



STRATEGY INPUT SESSION ON FLEXIBLE PATH

Discussions with our Environmental Stakeholders

May 4, 2018

COMPETITIVE INFORMATION



As a municipally-owned utility, we focus on providing reliable service at an affordable price to all the customers in our broad service area. We are committed to being as transparent as possible about our business decisions.

We also though operate in the competitive ERCOT market where our ability to buy & sell electricity at optimum prices is critical to our ability to provide reasonably-priced services to our customers. When we are asked to disclose competitively-sensitive information, we do so only when we are sure that our actions will not compromise our ability to protect our customers' best interests.

The requested items listed below, we believe, would fall into this category:

- Price/cost by resource
- ERCOT Price Projections – subscription resources to consider:
 - Siemens Pace Global
 - Wood MacKenzie
 - PIRA
 - SNL

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WE ARE RECOGNIZED AS AN INDUSTRY LEADER



**2017
Public Utility
of the Year**



**2017
Demand Response Project
of the Year**

**2017
Community Steward of
the Year Award
for Air Quality Program**



**2018
Environmental Champion**

**2017
Most Trusted Utility Brand
in US Southern Region**

**2018
Shining Cities
#6 in
Total Solar Capacity**



**2018
#3 nationally in Wind
for Publicly Held Utilities**

GREAT INPUT FROM OUR ENVIRONMENTAL COMMUNITY



- Quarterly meetings since 2012 representing many organizations
 - Citizens Climate Lobby
 - EDF
 - Environment Texas
 - Imagine SA
 - MOMS Clean Air Force
 - Our Revolution Texas
 - Public Citizen
 - SEED
 - Sierra Club
 - Alamo Group
 - Lone Star
 - National
 - Texas Solar Services
 - Texas Victory Project



Collaboration Leading to Action!

- Closing Deely
- Spruce 1 SCRs on hold
- Adding Air Monitors
- Added \$15 M in Solar Rebates
- Community Solar

UPCOMING COMMUNITY EVENTS



Event Date	Time	Venue
Saturday, May 12, 2018	9:30 am – 12:00 pm	Our Savior Lutheran Church
Thursday, May 17, 2018	5:30 pm – 7:30 pm	Somerset Multi-Purpose Center
Tuesday, May 22, 2018	5:30 pm – 7:30 pm	St. Mary Magdalen
Thursday, May 31, 2018	5:30 pm – 7:30 pm	Cuellar Community Center
Saturday, June 2, 2018	9:30 am – 12:00 pm	The Neighborhood Place
Thursday, June 7, 2018	5:30 pm – 7:30 pm	Hamilton Community Center
Tuesday, June 12, 2018	5:30 pm – 7:30 pm	St. Anthony's Church Hall
Saturday, June 23, 2018	9:30 am – 12:00 pm	Southside Lions Community Center
Tuesday, June 26, 2018	5:30 pm – 7:30 pm	Hardberger Park Ecology Center
Thursday, July 12, 2018	5:30 pm – 7:30 pm	Pre-K for SA East Center
Saturday, July 21, 2018	9:30 am – 12:00 pm	Ramirez Community Center
Thursday, July 26, 2018	5:30 pm – 7:30 pm	St. Dominic Church

FLEXIBLE PATH: WHY & WHY NOW



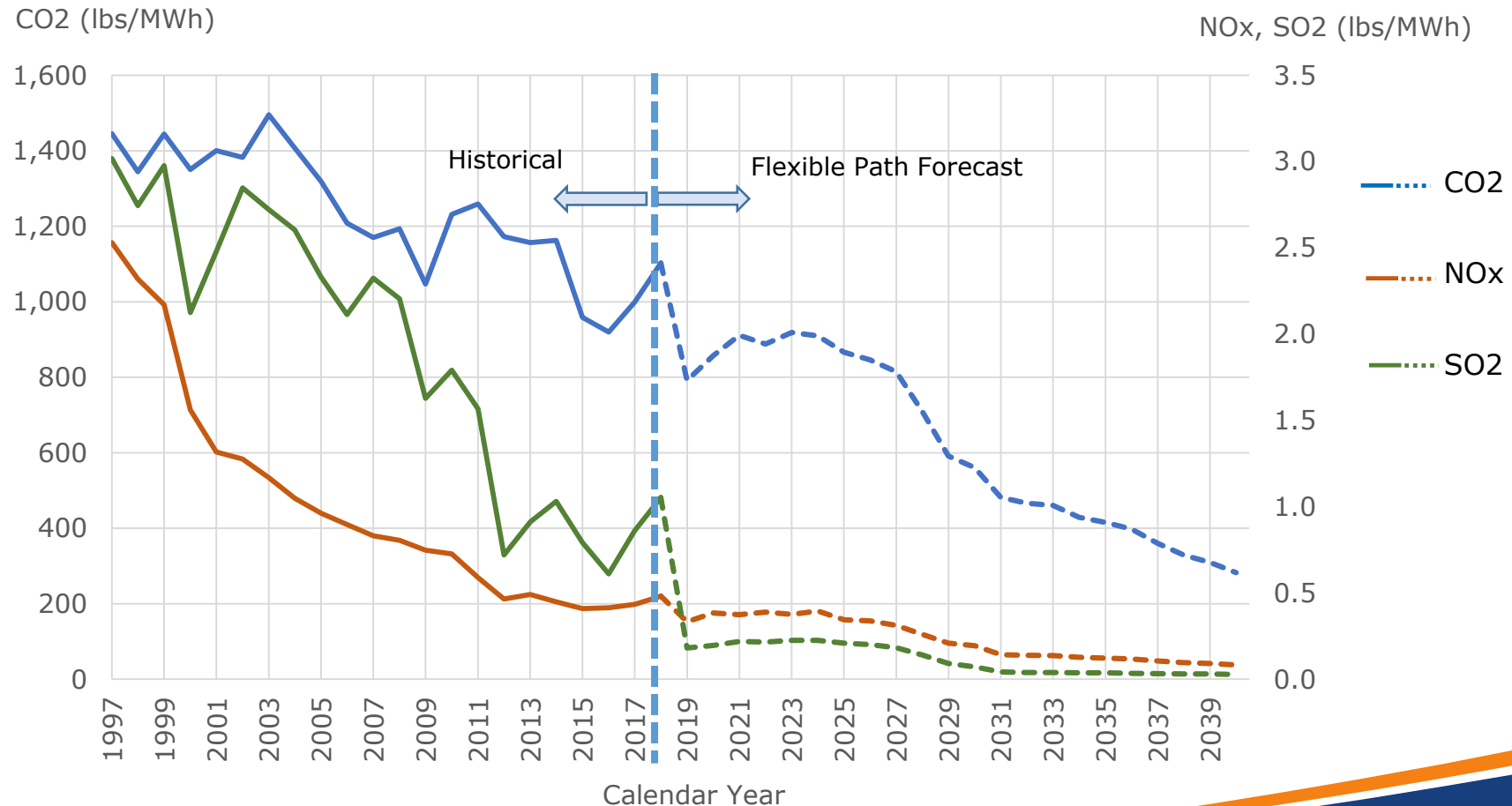
Technology is evolving at a rapid pace.
Flexibility is needed for us to meet the needs & desires of our customers in a responsible way.



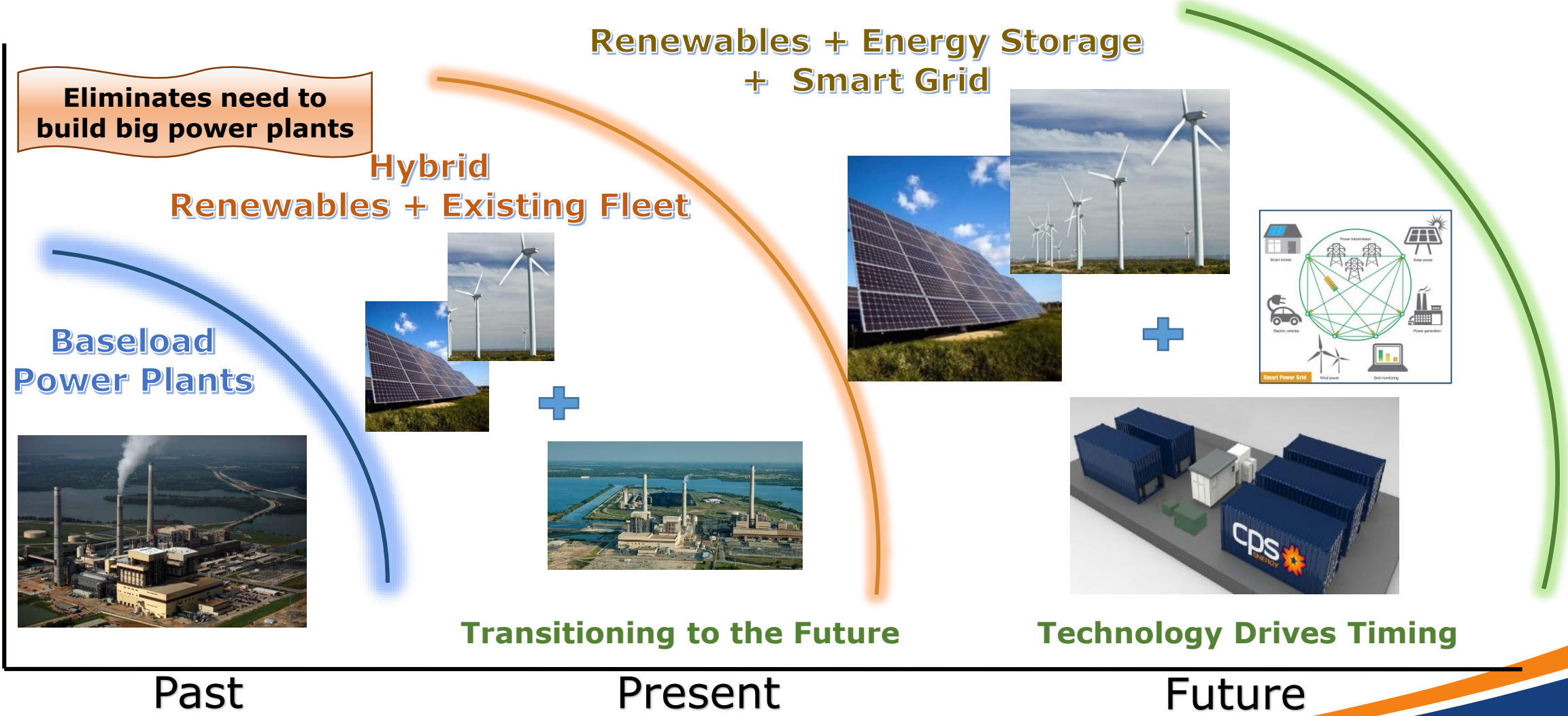
ACTIVE & EFFECTIVE EMISSION REDUCTIONS



Sparked by great progress thru 2017, by 2040 the Flexible Path reduces the intensity of CO₂, NO_x, & SO₂ emissions by 80%, 97%, & 99%, respectively.



EXISTING FLEET IS A KEY PART OF THE EVOLUTION



KEY ASSUMPTIONS



The Flexible Path allows for updates in strategic direction as technologies & customer needs change.

- Shut down JK Spruce 1 in 2030 – potentially 17 years before planned 2047
- Remove SCR* for JK Spruce 1 from business plan & budget
- Extend Combined Cycle plants' (AVR & Rio Nogales) life for 8 years
- Add 4,100 MW more renewables by 2040 – total of 5,700 MW renewable
- Change 550 MW battery storage from 1 to 4 hour duration
- Smaller increments of flexible generation build to meet load forecast gap

MAJOR CONSIDERATION:

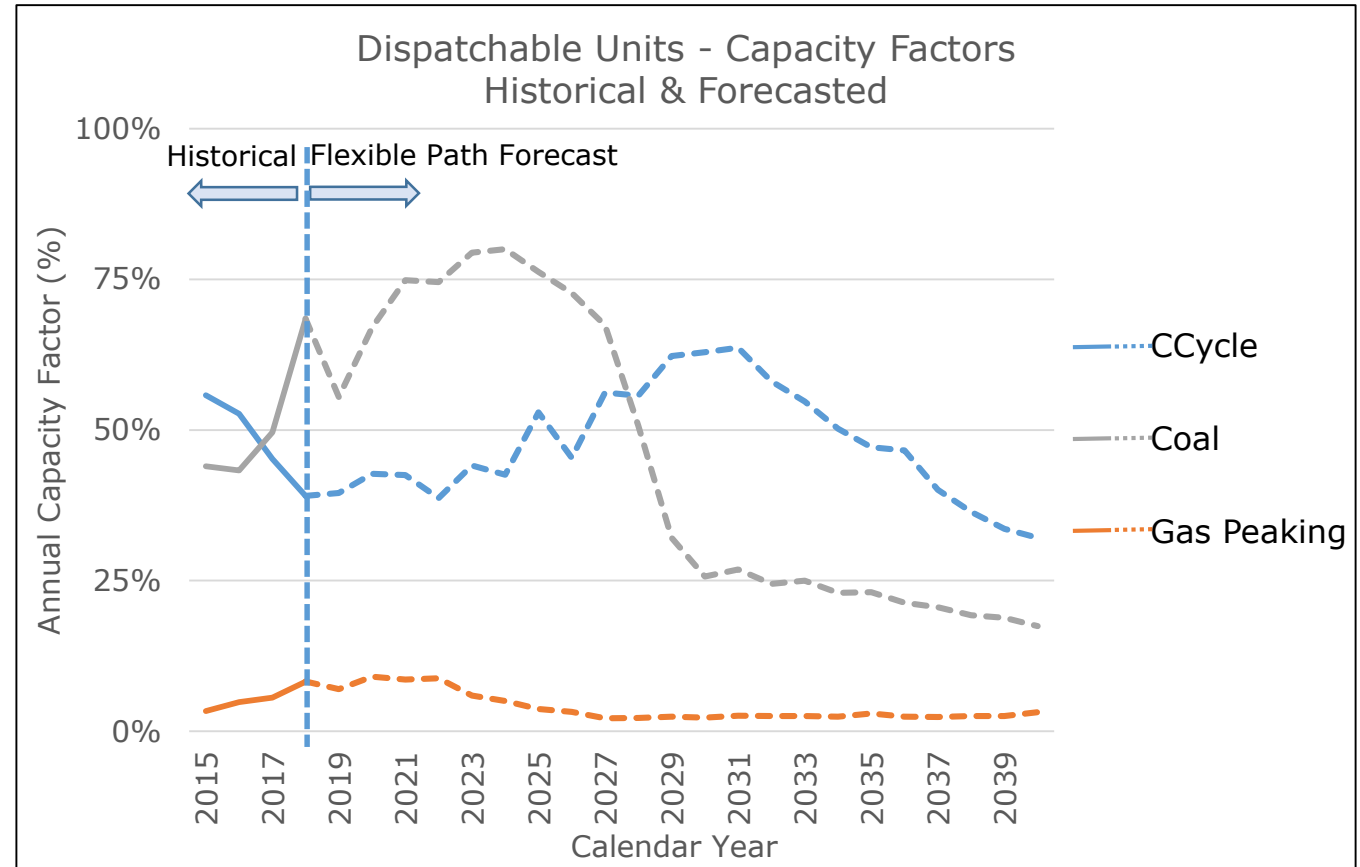
“Technology to Beat” based on small flexible gas units

* Selective Catalytic Reduction (Reduces NOx)

CAPACITY FACTORS

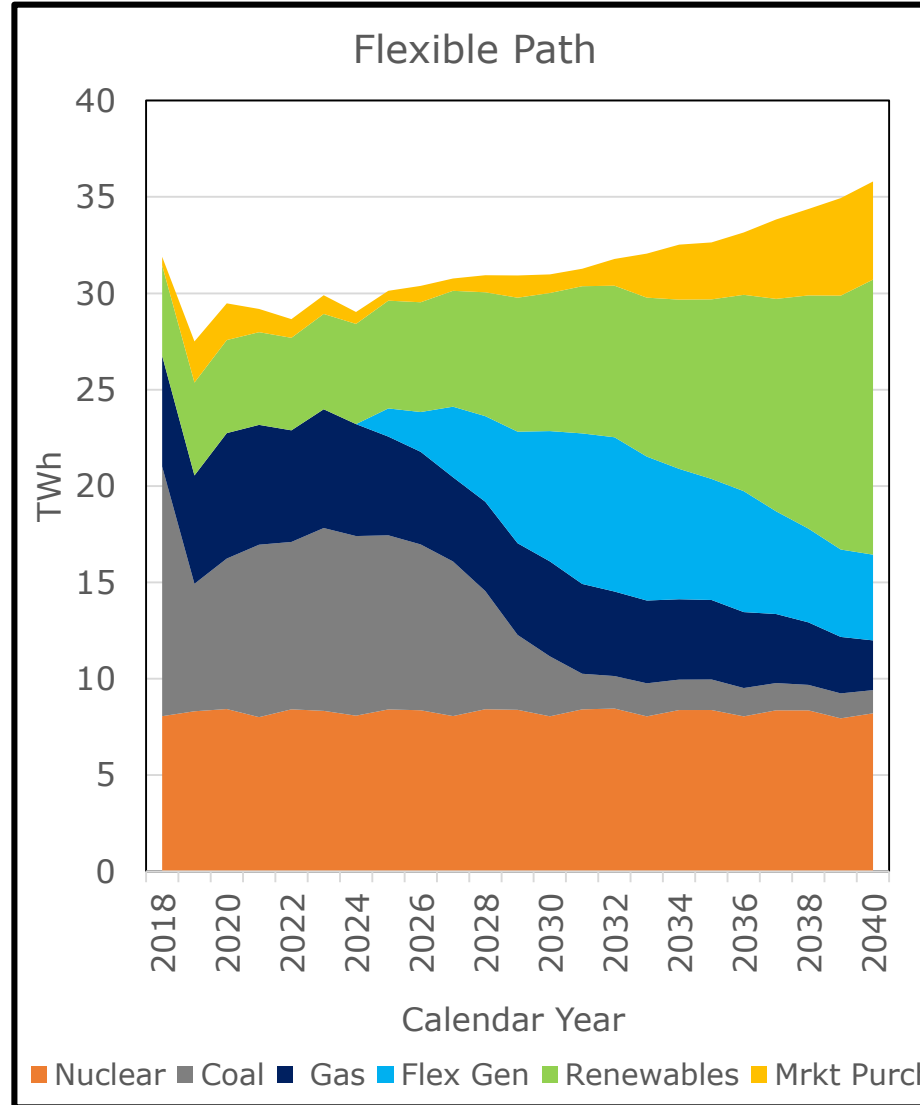
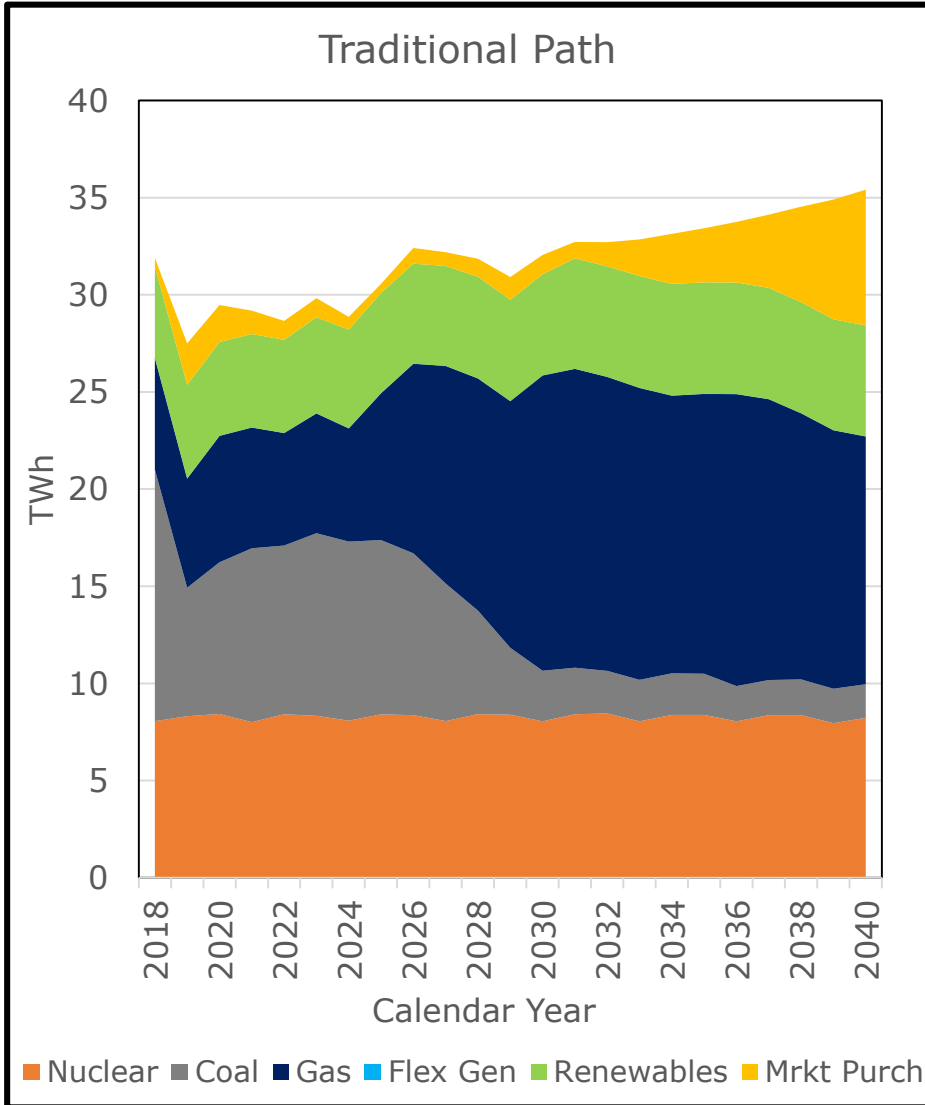


Non-Dispatchable Units Historical & Forecasted Capacity Factors (CY 2015-2017)	
West Texas Solar	25 - 31%
Local Solar	19 - 25%
West Texas Wind	33 - 36%
Coastal Wind	36 - 37%
Nuclear	87 - 97%



Flex Path results in running less coal / other fossil fuel plants, while maintaining reliability & broadening our future opportunities to integrate new technology.

PROJECTED PRODUCTION CURVES BY RESOURCE



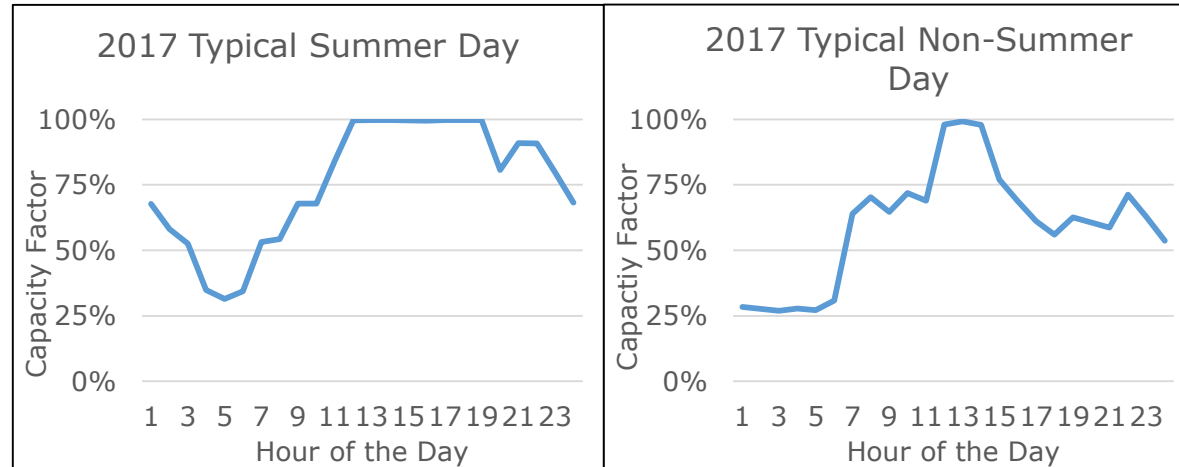
The Flexible Path:

- Adds significant amount of renewables & battery storage
- Traditional assets play a transitional role for reliability
- Timing of retirements will be flexible & most likely dependent on energy storage technology

PRODUCTION PROFILE CURVES

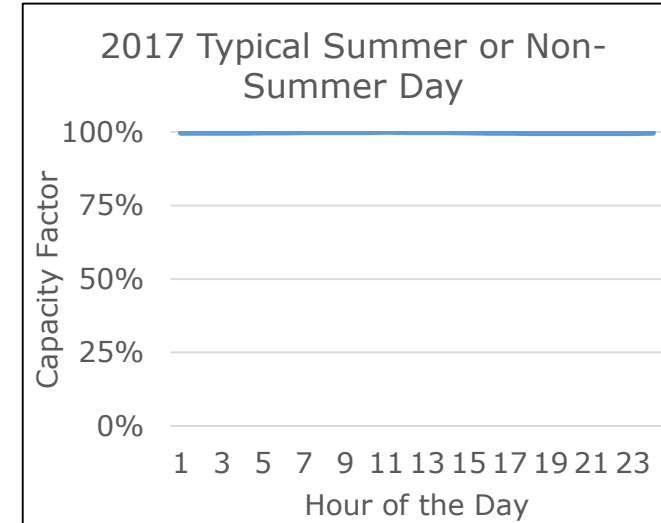


Coal



Coal tends to be load following & is driven by customer demand, as well as power market & gas prices

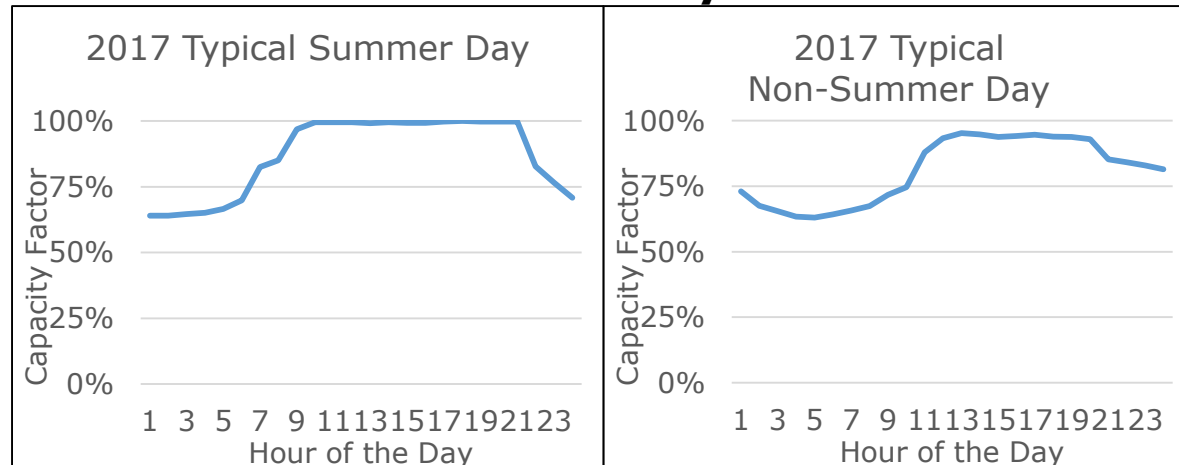
Nuclear



Note: Customer demand = usage = load

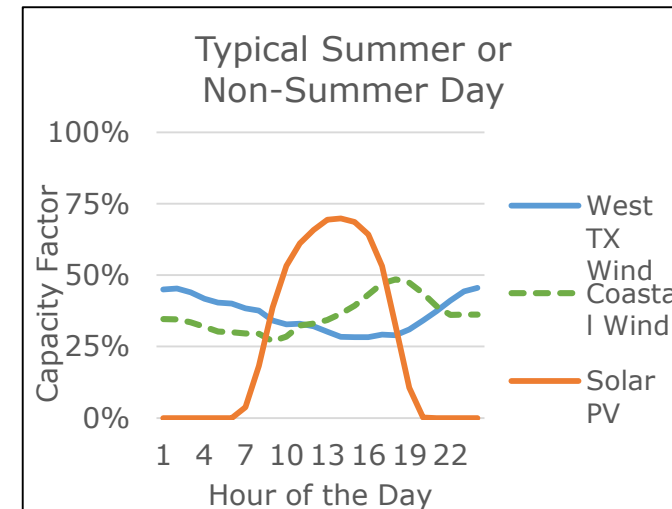
Nuclear serves baseload role

Combined Cycle



Combined Cycle is dependent on customer demand, as well as power market & gas prices

Solar & Wind



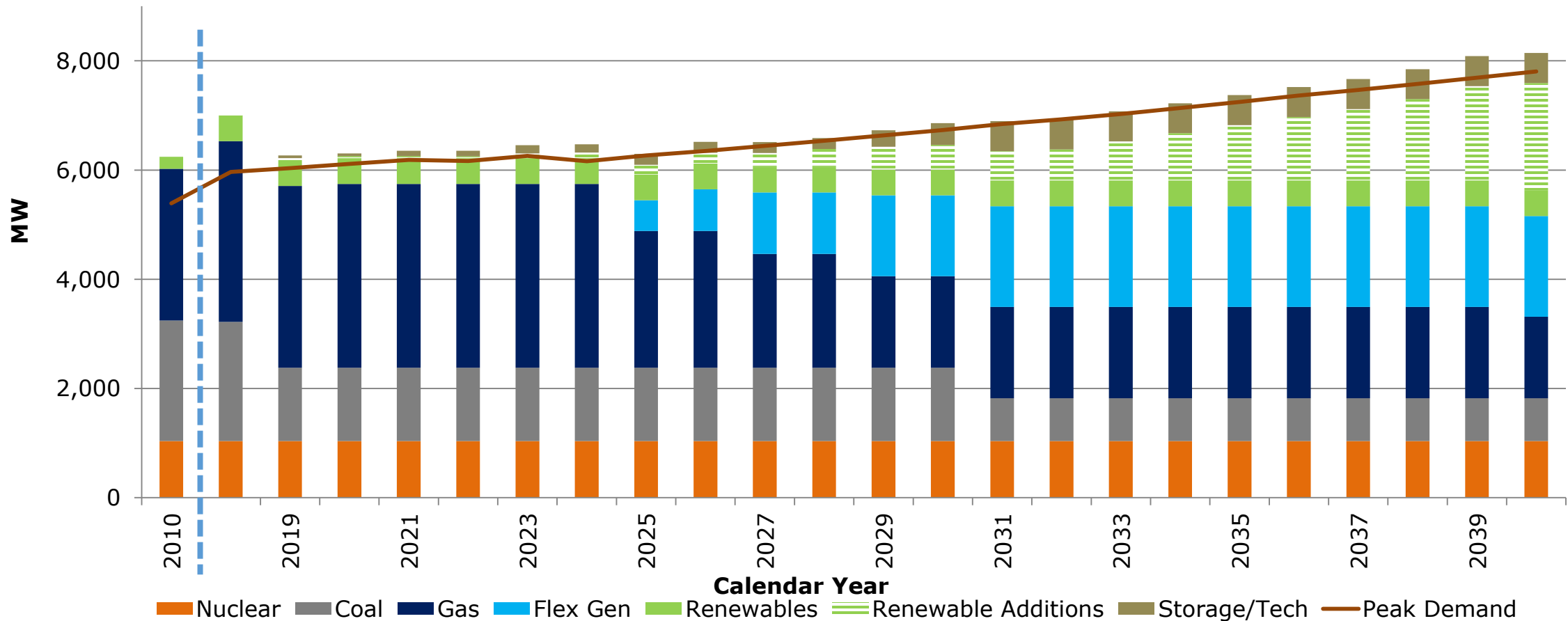
Solar provides about 6 effective hours without clouds

Wind is the most variable - Coastal wind better matches customer load

LOAD / DEMAND



- Capacity is added to replace retired units & to meet growing demand
- Solar produces about 31% & wind produces about 40% during the 7 p.m. August summer peak
- Storage is assumed to become economically viable over time & produce 100% at summer peak
- New plant sizes of 200 to 750 MW are reduced to 50 to 350 MW with Flex Path

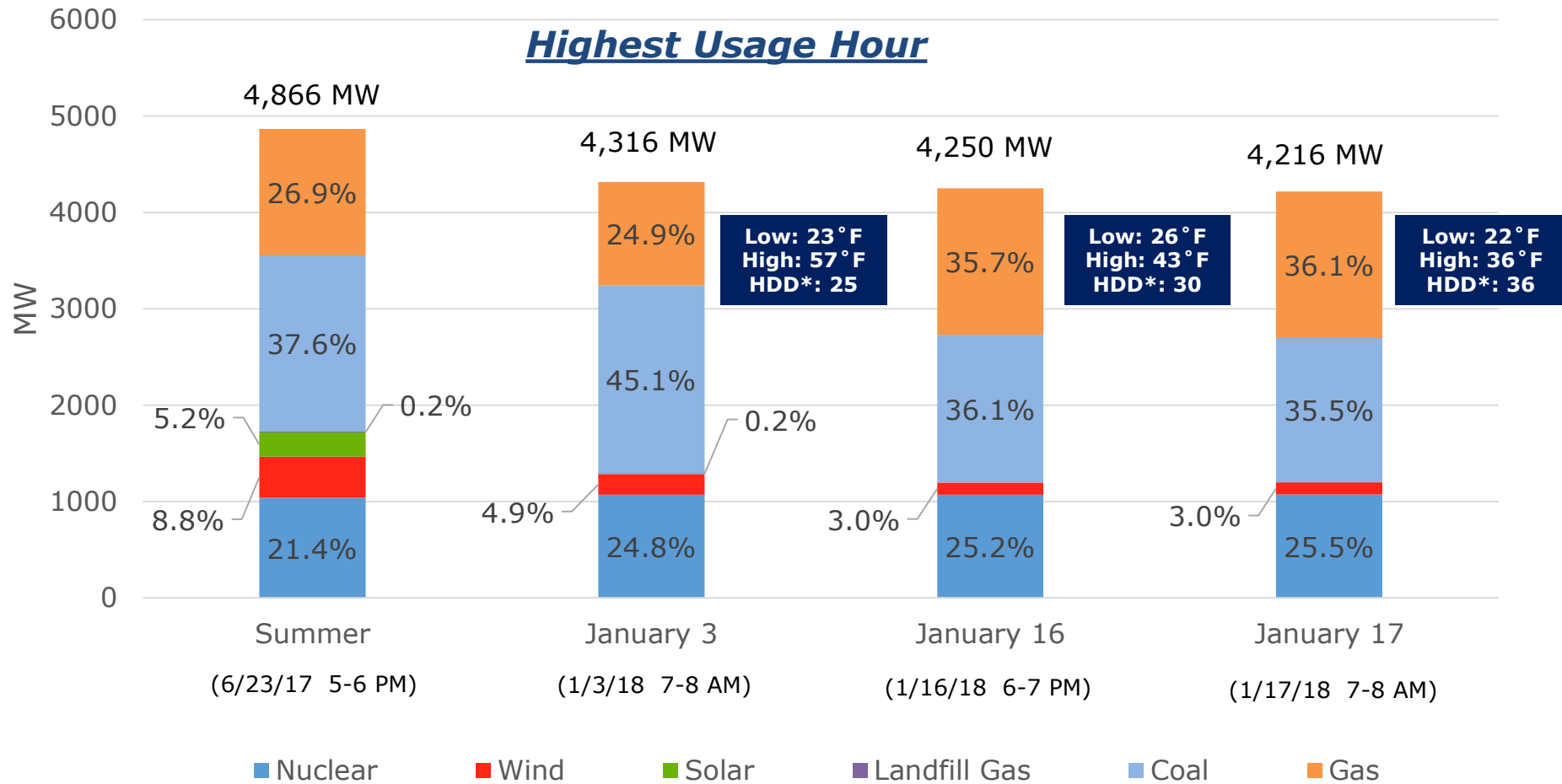


Note: Demand contains retail & wholesale obligations, but capacity is only built for retail

MAINTAINING RELIABILITY IN ADVERSE WEATHER



Traditional generation assets are needed when renewables are not available.



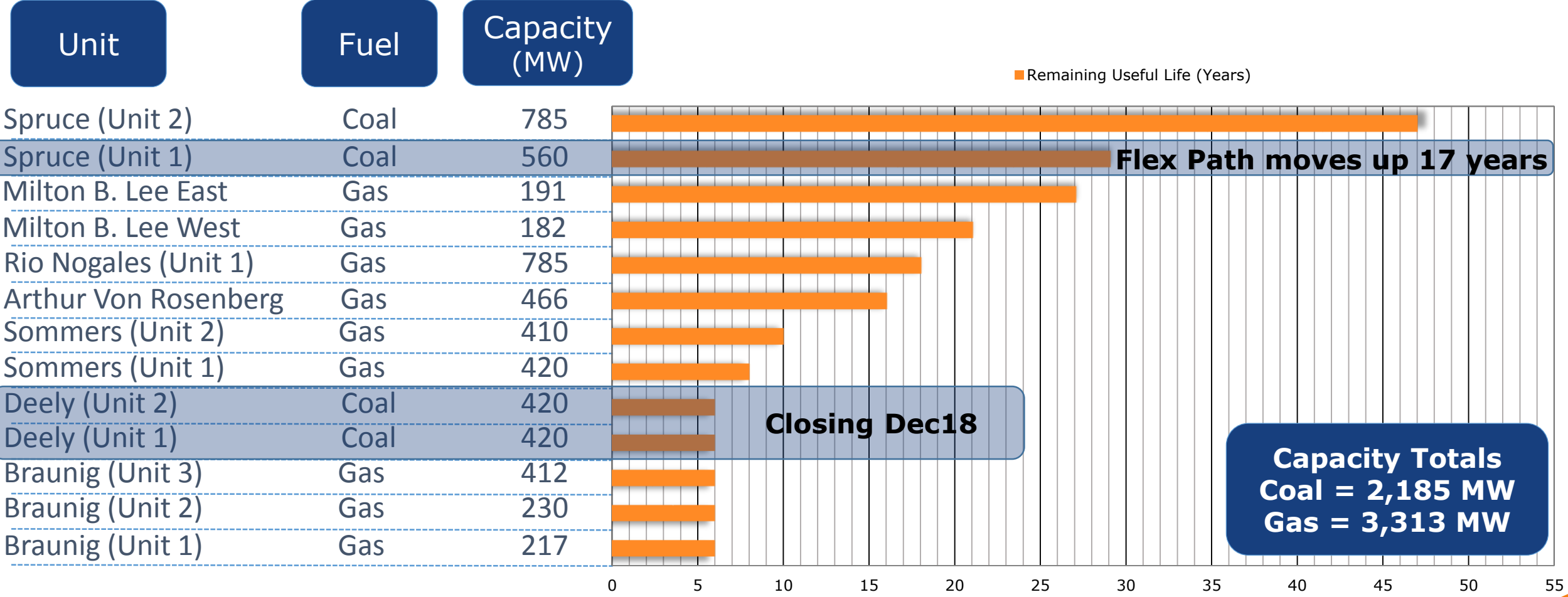
*HDD = Heating Degree Days

OTHER COSTS



Cost Forecast (nominal\$)	Description
Solar	Cost starts below \$30/MWh, increases to mid \$30/MWh range by 2022 upon ITC reduction from the original 30% level down to 10% level, then follows a 1% to 2% annual cost reduction curve.
Wind	Cost starts in the \$20/MWh to \$30/MWh range, increases by about \$23/MWh by the 2022 timeframe due to PTC/"Start of Construction" expiration, then follows a less than 1% annual cost reduction curve.
Battery Storage	50 MW, 4-hour lithium ion battery technology for peaking application. Cost starts in the \$1,500/kW to \$2,000/kW range, decreasing annually by 8% to 10% until the 2030 timeframe when the cost then increases by GDPIPD + 0.5 percentage point.
CO2 Emissions	Cost starts in 2026 & applies to all fossil generation. Cost starts below \$5/short ton, increases to the \$20/short ton to \$25/short ton range by 2034 timeframe, when the cost then increases by GDPIPD.
<ul style="list-style-type: none"> • Energy Efficiency • Demand Response 	See Measurement & Verification Report handout
<ul style="list-style-type: none"> • Natural gas combined cycle (existing) • Natural gas peaker engines (new & existing) • Coal (existing) • Nuclear (existing) 	Recommend using publically available sources such as: <ul style="list-style-type: none"> • Program on Technology Innovation: Integrated Generation Technology Options 2017. EPRI, Palo Alto, CA: 2018. 3002011806 • Lazard's Levelized Cost of Energy Analysis – Version 11.0, November 2017 • U.S. Energy Information Administration, Cost & Performance Characteristics of New Generating Technologies, Annual Energy Outlook 2018

FINANCIAL INVESTMENTS & SCHEDULES

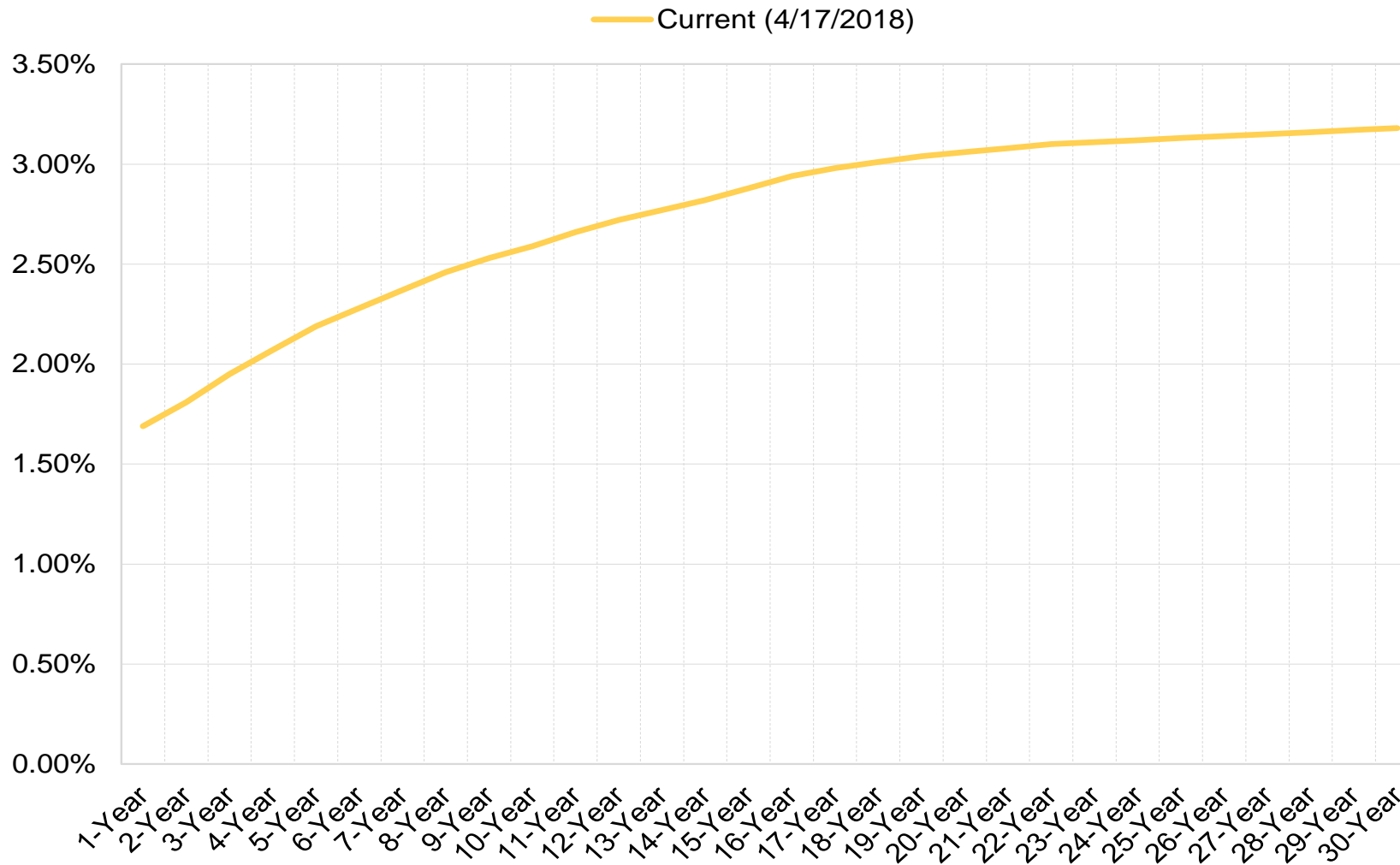


Based on current studies, Spruce Units 1&2 have the longest remaining useful lives of CPS Energy's gas & coal units.

INTEREST RATES



Projected AA MMD Yield Curve



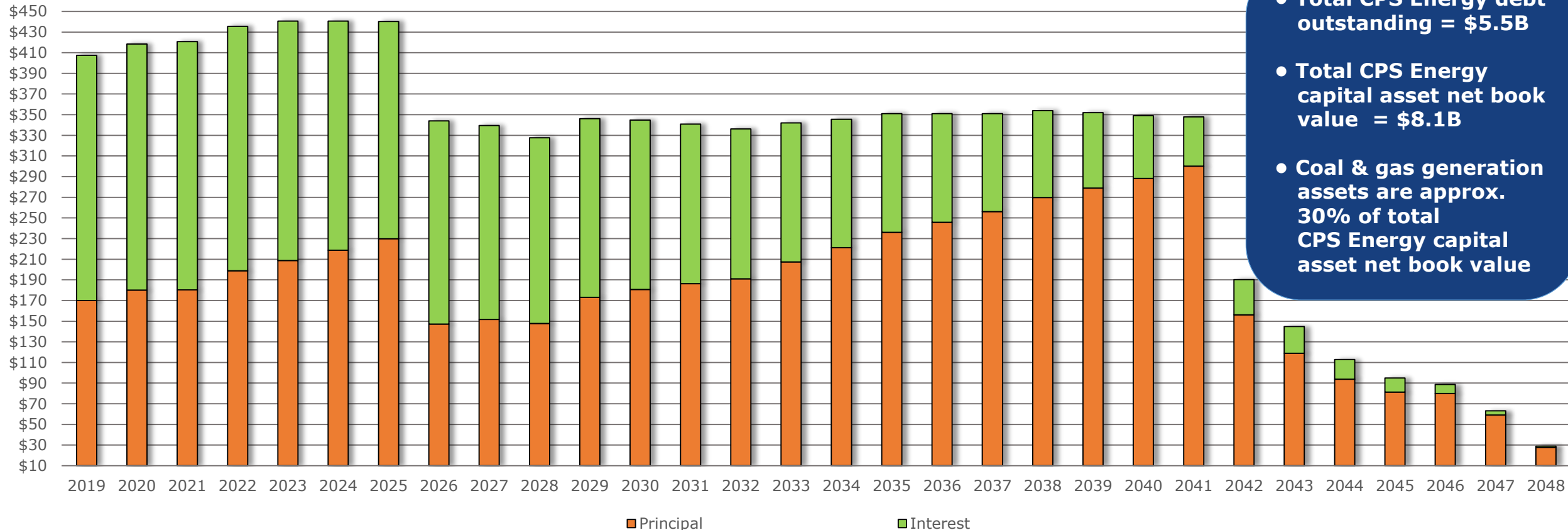
SOURCE: Thompson Reuters from PFM Financial Advisors, LLC

- **Federal Reserve raised the short-term rate six times since December 2015.**
- **The Fed raised its benchmark rate by a quarter percentage point to between 1.50% & 1.75% last month.**
- **Current projections are for the Fed to raise rates 2 or 3 more times in 2018.**
- **If CPS Energy were to issue bonds, the coupon (interest) rate is projected to be between 4.00% & 5.00%.**

TOTAL CURRENT DEBT BY YEAR



Principal + Interest due by fiscal year¹ (\$ millions)



- Total CPS Energy debt outstanding = \$5.5B
- Total CPS Energy capital asset net book value = \$8.1B
- Coal & gas generation assets are approx. 30% of total CPS Energy capital asset net book value

CPS Energy debt, issued for total system capital expenditures including generation, is scheduled to mature over 30 years.

¹ As of 02/01/2018: Senior Lien, Junior Lien Fixed, & Junior Lien Variable. Does not include Commercial Paper & FRRN.

ADDITIONAL SCENARIOS



- **Traditional Plan**

- Larger gas plant additions
- Spruce 1 SCR
- Renewables & storage
- STEP

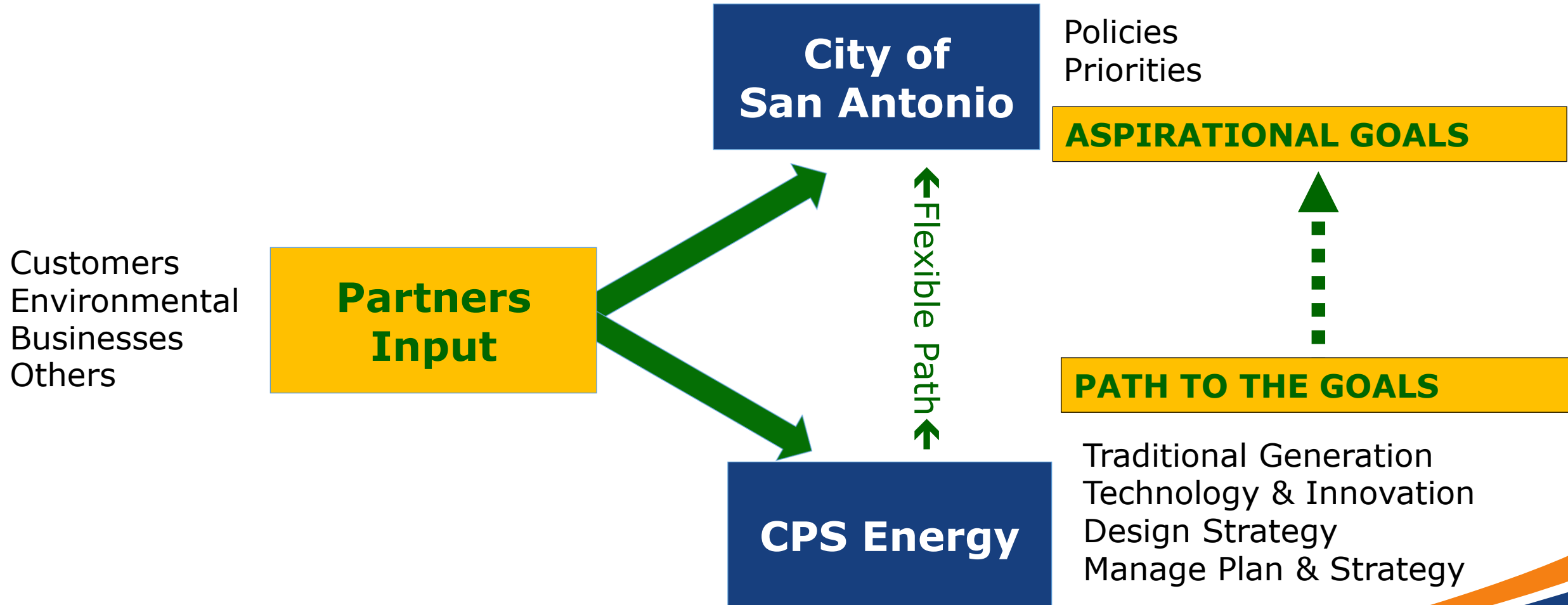
- **Flex Path**

- Smaller flexible resource additions
- Move up Spruce 1 coal unit shut down
- Remove Spruce 1 SCR from plan & budget
- Extend life of combined cycle plants
- More renewables & more storage
- STEP

- **No Coal 2025**

- Major renewable & storage additions
- Accelerated coal plant depreciation impact on customer bills
- Cost, feasibility, & reliability in question
- Transmission congestion risk
- Cost of transmission reliability upgrades
- STEP

COMMITMENT TO COMMUNITY: DIALOGUE = MORE ENGAGEMENT



Our decisions reflect the values & priorities of our community!



Thank You...