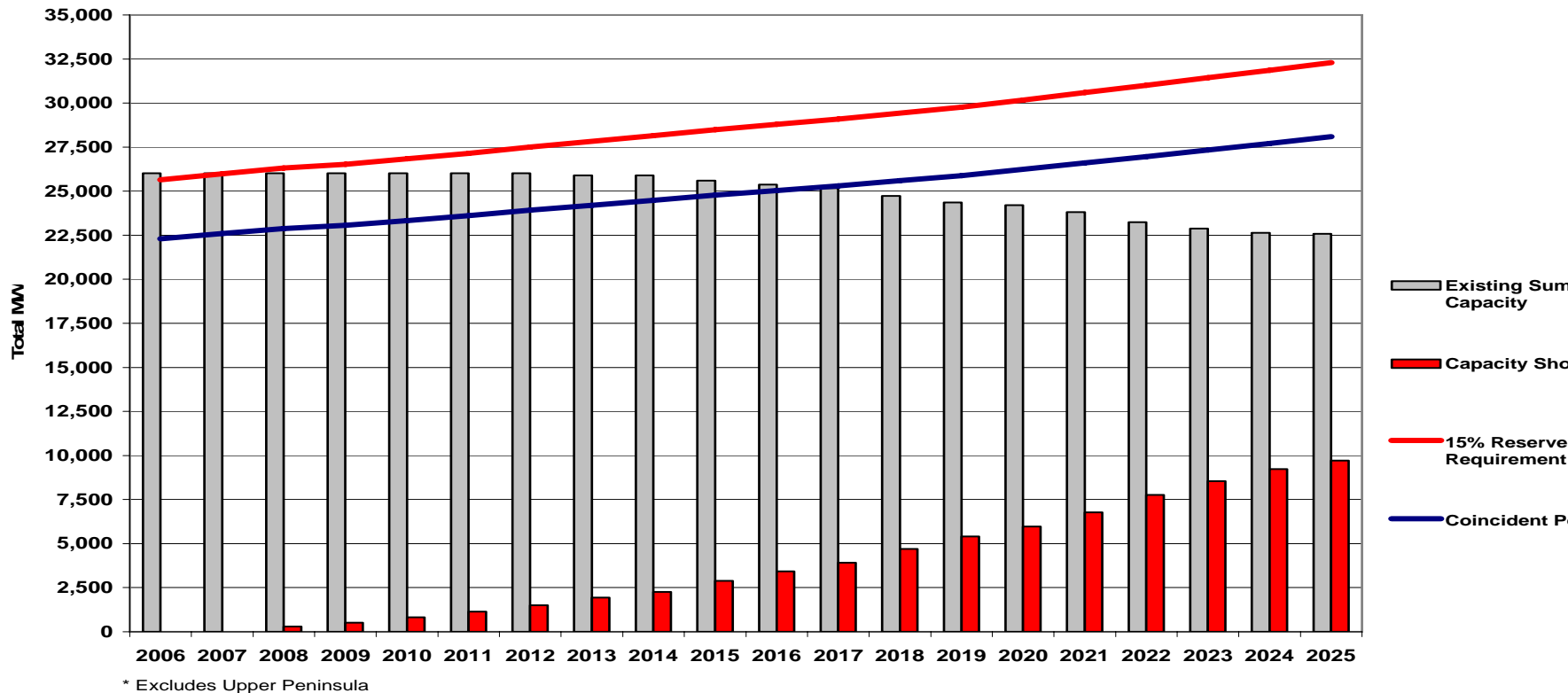


- Annual energy requirement is 20,300 GWh, or 12%, lower than 2005 CNF Forecast by 2025

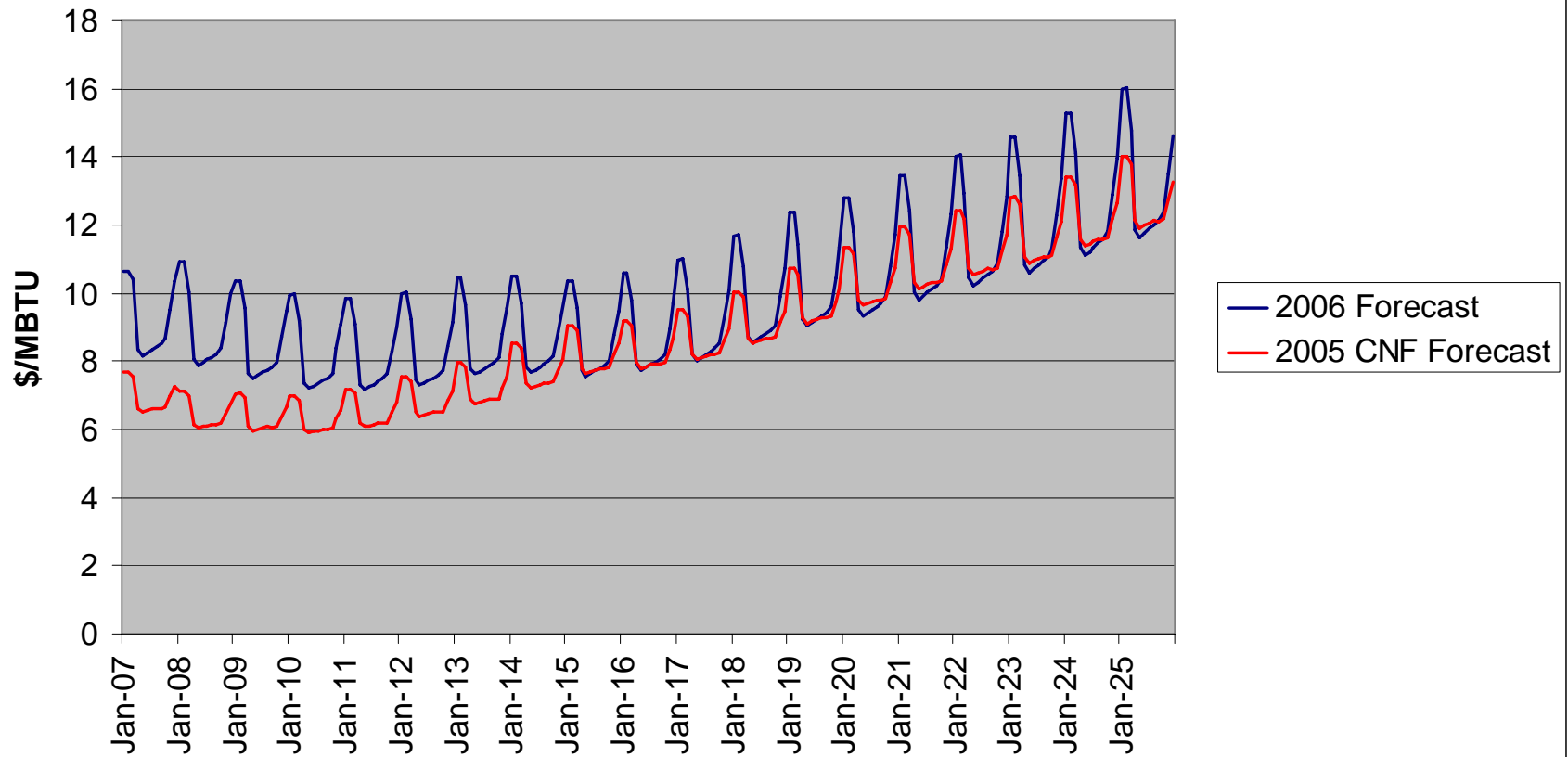


- 300 MW of Firm Summer Capacity needed in MECS by 2008
- 9,700 MW of Firm Summer Capacity need in MECS by 2025

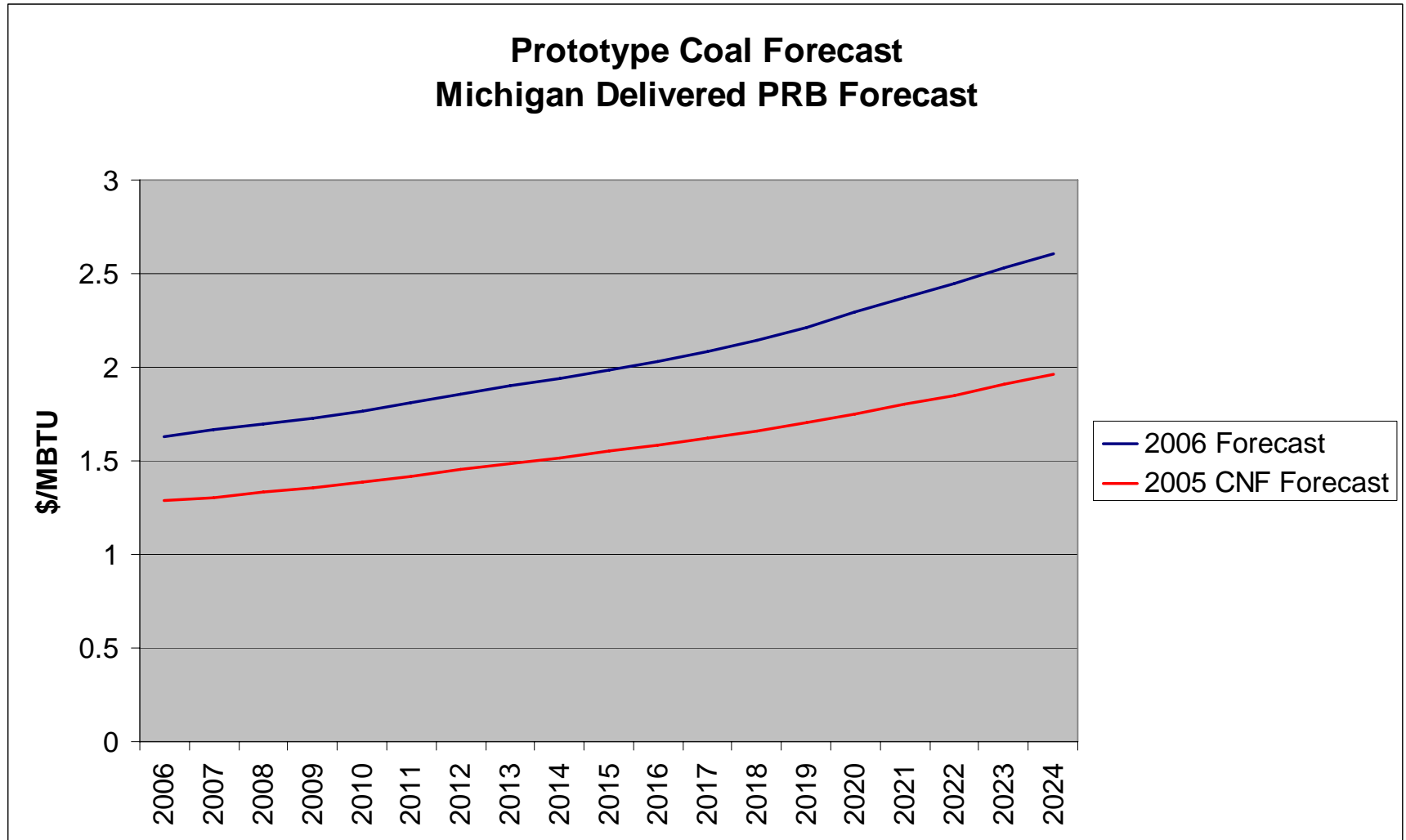
MECS Resource Gap Analysis
Summer Peak Load and Resource Balance of Existing System

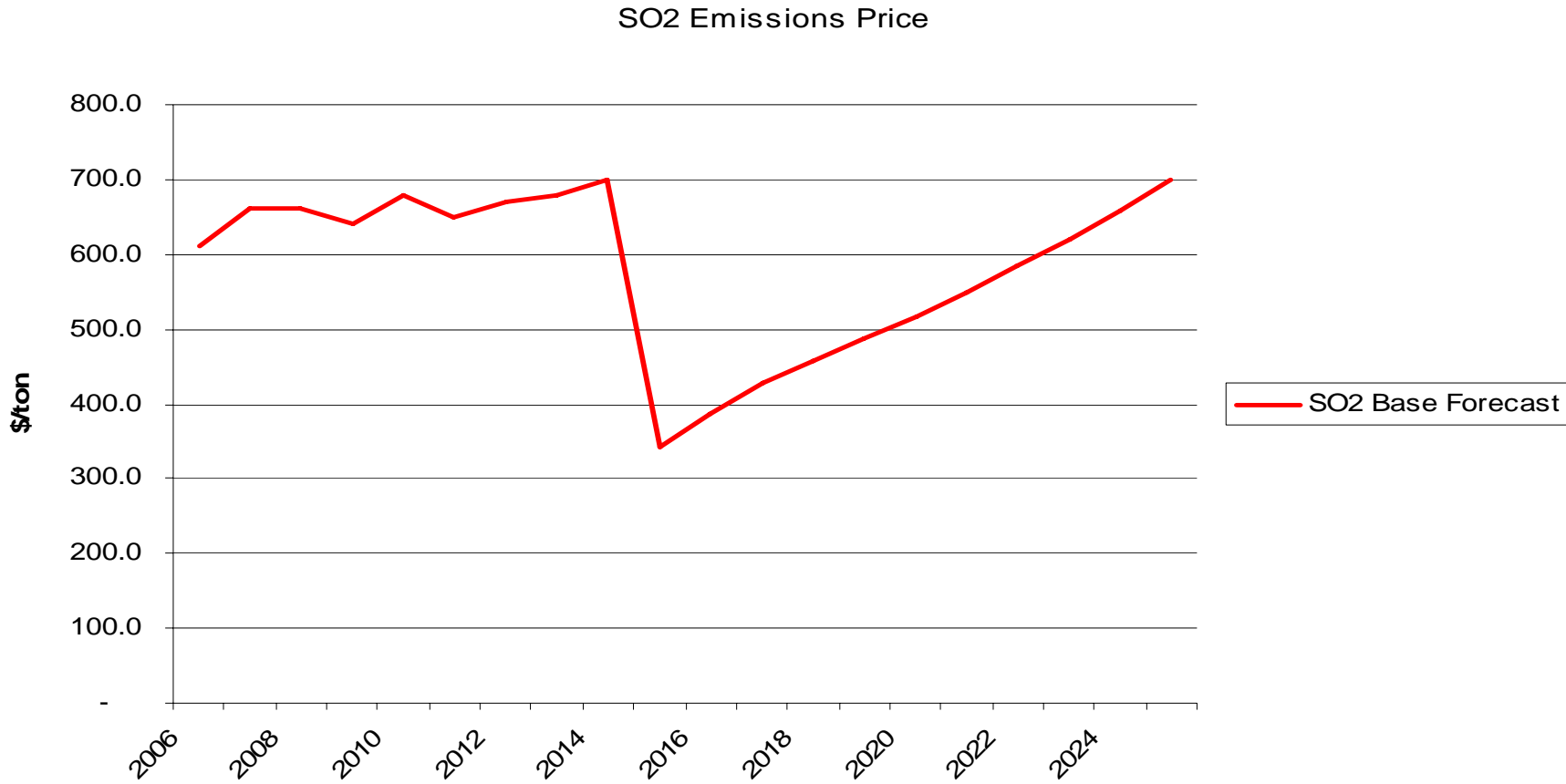


Gas Price Forecast Monthly Michigan Delivered Price

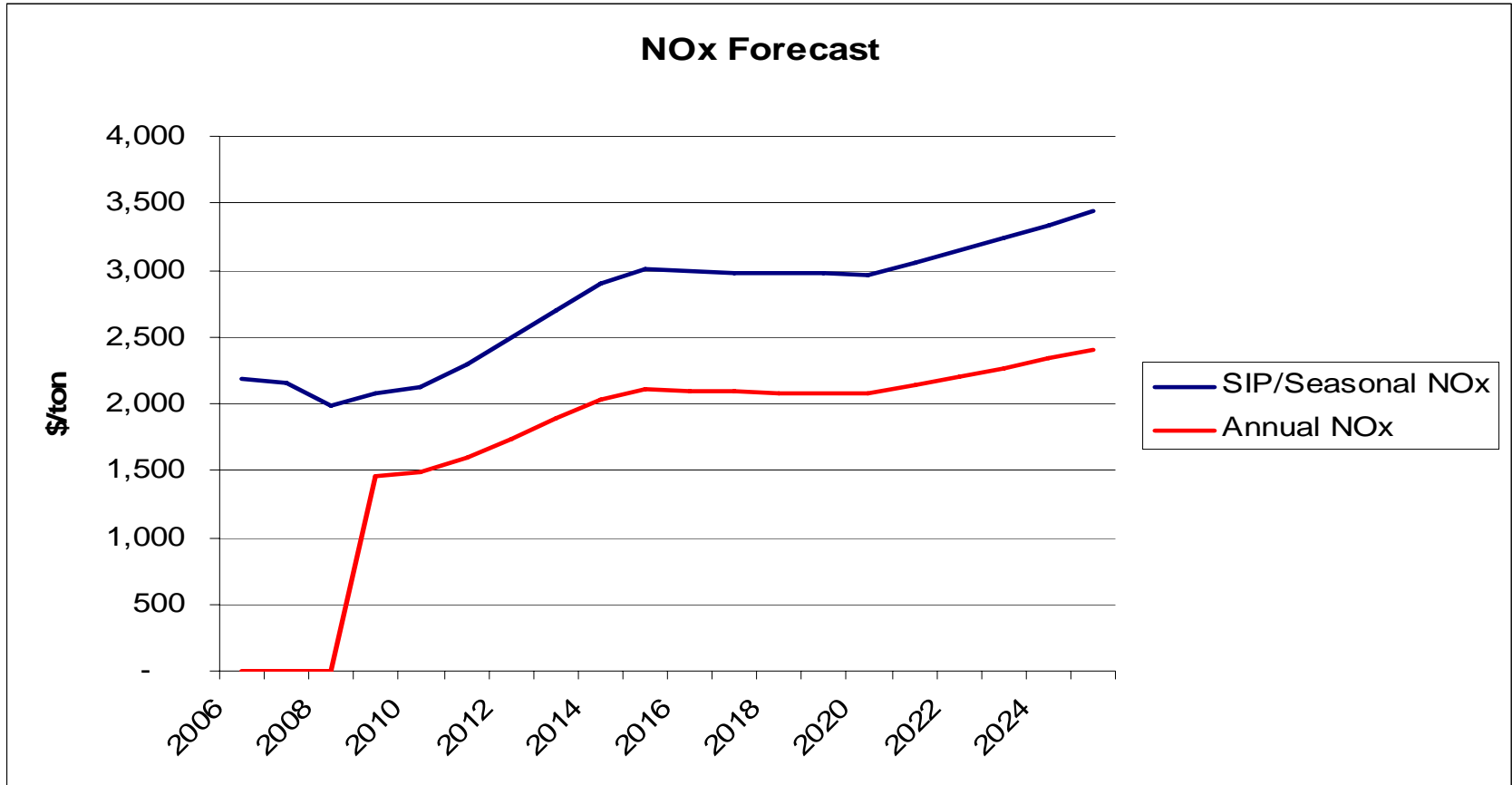


Prototype Coal Forecast Michigan Delivered PRB Forecast

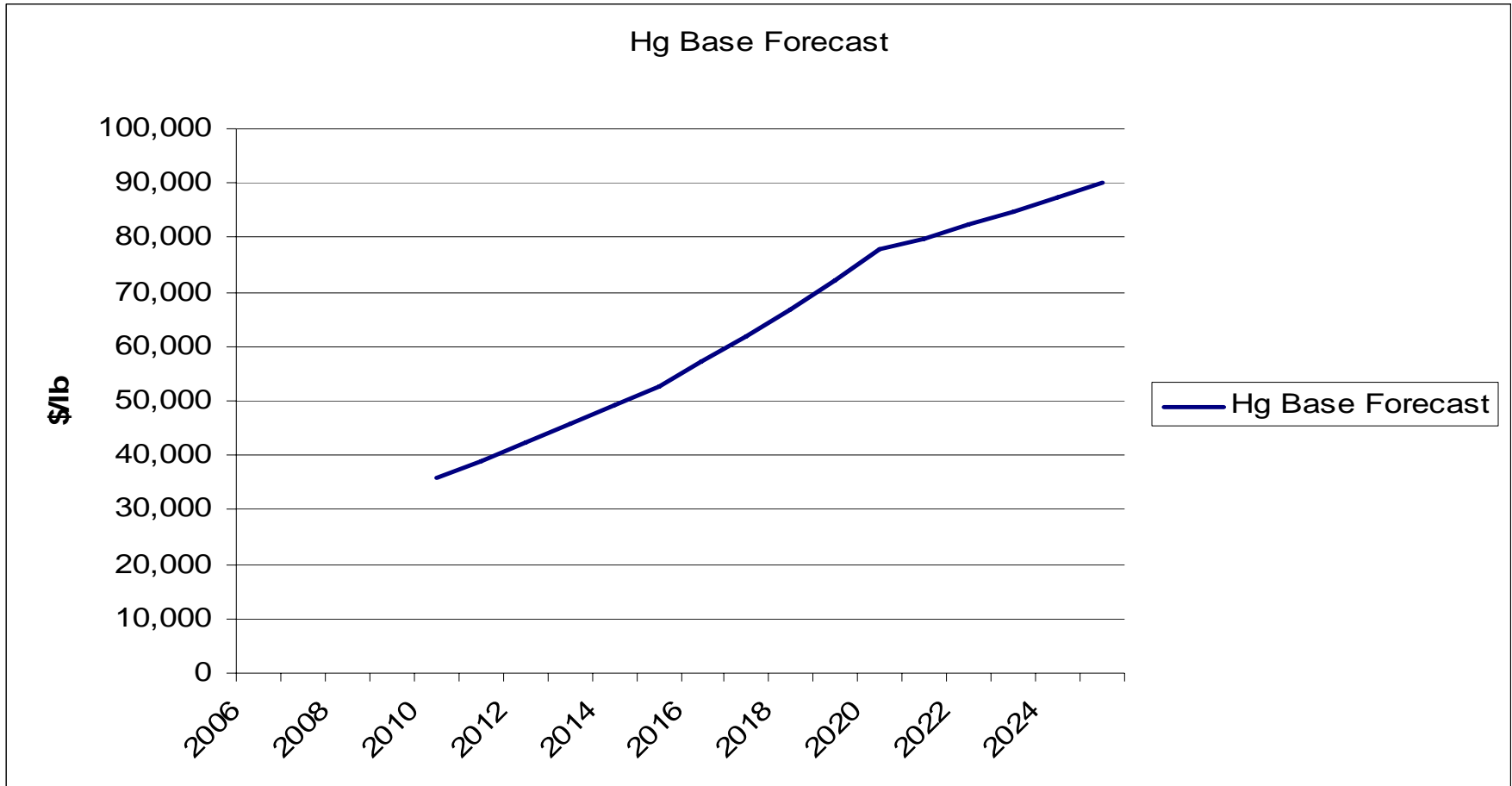




■ Source: Evomarkets SO2 allowance forwards, May 2006

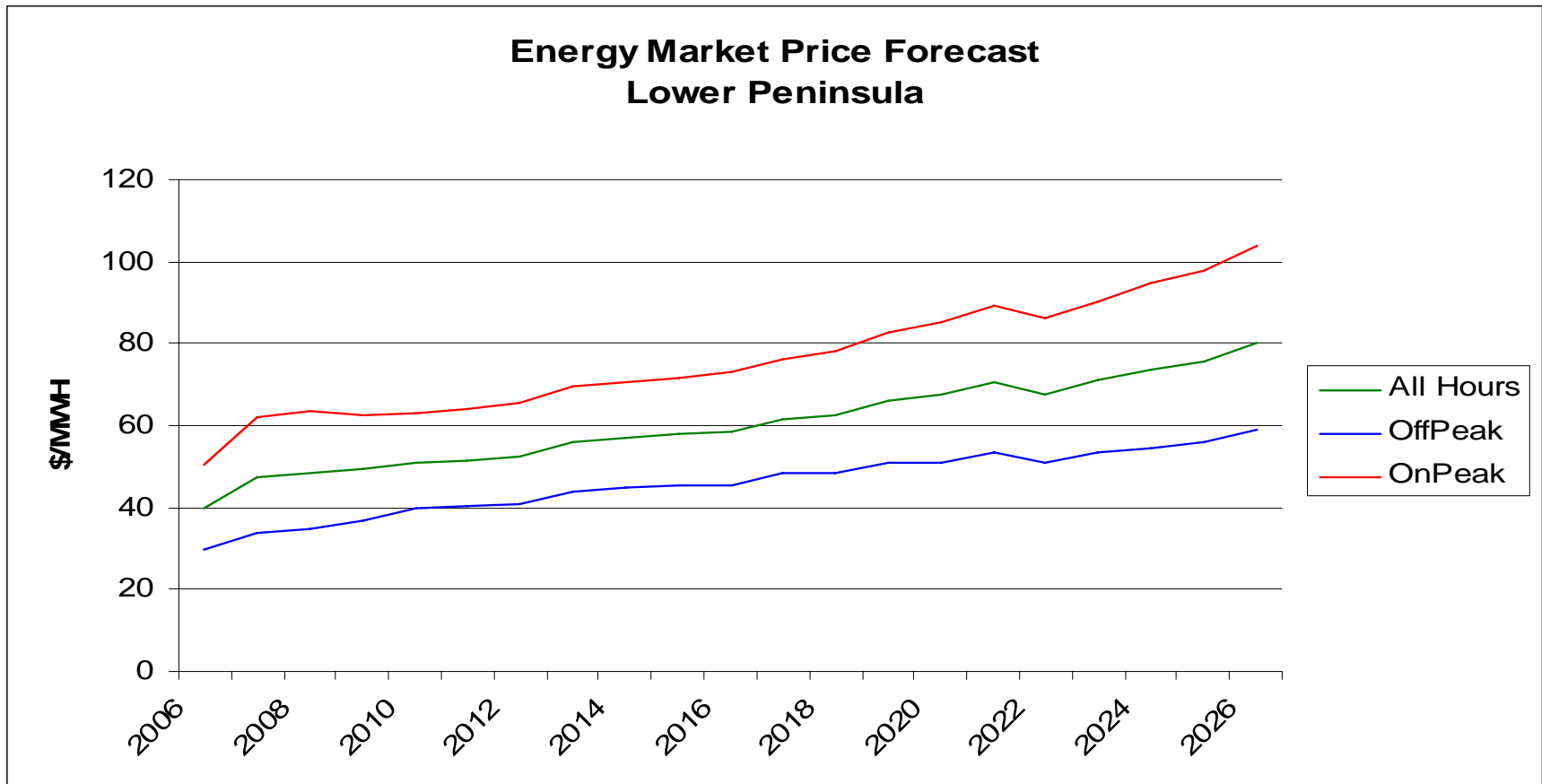


- The SIP NOx forecast from Evomarkets SIP NOx allowance forwards through 2008
- The long-term NOx forecast from EPA-452/R-05-003, Mar 2005

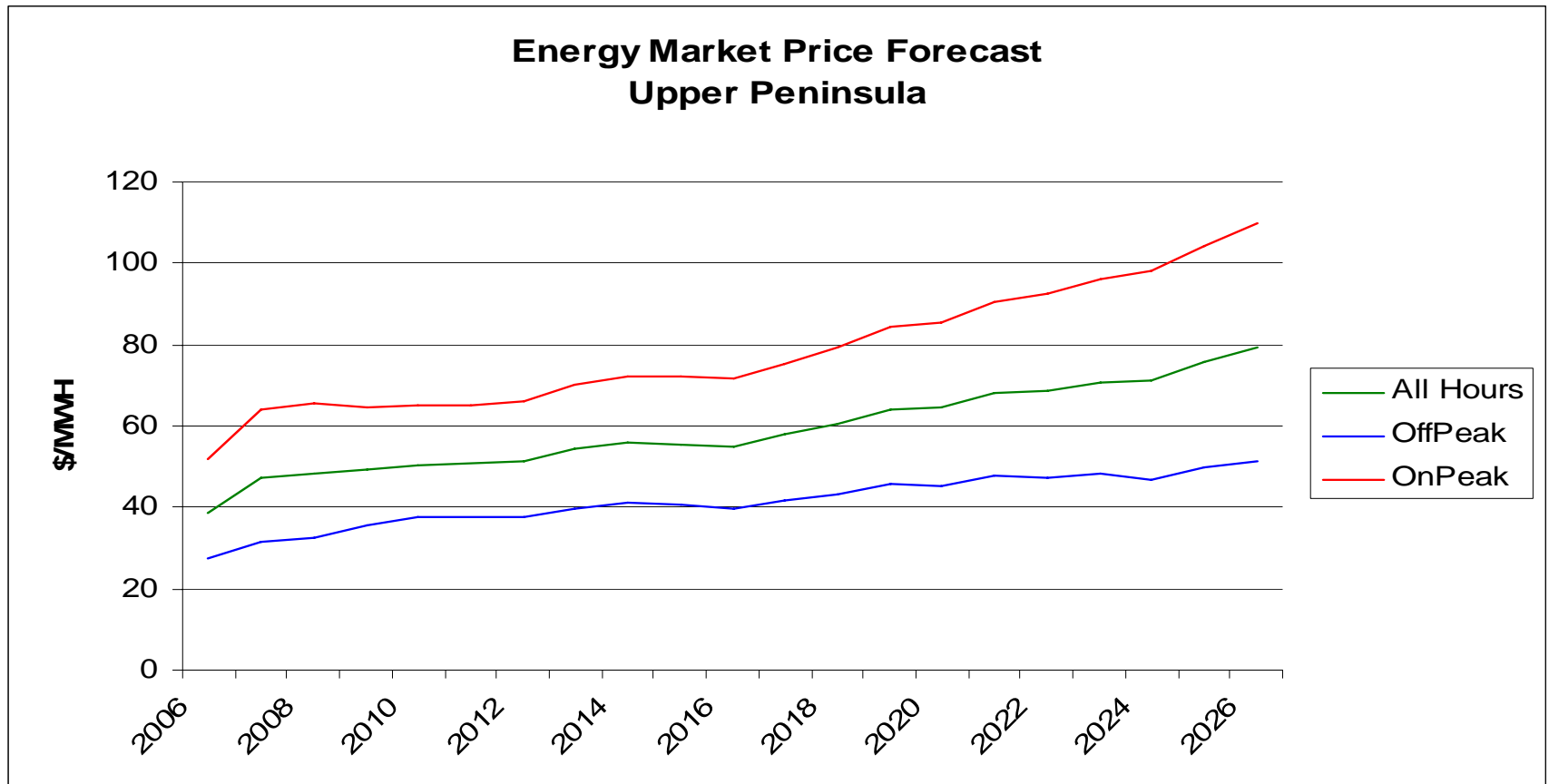


Source: EPA-452/R-05-003, Mar 2005

- Lower Peninsula 2007 Prices:
 - All Hours: \$47.30 / MWH
 - OnPeak: \$62.10 / MWH
 - OffPeak: \$33.82 /MWH



- Upper Peninsula 2007 Prices:
 - All Hours: \$47.09 / MWH
 - OnPeak: \$63.97 / MWH
 - OffPeak: \$31.71 /MWH



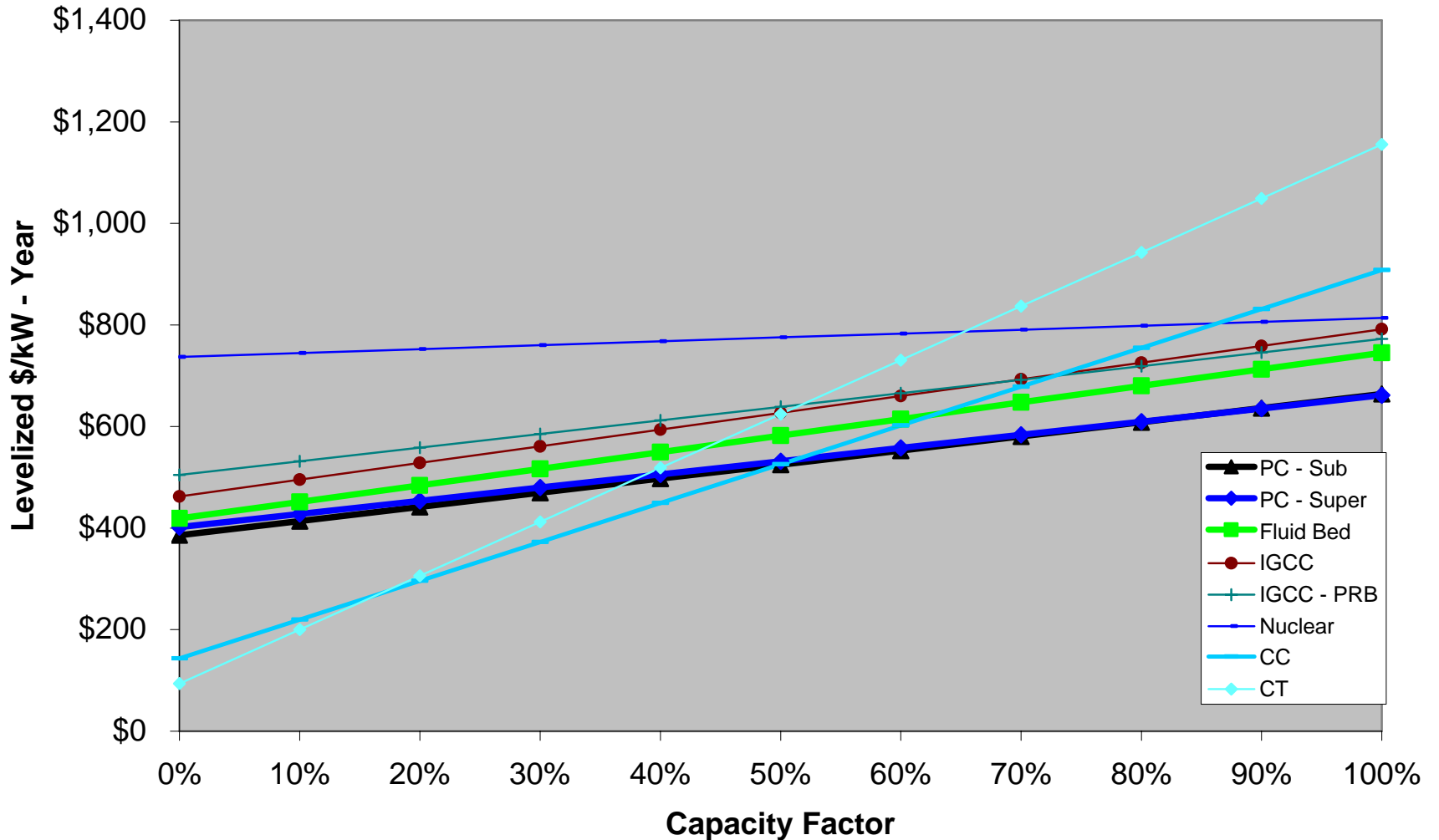
Type	Capacity	Construction Cost	Fixed O&M	VOM	Heat Rate BTU/kWh	Available Year
	MW	\$/kW	\$/kW-yr	\$/MWH		
PC-Sub	500	1,478	42.26	1.86	9,496	2012
PC-Super	500	1,551	44.91	1.75	8,864	2012
Fluid Bed	300	1,628	46.11	4.37	9,996	2012
IGCC	550	1,785	61.30	0.98	9,000	2012
IGCC-PRB	550	1,999	61.30	0.98	10,080	2012
Nuclear	1000	2,352	70.04	0.55	10,400	2018
CC	500	529	5.57	2.19	7,200	2009
CT	160	425	2.19	3.83	10,450	2008

- A transmission interconnection fee of \$77.56/kW, calculated based on 5% of the average coal construction cost, is added to all technologies.
- A firm gas reservation charge of \$20.18/kW-yr and \$5.12/kW-yr is added to the fixed cost of the Combined Cycle and Combustion Turbine, respectively
- All other operational parameters remained the same, including unit capacity, heat rates, and emission rates.

Type	SO ₂ #/MMBTU	NO _x #/MMBTU	Hg #/MMBTU	CO ₂ #/MMBTU
PC-Sub	0.05	0.08	1.22 x 10 ⁻⁶	201
PC-Super	0.05	0.08	1.22 x 10 ⁻⁶	201
Fluid Bed	0.02	0.10	1.22 x 10 ⁻⁶	200
IGCC	0.03	0.06	8.05 x 10 ⁻⁷	195
Nuclear	0.00	0.00	0.00	0.00
CC		0.03	0.00	120
CT		0.03	0.00	120



Technology Screening Curves Base Case 2006



- PROVIEW Methodology
 - For each year of the optimization PROVIEW generates all possible combinations of alternatives
 - Each combination is tested against the constraints for that year and only those combinations that meet all the constraints are passed; these are the feasible states
 - Cumulative Capital and operations costs are calculated for each feasible state
 - Feasible states from year X are the starting points for generating new combinations for year X+1
 - Repeat to end of Optimization Horizon

- Objective Function
 - Minimize Present Worth Utility Cost

- System and Area Constraints
 - 15% Minimum Reserve Margin for MECS
 - 10% Minimum Reserve Margin for METC and ITC by 2015
 - 15% Minimum Reserve Margin for Upper Peninsula
 - No additional units added once minimum reserve targets are met

- Other Constraints
 - No more than one “Large” unit per area commissioned at a time



Modeling Results



■ Central Station Resources

- Base Conditions
- High Load
- Low Load
- Reduced Import
- Expanded Transmission

■ Emissions (Carbon)

- Base Conditions
- High Load
- Low Load
- Conservation
- Renewable w/ Conservation

■ Full Renewable Generation

- Base Conditions
- High Load
- Low Load

■ Energy and Demand Conservation

- Base Conditions
- High Load
- Low Load
- Reduced DSM Penetration

■ Conservation and Renewable

- Base Conditions
- High Load
- Low Load
- Reduced DSM Penetration

■ Combustion Turbines Only

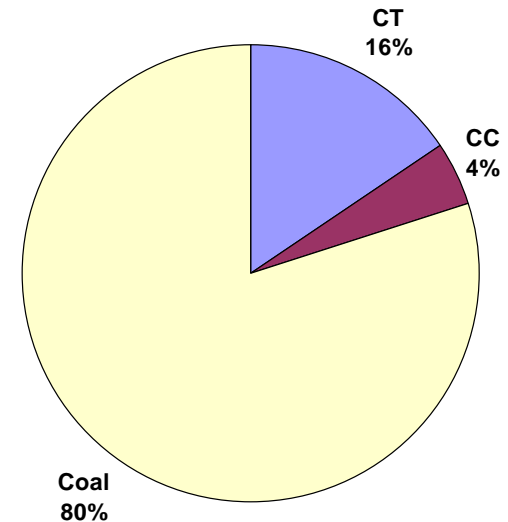
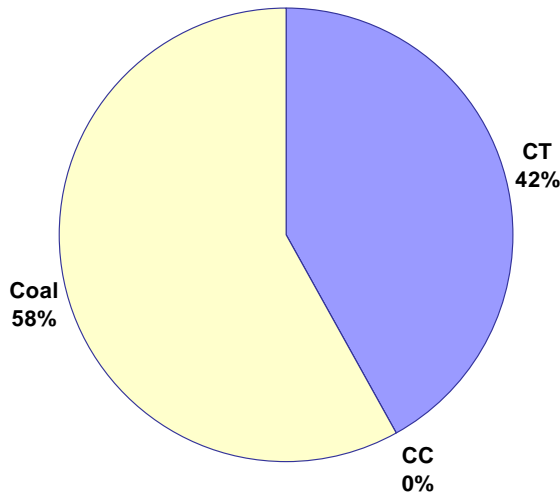
- Base Conditions
- High Load
- Low Load

- Central Station Resources
- Plan Specifics
 - Average Annual Peak Demand Growth at 1.21%
 - Average Annual Energy Sales Growth at 1.29%
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
- Alternatives Screened Out
 - IGCC
 - IGCC – PRB coal
 - Nuclear
 - CFB – except UP

Central Station Resources Scenario Expansion Plan Results

■	2006 to 2015	
■	Capacity Additions	
■	CT	1,440 mW
■	CC	0 mW
■	PC	2,000 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	0 mW
■	Total	3,440 mW
■	Demand Growth	1.17 %
■	Reserve Margin	15.26 %
■	Plan Costs	
■	NPV Utility Cost	\$ 32,073.0 M
■	NPV Emissions	\$ 3,385.6 M
■	NPV CO2	\$ 0.00 M

■	2006 to 2025	
■	Capacity Additions	
■	CT	1,760 mW
■	CC	500 mW
■	PC	9,000 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	0 mW
■	Total	11,260 mW
■	Demand Growth	1.21 %
■	Reserve Margin	15.52 %
■	Plan Costs	
■	NPV Utility Cost	\$ 56,716.9 M
■	NPV Emissions	\$ 5,602.8 M
■	NPV CO2	\$ 0.00 M



Central Station Resources Scenario Expansion Plan Schedule

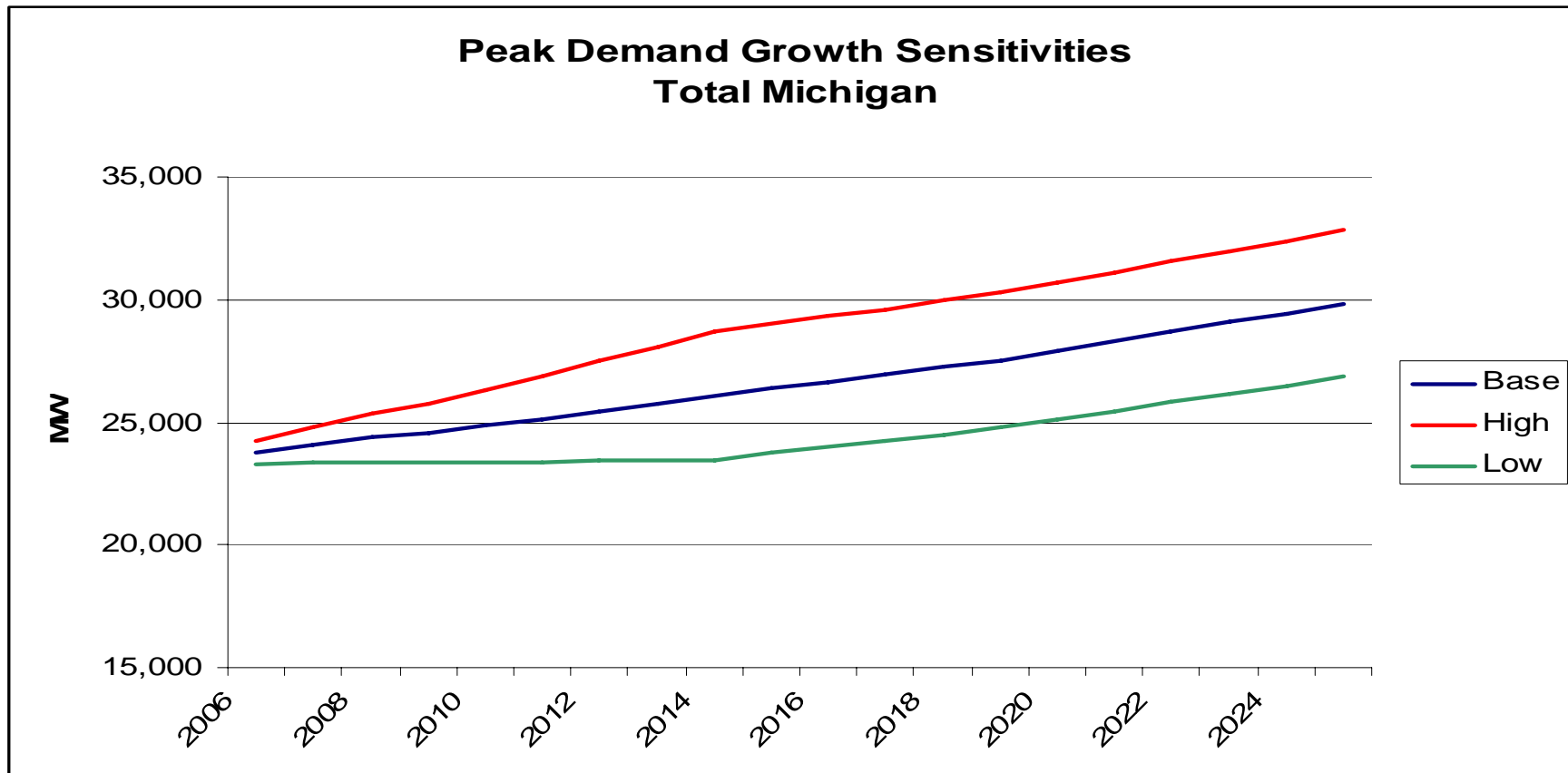
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Central Station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
2 CT - METC	-	-	1	1	-	-	-	-	-	-
7 CT - ITC	-	-	2	-	2	2	-	-	-	-
2 CT - ATC2	-	-	-	-	-	-	1	-	-	-
0 CC - METC	-	-	-	-	-	-	-	-	-	-
1 CC - ITC	-	-	-	-	-	-	-	-	-	-
0 CC - ATC2	-	-	-	-	-	-	-	-	-	-
6 COAL - METC	-	-	-	-	-	-	-	-	-	-
12 COAL - ITC	-	-	-	-	-	-	1	1	1	-
0 COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0 CFB - ATC	-	-	-	-	-	-	-	-	-	-

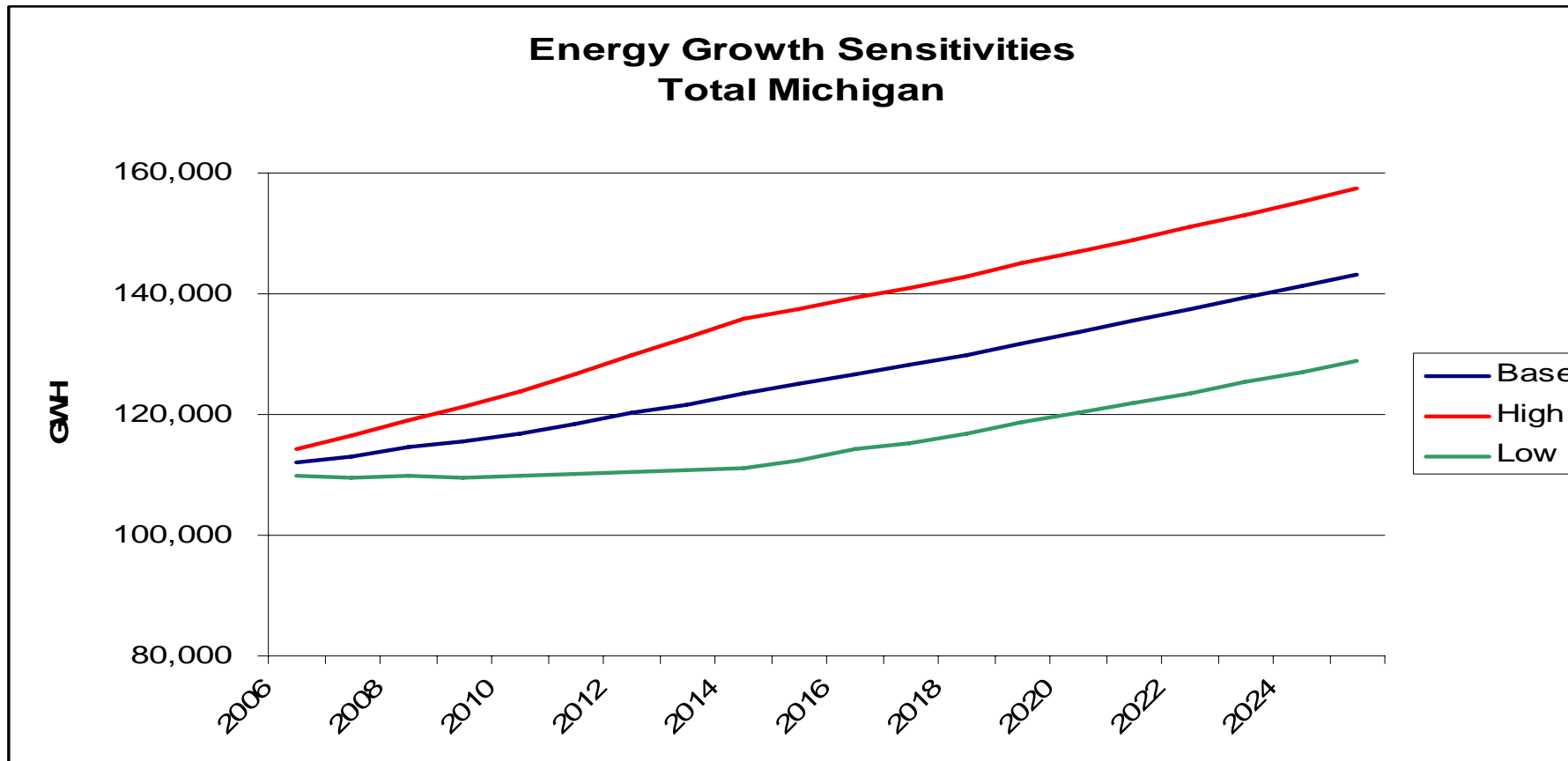
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	-	-	-	-	-
CT - ITC	-	-	-	-	-	-	-	-	-	-
CT - ATC2	1	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	1	1	-	1	-	1	1	1	-	-
COAL - ITC	1	-	1	1	1	1	1	1	1	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC	-	-	-	-	-	-	-	-	-	-



- Base 2025 Peak: 29,856 MW
- High 2025 Peak: 32,403 MW
- Low 2025 Peak: 26,870 MW



- Base 2025 Annual Energy: 143,094 GWH
- High 2025 Annual Energy: 157,404 GWH
- Low 2025 Annual Energy: 128,785 GWH



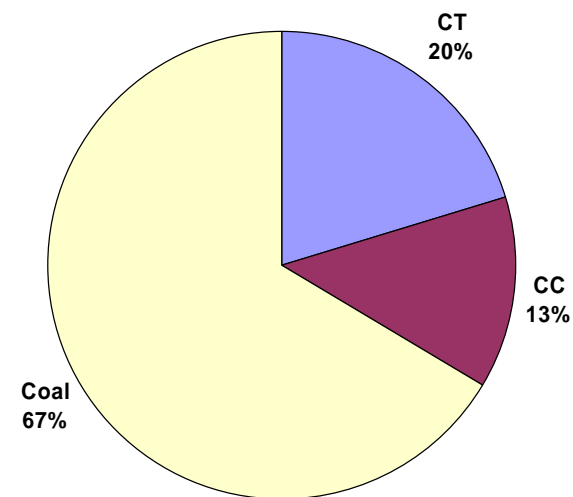
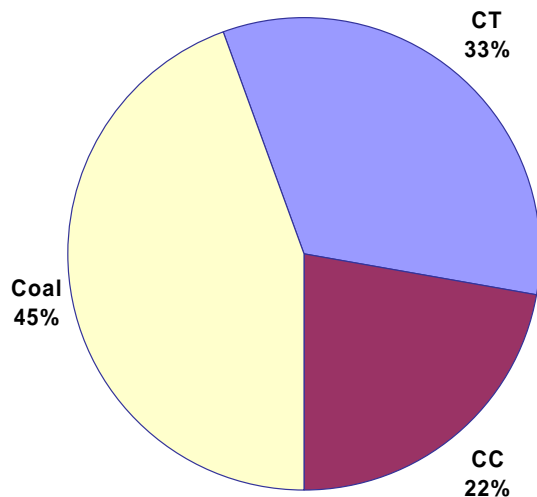
- Central Station Resources with High Load Growth
- Plan Specifics
 - Average Annual Peak Demand Growth at 1.16%
 - Average Annual Energy Sales Growth at 1.69%
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
- Alternatives Screened Out
 - IGCC
 - IGCC – PRB coal
 - Nuclear
 - CFB – except UP

Central Station Resources High Load Growth Scenario

Expansion Plan Results

■	2006 to 2015	
■	Capacity Additions	
■	CT	2,240 mW
■	CC	1,500 mW
■	PC	3,000 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	0 mW
■	Total	6,740 mW
■	Demand Growth	2.02 %
■	Reserve Margin	15.26 %
■	Plan Costs	
■	NPV Utility Cost	\$35,512.2 M
■	NPV Emissions	\$ 3,431.0 M
■	NPV CO ₂	\$ 0.0 M

■	2006 to 2025	
■	Capacity Additions	
■	CT	3,040 mW
■	CC	2,000 mW
■	PC	10,000 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	0 mW
■	Total	15,040 mW
■	Demand Growth	1.61 %
■	Reserve Margin	15.63 %
■	Plan Costs	
■	NPV Utility Cost	\$64,116.8 M
■	NPV Emissions	\$ 5,720.8 M
■	NPV CO ₂	\$ 0.0 M



Central Station Resources High Load Growth Scenario

Expansion Plan Schedule

Central St. High Load	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
8 CT - METC	-	-	1	1	1	1	1	-	-	-
8 CT - ITC	-	-	2	1	2	1	-	-	-	-
3 CT - ATC2	-	-	-	-	-	-	2	-	-	-
0 CC - METC	-	-	-	-	-	-	-	-	-	-
4 CC - ITC	-	-	-	1	1	1	-	-	-	-
0 CC - ATC2	-	-	-	-	-	-	-	-	-	-
8 COAL - METC	-	-	-	-	-	-	1	1	-	-
12 COAL - ITC	-	-	-	-	-	-	1	1	1	-
0 COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0 CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	1	-	-	-	-	-	-	-	1	-
CT - ITC	1	-	-	-	-	-	-	-	1	-
CT - ATC2	-	-	-	1	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	1	-	1	-	1	1	1	1	-
COAL - ITC	1	1	1	1	1	1	1	1	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-



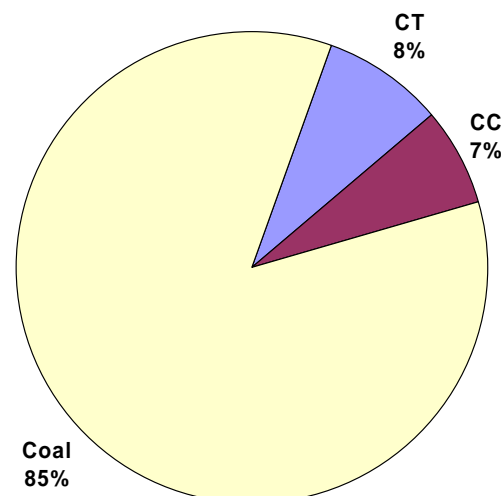
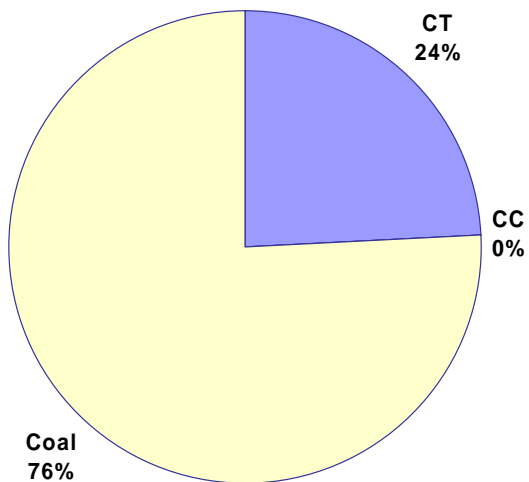
- Central Station Resources with Low Load Growth
- Plan Specifics
 - Average Annual Peak Demand Growth at 0.76%
 - Average Annual Energy Sales Growth at 0.84%
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
- Alternatives Screened Out
 - IGCC
 - IGCC – PRB coal
 - Nuclear
 - CFB – except UP

Central Station Resources Low Load Growth Scenario

Expansion Plan Results

■	2006 to 2015	
■	Capacity Additions	
■	CT	160 mW
■	CC	0 mW
■	PC	500 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	0 mW
■	Total	660 mW
■	Demand Growth	0.21 %
■	Reserve Margin	17.28 %
■	Plan Costs	
■	NPV Utility Cost	\$28,873.2 M
■	NPV Emissions	\$ 3,356.5 M
■	NPV CO2	\$ 0.0 M

■	2006 to 2025	
■	Capacity Additions	
■	CT	640 mW
■	CC	500 mW
■	PC	6,500 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	0 mW
■	Total	7,640 mW
■	Demand Growth	0.76 %
■	Reserve Margin	15.95 %
■	Plan Costs	
■	NPV Utility Cost	\$49,811.6 M
■	NPV Emissions	\$ 5,470.6 M
■	NPV CO2	\$ 0.0 M



Central Station Resources Low Load Growth Scenario

Expansion Plan Schedule

Central St. Low LD	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
0 CT - METC	-	-	-	-	-	-	-	-	-	-
2 CT - ITC	-	-	-	-	-	-	-	-	-	-
2 CT - ATC2	-	-	-	-	-	-	1	-	-	-
0 CC - METC	-	-	-	-	-	-	-	-	-	-
1 CC - ITC	-	-	-	-	-	-	-	-	-	-
0 CC - ATC2	-	-	-	-	-	-	-	-	-	-
4 COAL - METC	-	-	-	-	-	-	-	-	-	-
9 COAL - ITC	-	-	-	-	-	-	-	-	-	-
0 COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0 CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	-	-	-	-	-
CT - ITC	-	-	-	-	-	1	1	-	-	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	1	-	-	1	-	-	1	1	-	-
COAL - ITC	-	1	1	1	1	1	1	1	1	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-



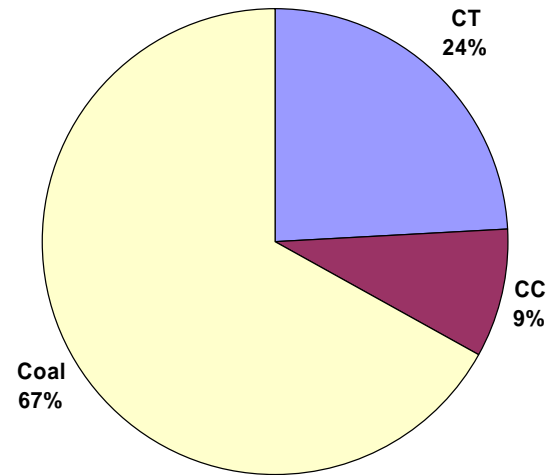
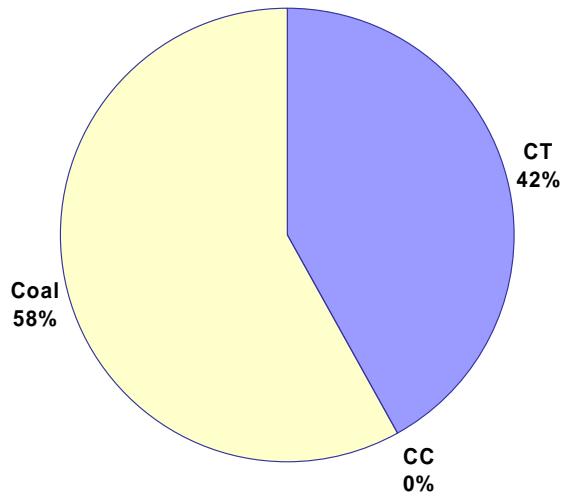
- Central Station Resources with Reduced Import Capability
- Plan Specifics
 - Base Load Growth
 - Reduced Import Capacity into MECS to 1,650 mW to account for energy flows to Ontario
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
- Alternatives Screened Out
 - IGCC
 - IGCC – PRB coal
 - Nuclear
 - CFB – except UP

Central Station Resources Reduced Import Scenario

Expansion Plan Results

■	2006 to 2015	
■	Capacity Additions	
■	CT	1,440 mW
■	CC	0 mW
■	PC	2,000 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	0 mW
■	Total	3,440 mW
■	Demand Growth	1.17 %
■	Reserve Margin	15.26 %
■	Plan Costs	
■	NPV Utility Cost	\$32,169.2 M
■	NPV Emissions	\$ 3,373.6 M
■	NPV CO2	\$ 0.0 M

■	2006 to 2025	
■	Capacity Additions	
■	CT	2,720 mW
■	CC	1,000 mW
■	PC	7,500 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	0 mW
■	Total	11,220 mW
■	Demand Growth	1.21 %
■	Reserve Margin	15.40 %
■	Plan Costs	
■	NPV Utility Cost	\$57,004.8 M
■	NPV Emissions	\$ 5,492.4 M
■	NPV CO2	\$ 0.0 M



Central Station Resources Reduced Import Scenario

Expansion Plan Schedule

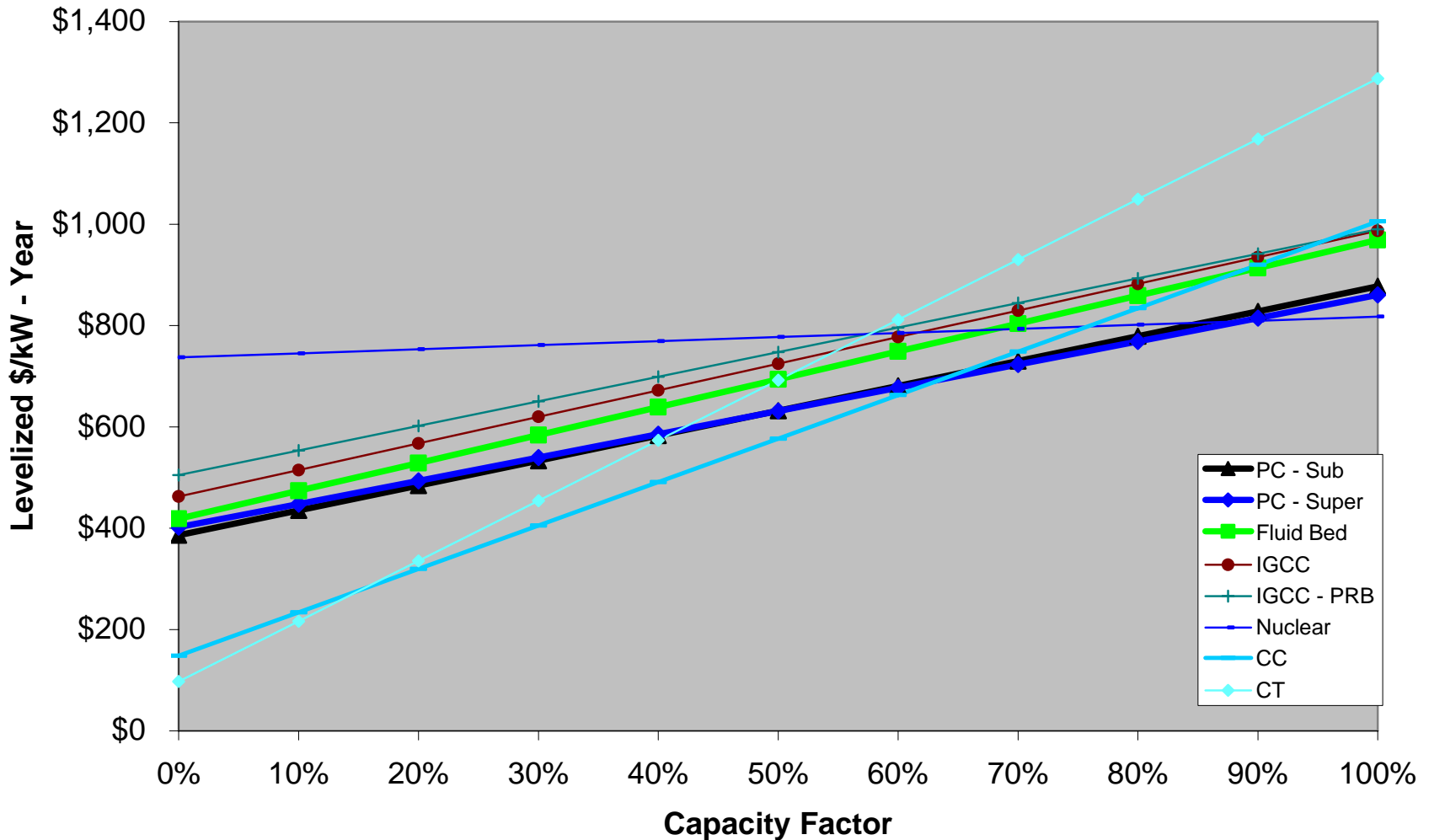
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Central St.	Low Import	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
5	CT - METC	-	-	1	-	1	1	-	-	-	-
10	CT - ITC	-	-	2	1	1	1	-	-	-	-
2	CT - ATC2	-	-	-	-	-	-	1	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
2	CC - ITC	-	-	-	-	-	-	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
6	COAL - METC	-	-	-	-	-	-	-	-	-	-
9	COAL - ITC	-	-	-	-	-	-	1	1	1	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	-	-	1	-	-
CT - ITC	1	-	-	1	1	-	-	1	-	-
CT - ATC2	1	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	1	1	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	1	1	-	1	1	1	-	1	-
COAL - ITC	1	-	1	1	-	1	1	-	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-

- Emissions Case
- Plan Specifics
 - Base Load Growth
 - Carbon Tax
 - \$10/Ton in 2010
 - Grows to \$30/Ton in 2018
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
 - Nuclear
- Alternatives Screened Out
 - IGCC
 - IGCC – PRB coal
 - CFB – except UP

Technology Screening Curves Emissions Case 2006



Emissions (Carbon Case) Scenario Expansion Plan Results

2006 to 2015

Capacity Additions

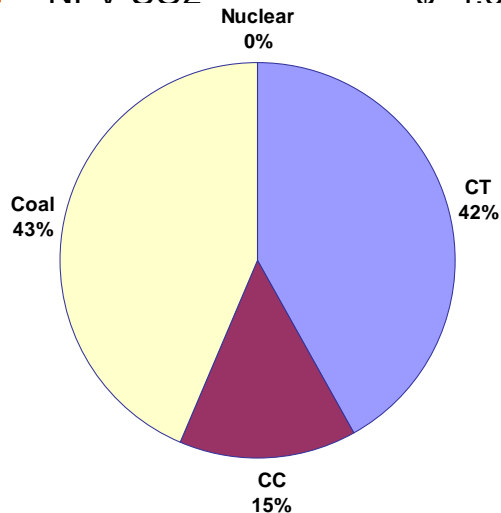
■ CT	1,440 mW
■ CC	500 mW
■ PC	1,500 mW
■ Nuclear	0 mW
■ Renewable	0 mW
■ Conservation	0 mW
■ Total	3,440 mW

■ Demand Growth 1.17 %

■ Reserve Margin 15.26 %

Plan Costs

■ NPV Utility Cost	\$36,956.6 M
■ NPV Emissions	\$ 8,150.5 M
■ NPV CO2	\$ 4.688.2 M



2006 to 2025

Capacity Additions

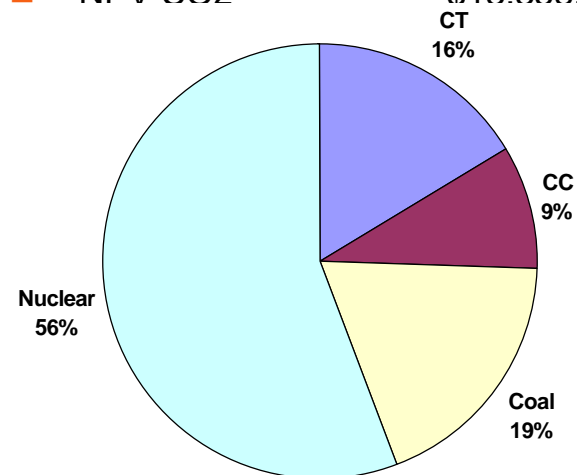
■ CT	1,760 mW
■ CC	1,000 mW
■ PC	2,000 mW
■ Nuclear	6,000 mW
■ Renewable	0 mW
■ Conservation	0 mW
■ Total	10,760 mW

■ Demand Growth 1.21 %

■ Reserve Margin 16.04 %

Plan Costs

■ NPV Utility Cost	\$70,752.2 M
■ NPV Emissions	\$18,991.7 M
■ NPV CO2	\$13.358.9 M



Emissions (Carbon Case) Scenario Expansion Plan Schedule

SIEMENS

Emissions (Carbon)		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
4	CT - METC	-	-	1	-	1	1	-	-	-	-
5	CT - ITC	-	-	2	1	1	1	-	-	-	-
2	CT - ATC2	-	-	-	-	-	-	1	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
2	CC - ITC	-	-	-	-	-	-	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
1	COAL - METC	-	-	-	-	-	-	-	-	-	-
3	COAL - ITC	-	-	-	-	-	-	1	1	1	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-
2	NUKE - METC	-	-	-	-	-	-	-	-	-	-
4	NUKE - ITC	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	1	-	-	-	-	-	-	-	-	-
CT - ITC	-	-	-	-	-	-	-	-	-	-
CT - ATC2	1	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	1	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	1	-	-	-	-	-	-	-	-
COAL - ITC	-	-	-	-	-	-	-	-	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-
NUKE - METC	-	-	-	1	-	-	-	1	-	-
NUKE - ITC	-	-	1	-	1	-	1	-	1	-

- Emissions with High Load Growth
- Plan Specifics
 - High Load Growth
 - Carbon Tax
 - \$10/Ton in 2010
 - Grows to \$30/Ton in 2018
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
 - Nuclear
- Alternatives Screened Out
 - IGCC
 - IGCC – PRB coal
 - CFB – except UP

Emissions (Carbon Case) High Load Growth Scenario

Expansion Plan Results

2006 to 2015

Capacity Additions

■ CT	1,760 mW
■ CC	2,000 mW
■ PC	3,000 mW
■ Nuclear	0 mW
■ Renewable	0 mW
■ Conservation	0 mW

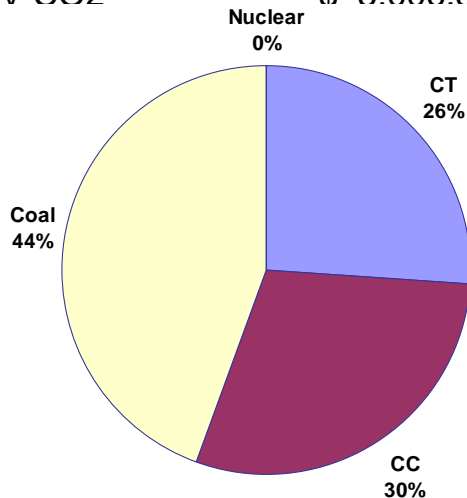
■ Total 6,760 mW

■ Demand Growth 2.02 %

■ Reserve Margin 15.33 %

Plan Costs

■ NPV Utility Cost	\$40,832.7 M
■ NPV Emissions	\$ 8,523.0 M
■ NPV CO2	\$ 5.006.8 M



2006 to 2025

Capacity Additions

■ CT	2,240 mW
■ CC	2,000 mW
■ PC	4,000 mW
■ Nuclear	6,000 mW
■ Renewable	0 mW
■ Conservation	0 mW

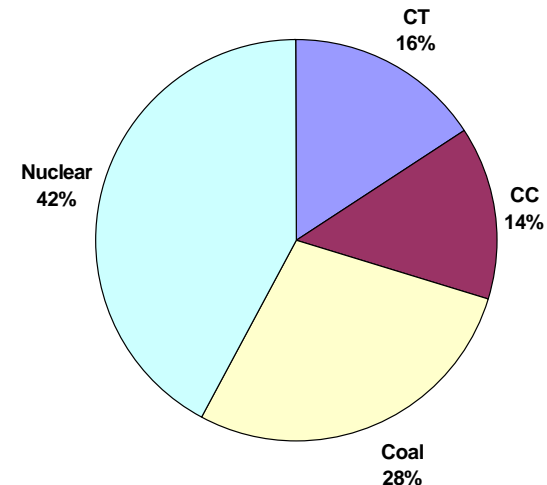
■ Total 14,240 mW

■ Demand Growth 1.61 %

■ Reserve Margin 15.26 %

Plan Costs

■ NPV Utility Cost	\$79,492.7 M
■ NPV Emissions	\$20,788.7 M
■ NPV CO2	\$14,989.6 M



Emissions (Carbon Case) High Load Growth Scenario

Expansion Plan Schedule

Emissions High LD		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
4	CT - METC	-	-	1	1	-	1	-	-	-	-
7	CT - ITC	-	-	2	1	-	1	-	1	-	-
3	CT - ATC2	-	-	-	-	-	-	2	-	-	-
1	CC - METC	-	-	-	-	1	-	-	-	-	-
3	CC - ITC	-	-	-	1	1	1	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
2	COAL - METC	-	-	-	-	-	-	1	1	-	-
6	COAL - ITC	-	-	-	-	-	-	1	1	1	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-
3	NUKE - METC	-	-	-	-	-	-	-	-	-	-
3	NUKE - ITC	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	-	1	-	-	-
CT - ITC	1	-	-	-	-	-	-	-	-	-
CT - ATC2	-	-	-	1	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	-	-	-	-	-	-	-	-
COAL - ITC	1	1	-	-	-	-	-	-	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-
NUKE - METC	-	-	1	-	1	-	-	-	-	1
NUKE - ITC	-	-	-	1	-	1	-	1	-	-

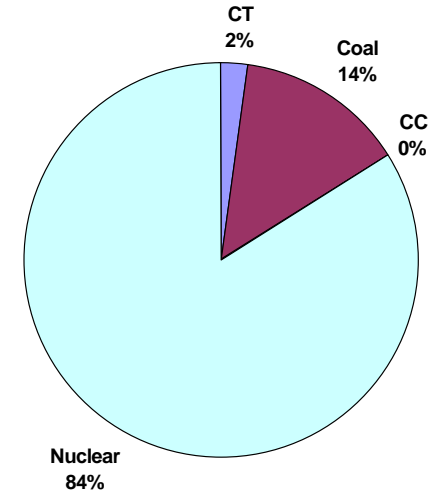
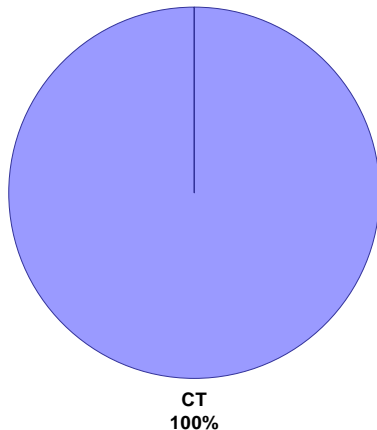
- Emissions Low Load Case
- Plan Specifics
 - Low Load Growth
 - Carbon Tax
 - \$10/Ton in 2010
 - Grows to \$30/Ton in 2018
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
 - Nuclear
- Alternatives Screened Out
 - IGCC
 - IGCC – PRB coal
 - CFB – except UP

Emissions (Carbon Case) Low Load Growth Scenario

Expansion Plan Results

■	2006 to 2015	
■	Capacity Additions	
■	CT	160 mW
■	CC	0 mW
■	PC	0 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	0 mW
■	Total	160 mW
■	Demand Growth	0.21 %
■	Reserve Margin	15.45 %
■	Plan Costs	
■	NPV Utility Cost	\$31,407.9 M
■	NPV Emissions	\$ 7,515.2 M
■	NPV CO2	\$ 4,199.5 M

■	2006 to 2025	
■	Capacity Additions	
■	CT	160 mW
■	CC	0 mW
■	PC	1,000 mW
■	Nuclear	6,000 mW
■	Renewable	0 mW
■	Conservation	0 mW
■	Total	7,160 mW
■	Demand Growth	0.76 %
■	Reserve Margin	17.23 %
■	Plan Costs	
■	NPV Utility Cost	\$58,628.0 M
■	NPV Emissions	\$17,042.8 M
■	NPV CO2	\$11.695.6 M



Emissions (Carbon Case) Low Load Growth Scenario

Expansion Plan Schedule

Emissions Low LD		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
0	CT - METC	-	-	-	-	-	-	-	-	-	-
1	CT - ITC	-	-	-	-	-	-	-	-	-	-
0	CT - ATC2	-	-	-	-	-	-	-	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
0	CC - ITC	-	-	-	-	-	-	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
1	COAL - METC	-	-	-	-	-	-	-	-	-	-
1	COAL - ITC	-	-	-	-	-	-	-	-	-	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-
2	NUKE - METC	-	-	-	-	-	-	-	-	-	-
4	NUKE - ITC	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	-	-	-	-	-
CT - ITC	-	-	-	-	-	-	-	-	-	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	1	-	-	-	-	-	-	-	-
COAL - ITC	1	-	-	-	-	-	-	-	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-
NUKE - METC	-	-	-	1	-	-	-	-	1	-
NUKE - ITC	-	-	1	-	1	-	1	1	-	-

- Emissions with Renewables and Conservation
- Plan Specifics
 - Base Load Growth
 - Carbon Tax
 - \$10/Ton in 2010
 - Grows to \$30/Ton in 2018
 - Conservation and Renewables added to existing resource mix:
 - 1,354 mW of Renewable Resources
 - 798 mW Firm Renewable Capacity
 - 4,053 mW Peak Demand reduction
 - 17,431 gWh Energy Sales reductions
 - Central Station resource additions re-optimized
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
 - Nuclear
- Alternatives Screened Out
 - IGCC
 - IGCC – PRB coal
 - CFB – except UP

Emissions (Carbon Case) with Renewable and Conservation Scenario Expansion Plan Results

2006 to 2015

Capacity Additions

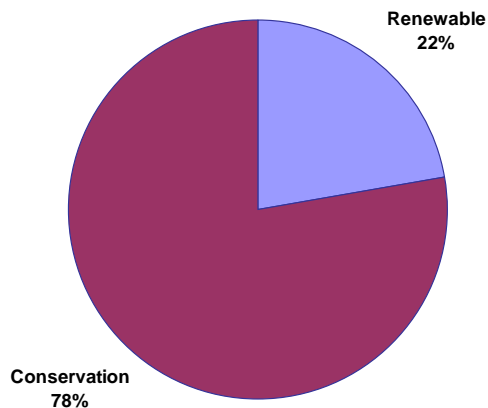
■ CT	0 mW
■ CC	0 mW
■ PC	0 mW
■ Nuclear	0 mW
■ Renewable	599 mW
■ Conservation	2,097 mW
■ Total	2,696 mW

■ Demand Growth 0.24 %

■ Reserve Margin 15.48 %

Plan Costs

■ NPV Utility Cost	\$36,203.2 M
■ NPV Emissions	\$ 7,828.7 M
■ NPV CO2	\$ 4,403.2 M



2006 to 2025

Capacity Additions

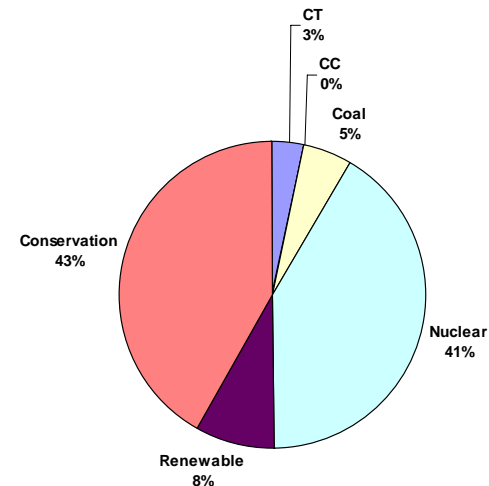
■ CT	320 mW
■ CC	0 mW
■ PC	500 mW
■ Nuclear	4,000 mW
■ Renewable	798 mW
■ Conservation	4,053 mW
■ Total	9,671 mW

■ Demand Growth 0.47 %

■ Reserve Margin 15.42 %

Plan Costs

■ NPV Utility Cost	\$66,179.2 M
■ NPV Emissions	\$17,477.3 M
■ NPV CO2	\$11,983.2 M



Emissions (Carbon Case) with Renewable and Conservation Scenario Expansion Plan Schedule

Emissions Ren & Con		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
0	CT - METC	-	-	-	-	-	-	-	-	-	-
2	CT - ITC	-	-	-	-	-	-	-	-	-	-
0	CT - ATC2	-	-	-	-	-	-	-	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
0	CC - ITC	-	-	-	-	-	-	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
0	COAL - METC	-	-	-	-	-	-	-	-	-	-
1	COAL - ITC	-	-	-	-	-	-	-	-	-	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-
1	NUKE - METC	-	-	-	-	-	-	-	-	-	-
3	NUKE - ITC	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	-	-	-	-	-
CT - ITC	-	1	1	-	-	-	-	-	-	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	-	-	-	-	-	-	-	-
COAL - ITC	1	-	-	-	-	-	-	-	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-
NUKE - METC	-	-	1	-	-	-	-	-	-	-
NUKE - ITC	-	-	-	1	-	1	1	-	-	-

- Emissions with Conservation Only
- Plan Specifics
 - Base Load Growth
 - Carbon Tax
 - \$10/Ton in 2010
 - Grows to \$30/Ton in 2018
 - Conservation added to existing resource mix:
 - 4,053 mW Peak Demand reduction
 - 17,431 gWh Energy Sales reductions
 - Central Station resource additions re-optimized
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
 - Nuclear
- Alternatives Screened Out
 - IGCC
 - IGCC – PRB coal
 - CFB – except UP



Emissions (Carbon Case) with Conservation Only Scenario Expansion Plan Results

2006 to 2015

Capacity Additions

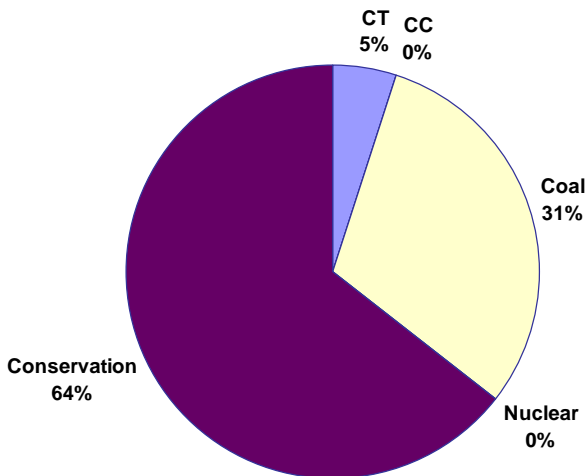
■ CT	160 mW
■ CC	0 mW
■ PC	1,000 mW
■ Nuclear	0 mW
■ Renewable	0 mW
■ Conservation	2,097 mW
■ Total	3,257 mW

■ Demand Growth 0.24 %

■ Reserve Margin 16.60 %

Plan Costs

■ NPV Utility Cost	\$35,863.7 M
■ NPV Emissions	\$ 7,970.9 M
■ NPV CO2	\$ 4,527.9 M



2006 to 2025

Capacity Additions

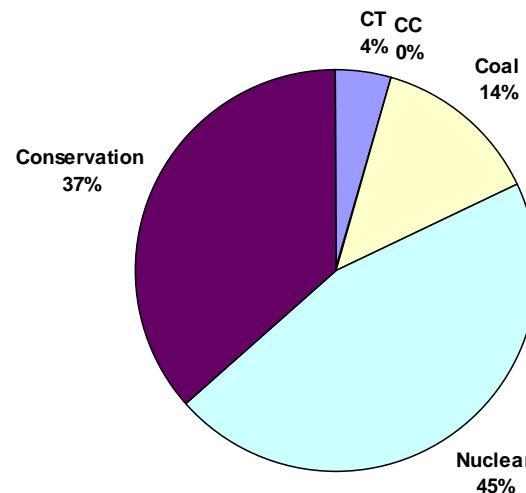
■ CT	480 mW
■ CC	0 mW
■ PC	1,500 mW
■ Nuclear	5,000 mW
■ Renewable	0 mW
■ Conservation	4,053 mW
■ Total	11,033 mW

■ Demand Growth 0.47 %

■ Reserve Margin 19.63 %

Plan Costs

■ NPV Utility Cost	\$65,746.9 M
■ NPV Emissions	\$18,347.3 M
■ NPV CO2	\$12,772.7 M



Emissions (Carbon Case) with Conservation Only Scenario Expansion Plan Schedule

Emissions Cons Only		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
0	CT - METC	-	-	-	-	-	-	-	-	-	-
2	CT - ITC	-	-	-	-	-	-	-	-	-	-
1	CT - ATC2	-	-	-	-	-	-	1	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
0	CC - ITC	-	-	-	-	-	-	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
0	COAL - METC	-	-	-	-	-	-	-	-	-	-
3	COAL - ITC	-	-	-	-	-	-	-	1	-	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-
2	NUKE - METC	-	-	-	-	-	-	-	-	-	-
3	NUKE - ITC	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	-	-	-	-	-
CT - ITC	-	1	-	-	-	-	-	1	-	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	-	-	-	-	-	-	-	-
COAL - ITC	1	-	-	-	-	-	-	-	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-
NUKE - METC	-	-	-	-	1	-	-	1	-	-
NUKE - ITC	-	-	1	-	-	1	-	-	1	-

- Renewable Generation Resources
- Plan Specifics
 - Base Load Growth
 - Renewable Resources “Hard Wired” into future generation mix:
 - 1,354 mW of Renewable Resources
 - 798 mW Firm Renewable Capacity
 - Central Station resource additions re-optimized
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
- Alternatives Screened Out
 - Renewable
 - Renewable – PRB coal
 - Nuclear
 - CFB – except UP

Renewable Generation Scenario Expansion Plan Results

2006 to 2015

Capacity Additions

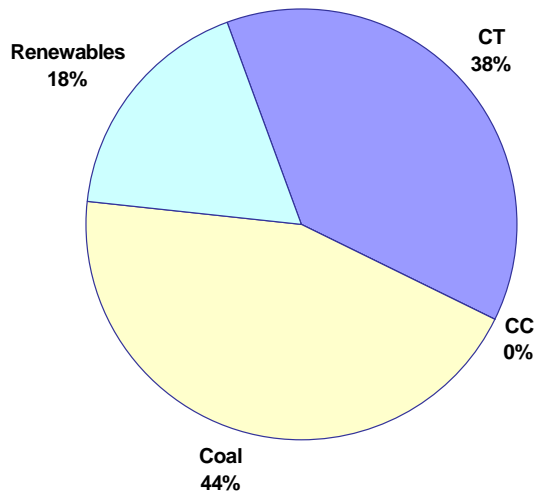
■ CT	1,280 mW
■ CC	0 mW
■ PC	1,500 mW
■ Nuclear	0 mW
■ Renewable	599 mW
■ Conservation	0 mW
■ Total	3,379 mW

■ Demand Growth 1.17 %

■ Reserve Margin 15.52 %

Plan Costs

■ NPV Utility Cost	\$30,710.8 M
■ NPV Emissions	\$ 3,266.4 M
■ NPV CO2	\$ 0.0 M



2006 to 2025

Capacity Additions

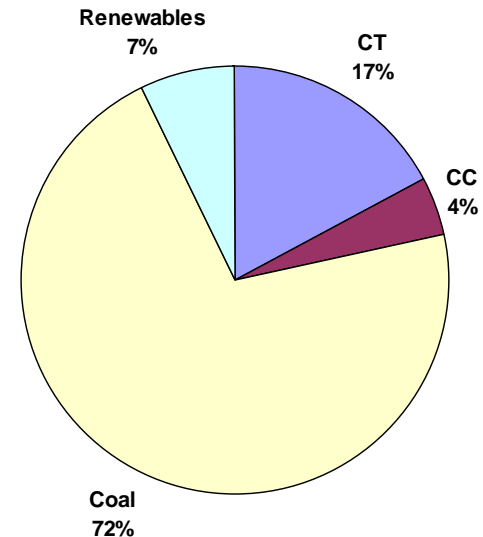
■ CT	1,920 mW
■ CC	500 mW
■ PC	8,000 mW
■ Nuclear	0 mW
■ Renewable	798 mW
■ Conservation	0 mW
■ Total	11,218 mW

■ Demand Growth 1.21 %

■ Reserve Margin 16.23 %

Plan Costs

■ NPV Utility Cost	\$54,709.1 M
■ NPV Emissions	\$ 5,375.3 M
■ NPV CO2	\$ 0.0 M



Renewable Generation Scenario Expansion Plan Schedule

SIEMENS

Renewables		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
4	CT - METC	-	-	1	-	-	-	-	-	-	-
7	CT - ITC	-	-	-	1	2	1	-	-	1	-
1	CT - ATC2	-	-	-	-	-	-	1	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
1	CC - ITC	-	-	-	-	-	-	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
5	COAL - METC	-	-	-	-	-	-	-	-	-	-
11	COAL - ITC	-	-	-	-	-	-	1	1	-	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	1	1	-	-	-
CT - ITC	-	-	-	-	-	-	-	-	1	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	1	1	-	-	1	1	1	-
COAL - ITC	1	1	1	1	1	1	1	1	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-



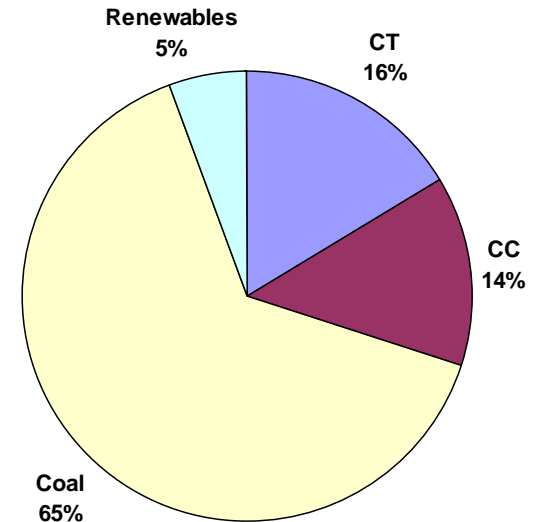
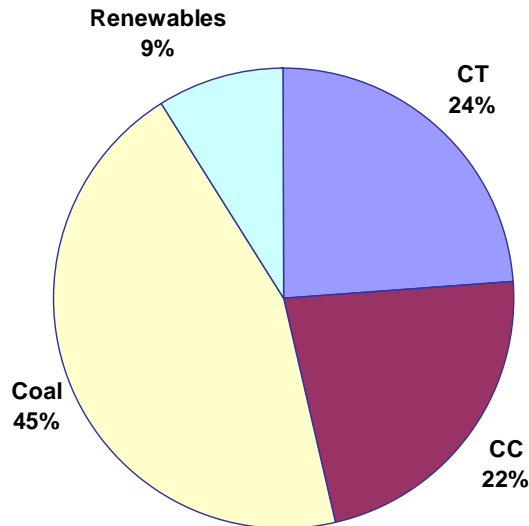
- Renewable Generation Resources with High Load Growth
- Plan Specifics
 - High Load Growth
 - Renewable Resources “Hard Wired” into future generation mix:
 - 1,354 mW of Renewable Resources
 - 798 mW Firm Renewable Capacity
 - Central Station resource additions re-optimized
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
- Alternatives Screened Out
 - Renewable
 - Renewable – PRB coal
 - Nuclear
 - CFB – except UP

Renewable Generation High Load Growth Scenario

Expansion Plan Results

■	2006 to 2015	
■	Capacity Additions	
■	CT	1,600 mW
■	CC	1,500 mW
■	PC	3,000 mW
■	Nuclear	0 mW
■	Renewable	599 mW
■	Conservation	0 mW
■	Total	6,699 mW
■	Demand Growth	2.02 %
■	Reserve Margin	15.98 %
■	Plan Costs	
■	NPV Utility Cost	\$35,968.4 M
■	NPV Emissions	\$ 3,424.3 M
■	NPV CO2	\$ 0.0 M

■	2006 to 2025	
■	Capacity Additions	
■	CT	2,400 mW
■	CC	2,000 mW
■	PC	9,500 mW
■	Nuclear	0 mW
■	Renewable	798 mW
■	Conservation	0 mW
■	Total	14,698 mW
■	Demand Growth	1.61 %
■	Reserve Margin	15.48 %
■	Plan Costs	
■	NPV Utility Cost	\$65,216.8 M
■	NPV Emissions	\$ 5,687.4 M
■	NPV CO2	\$ 0.0 M



Renewable Generation High Load Growth Scenario

Expansion Plan Schedule

SIEMENS

Renewables High LD	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
7 CT - METC	-	-	1	-	1	1	-	1	-	-
6 CT - ITC	-	-	1	1	1	1	-	1	-	-
2 CT - ATC2	-	-	-	-	-	-	1	-	-	-
0 CC - METC	-	-	-	-	-	-	-	-	-	-
4 CC - ITC	-	-	-	1	1	1	-	-	-	-
0 CC - ATC2	-	-	-	-	-	-	-	-	-	-
7 COAL - METC	-	-	-	-	-	-	1	-	1	-
12 COAL - ITC	-	-	-	-	-	-	1	1	1	-
0 COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0 CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	1	1	-	-	-
CT - ITC	-	-	-	-	-	-	-	-	1	-
CT - ATC2	-	-	1	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	1	1	-	-	1	1	1	-
COAL - ITC	1	1	1	1	1	1	1	1	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-

- Renewable Generation Resources with Low Load Growth
- Plan Specifics
 - Low Load Growth
 - Renewable Resources “Hard Wired” into future generation mix:
 - 1,354 mW of Renewable Resources
 - 798 mW Firm Renewable Capacity
 - Central Station resource additions re-optimized
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
- Alternatives Screened Out
 - Renewable
 - Renewable – PRB coal
 - Nuclear
 - CFB – except UP



Renewable Generation Low Load Growth Scenario

Expansion Plan Results

■ 2006 to 2015

■ Capacity Additions

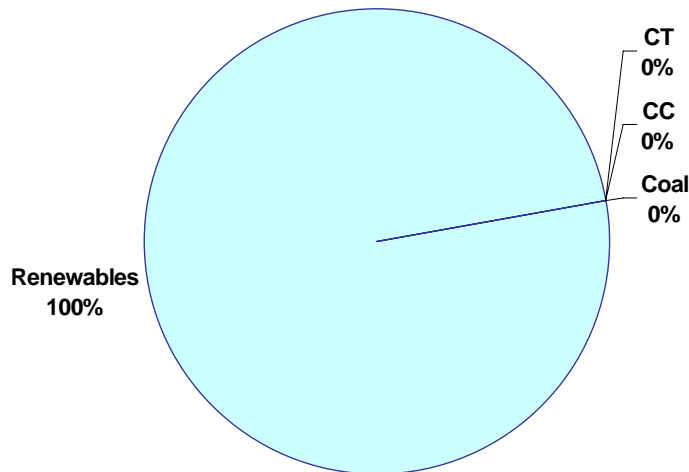
■ CT	0 mW
■ CC	0 mW
■ PC	0 mW
■ Nuclear	0 mW
■ Renewable	599 mW
■ Conservation	0 mW
■ Total	599 mW

■ Demand Growth 0.21 %

■ Reserve Margin 18.07 %

■ Plan Costs

■ NPV Utility Cost	\$29,475.3 M
■ NPV Emissions	\$ 3,348.2 M
■ NPV CO2	\$ 0.0 M



■ 2006 to 2025

■ Capacity Additions

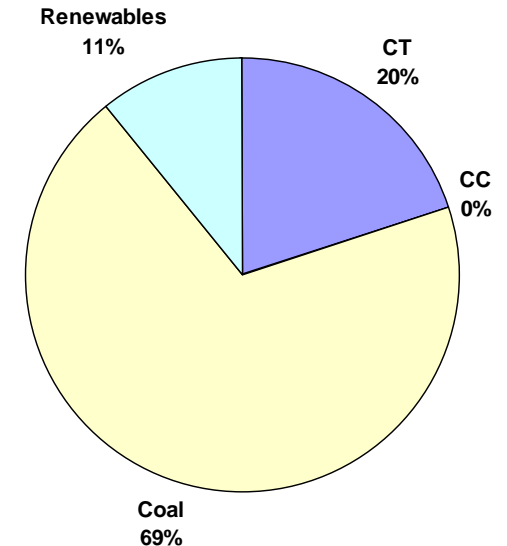
■ CT	1,440 mW
■ CC	0 mW
■ PC	5,000 mW
■ Nuclear	0 mW
■ Renewable	798 mW
■ Conservation	0 mW
■ Total	7,238 mW

■ Demand Growth 0.76 %

■ Reserve Margin 15.55 %

■ Plan Costs

■ NPV Utility Cost	\$51,256.1 M
■ NPV Emissions	\$ 5,382.1 M
■ NPV CO2	\$ 0.0 M



Renewable Generation Low Load Growth Scenario

Expansion Plan Schedule

SIEMENS

Renewables Low LD	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
3 CT - METC	-	-	-	-	-	-	-	-	-	-
6 CT - ITC	-	-	-	-	-	-	-	-	-	-
0 CT - ATC2	-	-	-	-	-	-	-	-	-	-
0 CC - METC	-	-	-	-	-	-	-	-	-	-
0 CC - ITC	-	-	-	-	-	-	-	-	-	-
0 CC - ATC2	-	-	-	-	-	-	-	-	-	-
2 COAL - METC	-	-	-	-	-	-	-	-	-	-
8 COAL - ITC	-	-	-	-	-	-	-	-	-	-
0 COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0 CFB - ATC2	-	-	-	-	-	-	-	-	-	-

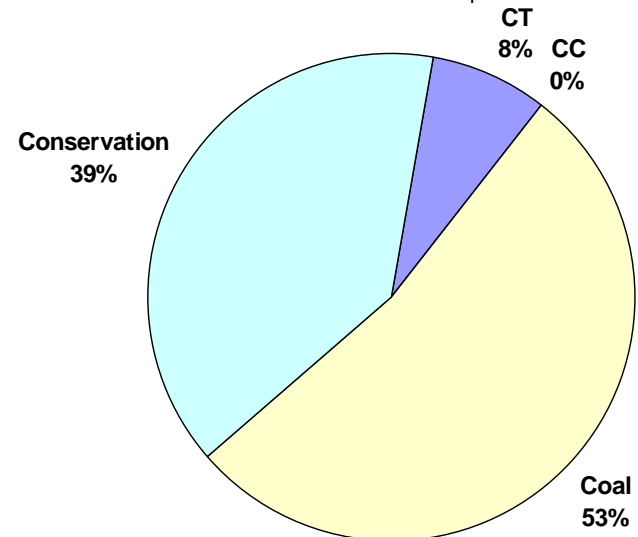
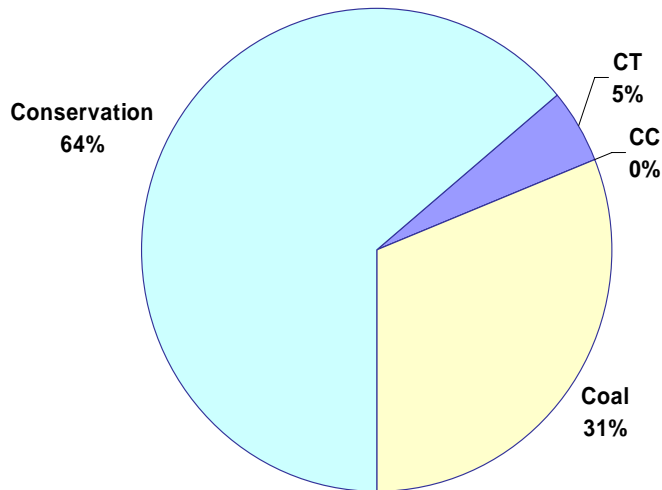
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	1	-	1	-	-	-	-
CT - ITC	-	-	1	1	-	1	1	1	-	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	-	-	-	-	1	-	1	-
COAL - ITC	-	1	1	1	1	1	1	1	1	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-

- Energy and Demand Conservation
- Plan Specifics
 - Base Load Growth starting point
 - Conservation Added to existing resource mix:
 - 4,053 mW Peak Demand reduction
 - 17,431 gWh Energy Sales reductions
 - Central Station resource additions re-optimized
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
- Alternatives Screened Out
 - Renewable
 - Renewable – PRB coal
 - Nuclear
 - CFB – except UP

Energy and Demand Conservation Scenario Expansion Plan Results

■	2006 to 2015	
■	Capacity Additions	
■	CT	160 mW
■	CC	0 mW
■	PC	1,000 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	2,057 mW
■	Total	3,257 mW
■	Demand Growth	0.24 %
■	Reserve Margin	16.60 %
■	Plan Costs	
■	NPV Utility Cost	\$31,211.6 M
■	NPV Emissions	\$ 3,366.8 M
■	NPV CO2	\$ 0.0 M

■	2006 to 2025	
■	Capacity Additions	
■	CT	800 mW
■	CC	0 mW
■	PC	5,500 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	4,053 mW
■	Total	10,353 mW
■	Demand Growth	0.47 %
■	Reserve Margin	15.24 %
■	Plan Costs	
■	NPV Utility Cost	\$52,824.0 M
■	NPV Emissions	\$ 5,473.0 M
■	NPV CO2	\$ 0.0 M



Energy and Demand Conservation Scenario Expansion Plan Schedule

SIEMENS

Conservation		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
2	CT - METC	-	-	-	-	-	-	-	-	-	-
2	CT - ITC	-	-	-	-	-	-	-	-	-	-
1	CT - ATC2	-	-	-	-	-	-	1	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
0	CC - ITC	-	-	-	-	-	-	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
3	COAL - METC	-	-	-	-	-	-	-	-	-	-
8	COAL - ITC	-	-	-	-	-	-	-	1	-	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	-	-	1	-	-
CT - ITC	-	-	-	-	-	-	1	-	-	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	-	1	-	1	-	-	1	-
COAL - ITC	1	1	-	1	1	-	1	1	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-



- Energy and Demand Conservation with High Load Growth

- Plan Specifics

- High Load Growth starting point
- Conservation Added to existing resource mix:
 - 4.053 mW Peak Demand reduction
 - 17,431 gWh Energy Sales reductions
- Central Station resource additions re-optimized

- Alternatives Considered

- 160 mW CT – all regions
- 500 mW CC – all regions
- 500 mW PC – all regions
- 150 mW CFB – UP only

- Alternatives Screened Out

- Renewable
- Renewable – PRB coal
- Nuclear
- CFB – except UP



Energy and Demand Conservation High Load Growth Scenario Expansion Plan Results

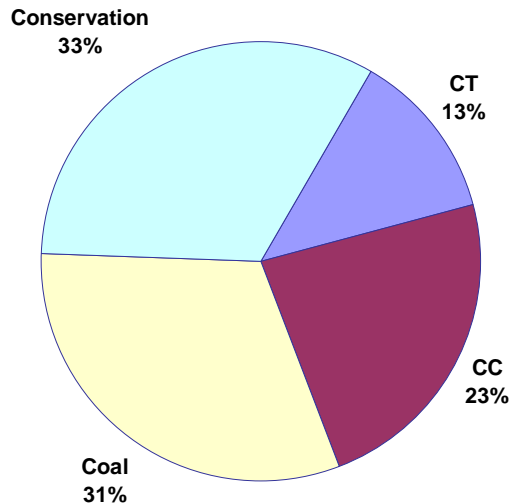
2006 to 2015

Capacity Additions

■ CT	800 mW
■ CC	1,500 mW
■ PC	2,000 mW
■ Nuclear	0 mW
■ Renewable	0 mW
■ Conservation	2,097 mW
■ Total	6,397 mW

■ Demand Growth	1.17 %
■ Reserve Margin	15.93 %
■ Plan Costs	

■ NPV Utility Cost	\$34,599.1 M
■ NPV Emissions	\$ 3,408.5 M
■ NPV CO2	\$ 0.0 M



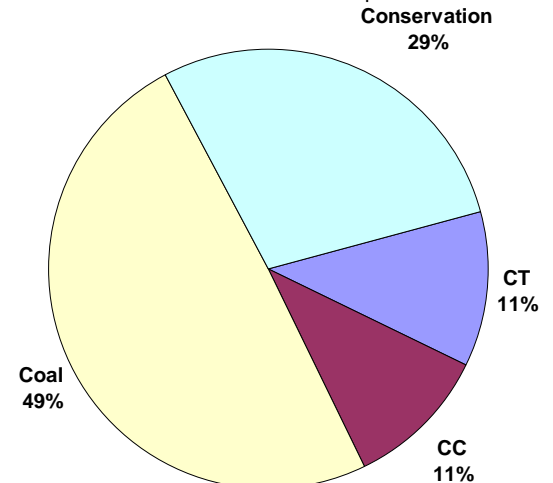
2006 to 2025

Capacity Additions

■ CT	1,600 mW
■ CC	1,500 mW
■ PC	7,000 mW
■ Nuclear	0 mW
■ Renewable	0 mW
■ Conservation	4,053 mW
■ Total	14,153 mW

■ Demand Growth	0.94 %
■ Reserve Margin	15.46 %
■ Plan Costs	

■ NPV Utility Cost	\$60,094.8 M
■ NPV Emissions	\$ 5,597.6 M
■ NPV CO2	\$ 0.0 M



Energy and Demand Conservation High Load Growth Scenario Expansion Plan Schedule

SIEMENS

Conservation High LD		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
3	CT - METC	-	-	-	-	-	1	-	-	-	-
5	CT - ITC	-	-	-	-	-	1	1	-	-	-
2	CT - ATC2	-	-	-	-	-	-	2	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
3	CC - ITC	-	-	-	1	1	1	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
6	COAL - METC	-	-	-	-	-	-	-	-	-	1
8	COAL - ITC	-	-	-	-	-	-	1	1	-	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	1	-	-	-	-
CT - ITC	-	-	-	-	-	-	-	1	1	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	1	-	1	-	1	-	1	-	1	-
COAL - ITC	-	1	-	1	-	1	1	1	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-

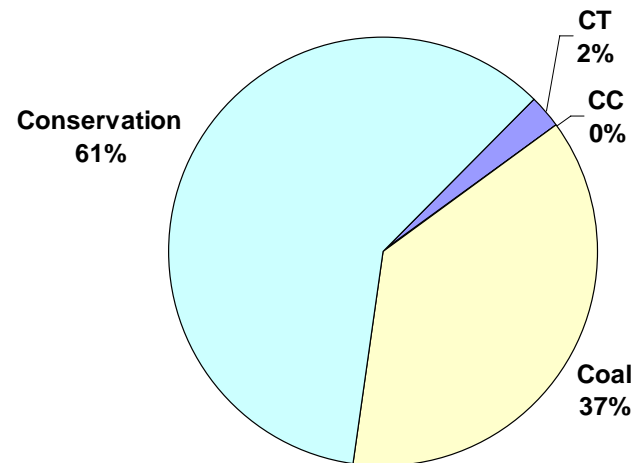
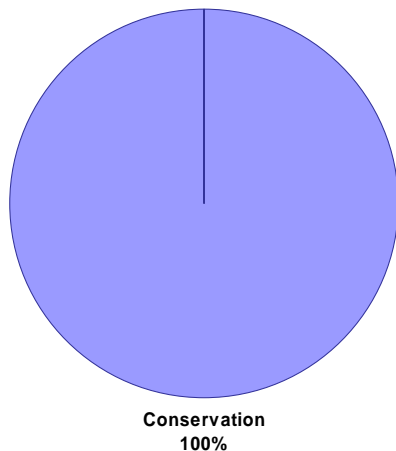


- Energy and Demand Conservation with Low Load Growth
- Plan Specifics
 - Low Load Growth starting point
 - Conservation Added to existing resource mix
 - 4,053 mW Peak Demand reduction
 - 17,431 gWh Energy Sales reductions
 - Central Station resource additions re-optimized
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
- Alternatives Screened Out
 - Renewable
 - Renewable – PRB coal
 - Nuclear
 - CFB – except UP

Energy and Demand Conservation Low Load Growth Scenario Expansion Plan Results

■	2006 to 2015	
■	Capacity Additions	
■	CT	0 mW
■	CC	0 mW
■	PC	0 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	2,097 mW
■	Total	2,097 mW
■	Demand Growth	-0.82 %
■	Reserve Margin	25.88 %
■	Plan Costs	
■	NPV Utility Cost	\$28,421.8 M
■	NPV Emissions	\$ 3,350.0 M
■	NPV CO2	\$ 0.0 M

■	2006 to 2025	
■	Capacity Additions	
■	CT	160 mW
■	CC	0 mW
■	PC	2,500 mW
■	Nuclear	0 mW
■	Renewable	0 mW
■	Conservation	4,053 mW
■	Total	6,713 mW
■	Demand Growth	-0.07 %
■	Reserve Margin	15.62 %
■	Plan Costs	
■	NPV Utility Cost	\$46,609.5 M
■	NPV Emissions	\$ 5,316.5 M
■	NPV CO2	\$ 0.0 M



Energy and Demand Conservation Low Load Growth Scenario Expansion Plan Schedule

SIEMENS

Conservation Low LD		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	CT - METC	-	-	-	-	-	-	-	-	-	-
0	CT - ITC	-	-	-	-	-	-	-	-	-	-
0	CT - ATC2	-	-	-	-	-	-	-	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
0	CC - ITC	-	-	-	-	-	-	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
1	COAL - METC	-	-	-	-	-	-	-	-	-	-
4	COAL - ITC	-	-	-	-	-	-	-	-	-	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	-	-	-	-	-
CT - ITC	-	-	-	-	-	-	-	-	-	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	-	-	-	-	1	-	-	-
COAL - ITC	-	-	-	-	-	1	1	1	1	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-



- Energy and Demand Conservation with Renewable Generation Resources
- Plan Specifics
 - Base Load Growth starting point
 - Conservation and Renewables added to existing resource mix:
 - 1,354 mW of Renewable Resources
 - 798 mW Firm Renewable Capacity
 - 4,053 mW Peak Demand reduction
 - 17,431 gWh Energy Sales reductions
 - Central Station resource additions re-optimized
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
- Alternatives Screened Out
 - Renewable
 - Renewable – PRB coal
 - Nuclear
 - CFB – except UP

Conservation and Renewables Scenario Expansion Plan Results

2006 to 2015

Capacity Additions

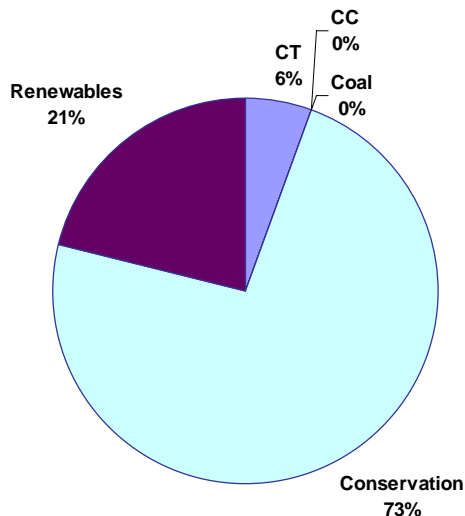
■ CT	160 mW
■ CC	0 mW
■ PC	0 mW
■ Nuclear	0 mW
■ Renewable	599 mW
■ Conservation	2,097 mW
■ Total	2,856 mW

■ Demand Growth 0.24 %

■ Reserve Margin 16.09 %

Plan Costs

■ NPV Utility Cost	\$31,781.5 M
■ NPV Emissions	\$ 3,351.9 M
■ NPV CO2	\$ 0.0 M



2006 to 2025

Capacity Additions

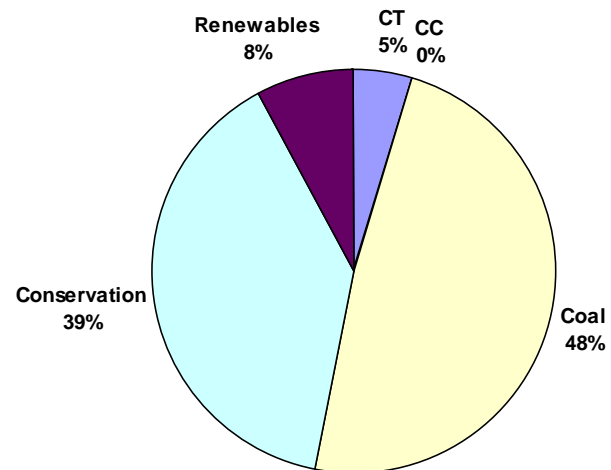
■ CT	480 mW
■ CC	0 mW
■ PC	5,000 mW
■ Nuclear	0 mW
■ Renewable	798 mW
■ Conservation	4,053 mW
■ Total	10,331 mW

■ Demand Growth 0.47 %

■ Reserve Margin 16.18 %

Plan Costs

■ NPV Utility Cost	\$54,207.8 M
■ NPV Emissions	\$ 5,411.5 M
■ NPV CO2	\$ 0.0 M



Conservation and Renewables Scenario Expansion Plan Schedule

SIEMENS

Cons & Renew		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	CT - METC	-	-	-	-	-	-	-	-	-	-
1	CT - ITC	-	-	-	-	-	-	-	-	-	-
1	CT - ATC2	-	-	-	-	-	-	1	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
0	CC - ITC	-	-	-	-	-	-	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
2	COAL - METC	-	-	-	-	-	-	-	-	-	-
8	COAL - ITC	-	-	-	-	-	-	-	-	-	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	-	-	-	-	-
CT - ITC	-	-	-	-	-	-	-	-	-	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	-	-	-	-	1	-	1	-
COAL - ITC	1	1	1	1	1	1	1	1	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-



- Energy and Demand Conservation with Renewable Generation Resources
- Plan Specifics
 - High Load Growth starting point
 - Conservation and Renewables added to existing resource mix:
 - 1,354 mW of Renewable Resources
 - 798 mW Firm Renewable Capacity
 - 4,053 mW Peak Demand reduction
 - 17,431 gWh Energy Sales reductions
 - Central Station resource additions re-optimized
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
- Alternatives Screened Out
 - Renewable
 - Renewable – PRB coal
 - Nuclear
 - CFB – except UP

Conservation and Renewables High Load Growth Scenario Expansion Plan Results

2006 to 2015

Capacity Additions

■ CT	480 mW
■ CC	1,000 mW
■ PC	2,000 mW
■ Nuclear	0 mW
■ Renewable	599 mW
■ Conservation	2,097 mW

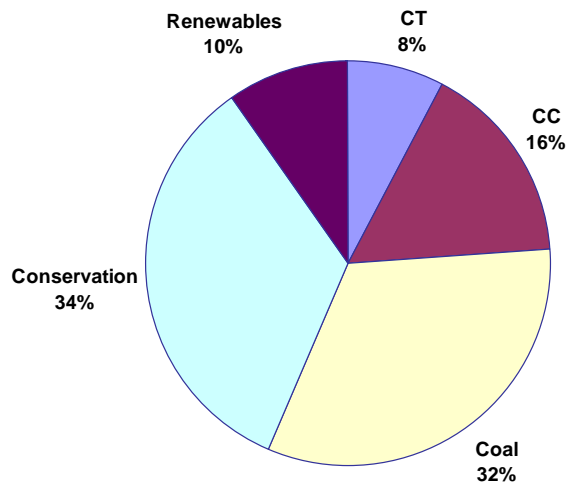
■ Total 6,176 mW

■ Demand Growth 1.17 %

■ Reserve Margin 16.08 %

Plan Costs

■ NPV Utility Cost	\$35,025.9 M
■ NPV Emissions	\$ 3,408.6 M
■ NPV CO2	\$ 0.0 M



2006 to 2025

Capacity Additions

■ CT	960 mW
■ CC	1,000 mW
■ PC	7,000 mW
■ Nuclear	0 mW
■ Renewable	798 mW
■ Conservation	4,053 mW

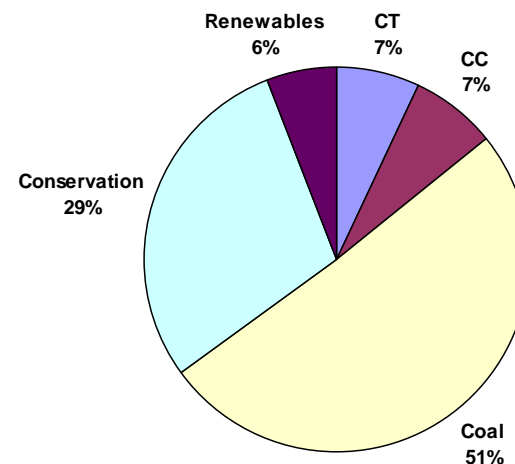
■ Total 13,811 mW

■ Demand Growth 0.94 %

■ Reserve Margin 15.28 %

Plan Costs

■ NPV Utility Cost	\$61,134.7 M
■ NPV Emissions	\$ 5,585.2 M
■ NPV CO2	\$ 0.0 M



Conservation and Renewables High Load Growth Scenario Expansion Plan Schedule

SIEMENS

Con & Ren High LD	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
2 CT - METC	-	-	-	-	-	-	-	-	-	-
3 CT - ITC	-	-	-	1	-	1	-	-	-	-
1 CT - ATC2	-	-	-	-	-	-	1	-	-	-
0 CC - METC	-	-	-	-	-	-	-	-	-	-
2 CC - ITC	-	-	-	-	1	1	-	-	-	-
0 CC - ATC2	-	-	-	-	-	-	-	-	-	-
5 COAL - METC	-	-	-	-	-	-	1	-	-	-
9 COAL - ITC	-	-	-	-	-	-	1	1	-	-
0 COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0 CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	-	-	1	-	-
CT - ITC	-	-	-	-	-	-	-	-	-	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	1	1	-	-	1	-	1	-
COAL - ITC	1	-	1	-	1	1	1	1	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-

- Energy and Demand Conservation with Renewable Generation Resources
- Plan Specifics
 - Low Load Growth starting point
 - Conservation and Renewables added to existing resource mix:
 - 1,354 mW of Renewable Resources
 - 798 mW Firm Renewable Capacity
 - 4,053 mW Peak Demand reduction
 - 17,431 gWh Energy Sales reductions
 - Central Station resource additions re-optimized
- Alternatives Considered
 - 160 mW CT – all regions
 - 500 mW CC – all regions
 - 500 mW PC – all regions
 - 150 mW CFB – UP only
- Alternatives Screened Out
 - IGCC
 - IGCC – PRB coal
 - Nuclear
 - CFB – except UP

Conservation and Renewables Low Load Growth Scenario Expansion Plan Results

2006 to 2015

Capacity Additions

■ CT	0 mW
■ CC	0 mW
■ PC	0 mW
■ Nuclear	0 mW
■ Renewable	599 mW
■ Conservation	2,097 mW

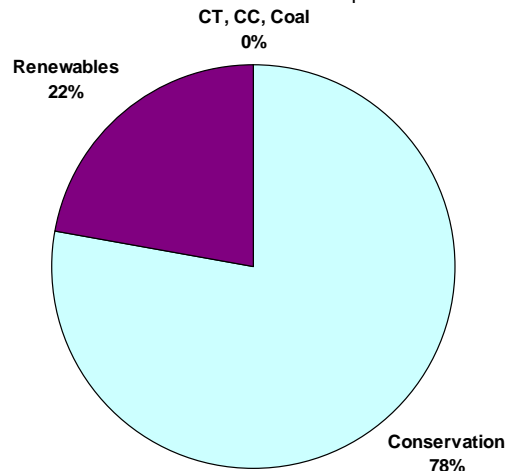
■ Total 2,696 mW

■ Demand Growth -0.82 %

■ Reserve Margin 29.56 %

Plan Costs

■ NPV Utility Cost	\$29,071.4 M
■ NPV Emissions	\$ 3,345.9 M
■ NPV CO2	\$ 0.0 M



2006 to 2025

Capacity Additions

■ CT	160 mW
■ CC	0 mW
■ PC	1,500 mW
■ Nuclear	0 mW
■ Renewable	798 mW
■ Conservation	4,053 mW

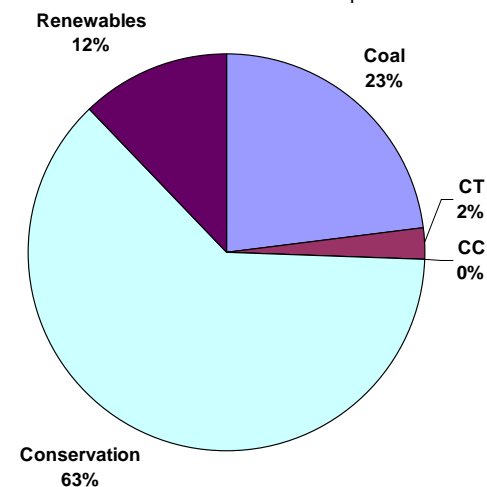
■ Total 6,511 mW

■ Demand Growth -0.07 %

■ Reserve Margin 15.96 %

Plan Costs

■ NPV Utility Cost	\$48,108.1 M
■ NPV Emissions	\$ 5,286.2 M
■ NPV CO2	\$ 0.0 M



Conservation and Renewables Low Load Growth Scenario Expansion Plan Schedule

SIEMENS

Cons & Ren Low LD		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
0	CT - METC	-	-	-	-	-	-	-	-	-	-
1	CT - ITC	-	-	-	-	-	-	-	-	-	-
0	CT - ATC2	-	-	-	-	-	-	-	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
0	CC - ITC	-	-	-	-	-	-	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
0	COAL - METC	-	-	-	-	-	-	-	-	-	-
3	COAL - ITC	-	-	-	-	-	-	-	-	-	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	-	-	-	-	-	-	-	-	-
CT - ITC	-	-	-	-	-	-	-	-	-	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	-	-	-	-	-	-	-	-
COAL - ITC	-	-	-	-	-	-	1	1	1	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-

- Combustion Turbines Only
- Plan Specifics
 - Base Load Growth
- Alternatives Considered
 - 160 mW CT
- Alternatives Not Considered
 - CC
 - PC
 - CFB
 - IGCC
 - IGCC – PRB coal
 - Nuclear

Combustion Turbines Only Scenario Expansion Plan Results

SIEMENS

■ 2006 to 2015

■ Capacity Additions

■ CT	3,520 mW
■ CC	0 mW
■ PC	0 mW
■ Nuclear	0 mW
■ Renewable	0 mW
■ Conservation	0 mW

■ Total 3,520 mW

■ Demand Growth 1.17 %

■ Reserve Margin 15.54 %

■ Plan Costs

■ NPV Utility Cost	\$32,126.9 M
■ NPV Emissions	\$ 3,354.5 M
■ NPV CO2	\$ 0.0 M

■ 2006 to 2025

■ Capacity Additions

■ CT	11,200 mW
■ CC	0 mW
■ PC	0 mW
■ Nuclear	0 mW
■ Renewable	0 mW
■ Conservation	0 mW

■ Total 11,200 mW

■ Demand Growth 1.21 %

■ Reserve Margin 15.34 %

■ Plan Costs

■ NPV Utility Cost	\$58,987.6 M
■ NPV Emissions	\$ 5,348.5 M
■ NPV CO2	\$ 0.0 M



Combustion Turbines Only Scenario Expansion Plan Schedule

SIEMENS

CT's Only		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
20	CT - METC	-	-	1	1	1	-	-	-	-	-
48	CT - ITC	-	-	2	-	1	2	3	3	2	-
2	CT - ATC2	-	-	-	-	-	-	1	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
0	CC - ITC	-	-	-	-	-	-	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
0	COAL - METC	-	-	-	-	-	-	-	-	-	-
0	COAL - ITC	-	-	-	-	-	-	-	-	-	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	-	2	1	-	4	2	4	2	-	-
CT - ITC	3	2	4	5	-	4	2	4	5	-
CT - ATC2	1	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	-	-	-	-	-	-	-	-
COAL - ITC	-	-	-	-	-	-	-	-	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-

- Combustion Turbines Only
- Plan Specifics
 - High Load Growth
- Alternatives Considered
 - 160 mW CT
- Alternatives Not Considered
 - CC
 - PC
 - CFB
 - IGCC
 - IGCC – PRB coal
 - Nuclear

Combustion Turbines Only High Load Growth Scenario

Expansion Plan Results

SIEMENS

■ 2006 to 2015

■ Capacity Additions

■ CT	6,720 mW
■ CC	0 mW
■ PC	0 mW
■ Nuclear	0 mW
■ Renewable	0 mW
■ Conservation	0 mW

■ Total 6,720 mW

■ Demand Growth 2.02 %

■ Reserve Margin 15.20 %

■ Plan Costs

■ NPV Utility Cost	\$35,630.2 M
■ NPV Emissions	\$ 3,362.5 M
■ NPV CO2	\$ 0.0 M

■ 2006 to 2025

■ Capacity Additions

■ CT	14,880 mW
■ CC	0 mW
■ PC	0 mW
■ Nuclear	0 mW
■ Renewable	0 mW
■ Conservation	0 mW

■ Total 14,880 mW

■ Demand Growth 1.61 %

■ Reserve Margin 15.18 %

■ Plan Costs

■ NPV Utility Cost	\$68,096.6 M
■ NPV Emissions	\$ 5,410.1 M
■ NPV CO2	\$ 0.0 M



Combustion Turbines Only High Load Growth Scenario

Expansion Plan Schedule

CT Only High LD		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
33	CT - METC	-	-	1	-	4	3	-	3	1	
57	CT - ITC	-	-	2	5	2	3	6	2	4	
3	CT - ATC2	-	-	-	-	-	-	2	-	-	
0	CC - METC	-	-	-	-	-	-	-	-	-	
0	CC - ITC	-	-	-	-	-	-	-	-	-	
0	CC - ATC2	-	-	-	-	-	-	-	-	-	
0	COAL - METC	-	-	-	-	-	-	-	-	-	
0	COAL - ITC	-	-	-	-	-	-	-	-	-	
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	1	-	3	2	3	3	1	5	1	
CT - ITC	3	4	3	3	1	3	6	1	4	
CT - ATC2	-	-	-	1	-	-	-	-	-	
CC - METC	-	-	-	-	-	-	-	-	-	
CC - ITC	-	-	-	-	-	-	-	-	-	
CC - ATC2	-	-	-	-	-	-	-	-	-	
COAL - METC	-	-	-	-	-	-	-	-	-	
COAL - ITC	-	-	-	-	-	-	-	-	-	
COAL - ATC2	-	-	-	-	-	-	-	-	-	
CFB - ATC2	-	-	-	-	-	-	-	-	-	



- Combustion Turbines Only
- Plan Specifics
 - Low Load Growth
- Alternatives Considered
 - 160 mW CT
- Alternatives Not Considered
 - CC
 - PC
 - CFB
 - IGCC
 - IGCC – PRB coal
 - Nuclear

Combustion Turbines Only Low Load Growth Scenario

Expansion Plan Results

■ 2006 to 2015

■ Capacity Additions

■ CT	320 mW
■ CC	0 mW
■ PC	0 mW
■ Nuclear	0 mW
■ Renewable	0 mW
■ Conservation	0 mW

■ Total 320 mW

■ Demand Growth 0.21 %

■ Reserve Margin 15.96 %

■ Plan Costs

■ NPV Utility Cost	\$28,856.0 M
■ NPV Emissions	\$ 3,354.0 M
■ NPV CO2	\$ 0.0 M

■ 2006 to 2025

■ Capacity Additions

■ CT	7,680 mW
■ CC	0 mW
■ PC	0 mW
■ Nuclear	0 mW
■ Renewable	0 mW
■ Conservation	0 mW

■ Total 7,680 mW

■ Demand Growth 0.76 %

■ Reserve Margin 16.09 %

■ Plan Costs

■ NPV Utility Cost	\$50,737.5 M
■ NPV Emissions	\$ 5,308.7 M
■ NPV CO2	\$ 0.0 M



Combustion Turbines Only Low Load Growth Scenario

Expansion Plan Schedule

CT Only Low LD		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
13	CT - METC	-	-	-	-	-	-	-	-	-	-
33	CT - ITC	-	-	-	-	-	-	-	-	-	-
2	CT - ATC2	-	-	-	-	-	-	1	-	-	-
0	CC - METC	-	-	-	-	-	-	-	-	-	-
0	CC - ITC	-	-	-	-	-	-	-	-	-	-
0	CC - ATC2	-	-	-	-	-	-	-	-	-	-
0	COAL - METC	-	-	-	-	-	-	-	-	-	-
0	COAL - ITC	-	-	-	-	-	-	-	-	-	-
0	COAL - ATC2	-	-	-	-	-	-	-	-	-	-
0	CFB - ATC2	-	-	-	-	-	-	-	-	-	-

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
CT - METC	1	2	1	1	2	1	2	1	-	-
CT - ITC	2	2	4	3	2	4	5	4	4	-
CT - ATC2	-	-	-	-	-	-	-	-	-	-
CC - METC	-	-	-	-	-	-	-	-	-	-
CC - ITC	-	-	-	-	-	-	-	-	-	-
CC - ATC2	-	-	-	-	-	-	-	-	-	-
COAL - METC	-	-	-	-	-	-	-	-	-	-
COAL - ITC	-	-	-	-	-	-	-	-	-	-
COAL - ATC2	-	-	-	-	-	-	-	-	-	-
CFB - ATC2	-	-	-	-	-	-	-	-	-	-



Summary Across Expansion Plans

SIEMENS

Plan Name	Total Capacity Added mW	CT Capacity mW	CC Capacity mW	PC Capacity mW	Nuclear Capacity mW	Renewable Capacity mW	Conservation Capacity mW	Ending Reserve Margin %	Ending Peak Demand mW	PVRR \$M
Central Station	11,260	1,760	500	9,000	0	0	0	15.52%	29,856	\$56,716.9
Traditional High Load	15,040	3,040	2,000	10,000	0	0	0	15.63%	32,403	\$64,116.8
Traditional Low Load	7,640	640	500	6,500	0	0	0	15.95%	26,870	\$49,811.6
Traditional Reduce Import	11,220	2,720	1,000	7,500	0	0	0	15.40%	29,856	\$57,004.8
Traditional Expand Trans										
Emissions	10,760	1,760	1,000	2,000	6,000	0	0	16.04%	29,856	\$70,752.2
Emissions High Load	14,240	2,240	2,000	4,000	6,000	0	0	15.26%	32,403	\$79,492.7
Emissions Low Load										
Emissions Renew & Cons	9,671	320	0	500	4,000	798	4,053	15.42%	25,358	\$66,179.2
Emissions Conserve Only	11,033	480	0	1,500	5,000	0	4,053	19.63%	25,358	\$65,746.9
Renewable Generation	11,218	1,920	500	8,000	0	798	0	16.23%	29,856	\$54,709.1
Renewable High Load	14,698	2,400	2,000	9,500	0	798	0	15.48%	32,403	\$65,216.8
Renewable Low Load	7,238	1,440	0	5,000	0	798	0	15.55%	26,870	\$51,256.1
Conservation	10,353	800	0	5,500	0	0	4,053	15.24%	25,358	\$52,824.0
Conservation High Load	14,153	1,600	1,500	7,000	0	0	4,053	15.46%	28,274	\$60,094.8
Conservation Low Load	6,713	160	0	2,500	0	0	4,053	15.62%	22,442	\$46,609.5
Conservation Reduce Pen										
Cons & Renew	10,331	480	0	5,000	0	798	4,053	16.18%	25,358	\$54,207.8
C&R High Load	13,811	960	1,000	7,000	0	798	4,053	15.28%	28,274	\$61,134.7
C&R Low Load	6,511	160	0	1,500	0	798	4,053	15.96%	22,442	\$48,108.1
C&R Reduce Penetration										
CTs Only	11,200	11,200	0	0	0	0	0	15.34%	29,856	\$58,987.6
CTs Only High Load	14,880	14,880	0	0	0	0	0	15.18%	32,403	\$68,096.6
CTs Only Low Load	7,680	7,680	0	0	0	0	0	16.09%	26,870	\$50,737.5