Role of Offsets in AB 32

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ARB Workshop on Economic Modeling: Offsets

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CRA's MRN-NEEM Model is a Well-Documented, Peer-Reviewed State-of-the-Art System

- **State-of-the-art treatment of economy-wide and electric sector issues**
- **Used extensively in prior studies of climate legislation and in development of SO_2, NO_x and mercury regulations**
- **Used in CRA/EPRI study of California climate policies and by State of California for analyzing implementation alternatives**
  - Expert panel created by EPRI reviewed model development and study
  - This model was originally selected by Cal/EPA for its study: "Updated Macroeconomic Analysis of March 2006 Climate Action Team Report Strategies."
- **Documented through publications in peer-reviewed literature and open access to assumptions**
  - "Equity and the Kyoto Protocol: measuring the distributional effects of alternative emissions trading regimes." Global Environmental Change 2000
  - "The Role of Expectations in Modeling Costs of Climate Change Policies," Chapter 18 in Human-Induced Climate Change: An Interdisciplinary Assessment, Cambridge University Press, 2007
  - Documentation of Scenarios Used in Dr. Anne E. Smith's Testimony of November 8, 2007 Before the Senate Environment and Public Works Committee Regarding the Economic Impacts of S.2191: Response to a request by Senator Lieberman dated November 16, 2007

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Capabilities Included in MRN-NEEM

- **Sound treatment of economic decisions and markets**
  - Household and business decisions based on rational economic calculations
  - Complete accounting for factor inputs so that all costs are accounted for
  - Supply and demand equilibrium that supports efficient use of limited resources unless there are specific market failures represented in the model
- **Detail sufficient to differentiate the impacts of alternative proposals**
  - Detailed representation of the electricity sector since this sector is the subject of complex regulatory interventions, especially in the near-term
  - Explicit treatment of key technologies whose availability influences costs of meeting targets, such as nuclear power, CCS and low-carbon fuels
- **Dynamics suitable to climate policy analysis**
  - Time horizon long enough to account for effects of policies on investment decisions
  - Impossibility of outsmarting agents about future price trends and policies
- **Sufficient regional and sectoral detail to describe impacts in familiar terms**

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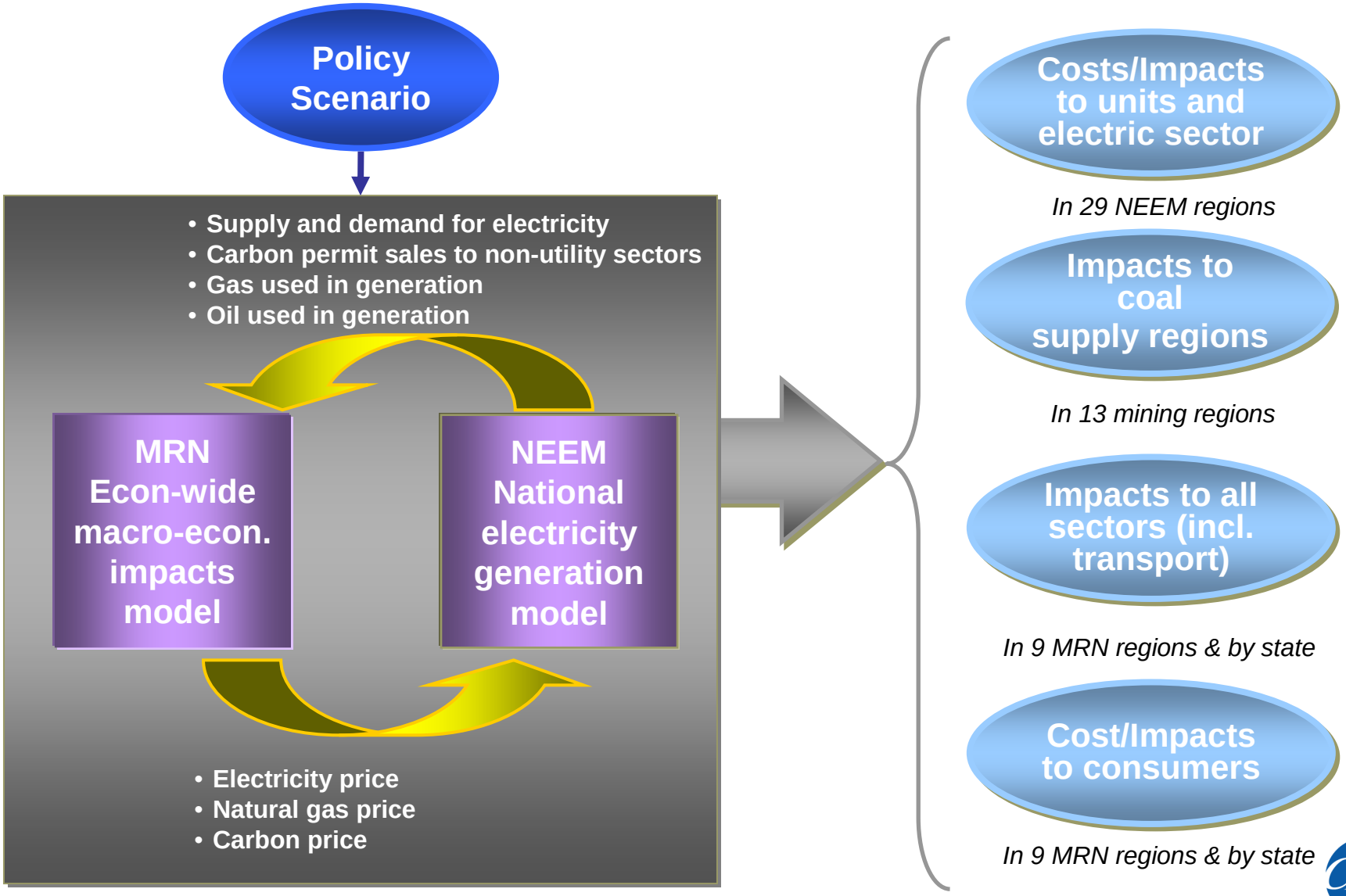
Integration of MRN and NEEM Provides a Unique Capability for Analysis of GHG Policy Impacts



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The Multi-Region National Model (MRN)

MRN is a forward-looking, dynamic computable general equilibrium (CGE) model of region-specific impacts and regional interaction in the US economy

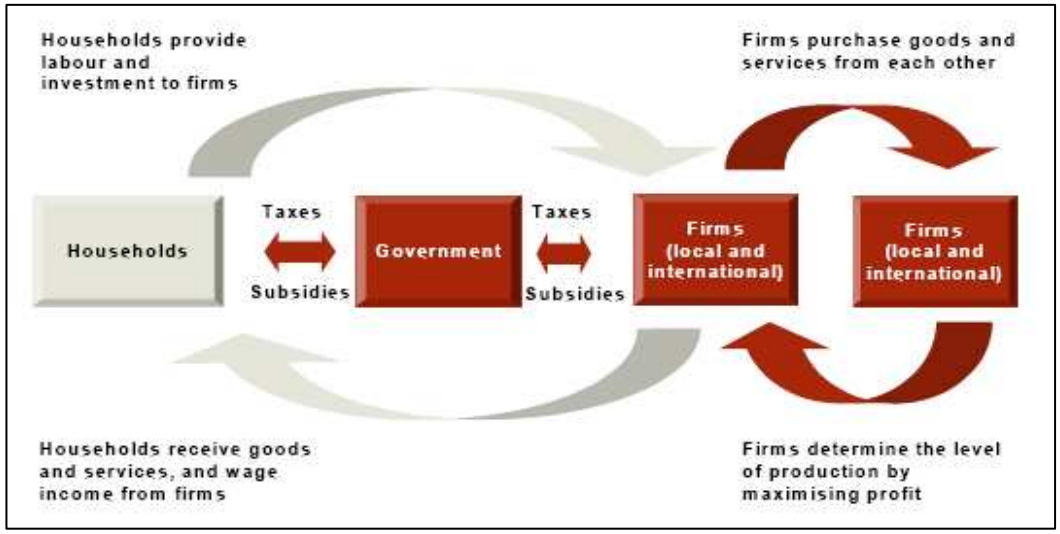
Inputs

- New IMPLAN data including 2002 input-output matrices and trade flow data
- EIA state-level energy production, consumption and price data

Flexible Sectoral and Regional Coverage

- **Five Energy Sectors -** electricity, coal, crude oil, natural gas, refined petroleum products
- **29 Non-Energy Sectors –** can be aggregated based on analysis needs
- **Adaptable Regional Aggregation –** down to the state level

CGE Model



Key Economic Mechanisms

- Possibility of premature retirement of capital
- Impacts on government budgets, tax interaction and "double dividend" effects
- Improvement in technology over time or in response to policies
- Sufficiently long time horizon to capture anticipation of future policies

Analysis

- Simulates patterns of investment and consumption behavior that maximize consumer welfare over time
- Captures changes in energy demand and fuel prices that cannot be modeled without modeling the entire US energy sector

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Offset curves considered

- **EPRI base case – jumping off point**
- **Sensitivity analysis around this case**
  - EPRI analysis assumed only offsets from CA sources as described by CAT

Scenario Name	Availability of Offsets
CA_Only	California only
US_All	California + Rest of US
US_Restricted	California + Limited Offsets from rest of US
International-1%	California + International 1% rise
International-5%	California + International 5% rise

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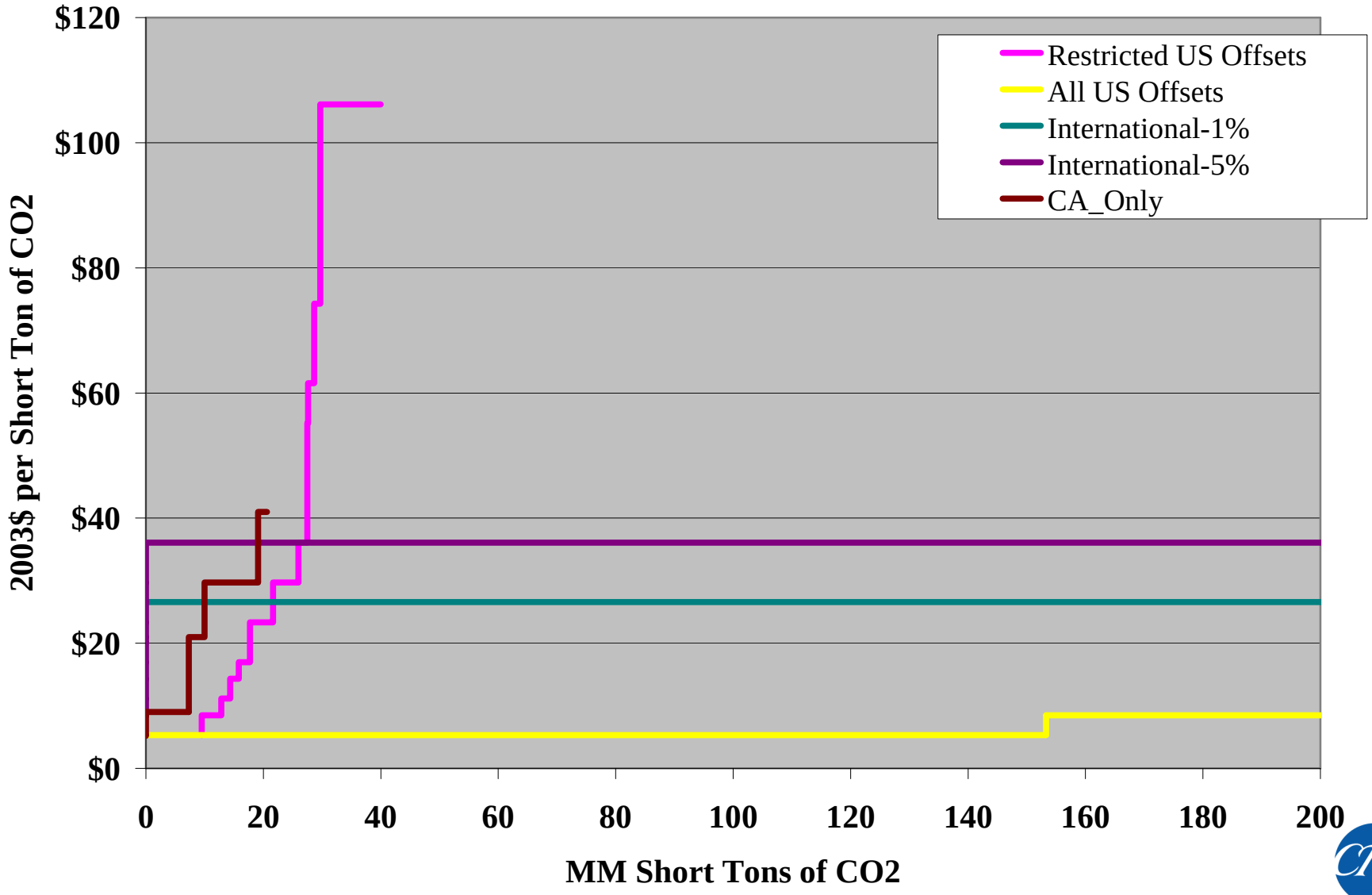
Offset Supply Curves in 2020



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Results

Depending on availability of offsets, the inclusion of offsets can:

– Dramatically reduce program costs by **up to 80%**

– Minimize economic loss to the economy by **up to $40 billion/year by 2035 (2003$s)**

– Prevent leakage of **more than 300,000 jobs**

– Cut consumption losses by 50% in 2015 and by as much as 80% in 2020.

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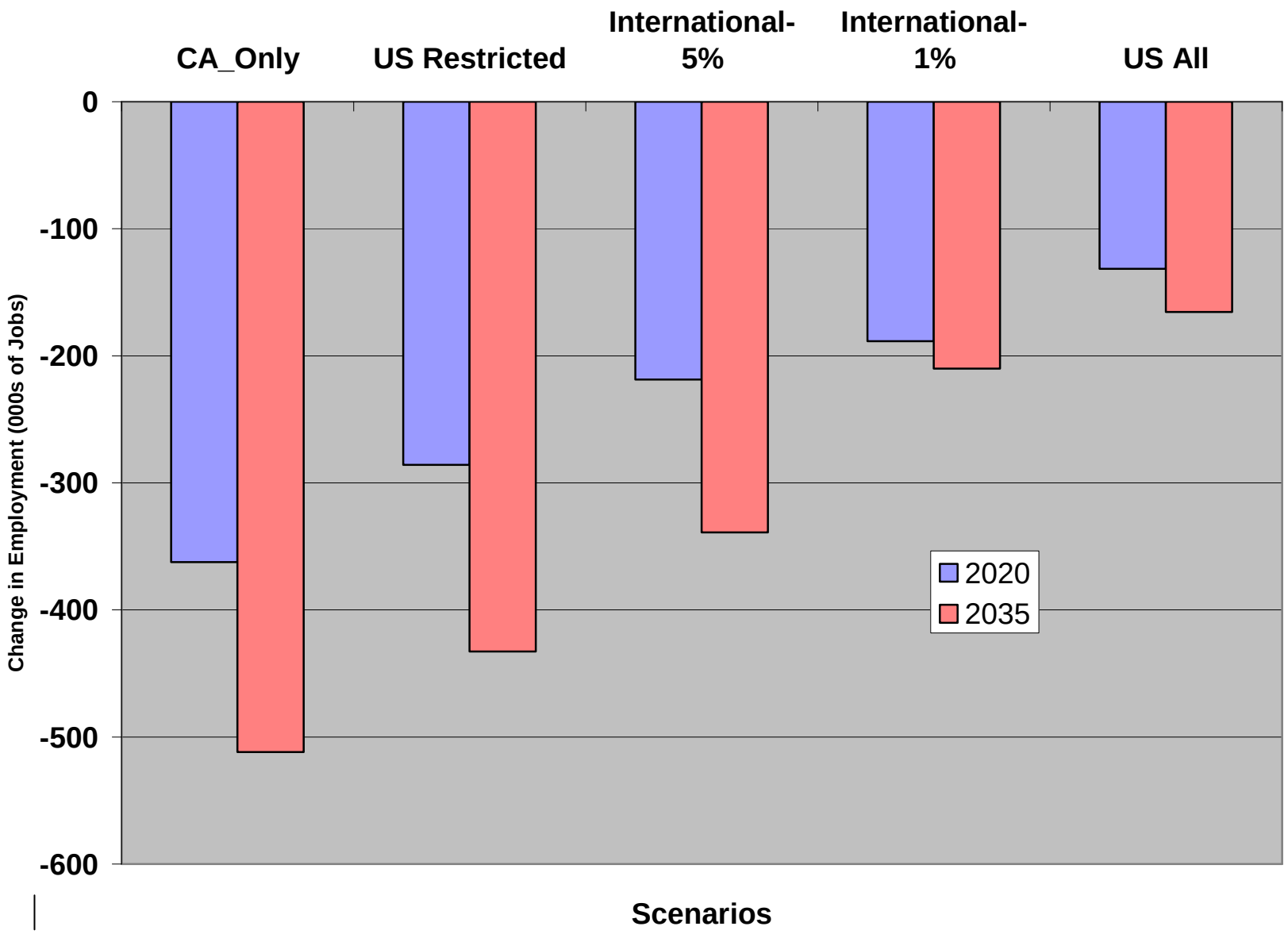
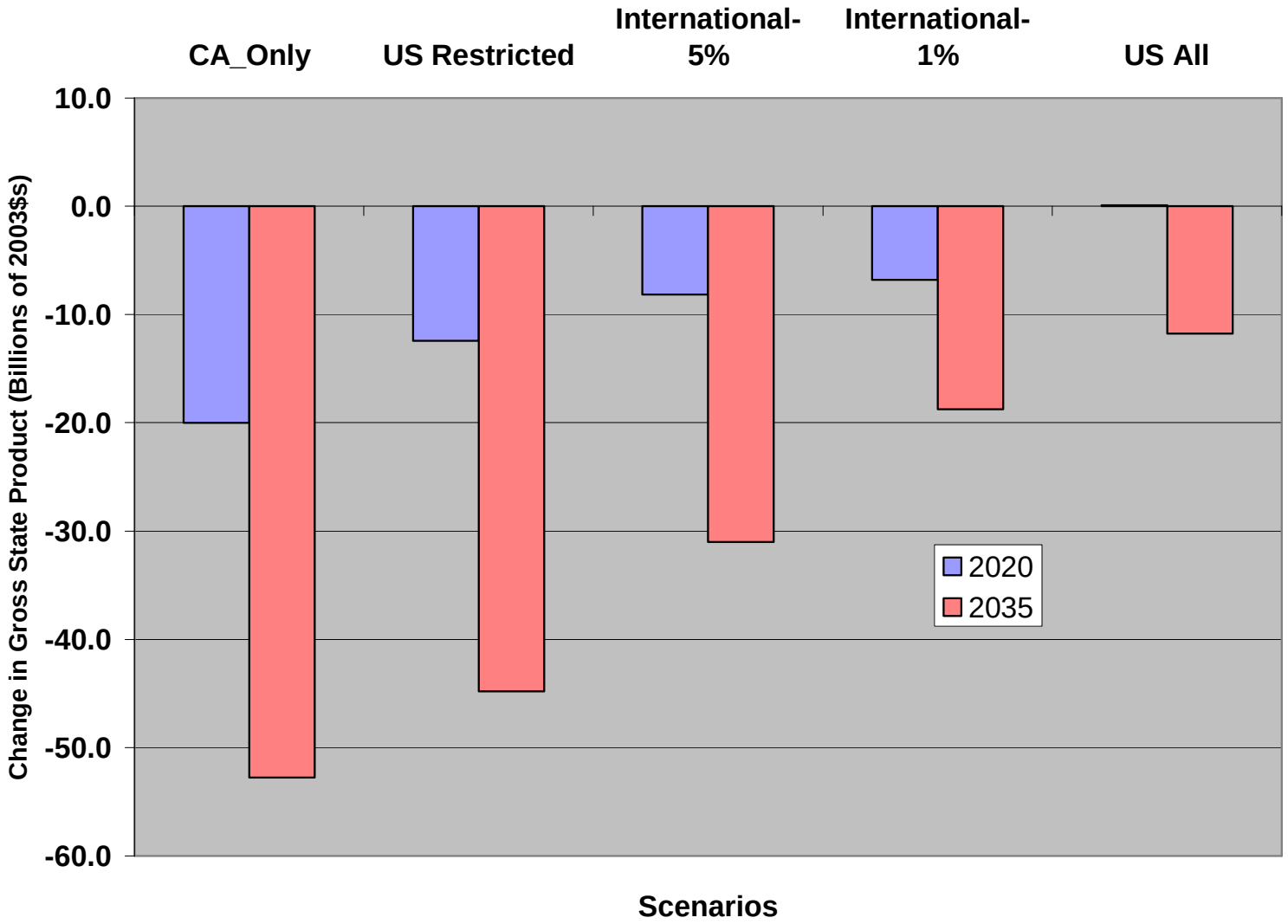
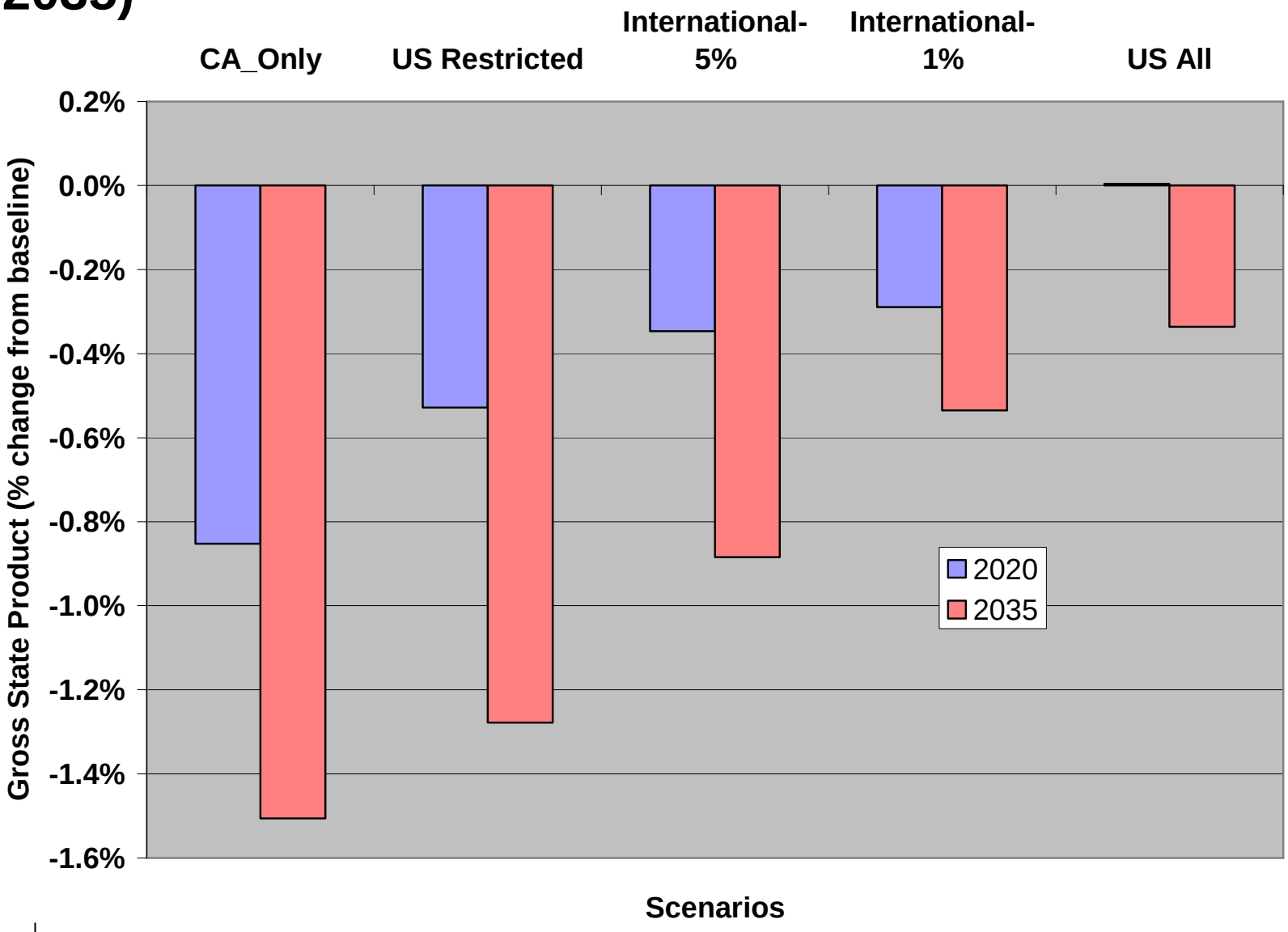
Change in Employment (‘000s of jobs)



Change in CA's gross state product in 2020 and 2035 (Billions of 2003$s)



Change in Statewide Gross State Product (2020 and 2035)



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Conclusion

- **The analysis shows unequivocally that including offsets lowers the economic costs of complying with AB 32**
  - Could reduce overall welfare impacts by 80%
  - Placing arbitrary restrictions on the availability of offsets raises compliance costs
- **The importance of offsets depends greatly on the availability of low emitting technologies**
  - In the near-term, when the availability of these technologies is likely to be small, the availability of offsets is critical to contain costs.
  - If or when these technologies are prevalent, the demand for offsets will decline.
- **Unlike a safety-valve where total emissions can increase, offsets (assuming they are real, additional, and permanent) will leave global emissions unchanged**
- **Therefore regulators need to focus on developing rules to allow offsets and to ensure that they are "real, additional, independently verifiable, permanent, enforceable, and transparent."**

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Thank You

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