EPA's Energy Recovery Inventory

Steps Toward a New Energy Recovery Policy

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Toward a New EPA Policy

- The terminology issue
- The polarized waste-to-energy debate
  - Industry view
  - Environmentalists view
  - How is EPA viewing it now?
- EPA's efforts in incorporating energy recovery into national policy
  - Energy inventory
  - Energy recovery website
  - A study of existing communities with energy recovery
- Energy legislation impacts
- Suggestions for next steps

Terminology

- The recent change from Integrated Waste Services Association to the Energy Recovery Council is a very good idea
- The Office of Solid Waste is now the Office of Resource Conservation and Recovery
- A permanent terminology change in the “waste to energy” field may be in order: “Energy Recovery” not WTE
- NAWTEC?

Suggestion for 2010:

North American Conference on Energy Recovery

(NACER)

Waste-to-Energy?

- I have never witnesses such issue polarization, in the public, in states, in the Federal government, in NGOs.
- Getting energy from material that would otherwise be lost is such a straightforward concept:
  - We can turn a waste management problem into an energy (and climate change) solution

Why such polarity? Two world views:

Energy Recovery Proponents Viewpoint

- Energy recovery from the combustion of waste materials, particularly MSW, is currently producing significant amounts of clean power for an energy hungry world – and more is available
- Toxics releases have been significantly reduced (MACT coverage for municipal waste combustors)
- It is beneficial to climate change due to lifecycle GHG reduction
- It reduces volume of MSW landfilled, it reduces landfill emissions, it recovers materials otherwise lost, like metals
- What is the debate? The absence of energy recovery is landfilling. Expand energy recovery!

Energy Recovery Opposition Viewpoint

- Incineration is disposal, “wasting”, that is worse than landfilling
- It produces a “toxic soup” of air emissions that could poison the world
- It significantly restricts the more beneficial option of increased recycling and composting (the “feed the beast” syndrome ruins the potential for a “zero waste” national policy)
- It adversely impacts GHG reduction efforts by directly releasing massive amounts of CO2 and NOx while reducing future carbon emissions reductions from increased recycling
- It has adverse environmental justice impacts. No jobs are created for local communities, just pollution. Big cost, no gain.
- Why is it even being considered? Ban it!

Where is EPA Now?

- No current national policy on energy recovery from secondary materials
- There are actions that encourage some recovery, for example EPA promotes energy from tires
- New Administration with still evolving policies
- Continued EPA analysis showing significant lifecycle carbon emission benefits
- New legislation pending on energy (Waxman bill)
- Still, the bottom line: the U.S. landfills over 60% of its MSW

Good news/bad news on getting a national energy recovery policy

- Good:
  - Increasing climate change concerns have forced analysis of comprehensive mitigation strategies – and energy recovery has evolved as a major player
  - Growing internal consensus on role of energy recovery as a renewable resource – plus joint OAR/ORCR technical support of legislation
  - OSWER climate change strategy shows increased recycling and energy recovery provide significant greenhouse gas emissions savings

Box 7: Summary of Hypothetical Materials Management Approaches

Reduce packaging use by 50%		147 $MMTCO_2E$ per year
Extend the life of personal computers by 50%		51 $MMTCO_2E$ per year
Recycle all construction materials		160 $MMTCO_2E$ per year
Increase national MSW recycling rate to 50%		36 $MMTCO_2E$ per year
Composting	Compost all food scraps	21 $MMTCO_2E$ per year
Energy Recovery	Combust all landfilled MSW	73-136 $MMTCO_2E$ per year
Disposal	Capture all methane at U.S. landfills	67 $MMTCO_2E$ per year

These examples represent just a small portion of the total impact that materials management approaches could have on U.S. GHG emissions.

- Bad:
  - Public opinion on “waste incineration” seems trapped in the 1970’s (and it is exploitable by opponents of combustion)
  - Some state regulatory agencies also see it this way
  - Potential for adverse legislation (is energy recovery from waste materials a renewable energy source or not?)
  - Such legislation could seriously impact development of a national integrated materials management policy

Most Compelling Reasons for Promoting Energy Recovery

- Consensus growing on need for climate change mitigation
  - dictates all materials management decisions consider carbon emissions first
- This is biogenic energy
  - The feedstock here is 56% to 66% biogenic in origin. Such energy doesn't contribute to higher atmospheric carbon like fossil fuel-derived energy. This "biogenic" material comes mostly from renewable sources: agriculture and tree farming

- The U.S. landfills too much material.
  - Only a specific portion of MSW can be recycled/composted, & today's markets show market volatility affects recycling rates.
  - The reality is you either recover energy or you put MSW in the ground where it generates gases.
- We must avoid false choices.
  - It is not energy recovery v. recycling, it is energy recovery v. landfilling.
  - We need energy. We don't need landfills

- National security
  - The U.S. uses too much fossil fuel. ER from waste could offset a sizeable amount of fossil fuel-derived baseload power.


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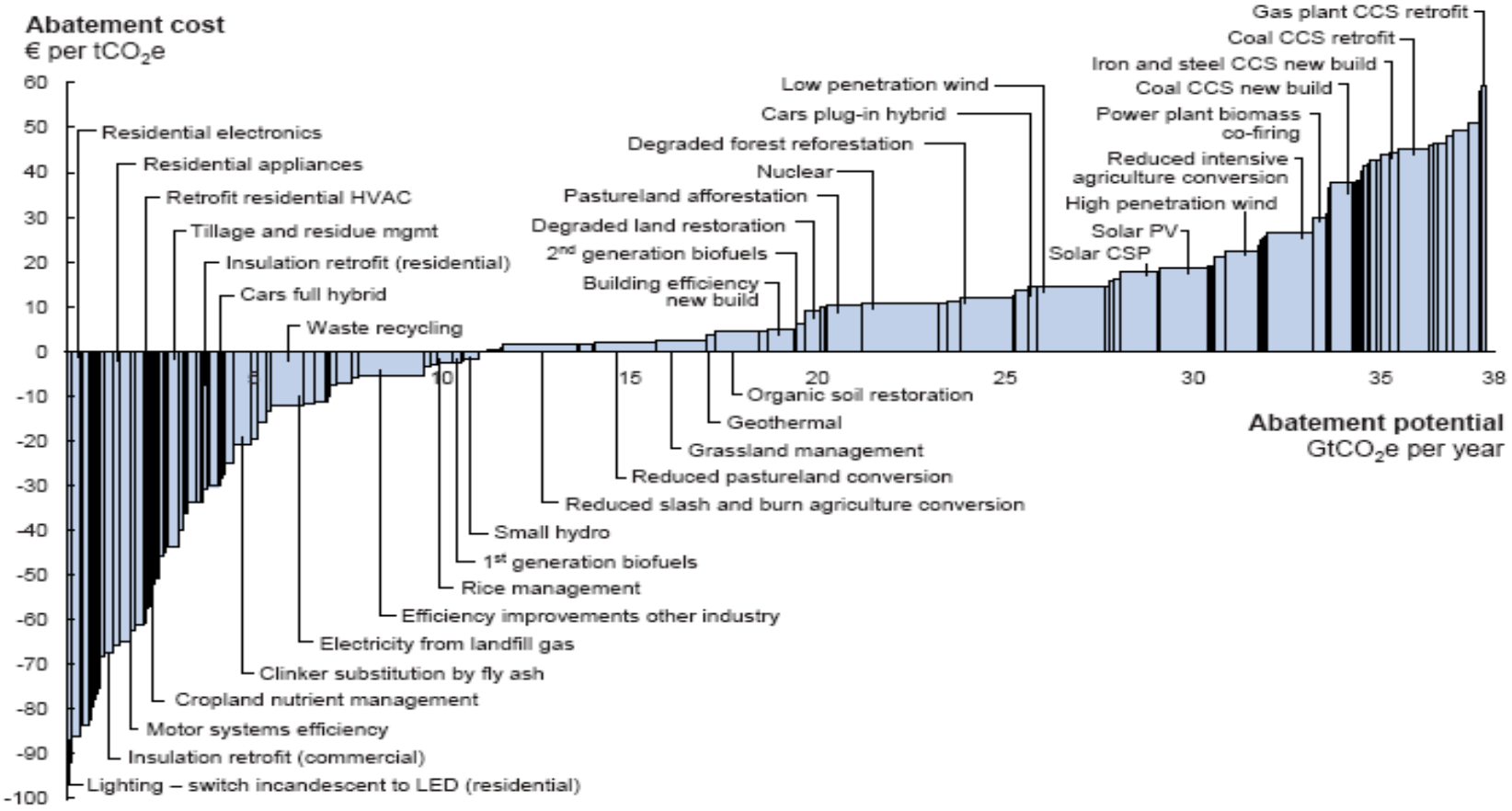
McKinsey Pathway to Low Carbon Economy (January, 2009)

Exhibit 1

Global GHG abatement cost curve beyond business-as-usual – 2030



Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €60 per tCO_2e if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.
Source: Global GHG Abatement Cost Curve v2.0

EPA Activities

- Inventory
  - Tasked by senior management to determine what energy recovery potential from hazardous and non-hazardous secondary materials is available
  - We found a not surprising result: MSW is the only materials stream that contains sufficient potential energy to be important, as much as 2% - 4% of the nation's electrical energy demand

Inventory of Energy Recovery Opportunities

Energy Recovery Opportunities	Material Available for Recovery (million tons/year)	Potential Energy Recovery/Saving (billion BTU/year)	Percent of U.S. Energy Production
MSW			
BioCycle Data	266	2,729,160	3.90%
Franklin Data	137	1,405,620	2.01%
Biomass, Ag Residue	100	1,000,000	1.43%
Biomass, Animal Manure/Gaseous Fuels	35	420,000	0.60%
C&D, Land Clearing Debris	27	394,200	0.56%
C&D, Wood Building Materials	19.6	353,000	0.50%
Landfill Methane Gas	N/A	144,000	0.21%
Coal Combustion Products, Fly Ash	20	80,000	0.11%
Biomass, Pulp and Paper Residues	3	30,000	0.043%

Conclusions from the Inventory

- Nationally significant energy available from MSW combustion, not much from other sources
- If you want to have an impact on greenhouse gas mitigation, focus on MSW
- Even if you have >50% recycling, you still have a significant amount of potential energy to recover

Annual Benefits from MSW Energy Recovery after Assuming a Recycling Rate of 50%

	Material Available (millions of tons per year)	Energy Content (billions of BTU/year)	Electrical Power (billion kilowatt-hours)	Equivalent Number of Homes Powered	Lifecycle GHG Savings (million tons CO2E)
50% Recycling Rate					
BioCycle	**178**	**1,826,300**	**91**	**8,300,000**	**178**
Franklin	**95**	**974,700**	**49**	**4,500,000**	**95**

EPA Activities

- Developing an EPA Energy Recovery website
- It will be a place to provide both technical and programmatic information on energy recovery
- We see this as the place to show EPA's current and future positions on energy recovery
- A key part of this is the waste management hierarchy – which will be on the website and will be expanded

U.S. ENVIRONMENTAL PROTECTION AGENCY

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Energy Recovery

Welcome to EPA's Energy Recovery Portal!

Energy Recovery is the conversion of waste or secondary materials into useable heat, electricity, or fuel through a variety of processes such as combustion, gasification, or pyrolysis.

Here is how the site is organized...you can jump to any section by clicking the links below.

- Basic Information: Energy Recovery from Hazardous and Non-Hazardous Waste
- Regulatory Efforts Page
- Energy Recovery from Non-Hazardous Waste
  - WTE Main
    - Process Description and FAQs
    - Air Emissions
      - GHG Model Discussion
    - International Activities
    - WTE Compatibility with Recycling
    - Landfilling vs. WTE
    - Map/Directory of WTE Plants
  - Landfills, Open Dumps, and Open Burning
- **Comments and questions** about Energy Recovery can be directed to Jesse Miller at miller.jesse@epa.gov

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Comparison study

- Six community comparison study
- Researched materials management systems of six different communities
  - Broward Co. FL, Lancaster Co., PA, and Tulsa, OK who have or considered energy recovery
  - King Co., WA, Wilmington, DE, and Frederick Co., MD who either focus on recycling or are considering energy recovery

- Assessing why each community did what they did
- Run the DST Lifecycle models to measure what the impacts to carbon, energy, and cost are of these decisions
- Results will inform us about the actual experiences of communities, the best guide to what is being done by people faced with real materials management requirements

Pending Energy Legislation

- Current draft of Waxman bill excludes MSW from consideration as renewable
- Congressional staff wanted EPA to provide information on a number of topics:
  - What are the emissions from existing facilities?
  - What is the existing regulatory coverage?
  - What is the biogenic fraction of energy and can we define it?
  - What is the impact on recycling?

Some Key Information Provided by ORCR/OAR to the Hill

- On air toxics emissions:
  - EPA provided information on impact of MACT standards and % reductions of toxics
- On carbon emissions:
  - Lifecycle modeling shows significant reductions (1 ton in = 1 ton CO2 saved)
  - Offset of fossil fuel-derived power must be considered
  - Better profiles than landfilling w/energy recovery
- On renewable energy credits:
  - Are options for providing RECs
    - 100% renewable,
    - only “biogenic” fraction renewable so various partial credit levels could be allowed

- On energy efficiency of viable technologies
  - Energy efficiency data provided
  - Are other technologies but they are not in operation
- On impact of energy recovery on recycling:
  - Provided data indicating recycling rates higher in communities with energy recovery and noted that E.U. countries show same pattern
  - Noted that even with higher recycling the U.S. will still landfill huge amounts of MSW

- Our experience over the past several months was they listened carefully and asked questions without saying what they thought would happen
- Maybe next week we will see what happened

Suggested Next Steps – Energy Recovery Industry

- Continue to support legislation qualifying MSW combustion as renewable energy
- Use the opportunity to show local communities the lifecycle benefits of your industry for greenhouse gas reductions
- Provide a definitive paper on air emissions from your facilities

Next Steps - EPA

- Finish construction of the website that defines where energy recovery falls on the EPA hierarchy: it is not disposal; it is a source of renewable energy
- Issue a position paper on the necessity for integrated materials management system that includes a balanced recycling/composting and energy recovery goal
- Promote the “integrated materials management strategy” and help communities find the best integrated strategy for themselves (45-45-10?)
- We need a policy that stays ahead of the airplane


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