

# **Coming Climate Change Regulation and the Effect on Renewable Markets**

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# Overview

- Greenhouse gas cap-and-trade programs are likely to be in place throughout the U.S. in the next five years, and they will benefit renewables, but the effect may not be as some expect.
- Renewables are unlikely to benefit directly from the granting of allowances.
- Renewable energy is nearly certain to benefit indirectly from the effect of allowance costs on power prices.
- We expect that renewable energy credit REC prices will tend to decline in proportion to the stringency of the cap-and-trade program.

# The status of climate change regulation

- With the ratification of the Kyoto Protocol by Australia in 2007, the U.S. remained as the only developed country not committed to binding reductions in greenhouse gas emissions.
- In the absence of federal commitment, states, corporations, and individuals have taken it upon themselves.
- At the state and regional levels, the Regional Greenhouse Gas Initiative (RGGI) in the Northeast, the California Global Warming Solutions Act of 2006, and Western Climate Initiative are the leading efforts, with additional regional efforts underway in the Midwest.
- WCI economic modeling shows costs of \$18 to \$71 per ton by resulting from reduction of 15% below 2005 levels by 2020.
- 1<sup>st</sup> RGGI auction yielded prices of \$3/ton.

# Climate change: necessity and opportunity

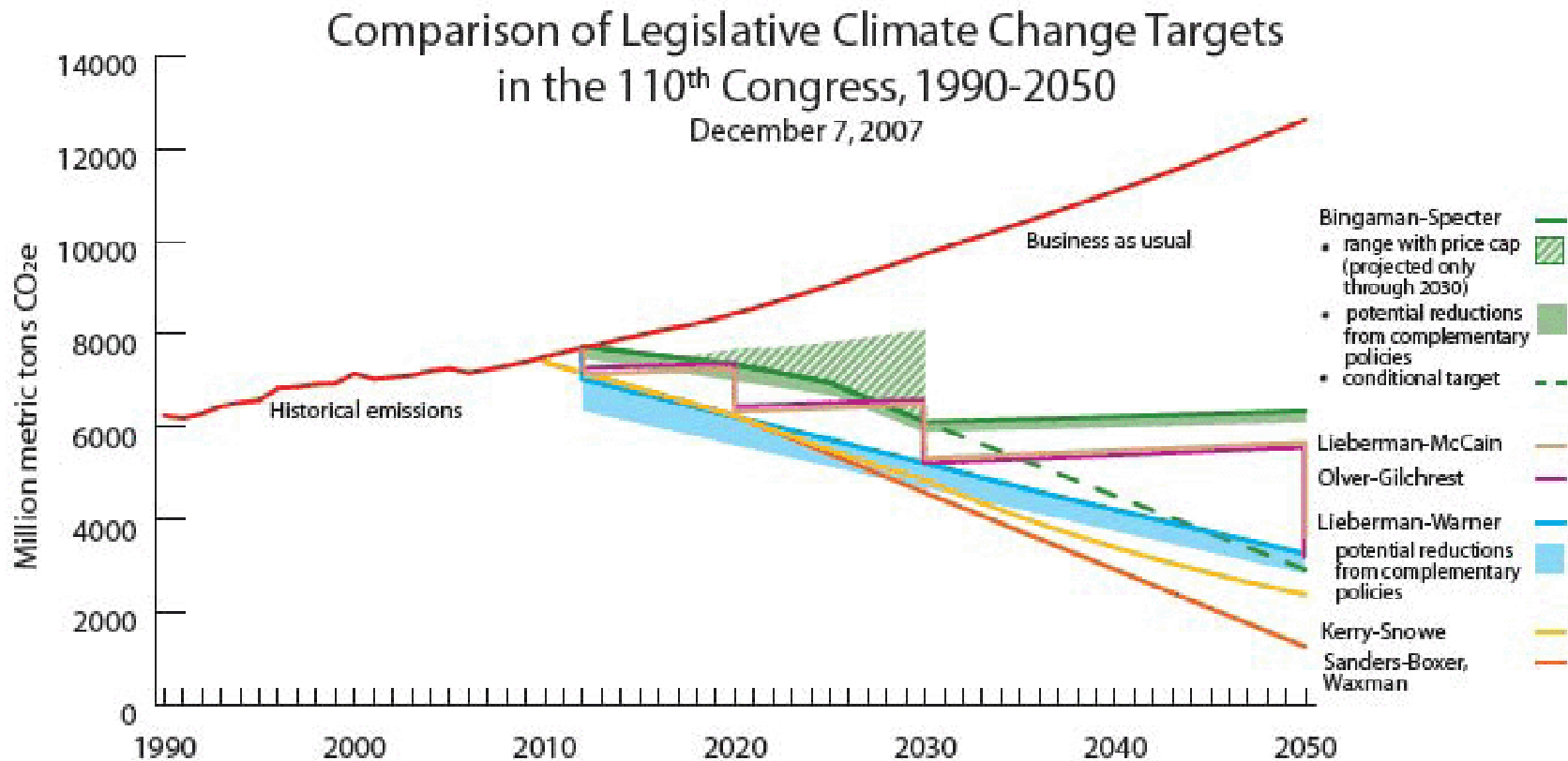
- *"The necessity to act now to mitigate and adapt to climate change has taken on even greater urgency than a year ago. With carbon levels at record highs, new research has shown that we are moving toward a tipping point that could set off a self-sustaining cycle of rapid global warming. Without significant and immediate action, this tipping point is perhaps only 15 years away."*
- *"As a result, the debate around climate change has started to shift away from issues of cost and risk toward the question of how to capitalize on investment strategies that span a vast array of asset classes and industries."*

Mark Fulton, Global Head of Climate Change Investment Research,  
Deutsche Bank October 2008.

# The status of federal climate change regulation

- Lieberman-Warner federal legislation was not successful in 2008, but some sort of legislation is expected to be enacted in next two years, with regulation by 2013.
- All major developing or proposed regulation is cap-and-trade.
- Obama has called for an economy-wide, cap-and-trade program to reduce CO2 emissions by 80% by 2050.
- House “discussion draft” would establish an economy-wide cap-and-trade system to cut GHG emissions six percent below 2005 levels by 2020 and 80 percent by 2050.

# Mitigating climate change requires substantial effort



 WORLD RESOURCES INSTITUTE

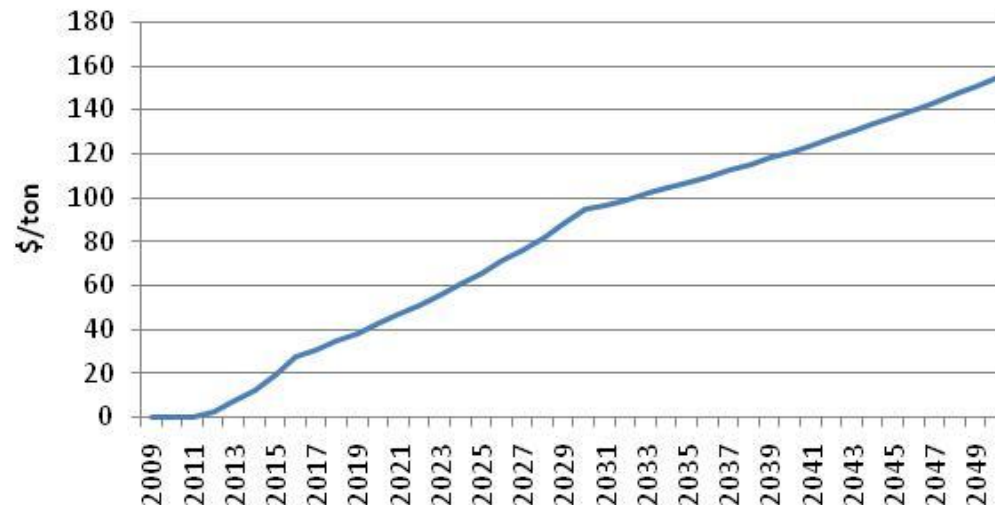
For a full discussion of underlying methodology, assumptions and references, please see <http://www.wri.org/usclimatetargets>. WRI does not endorse any of these bills. This analysis is intended to fairly and accurately compare explicit carbon caps in Congressional climate proposals. Data post-2030 may be derived from extrapolation of EIA projections.

# Utilities are planning for greenhouse gas regulation

- GHG regulation is seen as nearly certain by most utilities.
- Inclusion of GHG/CO2 costs in planning increases cost-effectiveness of renewables.
- Investment banks have expressed concern about financing new coal plants.

California Market Price Referent

## CO2 Adder



Source: utility integrated resource plans

# The effect of GHG regulation on REC prices

- It is unlikely that renewable generators will receive allowances.
- It is unlikely that renewable generators will qualify as offsets.
- GHG regulation is likely to increase power prices.
- The higher prices will mean less need for REC revenues.
- This is good for renewables.

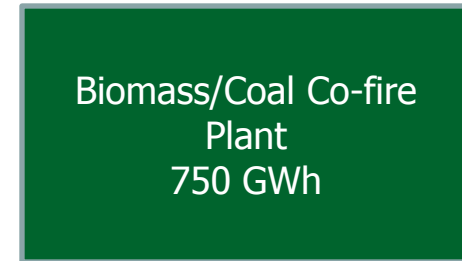
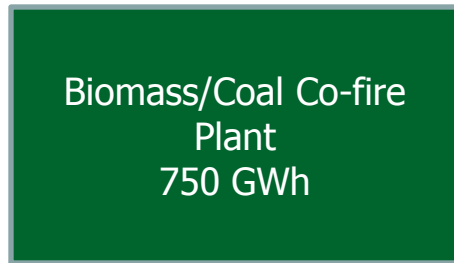
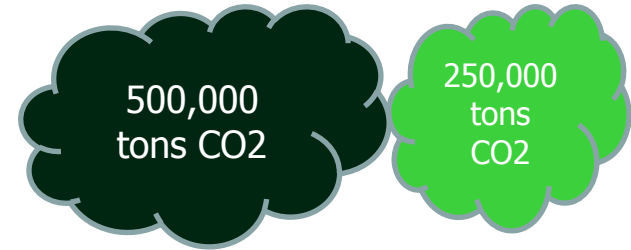
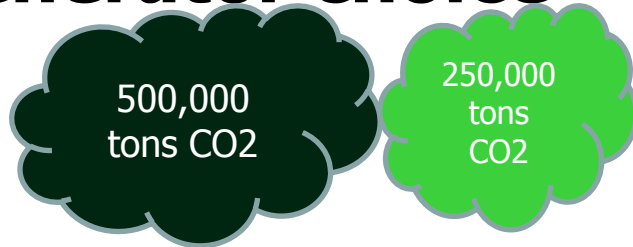
# It is unlikely that renewable generators will receive allowances

- An allowance is a right to emit one ton of GHG.
- The cap defines the amount of allowances that will be made available.
- Allowances may be given away or auctioned off.
- The European and RGGI markets have or will grant some portion of allowances based on historical emissions, which typically excludes most renewable generators.
- RGGI has a set-aside of 700,000 allowances for voluntary market purchases under RGGI which are retired.
- Renewable generators should not expect revenue from selling freely allocated emissions allowances.

# It is unlikely that renewable generators will qualify as offsets

- In capped systems, renewable generators will not provide any additional GHG reduction—fossil generators will emit up to the capped level.
- Offsets are meaningful when they take place outside a capped system.
- The only renewable generation allowed by RGGI is landfill gas generation, due to methane destruction.

# RGGI requires a biomass/coal co-fire generator choice



Generator Claiming Credit in RGGI

Generator Selling RECs to NYSERDA

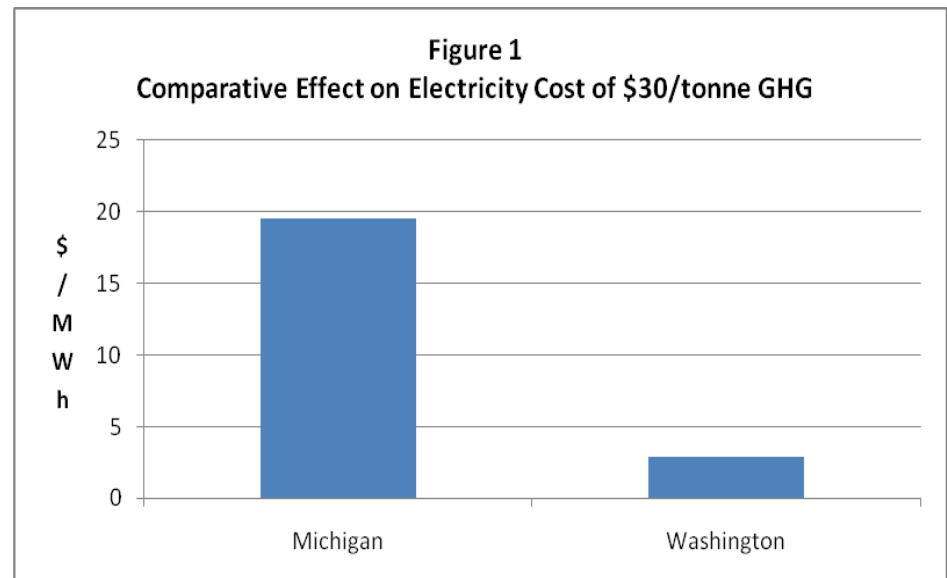
Allowance cost:	-\$2.25 million
Allowance credits:	+\$0.75 million
REC Revenue:	+\$ 0.0 million
Net revenue:	-\$1.50 million

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Net revenue:	+\$1.50 million

Allowance price = \$3/ton  
REC Price = \$15/MWh

# GHG regulation is likely to increase power prices

- As seen in the European GHG market, these costs tend to get passed through into electricity prices.
- The effect will vary, depending on the type of generation in a region.
- Coal-intensive regions will see higher price increases.
- Since renewable generators do not have significant GHG emissions, they will benefit from the higher prices without concomitant cost.



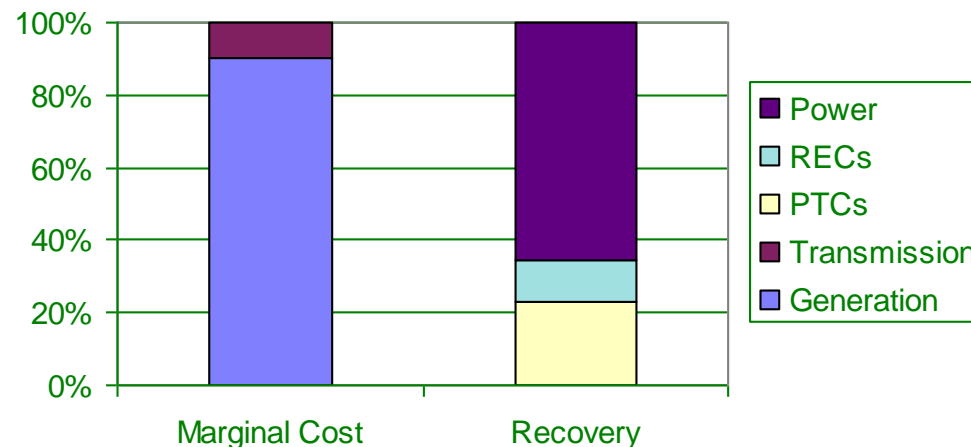
# Drivers of REC prices

Renewable generators typically have three revenue sources. These revenue sources are the key drivers of the renewable market.

- 1. Revenues from electricity power sales.** These depend on the market price of power and the production patterns of the generator.
- 2. Revenues from the sale of RECs.** These represent the premium buyers of renewable power are willing to pay over the price of normal ('brown') power for green power.
- 3. Revenues from tax credits or other incentives.** These include production tax credits , investment tax credits, and other federal and state-level incentives.

# Drivers of REC prices (cont.)

- Collectively, these revenue sources should meet the marginal cost of new additions, if the renewable markets are to be in balance.
- Renewable generators will not enter the market to meet the demand for renewable power if they do not expect to be able to recover their costs and make a reasonable profit.
- To the extent power prices do not allow full cost recovery, but there is still a willingness to pay a premium for renewables and/or tax credits are available, renewables may still be cost effective.

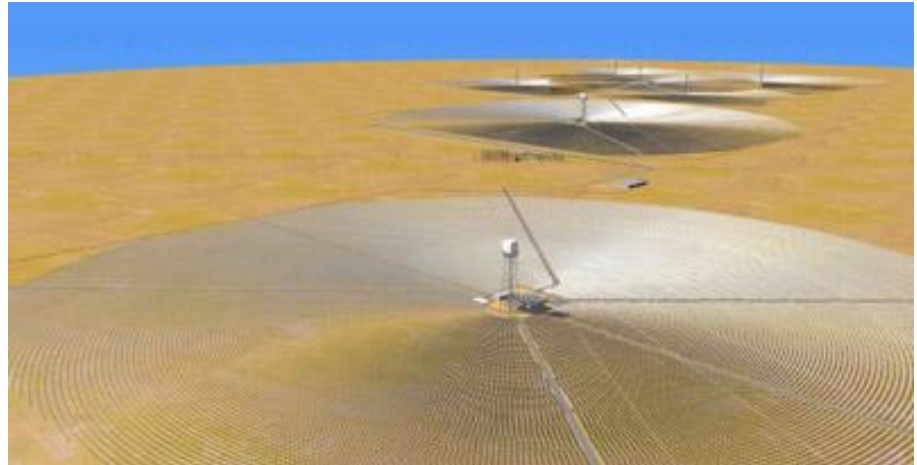


# The higher prices will mean less need for REC revenues

- In competitive markets, this should drive down the prices for RECs.
- Prices may be driven to zero if the GHG regulation is stringent enough.
- However, expiration of tax credits and increased commodity costs may offset increased power revenues.

# This should be good for renewables

- It means that renewables have become sustainable without the separate REC market.
- One of the goals of REC market design is to enable renewables to compete with traditional resources
- The presence of the REC market is just one tool for getting them there.



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