



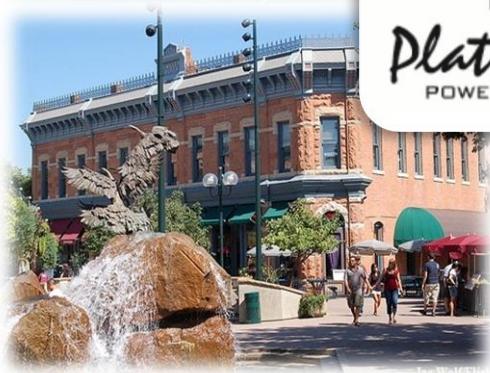
Estes Park



Longmont



Fort Collins



Loveland



Resource Planning Update

Loveland Utility Commission

September 2015

Strategic Planning Initiatives



Resource Management Initiative

Platte River Power Authority employs an adaptive strategy to cost-effectively maintain reliability, manage risks, and ensure regulatory compliance

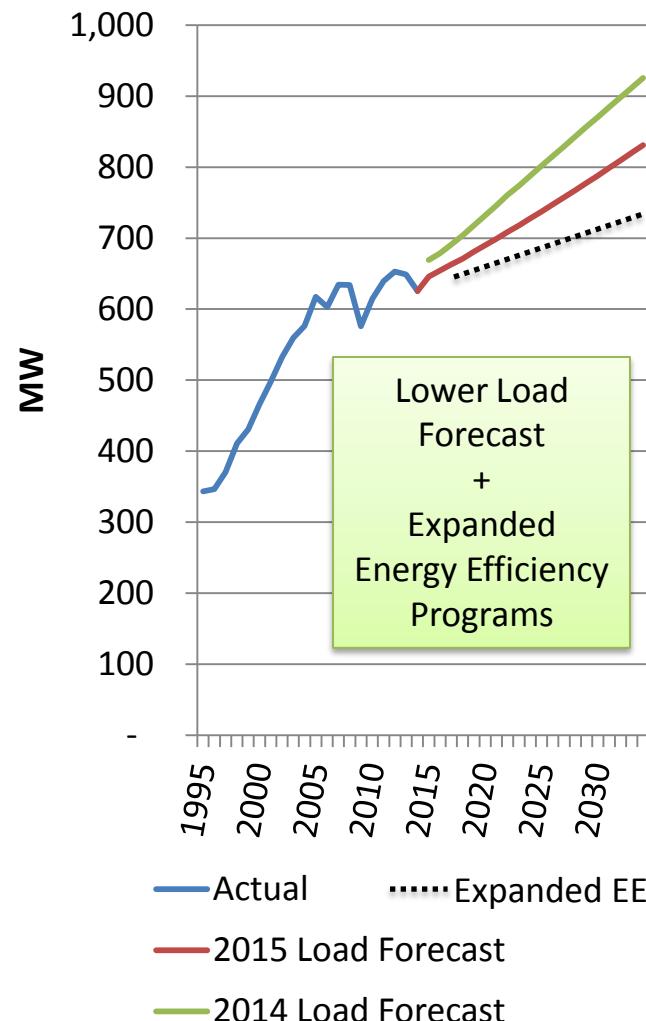
- **Adaptive** → many uncertainties – need to be flexible
- **Cost effective** → can go beyond minimum requirements
- **Reliability** → non-negotiable – gotta have this
- **Risk management** → ongoing process
- **Compliance** → also non-negotiable – once defined

Resource Management Considerations

- We have time for new resource decisions
 - Great performance of existing resources
 - Surplus capacity and energy available
 - Colorado renewable standard met
 - Lower future capacity needs vs. historical
- Wide range of future options – (promising cost trends)
- Many uncertainties going forward (some beyond our control)



Clean Power Plan



Clean Power Plan



- EPA Rule (Federal)
- States Implement – CO specific process
- ~ 25 to 40% reduction in CO₂ for Colorado
- Platte River amount uncertain
- State rules due by September 2018
- Performance by January 2022

Scenario	Implications for Platte River	
Colorado State Implementation Plan Alternatives	Physical Reduction Level	Potential Cost
Command & Control – Rate-Based	Red	Yellow
Command & Control – Mass-Based	Orange	Yellow
Single State Tax	Yellow	Red
Single State Trading – Free Allowances	Yellow	Yellow
Single State Trading – Allowance Auction	Yellow	Red
Multi-State Trading – Free Allowances	Green	Green
Multi-State Trading – Allowance Auction	Green/Yellow	Orange/Yellow

Energy Efficiency
“Common Programs”
Since 2002



**Efficiency
Works**
Co-branding

**Rawhide Flats
Solar
(30 MW)**



**Craig Unit 1
Exit Strategy**



Resource Changes

**Medicine Bow
Wind Pilot**
First in Region
1998



Expansions
through 2004

**Silver Sage – 2008
(12 MW)**



**108 MW
Total
Wind & Solar
(2016)**

**Spring Canyon
(60 MW)**



**Medicine Bow
Life Extension
(6 MW)**



Distributed Resources Joint Activities

2016 Budget Items:

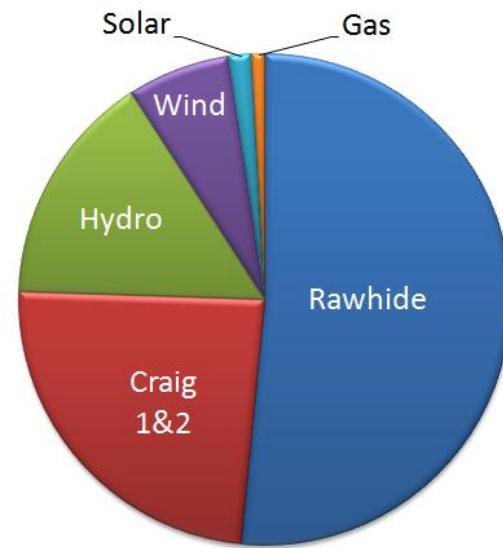
- *Expanded Energy Efficiency*
- *Demand Response Pilot*

Other 2015/2016 Activities:

- Combined Heat & Power
- System Community Solar
- Loveland FEMA Solar
- Fort Collins Solar Programs
- Total DG by 2016 ~ 12 MW
- DG Strategy Development

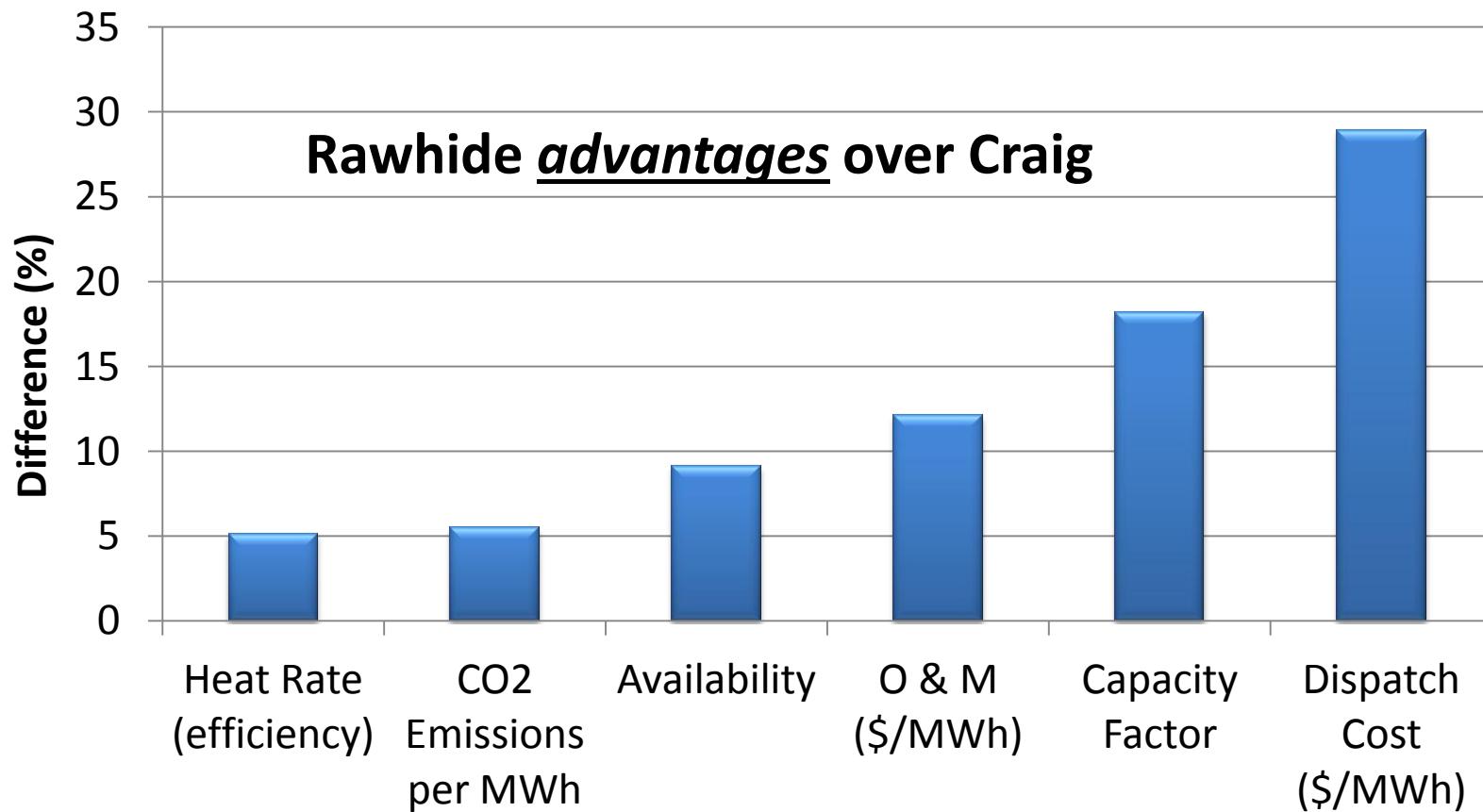
Why Exit Craig Unit 1?

- Potential to avoid future costs
- Big enough to allow major CO₂ changes to mix
 - About one-fourth of all system energy
 - About one-third of coal energy
- Most of Craig output serves surplus sales
 - Sales to others (not Municipalities)
- Rawhide provides sufficient base load
 - Need more flexible resources
- Craig capacity is incremental – two units
- Coal contract flexibility
- Craig units significantly underperform Rawhide



Other Craig Owners

Performance – Rawhide vs. Craig



Planning Timeframes



Board review and direction

- Initial Diversification: Large Wind & Solar
- Craig Unit 1 Strategy & Implementation
- Energy Efficiency Program Expansion
- DR/DG Programs
- **~ 20% CO₂ reduction**

NEAR TERM 2015-2020

MID TERM 2020-2030

- Multiple Viable Options To 2030
- 2030 Craig Unit 2 Strategy
- Continued Energy Efficiency Expansion
- More Renewables
- Resource Integration & New Technology
- **CO₂ reduction – CPP**

- Rawhide Operations Strategy (Long Term)
- Normal Rawhide Retirement
- New Technology Integration

LONG TERM 2030-2050

Current Focus

Resource Modeling – Screening

“See everything”

- Coal efficiency enhancement
- Natural gas technologies
- Fuel switching (coal to gas)
- Wind / solar / biomass / hydro (traditional and advanced)
- Demand side options (many)
- Storage technologies
- Small nuclear
- Grid enhancements

Position to meet CPP

- Maintain reliability
- Meet regulatory requirements
- Minimize rate impact

Range of input assumptions:

- Fuel costs
- Market prices
- Load forecast
- Technology cost projections
- Many others

Wide Range of Technologies

Technology Screen

23 Portfolios

BOD Guidelines

10 Portfolios

Scenario Analysis

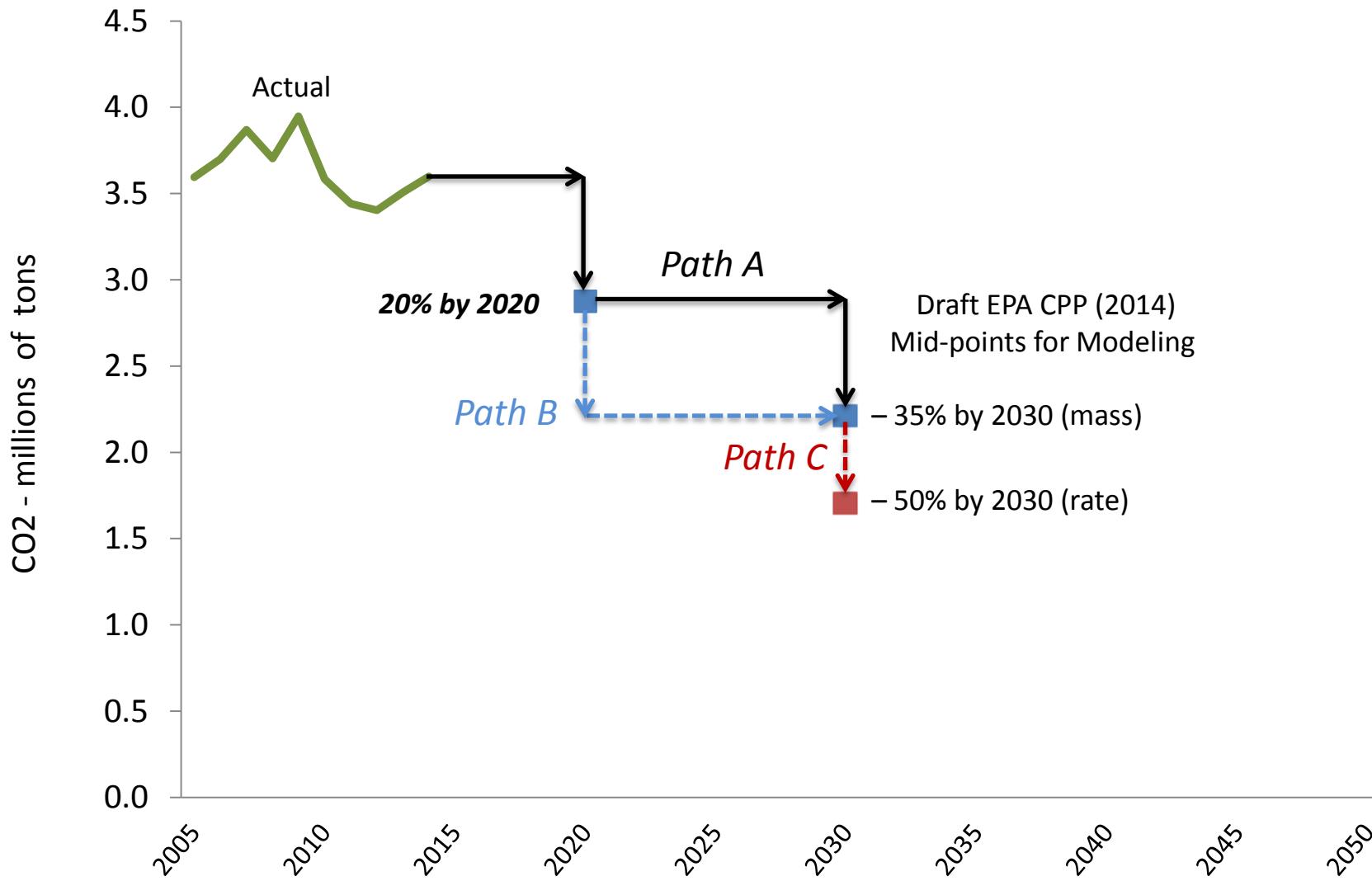
**Initial Set of Possible Future
Resource Mix Options**

Screen out some (for now)

Keepers –

- Mature / viable
- Cost effective
- No resource constraints:
 - fuel
 - location
 - integration

Modeling CO₂ Emission Paths



Path A – Resource Changes / Mix

Energy Efficiency Programs

- **Net capacity increase**
~332 MW (43 MW firm)
- **May not comply with new
EPA rule 2025-2030**

335 MW



150 MW



265 MW



90 MW



280 MW

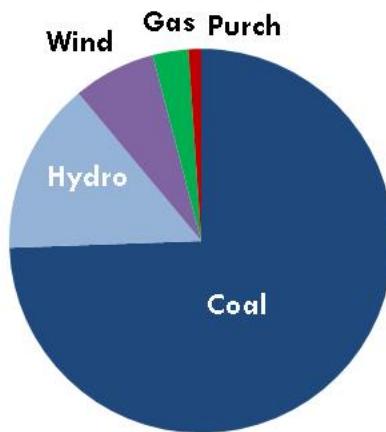


2015 2020

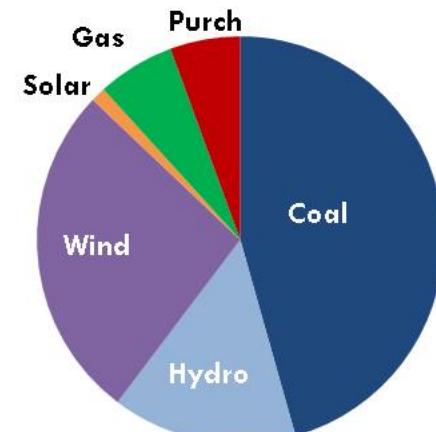
2030

2035

2015 Energy Mix



2035 Energy Mix



Path B – Resource Changes / Mix

Energy Efficiency Programs

- **Net capacity increase**
~ 332 MW (43 MW firm),
same as Path A
- **More aggressive than CPP**
(2020-2025)
- **35% CO₂ reduction by 2030**

335 MW



150 MW



265 MW

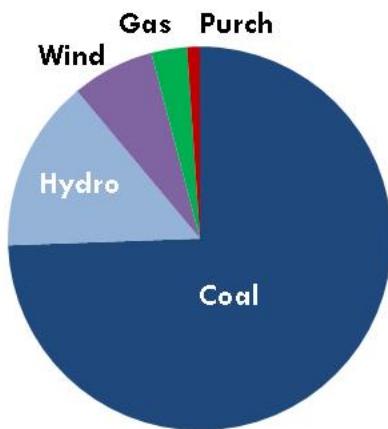


90 MW

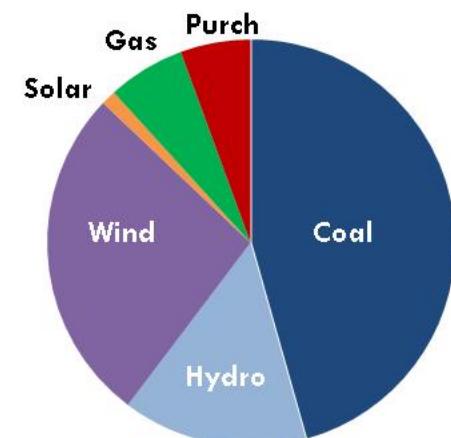


280 MW

2015 Energy Mix



2035 Energy Mix



2015 2020

2030

2035

Path C – Resource Changes / Mix

Energy Efficiency Programs

- **Net capacity increase**
~472 MW (78 MW firm)
- **More renewable sources**
- **Rawhide operates at lower capacity factor for 2030 +**
- **~50% CO₂ reduction by 2030**

475 MW



150 MW



265 MW



90 MW

280 MW

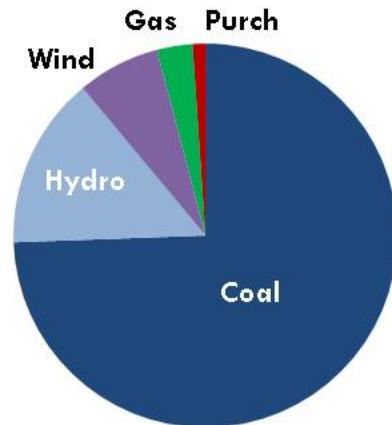


2015 2020

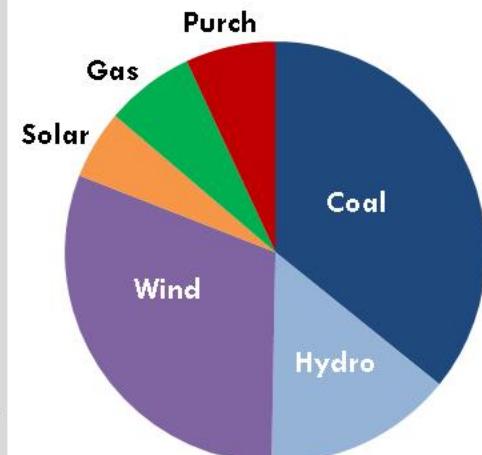
2030

2035

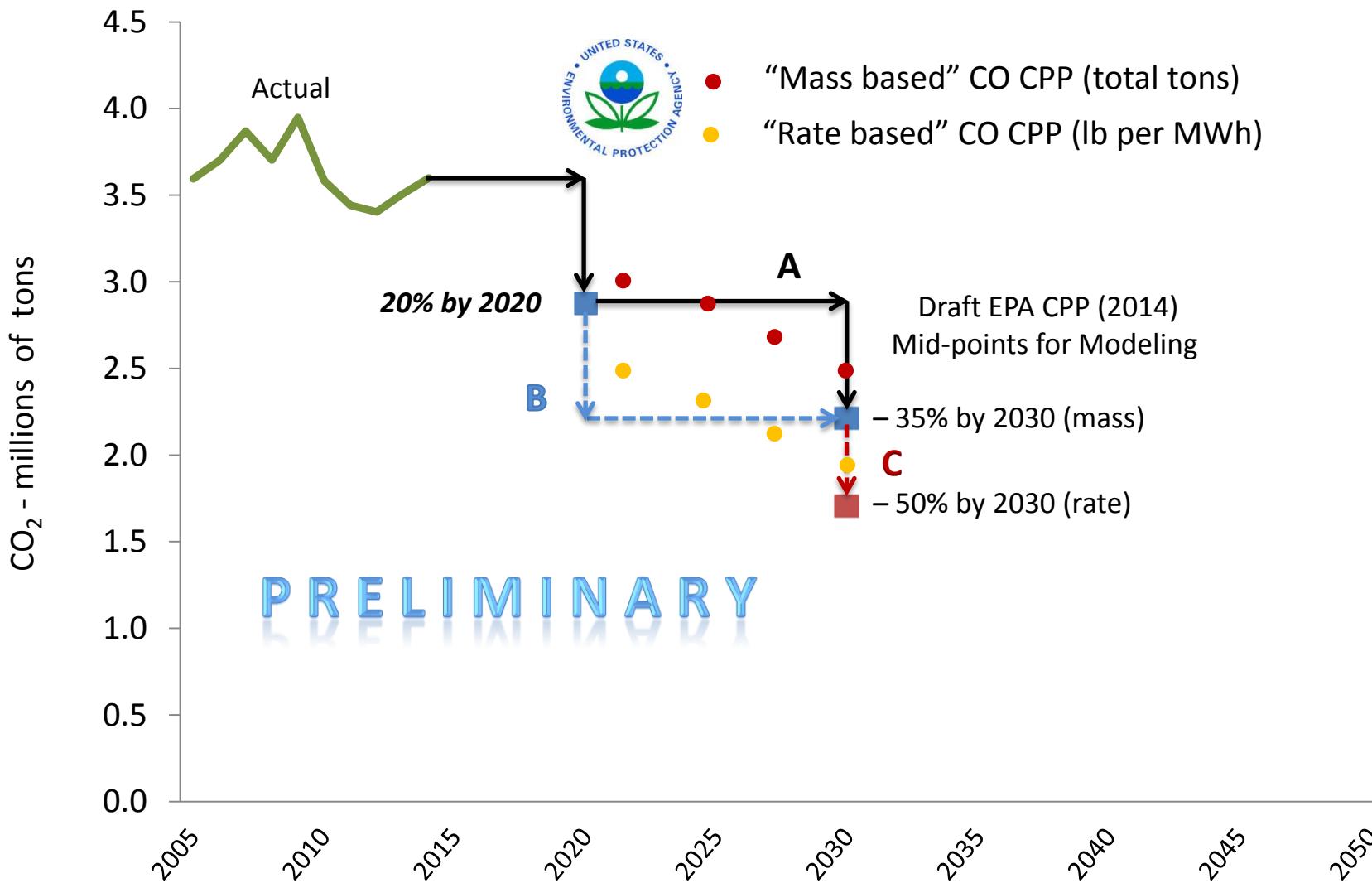
2015 Energy Mix



2035 Energy Mix



Modeling CO₂ Emission Paths



Modeling Wholesale Rates – Many Variables

CO₂ REDUCTION

25% 50%



TIMING

2020 → 2030



RESOURCE MIX

EE/DSM



Wind



Coal



Solar



Gas



Others



IMPLEMENTATION MECHANISM

Tax

Command & Control



Cap & Trade

INPUT ASSUMPTIONS

Loads



Financing



Fuels



Trending



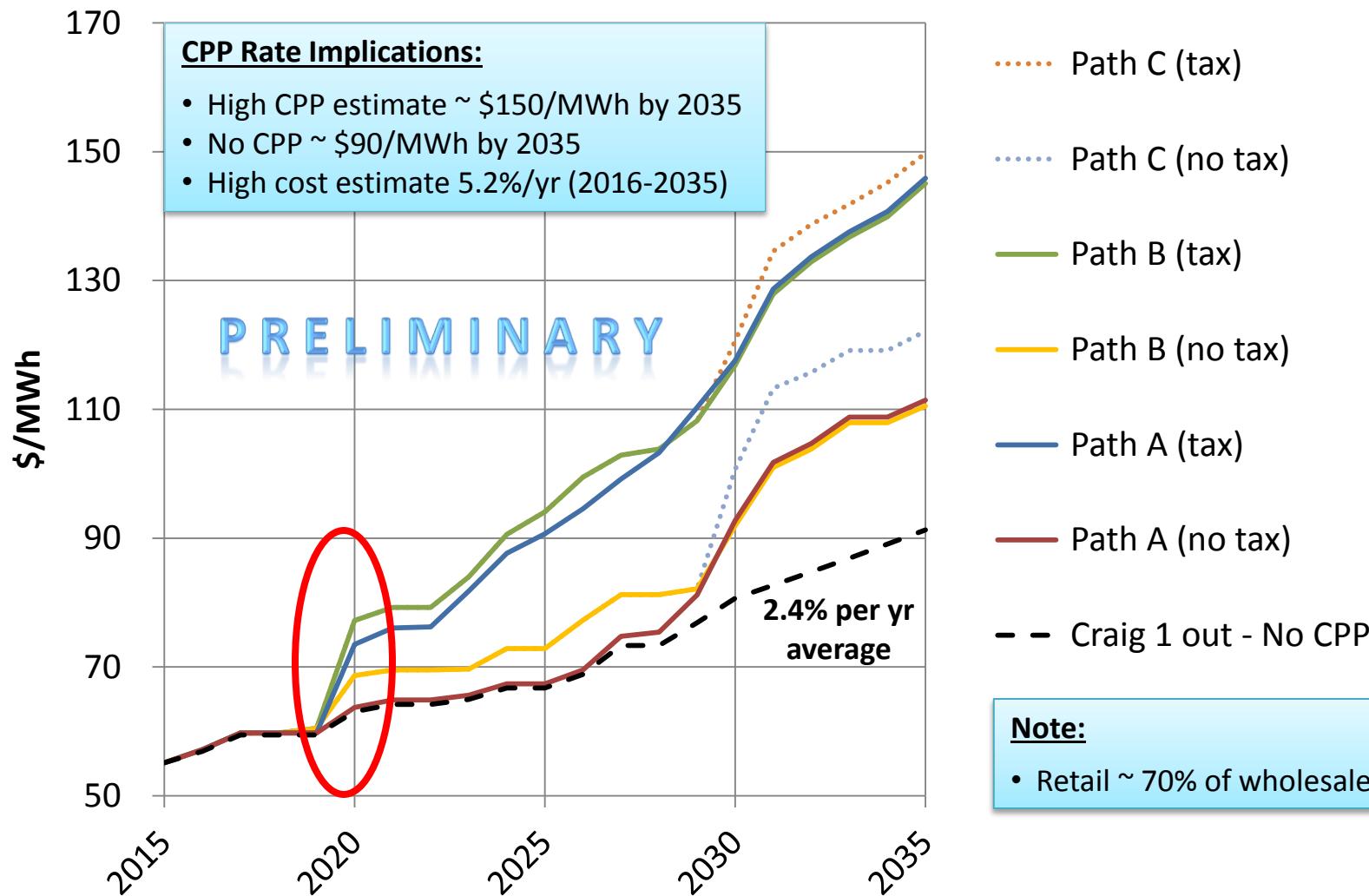
Market



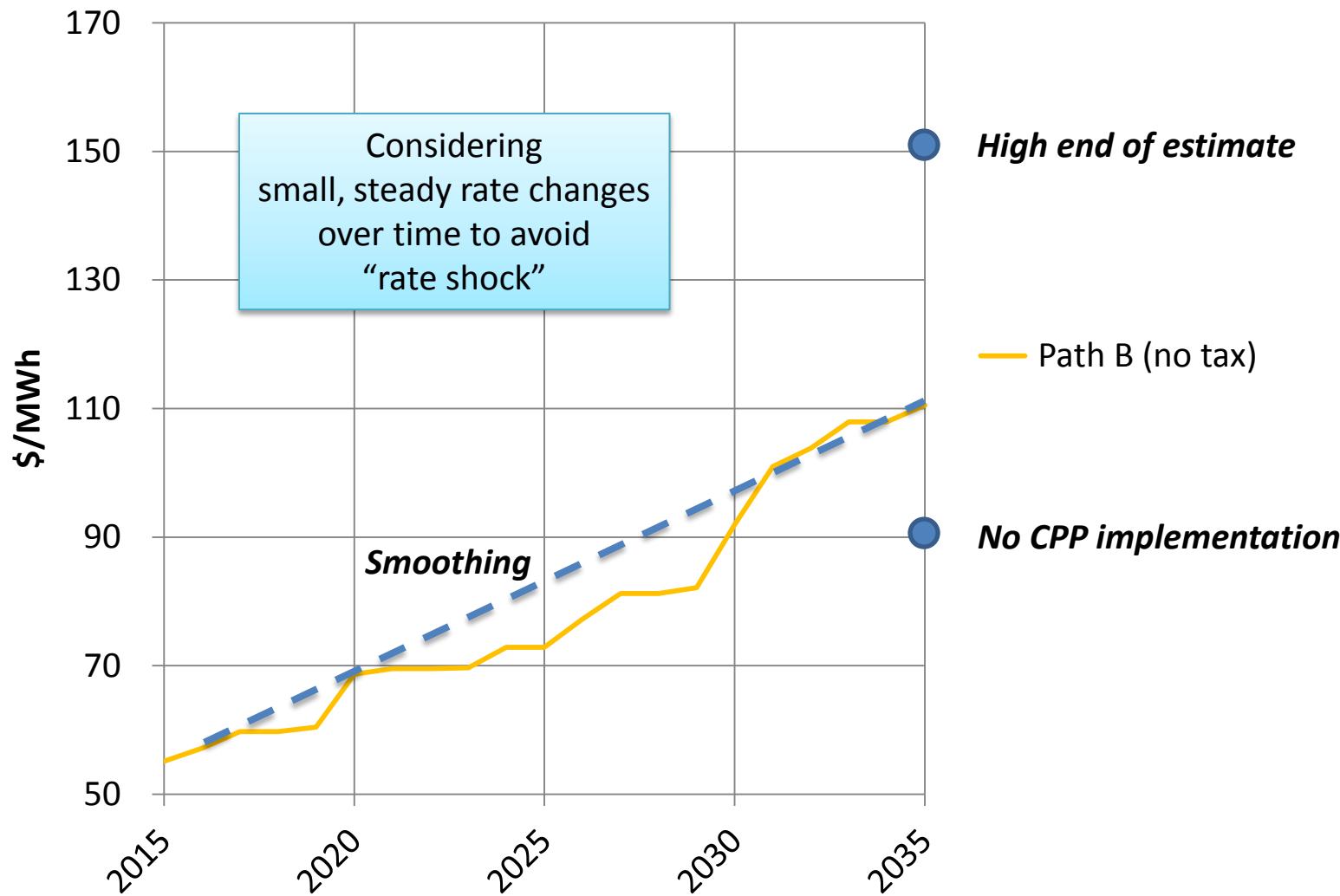
Others



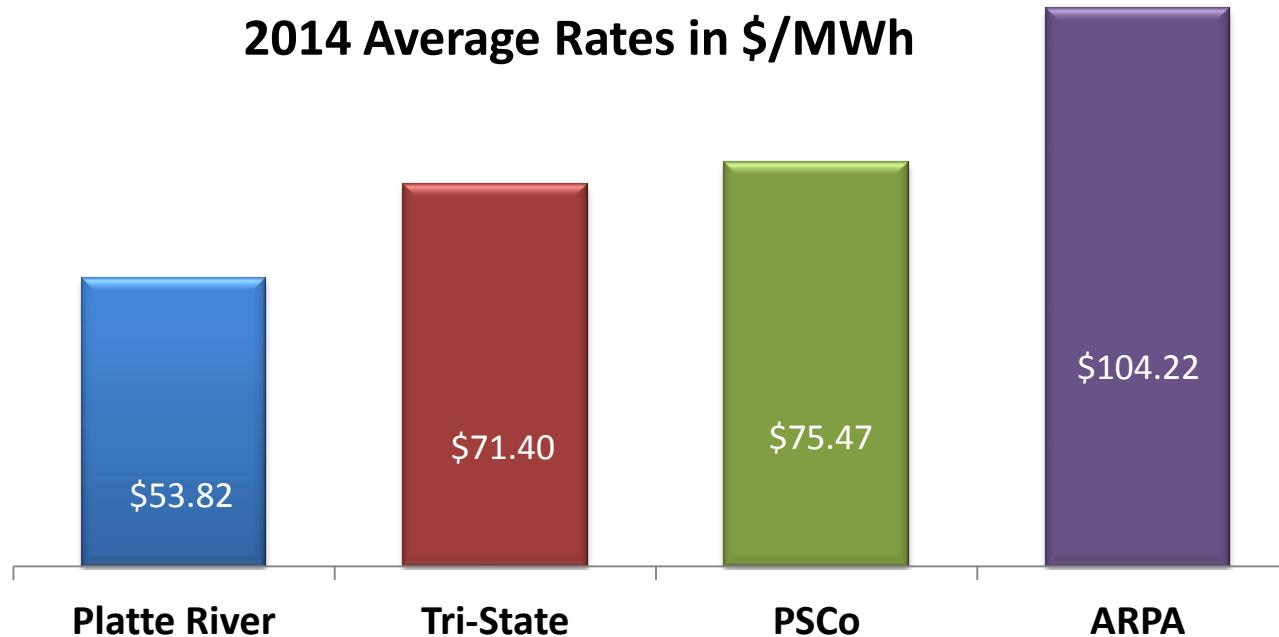
Modeling – Wholesale Rates



Wholesale Rates – Smoothing Rate Impacts



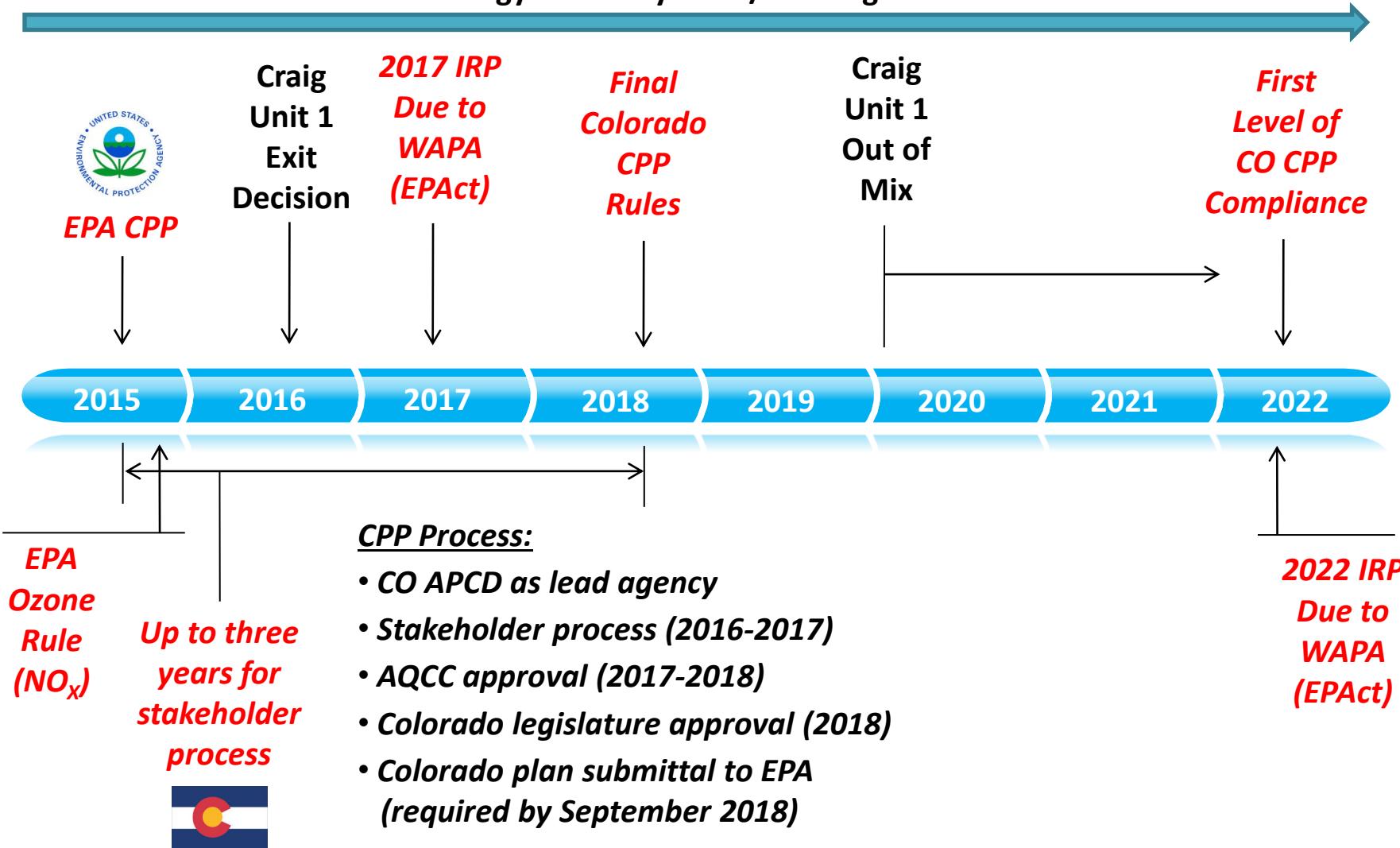
Wholesale Rates – Colorado Suppliers

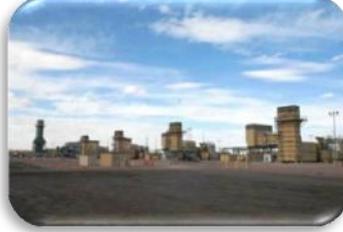


- Next closest supplier (Tri-State) was 33% higher in 2014
- For the last 10 years, others have risen faster than Platte River
- Platte River may rise faster in the future due to high coal in mix (depends on CPP implementation in Colorado)

Planning Timeline

Energy Efficiency & DR/DG Programs





Questions & Discussion