PLANNING FOR CLIMATE CHANGE IN MICHIGAN

MSU Symposium On Climate Change
Vulnerabilities and Opportunities:
Michigan and Beyond

April 26, 2010

Steven Chester, Presenter
CLIMATE CHANGE IN MICHIGAN

• Michigan’s Climate Plan
  ➢ Process, Outcomes, Actions, Next Steps

• New York Climate Project
  ➢ A Learning Opportunity on Adaptation
MICHIGAN’S BASELINE EMISSIONS 2005

- 248 MMtCO$_2$e (292 MMtCO$_2$e by 2025)
- 3.5% of US Emissions
- Rising Slower (12%) than National Average (16%)
- Sector Emissions Mirror Nat’l Averages
- Highest Emissions – Electricity Generation
  - Consumption = 90 MMtCO$_2$e
  - In-State Production = 71 MMtCO$_2$e
MICHIGAN CLIMATE ACTION COUNCIL

• Created by EO 2007 – 42
  ➢ Advisory to DEQ & Executive Branch
  ➢ 35 Members + 104 TWG Members

• MCAC Charge:
  ➢ Produce a GHG Inventory & Forecast 1990 to 2020
  ➢ Compile Climate Action Plan (CAP)
  ➢ Advise Local Gov’ts on Climate Change
MCAC PROCESS

• Center for Climate Strategies - Facilitator
• Six Technical Workgroups
  ➢ Assist in Identification, Design & Quantification of Policy Recommendations
    ✓ Energy Supply (Heat & Power)
    ✓ Commercial, Industrial & Residential Energy
    ✓ Transportation & Land Use
    ✓ Agriculture, Forestry & Waste
    ✓ Cross Cutting Issues
    ✓ Market Based Policies (Cap & Trade)
• 54 Policy Recommendations
  ➢ Opening Policy Statement
• GHG Reduction Goals
  ➢ 20% below 2005 levels by 2020
  ➢ 80% below 2005 levels by 2050
• Net Cumulative Savings: $10B 2009-25
• GHG Reductions: 987 MMtCO$_2$e by 2025
• Transform Transportation, Energy and Manufacturing Sectors
GHG REDUCTIONS BY 2025

- Projected GHG Emissions
- Projected GHG Emissions After Recent Actions
- Projected Emissions After Quantified MCAC Reductions
- MI Goal: 20% Below 2005 Level by 2020
GHG REDUCTION POTENTIAL


- Energy Supply
- Residential, Commercial, and Industrial
- Transportation and Land Use
- Agriculture, Forestry, and Waste
## POLICY OPTIONS W/ HIGHEST REDUCTION POTENTIAL

<table>
<thead>
<tr>
<th>Policy Option</th>
<th>Cost Effectiveness per Ton of CO2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incentives to Improve Existing Buildings (RCI-2)</td>
<td>$28 Savings</td>
</tr>
<tr>
<td>Improved Design and Construction Standards (RCI-7)</td>
<td>$31 Savings</td>
</tr>
<tr>
<td>Renewable &amp; Alternative Energy (Biomass, Nuclear Geothermal, Photovoltaic) (ES-1)</td>
<td>$7 to $276</td>
</tr>
<tr>
<td>Utility Side Demand Management (RCI-1)</td>
<td>$19 Savings</td>
</tr>
<tr>
<td>More Stringent Building Codes (RCI-4)</td>
<td>$35 Savings</td>
</tr>
<tr>
<td>Expand Biomass Feedstocks (AFW-1)</td>
<td>$21</td>
</tr>
<tr>
<td>Promote Low Carbon Fuel Use (TLU-1)</td>
<td>$16</td>
</tr>
</tbody>
</table>
GHG REDUCTION
COST/SAVINGS

Michigan Policy Options Ranked by Cost/ Savings per Ton GHG Reduced, 2009-2025
(Negative values signify monetary savings)
### MOST COST EFFECTIVE ACTIONS

<table>
<thead>
<tr>
<th>Action</th>
<th>Cost Effectiveness per Ton CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Use Planning &amp; Incentives-Smart Growth (TLU-6)</td>
<td>$189 Savings</td>
</tr>
<tr>
<td>Eco-Driver Program (TLU-2)</td>
<td>$176 Savings</td>
</tr>
<tr>
<td>Source Reduction/ Advanced Recycling (AFW-9)</td>
<td>$112 Savings</td>
</tr>
<tr>
<td>Truck Idling Policies (TLU-3)</td>
<td>$85 Savings</td>
</tr>
<tr>
<td>Congestion Mitigation (TLU-5)</td>
<td>$81 Savings</td>
</tr>
<tr>
<td>Expanded Use of Bio-Based Materials (AFW-4)</td>
<td>$62 Savings</td>
</tr>
<tr>
<td>More Stringent Building Codes-Energy (RCI-4)</td>
<td>$35 Savings</td>
</tr>
<tr>
<td>Incentives for Improved Design &amp; Construction (RCI-7)</td>
<td>$31 Savings</td>
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<tr>
<td>Existing Buildings Energy Efficiency Incentives (RCI-2)</td>
<td>$28 Savings</td>
</tr>
<tr>
<td>Utility Side Demand Management (RCI-1)</td>
<td>$19 Savings</td>
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</table>
MI EXEC. DIRECTIVE 2009 - 4

• Issued July 29, 2009

• Implements Certain MCAP Policy Options
  ➢ Adopts GHG Goals
    • 20% by 2020; 80% by 2050
  ➢ Mandates Macroeconomic Analysis
  ➢ Accelerates Action on Building Codes
  ➢ Expands Congestion Mitigation Programs
  ➢ Requires State Fleet Truck Idling Program
  ➢ Requires Eco-Driver Program
MACROECONOMIC ANALYSIS

- $75,000 Kresge Foundation Grant
- USC/MSU Economists Conducted Analysis Using REMI Model
- Macroeconomic Effects (2010-25):
  - Majority of GHG Mitigation Policy Options Have Positive Impacts on State Economy
    - 129,000 Net Jobs
    - $25.3 Billion Net Cumulative Increase to Gross State Product
MCAP IMPLEMENTATION
NEXT STEPS

• Prioritizing Remaining MCAP Policy Options

• Adaptation
  ➢ Impacts and Vulnerability Assessment
  ➢ State Adaptation Plan Development

• Federal Cap and Trade
NEW YORK CLIMATE PROJECT

• Purpose and Goals

- EO No. 24 (8/2009) Sets Goal To Reduce GHGs in NYS by 80% Below 1990 Levels by 2050

- EO Created Climate Action Council (CAC) – Directed To Prepare Draft Climate Plan (CAP) by 9/30/2010

- CAP To Also Include How NYS Can Adapt to Climate Change
NEW YORK CLIMATE PROJECT

- Technical Work Groups:
  - Power Supply and Delivery (PSD)
  - Residential, Commercial and Industrial (RCI)
  - Transportation and Land Use (TLU)
  - Agriculture, Forestry, and Waste Management (AFW)
  - Adaptation (ADP)
NYS ADAPTATION TWG

- Review ClimAID Adaptation Work
- Review Adaptation Work Done by Others
  - NYC Climate Change Adaptation Task Force
  - Sea Level Rise Task Force
  - Rising Waters Task Force
- Identify Policy Options for Analysis
- Prioritize Policy Options
- Make Recommendations to CAC
Providing NYS With Cutting-Edge Information On Its Vulnerability To Climate Change And Facilitating Development Of Adaptation Policies Informed By Local Experience And State-Of-The-Art Scientific Knowledge

Cynthia Rosenzweig (Columbia), Art DeGaetano (Cornell), William Solecki (CUNY)
ClimAID

- Identify and Characterize Vulnerabilities
- Prioritize Vulnerabilities
- Identify Adaptation Strategies
- Prioritize Adaptation Strategies
NYS ADAPTATION TWG

- Formed Sector Subgroups (ClimAID)
  - Agriculture
  - Coastal Zones
  - Communications
  - Ecosystems
  - Energy
  - Public Health
  - Transportation
  - Water Resources

- Populate Templates
- Make Recommendations to TWG
<table>
<thead>
<tr>
<th><strong>Yellow Scenario</strong></th>
<th><strong>Deep Blue Scenario</strong></th>
<th><strong>Ultraviolet Scenario</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>25% Efficiency R,C</td>
<td>Same</td>
<td>Same</td>
</tr>
<tr>
<td>10% Industry</td>
<td>Same</td>
<td>Same</td>
</tr>
<tr>
<td>LDV – CV/HEV/PHEV</td>
<td>LDV – Hydrogen 100%</td>
<td>LDV – PHEV/Bio-ethanol 95/5%</td>
</tr>
<tr>
<td>30/30/40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eliminate 75% fossil fuel combustion in R,C,I</td>
<td>Eliminate 100% in R,C; 75% Industry</td>
<td>Eliminate 75% R,C 75% Industry</td>
</tr>
<tr>
<td>IGCC and Nat Gas 90% CCS</td>
<td>30% Nuclear (2 new plants)</td>
<td>35% Nuclear (10-12 new plants)</td>
</tr>
<tr>
<td>Max Hydro and Wind</td>
<td>30% Renewables</td>
<td>35% Renewables</td>
</tr>
<tr>
<td></td>
<td>40% Nat Gas 90% CCS</td>
<td>17% Nat Gas 90% CCS</td>
</tr>
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