

Allowance Allocation and other CO₂ Policy Design Issues for the Electricity Sector

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Climate Policy and Electricity: Key Issues in Policy Design

- *Allocation of Allowances*
 - *free versus auction*
 - *compensating firms*
 - *compensating consumers*
 - *role of states*
- *Point of Compliance*
 - *generator*
 - *load based compliance*
 - *first seller approach*

Annual Asset Value of Emission Allowances

Venus



Earth



Jupiter



Neptune



NO_x

\$1.7 Billion

SO_2

\$2.7 Billion

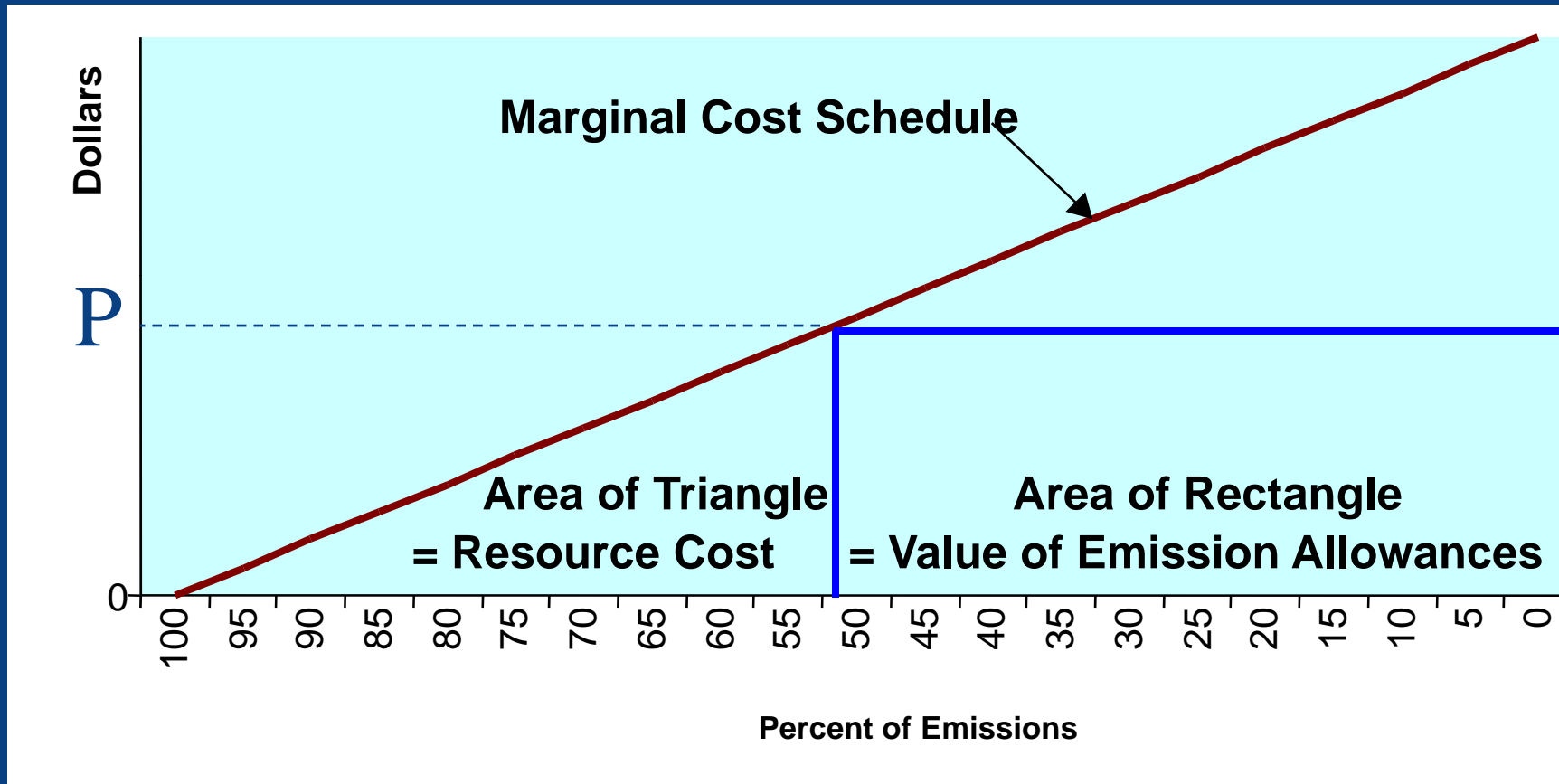
CO_2 - 34%

**Reduction (Kyoto)
Economy Wide
\$450 Billion**

CO_2 - 7%

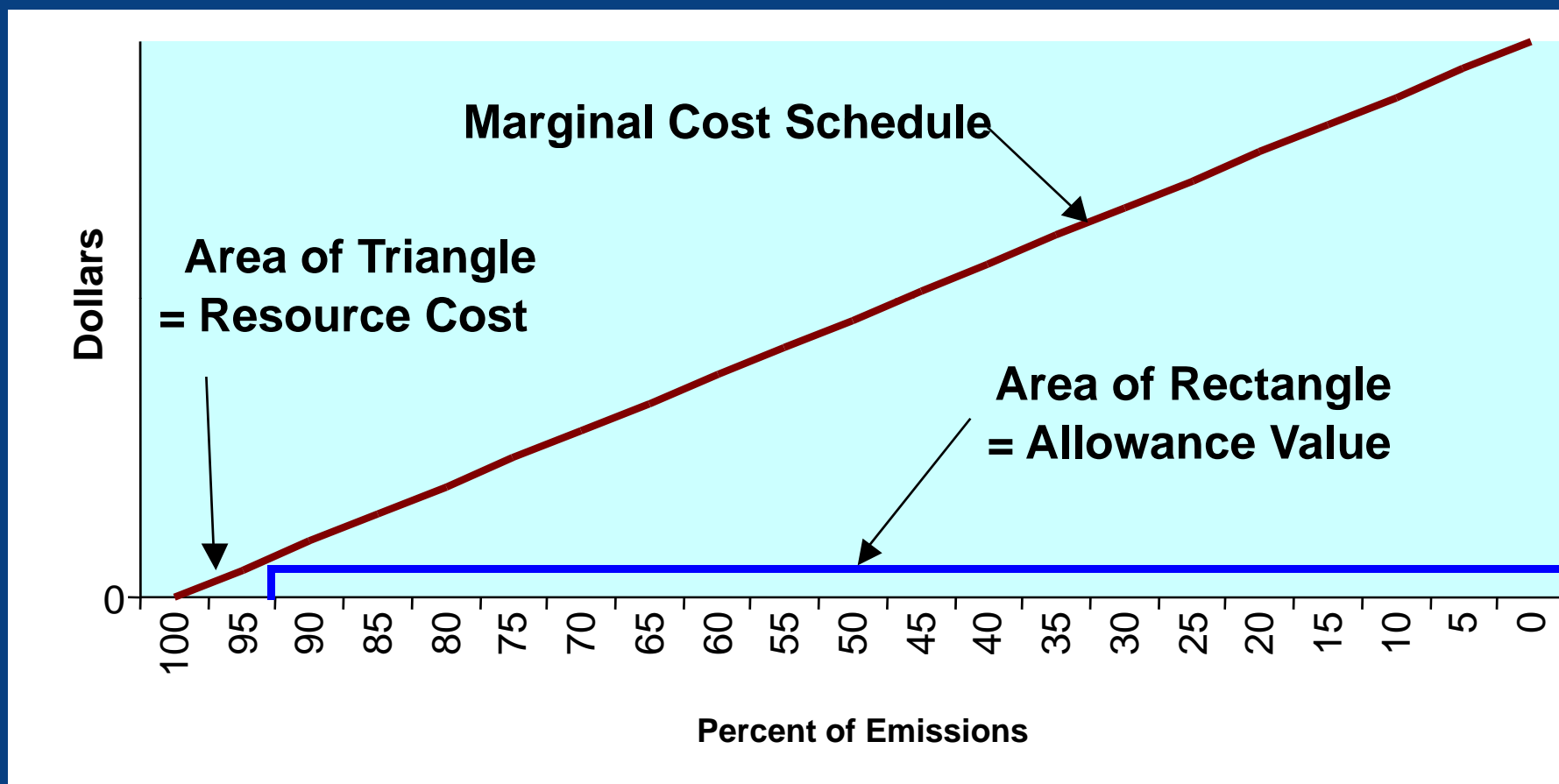
**Reduction
in Electricity
\$56 Billion**

The Previous SO₂ Trading Program Aimed at 50% Reductions



→ Value of permits = 2 times the cost of emission reductions

Why Carbon is Special...



→ Value of Permits = 20 times Total Cost

What is academic advice on the distribution of emission allowances?

- Economics literature broadly finds there are significant efficiency advantages to auctioning emission allowances.

Why give any allowances away for free?

1. Compensation

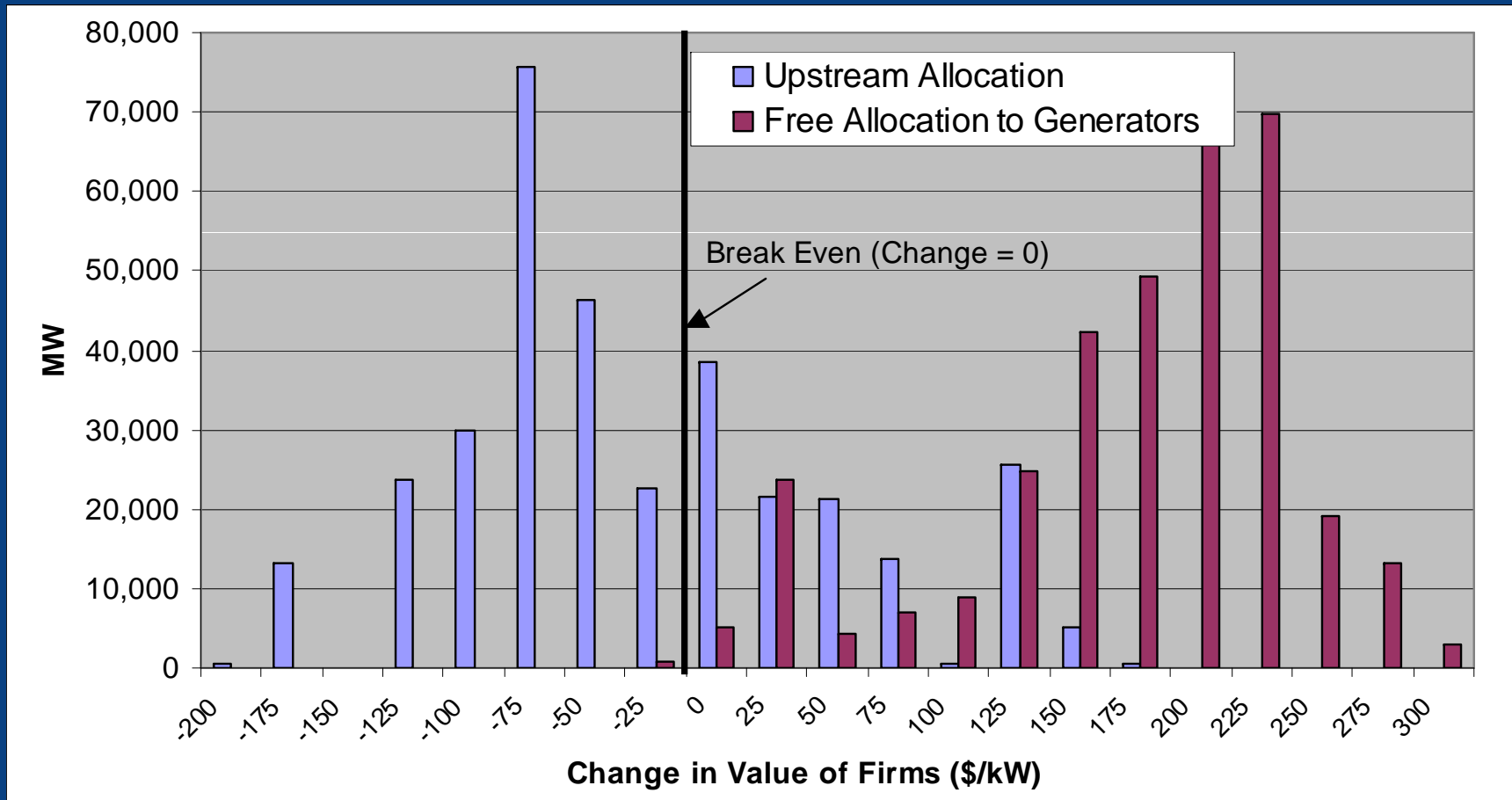
- But 100% free allocation can dramatically over-compensate affected firms at expense of consumers raising concerns about **equity** (“*windfall profits*”).
- Consumers bear 8 times the cost born by producers.

2. Promote Technology

3. Protect Competition

- All these goals could also be achieved with auction revenue.

Distribution of Costs to Electricity Generating Firms in Competitive Regions under Original NCEP/Bingaman Proposal



NPV of CO₂ Emission Allowances = \$141 billion

Losses at Industry Level (-\$9b)

Losing Facilities (-\$50b)

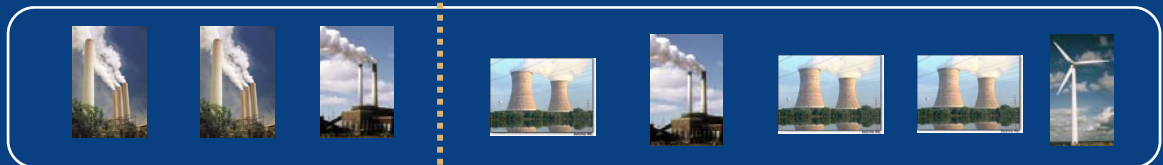
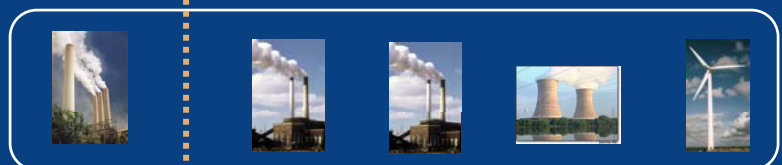
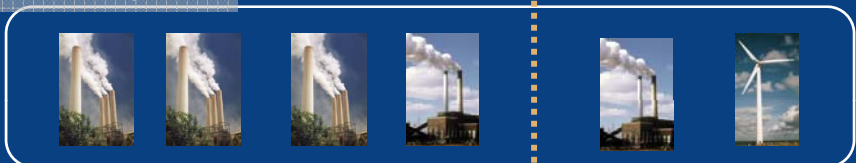
Winning Facilities (+\$41b)

Losing Firms (-\$14b)

Breakeven

Winning Firms (+\$5b)

Firm A
Firm C



Firm B
Firm D



RESOURCES FOR THE FUTURE

Change in Market Value of Individual Assets (billion dollars)

0

(+)

Compensating Generators with Free Allocation

- Nationally the loss in market value in electricity is ~ 6% of total allowance value. This mixes winners and losers.
- Losses to losing firms total ~ 11% of allowance value.
- Could limit over-compensation by targeting free allocation to most affected firms based on emission rates and generation mix.
- The best decision rules (implemented at a national level) we find require over 50% of allowance value, the difference accruing as windfall profits.
- To compensate the last \$2.6 billion in harm requires \$24 billion in allowance value.

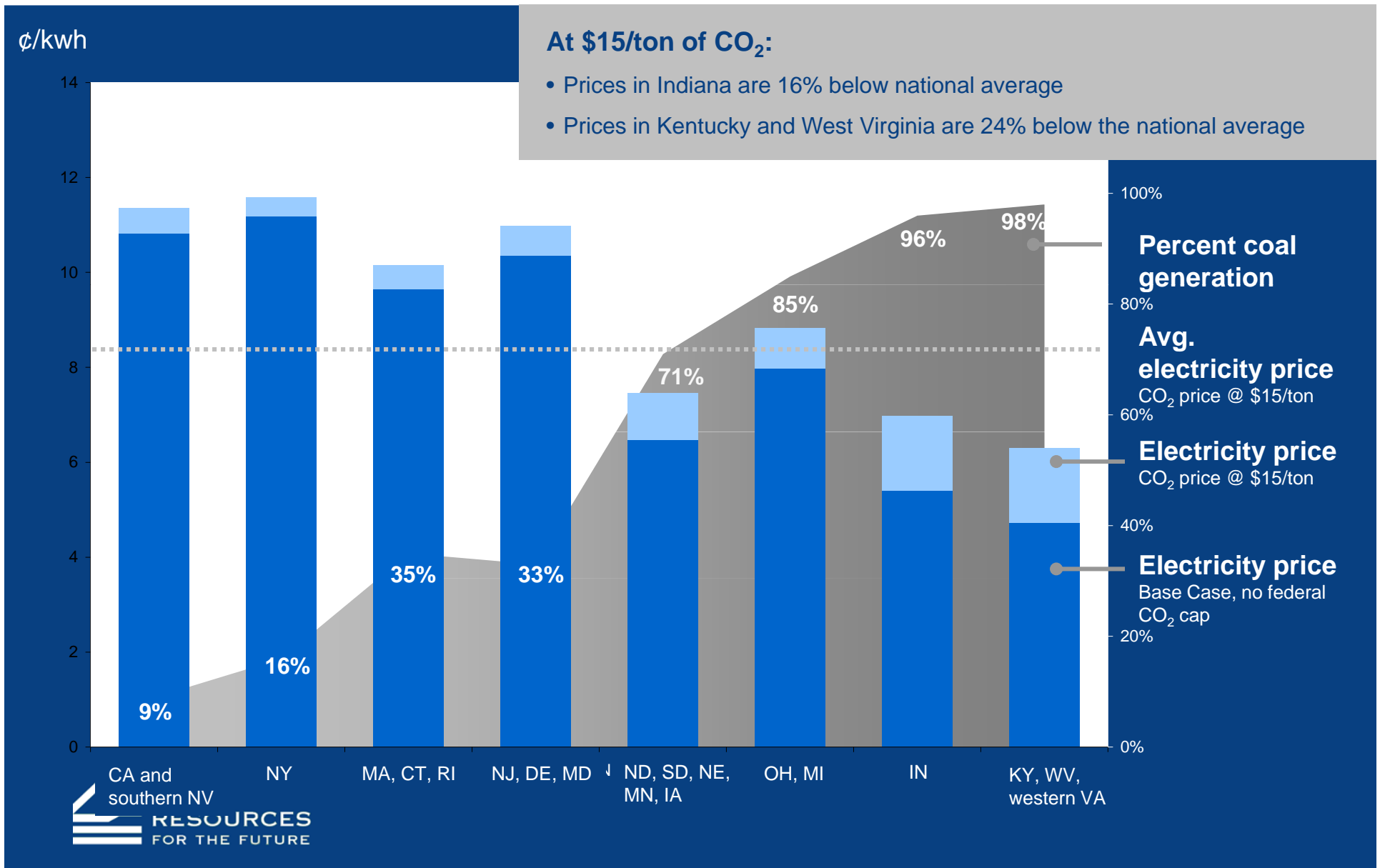
The cost-effectiveness can be improved by:

- Apportioning allowances to states and applying decision rules at the state level reduces cost by half.
- Incomplete compensation improves cost-effectiveness (reduces portion accruing as windfall profits).
- Nonetheless compensation for firms is problematic and erodes efficiency.

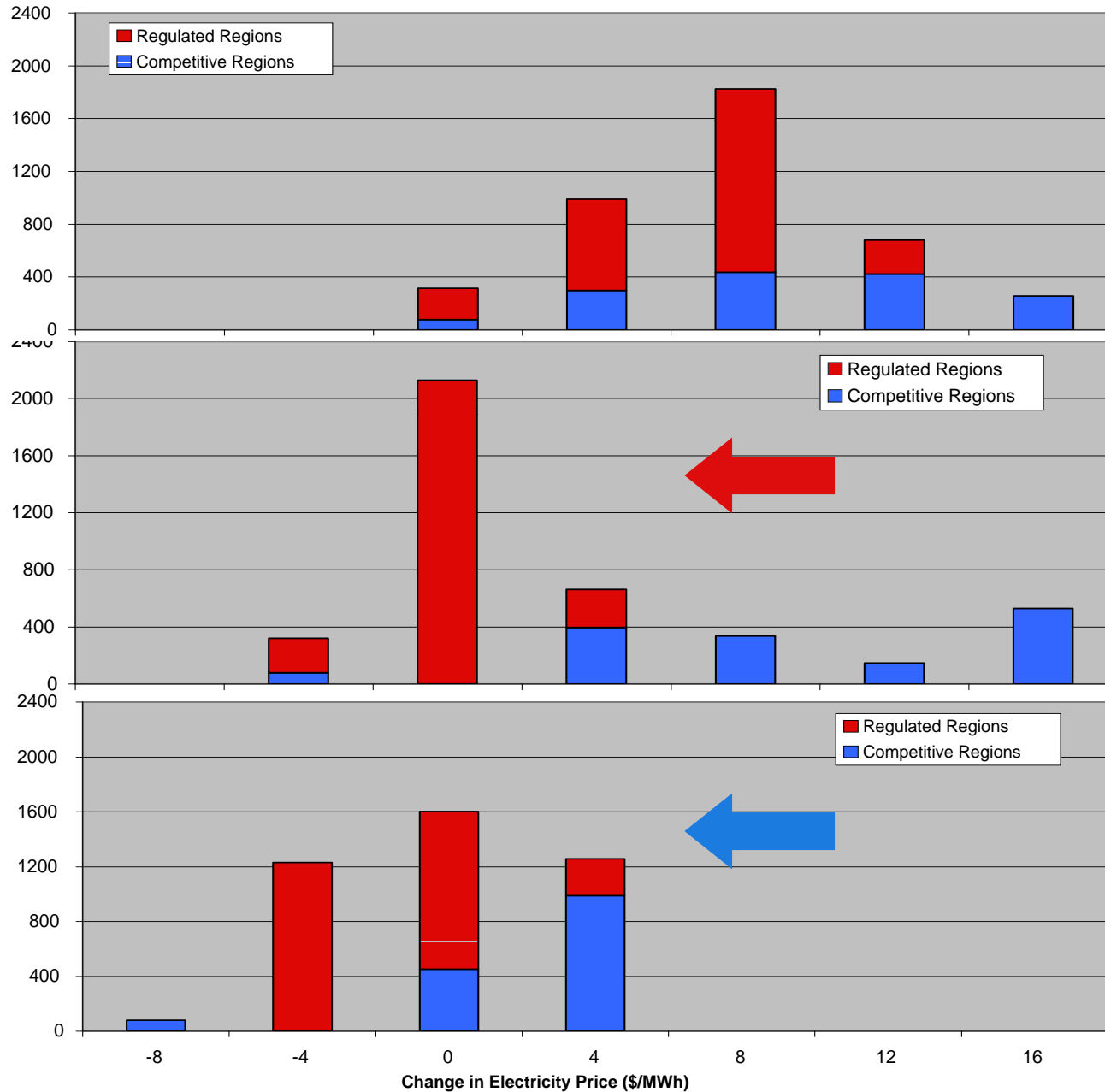
Regional Differences Are a Huge Challenge to Federal Policy

- Firms are compensated in two ways:
 1. (Maybe) Free allocation of allowances.
 2. Change in electricity price.
- How costs are recovered depends on regulatory status. Two models with large differences for firms and consumers
 - Deregulated/Competitive Generation Markets
 - Cost-of-Service Regulation

CO₂ compliance costs are projected to increase electricity prices the most in coal-intensive parts of the U.S. However, prices in higher CO₂-emitting states remain well below the national average.



McCain-Lieberman: Electricity Price Effects of Allowance Allocation



Auction

Efficiency Advantage
 Lowest Social Cost
 but Higher Prices

Free Allocation to Generators

Reduces Price in
 Regulated Regions

Free Allocation to Load

...But, Allowance Price
Increases by 15% With Subsidy
 to Electricity
 Consumption

Free Distribution to Electricity Consumers Can Have a Significant Efficiency Cost Also!

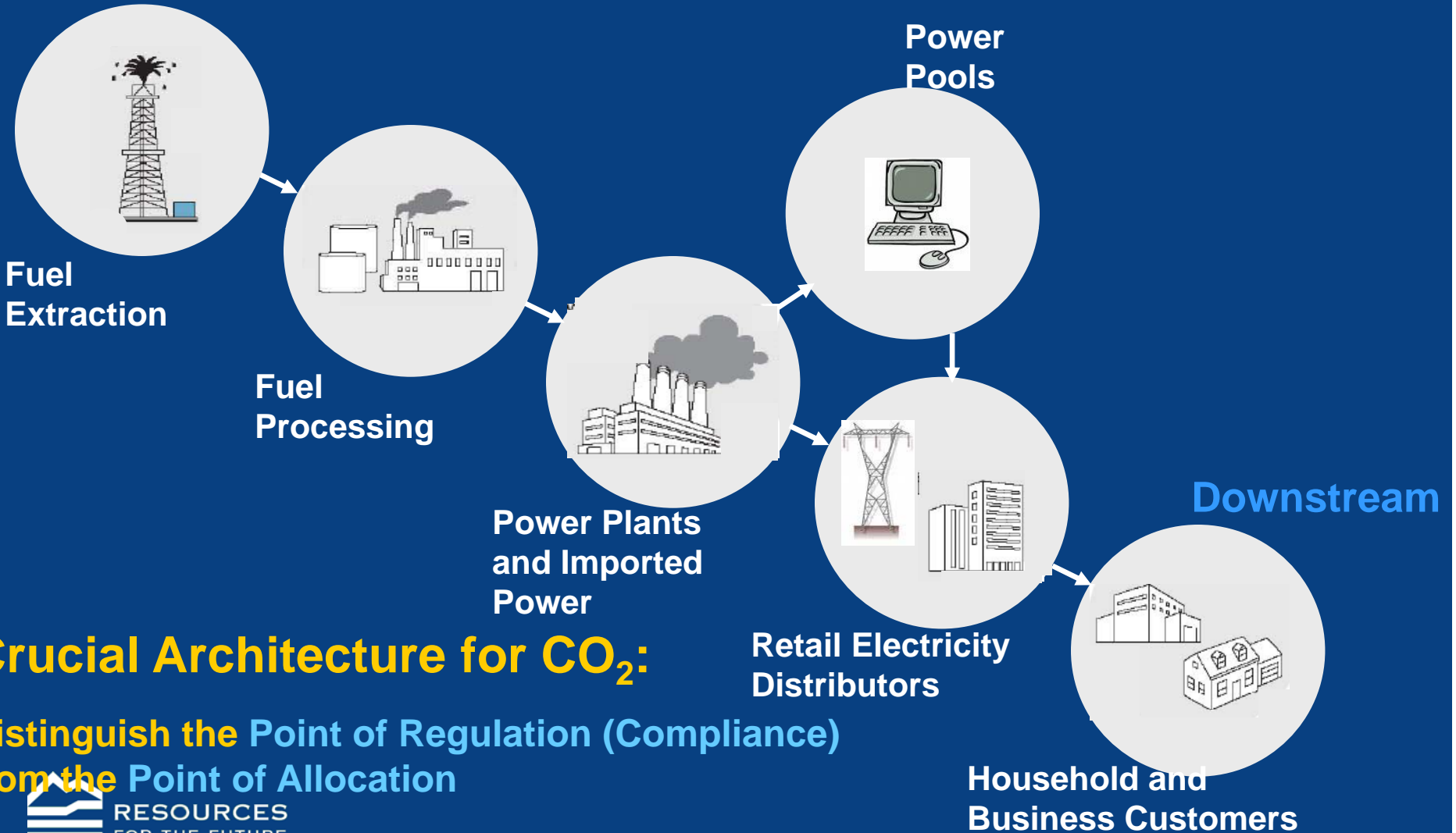
- Allocation to load constitutes a windfall to consumers through a subsidy of electricity prices
 - The parochial assignment of value or subsidy of prices to one sector of the economy will:
 - ✓ Lead to different marginal costs and levels of effort across economy
 - ✓ Greatly increase social cost of climate policy
- ➔ Candidate: Allocation to Load as Transition to Auction?

State and Regional Initiatives

- *Under federal cap, state initiatives may be impotent*
 - *Federal cap establishes an emission floor*
 - *Emission reductions here made up by increase there*
- *Architecture may fix the problem...*
 - *Federal target a composite of state goals*
 - *Apportionment to states, who may retire allowances*
 - *By what formula:*
 - Consumption?
 - Emissions?
 - Generation?
 - Population?

Where in the Electricity Fuel Cycle Should GHG Policy be Enforced?

Upstream



Crucial Architecture for CO₂:

**Distinguish the Point of Regulation (Compliance)
from the Point of Allocation**

Where in the Electricity Fuel Cycle Should GHG Policy be Enforced?

- **Upstream?** If not, then one of the following:
 - ❖ **Source-Based Approach** (SO₂, NO_x, RGGI, EU ETS)
 - ❖ **Load-Based Approach** (CA PUC's approach)
 - Retail distribution company would surrender allowances for emissions used to meet load
 - Ex post estimates of emissions from instate and imported power
 - ❖ **First-Seller Approach** (CA MAC recommendation)
 - Compliant party is entity that first sells power onto the grid
 - For instate generation it is sources/marketers
 - For imported power it is the party identified on transmission documents

Solution: First-Seller Approach

1. LB makes some sense, but it is not a market. It is increasingly flexible, increasingly smart regulation. It has poor incentives and accountability for emission reductions.
2. Organization and vision of GHG market and electricity market are inherently linked. LB is not consistent with electricity market reform and greater reliance on spot markets.
3. Justifications for LB about behavioral economics are imprecise.
4. The hidden agenda to soften electricity prices hinges on allocation to load, not LB compliance. Further, there is no off-ramp under LB. This will create a “windfall to electricity consumption,” raise allowance prices and social costs of GHG policy.

Conclusion

- *Electricity consumers, not generators, bear most of the cost of a climate policy.*
- *Compensating generators with free allocation is expensive, but can be done more efficiently through apportionment to states.*
- *Allocation to load can reduce regional differences in effects on consumers, but will not provide efficient incentives for energy efficiency.*
- *Compliance should be on generators or first sellers, not load serving entities.*
- *Point of compliance and point of allocation need not be the same.*
- *Phase in may be necessary, but ultimate approach to allocation should be an auction.*