Reflections on: Recycling Waste Energy -

Profitable Climate Change Mitigation

Michael E. Canes, LMI

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Improved Energy Efficiency a Key to Economic Growth

- In principle, a sound concept
  - Greater energy efficiency → less energy to produce given output or more output for a given energy input
  - Complementary resources such as labor and capital should become more productive
  - If can sustain increased energy efficiency over time, can continuously improve resource allocation within the economy and enable more growth opportunity
  - Question is whether can increase energy efficiency efficiently

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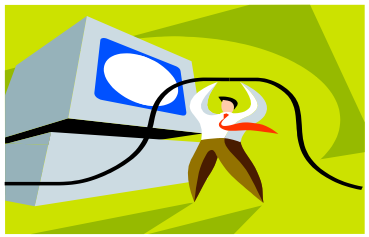
How Can We Increase Energy Efficiency?

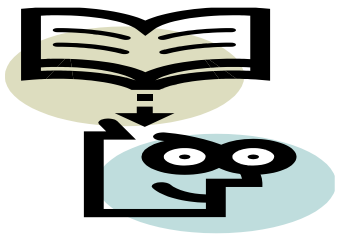
- Invest K, L, M & E to do so
  - K = capital
  - L = labor
  - M = materials
  - E = energy

- Remove institutional barriers

- Develop technology



- Disseminate information



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Tom Casten Presentation

- Reminds us how inefficiently the US uses energy
- Shows CO_2 consequences
- Explains how CHP can transform waste heat into power, steam, hot water
  - Topping cycle, bottoming cycle
- Demonstrates how it works in real life
  - E.g., Cokenergy Mittal Steel
- Tells us what we need to do to take better advantage

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So is there Anything Wrong with Tom's Perspective?

- No! His presentation is very illuminating
- But…….he operates in a tough world where buyers require a solid business case
- Why might they balk?
  - High upfront costs coupled with uncertain future returns
  - Industrial firms don't want to be in the CHP business
  - Alternatively, they don't want to negotiate and enforce long-term contracts with CHP providers
  - Firms don't want to commit to keeping their plants open for long periods, so need quick payoff to CHP
  - Conventional power is cheap and reliable
  - Local utility objects and wants compensation for stranded assets

A Look at Tom's Numbers for Silicon Furnace Alloy WV

- $170 million project
- Will recover 65 MW of power
- WVA large industrial retail rate ≈ $40/MWh

- Assume run CHP plant 8760 hrs/yr
- Assume no M&R costs
- Ignore subsidies

- Savings = 65 MW x $40/MWh x 8760h = $22.8M/yr
- Payback is 7.5 years
  - This is not attractive to most industrial firms

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Conclusions

- Increased energy efficiency can help us to resolve economic and environmental problems
- Where it can be done cost effectively – should push forward as fast and as much as possible
- CHP in particular looks like a promising avenue
- But not a panacea – there are costs involved and the returns are not always attractive
- Removal of barriers, improved technology, greater information flow will help

- THANK YOU!

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