

An Economic Perspective on the Benefits of Going Green

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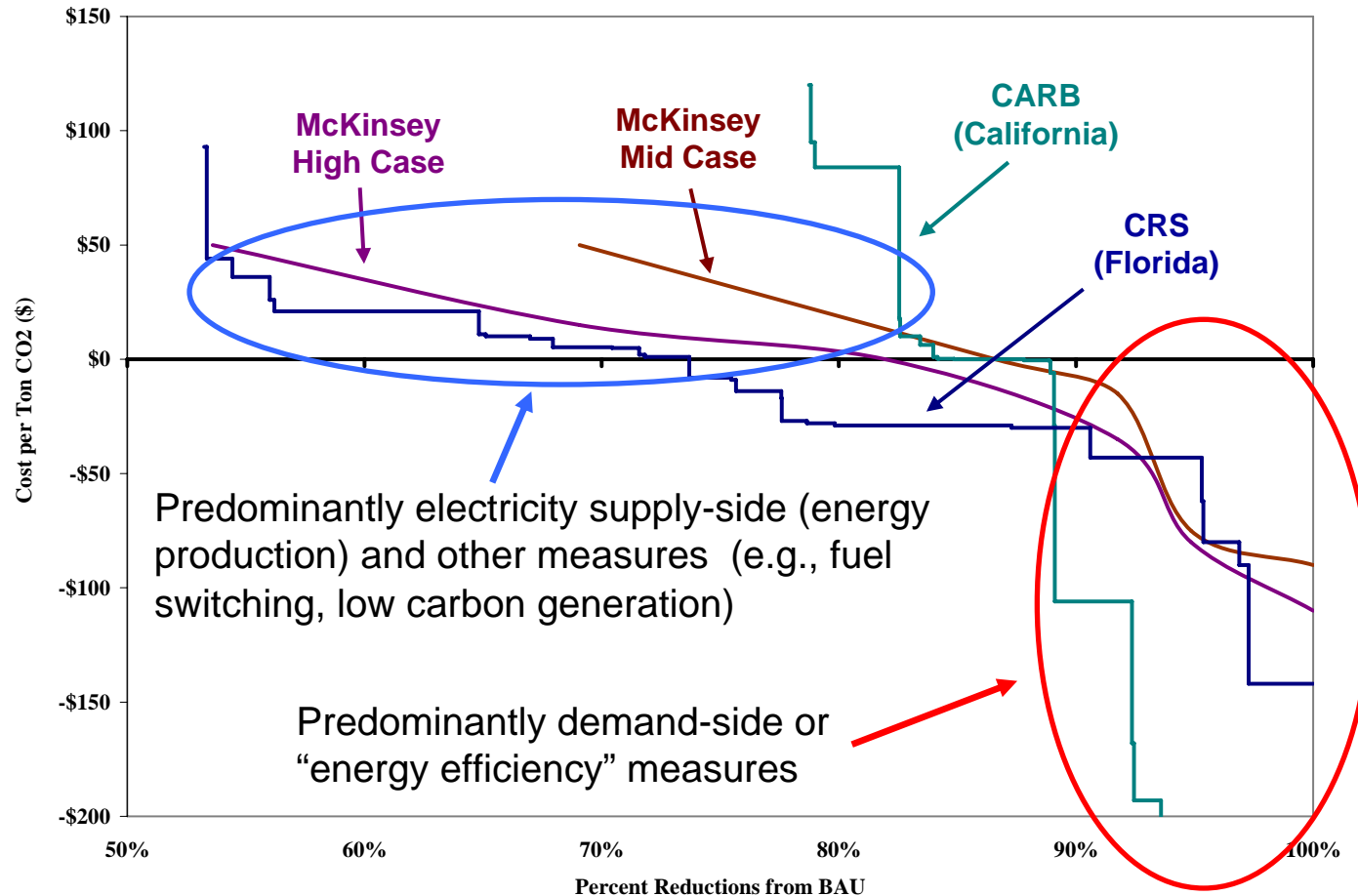
Harvard Electric Policy Group, Atlanta, Georgia

Session: Benefits of Going Green: Good or Too Good to Be True?

Green initiatives are being considered at many different levels of policy – for the most part, climate policy underlies these initiatives

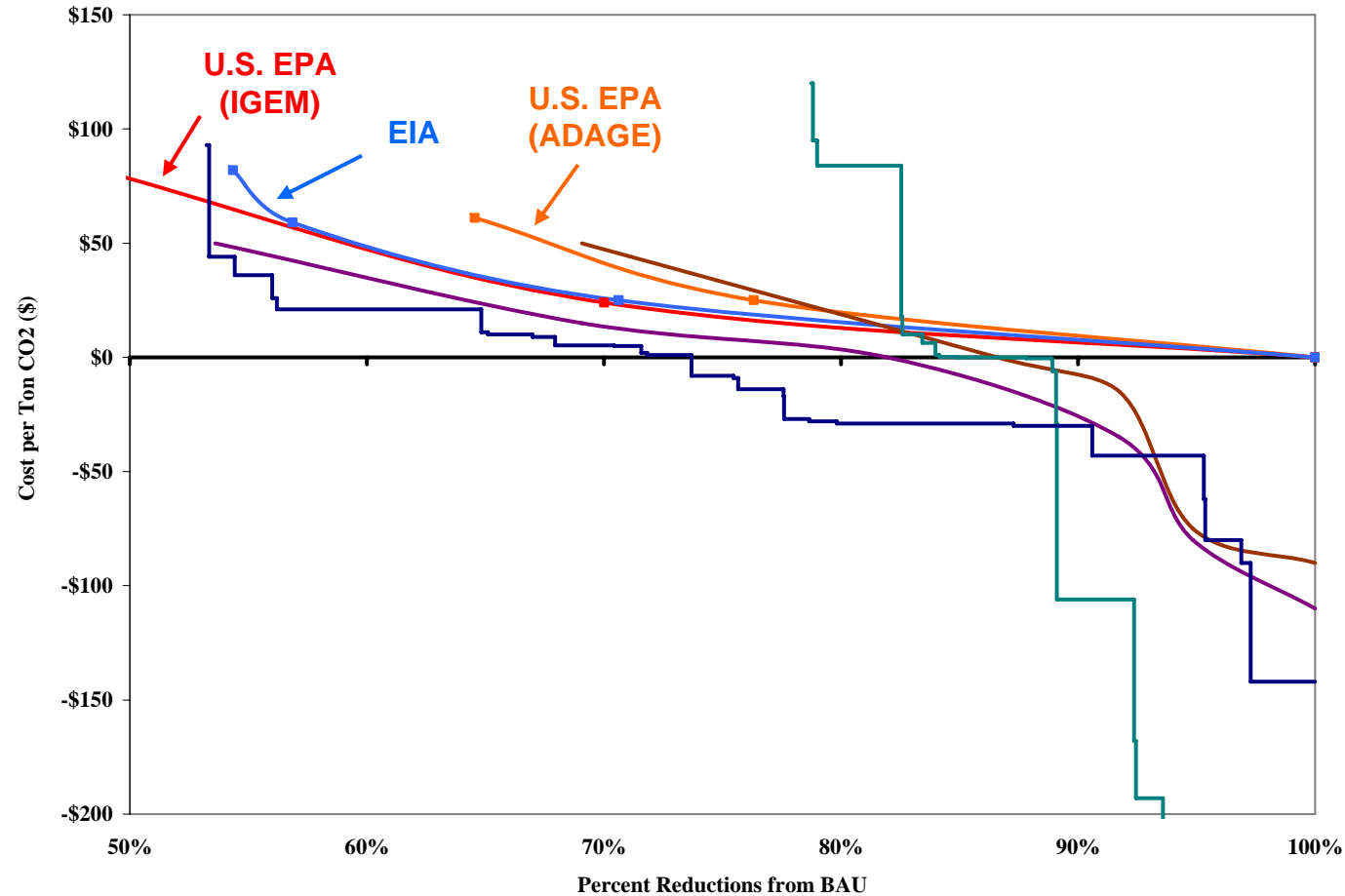
- **Economic Policy – Environmentally-driven energy policy has been included as a key component of some economic stimulus packages**
- **Energy Policy – Some place climate policy goals as central and complementary to energy (and economic) security**
- **Environmental Policy – Driven by climate policy aimed at achieving benefits that exceed costs in a cost-effective fashion**
 - The scope and depth of inevitable climate policy is anticipated to have a transformative effect on the energy sector with important implications for the broader economy
 - A market-based policy (e.g., cap-and-trade system) is likely to be a key element of a federal program (and most regional programs) with additional policy components to be determined

Estimated costs of supply- and demand-side reduction alternatives can differ significantly



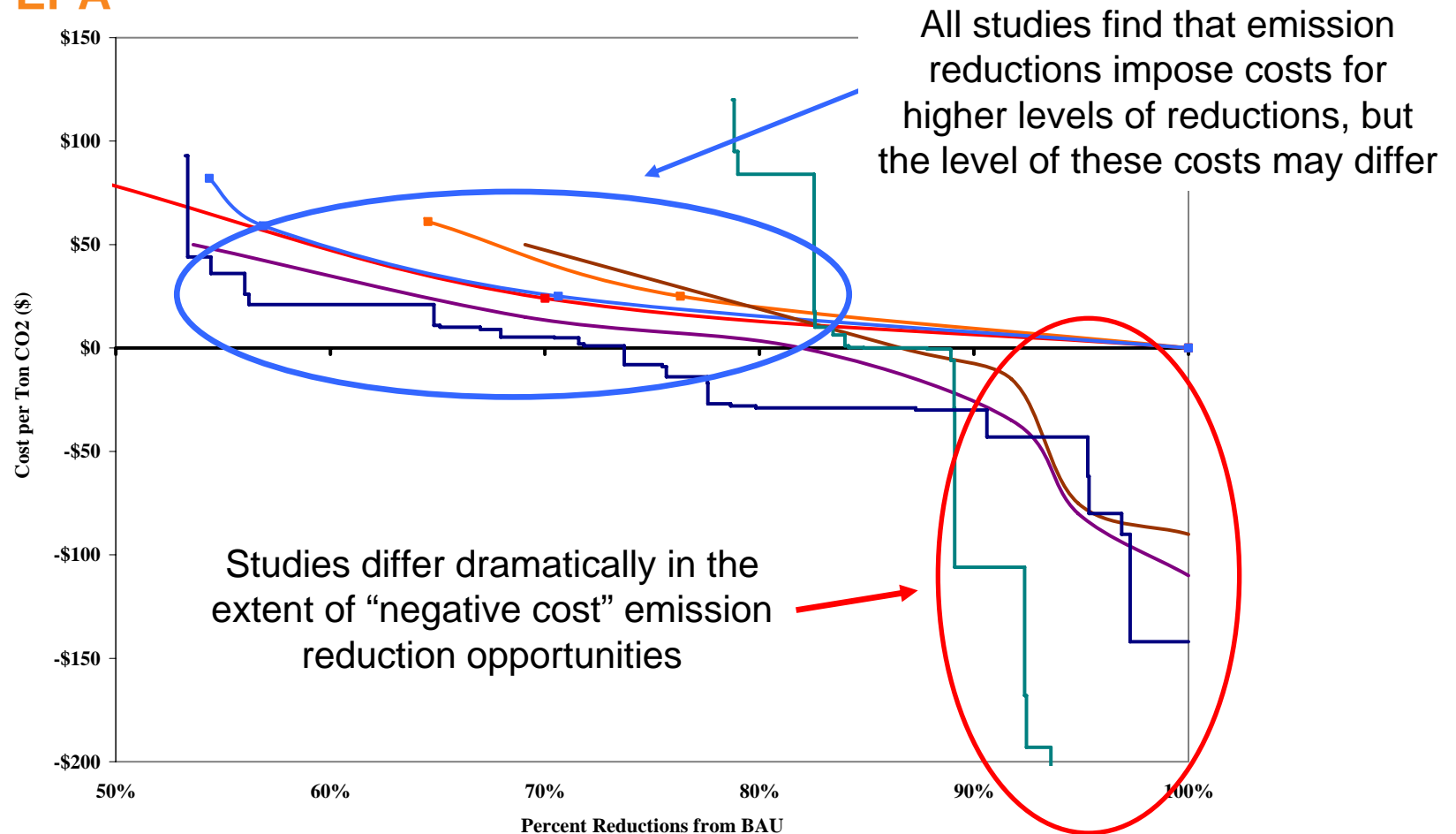
Note: Curves reflect GHG emission reductions and changes in biogenic sequestration. CARB and CRS estimates reflect costs of considered abatement options. Sources: California Air Resources Board, Center for Climate Strategies, McKinsey & Company.

Alternative abatement cost curves: CARB, CRS, EIA, McKinsey, U.S. EPA



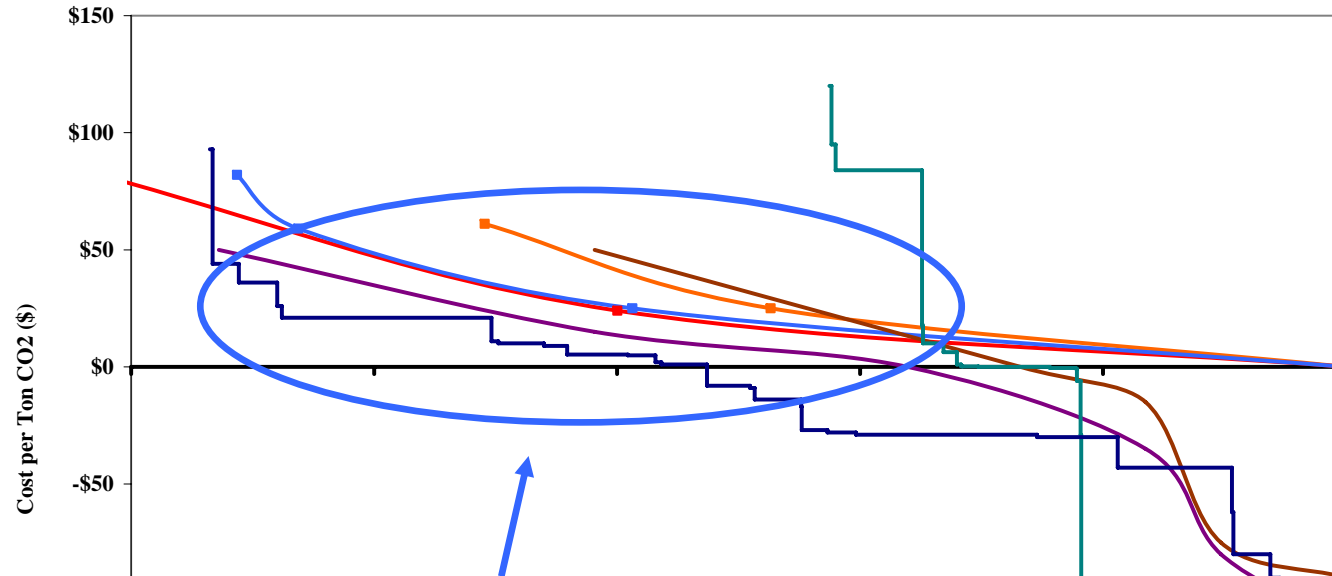
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Implications of “negative-cost” emission reductions for climate policy

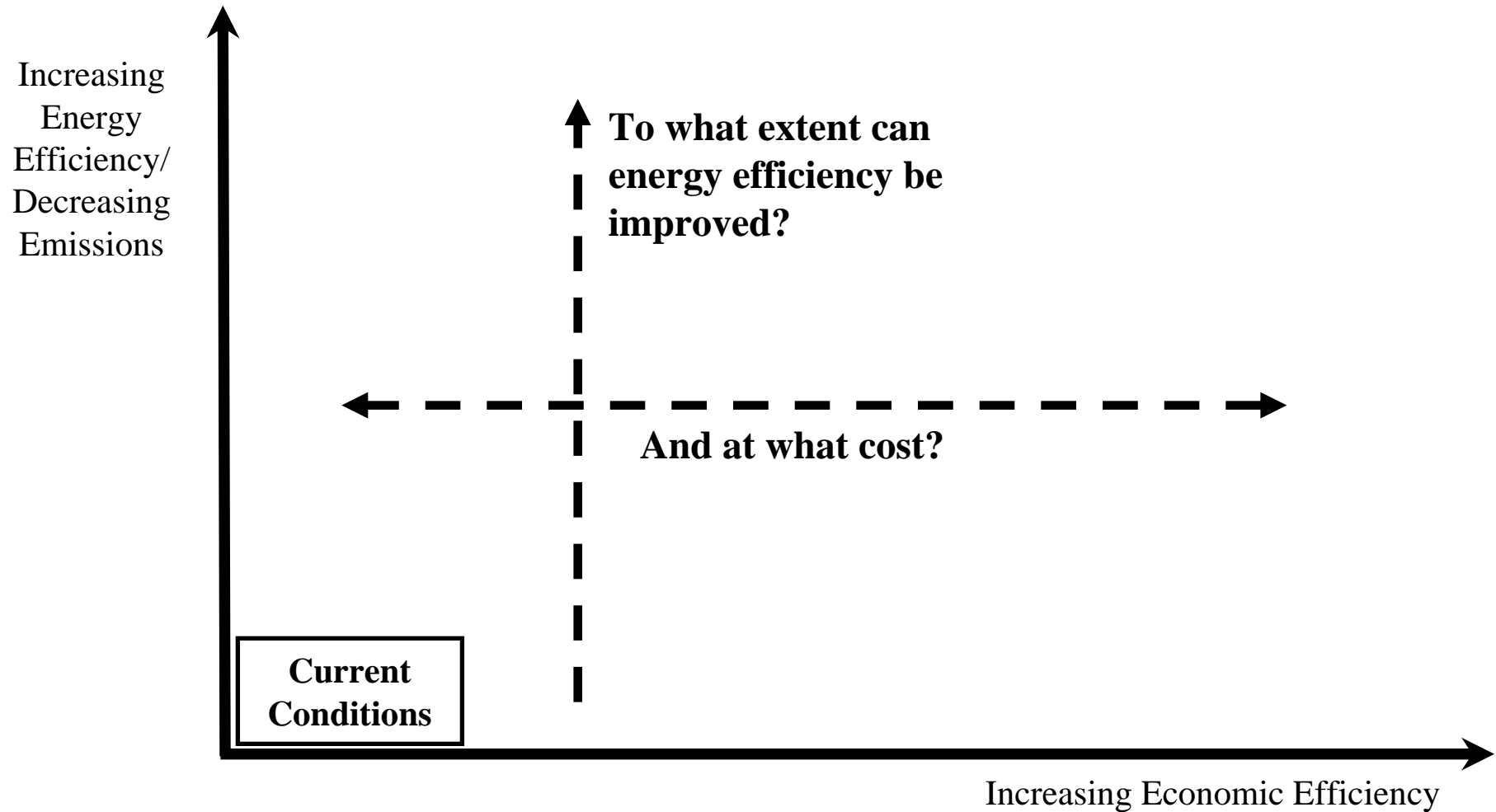


- **“Negative cost” studies may not suggest different targets for climate policy**
 - Climate targets should be informed by the marginal cost of emission reductions
- **“Negative cost” studies do not necessarily suggest differences in the economic consequences of a cap-and-trade system**
 - Allowance prices depend on the marginal costs of emission reduction
 - Changes in energy and electricity prices would reflect allowances prices (although reduced demand from conservation may dampen such price changes)

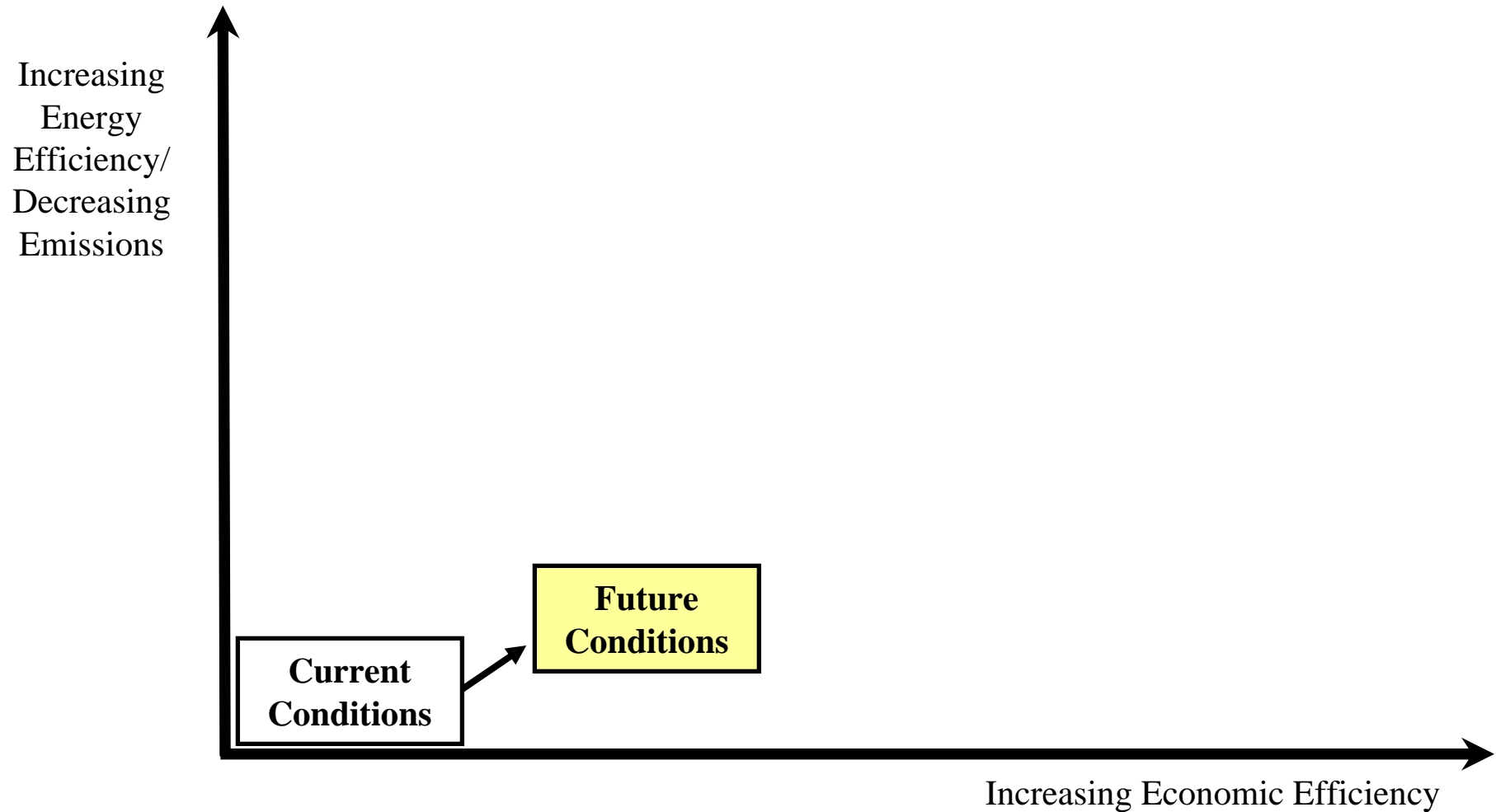
Implications of “negative-cost” emission reductions for the role of price signals to effective climate policy design

- **Emission reductions through supply-side (energy production) measures are largely expected to impose economic costs, although estimates of those costs vary**
 - Supply-side investment and operations decisions sensitive to price signals
 - Effective price signals require careful policy design including long-run price signals, appropriate cost containment, and wholesale electricity markets that properly pass-through price signals
 - Price signals may not overcome certain market failures affecting supply-side alternatives, which suggests potential government intervention – for example:
 - Funding of advanced technology development and early adoption (e.g., carbon capture and sequestration)
 - Coordination of transmission to support “economic” remote renewable and baseload technologies
- **Demand-side choices are also sensitive to price signals, although “negative cost” emission alternatives suggest that price signals alone may not encourage all socially desirable demand-side (energy saving) investments and activities**

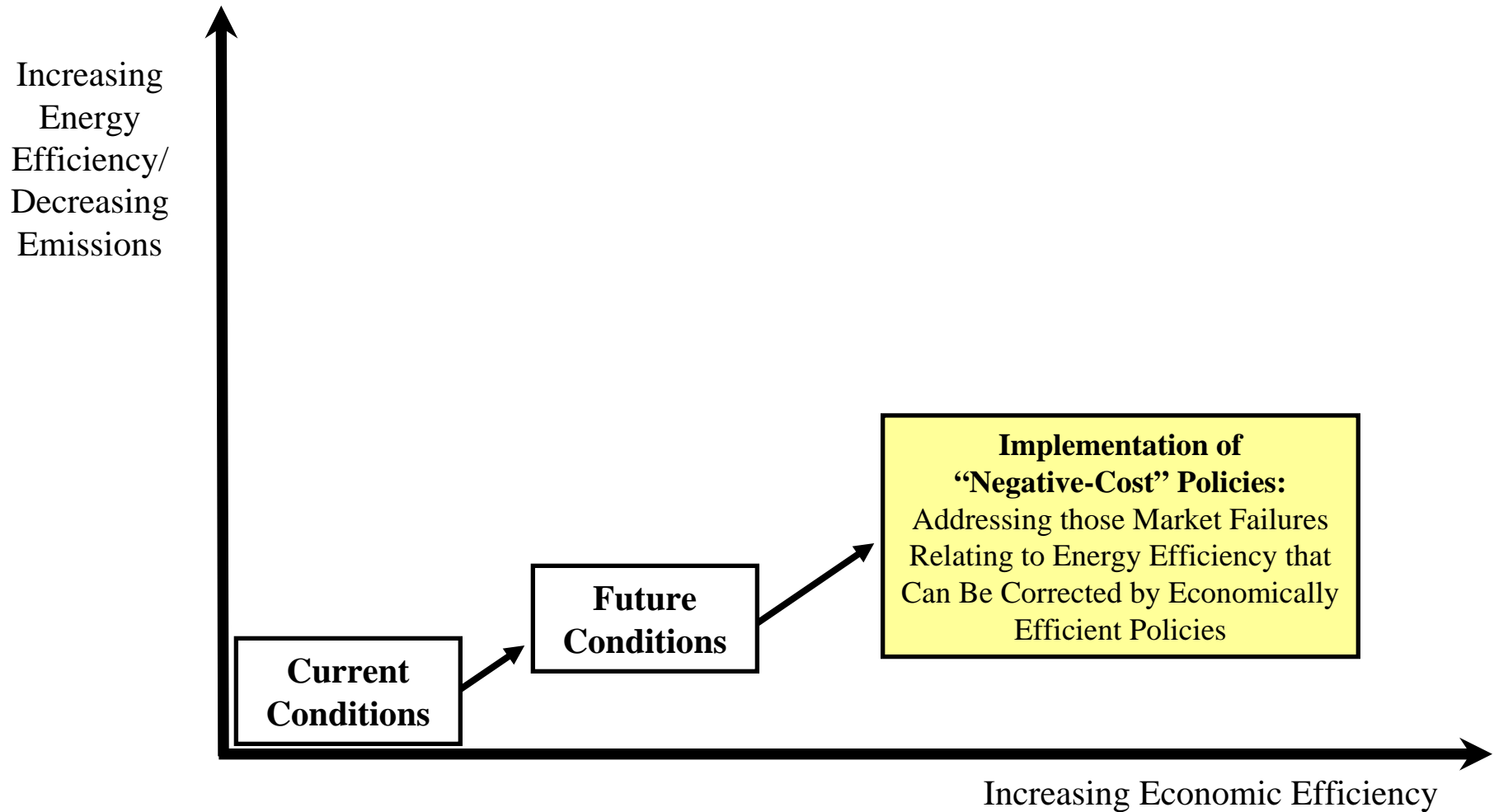
A graphical representation of opportunities for energy efficiency improvements



Firms and households will voluntarily adopt many “negative-cost” energy efficiency opportunities on their own



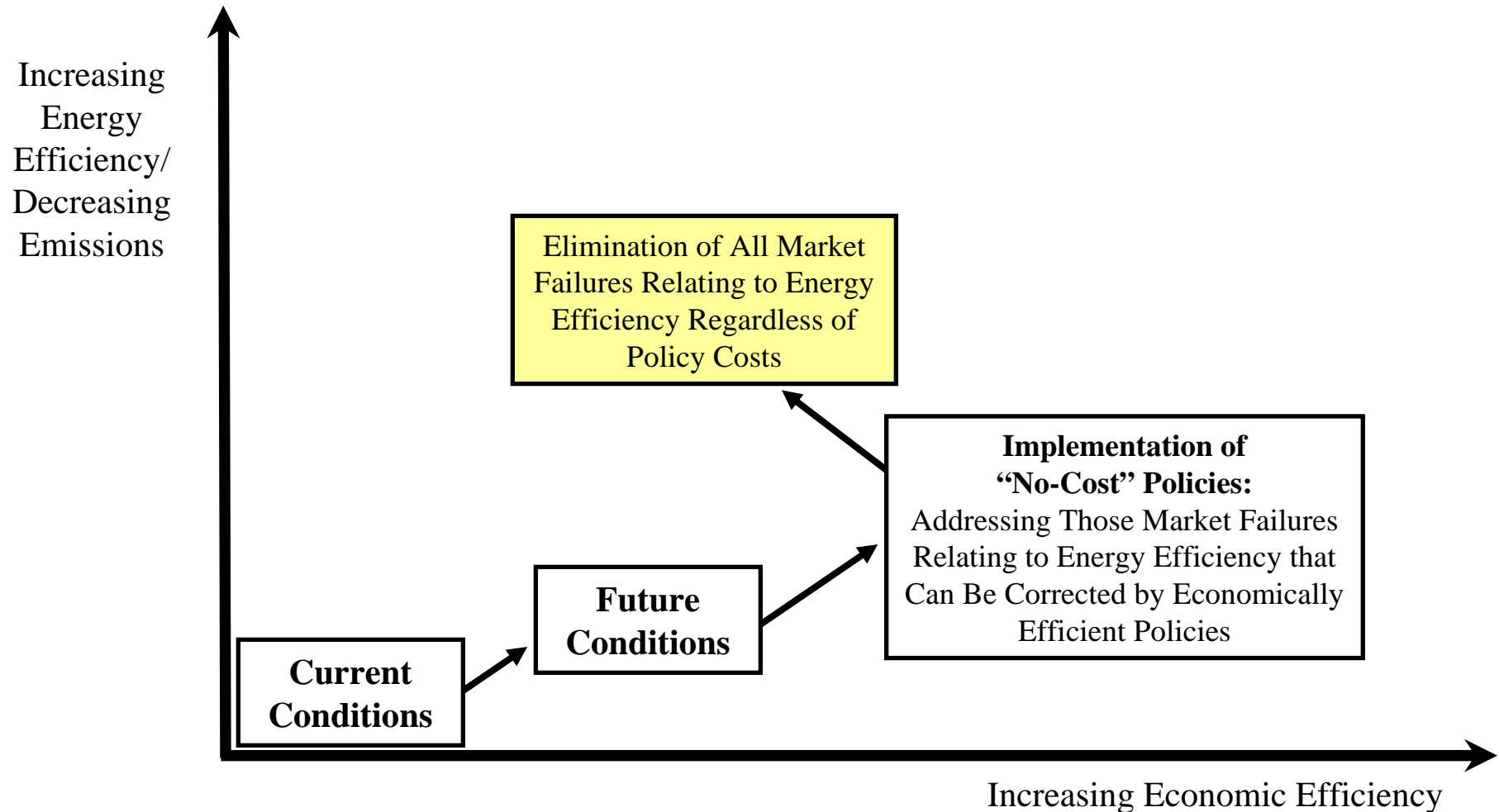
Market failures may offer opportunities for no-cost emission reductions ...



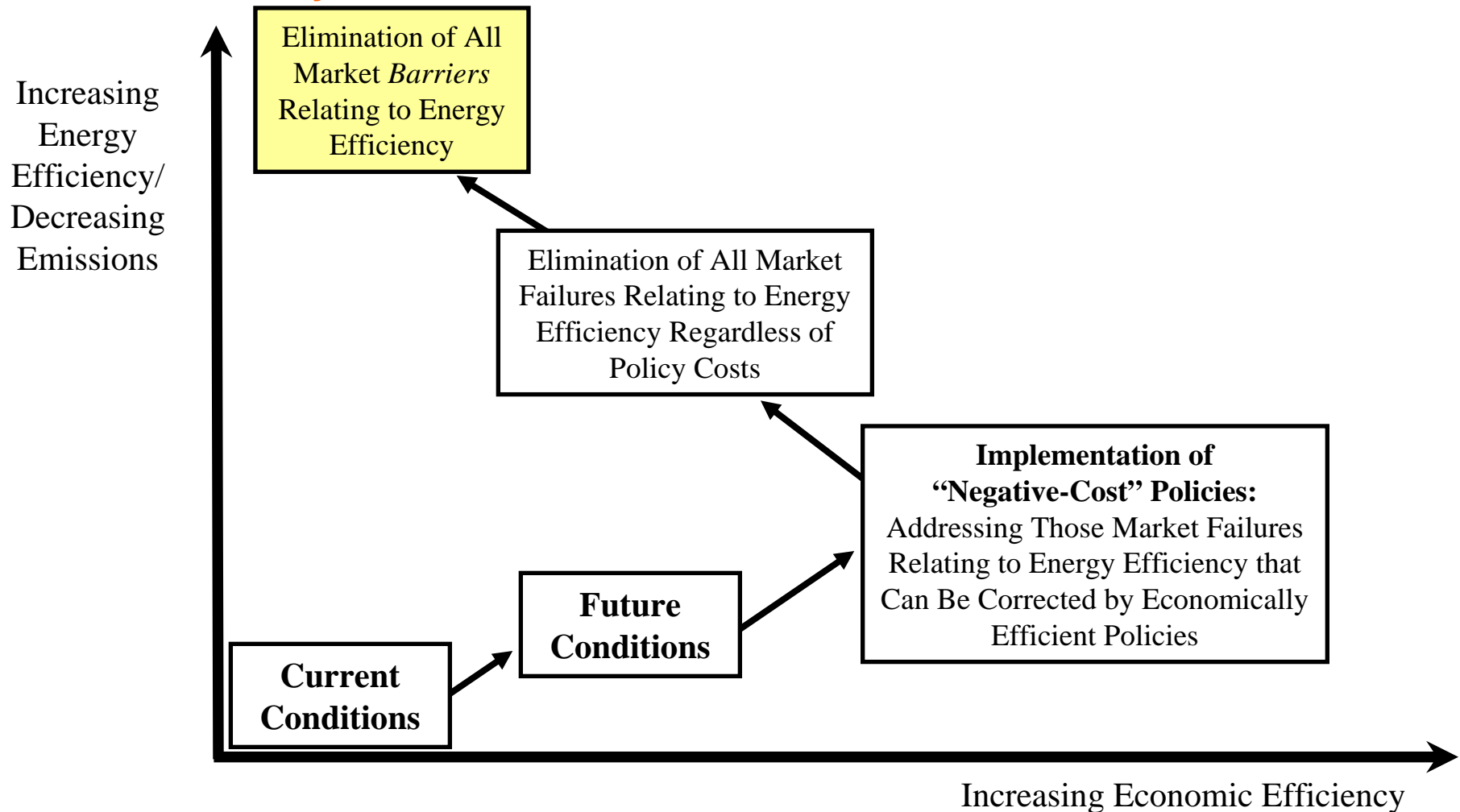
Market failures affecting various demand-side measures

- **Market failures affecting energy use — and emissions**
 - Inadequate information about the lifecycle costs of alternatives
 - Information may be costly to collect or provide
 - Principal-agent problem
 - Landlord invests in energy efficiency, but tenant reaps the benefits
 - Homebuilder makes decisions that affect buyer's energy costs
 - Price distortions
 - For example, retail electricity prices below marginal costs of generation

But even some “negative-cost” energy efficiency opportunities may be too costly to achieve through policy intervention



And many barriers to energy efficiency are not market failures, and are costly to overcome



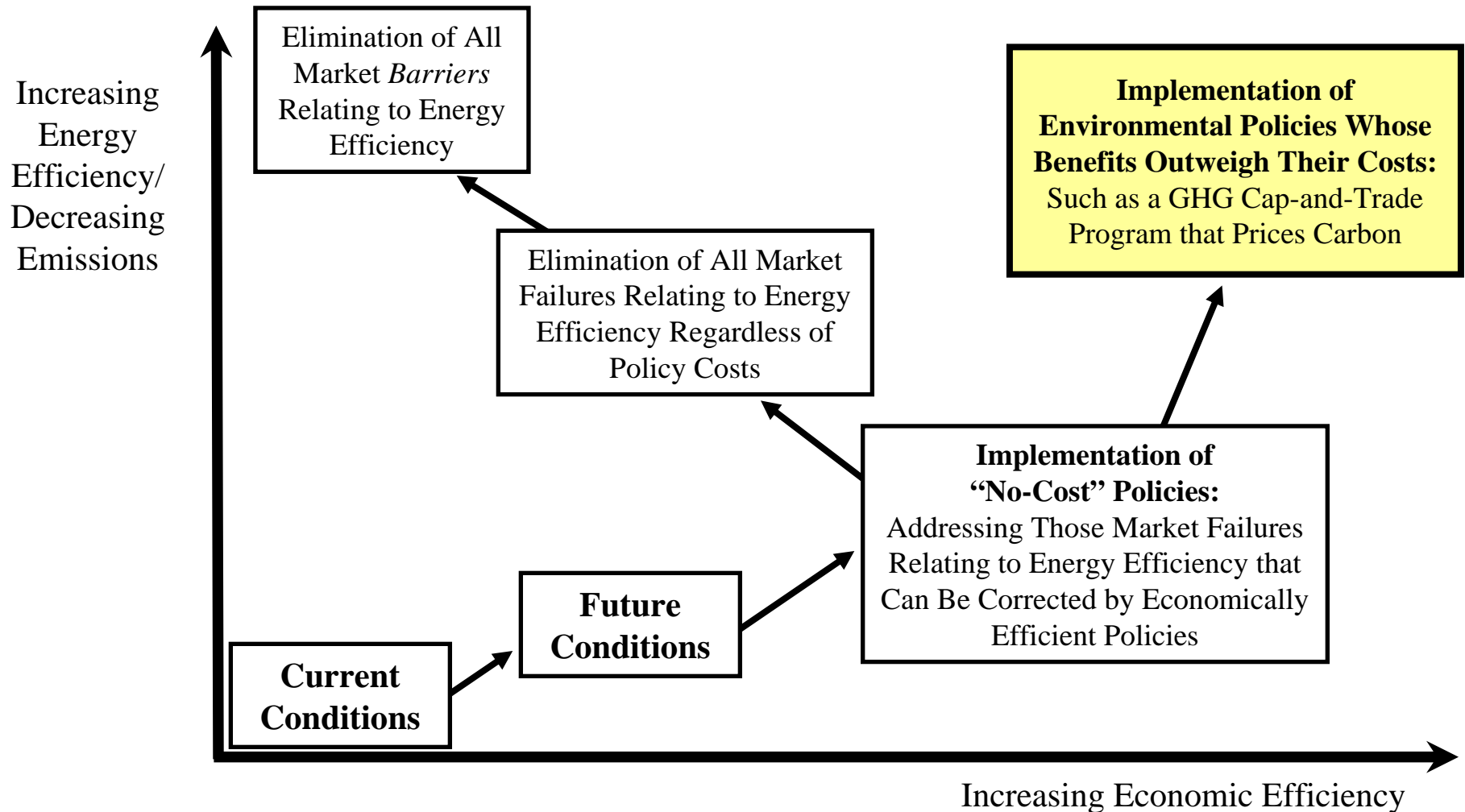
“Energy Efficiency Gap”

- Distinguishing market failures from market barriers is often difficult
- Implicit discount rates reflect the “gap” between observed behavior and “rational” decisions

Study	End-Use	Implicit Discount Rate (Average)
Arthur D. Little (1984)	Thermal shell measures	32%
Cole and Fuller (national survey, 1980)	Thermal shell measures	26%
Goett (1978)	Space heating system and fuel type	36%
Berkovec, Hausman, and Rust (1983)	Space heating system and fuel type	25%
Hausman (1979)	Room air conditioners	29%
Cole and Fuller (1980)	Refrigerators	61-108%
Gately (1980)	Refrigerators	45-300%
Meier and Whittier (1983)	Refrigerators	34-58%
Goett (1983)	Cooking and water heating fuel type	36%
Goett and McFadden (1982)	Water heating fuel type	67%

Source: Sanstad, Hanemann and Auffhammer, 2007.

But don't lose sight of the fact that costly measures can still be economically efficient when environmental benefits are considered



Studies may incorrectly find “negative cost” emission reductions by failing to properly account for market barriers and policy costs, or making other methodological or empirical errors

- **Omitting or failing to properly calculate certain components of investment or operations costs**
 - Individual and firm adoption and transition costs
 - Impacts on product attributes (e.g., lighting quality, vehicle attributes)
 - Full investment cost (utility and consumer) of utility energy efficiency programs
- **Failing to properly calculate economic savings**
 - Avoided energy production costs (not reduced ratepayer bills)
 - Actual effectiveness of utility efficiency programs
 - Rebound effect (i.e., use more when cost to use is lower)
- **Using improper “baseline” assumptions**
 - Baseline energy efficiency choices consistent with changes in policy, prices or technologies (or simply gradual adoption)
 - Program interactions (avoiding double-counting of emission reductions)
- **Using improper discount rates**

Lessons for policy development and design

- **Details matter in the development of reliable studies that provide information useful to policy design**
- **Concerns about the quality of studies finding significant “negative cost” emission reductions does not suggest that such measures do not exist nor that a timely and serious climate policy is not needed**
- **We need a better understanding of the market failures that motivate these policies to better identify and design appropriate policies – in particular, individual and firm behavior needs to be better understood**
 - Cognitive limits, heuristics and tendencies may lead to “non-rational” decision-making
 - Market failure or market barrier? (A broad policy question with many policy implications for many areas, including household finance, health care, and consumer decisions.)
 - Improved understanding of response to policy instruments – for example:
 - Choice framing – How do default options affect choice (e.g., 401k participation opt-in or opt-out)?
 - Nature of incentive – How do alternative price mechanisms (and “salience”) affect choice? How effective are non-pecuniary benefits (e.g., voluntary programs; unique benefits, such as HOV lane access)?

Lessons for policy development and design

- **The potential for “negative cost” emission reductions should not divert attention from the importance of careful climate policy design**
- **A market-based carbon policy (e.g., cap-and-trade system) should be the core component of domestic climate policy**
 - Addresses the key market failure associated with climate policy: the failure to internalize cost of excessive GHG emissions
 - Both supply- and demand-side decisions respond to the price signals
- **Cost containment measures are important in light of the uncertainty underlying cost estimates**
- **A market-based carbon policy can be complemented by cost-effective policies targeting market failures in energy saving investments and actions**
 - Price signals alone from a market-based policy may not induce all cost-effective reductions
 - “Negative cost” studies may provide an initial screen for complementary policies, but detailed, careful analysis of individual programs is required – the devil is in the details

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For further discussion of these issues, see:

Robert Stavins, Judson Jaffe, and Todd Schatzki, “Too Good to Be True? An Examination of Three Economic Assessments of California Climate Change Policy,” AEI-Brookings Joint Center for Regulatory Studies, Related Publication 07-01, 2007. (<http://www.reg-markets.org/publications/abstract.php?pid=1151>)