Electricity Policy Interactions: Climate, Renewables, & Demand Efficiency

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Outline

- Summary of policy instruments
  - climate, renewables, demand efficiency
- Discussion of policy interactions
- Haiku Electricity Market Model & scenarios
- Simulation results
  - climate ↔ renewables
  - climate ↔ demand efficiency

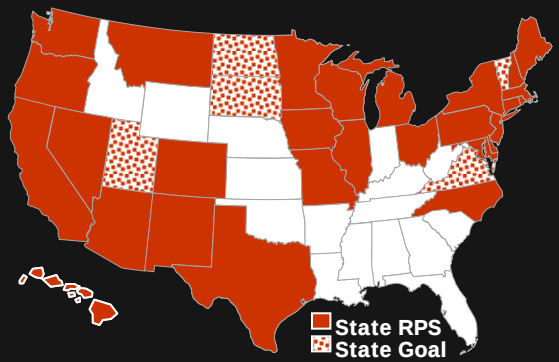
Climate Policy

- Carbon Tax vs. Cap & Trade
- Cap & Trade has many elements
  - allowance allocation: auction, grandfathering, updating, etc
  - banking & borrowing, offsets, safety valve, etc
- Outside of the Electricity Sector
  - point of compliance, border-tax adjustments, etc

- today: Cap & Trade w/Auction and no bells or whistles

Renewables Policy

- Renewables Portfolio Standards (RPS)
  - currently in place in 28 states & DC
  - specifics vary widely
    - level (10%-30%) & timing (2010-2025)
    - qualifying technologies & regions, types of utilities, etc
  - national policy is possible



- Renewable Energy Production Tax Credit (REPTC)
  - federal subsidy in place since 1992 with frequent lapses and unknown future

- today: National RPS & REPTC

Demand Efficiency

- No single policy instrument dominates
  - Standards, subsidies to efficient end-use capital, information campaigns, programs targeting low-income households, energy audits, etc all play a role.
  - Utilities, states, and federal government all play a role.
  - This great mash is likely to persist, but with more funding.
- Prominent in climate policy revenue allocation schemes

- today: Demand Conservation Incentive

Policy Complementarity

- Climate policy reinforces and is reinforced by both renewables policy & demand efficiency policy.
- CO_2 cap & trade (or tax) would induce
  - higher electricity prices and thus
    - lower levels of consumption and improved *demand efficiency*
  - cleaner electricity supply and more *renewables*
- Allowance prices (or emissions) would decline under
  - expanded *renewables* policy
  - improvements in *demand efficiency*

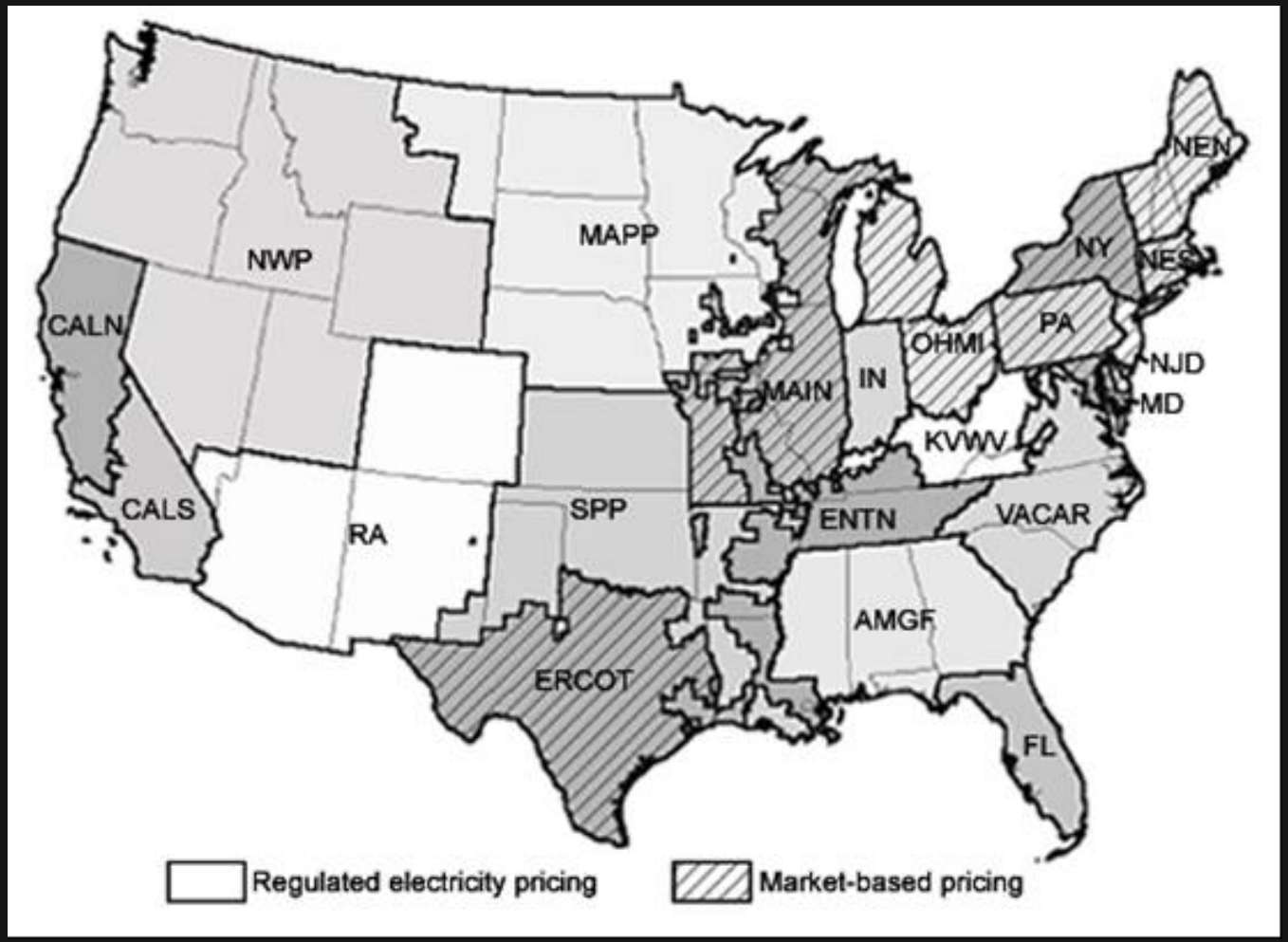
Policy Interactions Questions

- Climate ↔ Renewables
  - Will climate policy induce enough renewables to render RPS non-binding?
  - What will be the RPS contribution toward climate goals?
- Climate ↔ Demand Efficiency
  - What level of consumption reductions will be achieved by climate policy alone?
  - What additional contribution can demand efficiency policy make toward climate policy compliance?

Haiku
the RFF Electricity Market Model

- Simulation model with scenario flexibility on:
  - Electricity market regulatory institutions
    - regulation, competition, time-of-use pricing
  - Policies for abatement of airborne emissions
    - cap and trade, emissions taxes, portfolio standards, tax credits, etc
  - Cap-and-trade details
    - allowance allocation, banking, safety valve, offsets
- Space, Time, Technology
  - Continental U.S. divided into 21 regions.
  - 3 seasons * 4 times of day = 12 time blocks per year through 2030.
  - 49 model plants per region represent generators with technical similarities.

Haiku Market Regions



Haiku
Key Endogenous Components

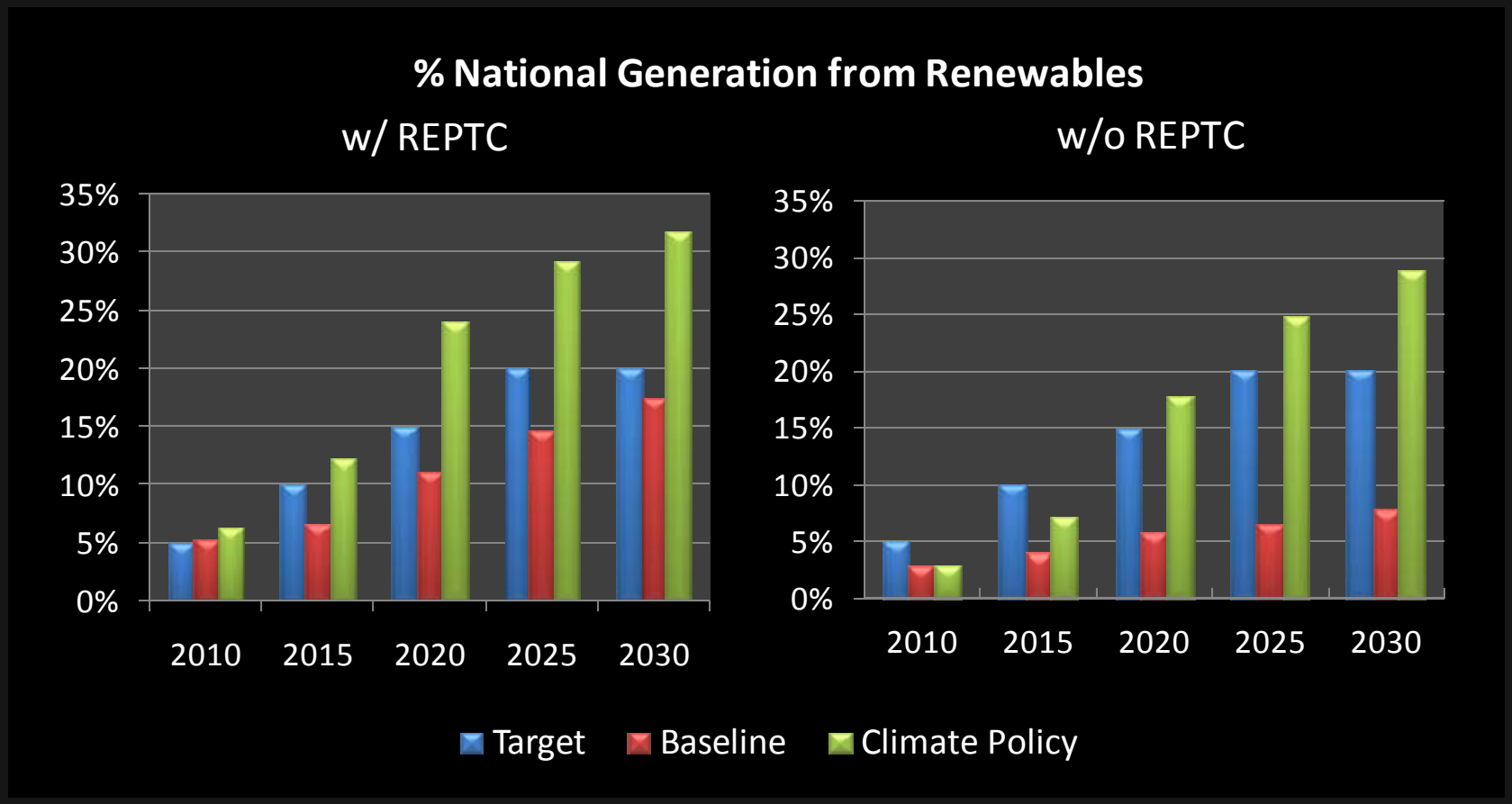
- Electricity prices & demand
- Generation capacity investment & retirement
- System operation & interregional power trading
- Pollution abatement investment & emissions
  - NO_x, SO_2, CO_2, mercury
- Allowance markets
- Fuel markets

Modeling Scenarios

- Baseline
  - calibrated to AEO07 and includes REPTC, CAIR, & RGGI
- Policies
  - climate: based on Lieberman-Warner (S.2191) w/auction
  - renewables:
    - RPS of 5% in 2010 to 20% by 2025, nuclear and hydro don't qualify
    - REPTC (based on EPACT) of $19/MWh for wind, geothermal, biomass
  - demand efficiency: 25% of allowance revenue to DCI

Climate → Renewables
Will climate policy satisfy RPS goals?

- Yes, maybe…



Climate ← Renewables
What are the climate benefits of RPS?

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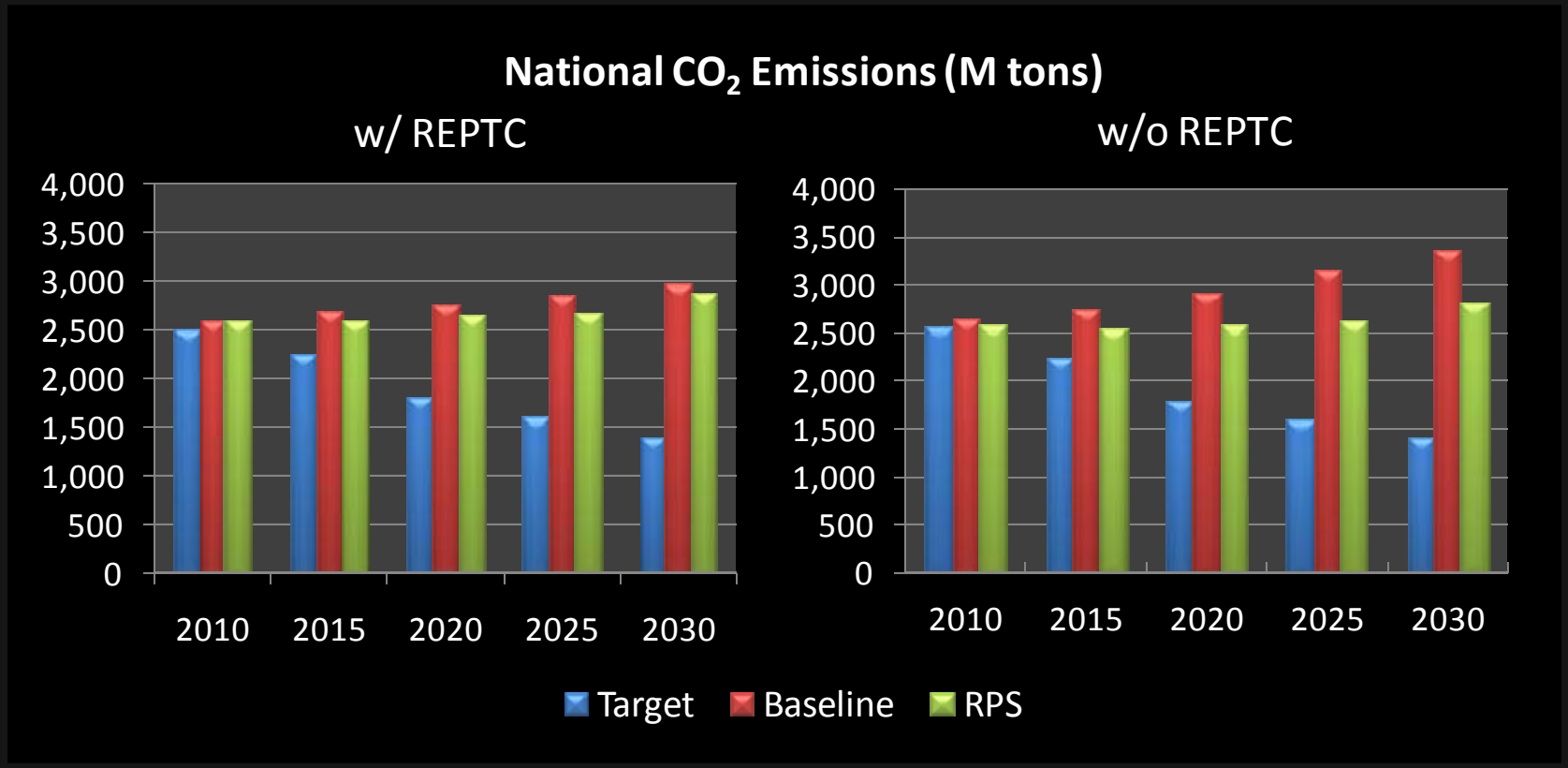
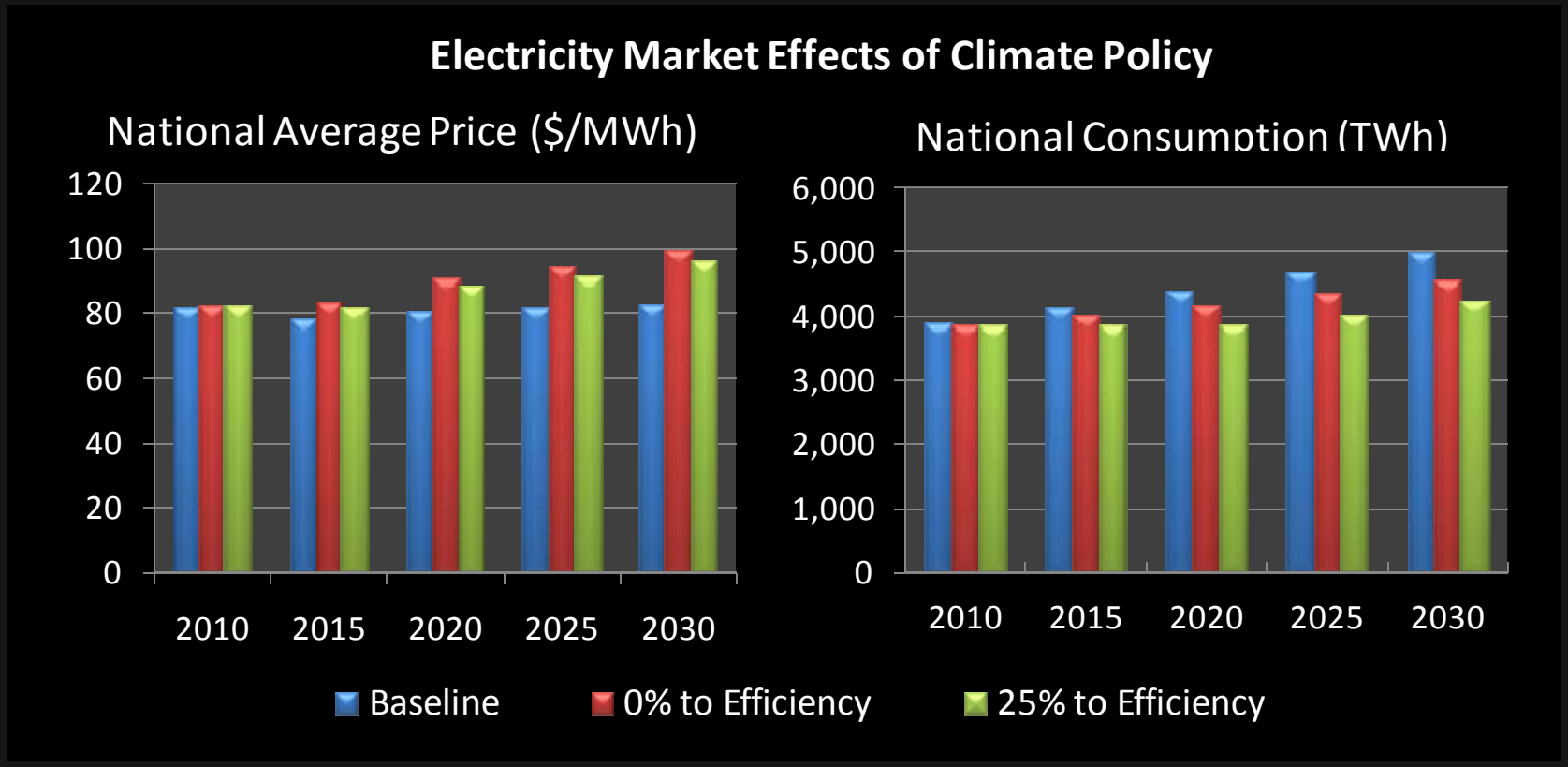
results

- Small if REPTC is the alternative. Larger if not.
- Less than half of target reductions.



Climate → Demand
Will climate policy reduce consumption?

- Yes, and even more with funding for efficiency.



Climate ← Demand Efficiency

Will demand efficiency help climate compliance?

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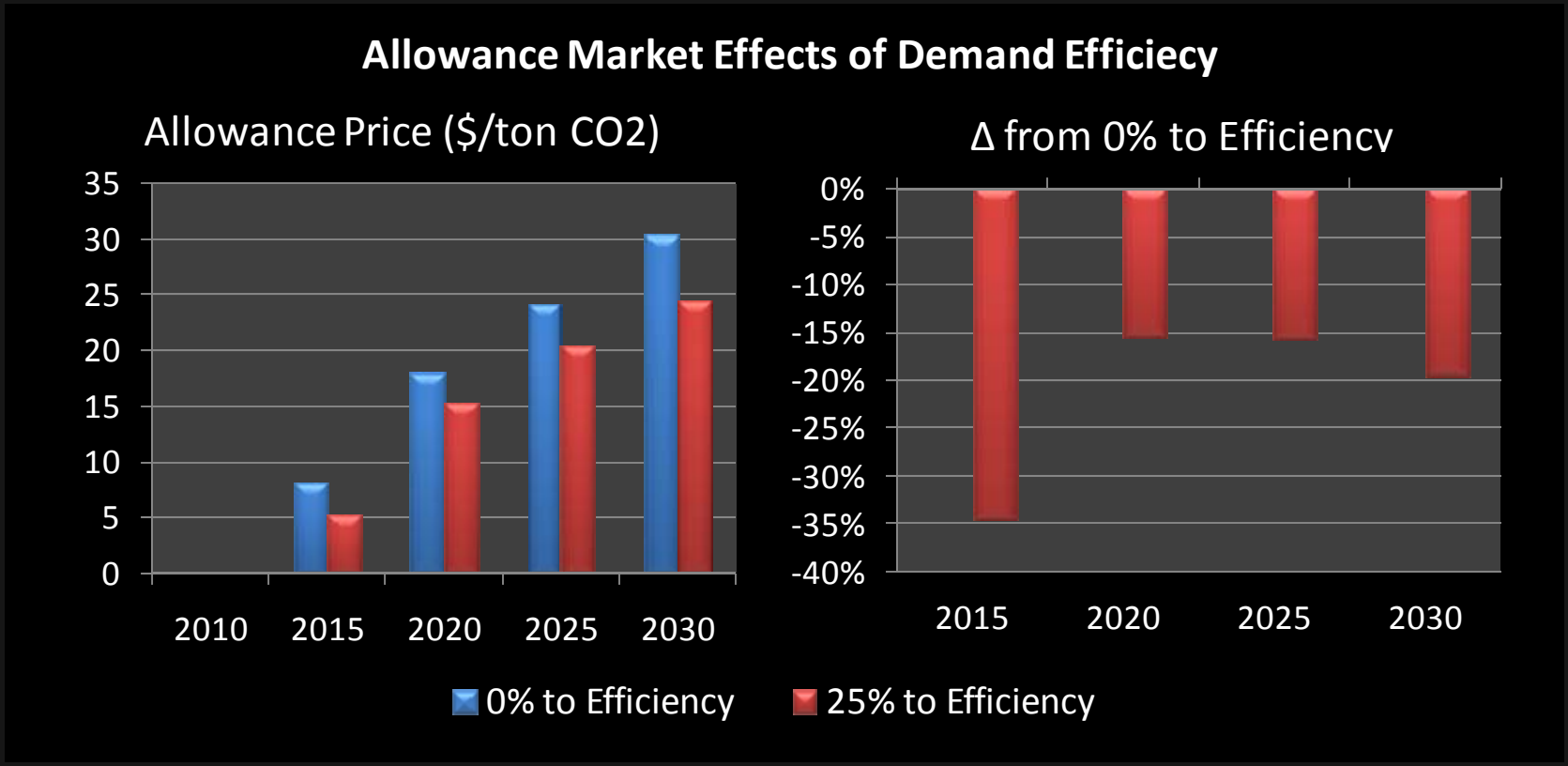
results

- Yes, substantially.



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Conclusions

- Policy complementarity
  - Climate policy reinforces and is reinforced by both renewables and demand efficiency policies.
- Climate → Renewables
  - The renewables impact of moderate climate policy would be substantial, likely rendering moderate RPS goals non-binding.
  - The climate policy impact of RPS is smaller, but positive.
- Climate ↔ Demand Efficiency
  - Mutually reinforcing with substantial benefits in both directions.

Thank you!

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