EPA's Proposed Clean Power Plan and Proposed Solutions for Arizona

March 2015

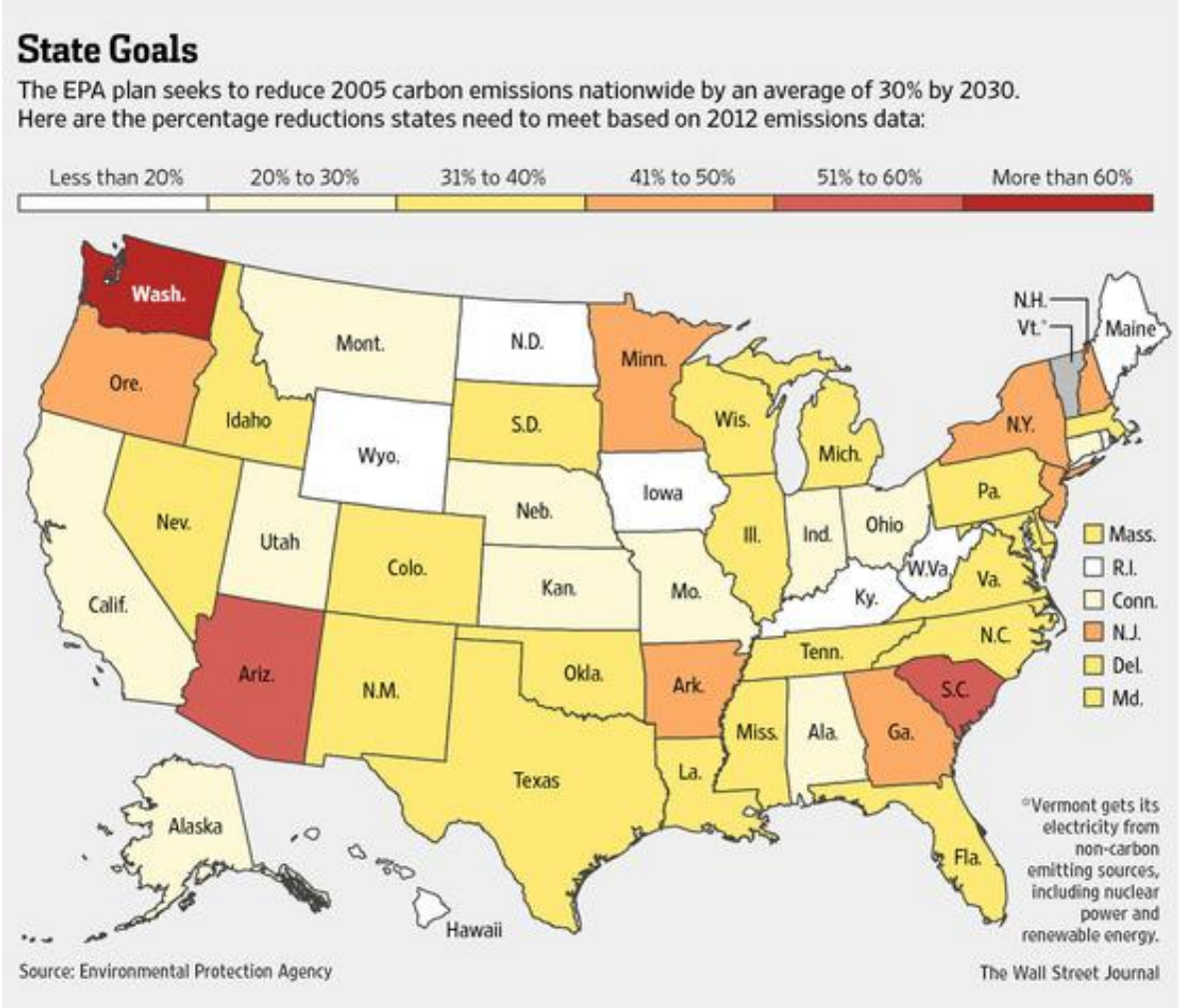
WEIL Portland

Arizona Goals

- Individual state goals are premised on "unique mix of emissions and power sources" in each state
- Arizona final goal represents a 52% reduction from 2012 level (1,453 lb/MWh)

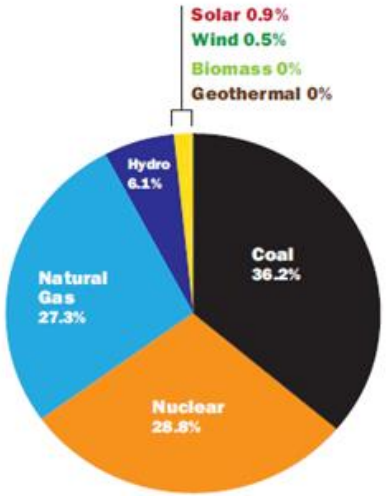
Arizona CO_2 Emission Rate Goals	
Interim Goal	Final Goal
2020-2029	2030
735 lbs/MWh	**702 lbs/MWh**

Comparison of State Goals



ENERGY MIX CHART

Comparison of CO_2 emissions (lbs.) / state electricity generation in megawatt-hour (MWh)

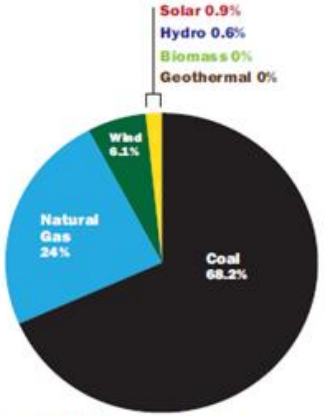


ARIZONA

REDUCTION: 51.7%

GOAL: 702 lbs./MWh

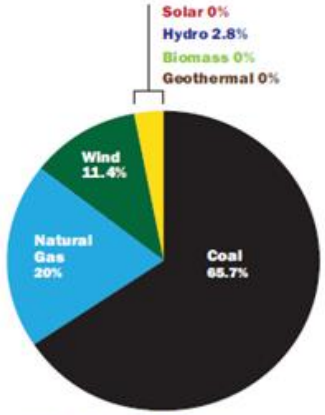
2012 Actual: 1,453 lbs./MWh



NEW MEXICO: 34.0% REDUCTION

2030 GOAL: **1,048** lbs./MWh

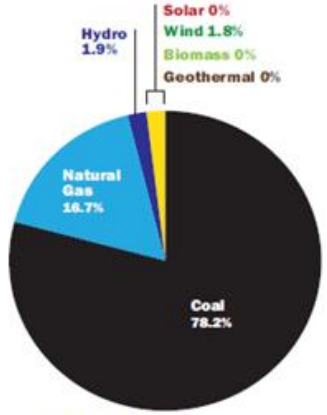
2012 Actual: **1,586** lbs./MWh



COLORADO: 35.4% REDUCTION

2030 GOAL: **1,108** lbs./MWh

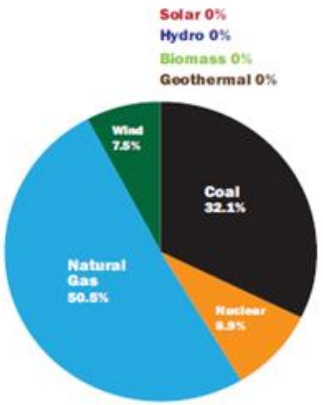
2012 Actual: **1,714** lbs./MWh



UTAH: 27.1% REDUCTION

2030 GOAL: **1,322** lbs./MWh

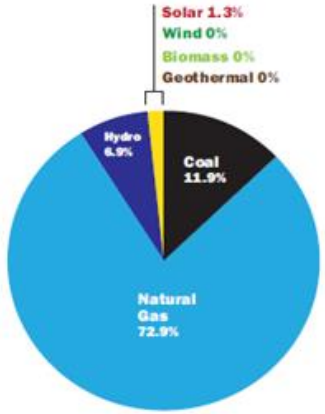
2012 Actual: **1,813** lbs./MWh



TEXAS: 39.1% REDUCTION

2030 GOAL: **791** lbs./MWh

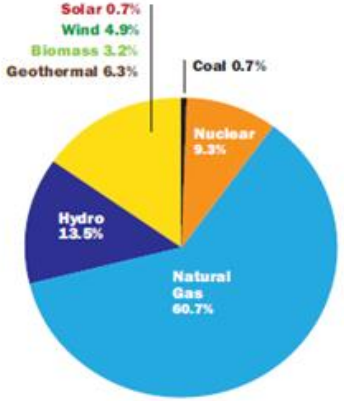
2012 Actual: **1,298** lbs./MWh



NEVADA: 34.5% REDUCTION

2030 GOAL: **647** lbs./MWh

2012 Actual: **988** lbs./MWh



CALIFORNIA: 23.1% REDUCTION

2030 GOAL: **537** lbs./MWh

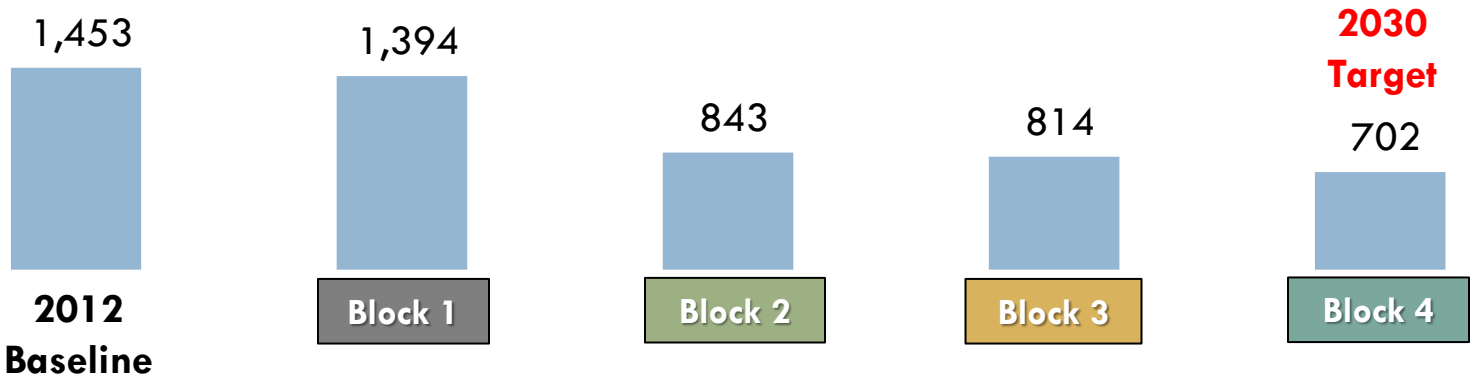
2012 Actual: **698** lbs./MWh

Source: http://cleanpowerplanmaps.epa.gov/CleanPowerPlan/

Publication Number: C-14-28

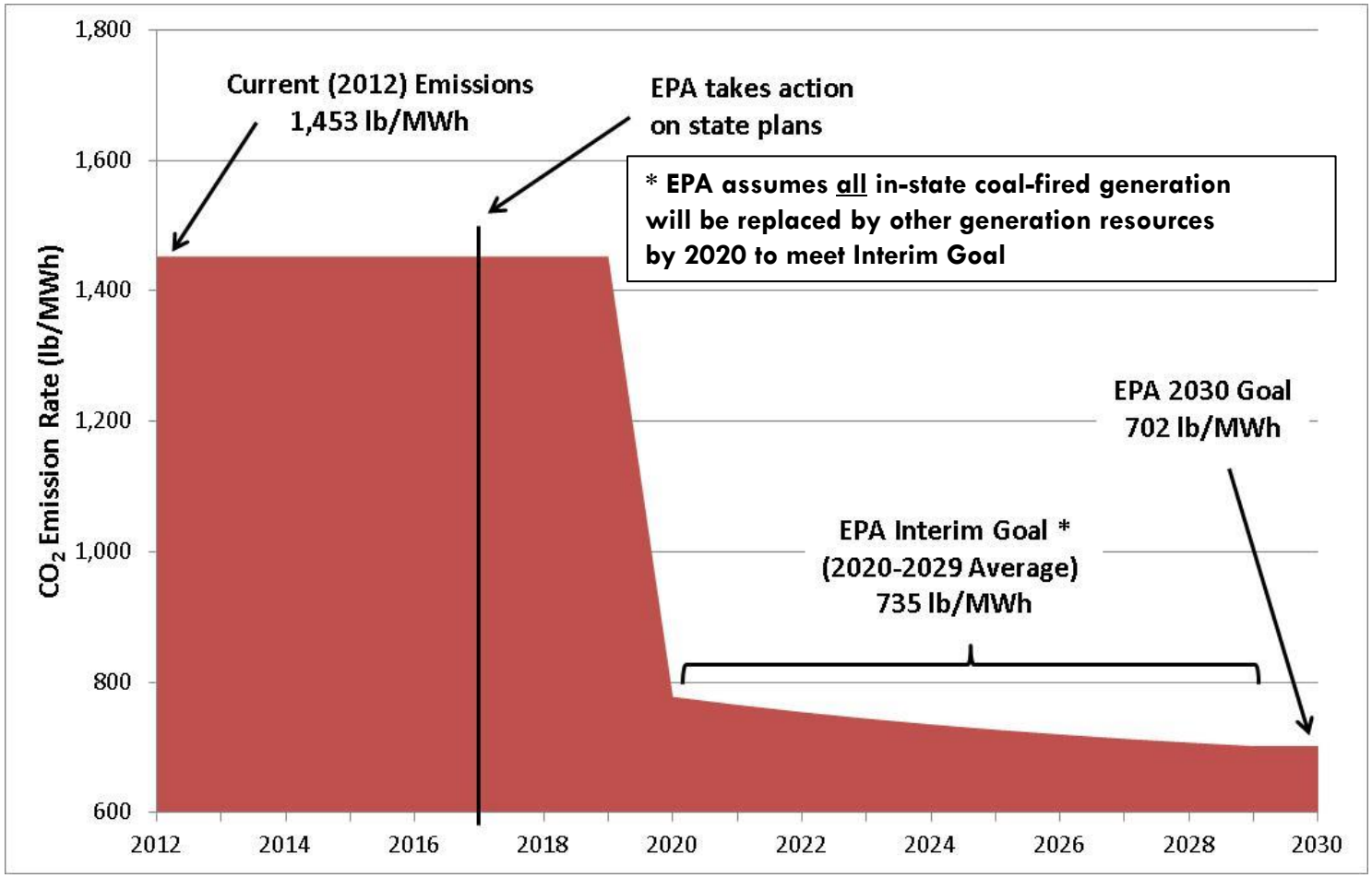
Basis for Arizona Goals

EPA Assumptions for Arizona Emission Rate Reduction
(CO_2 lbs / MWh)



Block 1	• Heat rate improvement of 6% across all coal-fired facilities
Block 2	• Up to 70% capacity factor (53% for AZ) from all combined cycle natural gas facilities (existing and under construction)
Block 3	• Achieve regional renewable energy target • 5.8% MWh from nuclear facilities "at risk"/under construction
Block 4	• Achieve state's energy efficiency standard

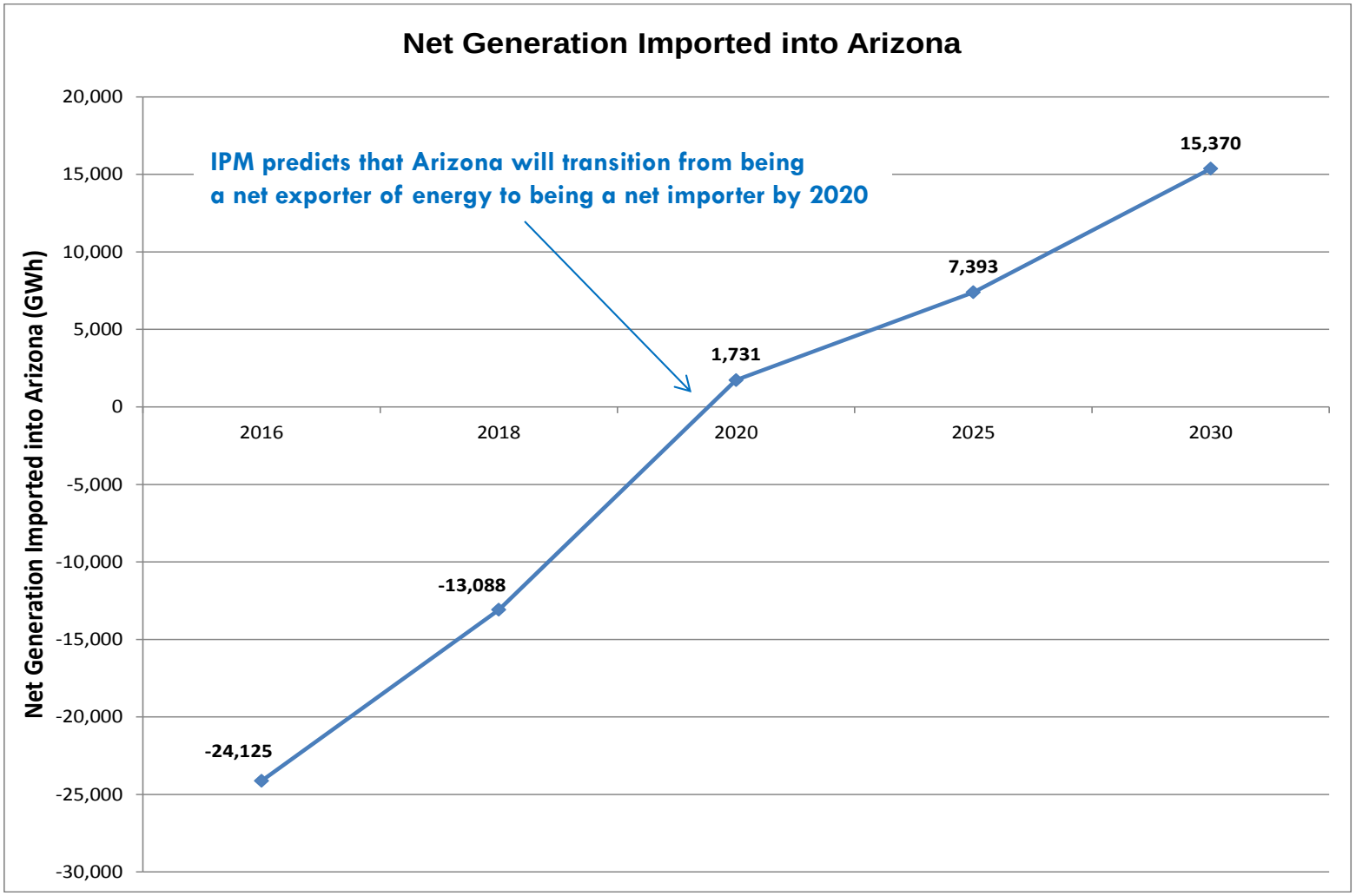
Reductions Required in Arizona



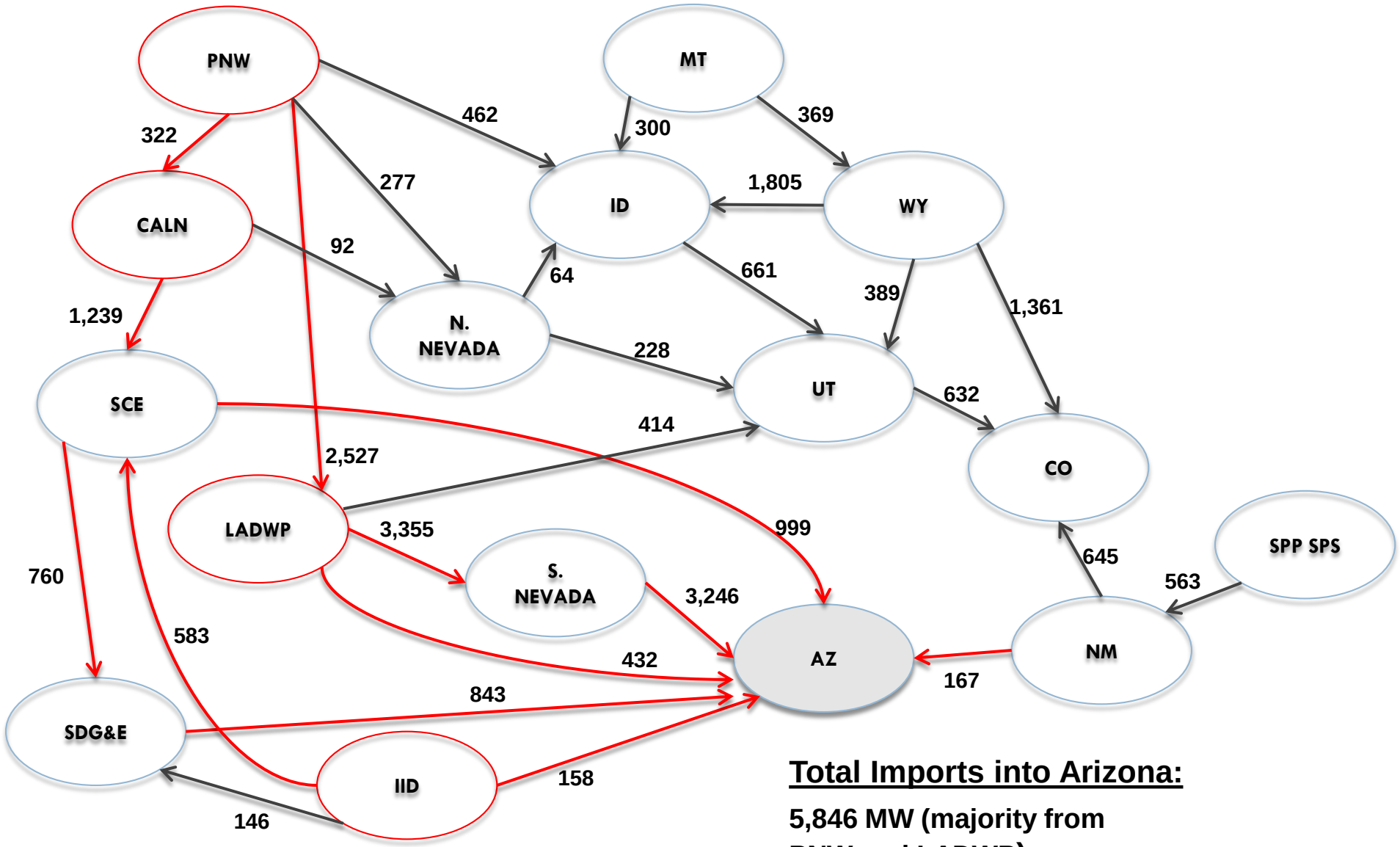
Concerns with Arizona Goals

- **Interim goal forces energy transition in 2.5 years or less**
- Arizona must achieve more emission reductions than any other state by 2020
- EPA's assumptions for Building Block #2 are inappropriate:
  - No coal or oil/gas steam generation after 2020
  - More than 80% of reductions come from this block
  - No proper consideration of summer peak demand, transmission constraints, or natural gas pipeline capacity

IPM Overstates Potential for Imports



Source of Imports to Arizona in IPM During Peak Load Hour in 2030



Total Imports into Arizona:

5,846 MW (majority from PNW and LADWP)

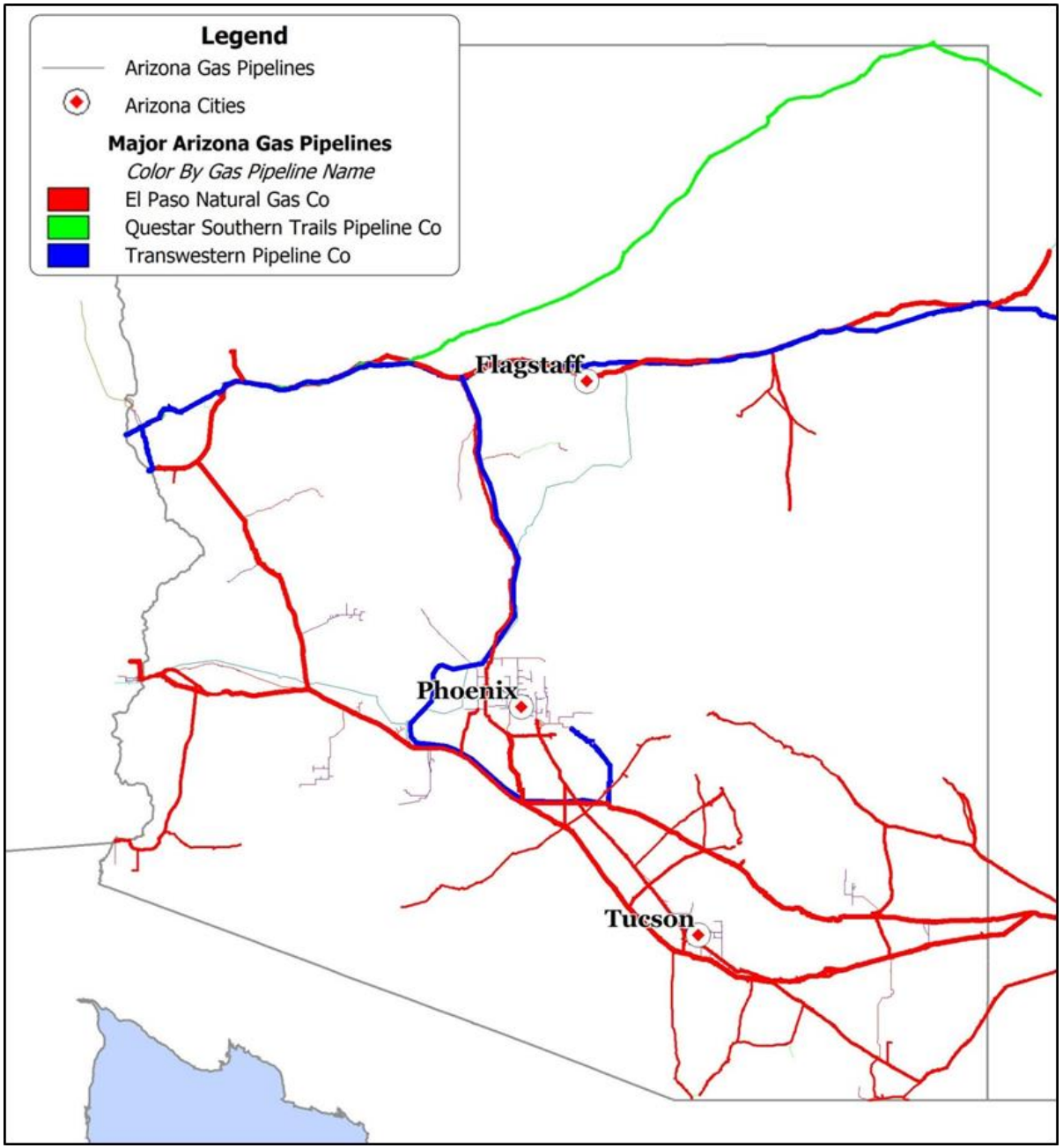
Source: The Brattle Group

IPM Overstates Amount of Available Capacity

- IPM appears to assume that all power that is generated by a plant located within Arizona is available to meet Arizona's peak demand, even if a portion of that plant is owned by an out-of-state entity
- Multiple plants in Arizona are jointly owned:
  - The model assumes the entire capacity of Palo Verde Generating Station (3,937 MW) is available to serve Arizona, but less than 50% is owned by Arizona entities
  - Springerville, Cholla, and Navajo Generating Stations are jointly owned by out-of-state entities
  - Many NGCC plants in Arizona are owned by merchant providers
- For jointly owned resources, the portion of capacity not owned by Arizona utilities would not be available to serve Arizona

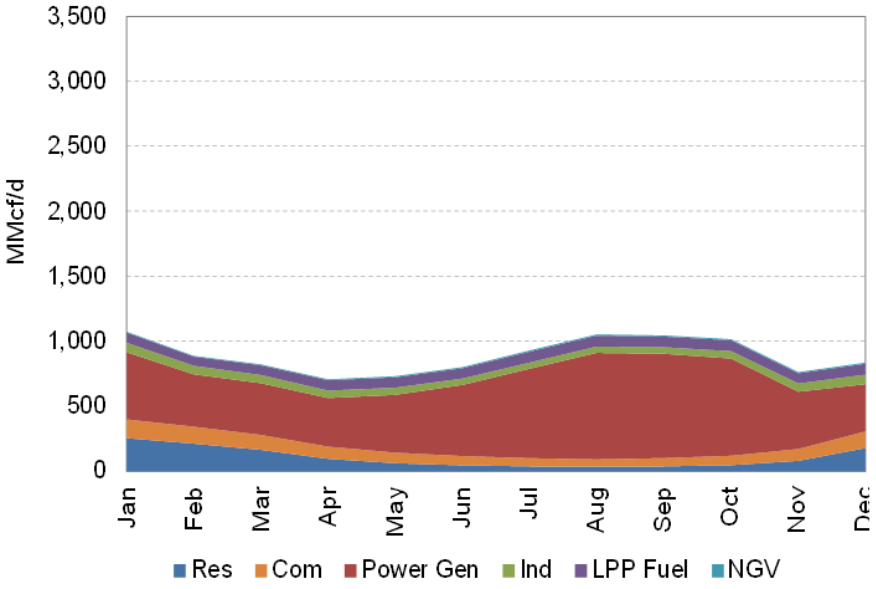
Natural Gas Infrastructure

No Natural Gas Storage

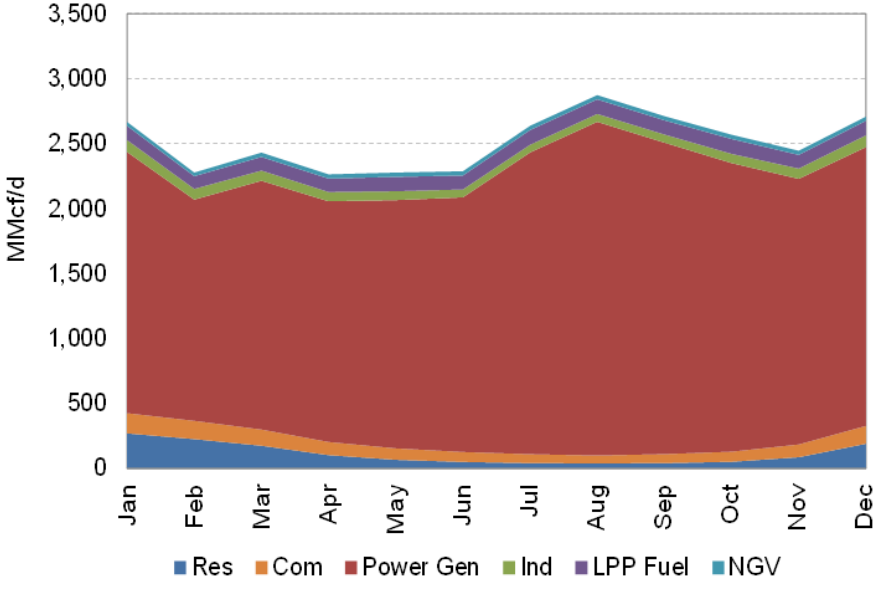


Monthly Arizona Natural Gas Needs 2015 vs Projected 2030 Building Block Scenario

2015 Monthly AZ Demand



2030 Monthly AZ Demand: EPA Clean Power Plan



Under the Clean Power Plan, Pace Global projects that Arizona's monthly peak profile will double from approximately 1,050 MMcf/d in 2015 to approximately 2,800 MMcf/d by 2030

Source: Pace Global.

Stranded Investment

	EPA Proposal	Proposed Solution	Delta (EPA– Proposed Solution)	Percent Change
2020-2030 Average Fuel + PP Costs ($/MWh)	$52.7/MWh	$37.9/MWh	$15/MWh	40%
2020-2030 Total Fuel + PP Costs ($Billion)	$62.2B	$44.5B	$17.8B	40%
2020 – 2030 Gas Capacity (MW)	10,125MW	7,825MW	2,300MW	29%
2020-2030 Capital Cost Investment ($Billion)	$8.1B	$6.2B	$1.9B	31%
Stranded Cost in 2020 Due to Early Coal Closures ($Billion)	$3.04B	n/a	n/a	n/a

Proposed Solutions for Arizona

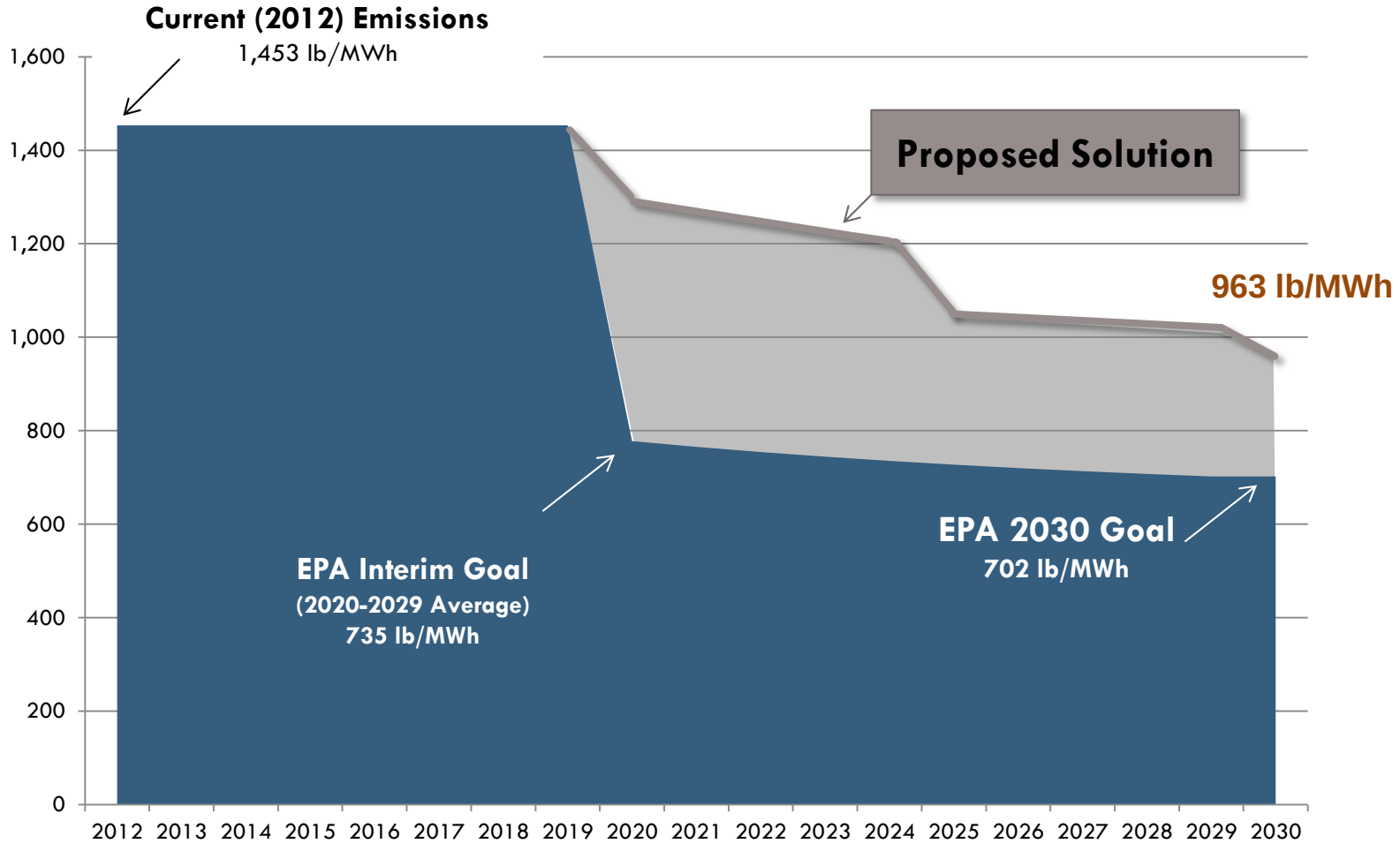
- EPA should account for "remaining useful life" of coal-fired power plants in establishing interim and final goals (similar to "book life" concept in EPA Notice of Data Availability) and adjust Building Block #2 re-dispatch schedule as follows:
  - Default re-dispatch date for all units is 40 years after startup date, or 2020, whichever is later
  - For EGUs that have installed a major pollution control retrofit (SCR, FGD, or baghouses)* prior to issuance of the final 111(d) rule, default re-dispatch date is 20 years after start of operation following addition of the major pollution control retrofit, or 2020, whichever is later
  - For EGUs that have been issued a permit incorporating a commitment to cease burning coal before the effective date of the final rule, re-dispatch date is the date of the commitment
- Allow states to set interim goals
- Apply appropriate natural gas emission rate

* For units owned by small entities as defined by FERC, a major pollution control retrofit would include equipment such as SNCR and ACI and would have to be installed prior to first year of compliance period (i.e., 2020)

Impact of Proposed Solutions on Arizona Goals

Arizona CO_2 Emission Rate Goals		
	Interim Goal (2020-2029)	Final Goal (2030)
EPA Proposed Arizona Goals	735 lbs/MWh	702 lbs/MWh
Adjusted Arizona Goals	**1,138 lbs/MWh**	**963 lbs/MWh**

Arizona's Carbon "Cliff" vs Proposed Solution

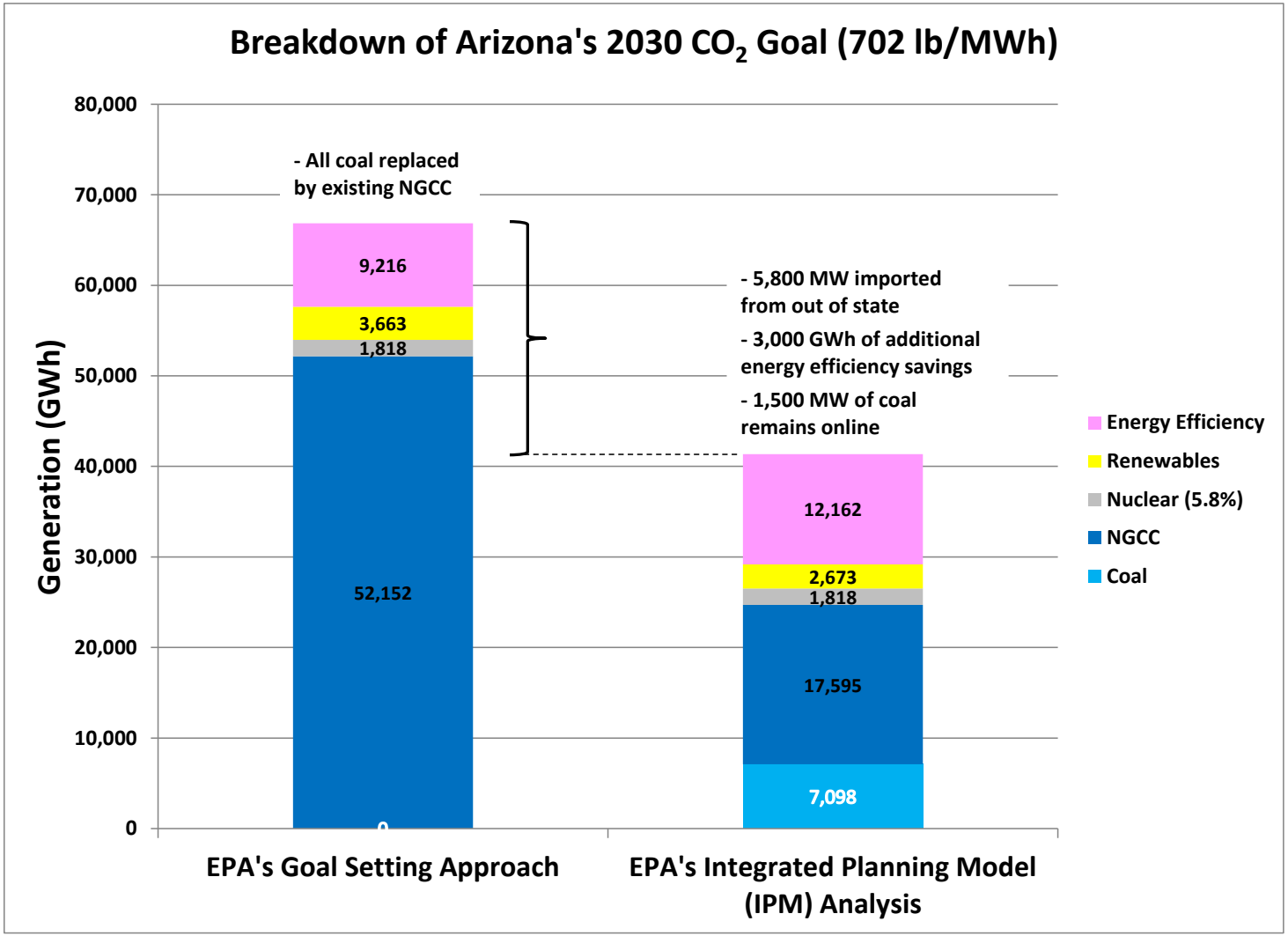


Recommendations to FERC

- Support the North American Electric Reliability Corporation's (NERC) analysis of EPA's proposal and any recommendations that NERC may offer.
- Support solutions like the Arizona proposal that would give states time and greater discretion in implementing the rule.
- Expedite approvals for new infrastructure necessary to implement the final rule.
- Encourage EPA to incorporate a detailed and thorough reliability analysis in the final rule prior to implementation.

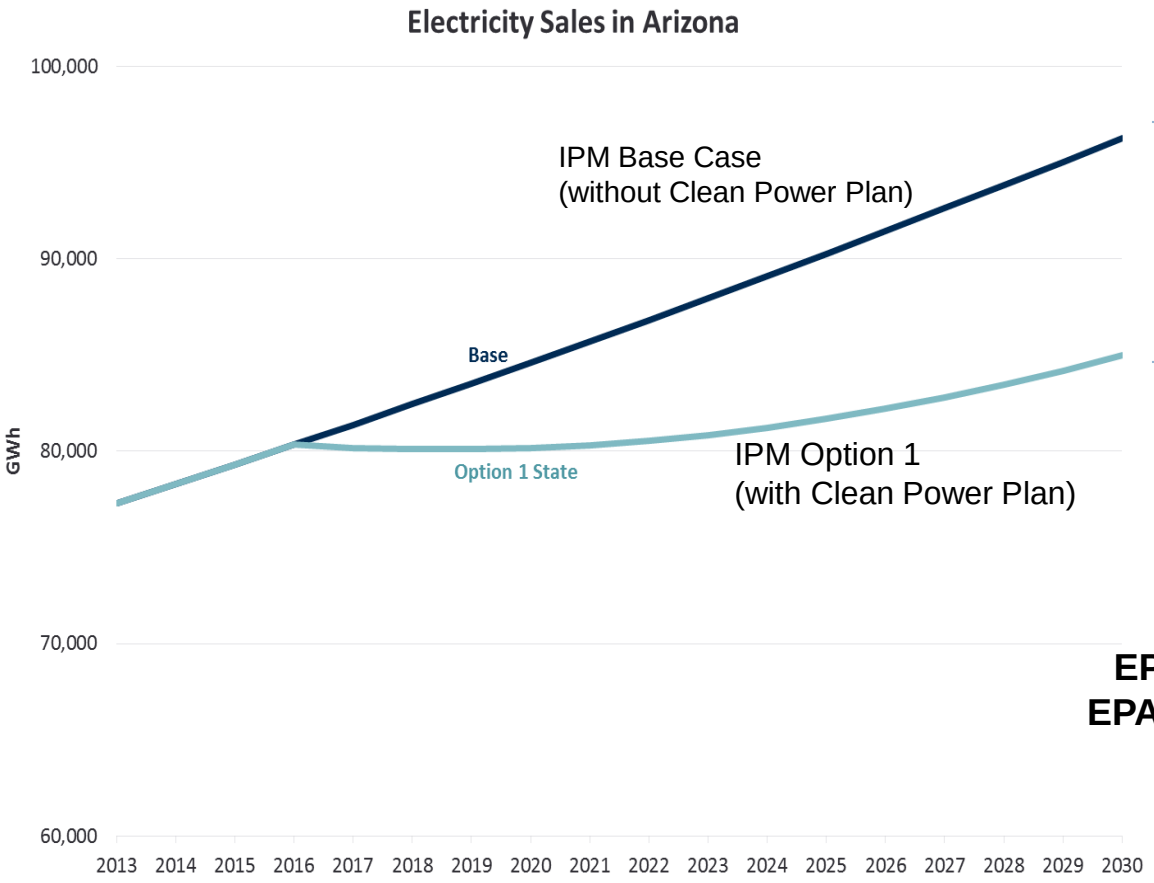
Questions?

How Arizona Meets CO_2 Goals in EPA's Reliability/Cost Modeling



Note: For "Option 1" case w/o Regional Cooperation

Concern #2 – Energy Efficiency Impacts May be Overestimated



Impact of Energy Efficiency (EE) Measures Assumed in IPM

EPA IPM Analysis: 12,162 GWh
EPA Building Block #4: 9,216 GWh

Source: EPA Technical Support Documentation, GHG Abatement Measures Scenario 1

Developed by The Brattle Group

Conclusions on EPA Modeling

- EPA's Reliability/Cost Modeling does not accurately assess the reliability implications associated with the proposed Clean Power Plan for Arizona.
- SRP encourages FERC to work with EPA to ensure that EPA's Reliability/Cost modeling reflects an accurate representation of Arizona's power system. Several changes could be considered, including:
  - Consider transmission constraints to assess whether Arizona can transition from being an exporter to importer in this short timeframe. Consider the reliability benefits of locating new NGCC plants in Arizona to replace retired coal capacity rather than out of state imports from the Pacific Northwest.
  - Consider additional scenarios that assume lower levels of energy efficiency measure adoption and peak hour performance to assess the associated reliability and cost implications.
  - Actual ownership arrangements for jointly owned power plants must be reflected in the model.

Background

- EPA proposed "Clean Power Plan" on June 2, 2014
- EPA claims plan will achieve a 30% reduction in U.S. carbon dioxide (CO_2) emissions from 2005 levels by 2030
- Two mandatory emission goals established for each state:
  - Interim goal (2020-2029) and final goal (2030)
  - Uses 2012 emissions as baseline
  - Goals expressed as an emission rate with ability to convert to a mass-based standard