



The Future of the U.S. Power Sector: Implications of the Clean Power Plan

Anthony Paul, Dallas Burtraw, Karen Palmer, Sophie Pan

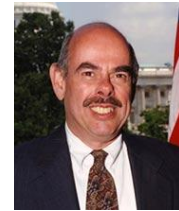
The Future of U.S. Climate Policy: Coal, Carbon Markets, and the CAA
Institute for Policy Integrity
New York University School of Law
October 28, 2014



RESOURCES
FOR THE FUTURE

The Context

- In 2009, Waxman-Markey passed in the US House of Representatives.



- Senate did not consider in floor vote.

- Cap and trade was declared dead.



- Meanwhile, US EPA proceeds developing regulations under the Clean Air Act.



- Obama 2013 Climate Action Plan foreshadows EPA's Clean Power Plan for existing power plants.



Background: Clean Power Plan

➤ Policy is implemented by the States

- EPA's technical findings determine state requirements based on best system of emissions reductions (BSER)
- State plans due to EPA by 2016 (extensions allowed)
- Compliance period begins in 2020

➤ Multiple pathways for States

- Example: rate-based or mass-based standard
- State plans must show equivalence to BSER

➤ States encouraged to work together

- Two-year deadline extension for multi-state plan

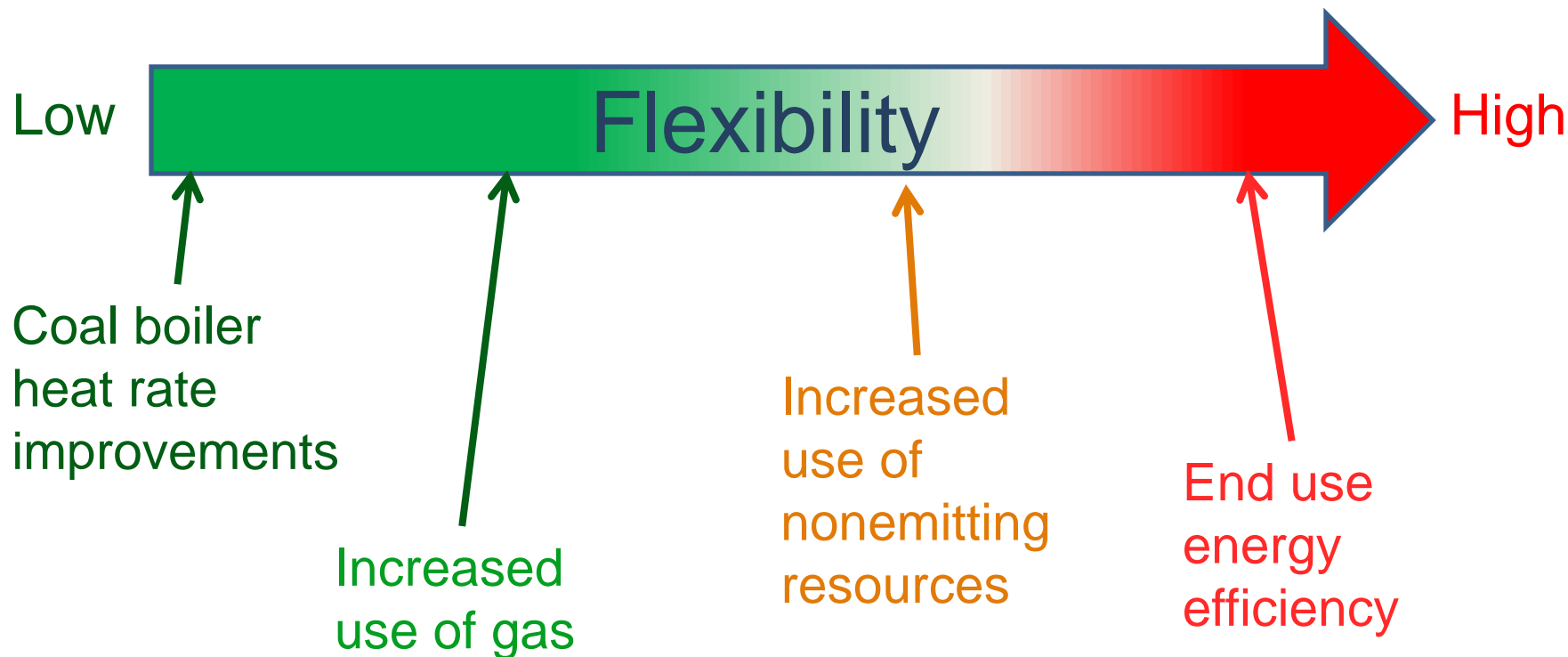
BSER: Building Blocks Translate to State Goals

<i>Technology/Building Block</i>	Proposed Option 1	Alternative Option 2
1. Heat rate improvement (Avg. Reduction for Coal)	6%	4%
2. Dispatch to existing and under-construction NGCC	Utilization of NGCC up to 70% capacity factor	Utilization of NGCC up to 65% capacity factor
3. Dispatch to new clean electric generation	Includes new nuclear generation under construction, moderate deployment of new renewable generation, and continued use of existing nuclear generation	
4. Demand-side Energy Efficiency (% reduction in demand from BAU MWh sales)	3.0% / 10.7% (2020 / 2030)	2.4% / 5.2% (2020 / 2025)
<i>Goal</i>	Proposed Option 1	Proposed Option 2
Average nationwide goal for covered sources (lbs/MWh)	25% to 30% below 2005 levels	20% to 25% below 2005 levels

- BSER is applied to observed state-level data (e.g., *best practice*) to set state-specific emission rate goals.

Flexibility, Stringency, Legal Risk are Intertwined

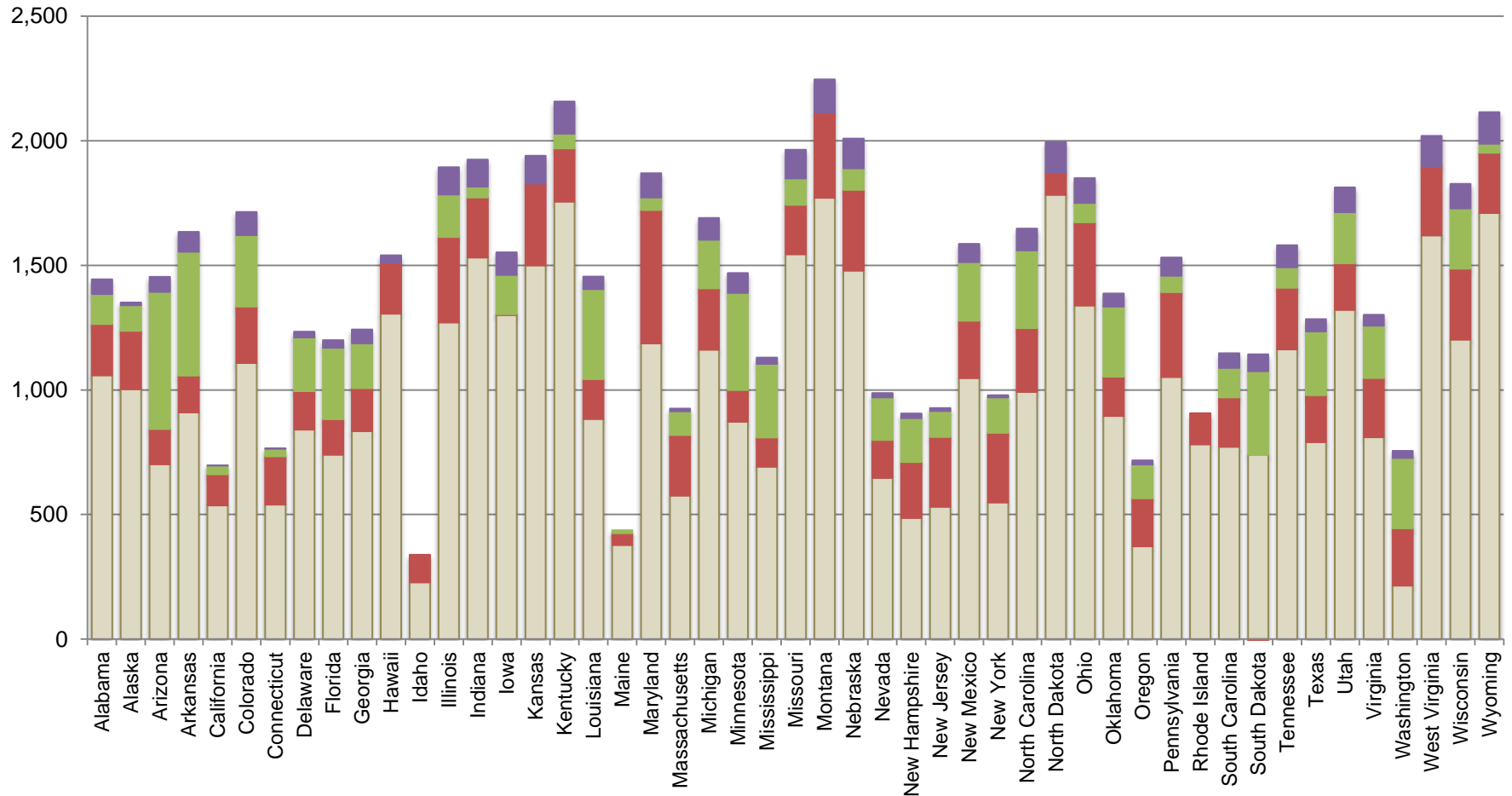
Stringency and Legal Risk



BSER: State Targets in 2030 Under Option 1

lb/MWh

Target Blocks 3 & 4 Block 2 Block 1



9 Questions on the Clean Power Plan

1. What is implied by conversion of targets from rate to mass?
2. What level of emissions reductions is implied by the targets?
3. *What if the building blocks are severed?*
4. Is carbon pricing necessary or could portfolios suffice?
5. What are the consequences of rate vs. mass policy?
6. What are the incentives for new NGCC and should it be covered?
7. How does allowance allocation affect policy performance?
8. What are the benefits (gains from trade) of regional cooperation?
9. What is the roll for energy efficiency and who will pay for it?

4. What if the building blocks are severed?

- EPA's formula for emissions rate targets:

$$\frac{lb}{MWh} = \frac{\text{Fossil Emissions}}{\text{Fossil Generation} + \text{Renewables Generation} + \text{Energy Efficiency}}$$

- The “covered” technologies count toward compliance.
- EPA published 4 targets for the 4 building blocks on 4 different versions of the “covered” technologies.
- What happens if the building blocks are severed and the formula is adjusted for “covered” technologies?

4. What if the building blocks are severed?

The “covered” technologies adjust in the formula

$$\frac{lb}{MWh} = \frac{Fossil\ Emissions}{Fossil\ Generation + Renewables\ Generation + Energy\ Efficiency}$$

New York Targets in the Clean Power Plan (2012 Rate: 978 lb/MWh):

Building Blocks	EPA Target for 2030 (lb/MWh)	Covered Techs	Adjusted Formula (lb/MWh)
1,2,3,4	549	Existing Fossil, All RE, EE	see above
1,2,3	652	Existing Fossil, All RE	$\frac{Fossil\ Emissions}{Fossil\ Generation + Renewables\ Generation}$
1,2	828	Existing Fossil , Existing RE	$\frac{Fossil\ Emissions}{Fossil\ Generation + Existing\ Renewables\ Generation}$
1	970	Existing Coal , Existing RE	$\frac{Coal\ Emissions}{Coal\ Generation + Existing\ Renewables\ Generation}$

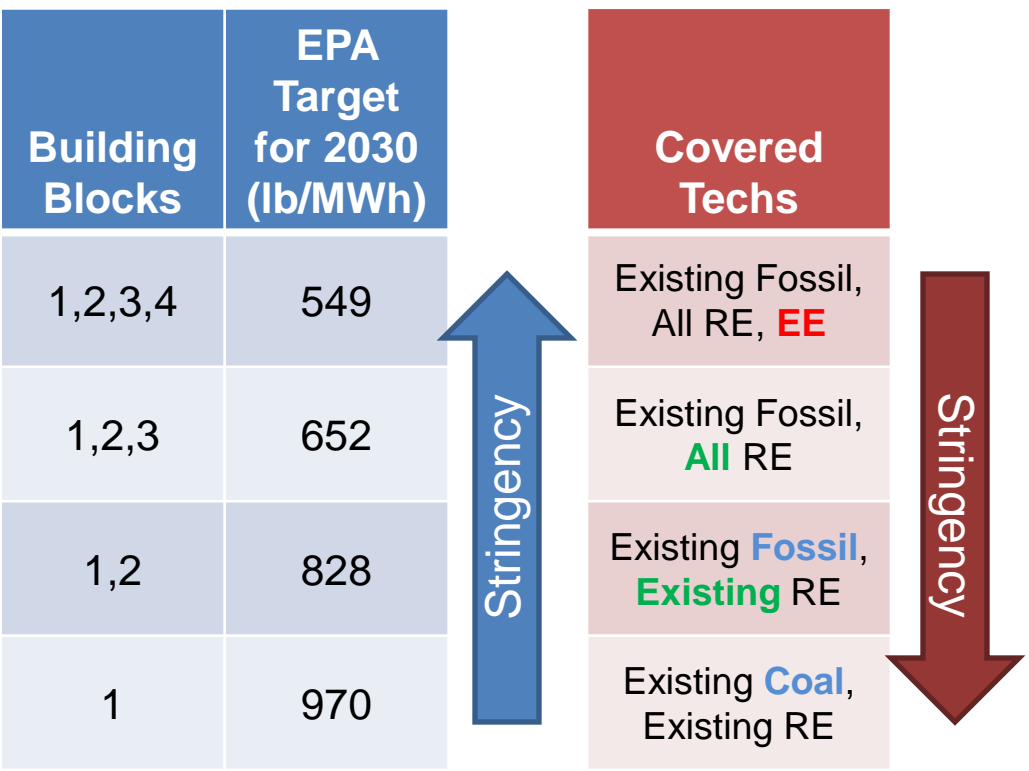


4. What if the building blocks are severed?

Stringency of each target depends on the “covered” technologies

$$\frac{lb}{MWh} = \frac{Fossil\ Emissions}{Fossil\ Generation + Renewables\ Generation + Energy\ Efficiency}$$

New York Targets in the Clean Power Plan (2012 Rate: 978 lb/MWh):



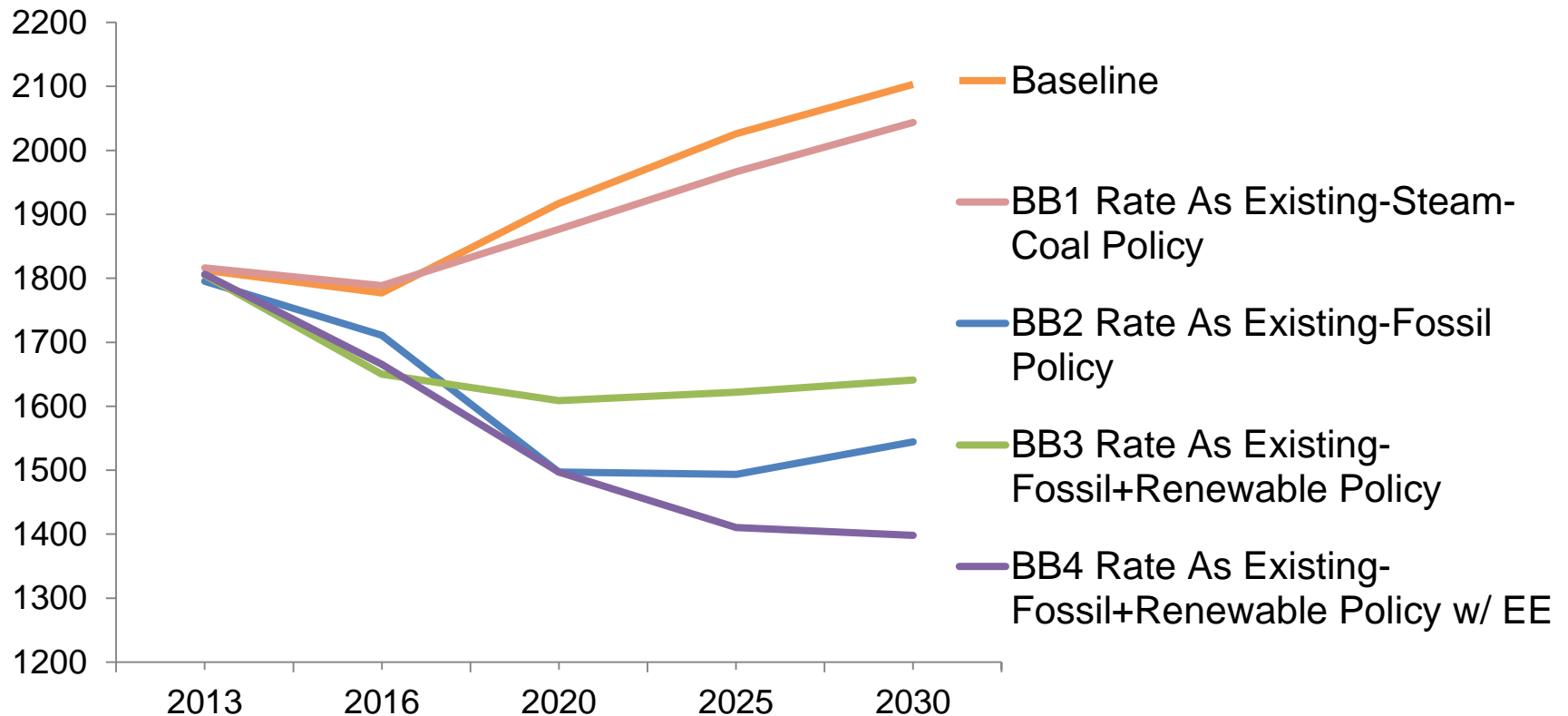
What is the overall impact of each building block?



4. What if the building blocks are severed?

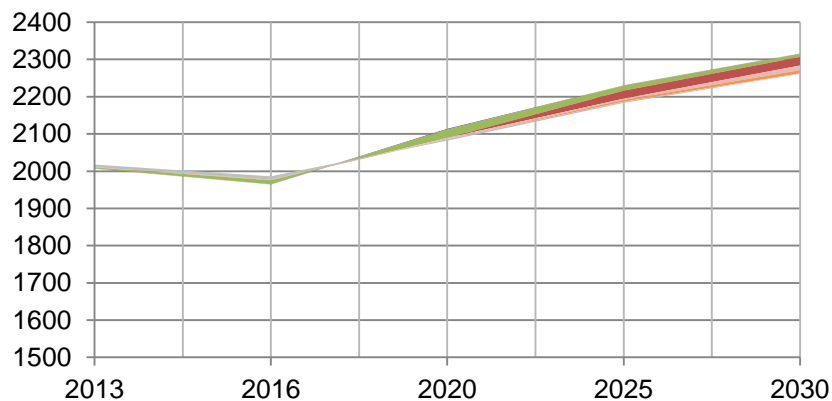
BB #2 is most stringent. BB #3 is negative!

National Electricity Sector CO₂ Emissions (M tons)

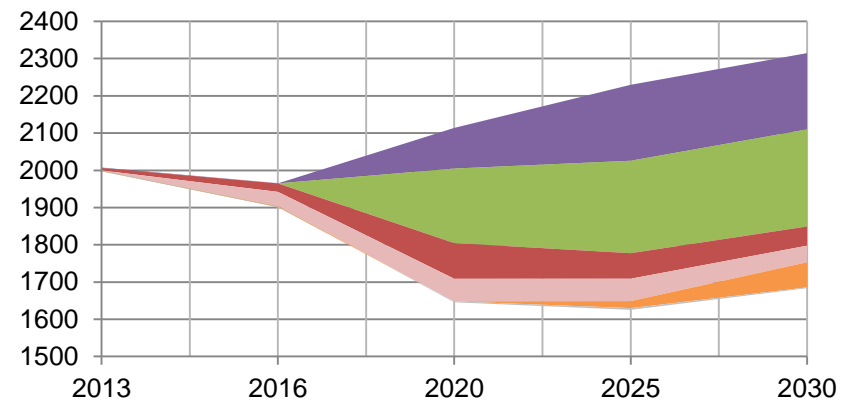


Emissions: Sources of Emissions Reductions (M short tons)

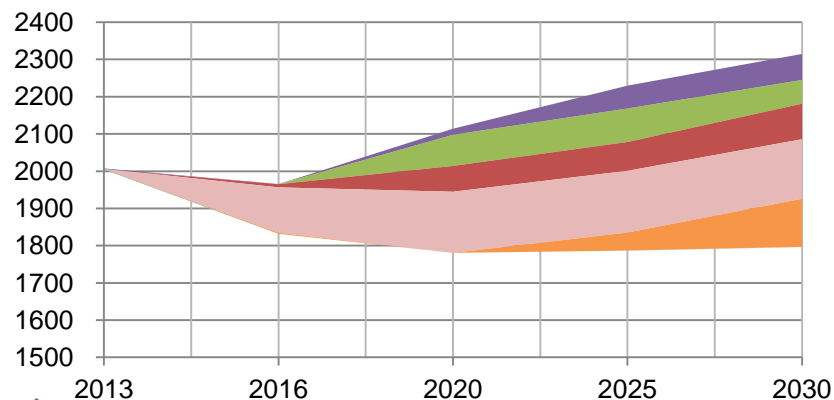
**BB1 Rate As
Existing Coal Policy**



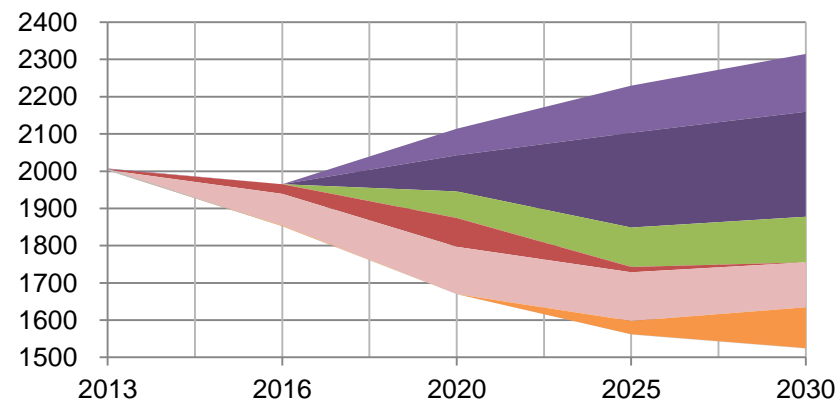
**BB2 Rate As
Existing Fossil Policy**



**BB3 Rate As Existing
Fossil+Renewables Policy**



**BB4 Rate As Existing
Fossil+Renewables Policy w/ EE**



■ Demand Reduction ■ EE Savings
■ New CC Nat Gas ■ Wind

■ Existing CC Nat Gas
■ Nuclear

Conclusions

- Building blocks and stringency
 - Flexibility, stringency, legal risk are intertwined
 - *Emissions rate target* stringency **falls** as building blocks fall
 - *Covered tech* stringency **rises** as building blocks fall
- Emissions reductions in the building blocks
 - Most of the emissions reductions are in building block #2
 - Building block #3 actually raises emissions