

Investing in a Clean Future

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

*Council Committee on Austin Energy
December 4, 2014*



2014 Resource Plan Update

Khalil Shalabi, Vice President, Resource Planning and Energy Market Operations



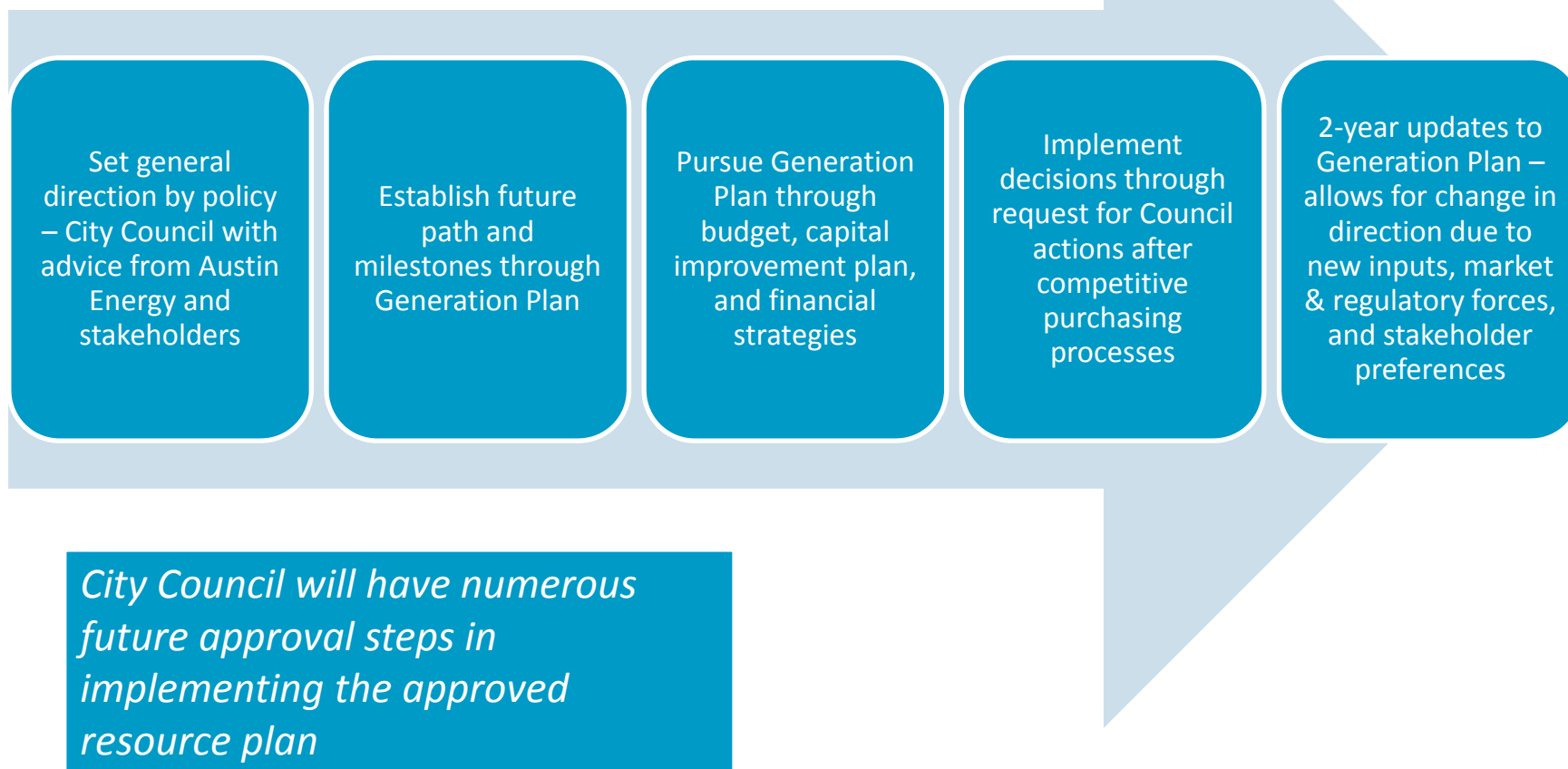
Highlights

- A process for looking into the future
- Progress to date
- Observations and drivers for planning results
- Additional scenarios to the 500+ plan
- Economic and affordability results
- Conclusions
- Impact of an additional 100MW local solar
- Recommendation
- Leadership amongst peers
- Appendix



Generation Plan Process – Looking Forward

- A measured system of choices and milestones over time





Progress to date

- AE starts stakeholder process in February to gather input to update the 2010 resource plan to be issued in September
- Council forms and appoints members to the Generation Task Force (GTF) in April
- GTF issues report in June
- Resolutions 20140828-157 and 20140828-158 issued by Council in August
- AE presents affordability analysis for resolution 157 in September
- AE presents results of resource plan in October and recommends 500+ plan
- AE works with stakeholders on variations to the 500+ plan



Observations and Drivers for Resource Plan Results

- Affordability is dependent on keeping existing generation in service or replacing with new efficient gas generation. Both cost and risk improve with the efficiency and size of the replacement unit(s).
 - Location matters, the closer generation is to the Austin load zone the better
- A significant amount of renewable energy can be added economically with a marginal improvement to cost and risk if a gas fleet is maintained. This is not the case, however, if renewables are added and the gas fleet is retired without replacement. In this case, both cost and risk are increased.
 - The optimal amount of renewable energy for Austin Energy is around 50% of its load obligations; greater amounts result in diminishing returns
- Overall CO₂ emissions are not affected by changes to Austin Energy's gas fleet. The retirement or 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 larger ERCOT market (i.e. ~4 percent).



Austin Energy 500+ Plan:

- Acquire 500 MW of solar, a 250% increase
- Add 375 MW of wind to achieve 50% renewables by 2025
- Reduce FPP output beginning in 2020, retire FPP in 2025
- Retire existing Decker steam plants by 2019
- Add 500 MW of highly efficient gas generation at Decker site
- Do not expand Sand Hill combined cycle unit
- Add grid-scale storage as technology and prices improve



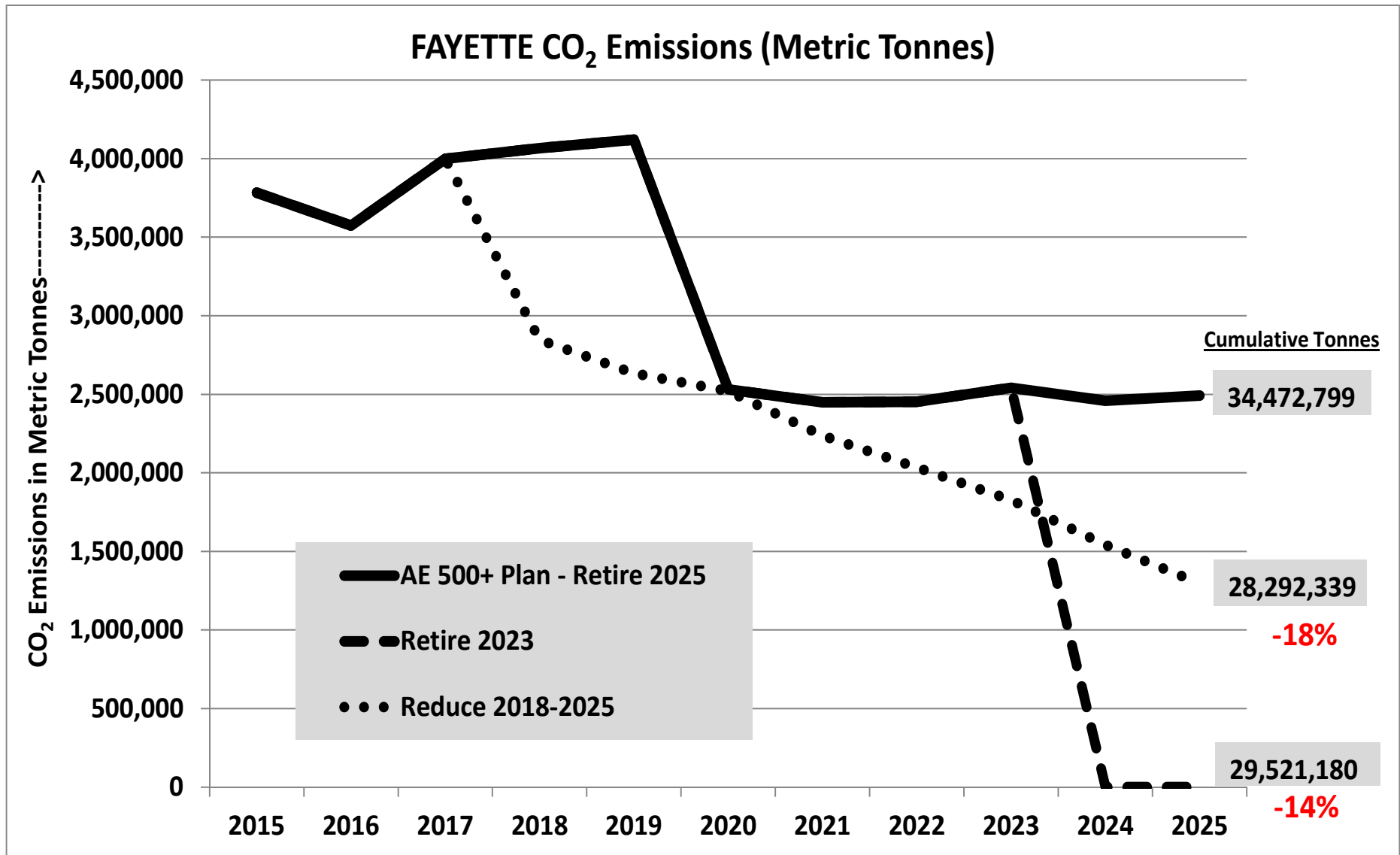
Variations to Austin Energy 500+ Plan:

- 500+ 55% + 10 Li + FPP 2022 + 100 DR + (100/200 local):
 - Increase to 55% renewables by 2025
 - ✓ Additional 100 MW of West Texas Solar
 - ✓ Additional 75 MW of Wind
 - 10 MW (Lithium Ion batteries) of local storage by 2025 + 20MW of thermal storage
 - Retire FPP starting in 2022
 - 100 MW of new demand response by 2025
 - ✓ Approximately 20 MW per year beginning in 2021
 - Local Solar sensitivities with 100 MW vs. 200 MW

- 500+ 55% + 10 Li + FPP Ramp + 100 DR + (100/200 local):
 - Same as above, except gradual ramp down of FPP beginning in 2018 (8% to 10% per year) then retired by 2025

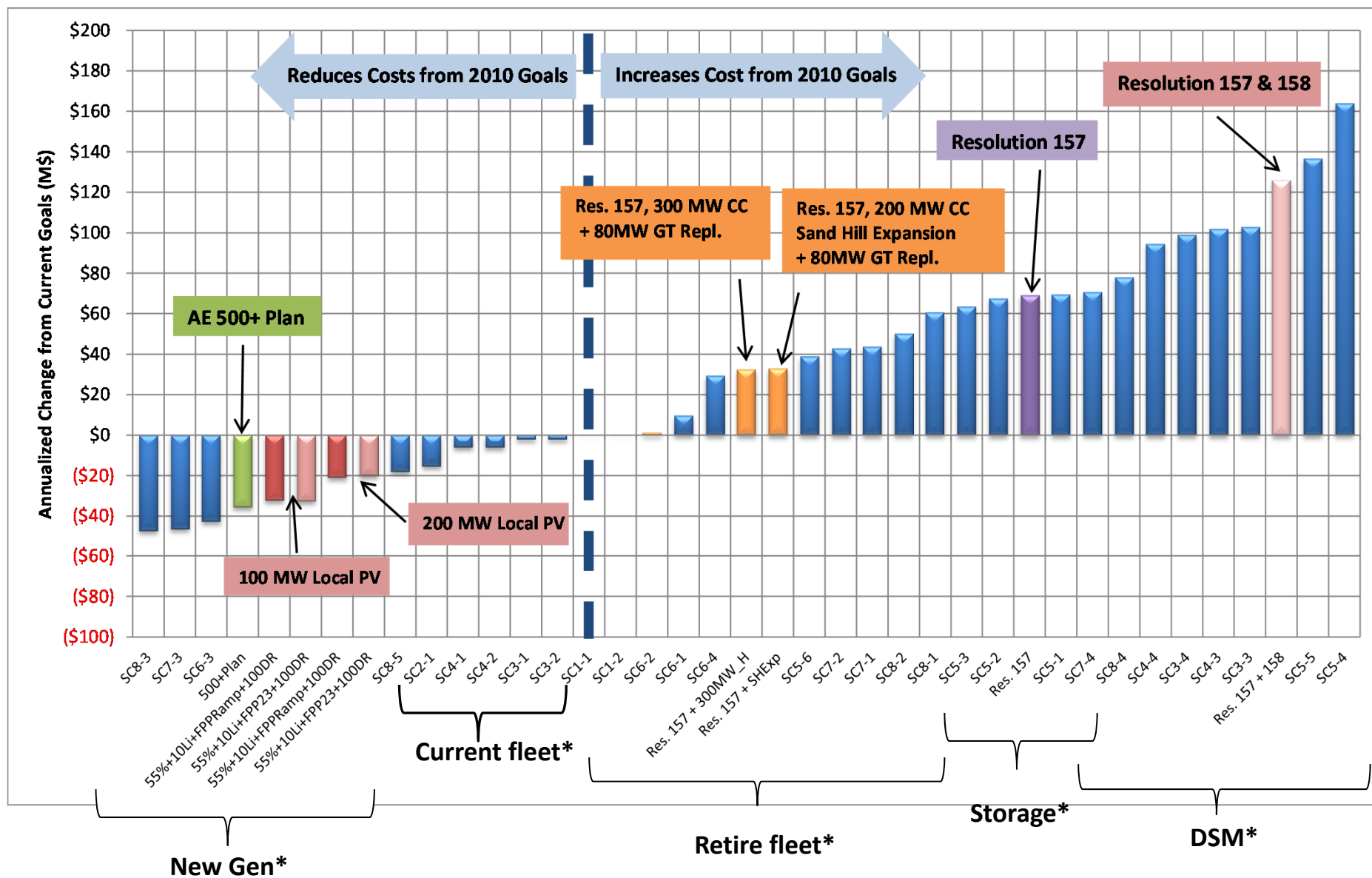
FPP Emissions Reduction Scenarios

Retire in 2023 vs Gradual Ramp Down





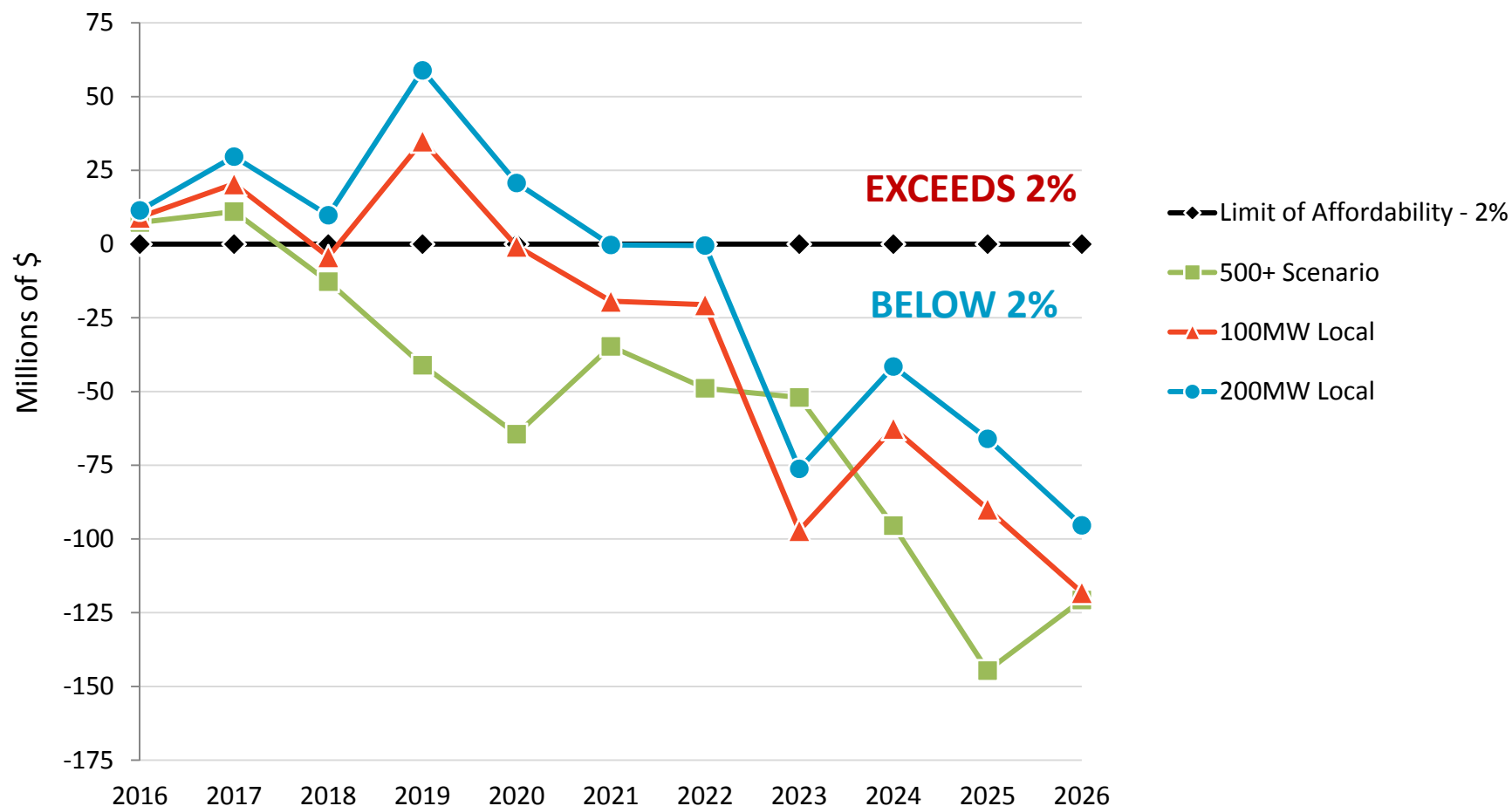
Yearly Change from 2010 Goals in \$Millions per year



* - Major drivers

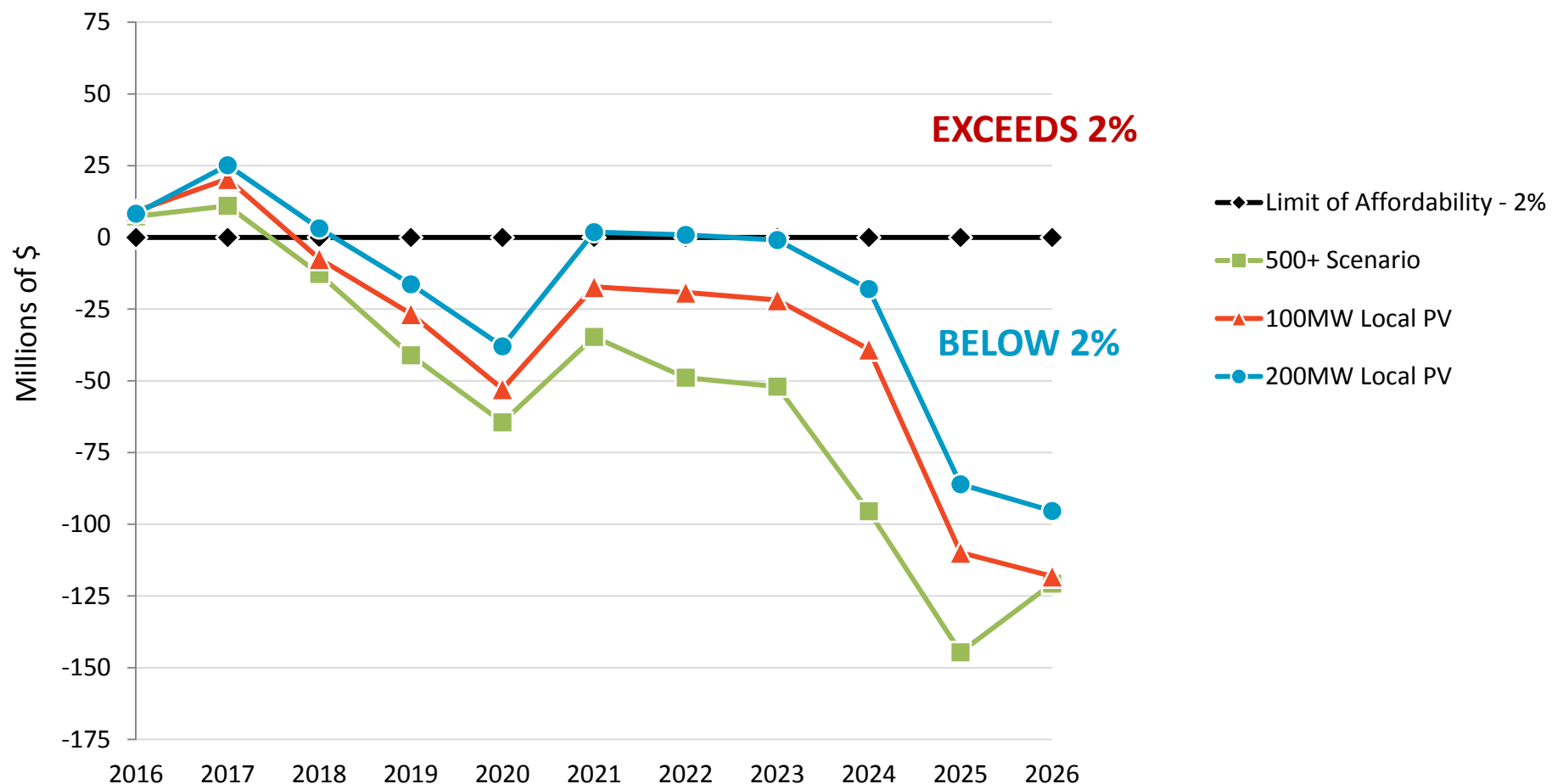


Austin Energy 500+ 55% + 10 Li + FPP 2022 + 100 DR + (100/200 local): Affordability Chart





Austin Energy 500+55% + 10 Li + FPP Ramp + 100 DR + (100/200 local): Affordability Chart





Conclusions from variations on 500+ plan

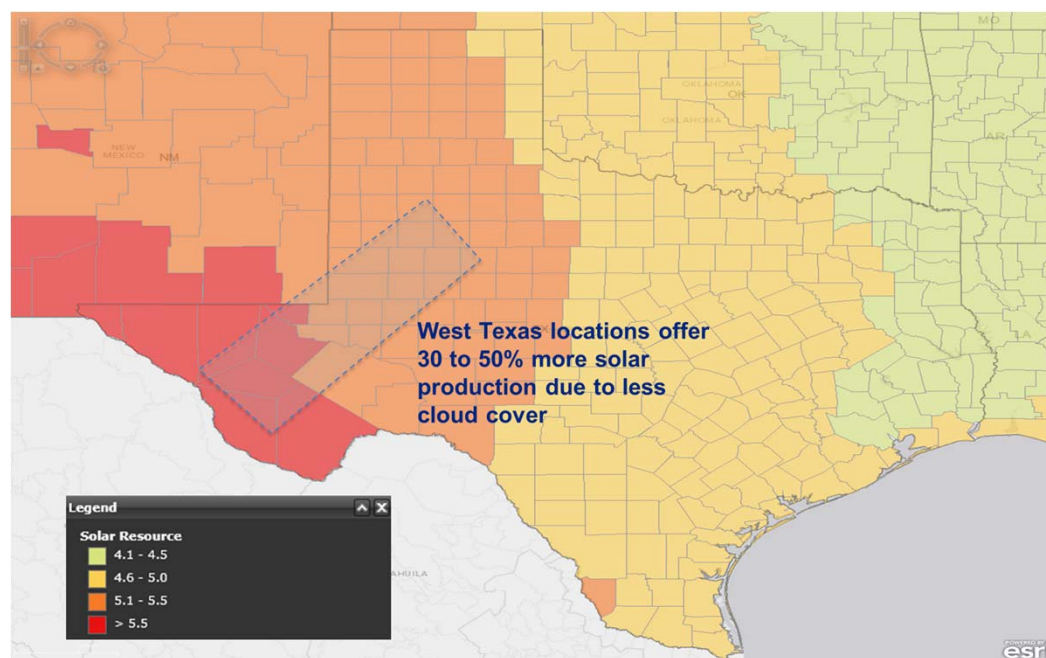
- 500 + Plan:
 - Early bumps in 2016/2017 due to capital on new plant and decker retirement
 - New plant revenues start in 2018 driving rates down through 2020
 - FPP retirement account drives rates up in 2020 but still affordable due to 500 CC revenues
 - Capital on new utility solar in 2019/2022/2025
 - Loss of FPP revenues are seen in 2025 but rates still stable due to 500 CC
- Early 2022 FPP Retirement
 - Earlier FPP collection and additional wind/solar for 55% drives rates up in 2019 above affordability
 - Incremental DR felt in 2021
 - Loss of FPP revenues comes earlier in 2023
 - Increased 100MWs of local solar keeps rates above affordability for the next few years
- Gradual FPP Retirement
 - Similar dynamics as above but maintains affordability



Cost of Local Solar versus Utility Scale Solar

- While distributed solar can reduce transmission costs and provide local economic development benefits, the cost per kW, and per kWh, is significantly higher than utility-scale solar
 - Utility-scale solar is less expensive due to economies of scale, and ability to locate in areas with better solar resource, such as West Texas
 - Customer-sited solar has a higher installed cost, and receives substantial subsidies from Austin Energy ratepayers, along with Value of Solar payments

| | Rooftop Solar (residential) | Utility Scale (W. Texas) |
|-------------------|--|-----------------------------|
| Installed cost | \$3.00-\$4.25/W | \$1.75-\$2.25/W |
| Cost to utility | \$0.107/kWh | \$0.05/kWh |
| Additional rebate | \$1.10/W = ~3.5 cents/kWh over 25 yrs | - |





Recommendation

The plan adopts and acts immediately on:

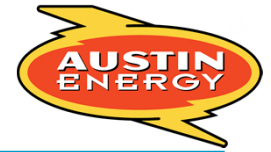
- Commencing a project to replace Decker steam units with a 500MW highly efficient gas plant contingent on an independent review and council approval
- Issuing an RFP for 600MW of utility scale solar to commence the process towards a generation portfolio consisting of 55% renewable energy.
- Maintaining the current goal of 800 MWs of EE and DR by 2020, and adding an incremental 100 MWs of DR to achieve a total of at least 900 MWs of DSM by 2024.
- Implementation plan for distribution connected local storage of at least 10 MWs complemented by as much as 20MWs of thermal storage.
- Create cash reserve fund for FPP retirement approved through the regular budgeting process and targeted to retire Austin's share of the plant beginning in 2022



Recommendation - Continued

- The Plan also recommends the following contingent upon further study, technological development, progress towards goals and rate adjustments or restructuring:
 - An additional 100MWs of DR or EE to increase the DSM achieved to 1000MWs by 2025
 - An additional 100MWs of local solar for a local solar portfolio of 200MWs contingent upon development of rate structure that maintains equity amongst customers
 - Issuing an RFI for 170 MWs large scale storage such as Compressed Air Energy Storage

Leadership



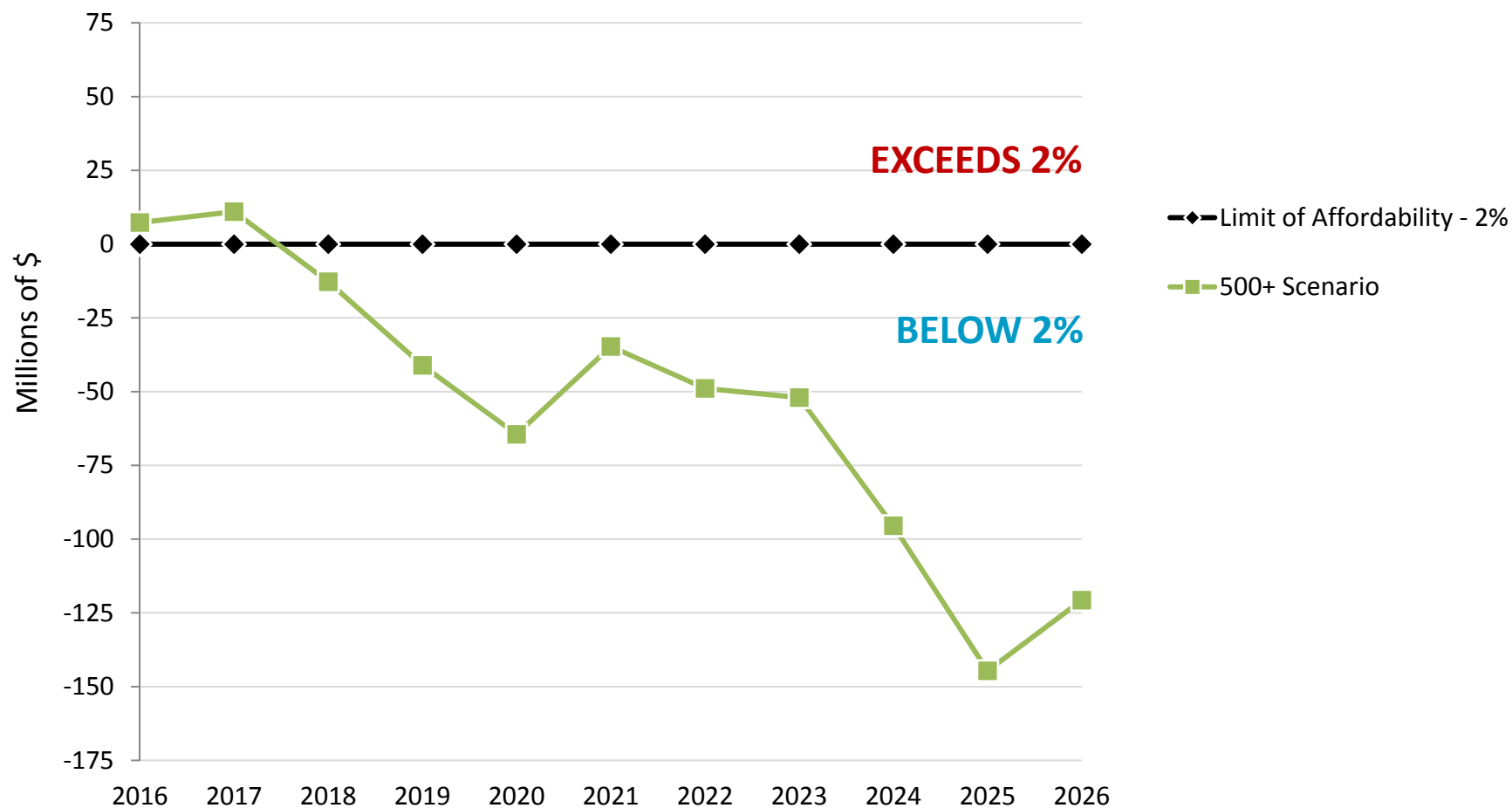
| Plan Attribute | 2020 Plan | 2025 Plan | Improvement | Leadership |
|----------------|-------------|--|---------------|--|
| % Renewable | 35% | 55% | 71% increase | Exceeds leading state goals (Hawaii 40%) and top European goals (Germany/Sweden 50%) |
| Solar | 200 MWs | 950 MWs | 375% increase | If Austin were a state it would rank second behind CA |
| Wind | 1200 | 1575 | 31% increase | Austin will have 14% share of Texas wind, 3.5x its load share |
| DSM | 800 | 900 | 12% increase | Covers 3 years of peak demand growth |
| Fossil Fuel | Fleet as is | Retire FPP coal & Decker gas, add 500MW gas CC | 36% decrease | Nearly 80% carbon free |
| Storage | NA | 30 MWs | NA | Nearly equal to ERCOT's current installed battery storage (34 MW) |

Appendix

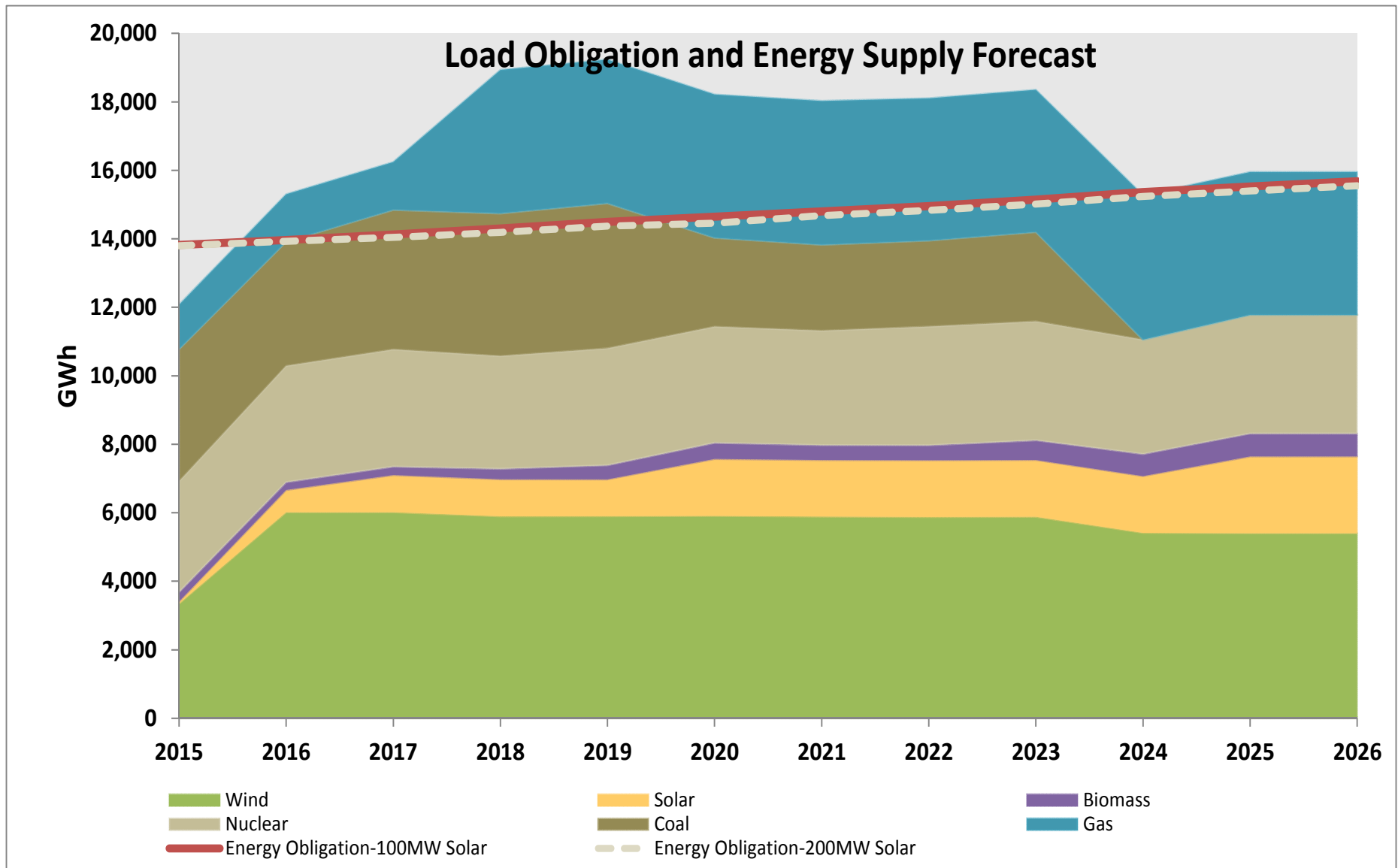




Austin Energy 500+ Scenario Affordability Chart



Energy Supply with 500+ 55% + 10 Li + FPP 2023 + 100 DR + 100/200 Local

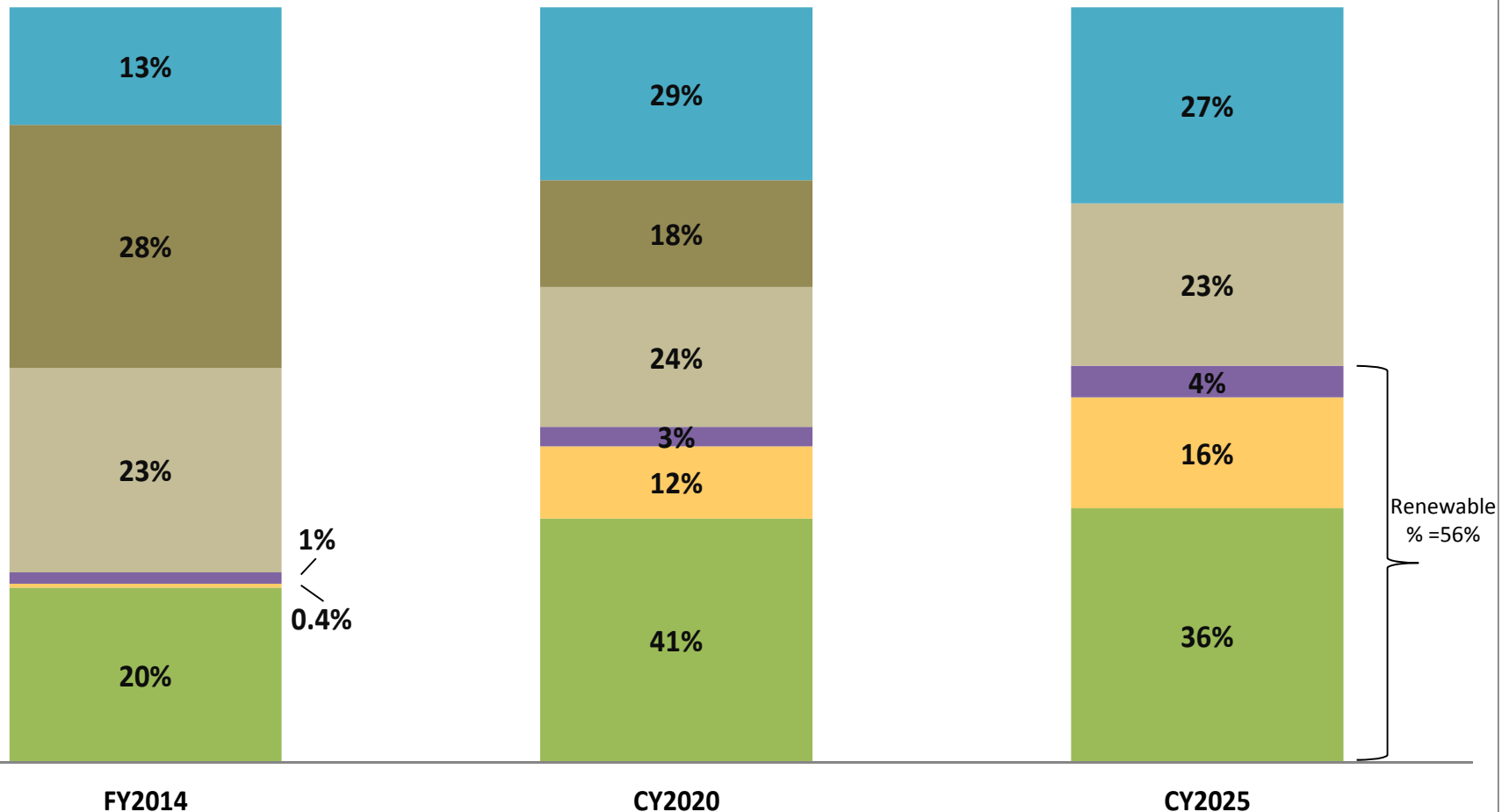


Energy Supply (% Mix) with 500+ 55% + 10 Li + FPP 2023 + 100 DR + 100 Local

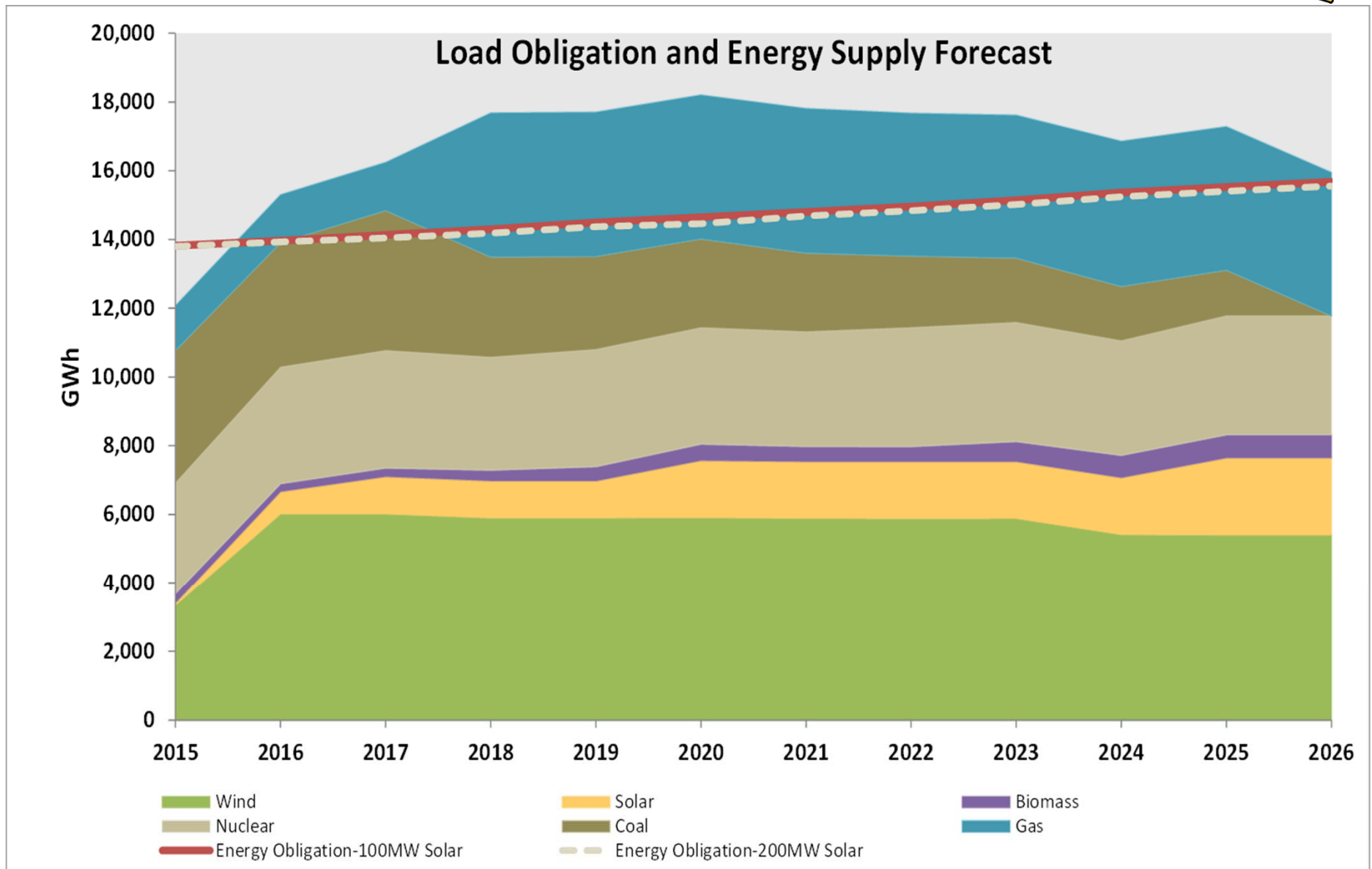


Generation Mix (% of load)

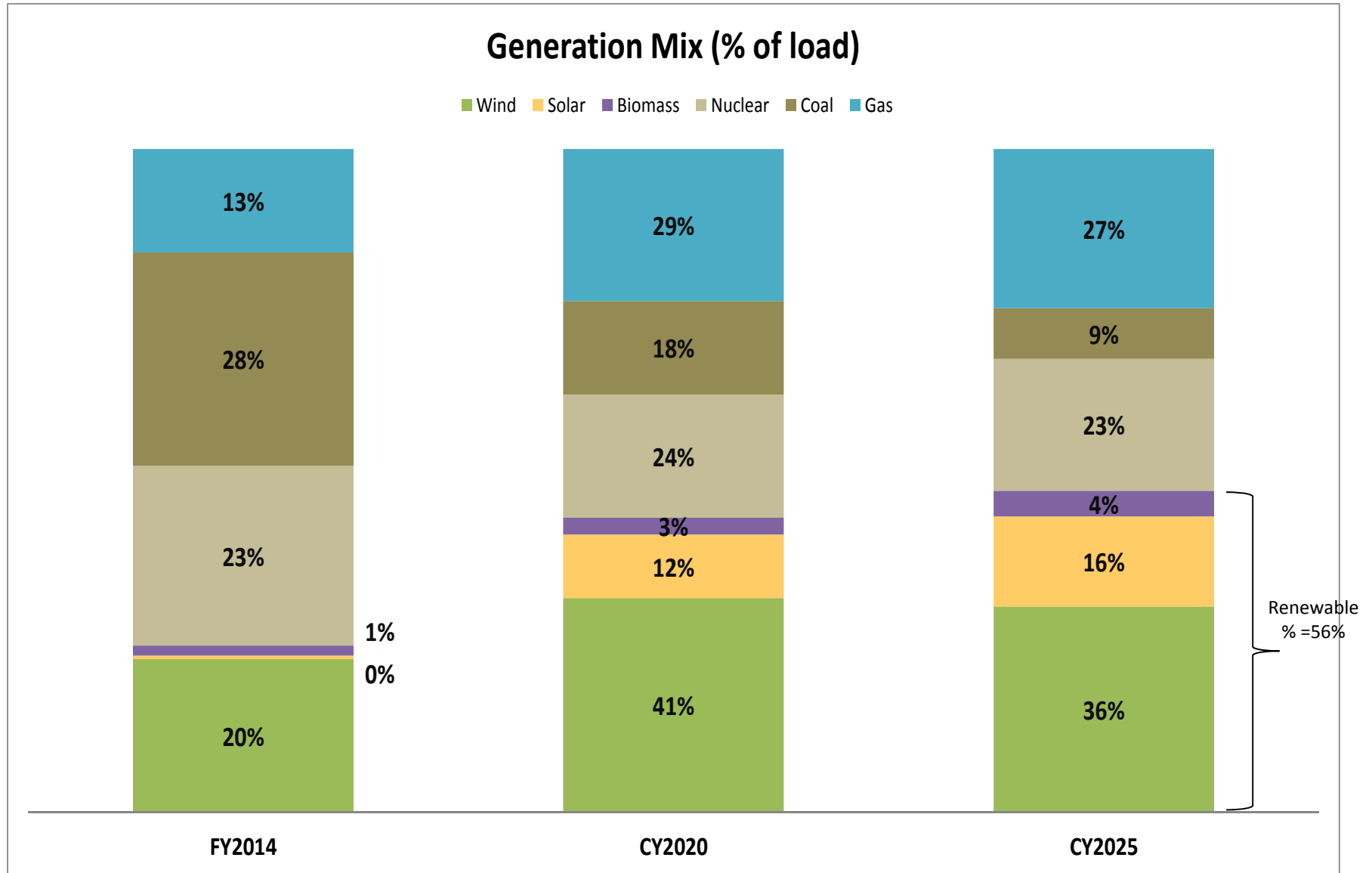
Wind Solar Biomass Nuclear Coal Gas



Energy Supply with 500+ 55% + 10 Li + FPP Ramp + 100 DR + 100/200 Local



Energy Supply (% Mix) with 500+ 55% + 10 Li + FPP Ramp + 100 DR + 100 Local





500+ 55% + 10 Li + FPP 2023 + 100 DR + 100 Local

| Year | Coal | Nuclear | Gas | Local Storage | Demand Response | Energy Efficiency | Biomass | Solar | Local Solar | Wind | % Renewables |
|------------------------|--------------------|------------|--------------------|---------------|------------------|-------------------|------------|------------------|-------------------|----------------------|--------------|
| 2015 | 602 | 436 | 1,497 | | | | 112 | | 58.5 ⁵ | 1041 | 28% |
| 2016 | | | | | | | | 200 ⁴ | 25.4 ⁶ | 754 ⁷ | 51% |
| 2017 | | | | 1 | | | | 150 | 5.4 ⁶ | (91.5) ⁸ | 54% |
| 2018 | | | | 1 | | | | | 5.4 ⁶ | (34.5) ⁸ | 53% |
| 2019 | | | (235) ³ | 1 | | | | | 5.4 ⁶ | | 53% |
| 2020 | (235) ¹ | | | 1 | 100 (cumulative) | 700 (cumulative) | | 200 ⁴ | | | 57% |
| 2021 | | | | 1 | 20 | | | | | | 56% |
| 2022 | | | | 1 | 20 | | | | | | 55% |
| 2023 | (367) ² | | | 1 | 20 | | | | | (165.6) ⁸ | 56% |
| 2024 | | | | 1 | 20 | | | | | | 52% |
| 2025 | | | | 2 | 20 | | | 200 ⁴ | | | 56% |
| Total Resources | 0 | 436 | 1262 | 10 | 200 | 700 | 112 | 750 | 100 | 1503 | |

Note:

- 1) Equivalent MW reduction of Fayette Coal Plant to achieve 20% below 2005 CO₂ levels
- 2) Retirement of Fayette Coal Plant at the end of 2023
- 3) Net of Retirement of Decker Steam Units and addition of 500 MW Combined Cycle
- 4) New utility scale solar additions
- 5) Net of existing and new local solar additions
- 6) Total local solar additions including community solar
- 7) Net of committed wind and new additional wind
- 8) Expirations of existing wind contracts



500+55% + 10 Li + FPP Ramp + 100 DR + 100 Local

| Year | Coal | Nuclear | Gas | Local Storage | Demand Response | Energy Efficiency | Biomass | Solar | Local Solar | Wind | % Renewables |
|------------------------|--------------------|------------|--------------------|---------------|---------------------|---------------------|------------|------------------|-------------------|----------------------|--------------|
| 2015 | 602 | 436 | 1,497 | | | | 112 | | 58.5 ⁵ | 1041 | 28% |
| 2016 | | | | | | | | 200 ⁴ | 25.4 ⁶ | 754 ⁷ | 51% |
| 2017 | | | | 1 | | | | 150 | 5.4 ⁶ | (91.5) ⁸ | 54% |
| 2018 | (54) ¹ | | | 1 | | | | | 5.4 ⁶ | (34.5) ⁸ | 53% |
| 2019 | (54) ¹ | | (235) ³ | 1 | | | | | 5.4 ⁶ | | 53% |
| 2020 | (54) ¹ | | | 1 | 100 (cumulative) | 700 (cumulative) | | 200 ⁴ | | | 57% |
| 2021 | (54) ¹ | | | 1 | 20 | | | | | | 56% |
| 2022 | (54) ¹ | | | 1 | 20 | | | | | | 55% |
| 2023 | (54) ¹ | | | 1 | 20 | | | | | (165.6) ⁸ | 56% |
| 2024 | (54) ¹ | | | 1 | 20 | | | | | | 52% |
| 2025 | (224) ² | | | 2 | 20 | | | 200 ⁴ | | | 56% |
| Total Resources | 0 | 436 | 1262 | 10 | 200 | 700 | 112 | 750 | 100 | 1503 | |

Note:

- 1) Equivalent MW reduction of FPP Coal Plant to achieve gradual reduction of CO₂ emissions each year to reduce overall CO₂ reduction
- 2) Retirement of Fayette Coal Plant at the end of 2025
- 3) Net of Retirement of Decker Steam Units and addition of 500 MW Combined Cycle
- 4) New utility scale solar additions
- 5) Net of existing and new local solar additions
- 6) Total local solar additions including community solar
- 7) Net of committed wind and new additional wind
- 8) Expirations of existing wind contracts



500+ 55% + 10 Li + FPP 2023 + 100 DR + 200 Local

| Year | Coal | Nuclear | Gas | Local Storage | Demand Response | Energy Efficiency | Biomass | Solar | Local Solar | Wind | % Renewables |
|------------------------|--------------------|------------|--------------------|---------------|------------------|-------------------|------------|------------------|-------------------|----------------------|--------------|
| 2015 | 602 | 436 | 1,497 | | | | 112 | | 64.6 ⁵ | 1041 | 28% |
| 2016 | | | | | | | | 200 ⁴ | 32.5 ⁶ | 754 ⁷ | 50% |
| 2017 | | | | 1 | | | | 150 | 32.5 ⁶ | (91.5) ⁸ | 53% |
| 2018 | | | | 1 | | | | | 22.5 ⁶ | (34.5) ⁸ | 52% |
| 2019 | | | (235) ³ | 1 | | | | | 7.5 ⁶ | | 52% |
| 2020 | (235) ¹ | | | 1 | 100 (cumulative) | 700 (cumulative) | | 200 ⁴ | 7.5 ⁶ | | 57% |
| 2021 | | | | 1 | 20 | | | | 6.5 ⁶ | | 55% |
| 2022 | | | | 1 | 20 | | | | 6.5 ⁶ | | 55% |
| 2023 | (367) ² | | | 1 | 20 | | | | 6.5 ⁶ | (165.6) ⁸ | 55% |
| 2024 | | | | 1 | 20 | | | | 6.5 ⁶ | | 52% |
| 2025 | | | | 2 | 20 | | | 200 ⁴ | 6.5 ⁶ | | 56% |
| Total Resources | 0 | 436 | 1262 | 10 | 200 | 700 | 112 | 750 | 200 | 1503 | |

Note:

1) Equivalent MW reduction of Fayette Coal Plant to achieve 20% below 2005 CO₂ levels

2) Retirement of Fayette Coal Plant at the end of 2023

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

4) New utility scale solar additions

5) Net of existing and new local solar additions

6) Total local solar additions including community solar

7) Net of committed wind and new additional wind

8) Expirations of existing wind contracts



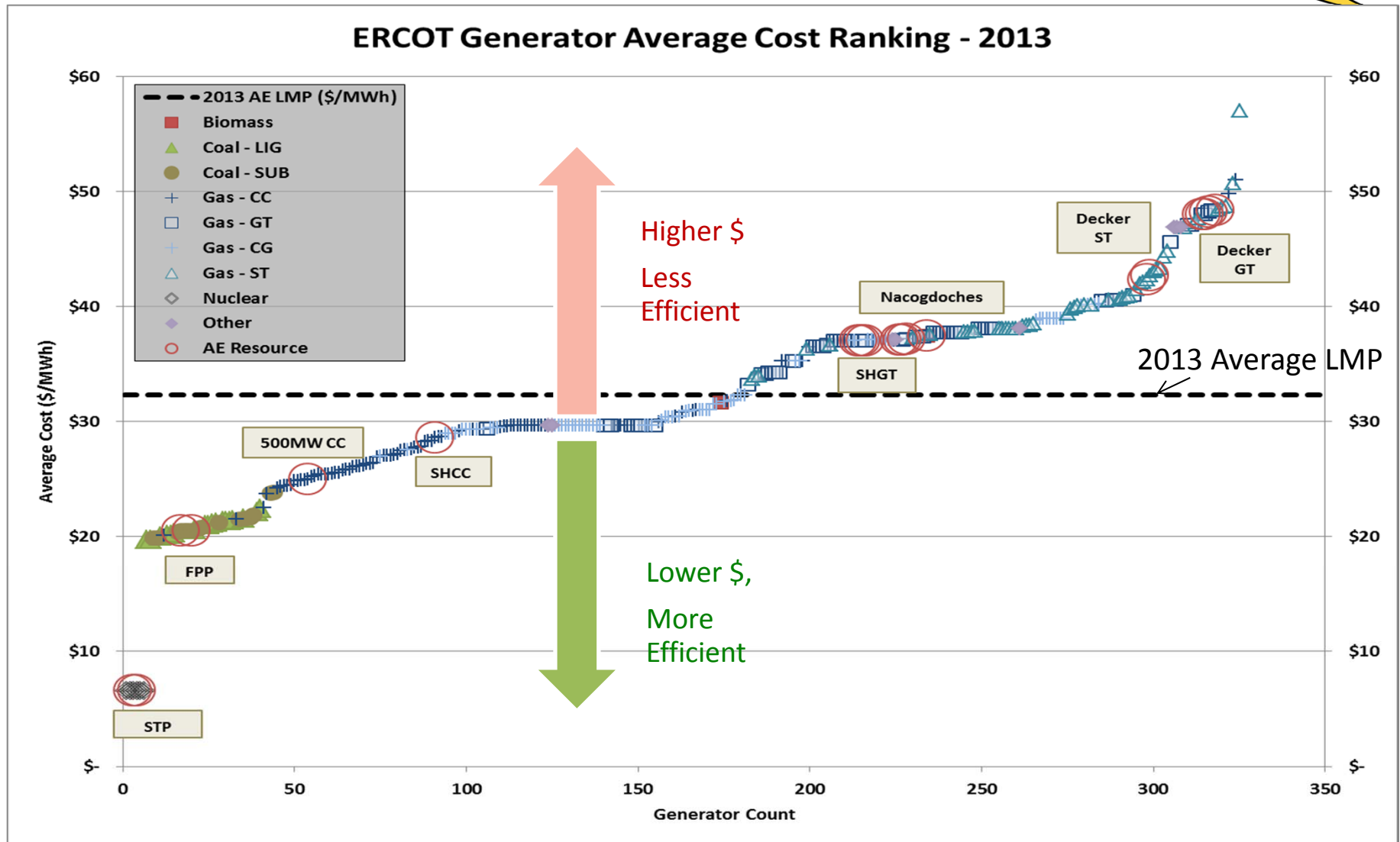
500+55% + 10 Li + FPP Ramp + 100 DR + 200 Local

| Year | Coal | Nuclear | Gas | Local Storage | Demand Response | Energy Efficiency | Biomass | Solar | Local Solar | Wind | % Renewables |
|------------------------|--------------------|------------|--------------------|---------------|---------------------|---------------------|------------|------------------|-------------------|----------------------|--------------|
| 2015 | 602 | 436 | 1,497 | | | | 112 | | 64.6 ⁵ | 1041 | 28% |
| 2016 | | | | | | | | 200 ⁴ | 32.5 ⁶ | 754 ⁷ | 50% |
| 2017 | | | | 1 | | | | 150 | 32.5 ⁶ | (91.5) ⁸ | 53% |
| 2018 | (54) ¹ | | | 1 | | | | | 22.5 ⁶ | (34.5) ⁸ | 52% |
| 2019 | (54) ¹ | | (235) ³ | 1 | | | | | 7.5 ⁶ | | 52% |
| 2020 | (54) ¹ | | | 1 | 100 (cumulative) | 700 (cumulative) | | 200 ⁴ | 7.5 ⁶ | | 57% |
| 2021 | (54) ¹ | | | 1 | 20 | | | | 6.5 ⁶ | | 55% |
| 2022 | (54) ¹ | | | 1 | 20 | | | | 6.5 ⁶ | | 55% |
| 2023 | (54) ¹ | | | 1 | 20 | | | | 6.5 ⁶ | (165.6) ⁸ | 55% |
| 2024 | (54) ¹ | | | 1 | 20 | | | | 6.5 ⁶ | | 52% |
| 2025 | (224) ² | | | 2 | 20 | | | 200 ⁴ | 6.5 ⁶ | | 56% |
| Total Resources | 0 | 436 | 1262 | 10 | 200 | 700 | 112 | 750 | 200 | 1503 | |

Note:

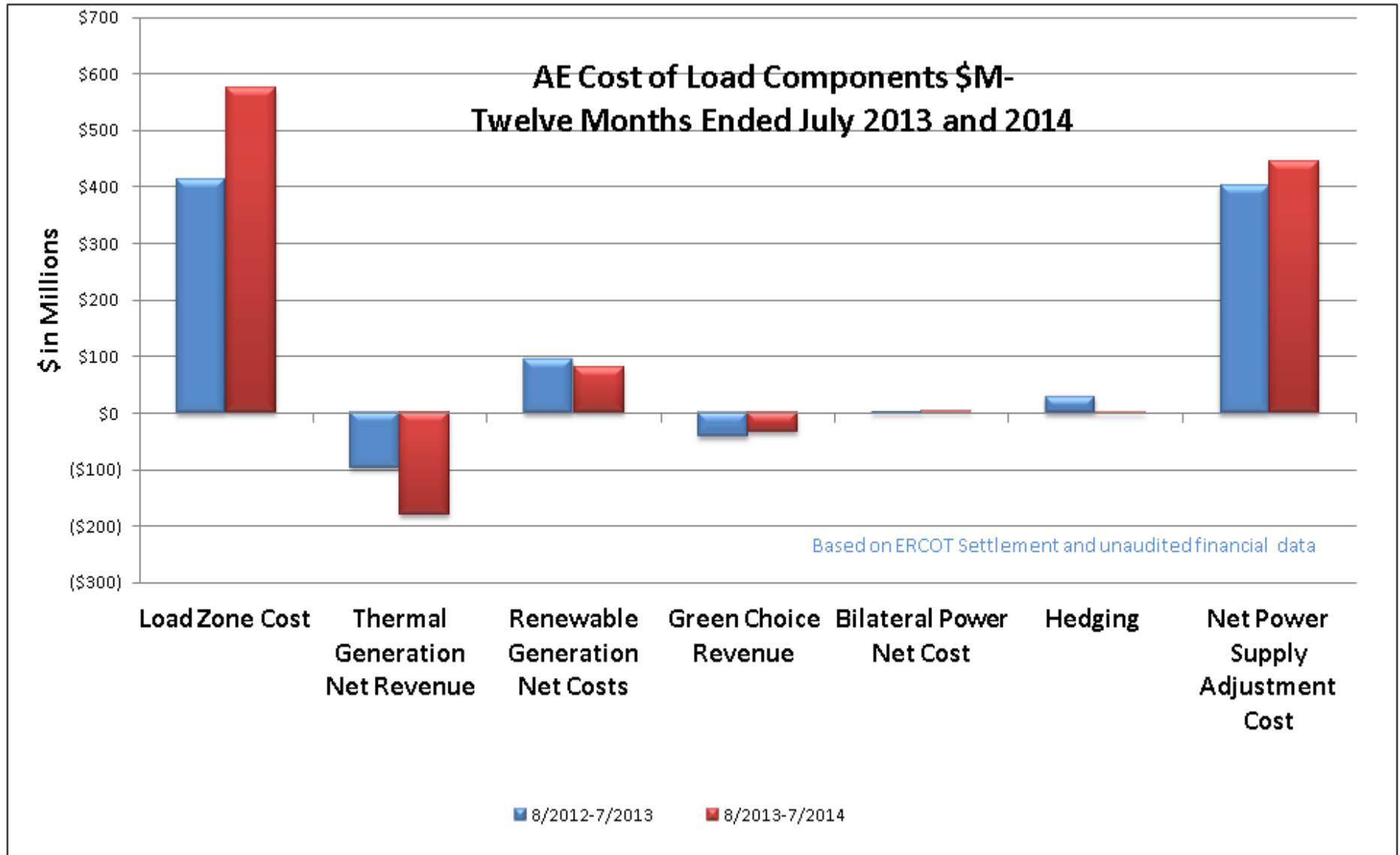
- 1) Equivalent MW reduction of FPP Coal Plant to achieve gradual reduction of CO₂ emissions each year to reduce overall CO₂ reduction
- 2) Retirement of Fayette Coal Plant at the end of 2025
- 3) Net of Retirement of Decker Steam Units and addition of 500 MW Combined Cycle
- 4) New utility scale solar additions
- 5) Net of existing and new local solar additions
- 6) Total local solar additions including community solar
- 7) Net of committed wind and new additional wind
- 8) Expirations of existing wind contracts

New Resources displace Higher Cost Gas Resources



- Having units in the most efficient position within ERCOT keeps energy prices low for AE customers

PSA COST COMPONENTS



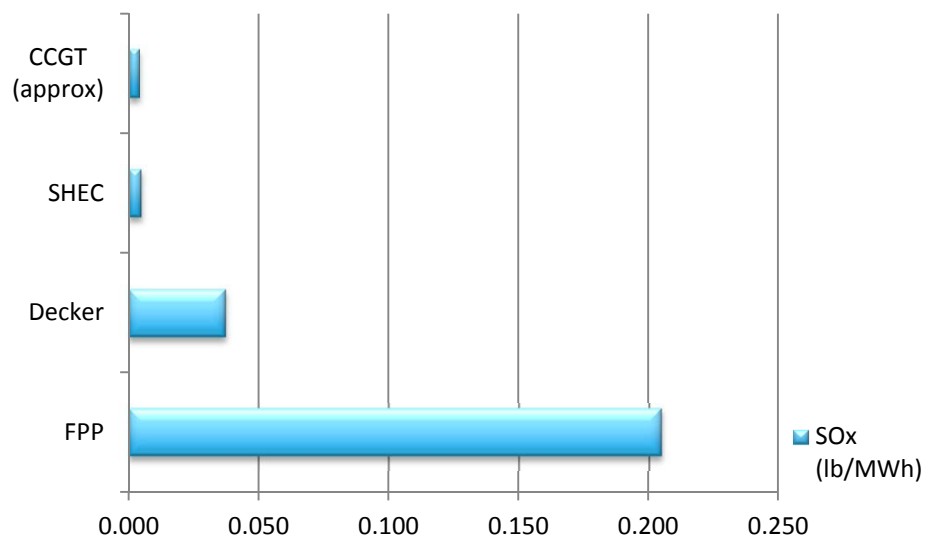


Comparing Emissions

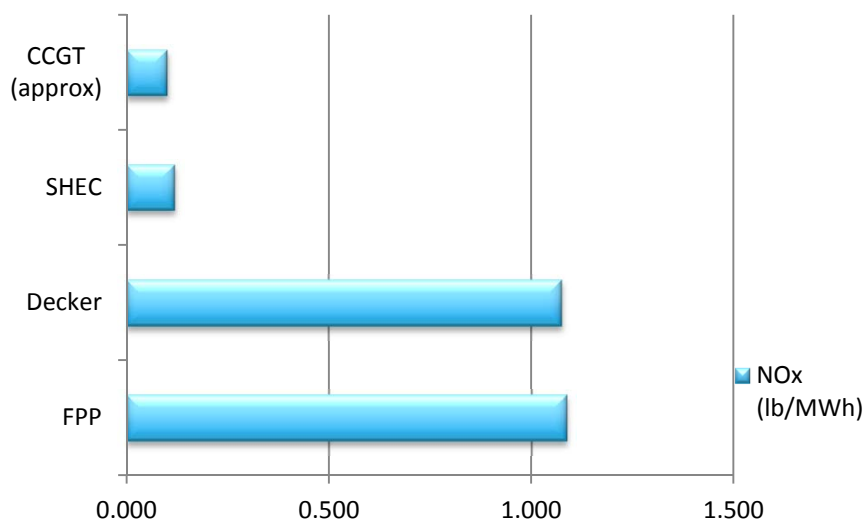
Migration to Latest Combined Cycle Technology results in (per MWhr):

- 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 NO_x compared to Decker, 93% to FPP
- >50% reduction in CO₂ over FPP

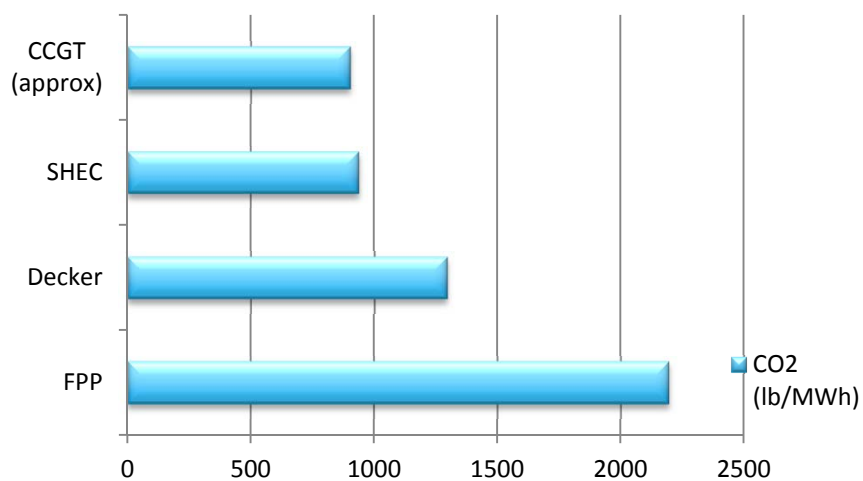
Sulfur Dioxide Emissions (lb/MWh)



Nitrous Oxides Emissions (lb/MWh)



Carbon Dioxide Emissions (lb/MWh)





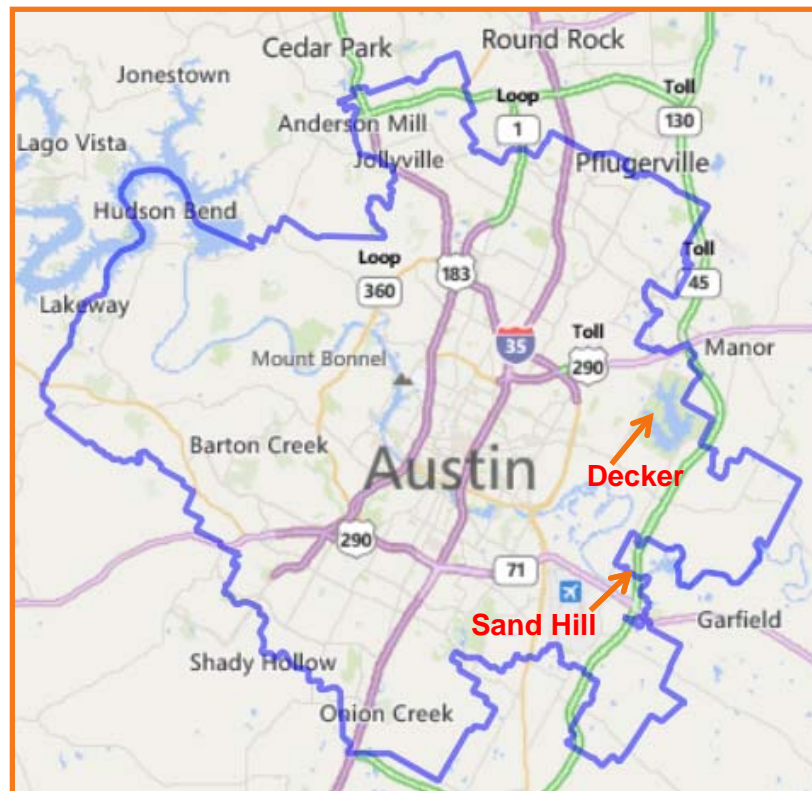
Why is Proximity to Austin Important?

- 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

Scenario Descriptions



| Scenario | Plan# | Long Description |
|---------------------------|-------|---|
| 1 - Current Strategy | SC1-1 | Current goals - 35% Renewable and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) |
| 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) |
| 2 - Do Nothing | SC2-1 | Current System and Commitments and 800 MW DSM by 2020 - 200 MW Solar (100 MW Local, 50 MW Rooftop) |
| 3 - Increase Ren/DSM | SC3-1 | Increase goal to 40% Renewable by 2020 |
| 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) |
| 3 - Increase Ren/DSM | SC3-3 | Increase goal to 40% Renewable by 2020 - Increase DSM Goal to 1,000 MW 2020 |
| 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) |
| 4 - Increase Ren/DSM More | SC4-1 | Increase goal to 50% Renewable by 2025 |
| 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) |
| 4 - Increase Ren/DSM More | SC4-3 | Increase goal to 50% Renewable by 2025 - Increase DSM Goal to 1,200 MW 2020 |
| 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) |

Scenario Descriptions Contd..



| Scenario | Plan# | Long Description |
|-----------------|--------------------|---|
| 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 |
| 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 |
| 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 |
| 5 - Carbon Free | Res. 157 | Carbon Free (Increase Goal to 65% Renewable by 2025) - 600 MW Utility Scale Solar by 2016 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire Decker Plant December 2017 - Retire FPP December 2025 - Retire Sand Hill Plant December 2030 - 200 MW Storage (50 MW Local Battery, 150 MW CAES) |
| 5 - LOW Carbon | Res. 157 + SHExp | Carbon Free (Increase Goal to 65% Renewable by 2025) - 600 MW Utility Scale Solar by 2016 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire Decker Plant December 2017 - Retire FPP December 2025 - Retire Sand Hill Plant December 2030 - 200 MW Storage (50 MW Local Battery, 150 MW CAES) - 200 MW Sand Hill CC Expansion |
| 5 - LOW Carbon | Res. 157 + 300MW_H | Carbon Free (Increase Goal to 65% Renewable by 2025) - 600 MW Utility Scale Solar by 2016 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire Decker Plant December 2017 - Retire FPP December 2025 - Retire Sand Hill Plant December 2030 - 200 MW Storage (50 MW Local Battery, 150 MW CAES) - 300 MW Combined Cycle at Decker |

Scenario Descriptions Contd..



| Scenario | Plan# | Long Description |
|-----------------|----------------|---|
| 5 - Carbon Free | Res. 157 + 158 | Carbon Free (Increase Goal to 65% Renewable by 2025) - Increase DSM Goal to 1,200 MW by 2024 - 600 MW Utility Scale Solar by 2016 - 200 MW Solar (100 MW Local, 50 MW Rooftop) - Retire Decker Plant December 2017 - Retire FPP December 2025 - Retire Sand Hill Plant December 2030 - 200 MW Storage (50 MW Local Battery, 150 MW CAES) |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |

Scenario Descriptions Contd..



| Scenario | Plan# | Long Description |
|---------------------------------------|------------------------|--|
| 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 |
| 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 |
| 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) |
| 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 |
| 8 - Retire FPP and Decker 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 |
| 8 - Retire FPP and Decker 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 |
| 8 - Retire FPP and Decker 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) |
| 8 - Retire FPP and Decker Plant | 500+Plan | Current goals - 35% Renewable and 800 MW DSM by 2020 - 500 MW Solar Additional Utility Solar PV - 100 MW Local, 50 MW Rooftop - Retire FPP December 2025 and Decker Steam Plant December 2017 - Increase Total Renewable Goal to 50% by 2025 - Add 500 MW Combined Cycle by 2018 at Decker Site |
| 9 - Retire FPP and Decker Steam Plant | 55%+10Li+FPPRamp+100DR | Current goals - 35% Renewable and 800 MW DSM by 2020 - 500 MW Solar Additional Utility Solar PV - 100 MW Local, 50 MW Rooftop - Retire FPP December 2025 and Decker Steam Plant December 2017 - Begin FPP Ramp Down in 2018 - Increase Total Renewable Goal to 50% by 2025 - Add 500 MW Combined Cycle by 2018 at Decker Site - Add 10 MW of Local Storage + 20 MW Thermal Storage - Add 100 MW Demand Response (DR) by 2025 |
| 9 - Retire FPP and Decker Steam Plant | 55%+10Li+FPP23+100DR | Current goals - 35% Renewable and 800 MW DSM by 2020 - 500 MW Solar Additional Utility Solar PV - 100 MW Local, 50 MW Rooftop - Retire FPP December 2025 and Decker Steam Plant December 2017 - Increase Total Renewable Goal to 50% by 2025 - Add 500 MW Combined Cycle by 2018 at Decker Site - Add 10 MW of Local Storage + 20 MW Thermal Storage - Add 100 MW Demand Response (DR) by 2025 |