



2016 Resource Plan Update Austin Energy Utility Oversight Committee

January 30, 2017

Agenda



- Resource Planning Process
- Planning Inputs
- Scenarios to be Evaluated
- Progress to date
- Next 150 MWs of Solar
- Next Steps



Why do Resource Planning?

- To support the Austin Energy Strategic Plan
- To meet the objectives of the (ACPP) Austin Climate Protection Plan – net zero carbon emissions by 2050 (among other goals)
- To manage cost and risk of energy to our customers– Affordability goals and rate volatility
- Manage customer load with behind the meter programs such as rooftop solar, energy efficiency, demand response and Storage
- Other complimentary strategies and objectives such as those related to low income customers

What Resource Planning is not?
A way to supply power to our customers



Resource Planning at Austin Energy

- A process that includes a measured system of choices and milestones over time

Set general direction by policy consistent with Austin Climate Protection Plan (ACPP) – City Council with advice from Austin Energy and stakeholders

Establish future path and milestones through Generation Plan to support ACPP

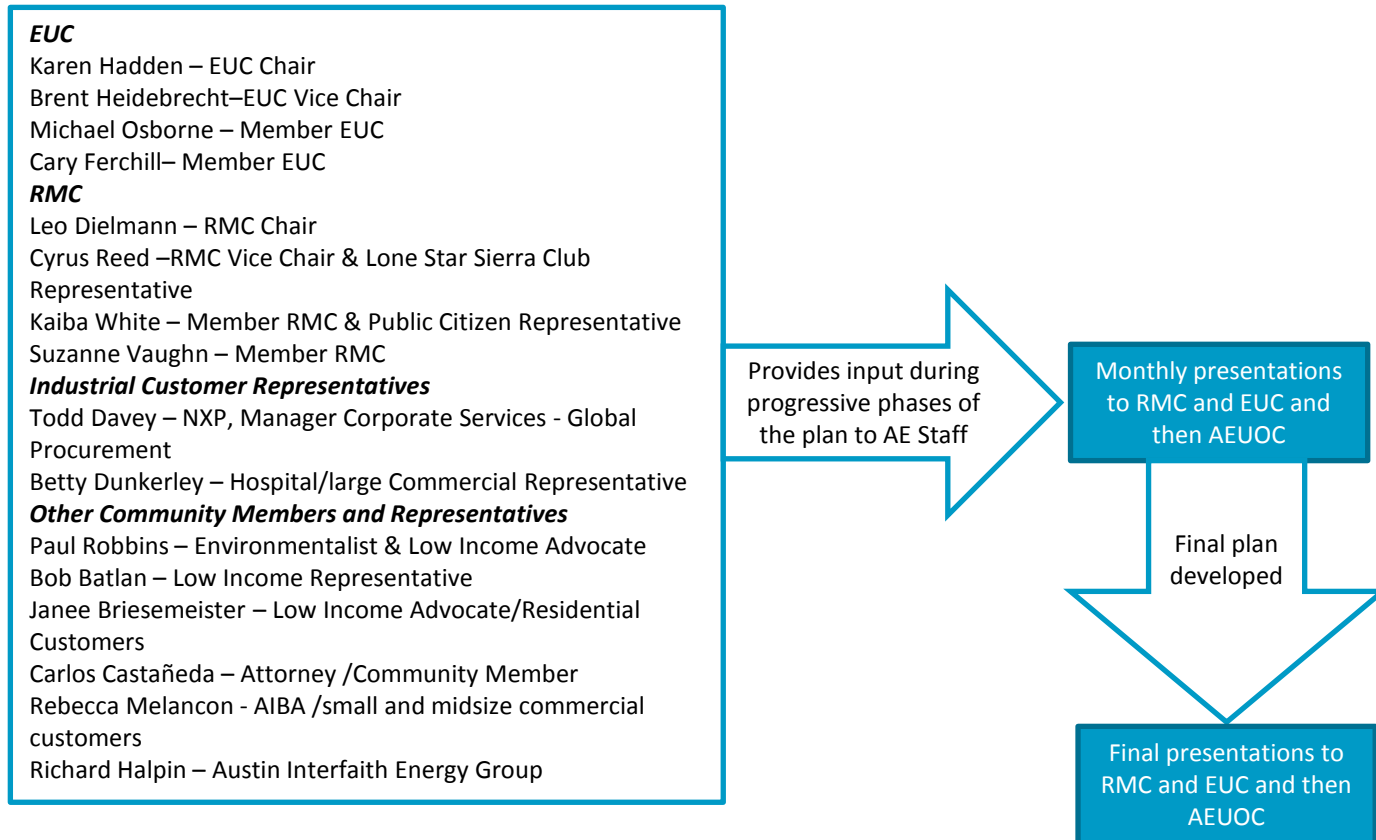
Pursue Generation Plan through budget, capital improvement plan, and financial strategies

Implement decisions through request for Council actions after competitive purchasing processes

2-year updates to Resource Plan – allows for change in direction due to new inputs, market & regulatory forces, and stakeholder preferences

City Council will have numerous approval steps in implementing the approved resource plan

Resource Planning Stakeholder Group



Austin Energy Methodology

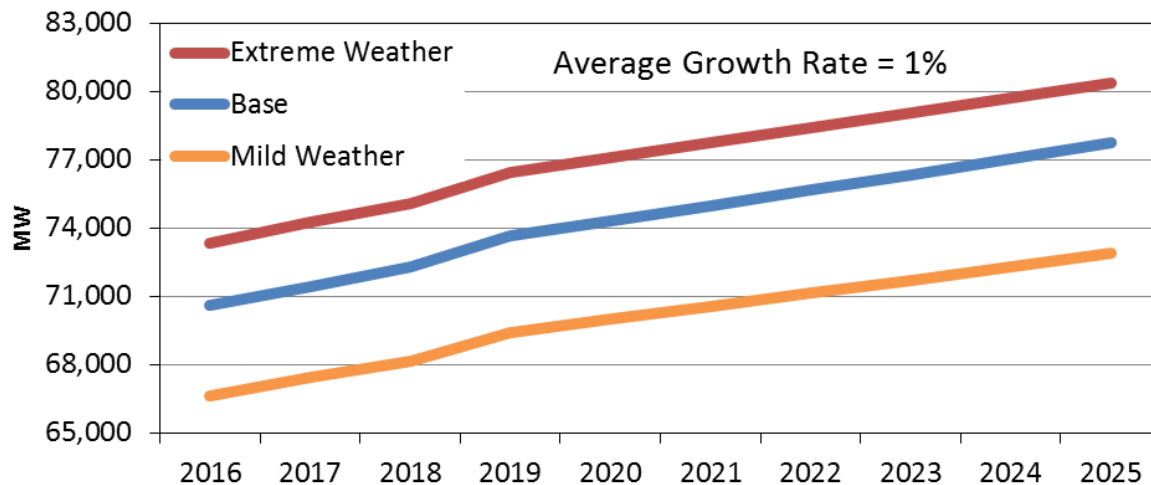


- AE uses integrated modeling tools to simulate market data, AE's load and generation assets, financial data along with emission modeling to assess resource plans
 - Uses UPLAN simulation modeling well suited to ERCOT's market design, risk analysis using Monte Carlo techniques as well as one-off scenarios
 - Inputs include: cost of gas, coal, nuclear, oil, carbon, cost of new build of various technologies, fixed and variable O&M for ERCOT generation
 - Calculates cost & revenues of ERCOT assets and pricing at each node – 6,600 data output points
 - Results modeled for rate impact and financial metrics
 - This approach in line with industry practices, Brattle endorsed AE methodology in 2015
 - Well trained highly experienced economists & engineers



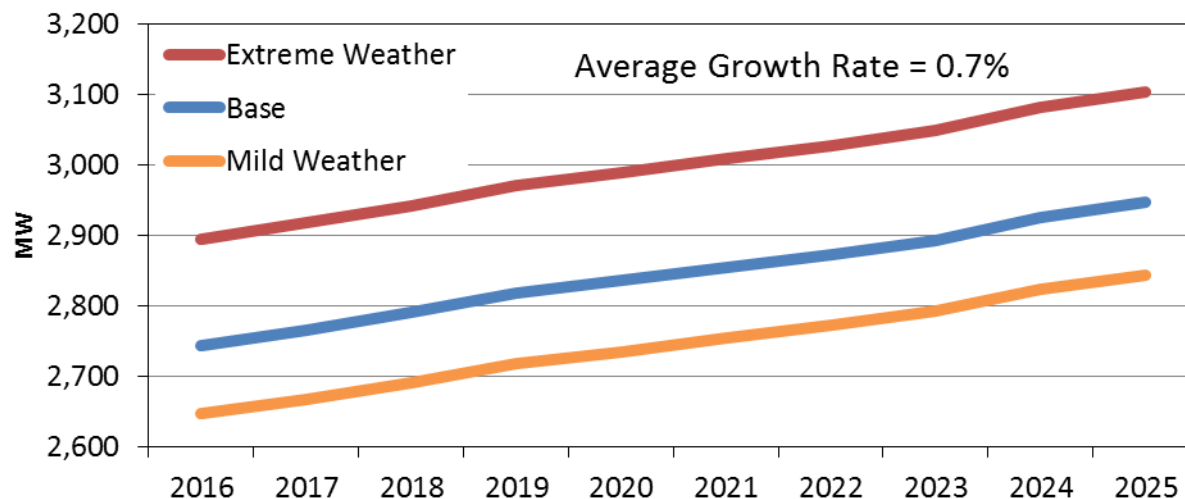
ERCOT vs. AE Peak Load Forecast

ERCOT Peak



Energy forecast follows similar trend with average growth rates of 1% for ERCOT and 0.7% for AE.

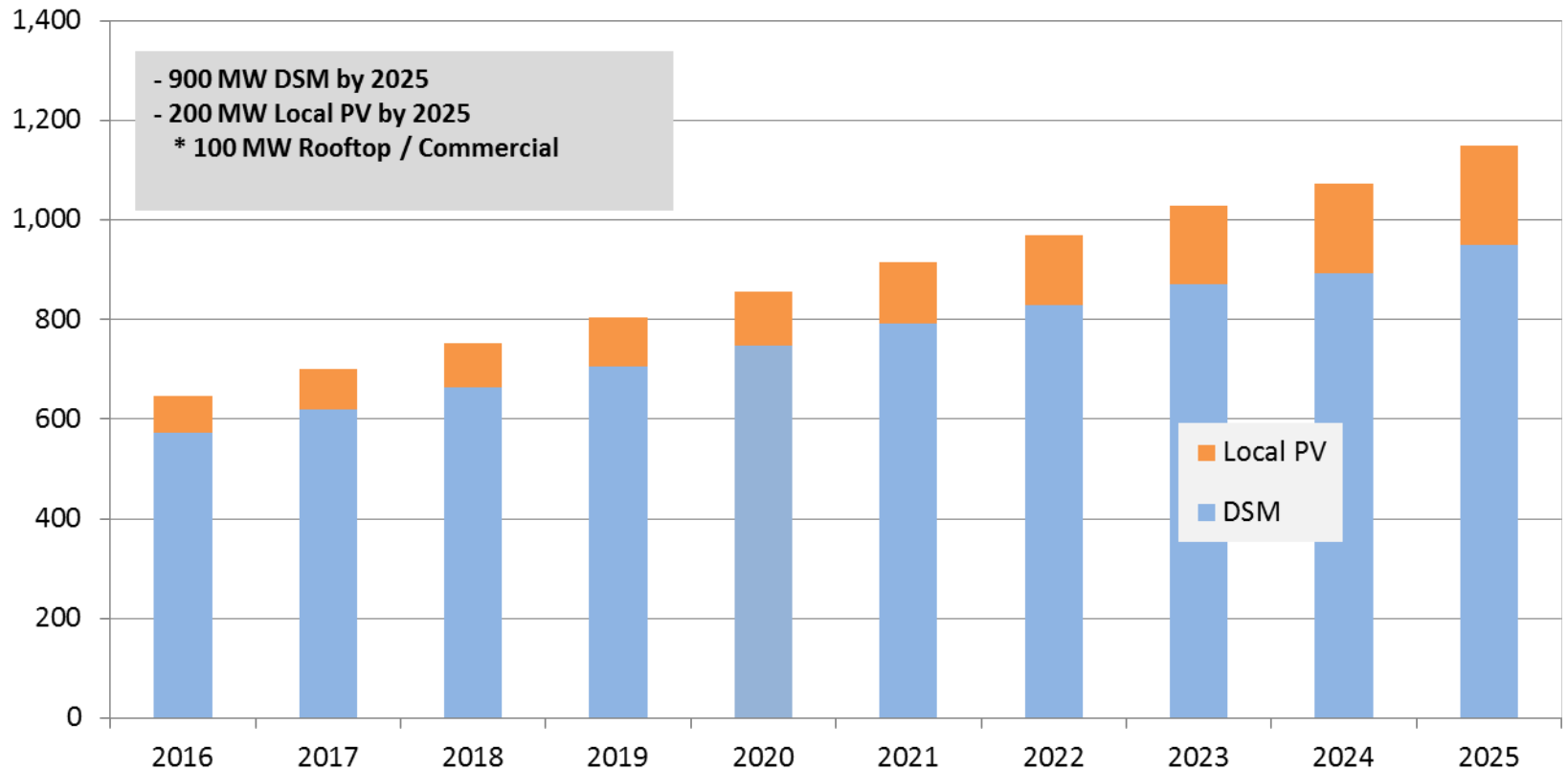
AE Peak



DSM & Local PV Forecast



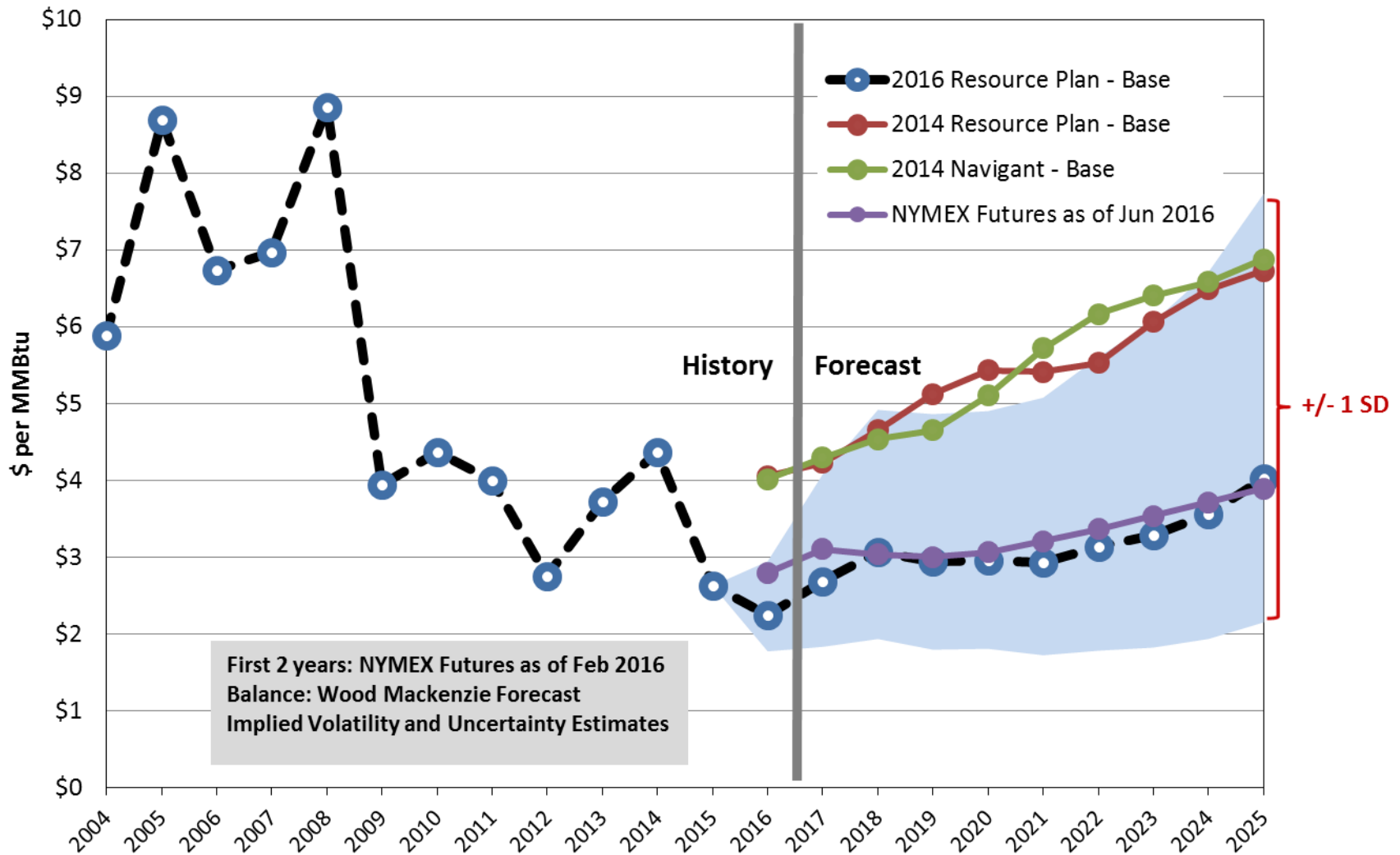
DSM and Local PV Goals



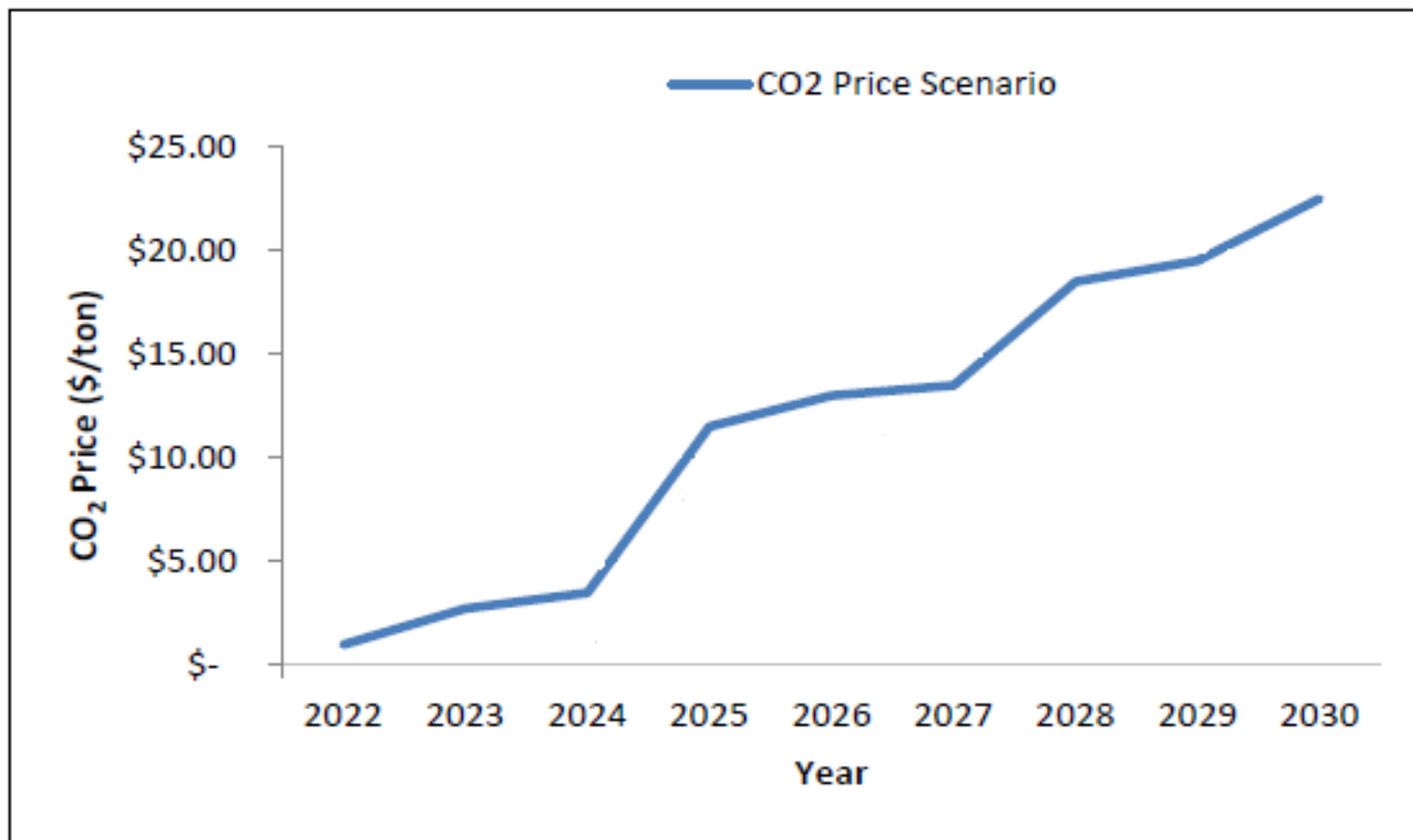
Gas Price Forecasts



2016 Resource Plan - Natural Gas Price Forecast Range



Environmental Assumptions – CO₂



- Source: ERCOT Analysis of The Impact of The Clean Power Plan



Financial and Economic Assumptions

■ Capital

- 30 year 100% debt financing
- 5% interest rate (near term: 5 years)
- 5.5% interest rate (beyond year 6)
- Applies to CIP for current plants as well

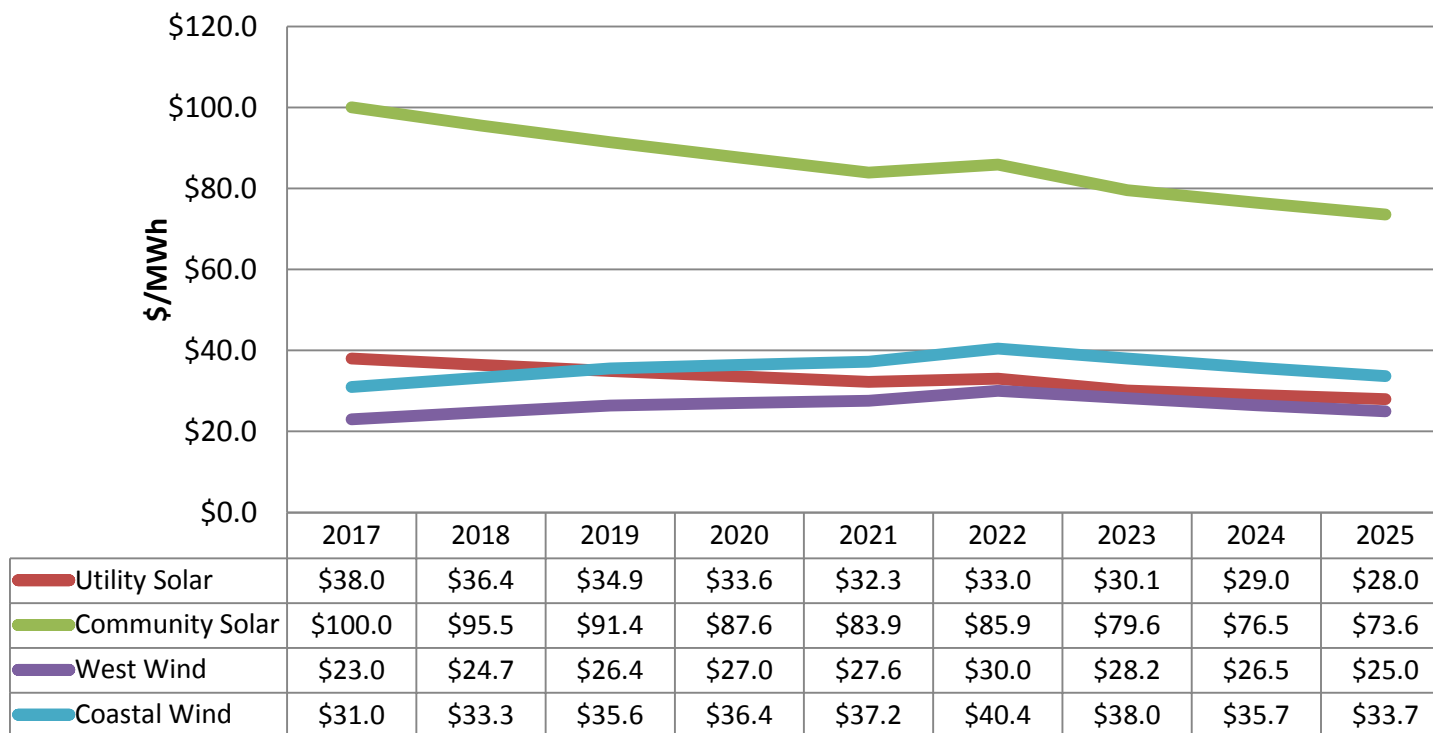
■ Economic parameters

- General inflation @ 2%
- Discount Rate @ 5% (i.e. AE Weighted Average Cost of Capital)

PPA/Levelized Cost Assumptions



PPA/Levelized Cost Assumptions



Commence Construction	2017	2018	2019	2020	2021	2022	2023	2024	2025
Solar ITC	30%	30%	30%	26%	22%	10%	0%	0%	0%
Wind ITC/PTC	24%/80%	18%/60%	12%/40%	0%	0%	0%	0%	0%	0%

For Solar assumed PPA through 2022 and ownership afterwards due to PTC/ITC expiration



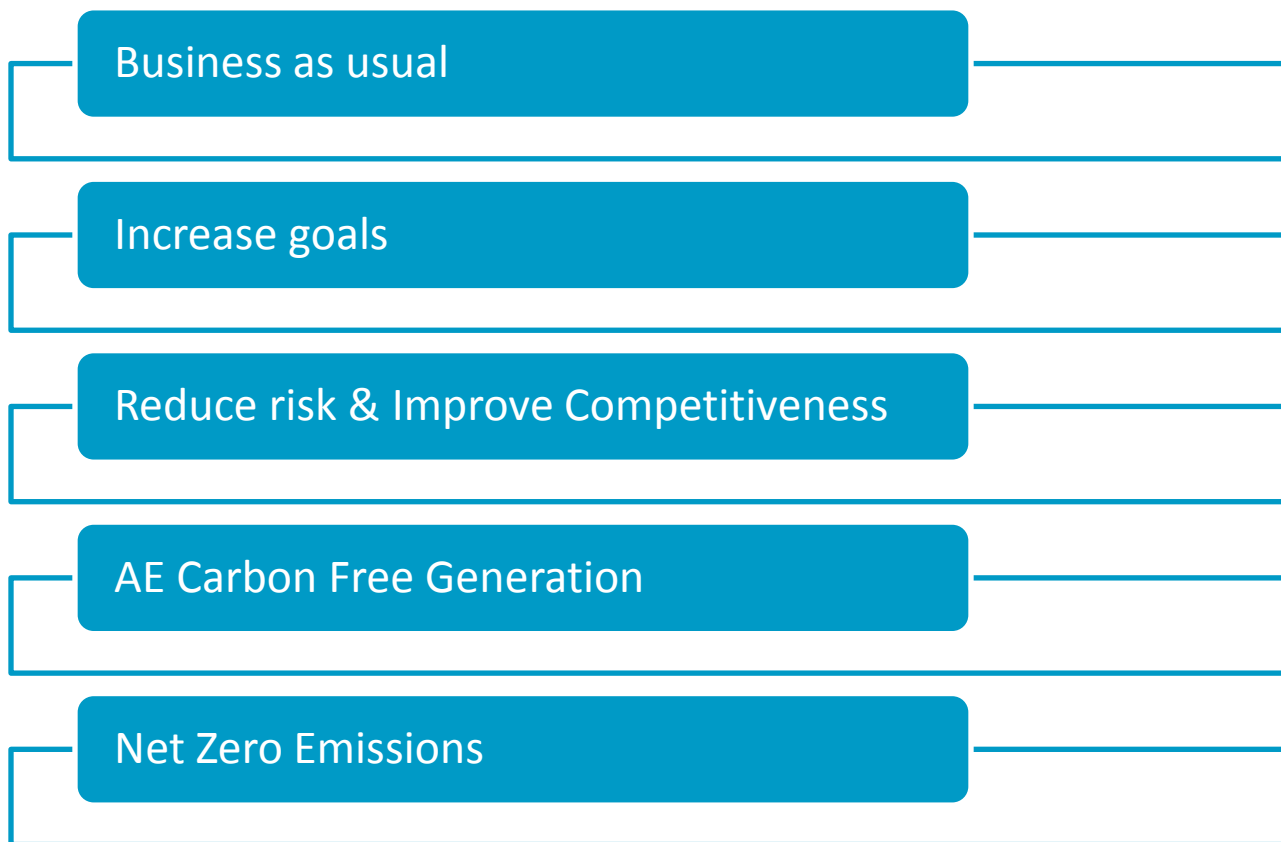
Scenarios & Sensitivities

- Scenarios cover a wide range of values for key uncertainties
- Planning horizon covers from 2018 to 2027 with end effects considered
- Assume PPA for future resources as long as it is more economical than ownership on a levelized cost basis
- 5 broad strategies:
 - 1) Business as usual
 - 2) Increase Goals
 - 3) Reduce risk and improve competitiveness through local generation
 - 4) AE Carbon Free Generation by 2030
 - 5) Net Zero Emissions by 2030
- In total:
 - 22 scenarios including variations
 - Sensitivities to ERCOT-wide market conditions:
 - Carbon cost
 - Natural gas cost
 - Demand level
- The top plans are further studied for high solar penetration & high ancillary services requirements or to optimize added resources



Strategies & Scenarios

Five broad Strategies with different themes



Scenarios Descriptions



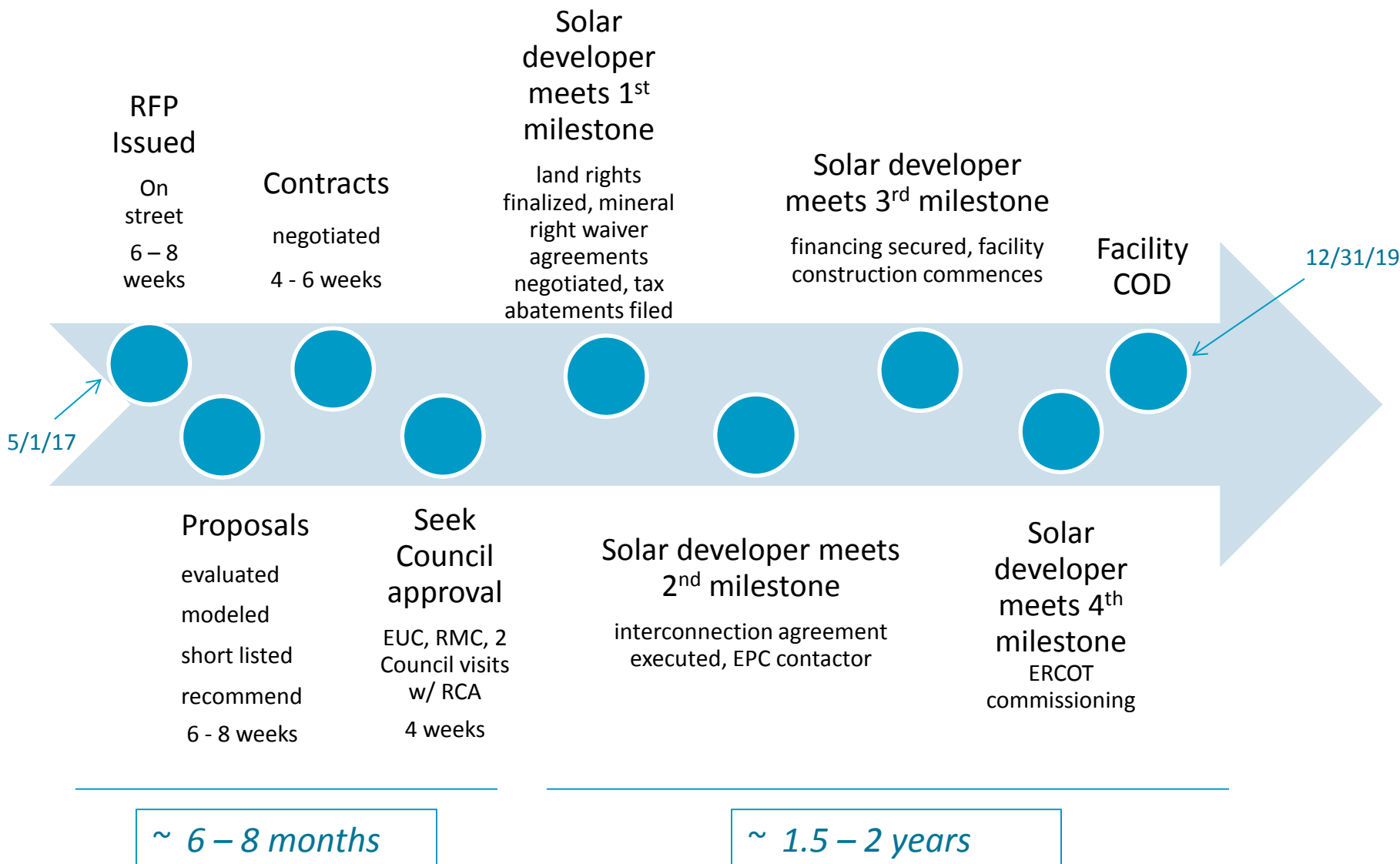
		Strategies				
		Business As Usual	Increase Goals	Reduce risk & Improve Competitiveness	AE Carbon Free Generation by 2030	Net Zero Emissions by 2030
Attributes of Scenarios	No New Commitments	Yes				
	Current Goals (55% Renewables, 950 MW Solar, 900 MW DSM, Reduce/Retire FPP, 10 MW Battery Storage)	Yes	Yes	Yes	Yes	Yes
	Renewable credits	To meet Goals				100%
	Additional 100 MW Local Solar		Yes			
	Additional renewable goal		75%	65%		75%
	Additional DSM		100-300 MW			
	Battery at Decker		125 - 300 MW			
	Gas Turbines / Reciprocating Engines at Decker			300 MW		
	Combine Cycle at Decker			500 MW		
	Compressed Energy Storage		300 MW			
	Local distributed Storage		20 MW			
	Retirement of Gas Units	Decker	Decker	Decker	Sand Hill & Decker	Decker
Number of Scenarios		3	12	4	1	2



2014 Resource Plan (Progress to date)

- 55% renewables by 2025 (31%)
- 900 MW Demand Side Management by 2025 (576MW)
 - 700 MW energy efficiency by 2020
 - Demand Response 100 MW by 2020 and additional 100 MW by 2025 (54MW)
- 950 MW solar by 2025
 - 110 MW Local Solar by 2020 and additional 90 MW by 2025 if affordable (74MW)
 - 750 MW Utility Scale Solar by 2025 (157.5MW Operational/450 under contract)
- CO2 emissions
 - 20% reduction from 2005 levels by 2020 (Meeting)
 - Retirement of Fayette Coal Plant beginning in 2023 (in progress)
- Affordability
 - 2% limit per year (meet)
 - Rates should be in the lower 50th percentile statewide (slightly above trending lower)
- 10 MW (lithium ion batteries) local storage by 2025 + 20 MW of thermal storage (17MWt/3 MWe in progress)
- Retire Decker steam units by 2019 and replace with 500 MW efficient combined-cycle (pending) – subject to a third party study (complete)

Timeline for 150MW of Solar



Maintain ability to defer COD should it result in better contract pricing



Next Steps:

- Work on the scenario's and present preliminary recommendations to the EUC Resource Planning Working group in February 2017
- Establish future path and milestones through Generation Plan to support ACP
- Present the 2016 Resource Plan update to Council in March/April 2017