

Incentivizing Energy Efficient Fuel Switching in Michigan

EO Collaborative

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Energy Efficient Fuel-Switching White Paper

- Paper will include:
 1. Legal Issues
 2. Policy Issues
 3. Environmental Issues
 4. Energy Issues
 5. Recommendation (with respect to EO programs)
 6. Technical Appendices



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- Legal Issues:
 - Administrative constraints for promoting technologies
 - What legislative changes to PA Act 295 would we have to make to promote these technologies- if any?



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Legal Issues

- Sec. 71(2) of PA 295:

“The overall goal of an energy optimization plan shall be to reduce the future costs of provider service to customers. In particular, an EO plan shall be designed to delay the need for constructing new electric generating facilities and thereby protect consumers from incurring the costs of such construction.”



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- Policy Issues:
 - Is this in the public's interest?
 - Subsidization design. Who would offer these incentives: gas companies, electric companies, or others?
 - Subsidization impact on rates and utilities.
 - Calculation of EO credits



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- Environmental Issues
 - Emission reductions/increases from fuel switching and efficiency of technology
 - What alternatives are there that may provide greater emission reductions?



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- Energy Issues
 - Research market potential
 - Economic feasibility, cost savings for ratepayer for various fuel switching options.
 - Divide into summer (air-conditioning) and winter (space-heating) loads



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- Recommendation
 - Integration into MPSC Energy Optimization programs



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- Technical Appendices
 - Calculations



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Energy Efficient Fuel-Switching White Paper

- Particular emphasis:
 - Ground sourced heat pumps (GSHP)
 - Air-to-air heat pumps
 - Solar Thermal
 - Commercial and industrial fuel-switching technologies

Ground-Source Heat Pumps (GSHP)

- 6 possible applications:
 - Electric Resistance Space Heating to GSHP,
 - Existing GSHP to High Efficiency GSHP,
 - Propane to GSHP,
 - Fuel Oil to GSHP,
 - Natural Gas to GSHP,
 - New Construction GSHP.



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Ground-Source Heat Pumps (GSHP)

EO Credit currently available on:

- Conversion of Electric Resistance Space Heating

OR

- Replacement of existing GSHP to High Efficiency GSHP



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Ground-Source Heat Pumps (GSHP)

- Most GSHPs are sized for the building's heating load; thus oversized for the cooling load*.
- The summer reduction in electric demand vis-à-vis high efficiency central a/c is less than the added winter electric utility demand.
- Thus, no EO credits are generated.

*in northern climates



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Ground-Source Heat Pumps (GSHP)

- Fuel usage based on winter weather-normalized residential space heating requirement of 40 MMbtu
 - Energy Star GSHP 3.3 COP:
 - Natural gas combined cycle generation efficiency = 45%
 - Transmission and distribution grid losses = 7%
 - $40 \text{ MMbtu} / 3.3(0.45 - 0.07) = 31.9 \text{ MMbtu}$
 - Energy Star GSHP 3.3 COP:
 - Pulverized coal generation efficiency = 32%
 - $40 \text{ MMbtu} / 3.3(0.32 - 0.07) = 48.4 \text{ MMbtu}$
 - Energy Star 95% AFUE natural gas furnace:
 - $40 \text{ MMbtu} / 0.95 = 42.1 \text{ MMbtu}$



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Summary Table of Federal Incentives for Ground Source Heat Pumps and Solar Thermal

Source: <http://www.dsireusa.org>

Incentive Type	Name	Applicable Sectors	Amount	Maximum Incentive
Federal; Corporate Deduction	Energy-Efficient Commercial Buildings Tax Deduction	Commercial, Construction, State Government, Fed. Government	\$0.30-\$1.80 per square foot, depending on technology and amount of energy reduction	\$1.80 per square foot
Federal Grant Program	USDA - High Energy Cost Grant Program	Commercial, Residential, Nonprofit, Local Government, State Government, Tribal Government	\$75,000-\$5,000,000	\$5 million

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Federal Grant Program	USDA - Rural Energy for America Program (REAP) Grants	Commercial, Schools, Local Government, State Government, Tribal Government, Rural Electric Cooperative, Agricultural, Public Power Entities	Varies	25% of project cost
Federal Loan Program	Energy-Efficient Mortgages	Residential	Not specified.	Not specified.
Federal Loan Program	USDA - Rural Energy for America Program (REAP) Loan Guarantees	Commercial, Agricultural	Varies	\$25 million per loan guarantee

Summary Table of Federal Incentives for Ground Source Heat Pumps and Solar Thermal

Source: <http://www.dsireusa.org>

Federal Loan Program	Qualified Energy Conservation Bonds (QECCBs)	Local Government, State Government, Tribal Government	Varies	Not specified.
Federal Loan Program	U.S. Department of Energy - Loan Guarantee Program	Commercial, Industrial, Nonprofit, Schools, Local Government, State Government, Agricultural, Institutional, Any non-federal entity, Manufacturing Facilities	Varies. Program focuses on projects with total project costs over \$25 million.	Not specified.

Other Financing Options

- Michigan Saves

- Provides up-front financing for energy efficiency installations such as GSHP (open and loop systems – replacement only) and solar water heaters.
- *Michigan Saves* pays installation costs with property owner/tenant making monthly payments to a Michigan Saves authorized lending institution.
- Monthly payment required to be less than energy savings resulting from installation. Example: new furnace might save \$19 on bill, so monthly payment might be \$11.
- Initial capital pool is \$6.5 Million, used to leverage additional funds from private equity, municipal foundations, etc. Full funding is expected to be \$40 - \$50 Million.
- Pilot programs began in 2009, full deployment by 2011.



White Paper on Incentivizing Energy Efficient Fuel-Switching

- Looking for input
 - Utilities
 - National Regulatory Research Institute
 - National Environmental Defense
 - Michigan Environmental Council
 - Energy Service Companies (ESCO's)
 - Others



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