Lessons from Cost–Benefit Analyses of Low Emission Development Strategies in China, Mexico, Colombia and Beyond

William A. Ward
Professor
The John E. Walker Department of Economics
Clemson University
We all want sustainability

But is sustainability consistent with “Good Business Practice”?

THE SYMPOSIUM PROVIDES MULTIPLE PERSPECTIVES ON THIS QUESTION – INCLUDING YOURS
My own view?

- Sustainability is not slam-dunk easy...
- But it is “do-able”

- We will talk about –
  - WHY it is do-able
  - HOW it is do-able

BUT FIRST A STORY FROM SOUTH CAROLINA
ABOUT EASY AND DIFFICULT TASKS
An elderly man living on a rural mail route crossed the road daily to get his mail.
One day as he was coming back....
Behind the wheel of the truck was a squirrel...
The squirrel said...

“Not as easy as it looks, is it?”
Can companies profitably improve their EE and reduce their GHG footprint?

What do CBA of LEDS show?

CBA = Cost–benefit analysis
LEDS = Low emission development strategy
The McKinsey (2007) global MACC

What might it cost?

Global cost curve for greenhouse gas abatement measures beyond "business as usual," greenhouse gases measured in GtCO$_2$e$^1$

Approximate abatement required beyond "business as usual," 2030

- Carbon capture and storage (CCS); new coal
- Medium-cost forestation
- Co-firing biomass
- Wind; low penetration
- Industrial feedstock substitution
- CCS, enhanced oil recovery, new coal
- Low-cost forestation
- Livestock
- Nuclear

Cost of abatement, € per tCO$_2$e

Industrial non-CO$_2$
Standby losses
Sugarcane biofuel
Fuel efficiency in vehicles
Water heating
Air-conditioning
Lighting systems
Fuel efficiency in commercial vehicles
Building insulation

Abatement beyond "business as usual," GtCO$_2$e$^1$ per year in 2030

Marginal cost,$^5$ € per tCO$_2$e$^2$

- 550 ppm$^4$
- 450 ppm$^4$
- 400 ppm$^4$

Further potential$^3$

$^1$GtCO$_2$e = gigaton of carbon dioxide equivalent; "business as usual" based on emissions growth driven mainly by increasing demand for energy and transport; around the world and by tropical deforestation.

$^2$tCO$_2$e = ton of carbon dioxide equivalent.

$^3$Measures costing more than €40 a ton were not the focus of this study.

$^4$Atmospheric concentration of all greenhouse gases recalculated into CO$_2$ equivalents; ppm = parts per million.

$^5$Marginal cost of avoiding emissions of 1 ton of CO$_2$ equivalents in each abatement demand scenario.
- *Private win–win*: Non-GHG benefits to individual exceed the costs

- *Social win–win*: Non-GHG benefits to society exceed the costs
<table>
<thead>
<tr>
<th>Private No-regrets Options (in black)</th>
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<tbody>
<tr>
<td>Openhearth vs BOF 16.08%</td>
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<tr>
<td>Continuous Casting 18.63%</td>
</tr>
<tr>
<td>Steel Rolling/Furnace 35.90%</td>
</tr>
<tr>
<td>Blast Furnace Gas Recovery 28.21%</td>
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<tr>
<td>Aluminium Plant Renovtn 84.31%</td>
</tr>
<tr>
<td>Med-sized Ammonia 19.50%</td>
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<tr>
<td>Small Ammonia 71.39%</td>
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<tr>
<td>NaOH Membrane 29.39%</td>
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<tr>
<td>Med.-Scale Kiln Renovtn 15.45%</td>
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<tr>
<td>Wet to Dry Processing 19.15%</td>
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<tr>
<td>Small-Scale Kiln Renovtn 35.19%</td>
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<tr>
<td>Co-Generation 28.51%</td>
</tr>
<tr>
<td>NaOH Recovery 24.57%</td>
</tr>
<tr>
<td>Printing &amp; Dyeing Co-Gen 37.56%</td>
</tr>
<tr>
<td>NaOH Recovery Project 57.94%</td>
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<tr>
<td>Computer Mgt Proj Pos. inf.</td>
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<tr>
<td>High Efficiency Motors 26.19%</td>
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<tr>
<td>Variable Speed Motors 15.56%</td>
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<tr>
<td>Motor Repairs 44.77%</td>
</tr>
<tr>
<td>Steam Trap Prodctn 52.41%</td>
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<tr>
<td>Coal Briquetting 63.08%</td>
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<tr>
<td>Coal Washing 18.80%</td>
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<tr>
<td>Low Volt Line Loss -0.46%</td>
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<tr>
<td>TPP Project 194.79%</td>
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<tr>
<td>Energy Conservtn 23.15%</td>
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</tbody>
</table>

[all compared with 12% cost of capital]
“Our cheapest energy source is, and always has been, energy efficiency.”

*Beth A. Nagusky (Maine Director for Environment Northeast), “Maine Voices: Before investing in alternative energy, let’s fund efficiency efforts”, *Portland Press Herald* (February 25, 2012).*
THE ECONOMISTS SAY:

“Negative cost options cannot exist – it is not logical that they would”

THE ENGINEERS SAY:

“Like hell they don’t – just lookee here!”
The basic questions to be addressed:

- WHY so many negative cost options in LEDS & EE studies?
- Why aren’t people already DOING these things, if the costs are truly ‘negative’?
McKinsey GHG Negative Cost Options

- Building insulation (2 applications)
- Fuel efficiency in commercial vehicles
- Lighting systems
- Air-conditioning
- Water heating
- Sugarcane biofuel
- Standby losses
- Industrial non-CO2

What keeps these options from being exploited?
Explaining the Negative Costs – some general principles

- Social versus private costs
- Split incentives (Principal–Agent Issues)
- Un-priced public goods
- Distortionary fiscal and regulatory policies
- Insufficient and incorrect information
The Mexico GHG Negative Cost Options

- Non-motorized transport [e.g., bicycles]
- Road freight logistics
- Co-generation in Pemex
- Residential lighting
- Non-residential lighting
- Charcoal production
- Industrial motors
- Zero-tillage maize
- Co-generation in industry

- Solar water-heating
- Forest management
- Non-residential air conditioning
- Residential refrigeration
- Gas leakage reduction
- Residential air-conditioning
- Bio-mass electricity generation
- Improved cook stoves
As indicated by World Bank “Ease of Doing Business Database” – Including measures like
- ‘Getting electricity’
- ‘Resolving insolvency’
- ‘Enforcing contracts’
- ‘Trading across borders’
- ‘Paying taxes’
- ‘Dealing with construction permits’
- ‘Registering property’
- ‘Getting credit’
- ‘Protecting investors’
China – Ease of doing business (91st globally)
Colombia ranks 42\textsuperscript{nd} globally in ease of doing business

Mexico ranks 53\textsuperscript{rd}
Compare to USA – 4th globally in ‘ease of doing business’
Ease of doing business rankings (I knew you would ask)

1. Singapore
2. Hong Kong SAR, China
3. New Zealand
4. United States
5. Denmark
6. Norway
7. United Kingdom
9. Iceland
10. Ireland
11. Finland
12. Saudi Arabia
13. Canada
14. Sweden
15. Australia
16. Georgia
17. Thailand
18. Malaysia
19. Germany
20. Japan
21. Latvia
22. Macedonia, FYR
23. Mauritius
24. Estonia
25. Taiwan, China
26. Switzerland
27. Lithuania
28. Belgium
29. France
30. Portugal
1. GHG abatement & EE can be difficult, but not impossible

2. Lots of variety – physical, cultural, institutional – No one-size-fits-all solutions

3. Companies need individuals focused on SUSTAINABILITY – otherwise, other business needs get the attention

4. Societies need creative focus on finding ‘meta’ solutions to EE & GHG related inefficiencies
"Heavier-than-air flying machines are impossible."
Lord Kelvin, President, Royal Society, 1895

"Computers in the future may weigh no more than 1.5 tons." – Popular Mechanics, forecasting the relentless march of science, 1949
"A conference is a gathering of important people who singly can do nothing, but together can decide that nothing can be done." – Fred Allen

But something CAN be done – at the company level, and at the global level