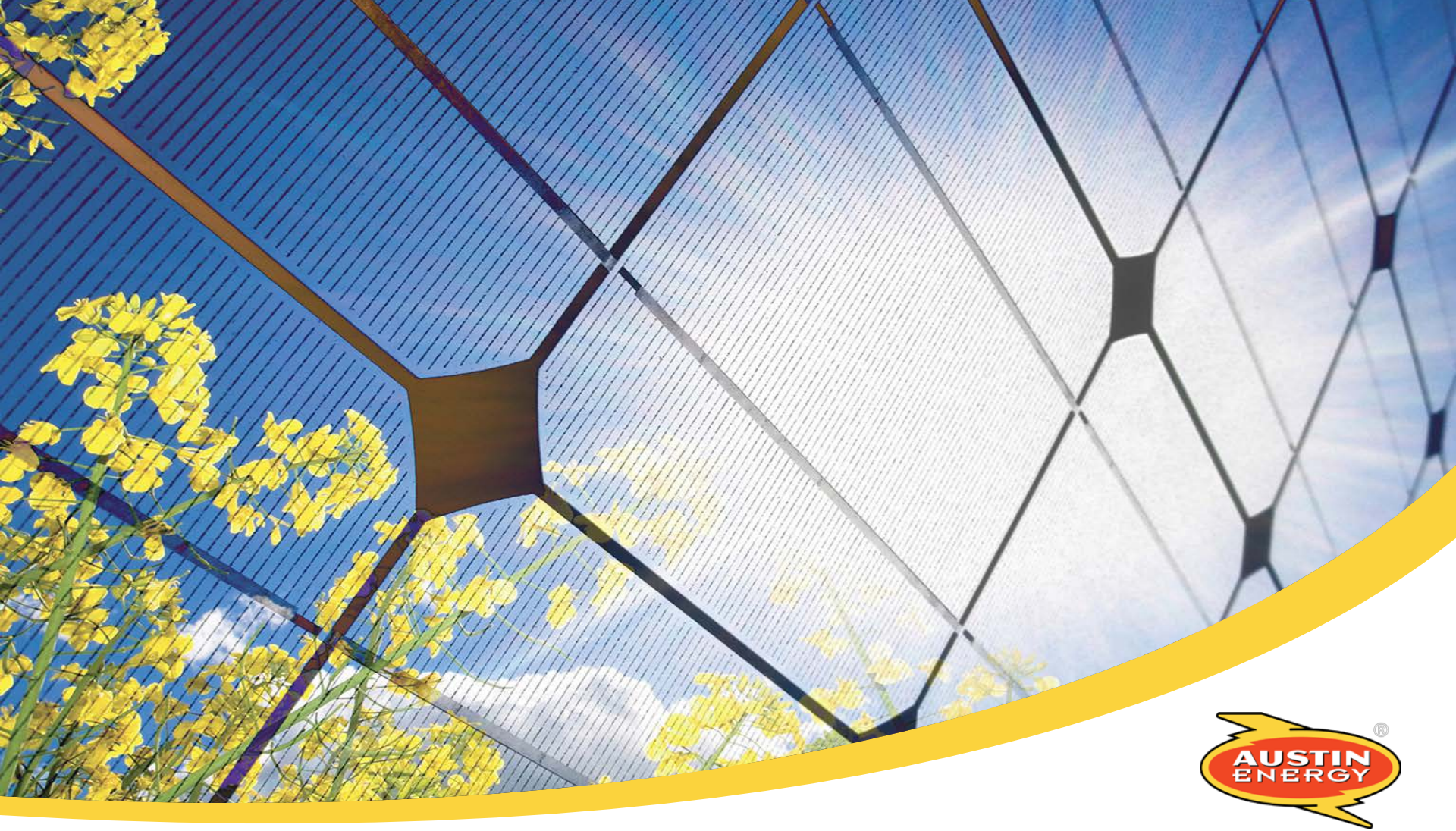


Investing in a Clean Future

Austin Energy's Resource, Generation and Climate Protection Plan to 2020 Updates

October 9, 2014

2014 Resource Plan Update

Cheryl Mele - Chief Operating Officer
Khalil Shalabi - Sr. Vice President, Resource Planning and Energy Market Operations
Elaina Ball - Sr. Vice President, Power Plant Production

Highlights

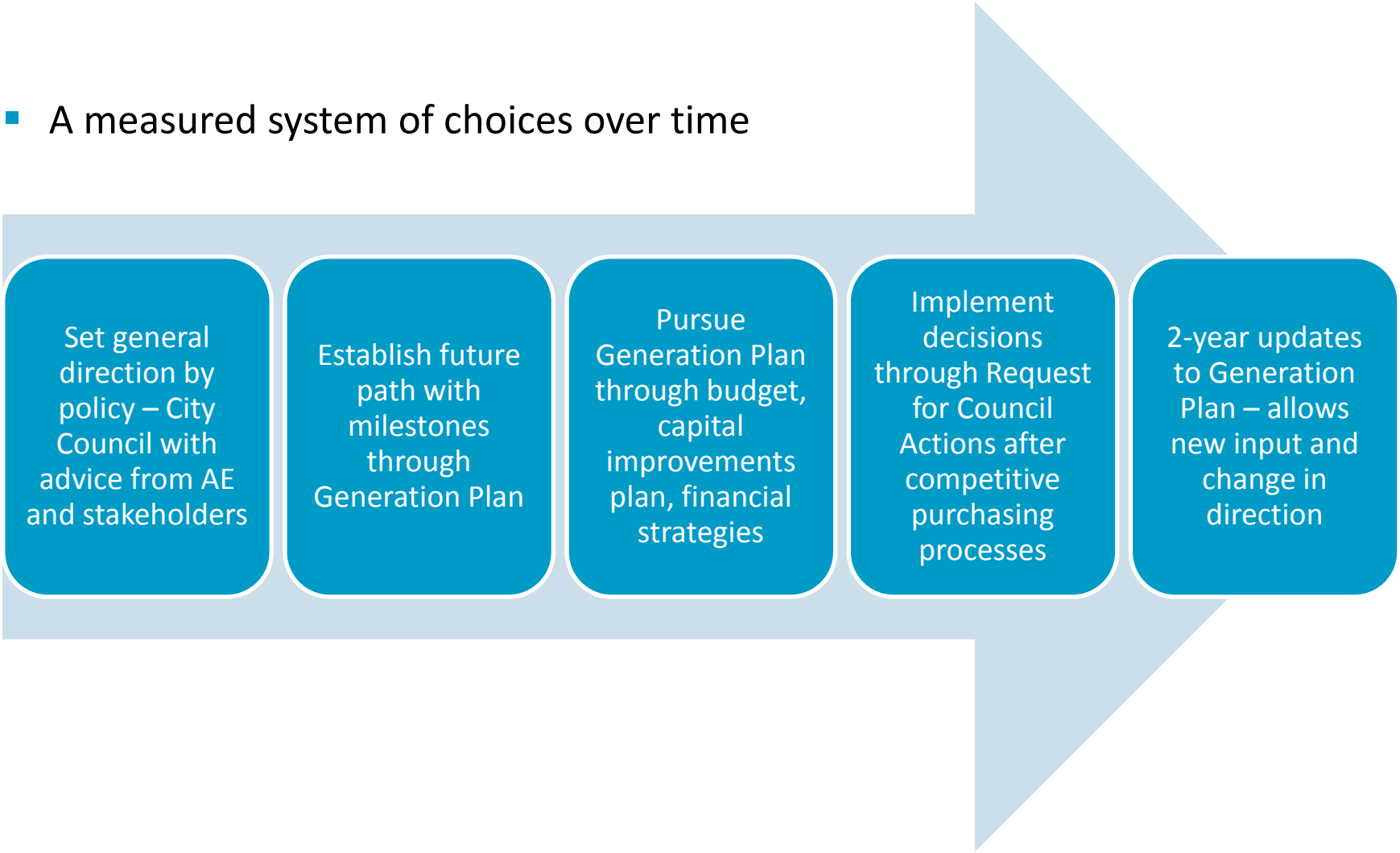
- A process for looking into the future
- Problems we're trying to solve
- "What if" scenarios, expanded options and sensitivities
- A scorecard to measure success
- Options ranked by cost
- No plan meets all requirements
- Cost and risk – two key factors for any investment
- More details about 500+ Plan
- Impact on Austin Energy capacity and energy
- New combined cycle characteristics & location
- Summary and next steps
- Appendix

Fundamentals

- We pay ERCOT prices for power
- We sell power to reduce costs, substitute green power for ERCOT power used, produce revenues for other purposes
- Where we produce power helps determine its value
- Dispatchable and flexible generation has unique value

Generation Plan Process – Looking Forward

- A measured system of choices over time



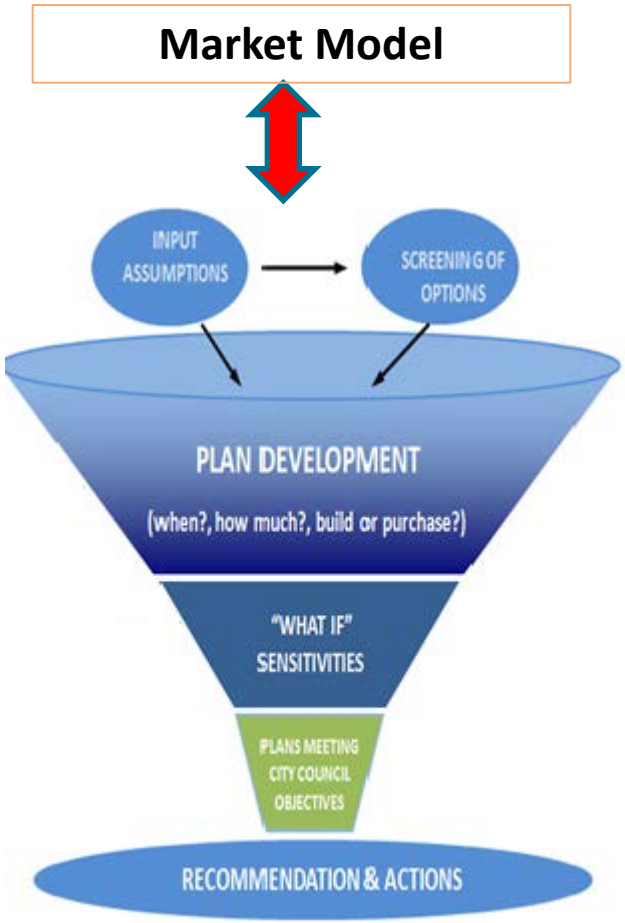
2010 Austin Energy Resource Planning and Council Affordability Goals

Quality	Goal	Date	Status
Renewable	35%	2020	35% Renewables by 2016
Energy Efficiency	800 MW	2020	On Track
Solar Power	200 MW	2020	On Track
CO_2 Emissions	20% Reduction	2020	On Track; 49% of Generation Non-Carbon Producing
Affordable	2% Limit to annual Increases		On Track; CREZ charges moved forward to 2016
Competitive	Lower 50% in ERCOT		Monitoring

Conclusions and Drivers for Resource Plan Results

- To improve upon the 2010 Goals it is a requirement that either the present generation be kept in service or that it be replaced with gas generation. Both cost and risk improve dramatically with the efficiency and size of the replacement unit. A corollary to this conclusion is that any plan that envisions the retirement of AE's gas fleet in the near term results in a significant increase in both cost and risk.
  - Location matters - the closer the replacement is to the Austin service area the better
- A significant amount of renewable energy can be added economically with a marginal improvement to cost and risk if the condition of maintaining a gas fleet is in effect. This means that hundreds of MWs of both solar and wind power have room in our portfolio. This is not the case however if renewables are added and the gas fleet is retired without the replacement. In this case both cost and risk are increased.
  - The optimal amount of renewable energy is around 50%; less or greater amounts are less economic
- CAES storage in all cases adds costs to the plans and does not pro port value back to AE customers. Most of the value is socialized within the ERCOT market to AE's customer detriment
- The 800 MW DSM goal seems to be the saturation point for AE within the 20 year planning window. Plans that try and achieve 1000 MWs or 1200 MWs of DSM are very expensive and unaffordable. Plans where gas plants are added provide head room for additional DSM spending; however in every case there may be more efficient expenditures for the utility's dollars to achieve environmental benefits.
- CO2 emissions are not affected by changes to AE's gas fleet. The retirement or the addition of gas owned by AE will either be replaced by underutilized generation or displace less efficient generation within ERCOT. In other words, AE is too small a fish to affect the big ERCOT market.

Resource Planning: It's a Process…



Industry Standard Methodology

- Brattle Group Findings:

  'AE's resource planning methods and tools are careful and consistent with good industry practices, with a range of input assumptions and possible resource plans that are reasonable.'

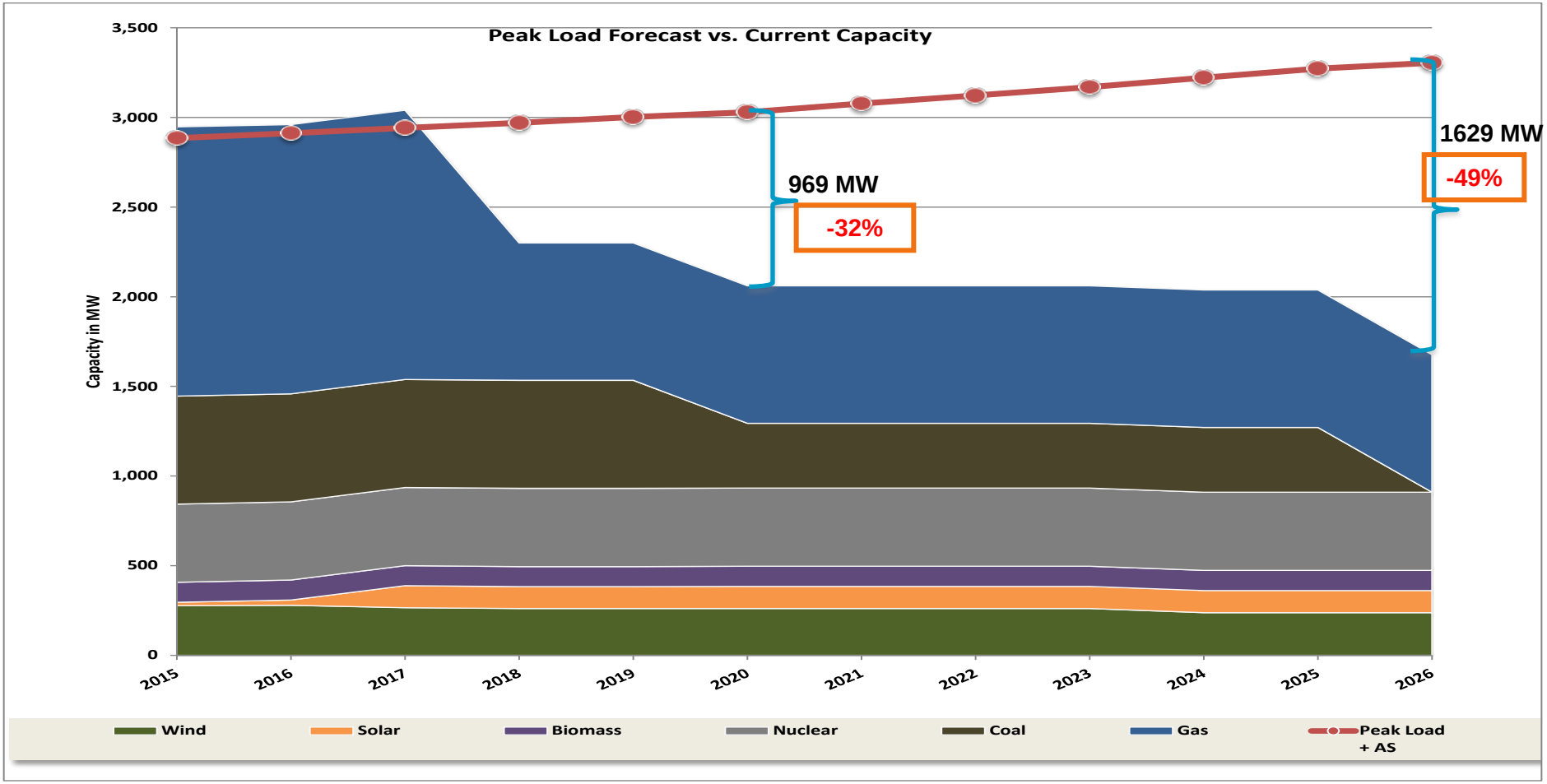
- Full report and subsequent observations available at austinenergy.com

Key Assumptions Range

- Load
  - ERCOT and Austin Energy extreme to mild weather
  - Captures scarcity risk in Market Price forecast
  - Austin Energy 2015 peak 2,511 to 2,810 MW
  - Austin Energy 2025 peak 2,863 to 3,176 MW
- Natural gas price
  - 10-yr base average $5.95 per MMbtu
  - Average $4.42 to $7.08 per MMBtu
- Carbon (CO_2) pricing
  - 2020 to 2040 from $0 to $54 per metric ton on average

LINK TO LOAD ASSUMPTIONS (SLIDE 52)
LINK TO GAS PRICE ASSUMPTIONS (SLIDE 56)
LINK TO CARBON PRICING ASSUMPTIONS (SLIDE 57)

Resource Capacity Gap Looking Forward

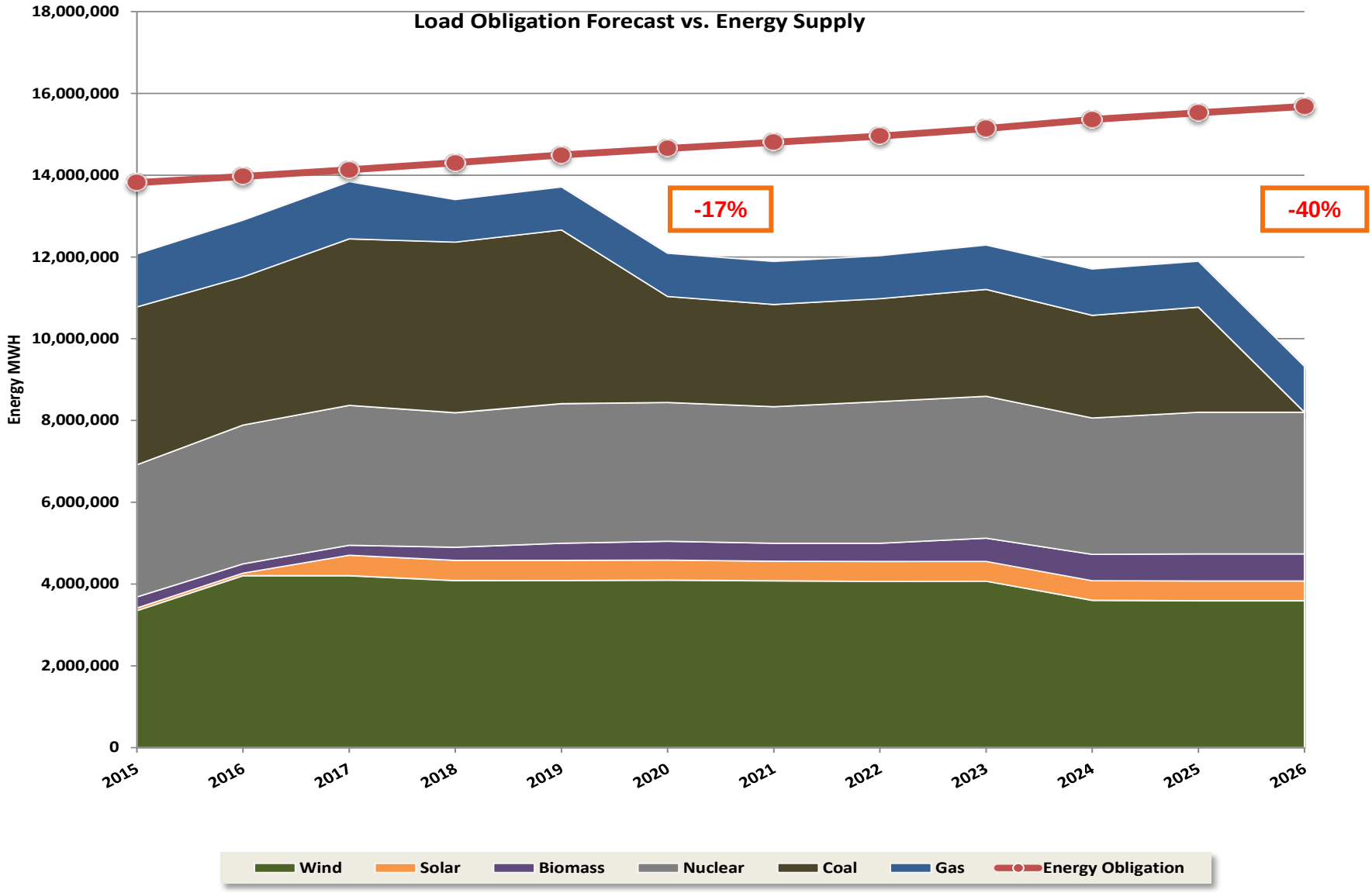


Assumption based on Austin Energy studies:

- Peak contribution of south wind = 27%
- Peak contribution of west wind = 14%
- Peak contribution of solar = 62%

The load assumes 800 MW DSM goal

Resource Energy Gap Looking Forward



Eight Broad Scenarios (30 plans, 210+ Sensitivities)

1. Meeting 2010 Council Goals
2. Do Nothing or No Additional Generation
   Includes current 800 MW DSM goal
3. Increase Renewables & DSM (40% Renewables/1,000 MW DSM/2020)
4. Increase Renewables & DSM More (50% Renewables/1,200 MW DSM/2025)
5. Increase Renewables & Carbon Free Strategies
   (Retire all fossil /40% /50% /1,000 MW/1,200 MW DSM/Res 157)
6. Retire & Replace FPP (~58% Renewables/317 MW CAES)
7. Retire & Replace Decker Plant (~38% Renewables/317 MW CAES)
8. Retire & Replace both Decker & FPP (~65% Renewables/317 MW CAES /500+)

List of Scenarios and Plans

Current Strategy →
Do Nothing →
Increase Renewables & DSM →
Increase Renewables & DSM more →
Various Renewable & Carbon Free Strategies →
Retire & Replace FPP →
Retire & Replace Decker Plant →
Retire & Replace Both →

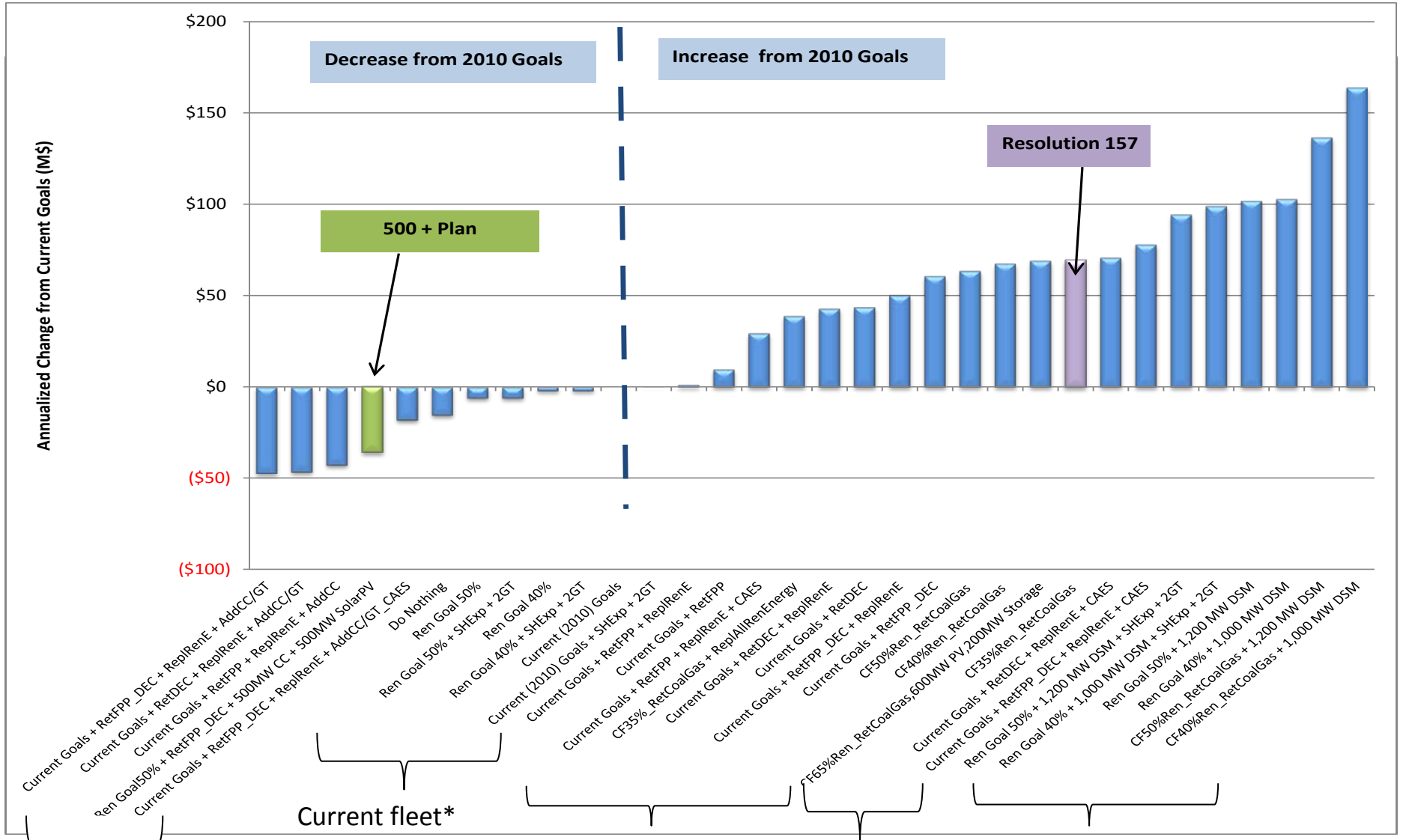
Plan ID	Description
	Scenario 1 - Plan Meeting Council Goals
SC1-1	Reduce FPP, 800 MW DSM, 35% Renewable, 200 MW PV (100 MW Local) 2020
SC1-2	SC1-1, Add GT & CCs
	Scenario 2 - No Additional Generation
SC2-1	Current System, No New Additions, PPAs Expire Per Term
	Scenario 3 -1000 MW of DSM and/or 40% Renewables by 2020
SC3-1	SC1-1, 40% Renewables by 2020, Optimized Wind & PV
SC3-2	SC3-1, Add GT & CCs
SC3-3	SC1-1, 1000 MW DSM, 40% Renewables by 2020, Optimized Wind & PV
SC3-4	SC3-3, Add GT & CCs
	Scenario 4 - 1200 MW of DSM and/or 50% Renewables by 2025
SC4-1	SC1-1, 50% Renewables by 2025, Optimized Wind & PV
SC4-2	SC4-1, Add GT & CCs
SC4-3	SC1-1, 1200 MW DSM, 50% Renewables by 2025, Optimized Wind & PV
SC4-4	SC4-3, Add GT & CCs
	Scenario 5 - 100% Emission Free by 2025
SC5-1	SC1-1, Retire FPP and All Gas Units by 2025
SC5-2	SC3-1, Retire FPP and All Gas Units by 2025
SC5-3	SC4-1, Retire FPP and All Gas Units by 2025
Res. 157	***65% Renewables by 2025, Retire FPP and All Gas Units by 2030, 600 MW Solar(+200 MW Local), 200 MW Storage***
SC5-4	SC3-3, Retire FPP and All Gas Units by 2025
SC5-5	SC4-3, Retire FPP and All Gas Units by 2025
SC5-6	SC5-1, Replace Retirements with Optimized Wind & PV
	Scenario 6 - Retire FPP (AE Share)
	Scenario 7 - Retire Decker Plant
	Scenario 8 - Replace FPP & Decker
SC6-1	SC1-1, Retire FPP 2025
SC6-2	SC6_8-1, Replace with Optimized Wind & PV
SC6-3	SC6_8-1, Replace with Optimized Wind & PV & GT/CC
SC6-4	SC6_8-1, Replace with Optimized Wind & PV & CAES
SC7-1	SC1-1, Retire Decker 2018
SC7-2	SC7_1, Replace with Optimized Wind & PV
SC7-3	SC7-1, Replace with Optimized Wind & PV & GT/CC
SC7-4	SC7-1, Replace with Optimized Wind & PV & CAES
SC8-1	SC1-1, Retire FPP 2025 and Decker 2018
SC8-2	SC8-1, Replace with Optimized Wind & PV
SC8-3	SC8-1, Replace with Optimized Wind & PV & GT/CC
SC8-4	SC8-1, Replace with Optimized Wind & PV & CAES
SC8-5	SC8-1, Replace with Optimized Wind & PV & GT/CC & CAES
500+Plan	***Ren Goal50% + RetFPP_DEC + 500MW CC + 500MW SolarPV***

Evaluation Metrics and Scorecard

Scenario	20-yr NPV$	20-yr NPV$ Fixed Cost Owned/PPA	2018 Near term Avg. Rate	2035 Long term Avg. Rate	20-yr Cost at Risk NPV$	Environmental

- Expected Net Present Value i.e. 2015 $ (NPV$) – Primary metric for resource planning
- NPV$ Fixed Cost (Owned vs. PPA) - Capital investment
- Average System Price (cents/kWh) - Affordability
  - Short term (2018)
  - Long term (2035)
- Cost at risk (NPV$ 95th Percentile – Expected Value NPV$) – Market risk
- Environmental
  - CO_2 savings from current goal (i.e. 20% below 2005)
  - Generation portfolio carbon intensity (lbs/MWh)
  - Renewable energy percentage of load
  - Water usage (acre-ft)

Yearly Change from 2010 Goals in Millions of Dollars



*** - Major drivers**

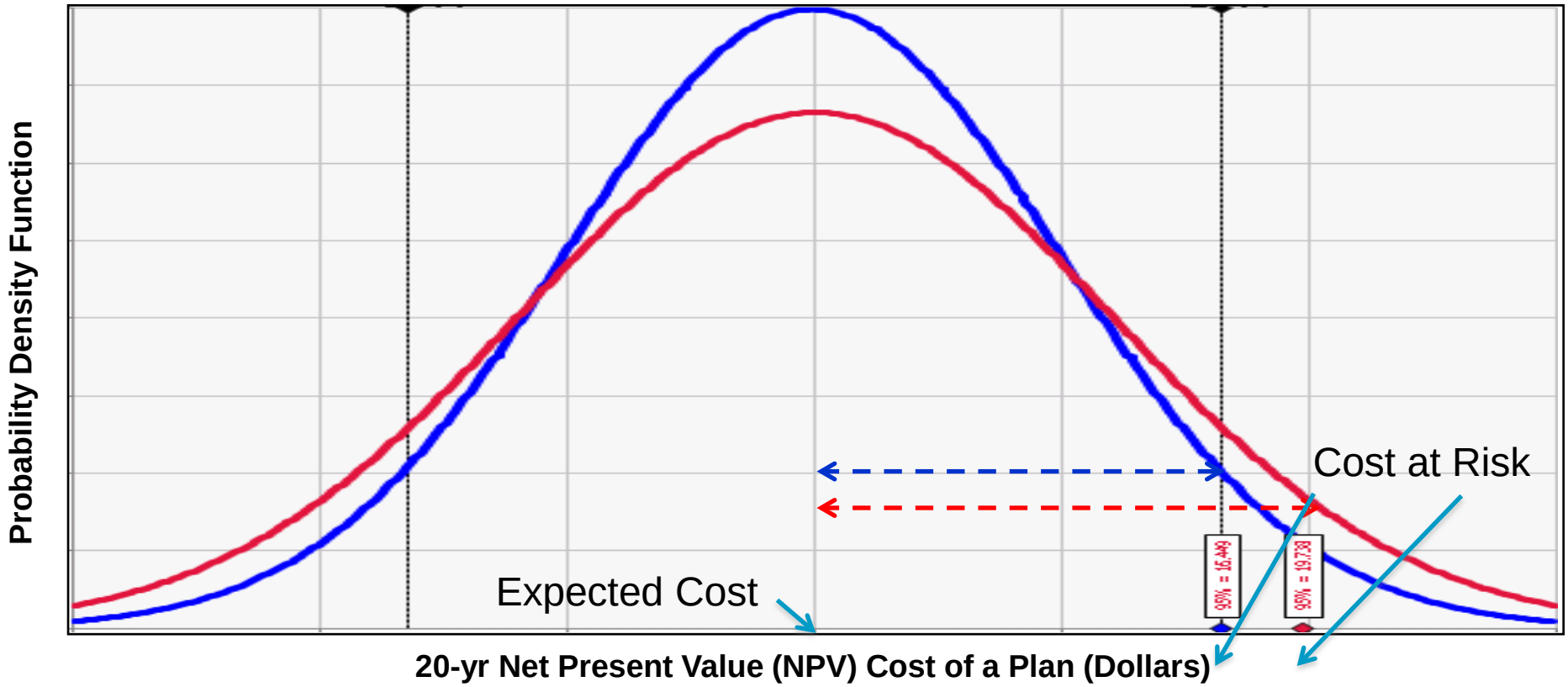
Austin Energy 500+ Plan

- 500+ Plan:
  - Acquire 500 MW of solar, a 250% increase
  - Add 375 MW of wind to achieve 50% renewables by 2025
  - Add 500 MW highly efficient gas plant
    - Retire current Decker steam units by 2019
    - Retire FPP by 2025
  - No expansion at Sand Hill
  - Keep carbon-neutral deadline of 2050
  - Add grid-scale storage as technology and prices improve

Selective Plan Results by Metric (Rankings)

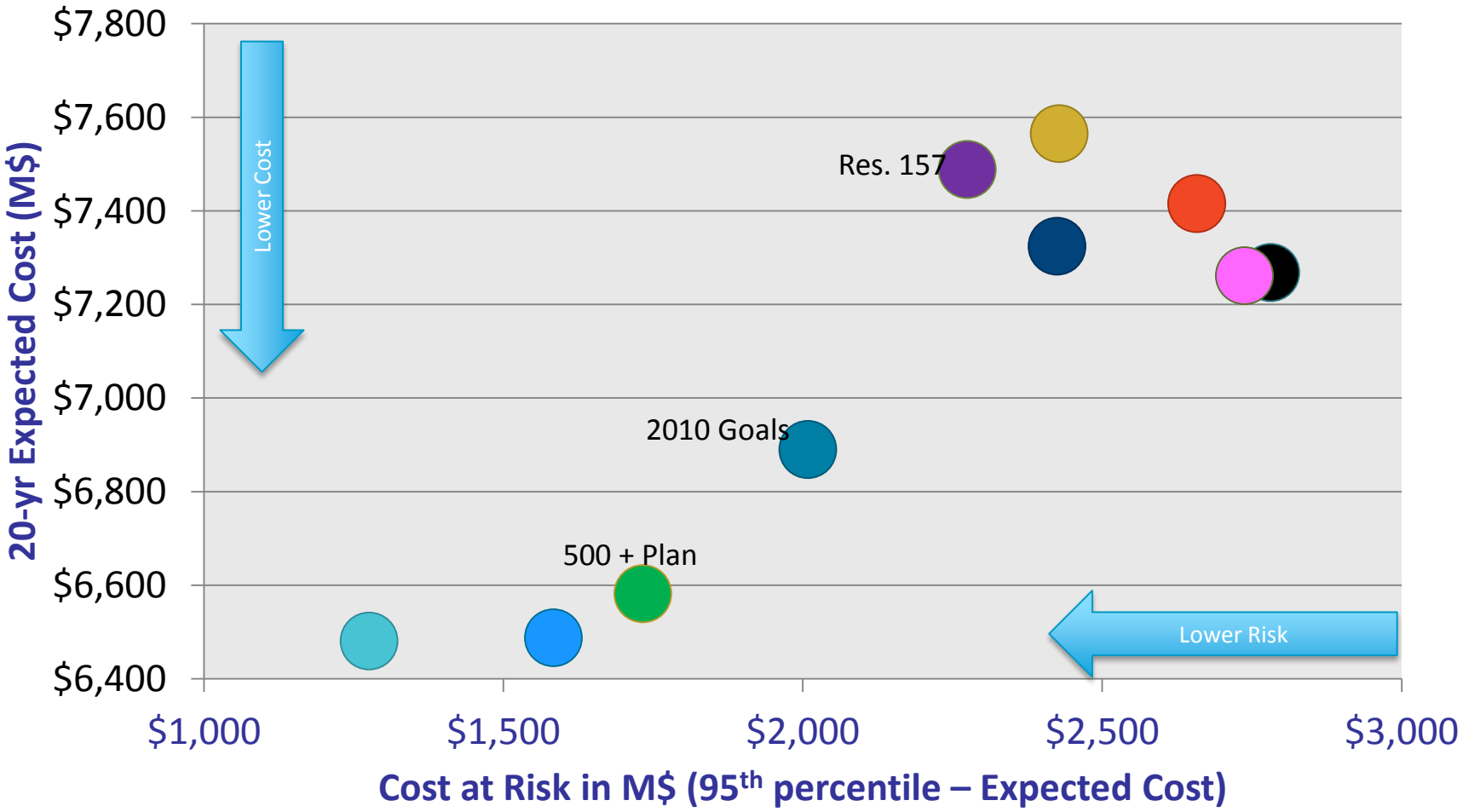
									Environmental			
ID	Plan#	Plan Description	20-yr Expected NPV$ Cost	20-yr Expected NPV$ Owned Fixed Cost	20-yr Expected NPV$ PPA Fixed Cost	2018 Near-Term Avg. Rate (Cents/kWh)	2035 Long-Term Avg. Rate (Cents/kWH)	NPV$ Cost at Risk	2026 CO2 80% below 2005 Delta Tonnes	2026 Portfolio Carbon Intensity lbs/MWh	2026 Renewable % of Load	2026 Water Usage Acre-ft
1	SC1-1	2010 Goals	11	17	5	4	11	19	23	28	30	20
		Retire AE Share of FPP										
19	SC6-1	Retire FPP	14	14	5	4	14	16	11	13	30	11
20	SC6-2	Retire FPP, Replace with Renewables	13	14	24	11	12	9	11	11	7	11
21	SC6-3	Retire FPP, Replace with Renewables & Gas Generation	3	28	24	11	2	13	17	17	7	31
		Retire Decker Plant										
23	SC7-1	Retire Decker	18	11	2	14	18	32	18	25	27	14
24	SC7-2	Retire Decker, Replace with Renewables	17	11	11	20	16	30	18	22	23	14
25	SC7-3	Retire Decker, Replace with Renewables & Gas Generation	2	32	13	1	3	4	31	31	25	32
		Retire AE Share of FPP and Decker Plant										
27	SC8-1	Retire FPP & Decker	20	8	2	14	21	29	8	10	27	8
28	SC8-2	Retire FPP & Decker, Replace with Renewables	19	8	27	21	19	24	8	8	2	9
29	SC8-3	Retire FPP & Decker, Replace with Renewables & Gas Generation	1	30	29	2	1	1	15	15	4	23
32	500+Plan	Retire FPP & Decker, Increase Renewables, 500 MW Solar, Gas Generation	4	29	23	13	4	7	14	14	10	16
15	Res. 157	Emission Free, 65% Renewable, 600MW PV, 200MW Storage	23	7	32	22	24	22	1	1	6	1

How Do We Measure Risk?

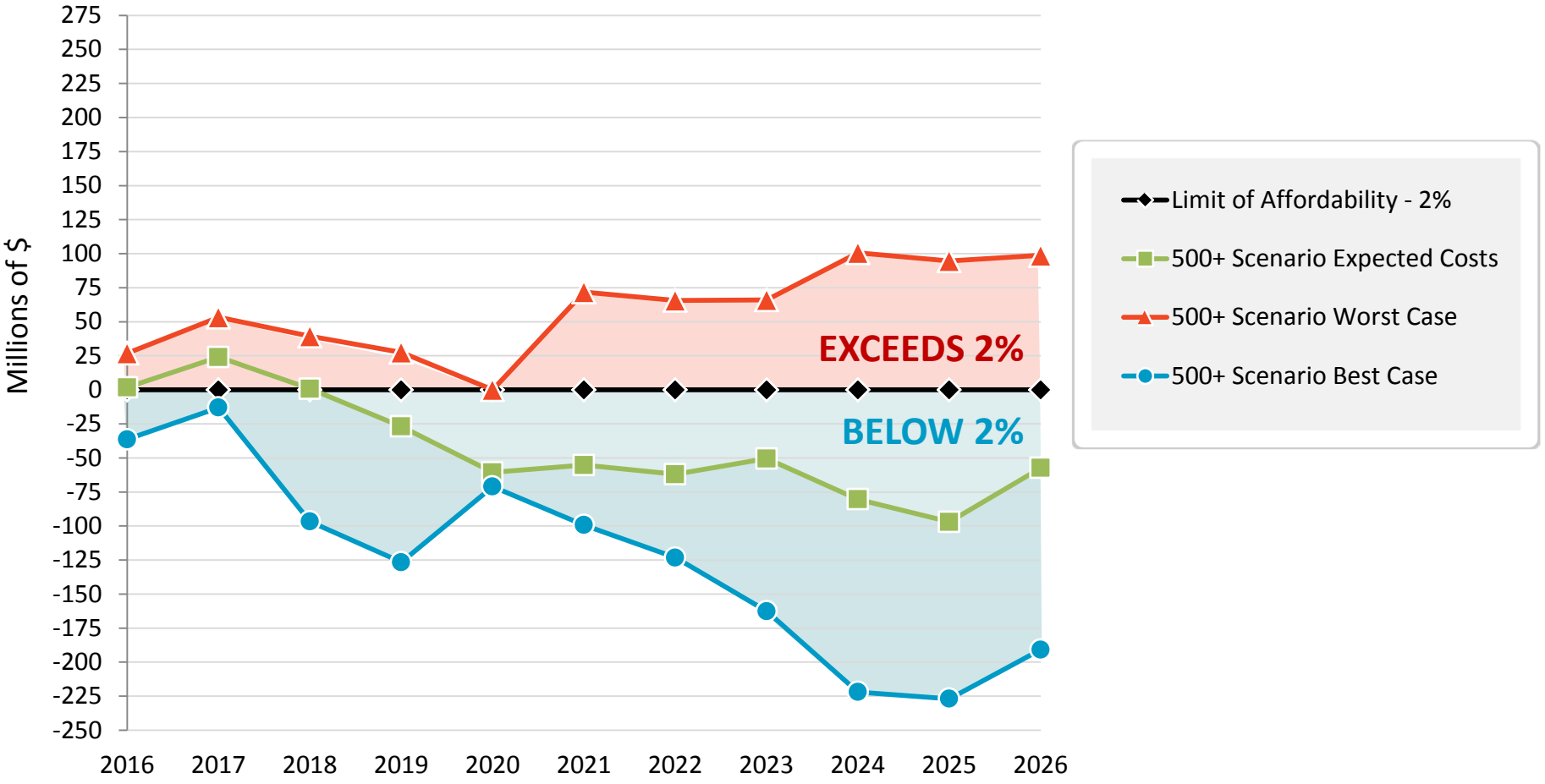


- The 20-yr cost range for a given plan can be represented as a probability distribution (y-axis) of outcomes (x-axis)
- Assuming both plans have the same "expected cost", risk can measured as the difference between the highest cost outcome in relation to the "expected cost" outcome (i.e. 95th percentile minus the expected cost)
- Cost at Risk is a term used for this type of risk (i.e. uncertainty) calculation
- In this illustration, the blue curve represents a lower risk plan than the red curve

Expected Cost vs. Cost at Risk



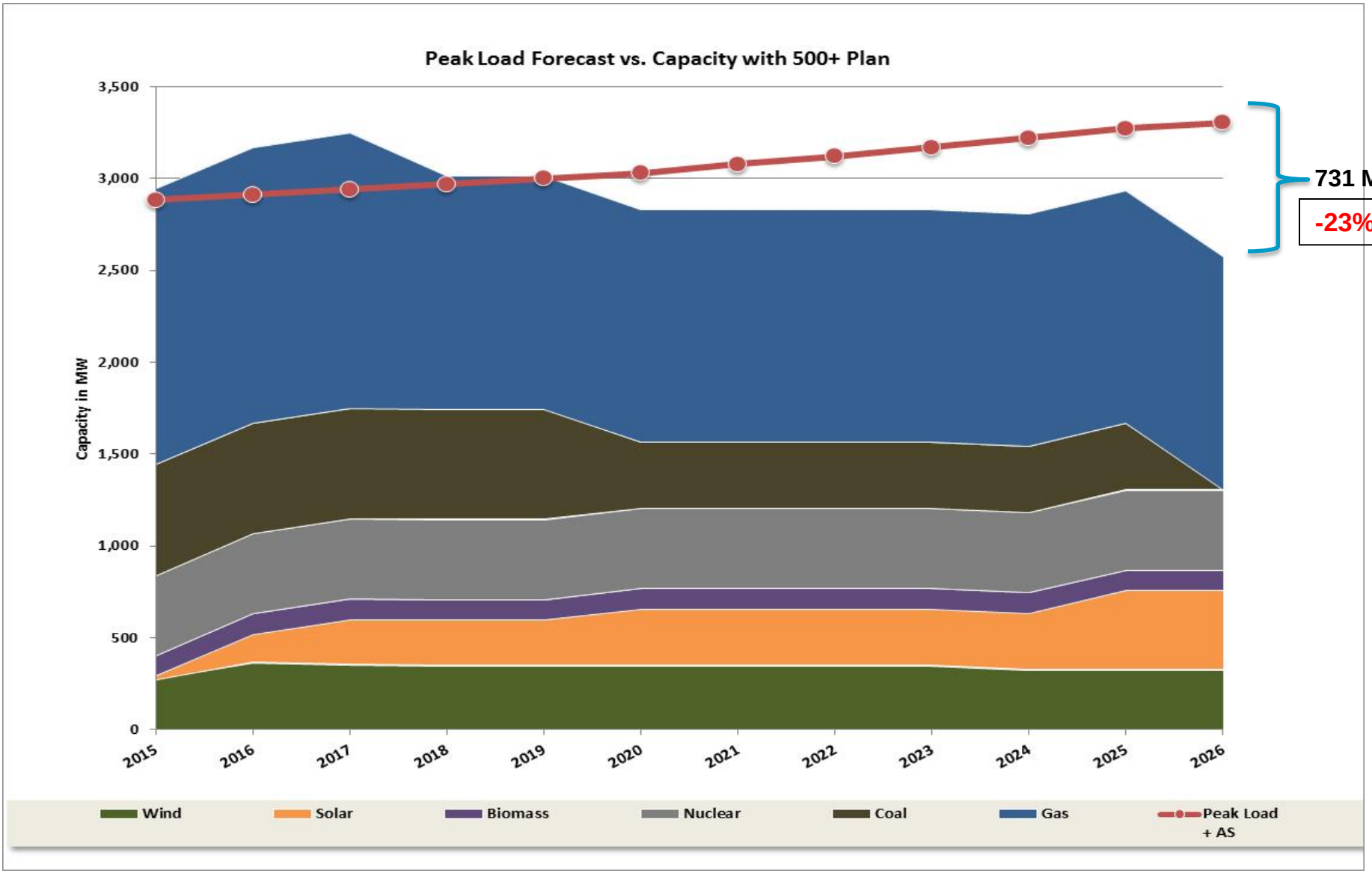
Austin Energy 500+ Scenario Affordability Chart



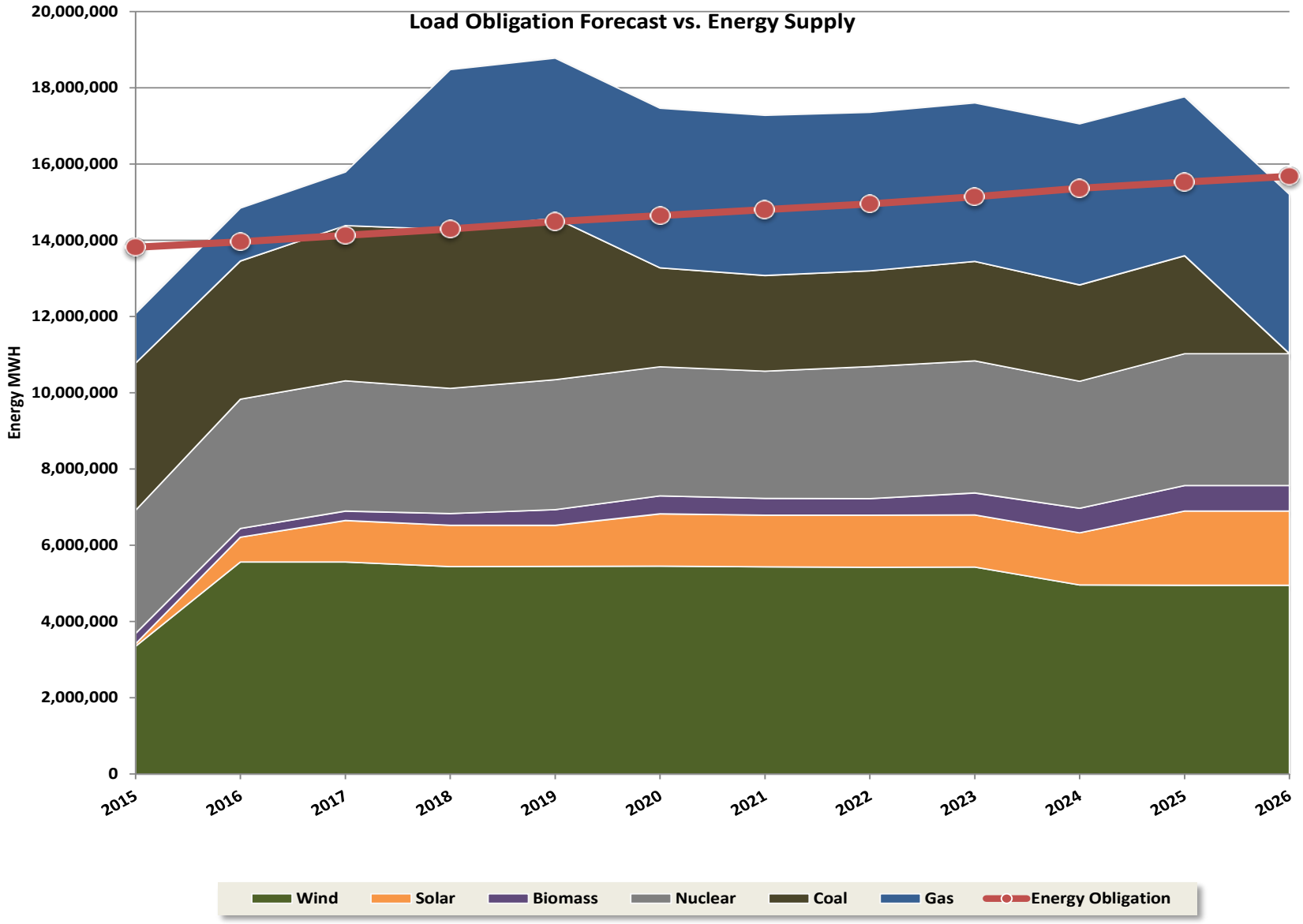
Austin Energy 500+ Scenario and Affordability

Year	2% Increase (millions)	500+ Scenario Costs (millions)	Difference	Cumulative Difference (millions)
2016	$26.1	$27.9	($1.8)	($1.8)
2017	$26.6	$50.6	($24.0)	($25.7)
2018	$27.2	$28.0	($0.8)	($26.6)
2019	$27.7	$0.8	$26.9	$0.3
2020	$28.3	($32.4)	$60.6	$60.9
2021	$28.8	($26.4)	$55.3	$116.2
2022	$29.4	($32.5)	$62.0	$178.2
2023	$30.0	($20.5)	$50.5	$228.6
2024	$30.6	($49.8)	$80.4	$309.0
2025	$31.2	($65.7)	$97.0	$405.9
2026	$31.8	($25.6)	$57.4	$463.4

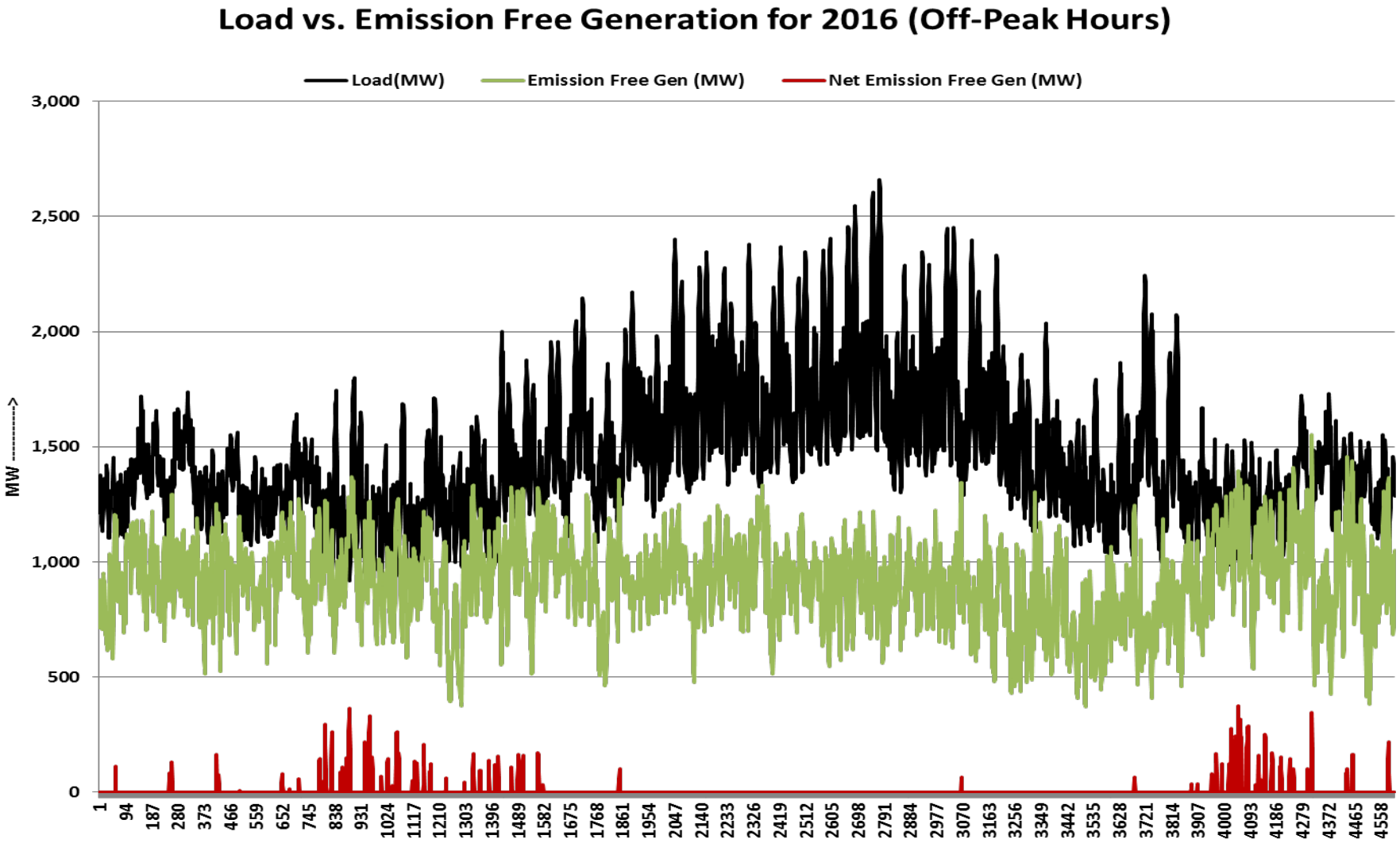
Capacity with 500+ Plan



Energy Supply with 500+ Plan



Excess Energy During Off-Peak/Low Price Hours



Note: Includes Existing Assets, PPA's & Commitments

500+ Plan

MW Capacity								
Year	Nuclear	Coal	Gas	Biomass	Wind	Utility Scale Solar	Local Solar	Renewable %
2015	436	602	1497	112	1041		58.5	28%
2020			(235)[2]		553[3]	450[5]	41.5	52%
2025		(602)[1]			(165.6)[4]	200[6]		51%
Total	**436**	**0**	**1262**	**112**	**1428**	**650**	**100.0**	

Note:

1) Retirement of Fayette Coal Plant at the end of 2025

2) Net of Retirement of Decker Steam Units and addition of 500 MW Combined Cycle

3) Net of committed wind and new additional wind for 50% Renewable goal

4) Expirations of existing wind contract

5) Total Solar additions including committed Solar and New Solar

6) New Solar Additions

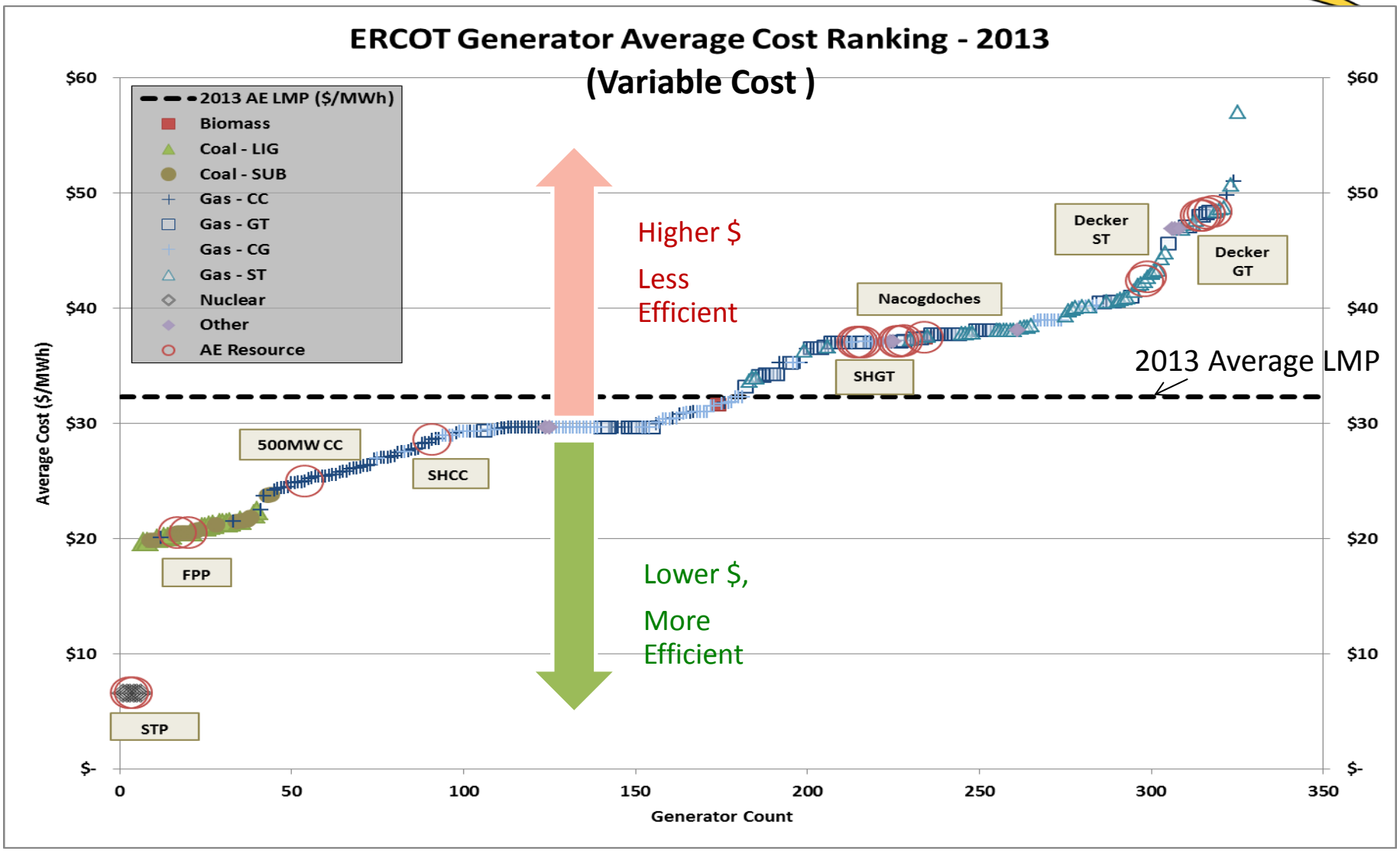
Why a New High Efficiency Gas Unit is a Good Fit

- Provides controllable capacity that is available 24x7
  - Available during high price periods
- Still represents a net decrease of 250 MW in gas based generation after Decker steam units retirement
- Maintains supply portfolio diversity to minimize risk & transition to retirement of FPP
- Provides revenue that promotes affordability
- Helps both Austin Energy and the ERCOT market reduce CO2 by displacing less efficient units
- Meets a need in the ERCOT energy market

Efficiency of Assets

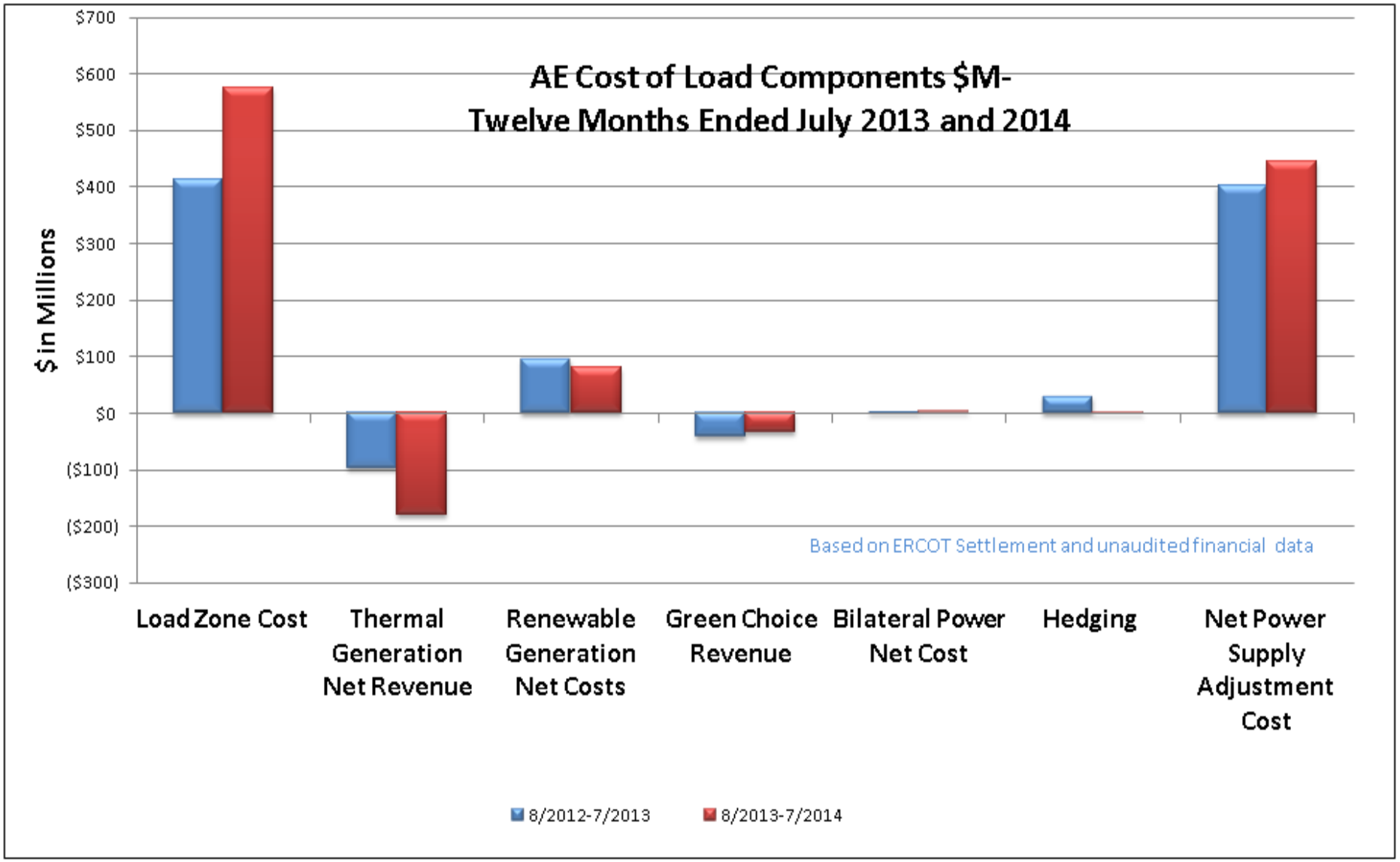
- High Efficiency = Lower Costs + Lower Emissions
- ERCOT dispatches units based on variable costs (for natural gas = efficiency)
- Typical dispatch order in ERCOT
  - Nuclear<renewables<efficient gas/coal<less efficient gas
  - Efficient technologies result in lower costs for Austin Energy customers
- ERCOT variable cost stack

New Resources Displace Higher Cost Gas Resources

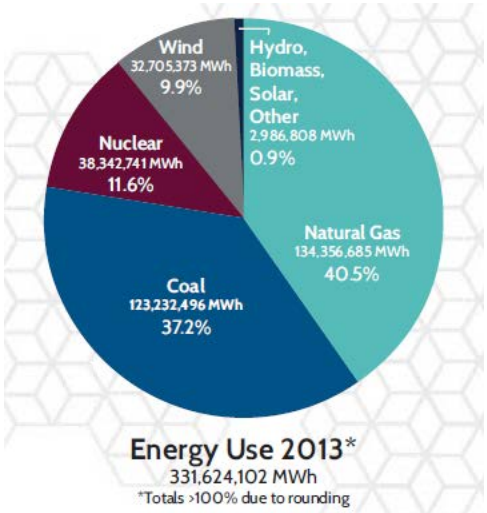


- Having units in the most efficient position within ERCOT keeps energy prices low for Austin Energy customers
- LMP is locational marginal price

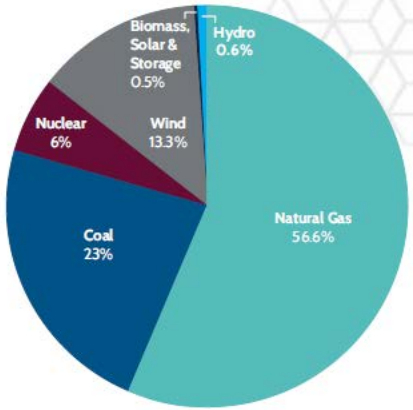
Power Supply Adjustment (PSA) Cost Components



Natural Gas is the Largest Generation Segment and is Poised to Grow



Energy Use 2013*
331,624,102 MWh
*Totals >100% due to rounding



2014 Generation Capacity
effective May 2014

Generation Development in ERCOT

ERCOT interconnection queue as of September 2, 2014:

Fuel Type	Initial Screening Study Projects (MW)	Full Interconnection Study Projects (MW)	Interconnection Agreement Executed (MW)	Total (MW)
Natural Gas	9,517	16,252	6,792	32,561
Coal	0	0	270	270
Wind (ELCC 8.7%)	2,875	13,650	8,852	25,377
Solar	588	3,208	265	4,061
Storage	0	594	0	594
Total	**12,980**	**33,704**	**16,179**	**62,863**

Historically, approximately 15% of capacity under study reaches commercial operations.

ERCOT Public

12

This need will be met by others if not Austin Energy.

New Facility Design Considerations

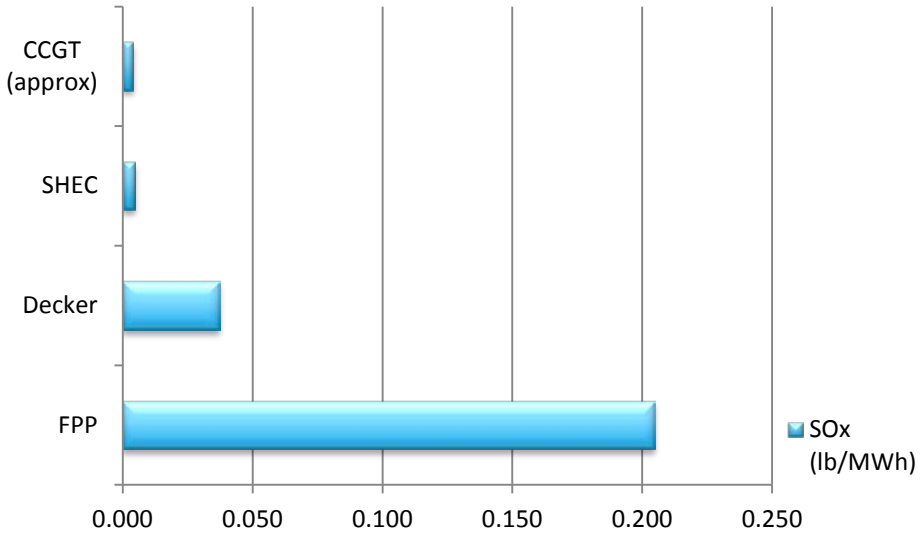
- Local control brings value to Austin Energy customers
- Clean
  - Conservation as core of design
  - Reduce water, air, and waste profiles by design (i.e., utilize most advanced air controls, efficient cooling technologies, best methods to eliminate waste)
  - Technologies: reclaim water reuse, efficient condenser cooling, zero liquid discharge, selective catalytic reduction systems, etc.
- Efficient
  - Design most efficient facility, for customer long term benefit and lessen resources required to produce power
  - Technologies: efficient gas turbine, heat recovery and steam turbine systems
- Flexible
  - Utilize latest technology, to have rapid response to grid needs, and adjust down when other resources (wind, solar, etc.) are available
  - Technologies: quick start, agile ramp characteristics to optimize grid response
- Affordable
  - Deliver efficient, clean, flexible plant in the most affordable manner through project design and execution

Comparing Emissions

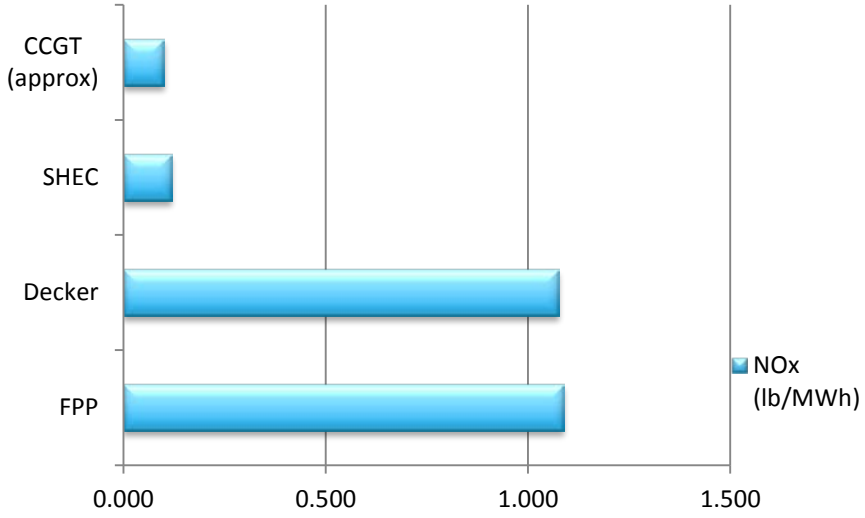
Migration to Latest Combined Cycle Technology results in (per MWh):

- 53% more efficient gas to electricity conversion than Decker
- 60-90% less water use than Decker steam units
- 88% reduction in SO2 compared to Decker, 98% to FPP
- 92% reduction in NOx compared to Decker, 93% to FPP
- >50% reduction in CO2 over FPP

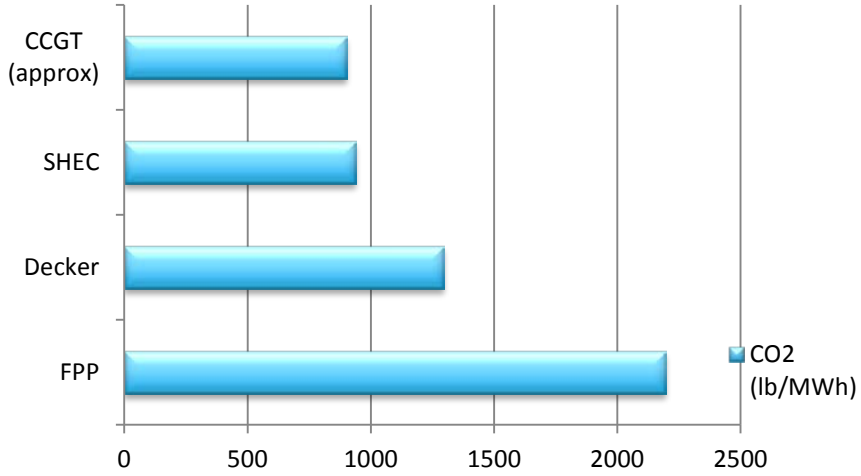
Sulfur Dioxide Emissions (lb/MWh)



Nitrous Oxides Emissions (lb/MWh)



Carbon Dioxide Emissions (lb/MWh)



New Combined Cycle Location

Preferred characteristics:

- Existing space and power plant infrastructure that minimizes cost
- Access to transmission lines
- Access to cooling water
- Access to major natural gas lines
- Located in or near the Austin Energy service area

Austin Energy has two locations meeting these criteria

Why is Proximity to Austin Important?

- The AE Load Zone is defined by Austin Energy's service area
- It is the metered demand of AE customer load
- Power generation within or in close proximity to Austin minimizes congestion risk and helps lower the price of energy in the load zone

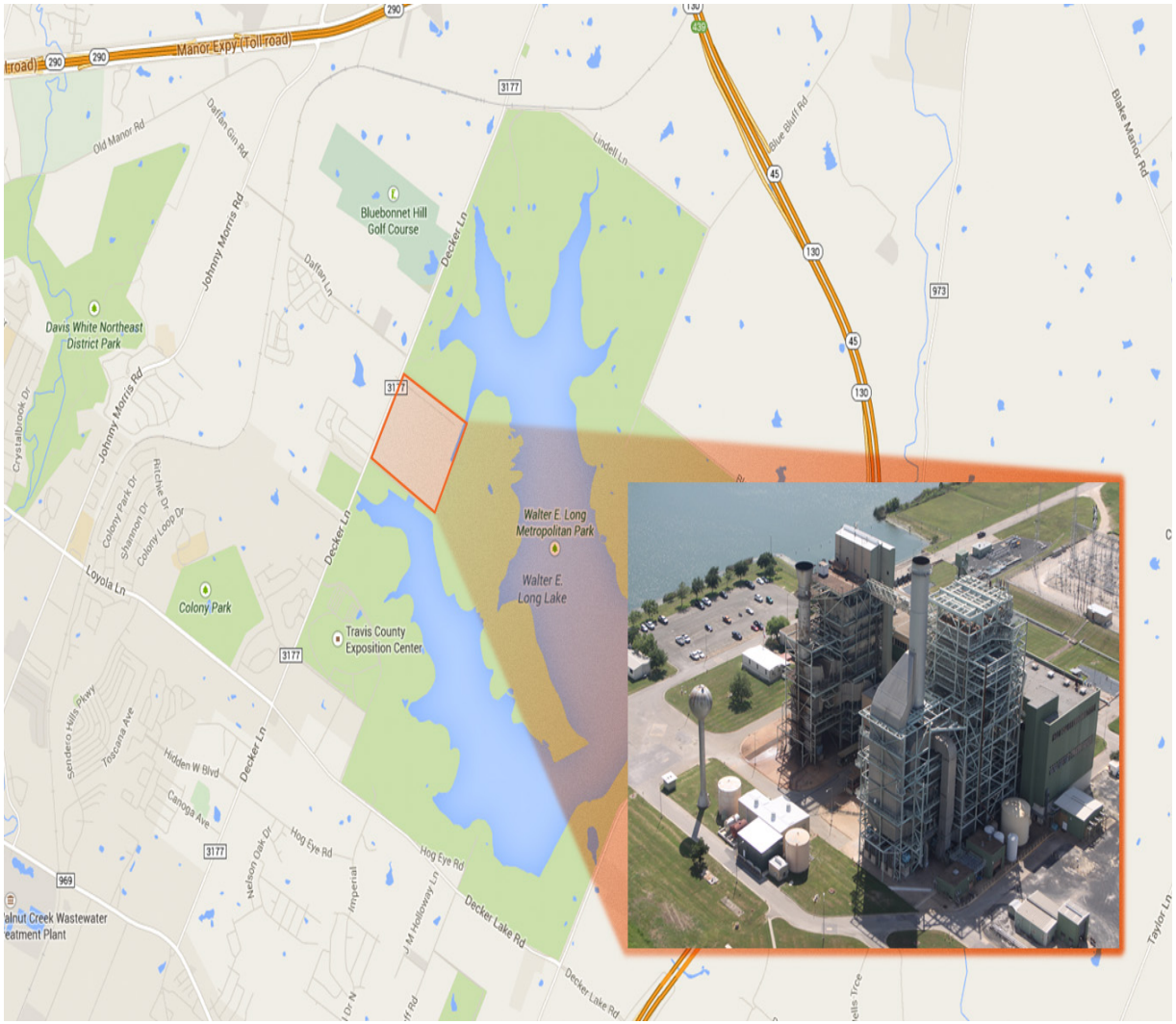
WHY?

Basic Economics

Increased Local Supply vs. Local Demand Helps Lower Prices

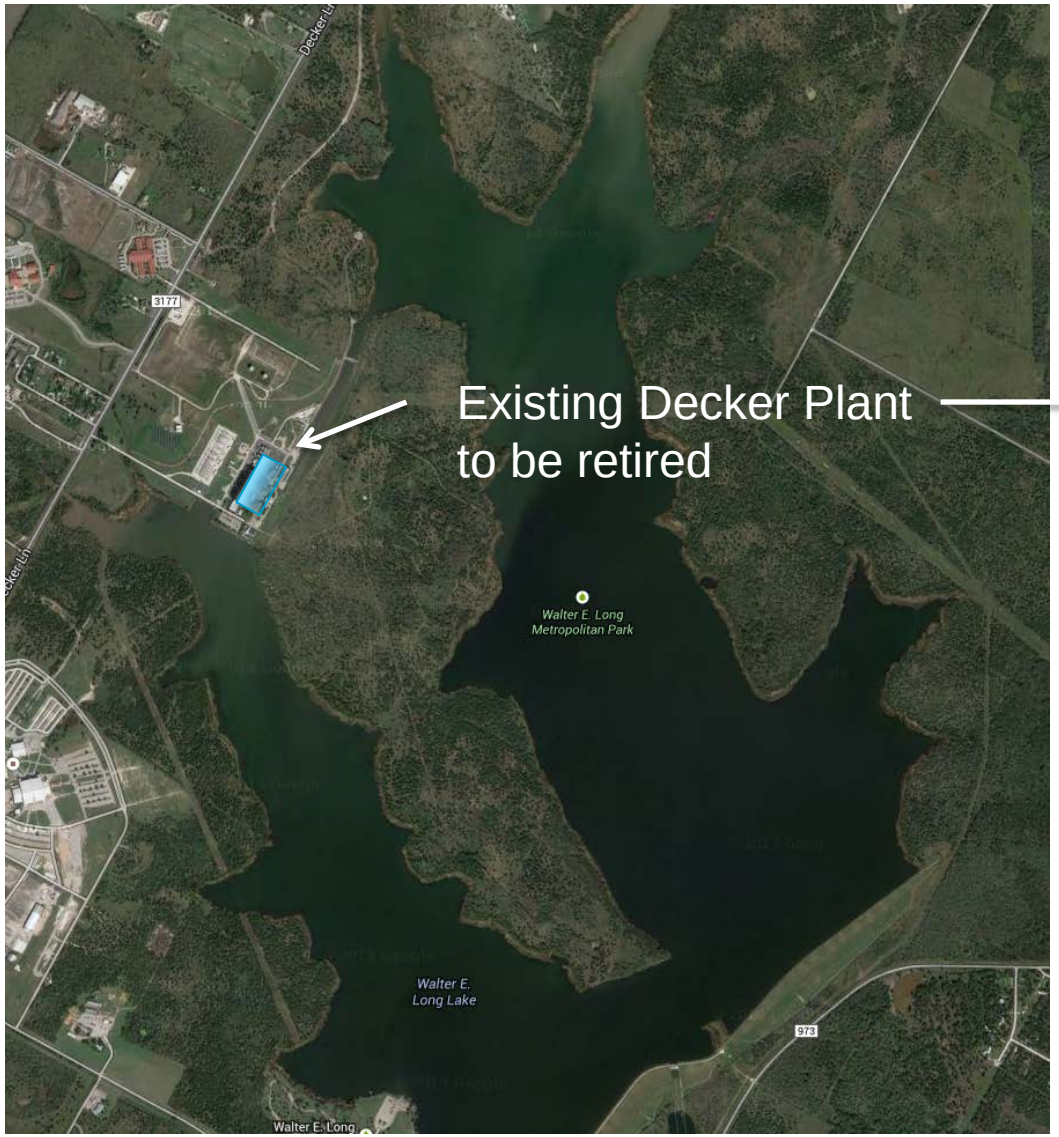
AE Service Area

Decker Location



- Meets preferred characteristics
- Projections indicate Decker offers $6M per year in savings over Sand Hill
  - Better transmission location
  - Subject to refinement after detailed transmission studies

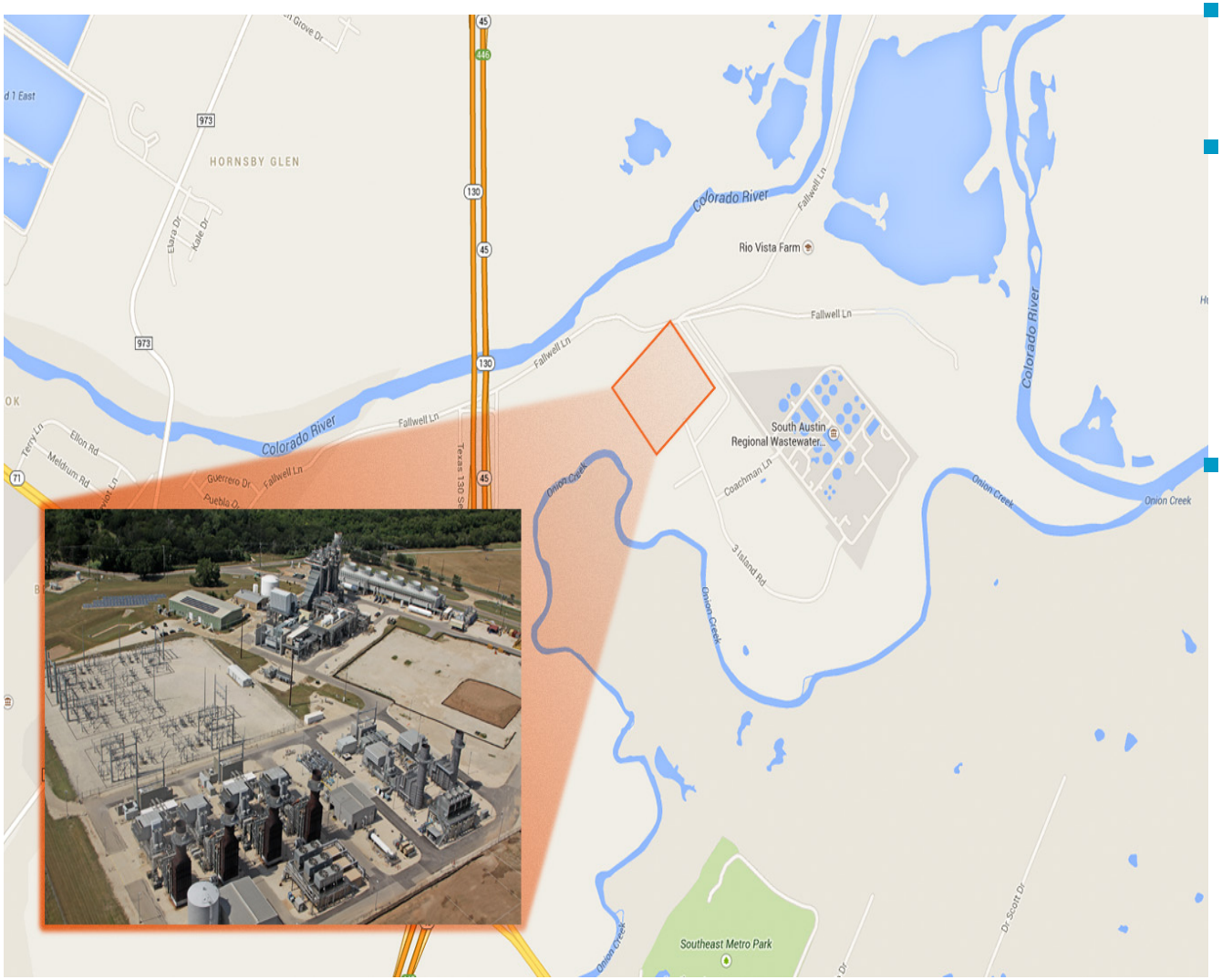
Decker Creek Power Station



Characteristics

- Transmission
- Gas supply
- Control center
- Solar farm
- Buffered by Tallgrass Prairie Preserve
- Proximity to Walnut Creek Wastewater Plant

Sand Hill Location



- Meets preferred characteristics
- Less favorable financially than Decker
  - Subject to refinement
- Expansion is required to use water from adjacent South Austin Regional Wastewater Plant

Summary

- Austin Energy's resource planning analysis did identify a scenario that costs less than 2010 Goals, improves its carbon footprint, retains flexibility, adds significantly more renewables, and remains affordable under the 2% rule
  - Add 500 MW clean and efficient gas combined cycle unit
  - 200 MW of utility solar by 2017
  - Additional 300 MW of utility solar by 2025
  - 50% Renewable by 2025
  - 75% Carbon free by 2025

Next Steps

- Discuss adoption of the 2014 Resource Plan
- Initiate utility scale solar RFP

Appendix

Resource Plan Update Timeline

1Q 14	• Targeted briefings and stakeholder input meetings
1Q 14	• Present scenarios & stakeholder results to Commission 3/17
2Q 14	• Run and analyze scenario results
3Q14	• Present preliminary recommendations to Committee
3Q14	• Committee/Commission review
Sep 14	• Present 2014 Generation Plan Update to Council

Customer Survey Highlights

Conducted interviews with 904 of Austin Energy's customers (Residential = 486, Commercial = 400 and Key Accounts = 18)

- There is no significant difference in the gap analysis between the importance of the generation mix and the satisfaction of the generation mix.
  - The current proposed mix meets expectations.
- Differences exist between Residential, Commercial and Key Account (large industrial and commercial) customers in terms of an ideal generation mix for 2020.
- Customers vary on the desire to reduce or increase an specific fuel within the current mix.
  - Not all want to decrease a fossil fuel at the same rate as a renewable.
  - Less than 40% of any one customer group reported wanting to change a specific fuel within the proposed mix.
  - Similar results were found in the independently fielded Community CAP study which asked the same set of generation mix questions.
- There was no agreement across customer groups in terms of an ideal fuel mix.

Customer Survey Highlights – cont'd

- The table below shows the percentage of customer wanting a change by specific fuel mix

Gen Mix Plan 2020	Residential	Commercial	Key Accounts
Lower Coal	27%	20%	0%
Lower Nuclear	12%	13%	6%
Lower Natural Gas	12%	9%	6%
Lower Renewables	6%	6%	11%
Increase Coal	4%	4%	6%
Increase Nuclear	6%	8%	17%
Increase Natural Gas	9%	5%	11%
Increase Renewables	33%	28%	39%

- In terms of paying for the changes to the fuel mix, amounts ranged form zero dollars to more than $100 per month.
  - For the majority of options, paying zero dollars ("nothing") was the most common response.
  - An aggregated category indicated that customers would be willing to pay between $1 and $24 per month for the desired fuel change.
  - Interestingly, higher amounts of monthly increases were found in customers with lower reported household incomes.

Baseline Assumptions

- ERCOT market
  - Current nodal market design
  - Load forecast per Feb 2014 update
    - Adjusted South Central weather zone for AE forecast
  - Generators per ERCOT CDR (March 2014)
    - Adjusted LCG Consulting (UPLAN vendor) database
      - Unit characteristics (i.e. capacity, fuel type, heat rate, emissions, etc.)
    - Fuel price forecasts
      - Natural Gas (2 years at NYMEX futures, Wood Mackenzie April 2014)
      - Coal and lignite from SNL
      - Nuclear from AE estimates
    - Removed mothballed units
    - CC units added beyond 2017 to maintain 13.75% RM target

Baseline Assumptions – cont'd

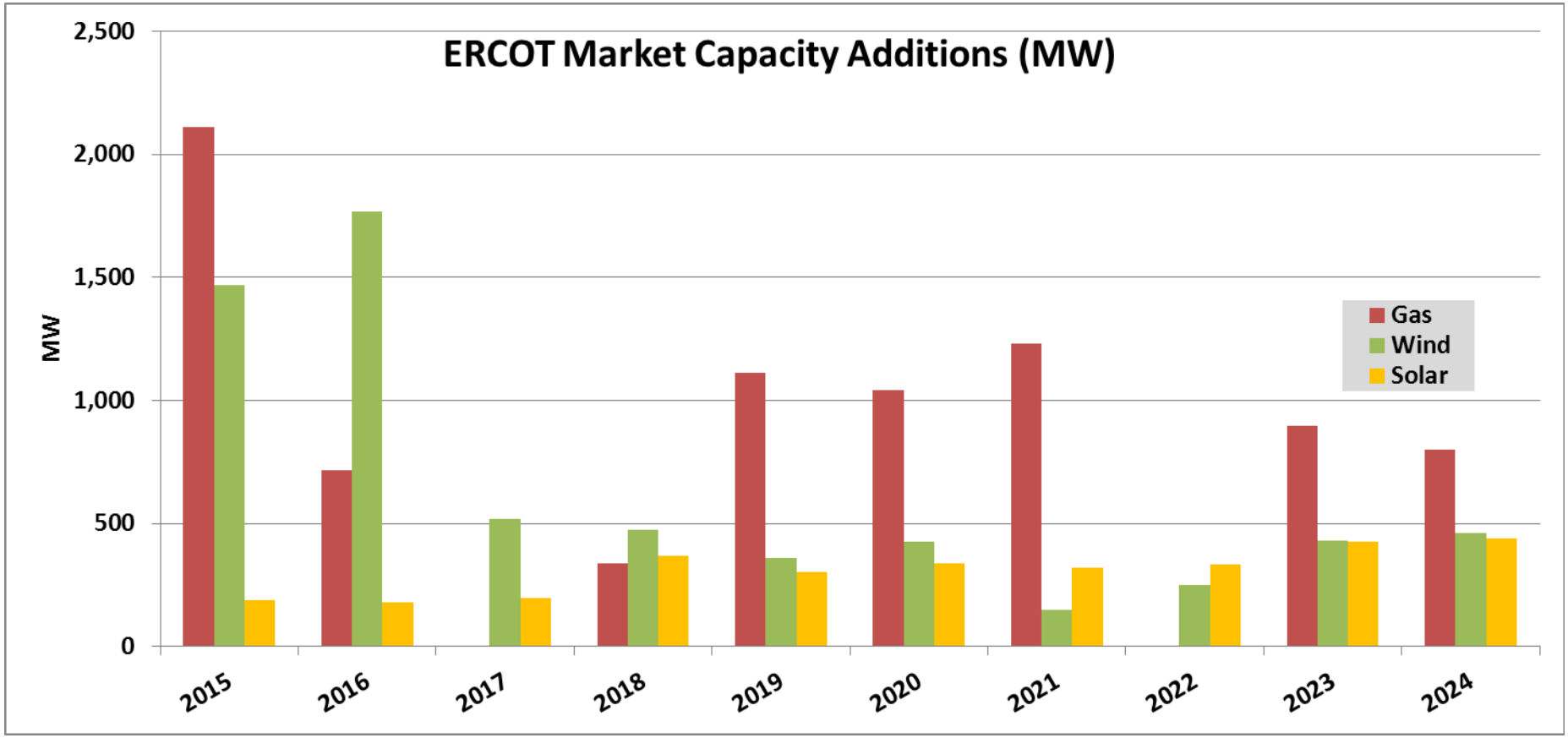
- Austin Energy system
  - Current FY2015 budget load forecast
  - AE unit characteristics and contracts
    - Excludes Sand Hill expansion
    - Retire Decker steam units 2018
    - Reduce FPP generation 2020 and beyond, retire in 2025
  - Fuel price forecasts
    - Natural gas (NYMEX gas futures first 2 years, Wood Mackenzie April 2014)
    - Coal per AE
    - Nuclear per AE
  - Emission costs focused on carbon
    - ERCOT long term study CO2 cost assumptions
    - Carbon cost will be included in market economic dispatch

New Generation/Resource Considerations

- Considerations
  - Cost-effective and mature technology
  - Good operating history and performance
  - Multiple suppliers and fuel availability
  - Defined permitting requirements

- Tradeoffs
  - Dispatchable vs. non-dispatchable
  - Fixed vs. variable operating costs
  - Flexibility

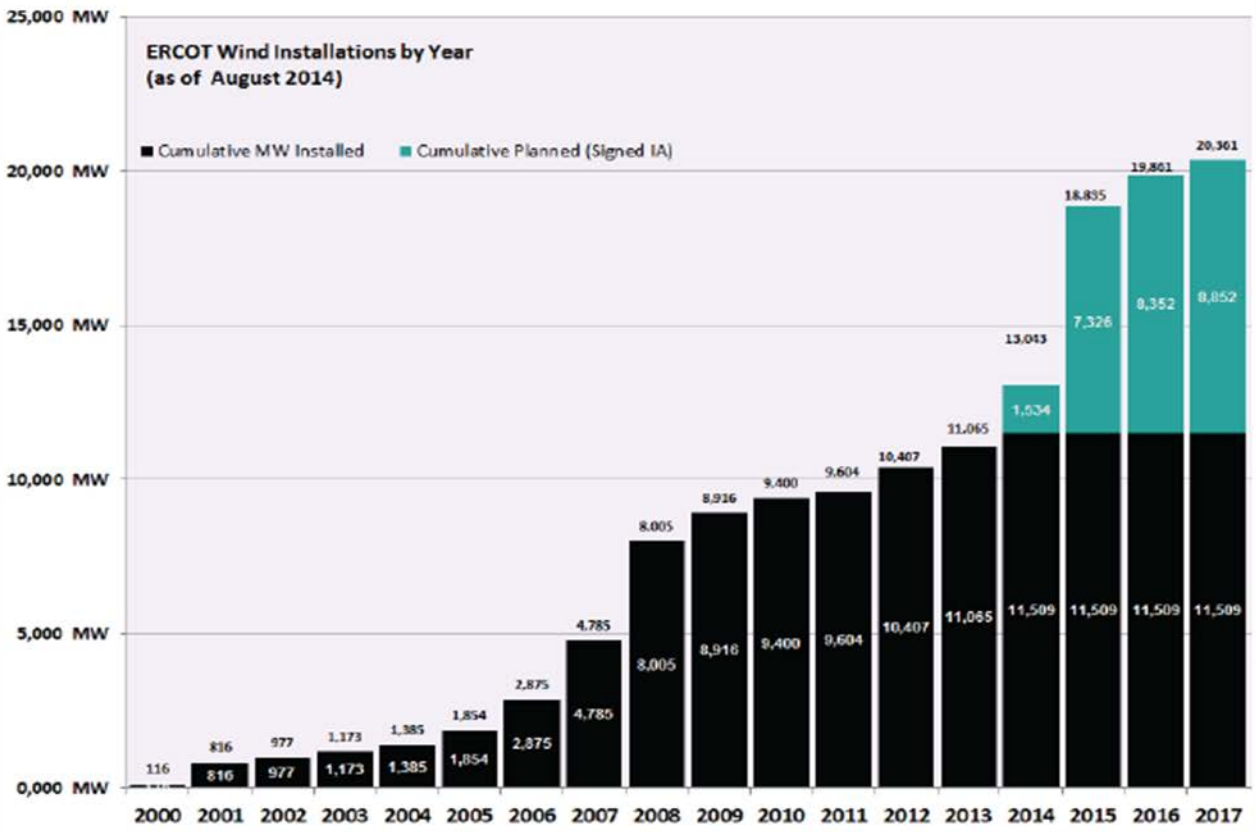
Assumed Generation Additions for ERCOT



- Gas & Wind additions are based on ERCOT CDR
  - The timing of additions adjusted to reflect more realistic expectations
- Solar additions are based on ERCOT CDR and AE projections

ERCOT Wind Installations by Year

Wind Generation Development in ERCOT



Current ERCOT Wind Generation Records

10,296 MW, on March 26, 2014, at 8:48 p.m.

- Non-Coastal Wind Output = 8,863 MW
- Coastal Wind Output = 1,433 MW
- Wind gen. supplied 28.78% of the 35,768 MW Load

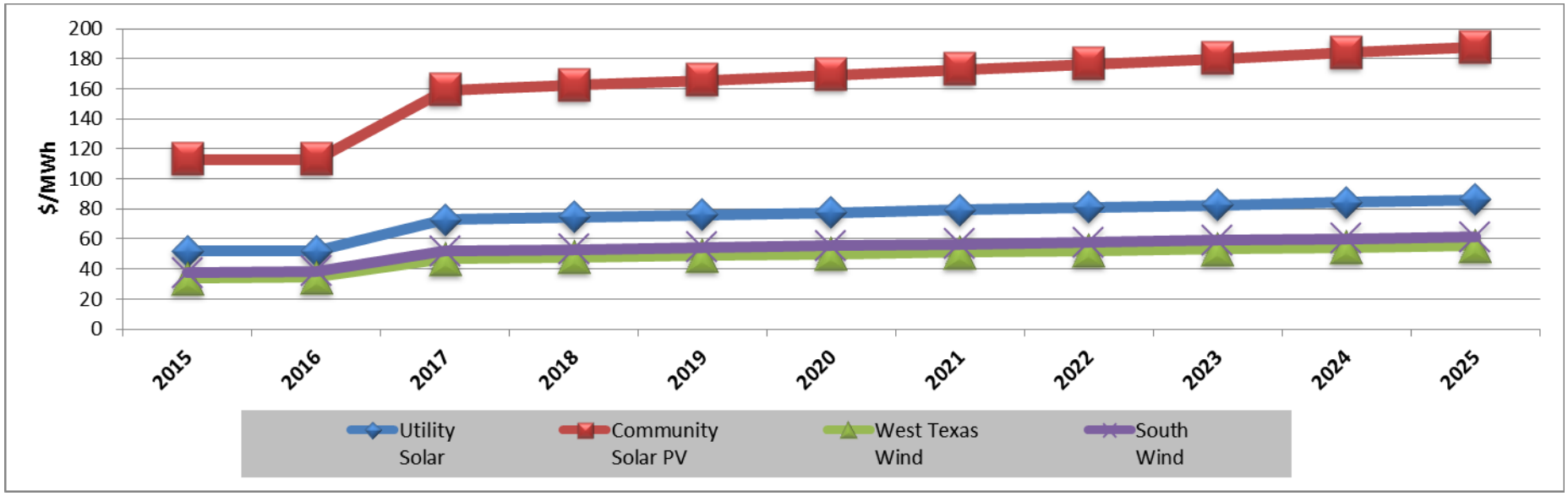
39.40% Wind Penetration, on March 31, 2014, at 2:12 a.m.

- Total Wind Output = 9,699 MW
- Total Load = 24,618 MW

ERCOT Public

Renewable Cost Assumptions

Base Cost Assumptions without PTC/ITC ($/MWh)				
	Utility Solar	Community Solar PV	West Texas Wind	South Wind
2015	52	113	34	38
2016	52	113	35	38
2017	73	159	47	52
2018	75	162	48	53
2019	76	166	49	54
2020	78	169	50	55
2021	79	173	51	57
2022	81	176	52	58
2023	83	180	53	59
2024	84	184	54	60
2025	86	188	55	61



Conventional Capacity Assumptions

Conventional Generation Additions/Retirements

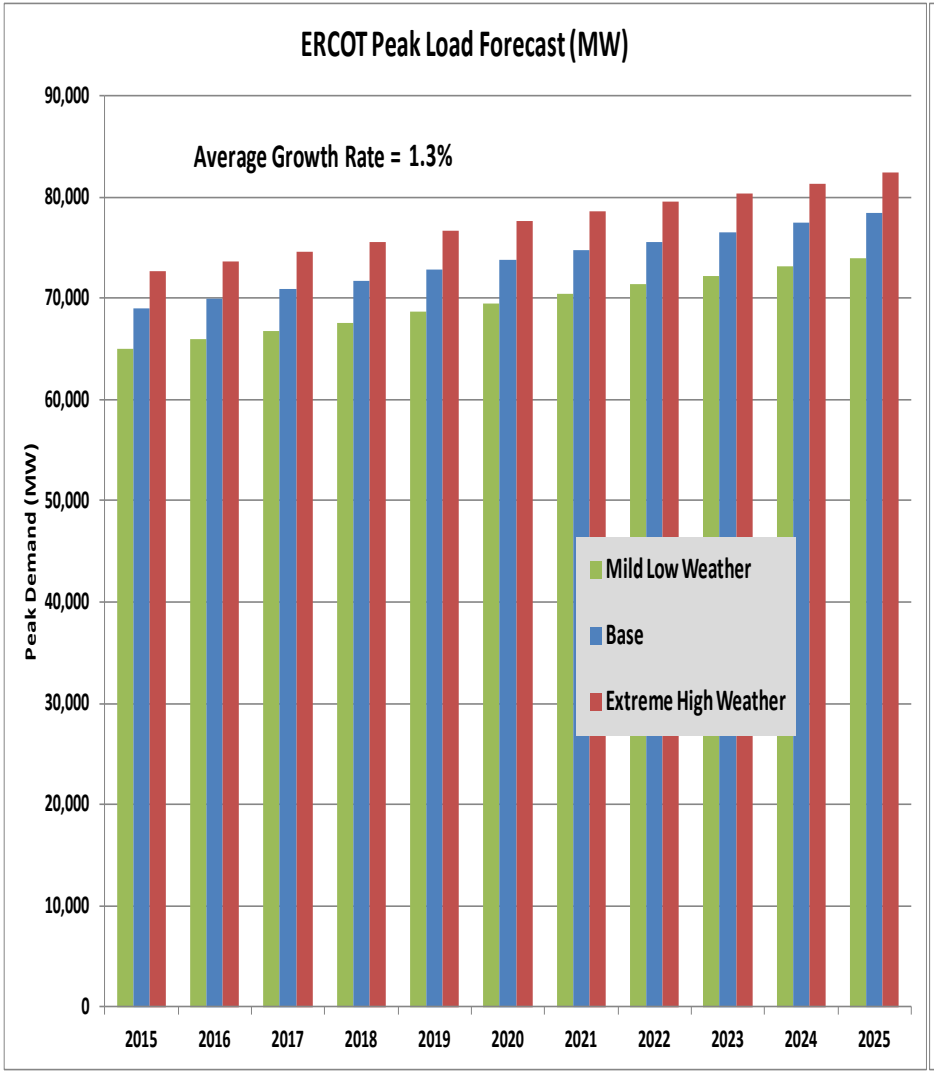
ID	Plan#			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
2	SC1-2	Current Goals + SHExp + 2GT	Additions						280						
			Retirements												
20	SC6-3	Current Goals + RetFPP + ReplRenE + AddCC	Additions						780						
			Retirements												(600)
24	SC7-3	Current Goals + RetDEC + ReplRenE + AddCC/GT	Additions				940								
			Retirements				(946)								
28	SC8-3	Current Goals + RetFPP_DEC + ReplRenE + AddCC/GT	Additions				940								
			Retirements				(946)								(600)
29	SC8-4	Current Goals + RetFPP_DEC + ReplRenE + CAES	Additions	317											
			Retirements												

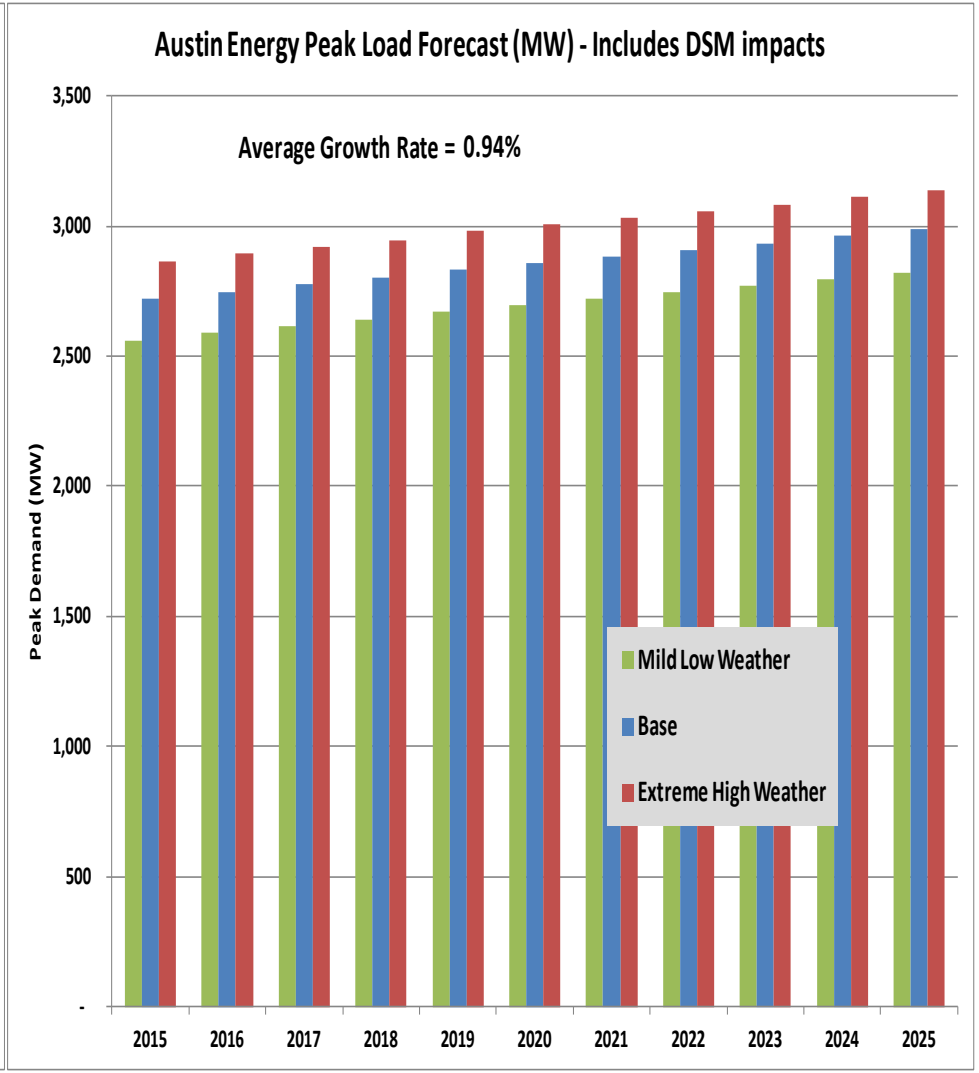
- Sand Hill expansion characteristics (800 $/kW)
  - 200 MW
  - 7,300 Btu/kWh heat rate
- Combined Cycle unit characteristics (800-900 $/kW)
  - 780 MW
  - 2 x 1 Configuration
  - 6,750 HR
  - Water Usage @ 300 gal/MWh
- Gas Turbines unit characteristics (800 $/kW)
  - 40 MW
  - 8,125 HR
  - No Water Usage
- Compressed Air Energy Storage (CAES)
  - $15 / kW-month
  - 4,300 HR
  - 60 hours of storage

Water Usage

Table ##. Austin Energy Water Usage Calendar Year 2013	Decker Creek Power Station	Fayette Power Project (facility-wide)	Sand Hill Energy Center	South Texas Project (facility-wide)	Facility Totals using only Austin Energy generation & consumption[3]
Water diverted from Colorado River (1,000 gallons)	1,573,950	6,942,265	0	14,343,469	6,153,394
Consumption due to Forced Evaporation (all facilities) and Groundwater pumping (STP only) (1,000 gallons)[1]	348,630	3,713,077	0	11,080,775	3,343,424
Consumption of Potable Water (1,000 gallons)	65,527	5,179	85,654	19,225	155,961
Reclaimed or Recycled Water (1,000 gallons)[2]	0	227,313	338,580	108,501	430,741
Total Consumptive Use with Reclaimed Water (1,000 gallons)	**414,157**	**3,945,569**	**424,234**	**11,208,501**	**3,930,126**
Total Consumptive Use without Reclaimed Water (1,000 gallons)	**414,157**	**3,718,256**	**85,654**	**11,100,000**	**3,499,385**
Percent of Use that is Reclaimed/Recycled Water (%)	**0.0%**	**6.0%**	**80.0%**	**1.0%**	**11.0%**
Total Site Generation (MWh)[4]	602,879	11,204,810	1,403,723	17,827,856	8,546,209
Water Usage Rate with Reclaimed Water (gal/KWh)	**0.690**	**0.350**	**0.300**	**0.630**	**0.460**
Water Usage Rate without Reclaimed Water (gal/KWh)	**0.690**	**0.330**	**0.060**	**0.620**	**0.410**
Water Diversion Rate (gal/KWh)	**2.610**	**0.620**	**0.000**	**0.800**	**0.720**

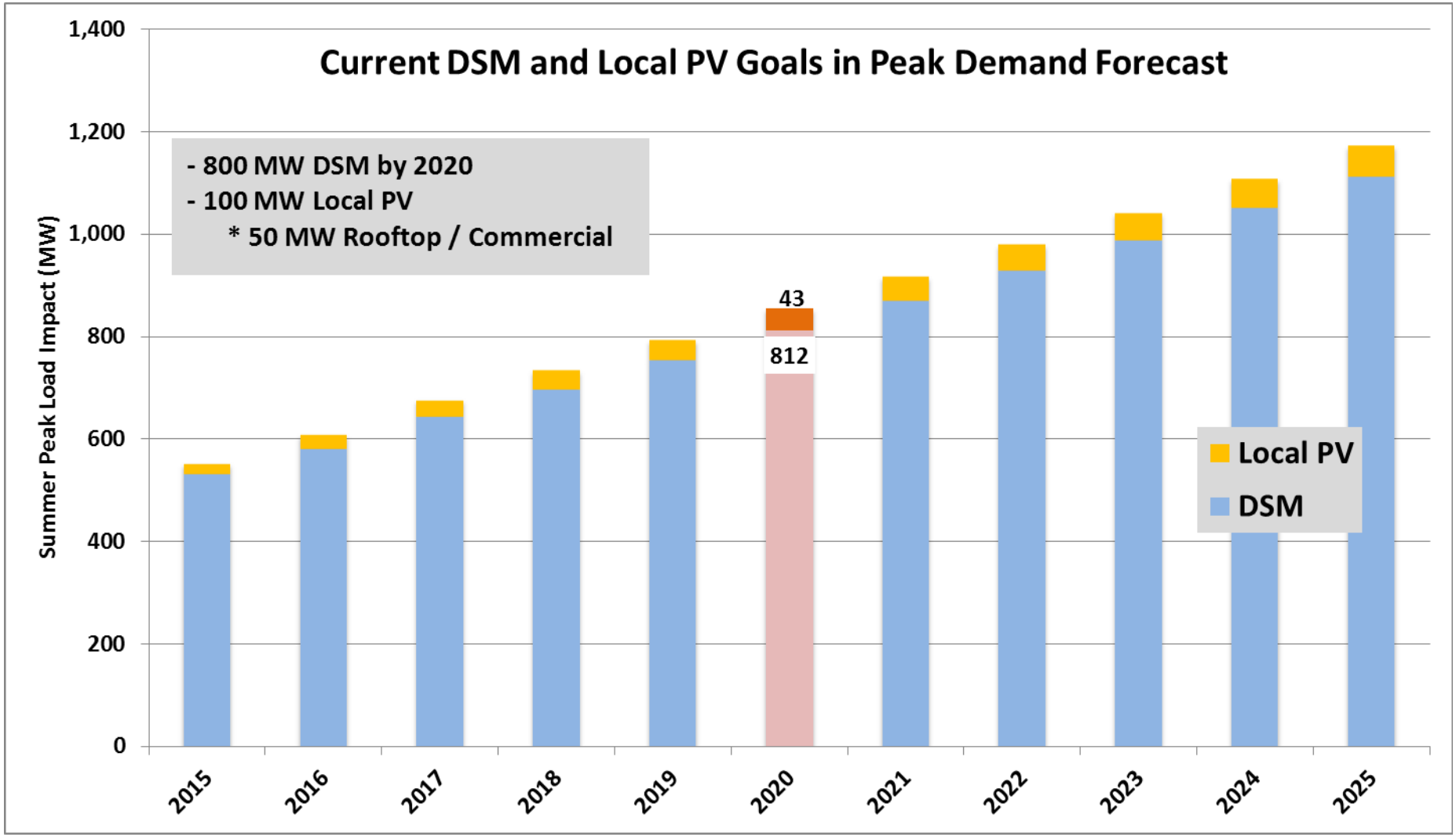
ERCOT vs. AE Peak Load Forecast





Home

DSM & Local PV Forecast

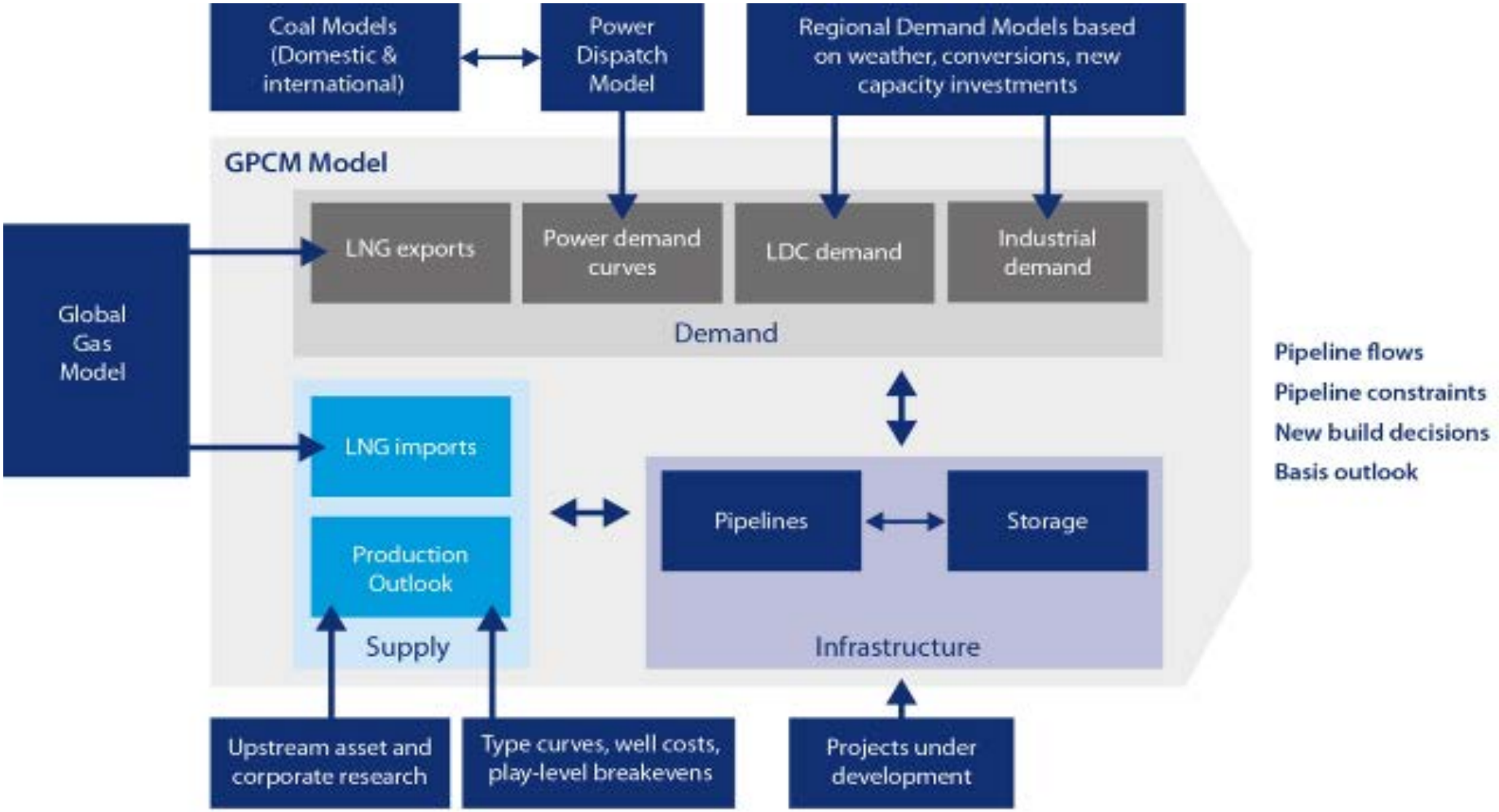


Financial and Economic Assumptions

- Capital
  - 30 year 80% debt financing
  - 5% interest rate (near term: 5 years)
  - 5.5% interest rate (beyond year 6)
  - Applies to CIP for current plants

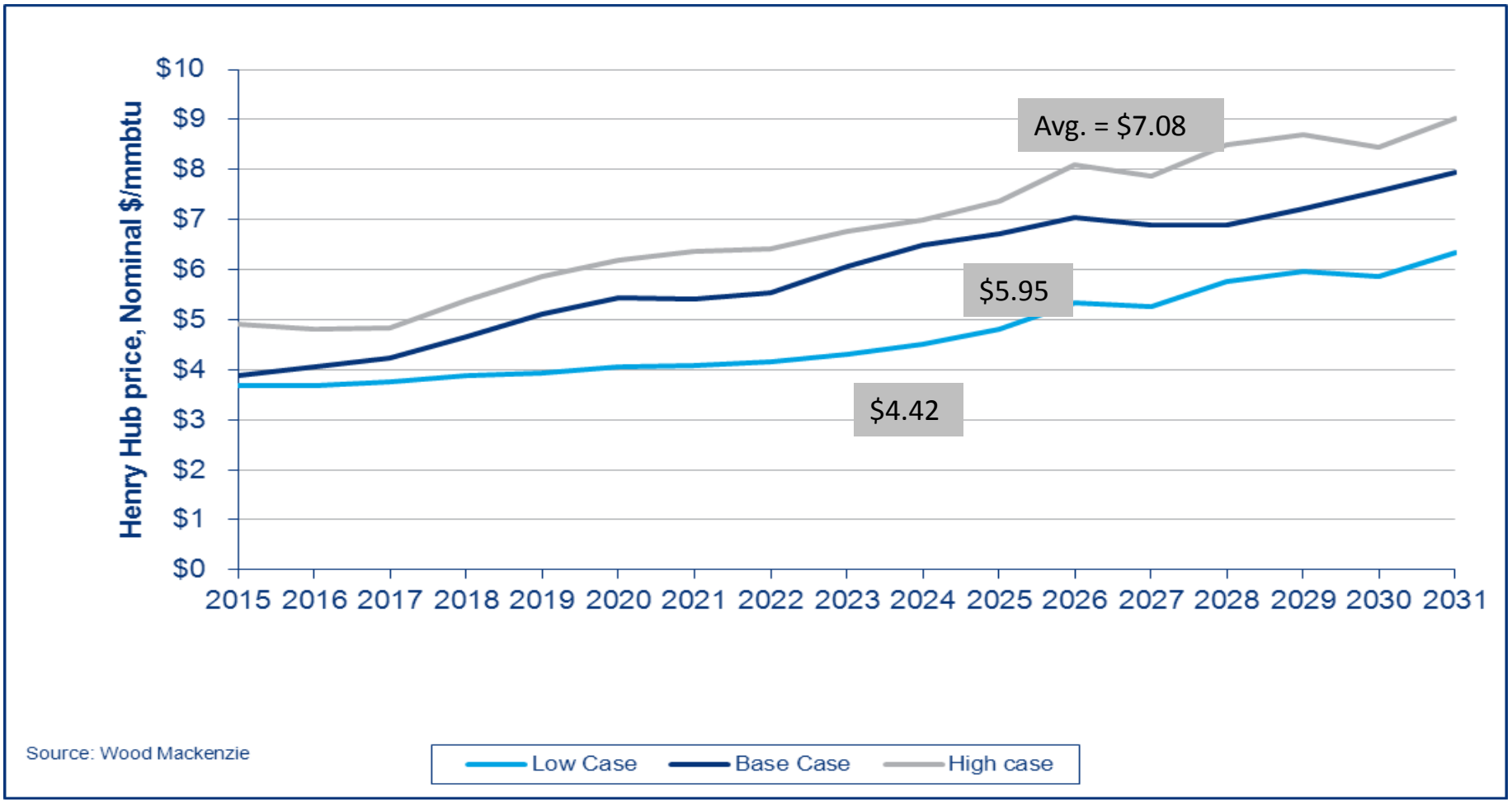
- Economic parameters
  - General inflation @ 3%
  - Discount Rate @ 10% (i.e. AE WACC)

Wood Mackenzie Natural Gas Forecast Model



Source: Wood Mackenzie

Fuel Price Forecasts (Nominal$)

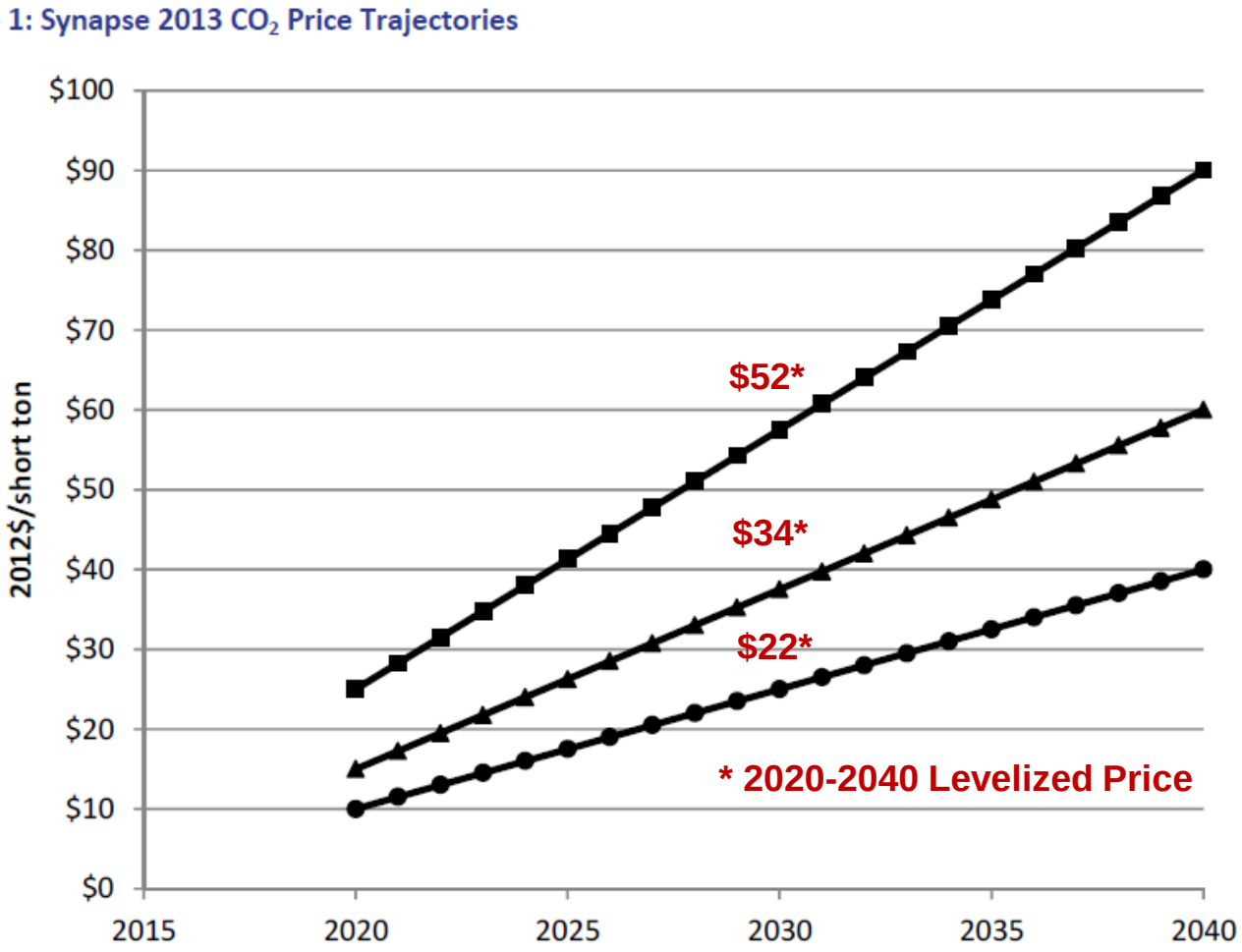


- Updated 4/12/2014, First 2 years is replaced by NYMEX futures.
- Assumes about a 2% annual inflation rate

HOME

Environmental Assumptions

- ERCOT 2014 Long Term System Assessment (LTSA) Report
- Source: Synapse Energy Economics
  - Eventual Federal Cap and Trade due to regional and state inconsistency
  - Emission abatement cost per Energy Modeling Forum (EMF) research
  - Forecast range from 28 utility IRPs



HOME

Scenario Descriptions

ID	Scenario	Plan#	Long Description	Graph Labels
1	1 - Current Strategy	SC1-1	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop)	SC1-1_Current Goals
2	1 - Current Strategy	SC1-2	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Add 200 MW Sand Hill Expansion by 2020 - Add 40 MW Simple Cycle Gas Turbines by 2020 (2 x 40 MW)	SC1-2_Current Goals + SHExp + 2GT
3	2 - Do Nothing	SC2-1	Current System and Commitments and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop)	SC2-1_Do Nothing
4	3 - Increase Ren/DSM	SC3-1	Increase goal to 40% Renewable by 2020	SC3-1_Ren Goal 40%
5	3 - Increase Ren/DSM	SC3-2	Increase goal to 40% Renewable by 2020 - Add 200 MW Sand Hill Expansion by 2020 - Add 40 MW Simple Cycle Gas Turbines by 2020 (2 x 40 MW)	SC3-2_Ren Goal 40% + SHExp + 2GT
6	3 - Increase Ren/DSM	SC3-3	Increase goal to 40% Renewable by 2020 - Increase DSM Goal to 1,000 MW 2020	SC3-3_Ren Goal 40% + 1,000 MW DSM
7	3 - Increase Ren/DSM	SC3-4	Increase goal to 40% Renewable by 2020 - Increase DSM Goal to 1,000 MW by 2020 - Add 200 MW Sand Hill Expansion by 2020 - Add 40 MW Simple Cycle Gas Turbines by 2020 (2 x 40 MW)	SC3-4_Ren Goal 40% + 1,000 MW DSM + SHExp + 2GT
8	4 - Increase Ren/DSM More	SC4-1	Increase goal to 50% Renewable by 2025	SC4-1_Ren Goal 50%
9	4 - Increase Ren/DSM More	SC4-2	Increase goal to 50% Renewable by 2025 - Add 200 MW Sand Hill Expansion by 2020 - Add 40 MW Simple Cycle Gas Turbines by 2020 (2 x 40 MW)	SC4-2_Ren Goal 50% + SHExp + 2GT
10	4 - Increase Ren/DSM More	SC4-3	Increase goal to 50% Renewable by 2025 - Increase DSM Goal to 1,200 MW 2020	SC4-3_Ren Goal 50% + 1,200 MW DSM
11	4 - Increase Ren/DSM More	SC4-4	Increase goal to 50% Renewable by 2025 - Increase DSM Goal to 1,200 MW by 2020 - Add 200 MW Sand Hill Expansion by 2020 - Add 40 MW Simple Cycle Gas Turbines by 2020 (2 x 40 MW)	SC4-4_Ren Goal 50% + 1,200 MW DSM + SHExp + 2GT

Scenario Descriptions Cont'd

ID	Scenario	Plan#	Long Description	Graph Labels
12	5 - Carbon Free	SC5-1	Carbon Free (Current goals - 35% Renewable and 800 MW DSM by 2020) - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire Decker Plant December 2017 - Retire FPP December 2025 - Retire Sand Hill Plant December 2025	SC5-1_CF35%Ren_RetCoalGas
13	5 - Carbon Free	SC5-2	Carbon Free (Increase Goal to 40% Renewable by 2020) - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire Decker Plant December 2017 - Retire FPP December 2025 - Retire Sand Hill Plant December 2025	SC5-2_CF40%Ren_RetCoalGas
14	5 - Carbon Free	SC5-3	Carbon Free (Increase Goal to 50% Renewable by 2025) - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire Decker Plant December 2017 - Retire FPP December 2025 - Retire Sand Hill Plant December 2025	SC5-3_CF50%Ren_RetCoalGas
15	5 - Carbon Free	SC5-4	Carbon Free (Increase Goal to 40% Renewable by 2020) - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Increase DSM Goal to 1,000 MW by 2020 - Retire Decker Plant December 2017 - Retire FPP December 2025 - Retire Sand Hill Plant December 2025	SC5-4_CF40%Ren_RetCoalGas + 1,000 MW DSM
16	5 - Carbon Free	SC5-5	Carbon Free (Increase Goal to 50% Renewable by 2025) - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Increase DSM Goal to 1,200 MW by 2025 - Retire Decker Plant December 2017 - Retire FPP December 2025 - Retire Sand Hill Plant December 2025	SC5-5_CF50%Ren_RetCoalGas + 1,200 MW DSM
17	5 - Carbon Free	SC5-6	Carbon Free (Current goals - 35% Renewable and 800 MW DSM by 2020) - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire Decker Plant December 2017 - Retire FPP December 2025 - Retire Sand Hill Plant December 2025 - Replace Retire Plant Energy with Renewable	SC5-6_CF35%_RetCoalGas + ReplAllRenEnergy

Scenario Descriptions Cont'd

ID	Scenario	Plan#	Long Description	Graph Labels
18	6 - Retire FPP	SC6-1	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire FPP December 2025	SC6-1_Current Goals + RetFPP
19	6 - Retire FPP	SC6-2	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire FPP December 2025 - Replace FPP Energy with Renewable	SC6-2_Current Goals + RetFPP + ReplE
20	6 - Retire FPP	SC6-3	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire FPP December 2025 - Replace FPP Energy with Renewable - Add 780 MW Combined Cycle by 2020	SC6-3_Current Goals + RetFPP + ReplE + AddCC
21	6 - Retire FPP	SC6-4	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire FPP December 2025 - Replace FPP Energy with Renewable - Add 317 MW Compressed Air Energy Storage (CAES) by 2020	SC6-4_Current Goals + RetFPP + ReplE + CAES
22	7 - Retire Decker Plant	SC7-1	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire Decker Plant December 2017	SC7-1_Current Goals + RetDEC
23	7 - Retire Decker Plant	SC7-2	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire Decker Plant December 2017 - Replace Decker Plant Energy with Renewable	SC7-2_Current Goals + RetDEC + ReplE
24	7 - Retire Decker Plant	SC7-3	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire Decker Plant December 2017 - Replace Decker Plant Energy with Renewable - Add 780 MW Combined Cycle by 2018 - Add 160 MW Simple Cycle Gas Turbines by 2018 (4 x 40 MW)	SC7-3_Current Goals + RetDEC + ReplE + AddCC/GT
25	7 - Retire Decker Plant	SC7-4	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire Decker Plant December 2017 - Replace Decker Plant Energy with Renewable - Add 317 MW Compressed Air Energy Storage (CAES) by 2020	SC7-4_Current Goals + RetDEC + ReplE + CAES

Scenario Descriptions Cont'd

ID	Scenario	Plan#	Long Description	Graph Labels
26	8 - Retire FPP and FPP Plant	SC8-1	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire FPP December 2025 and Decker Plant December 2017	SC8-1_Current Goals + RetFPP_DEC
27	8 - Retire FPP and FPP Plant	SC8-2	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire FPP December 2025 and Decker Plant December 2017 - Replace Retired Energy with Renewable	SC8-2_Current Goals + RetFPP_DEC + ReplE
28	8 - Retire FPP and FPP Plant	SC8-3	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire FPP December 2025 and Decker Plant December 2017 - Replace Retired Energy with Renewable - Add 780 MW Combined Cycle by 2018 - Add 160 MW Simple Cycle Gas Turbines by 2018 (4 x 40 MW)	SC8-3_Current Goals + RetFPP_DEC + ReplE + AddCC/GT
29	8 - Retire FPP and FPP Plant	SC8-4	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire FPP December 2025 and Decker Plant December 2017 - Replace Retired Energy with Renewable - Add 317 MW Compressed Air Energy Storage (CAES) by 2020	SC8-4_Current Goals + RetFPP_DEC + ReplE + CAES
30	8 - Retire FPP and FPP Plant	SC8-5	Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire FPP December 2025 and Decker Plant December 2017 - Replace Retired Energy with Renewable - Add 780 MW Combined Cycle by 2018 - Add 160 MW Simple Cycle Gas Turbines by 2018 (4 x 40 MW) - Add 317 MW Compressed Air Energy Storage (CAES) by 2020	SC8-5_Current Goals + RetFPP_DEC + ReplE + AddCC/GT_CAES

Summary of Scenarios and Key Uncertainties

		Potential Scenarios							
				Increase Goals			Replace FPP & Decker		
		Least Cost Plan Meeting Council Goals	No Additional Generation	1000 MW of DSM with 40% Renewables by 2020	1200 MW of DSM with 50% Renewables by 2025	100% Emission Free by 2025	With Renewables + Natural Gas Simple Cycle Peakers	With Renewables + Natural Gas Combined Cycle	With Renewables + Compressed Air Energy Storage
Key Uncertainties (Relative to Current Forecasts)	High Gas								
	Low Gas								
	High Load								
	Low Load								
	High Carbon								
	Low Carbon								
	Capacity Market								
	PTC/ITC Extn								

- Scenarios cover a wide range of values for key uncertainties
- Selected scenarios cover most feedback from the stakeholders

Plan Results (without CO2) – Metric Values

									Environmental			
ID	Plan#	Plan Description	20-yr Expected NPV$ Cost	20-yr Expected NPV$ Owned Fixed Cost	20-yr Expected NPV$ PPA Fixed Cost	2018 Near-Term Avg. Rate (Cents/kWh)	2035 Long-Term Avg. Rate (Cents/kWH)	NPV$ Cost at Risk	2026 CO2 80% below 2005 Delta Tonnes	2026 Portfolio Carbon Intensity lbs/MWh	2026 Renewable % of Load	2026 Water Usage Acre-ft
1	SC1-1	Current (2010) Goals	$6,890	$1,660	$2,172	10.09	11.61	$2,008	1,199,858	553	34%	11,284
2	SC1-2	Current (2010) Goals + SHExp + 2GT	$6,890	$1,731	$2,172	10.09	11.62	$1,933	718,844	580	34%	12,677
3	SC2-1	Do Nothing	$6,756	$1,660	$1,999	10.05	11.44	$2,211	-548,198	775	31%	13,177
4	SC3-1	Ren Goal 40%	$6,872	$1,660	$2,359	10.09	11.57	$1,959	1,199,858	520	39%	11,284
5	SC3-2	Ren Goal 40% + SHExp + 2GT	$6,872	$1,731	$2,359	10.09	11.59	$1,893	718,844	549	39%	12,677
6	SC3-3	Ren Goal 40% + 1,000 MW DSM	$7,781	$1,660	$2,259	10.97	12.65	$1,696	1,249,491	532	38%	11,169
7	SC3-4	Ren Goal 40% + 1,000 MW DSM + SHExp + 2GT	$7,747	$1,731	$2,259	10.97	12.61	$1,805	756,417	562	38%	12,585
8	SC4-1	Ren Goal 50%	$6,838	$1,660	$2,533	10.09	11.52	$1,894	1,199,858	470	49%	11,284
9	SC4-2	Ren Goal 50% + SHExp + 2GT	$6,838	$1,731	$2,533	10.09	11.53	$1,803	718,844	500	49%	12,677
10	SC4-3	Ren Goal 50% + 1,200 MW DSM	$7,772	$1,660	$2,420	10.97	12.90	$1,612	1,286,162	477	49%	11,087
11	SC4-4	Ren Goal 50% + 1,200 MW DSM + SHExp + 2GT	$7,708	$1,731	$2,420	10.97	12.80	$1,575	795,252	510	49%	12,484
12	SC5-1	CF35%Ren_RetCoalGas	$7,492	$1,411	$2,171	10.14	12.44	$2,652	4,451,795	0	34%	6,695
13	SC5-2	CF40%Ren_RetCoalGas	$7,475	$1,411	$2,358	10.14	12.41	$2,551	4,451,795	0	39%	6,695
14	SC5-3	CF50%Ren_RetCoalGas	$7,440	$1,411	$2,533	10.14	12.35	$2,465	4,451,795	0	49%	6,695
15	Res. 157	CF65%Ren_RetCoalGas,600MW PV,200MW Storage	$7,489	$1,462	$3,749	10.28	12.40	$2,274	4,451,795	0	64%	6,695
16	SC5-4	CF40%Ren_RetCoalGas + 1,000 MW DSM	$8,309	$1,411	$2,259	11.01	13.43	$2,091	4,451,795	0	38%	6,695
17	SC5-5	CF50%Ren_RetCoalGas + 1,200 MW DSM	$8,072	$1,411	$2,420	11.01	13.35	$1,740	4,451,795	0	49%	6,695
18	SC5-6	CF35%_RetCoalGas + ReplAllRenEnergy	$7,227	$1,411	$2,927	10.15	12.05	$2,377	4,451,795	0	76%	6,695
19	SC6-1	Current Goals + RetFPP	$6,974	$1,578	$2,172	10.09	11.75	$1,908	3,694,526	161	34%	8,525
20	SC6-2	Current Goals + RetFPP + ReplRenE	$6,900	$1,578	$2,679	10.09	11.62	$1,746	3,694,526	120	56%	8,525
21	SC6-3	Current Goals + RetFPP + ReplRenE + AddCC	$6,520	$1,861	$2,679	10.09	11.17	$1,807	1,903,456	298	56%	14,287
22	SC6-4	Current Goals + RetFPP + ReplRenE + CAES	$7,145	$1,578	$2,679	10.40	11.78	$1,763	3,599,179	132	56%	8,999
23	SC7-1	Current Goals + RetDEC	$7,268	$1,565	$2,171	10.14	12.06	$2,781	1,468,126	526	34%	10,480
24	SC7-2	Current Goals + RetDEC + ReplRenE	$7,262	$1,565	$2,269	10.15	12.05	$2,738	1,468,126	514	36%	10,480
25	SC7-3	Current Goals + RetDEC + ReplRenE + AddCC/GT	$6,488	$2,059	$2,270	10.01	11.17	$1,583	-278,271	590	36%	14,958
26	SC7-4	Current Goals + RetDEC + ReplRenE + CAES	$7,502	$1,565	$2,269	10.45	12.20	$2,775	1,372,782	514	36%	10,856
27	SC8-1	Current Goals + RetFPP_DEC	$7,416	$1,483	$2,171	10.14	12.30	$2,658	3,965,661	108	34%	7,717
28	SC8-2	Current Goals + RetFPP_DEC + ReplRenE	$7,325	$1,483	$2,854	10.16	12.16	$2,425	3,965,661	73	64%	7,983
29	SC8-3	Current Goals + RetFPP_DEC + ReplRenE + AddCC/GT	$6,481	$1,978	$2,855	10.02	11.17	$1,276	2,205,106	254	64%	12,201
30	SC8-4	Current Goals + RetFPP_DEC + ReplRenE + CAES	$7,565	$1,483	$2,854	10.46	12.31	$2,428	3,870,316	85	64%	8,458
31	SC8-5	Current Goals + RetFPP_DEC + ReplRenE + AddCC/GT_CAES	$6,733	$1,978	$2,855	10.31	11.33	$1,296	2,109,772	259	64%	12,597
32	500+Plan	Ren Goal50% + RetFPP_DEC + 500MW CC + 500MW SolarPV	$6,582	$1,968	$2,556	10.11	11.26	$1,733	2,862,679	229	49%	10,549

Plan Results (without CO2) – Ranking by Metric

									Environmental			
ID	Plan#	Plan Description	20-yr Expected NPV$ Cost	20-yr Expected NPV$ Owned Fixed Cost	20-yr Expected NPV$ PPA Fixed Cost	2018 Near-Term Avg. Rate (Cents/kWh)	2035 Long-Term Avg. Rate (Cents/kWH)	NPV$ Cost at Risk	2026 CO2 80% below 2005 Delta Tonnes	2026 Portfolio Carbon Intensity lbs/MWh	2026 Renewable % of Load	2026 Water Usage Acre-ft
1	SC1-1	Current (2010) Goals	11	17	5	4	11	19	23	28	30	20
2	SC1-2	Current (2010) Goals + SHExp + 2GT	12	23	7	4	13	17	28	30	26	27
3	SC2-1	Do Nothing	6	17	1	3	6	21	32	32	32	30
4	SC3-1	Ren Goal 40%	9	17	15	4	9	18	23	24	19	20
5	SC3-2	Ren Goal 40% + SHExp + 2GT	10	23	16	4	10	14	28	27	17	27
6	SC3-3	Ren Goal 40% + 1,000 MW DSM	30	17	9	27	28	6	22	26	22	19
7	SC3-4	Ren Goal 40% + 1,000 MW DSM + SHExp + 2GT	28	23	10	27	27	12	27	29	20	25
8	SC4-1	Ren Goal 50%	7	17	21	4	7	15	23	18	16	20
9	SC4-2	Ren Goal 50% + SHExp + 2GT	8	23	22	4	8	11	28	20	14	27
10	SC4-3	Ren Goal 50% + 1,200 MW DSM	29	17	17	27	30	5	21	19	13	18
11	SC4-4	Ren Goal 50% + 1,200 MW DSM + SHExp + 2GT	27	23	18	27	29	3	26	21	12	24
12	SC5-1	CF35%Ren_RetCoalGas	24	1	2	14	26	28	1	1	27	1
13	SC5-2	CF40%Ren_RetCoalGas	22	1	14	14	25	27	1	1	18	1
14	SC5-3	CF50%Ren_RetCoalGas	21	1	20	14	23	26	1	1	15	1
15	Res. 157	CF65%Ren_RetCoalGas,600MW PV,200MW Storage	23	7	32	22	24	22	1	1	6	1
16	SC5-4	CF40%Ren_RetCoalGas + 1,000 MW DSM	32	1	8	31	32	20	1	1	21	1
17	SC5-5	CF50%Ren_RetCoalGas + 1,200 MW DSM	31	1	19	31	31	8	1	1	11	1
18	SC5-6	CF35%_RetCoalGas + ReplAllRenEnergy	16	1	31	19	17	23	1	1	1	1
19	SC6-1	Current Goals + RetFPP	14	14	5	4	14	16	11	13	30	11
20	SC6-2	Current Goals + RetFPP + ReplRenE	13	14	24	11	12	9	11	11	7	11
21	SC6-3	Current Goals + RetFPP + ReplRenE + AddCC	3	28	24	11	2	13	17	17	7	31
22	SC6-4	Current Goals + RetFPP + ReplRenE + CAES	15	14	24	24	15	10	13	12	7	13
23	SC7-1	Current Goals + RetDEC	18	11	2	14	18	32	18	25	27	14
24	SC7-2	Current Goals + RetDEC + ReplRenE	17	11	11	20	16	30	18	22	23	14
25	SC7-3	Current Goals + RetDEC + ReplRenE + AddCC/GT	2	32	13	1	3	4	31	31	25	32
26	SC7-4	Current Goals + RetDEC + ReplRenE + CAES	25	11	11	25	20	31	20	23	23	17
27	SC8-1	Current Goals + RetFPP_DEC	20	8	2	14	21	29	8	10	27	8
28	SC8-2	Current Goals + RetFPP_DEC + ReplRenE	19	8	27	21	19	24	8	8	2	9
29	SC8-3	Current Goals + RetFPP_DEC + ReplRenE + AddCC/GT	1	30	29	2	1	1	15	15	4	23
30	SC8-4	Current Goals + RetFPP_DEC + ReplRenE + CAES	26	8	27	26	22	25	10	9	2	10
31	SC8-5	Current Goals + RetFPP_DEC + ReplRenE + AddCC/GT_CAES	5	30	29	23	5	2	16	16	4	26
32	500+Plan	Ren Goal50% + RetFPP_DEC + 500MW CC + 500MW SolarPV	4	29	23	13	4	7	14	14	10	16

Plan Results (with CO2) – Metric Values

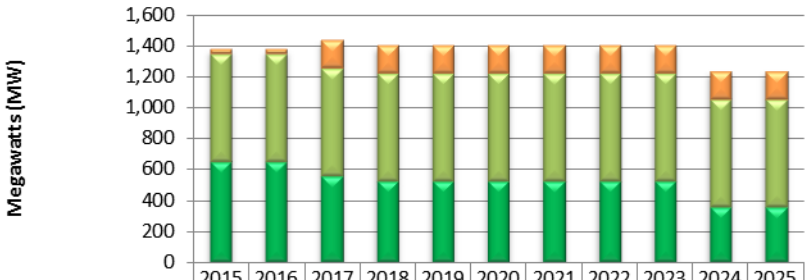
									Environmental			
ID	Plan#	Plan Description	20-yr Expected NPV$ Cost	20-yr Expected NPV$ Owned Fixed Cost	20-yr Expected NPV$ PPA Fixed Cost	2018 Near-Term Avg. Rate (Cents/kWh)	2035 Long-Term Avg. Rate (Cents/kWH)	NPV$ Cost at Risk	2026 CO2 80% below 2005 Delta Tonnes	2026 Portfolio Carbon Intensity lbs/MWh	2026 Renewable % of Load	2026 Water Usage Acre-ft
1	SC1-1	Current (2010) Goals	$7,493	$1,660	$2,172	10.09	12.37	$1,405	1,199,858	553	34%	11,284
2	SC1-2	Current (2010) Goals + SHExp + 2GT	$7,484	$1,731	$2,172	10.09	12.38	$1,339	718,844	580	34%	12,677
3	SC2-1	Do Nothing	$7,522	$1,660	$1,999	10.05	12.41	$1,446	-548,198	775	31%	13,177
4	SC3-1	Ren Goal 40%	$7,431	$1,660	$2,359	10.09	12.28	$1,401	1,199,858	520	39%	11,284
5	SC3-2	Ren Goal 40% + SHExp + 2GT	$7,422	$1,731	$2,359	10.09	12.29	$1,344	718,844	549	39%	12,677
6	SC3-3	Ren Goal 40% + 1,000 MW DSM	$8,329	$1,660	$2,259	10.97	13.37	$1,148	1,249,491	532	38%	11,169
7	SC3-4	Ren Goal 40% + 1,000 MW DSM + SHExp + 2GT	$8,287	$1,731	$2,259	10.97	13.31	$1,264	756,417	562	38%	12,585
8	SC4-1	Ren Goal 50%	$7,333	$1,660	$2,533	10.09	12.13	$1,399	1,199,858	470	49%	11,284
9	SC4-2	Ren Goal 50% + SHExp + 2GT	$7,324	$1,731	$2,533	10.09	12.13	$1,316	718,844	500	49%	12,677
10	SC4-3	Ren Goal 50% + 1,200 MW DSM	$8,237	$1,660	$2,420	10.97	13.50	$1,147	1,286,162	477	49%	11,087
11	SC4-4	Ren Goal 50% + 1,200 MW DSM + SHExp + 2GT	$8,165	$1,731	$2,420	10.97	13.39	$1,118	795,252	510	49%	12,484
12	SC5-1	CF35%Ren_RetCoalGas	$7,978	$1,411	$2,171	10.14	13.02	$2,166	4,451,795	0	34%	6,695
13	SC5-2	CF40%Ren_RetCoalGas	$7,916	$1,411	$2,358	10.14	12.93	$2,110	4,451,795	0	39%	6,695
14	SC5-3	CF50%Ren_RetCoalGas	$7,819	$1,411	$2,533	10.14	12.78	$2,086	4,451,795	0	49%	6,695
15	Res. 157	CF65%Ren_RetCoalGas,600MW PV,200MW Storage	$7,681	$1,462	$3,749	10.28	12.60	$2,082	4,451,795	0	64%	6,695
16	SC5-4	CF40%Ren_RetCoalGas + 1,000 MW DSM	$8,741	$1,411	$2,259	11.01	13.96	$1,658	4,451,795	0	38%	6,695
17	SC5-5	CF50%Ren_RetCoalGas + 1,200 MW DSM	$8,421	$1,411	$2,420	11.01	13.76	$1,391	4,451,795	0	49%	6,695
18	SC5-6	CF35%_RetCoalGas + ReplAllRenEnergy	$7,409	$1,411	$2,927	10.15	12.19	$2,196	4,451,795	0	76%	6,695
19	SC6-1	Current Goals + RetFPP	$7,467	$1,578	$2,172	10.09	12.34	$1,415	3,694,526	161	34%	8,525
20	SC6-2	Current Goals + RetFPP + ReplRenE	$7,233	$1,578	$2,679	10.09	11.98	$1,413	3,694,526	120	56%	8,525
21	SC6-3	Current Goals + RetFPP + ReplRenE + AddCC	$6,788	$1,861	$2,679	10.09	11.45	$1,539	1,903,456	298	56%	14,287
22	SC6-4	Current Goals + RetFPP + ReplRenE + CAES	$7,465	$1,578	$2,679	10.40	12.12	$1,443	3,599,179	132	56%	8,999
23	SC7-1	Current Goals + RetDEC	$7,862	$1,565	$2,171	10.14	12.82	$2,187	1,468,126	526	34%	10,480
24	SC7-2	Current Goals + RetDEC + ReplRenE	$7,837	$1,565	$2,269	10.15	12.78	$2,162	1,468,126	514	36%	10,480
25	SC7-3	Current Goals + RetDEC + ReplRenE + AddCC/GT	$6,999	$2,059	$2,270	10.01	11.83	$1,072	-278,271	590	36%	14,958
26	SC7-4	Current Goals + RetDEC + ReplRenE + CAES	$8,065	$1,565	$2,269	10.45	12.92	$2,212	1,372,782	514	36%	10,856
27	SC8-1	Current Goals + RetFPP_DEC	$7,900	$1,483	$2,171	10.14	12.88	$2,173	3,965,661	108	34%	7,717
28	SC8-2	Current Goals + RetFPP_DEC + ReplRenE	$7,586	$1,483	$2,854	10.16	12.41	$2,164	3,965,661	73	64%	7,983
29	SC8-3	Current Goals + RetFPP_DEC + ReplRenE + AddCC/GT	$6,679	$1,978	$2,855	10.02	11.34	$1,077	2,205,106	254	64%	12,201
30	SC8-4	Current Goals + RetFPP_DEC + ReplRenE + CAES	$7,814	$1,483	$2,854	10.46	12.55	$2,180	3,870,316	85	64%	8,458
31	SC8-5	Current Goals + RetFPP_DEC + ReplRenE + AddCC/GT_CAES	$6,918	$1,978	$2,855	10.31	11.49	$1,111	2,109,772	259	64%	12,597
32	500+Plan	Ren Goal50% + RetFPP_DEC + 500MW CC + 500MW SolarPV	$6,888	$1,968	$2,556	10.11	11.61	$1,427	2,862,679	229	49%	10,549

Plan Results (with CO2) – Ranking by Metric

									Environmental			
ID	Plan#	Plan Description	20-yr Expected NPV$ Cost	20-yr Expected NPV$ Owned Fixed Cost	20-yr Expected NPV$ PPA Fixed Cost	2018 Near-Term Avg. Rate (Cents/kWh)	2035 Long-Term Avg. Rate (Cents/kWH)	NPV$ Cost at Risk	2026 CO2 80% below 2005 Delta Tonnes	2026 Portfolio Carbon Intensity lbs/MWh	2026 Renewable % of Load	2026 Water Usage Acre-ft
1	SC1-1	Current (2010) Goals	15	17	5	4	14	14	23	28	30	20
2	SC1-2	Current (2010) Goals + SHExp + 2GT	14	23	7	4	15	9	28	30	26	27
3	SC2-1	Do Nothing	16	17	1	3	16	19	32	32	32	30
4	SC3-1	Ren Goal 40%	11	17	15	4	11	13	23	24	19	20
5	SC3-2	Ren Goal 40% + SHExp + 2GT	10	23	16	4	12	10	28	27	17	27
6	SC3-3	Ren Goal 40% + 1,000 MW DSM	30	17	9	27	28	6	22	26	22	19
7	SC3-4	Ren Goal 40% + 1,000 MW DSM + SHExp + 2GT	29	23	10	27	27	7	27	29	20	25
8	SC4-1	Ren Goal 50%	8	17	21	4	8	12	23	18	16	20
9	SC4-2	Ren Goal 50% + SHExp + 2GT	7	23	22	4	9	8	28	20	14	27
10	SC4-3	Ren Goal 50% + 1,200 MW DSM	28	17	17	27	30	5	21	19	13	18
11	SC4-4	Ren Goal 50% + 1,200 MW DSM + SHExp + 2GT	27	23	18	27	29	4	26	21	12	24
12	SC5-1	CF35%Ren_RetCoalGas	25	1	2	14	26	27	1	1	27	1
13	SC5-2	CF40%Ren_RetCoalGas	24	1	14	14	25	24	1	1	18	1
14	SC5-3	CF50%Ren_RetCoalGas	20	1	20	14	21	23	1	1	15	1
15	Res. 157	CF65%Ren_RetCoalGas,600MW PV,200MW Storage	18	7	32	22	19	22	1	1	6	1
16	SC5-4	CF40%Ren_RetCoalGas + 1,000 MW DSM	32	1	8	31	32	21	1	1	21	1
17	SC5-5	CF50%Ren_RetCoalGas + 1,200 MW DSM	31	1	19	31	31	11	1	1	11	1
18	SC5-6	CF35%_RetCoalGas + ReplAllRenEnergy	9	1	31	19	10	31	1	1	1	1
19	SC6-1	Current Goals + RetFPP	13	14	5	4	13	16	11	13	30	11
20	SC6-2	Current Goals + RetFPP + ReplRenE	6	14	24	11	6	15	11	11	7	11
21	SC6-3	Current Goals + RetFPP + ReplRenE + AddCC	2	28	24	11	2	20	17	17	7	31
22	SC6-4	Current Goals + RetFPP + ReplRenE + CAES	12	14	24	24	7	18	13	12	7	13
23	SC7-1	Current Goals + RetDEC	22	11	2	14	22	30	18	25	27	14
24	SC7-2	Current Goals + RetDEC + ReplRenE	21	11	11	20	20	25	18	22	23	14
25	SC7-3	Current Goals + RetDEC + ReplRenE + AddCC/GT	5	32	13	1	5	1	31	31	25	32
26	SC7-4	Current Goals + RetDEC + ReplRenE + CAES	26	11	11	25	24	32	20	23	23	17
27	SC8-1	Current Goals + RetFPP_DEC	23	8	2	14	23	28	8	10	27	8
28	SC8-2	Current Goals + RetFPP_DEC + ReplRenE	17	8	27	21	17	26	8	8	2	9
29	SC8-3	Current Goals + RetFPP_DEC + ReplRenE + AddCC/GT	1	30	29	2	1	2	15	15	4	23
30	SC8-4	Current Goals + RetFPP_DEC + ReplRenE + CAES	19	8	27	26	18	29	10	9	2	10
31	SC8-5	Current Goals + RetFPP_DEC + ReplRenE + AddCC/GT_CAES	4	30	29	23	3	3	16	16	4	26
32	500+Plan	Ren Goal50% + RetFPP_DEC + 500MW CC + 500MW SolarPV	3	29	23	13	4	17	14	14	10	16

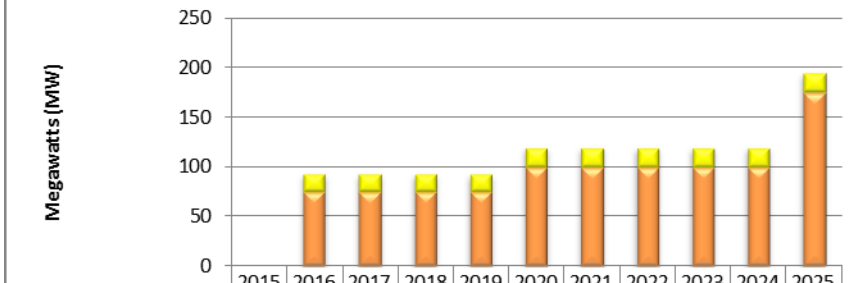
Renewable Capacity by Scenario Assumptions

Current Wind & Solar PV



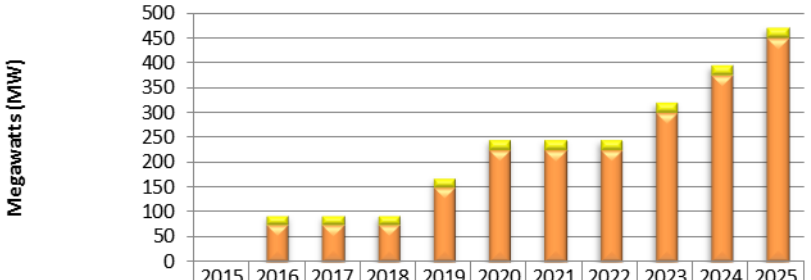
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Community Solar	0	0	0	0	0	0	0	0	0	0	0
Utility Solar	29	29	179	179	179	179	179	179	179	179	179
South Wind	695	694	694	694	694	694	694	694	694	694	694
West Wind	652	652	560	525	525	525	525	525	525	360	360

35% (by 2020)



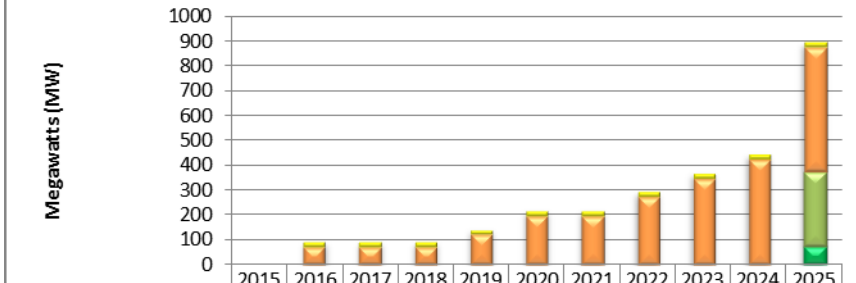
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Community Solar	0	18	18	18	18	20	20	20	20	20	20
Utility Solar	0	75	75	75	75	100	100	100	100	100	175
South Wind	0	0	0	0	0	0	0	0	0	0	0
West Wind	0	0	0	0	0	0	0	0	0	0	0

40% (by 2020)



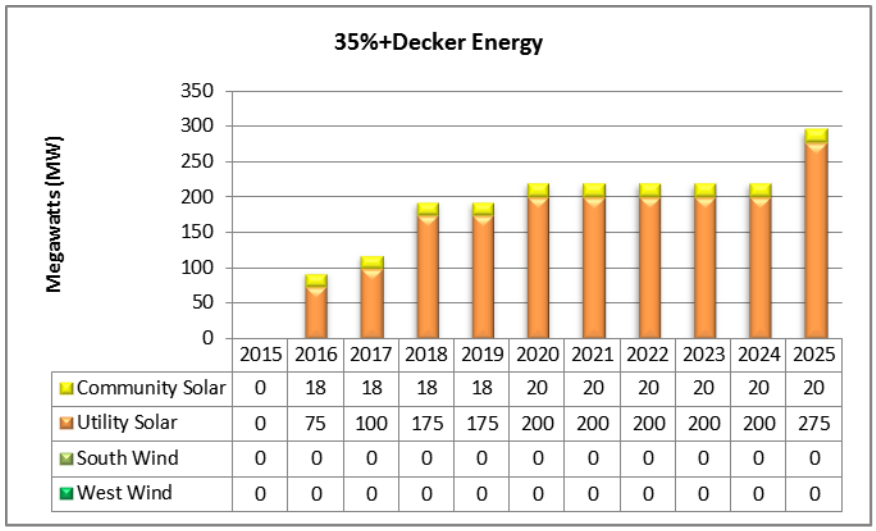
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Community Solar	0	18	18	18	18	21	21	21	21	21	21
Utility Solar	0	75	75	75	150	225	225	225	300	375	450
South Wind	0	0	0	0	0	0	0	0	0	0	0
West Wind	0	0	0	0	0	0	0	0	0	0	0

50% (by 2025)

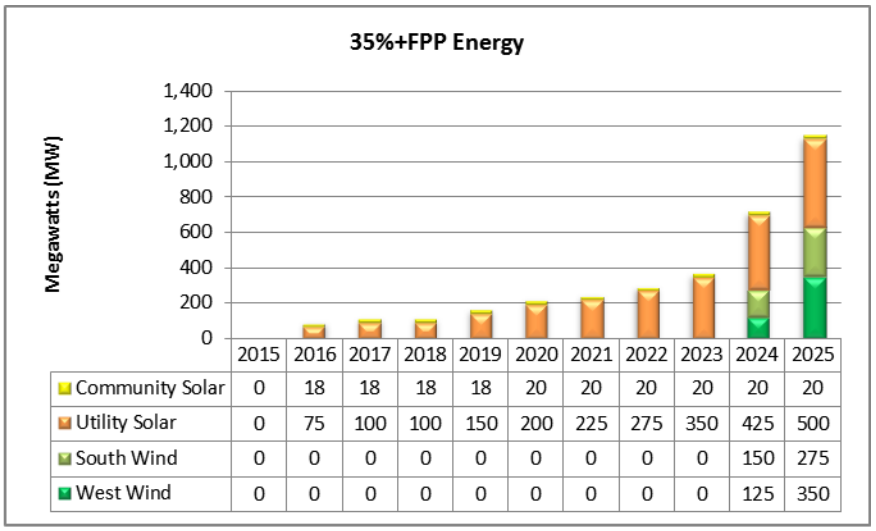


	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Community Solar	0	18	18	18	18	20	20	20	20	20	20
Utility Solar	0	75	75	75	125	200	200	275	350	425	500
South Wind	0	0	0	0	0	0	0	0	0	0	300
West Wind	0	0	0	0	0	0	0	0	0	0	75

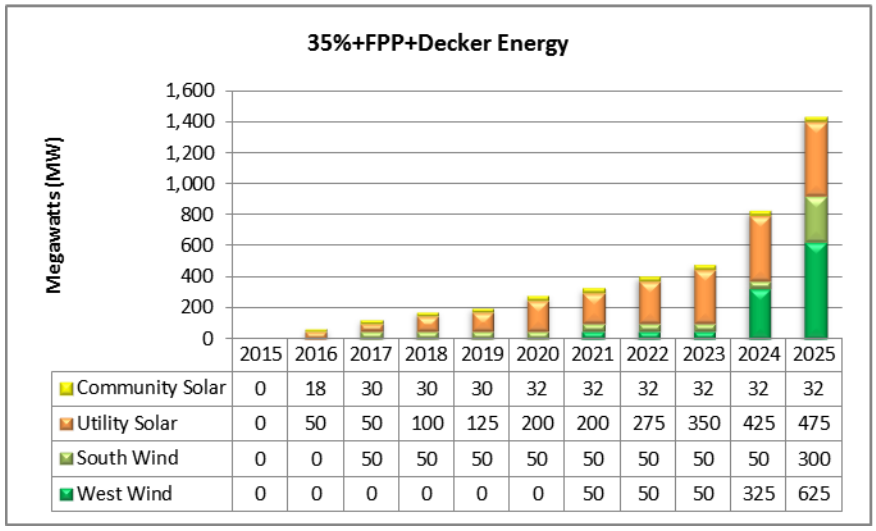
Renewable Capacity by Scenario Assumptions



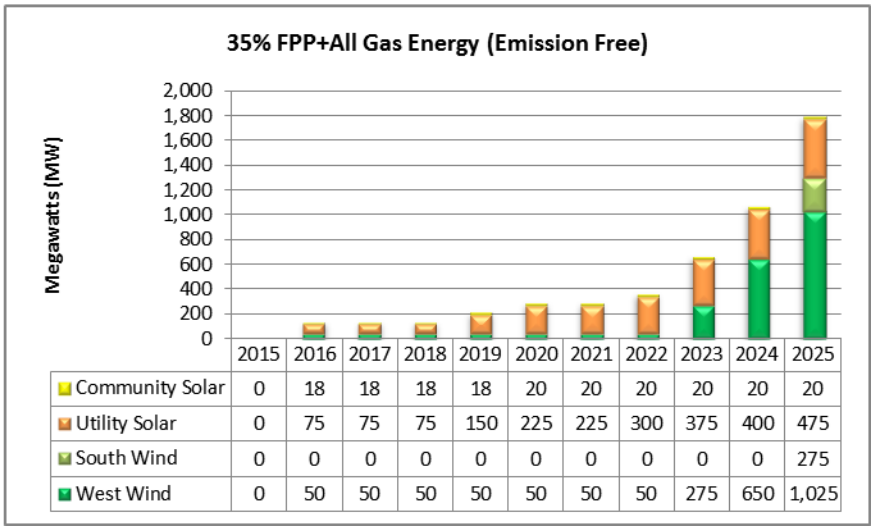
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Community Solar	0	18	18	18	18	20	20	20	20	20	20
Utility Solar	0	75	100	175	175	200	200	200	200	200	275
South Wind	0	0	0	0	0	0	0	0	0	0	0
West Wind	0	0	0	0	0	0	0	0	0	0	0



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Community Solar	0	18	18	18	18	20	20	20	20	20	20
Utility Solar	0	75	100	100	150	200	225	275	350	425	500
South Wind	0	0	0	0	0	0	0	0	0	150	275
West Wind	0	0	0	0	0	0	0	0	0	125	350

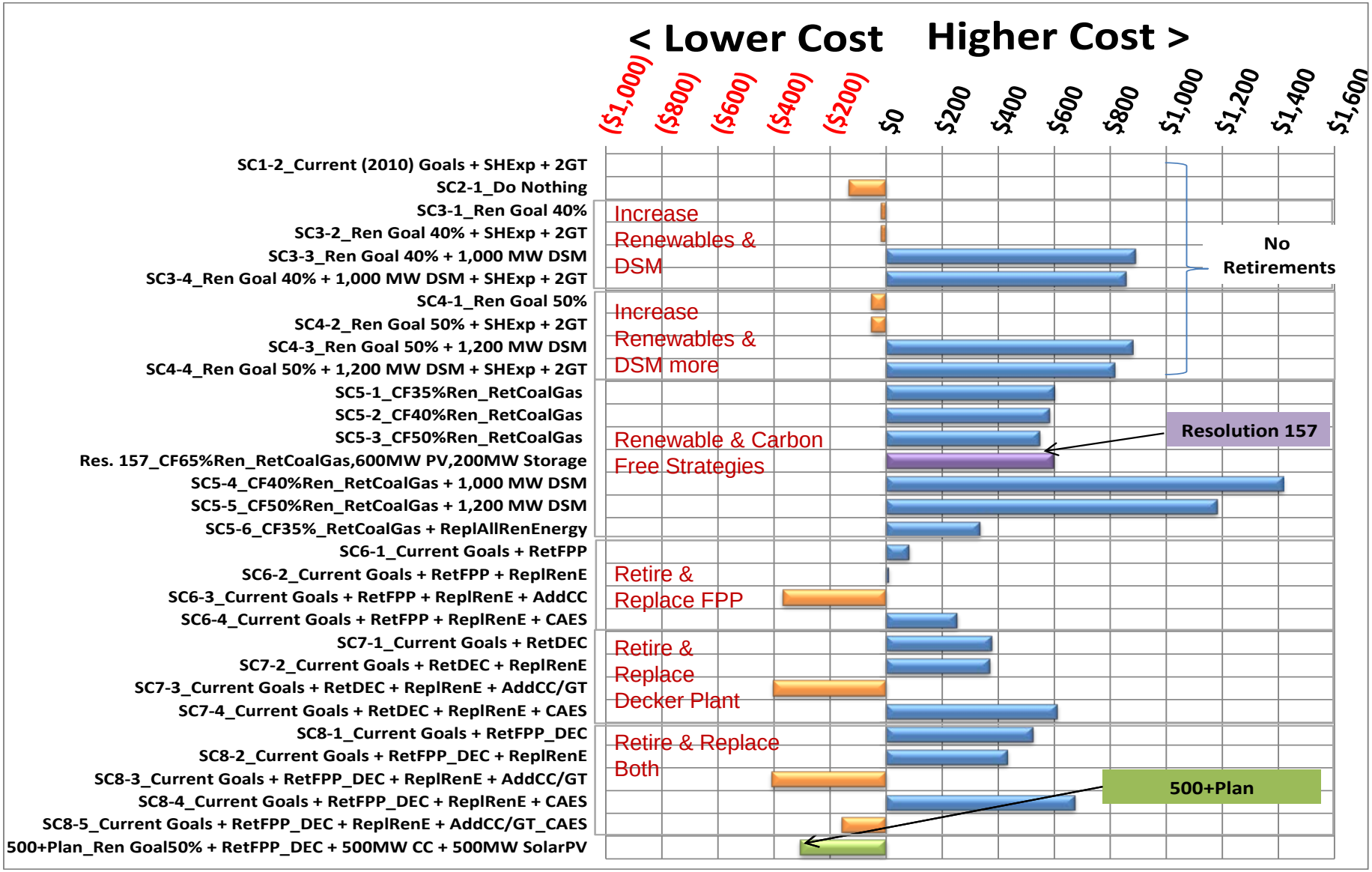


	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Community Solar	0	18	30	30	30	32	32	32	32	32	32
Utility Solar	0	50	50	100	125	200	200	275	350	425	475
South Wind	0	0	50	50	50	50	50	50	50	50	300
West Wind	0	0	0	0	0	0	50	50	50	325	625

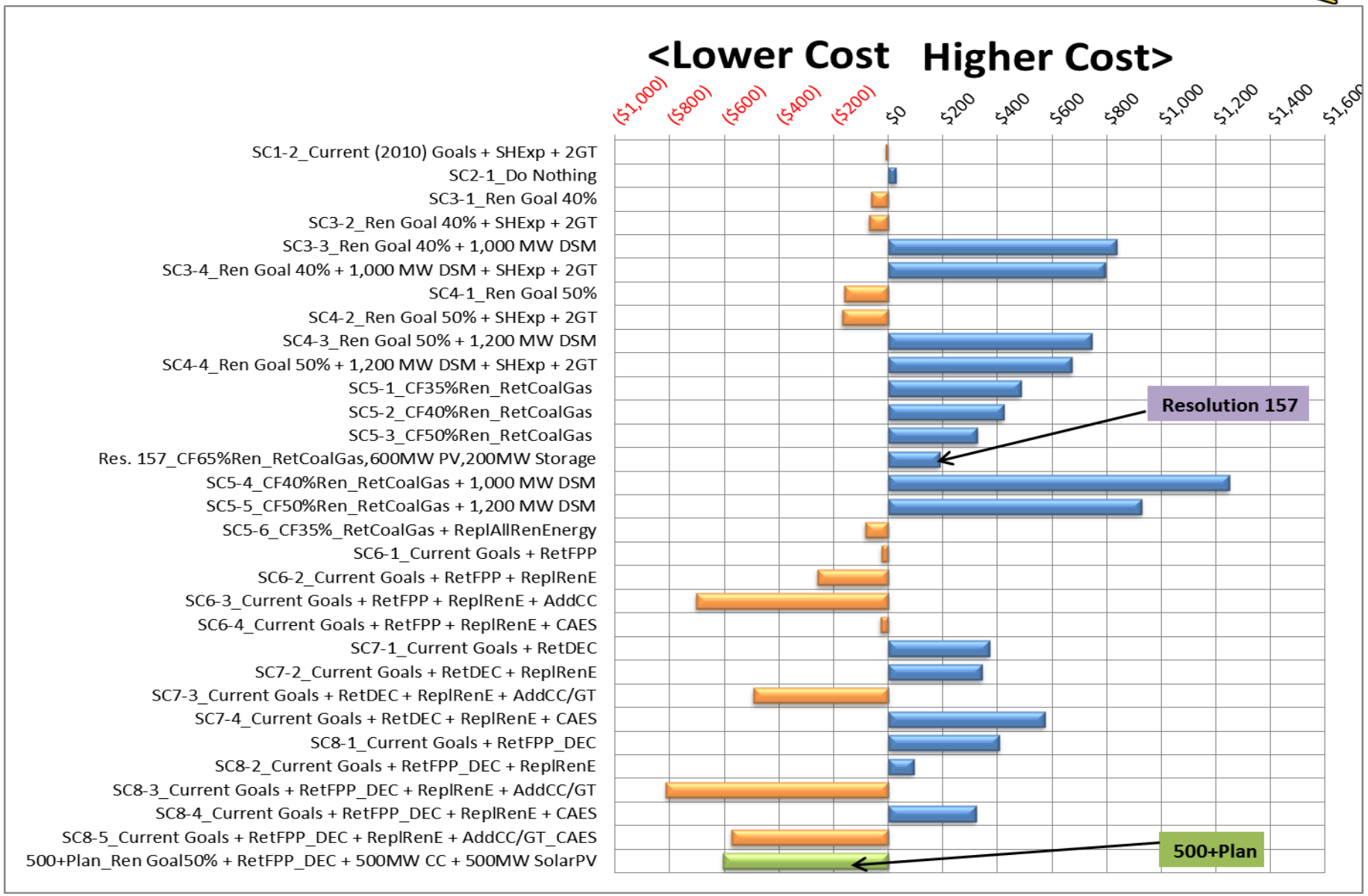


	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Community Solar	0	18	18	18	18	20	20	20	20	20	20
Utility Solar	0	75	75	75	150	225	225	300	375	400	475
South Wind	0	0	0	0	0	0	0	0	0	0	275
West Wind	0	50	50	50	50	50	50	50	275	650	1,025

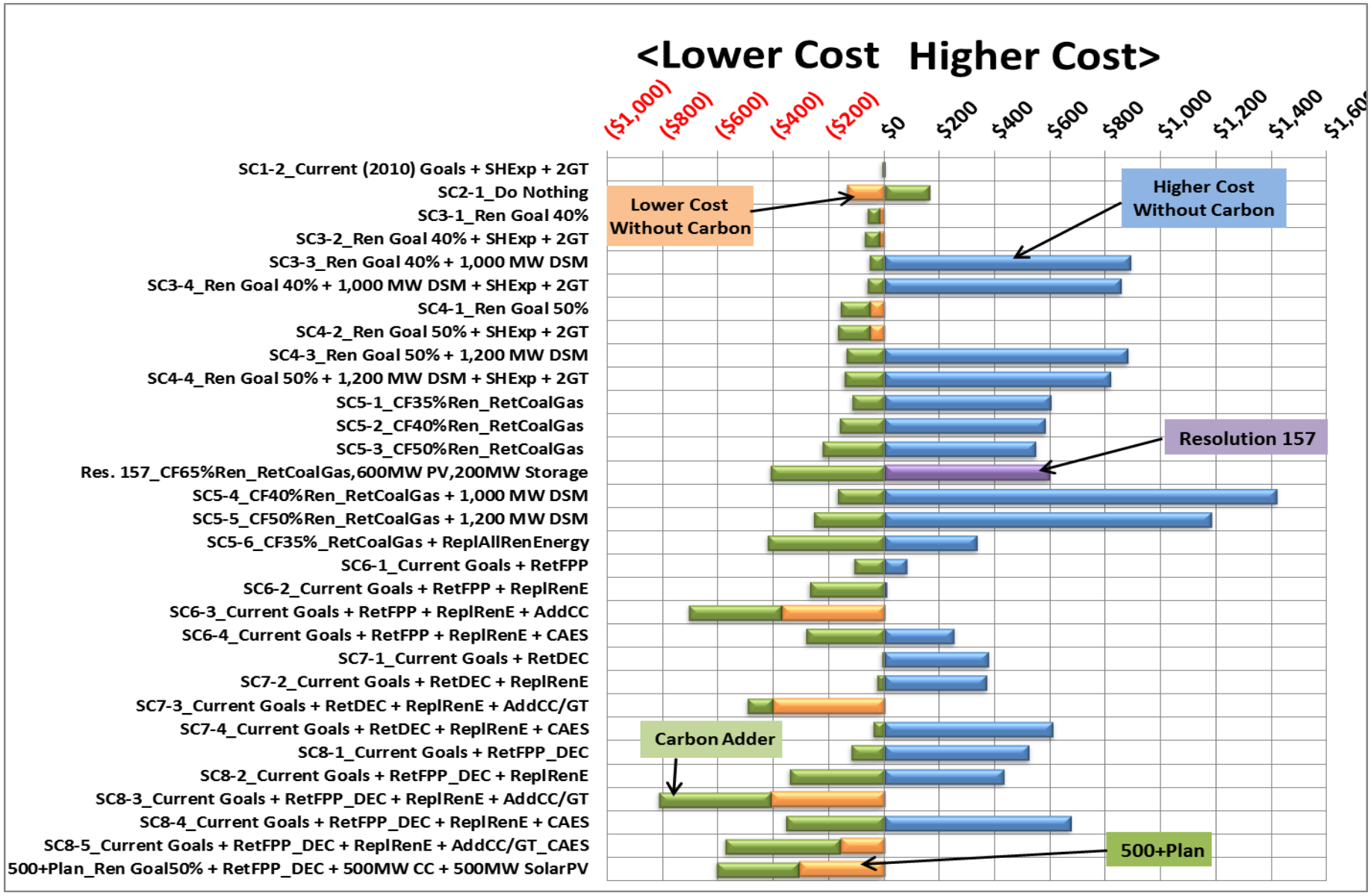
Plan 20-yr NPV$ change from current goals



Plan 20-yr NPV$ change from current goals Including Carbon (CO_2) Net Cost



Plan 20-yr NPV$ change from current goals Including Carbon (CO_2) Net Cost



AE & the ERCOT Market – What is the right amount of baseload

Brattle Observations from Sept 24th, 2014 CCAE Meeting:

- *This question reflects a pre-market recollection about how utilities did planning; AE membership in ERCOT entails separating generation economics from load economics*
- *In principle, AE could justify building as many baseload plants as have a positive NPV, which would only coincidentally have any relation to AE's load (e.g., we could build many of them and sell their power into ERCOT to defray AE's cost of load).*
- *Location matters! Some regions may be supply limited while others could be over-supplied relative to transmission export capacity.*

What is the long term outlook in gas prices?

Brattle Observations from Sept 24th, 2014 CCAE Meeting:

- It was alleged that shale gas might be petering out and that US gas prices could climb to EU or Pacific Rim levels (of $9/mmBtu or more) in the next few years.
- *This is extraordinarily unlikely and not supported by any gas market review we have seen, including ones targeted at preventing US gas exports. The netback costs of LNG transport from the US are too great, usually estimated at $5-8/mcf, such that US wellhead prices will almost always stay that much below those EU and Pacific points, i.e. at about where they are today.*
- *The biggest bumps we have seen in gas price forecasts for LNG or coal retirements are on the order of $1/mmBtu, and those only last for 2-4 years because the supply of shale gas is so deep that the industry can catch up fairly soon.*
- *It is more likely that the EU and Pacific costs will fall than our gas costs will rise.*

Do Renewable Contracts Reduce Risk?

Brattle Observations from Sept 24th, 2014 CCAE Meeting:

- *This is an intuitive and widely held view, but it is largely false in regard to power cost risks over the next few years (and probably longer).*
  - *it ignores the increased exposure to spot, real time purchases when relying on renewable resources, which can be extremely pricey in ERCOT*

- *This view also confuses costs with value, and with how value is captured. Even though AE must pay for the fuel at a gas or coal plant, it only does so (i.e. burns the fuel) when that is cheaper than the spot value of power-- so the dispatch always reduces net cost and net volatility.*

- *There are also MUCH cheaper ways of reducing risk than diversifying into renewables, even if they did work as proponents assume. In particular, gas hedging is almost costless and feasible over 2-5 years with standard products, and longer if desired with customized ones.*

- *One sense in which this view is correct is in regard to very long term risks, such as running out of water or facing a high carbon price 5 or 10 years from now. Renewables can help avoid those particular risks and there may be no financial hedge. But if that is a goal, the potential savings should be quantified and compared to the excess net cost of renewables vs. conventional alternatives. That is, it should not be deemed to be a per se benefit to avoid those future risks, if they are not very large or very expensive.*

Can a renewable portfolio match a load pattern?

Brattle Observations from Sept 24th, 2014 CCAE Meeting:

- *Claims that a diverse renewable portfolio can match load patterns ignores hourly and shorter uncertainty, and they do not consider correlations in the variability of these renewable sources.*

- *For instance, PacifiCorp has a large wind fleet that spans a much larger and more diverse geographic area than AE's fleet, and it has had periods when essentially the entire fleet went on or off production as a whole. All of Great Britain has also experienced such synchrony of wind outages.*

Value of the Decker Plant in relation to solar

Brattle Observations from Sept 24th, 2014 CCAE Meeting:

- There are claims that Decker is running at low capacity factors, so purportedly it is not needed.
- *This ignores the capacity and perhaps transmission value of the plant.*
- *Assertions that Decker is dumping lots of pollution into the Austin area. This is not supported by any environmental studies which mostly show that ozone problems in the area are regional and not a result of Decker as a point source*
- *Solar output, and spot prices at the solar site and the AE load center, will show a variability and mismatch between output and value for renewables.*
- *Average calculations are a generalization that ignore location and type of solar facility*
- It was suggested that now is a good time to move fast on solar, because of expiring tax benefits and the CREZ lines will fill up; *this ignores the optionality benefit of waiting for solar costs or performance to improve further.*