The Role of Traditional and Alternative Energy in Economic Development of Rural Communities

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Energy Efficiency: *"the low hanging fruit"*

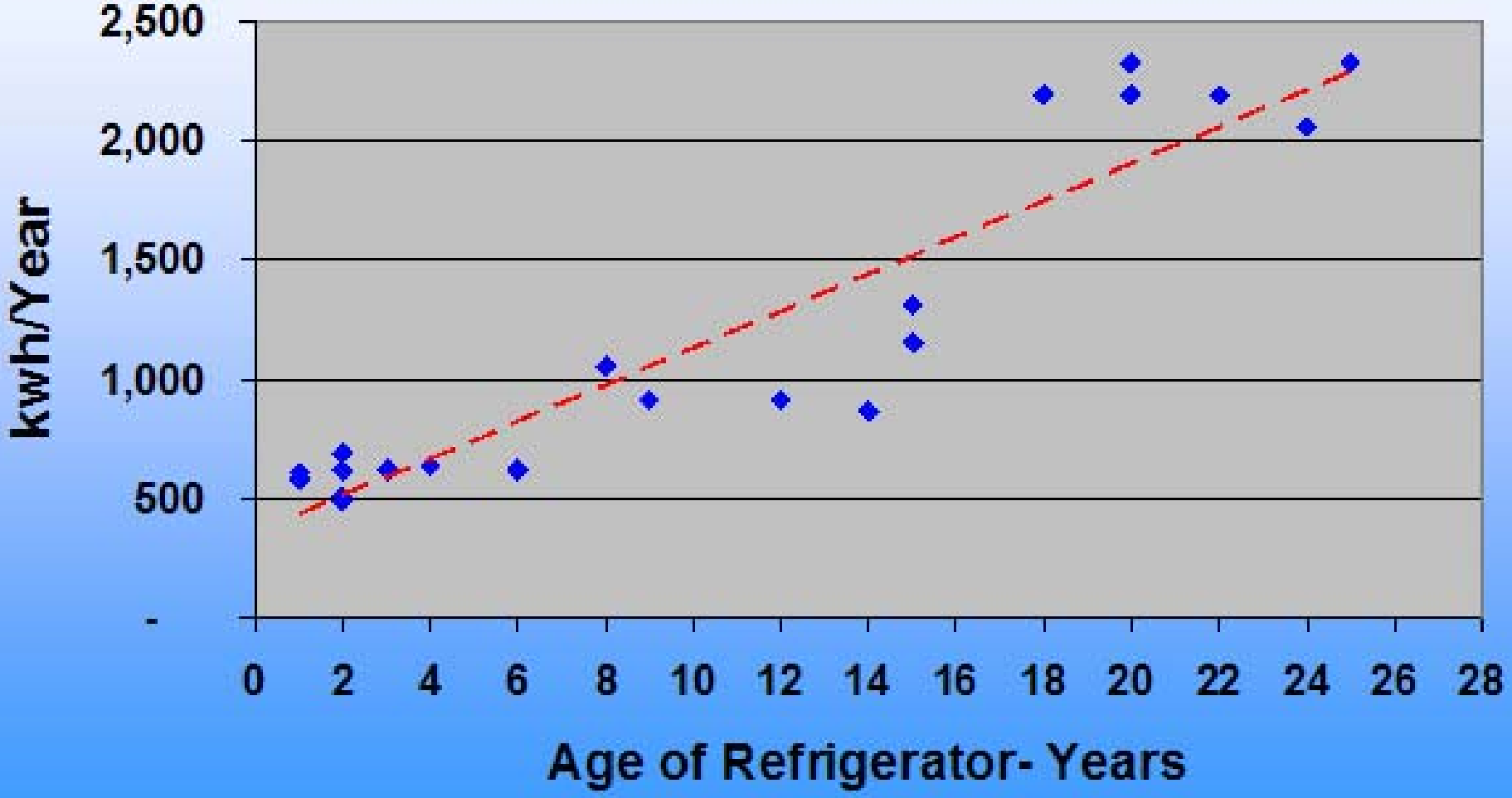
- Google search yields **865,000** hits
- Since new appliances, air conditioners and heat pumps are more efficient than older units, what's inhibiting Energy Efficiency?

Refrigerators are one of the larger home electricity uses: "*one of the lowest hanging fruits*"

- Average refrigerator uses 1,239 Kwh/yr. (http://www.eia.doe.gov/emeu/reps/enduse/er01_us.html)

- Average lifetime 14 yrs (www.energystar.gov/refrigerators)

Refrigerator Population of Ohio
Statewide and G&T office personnel



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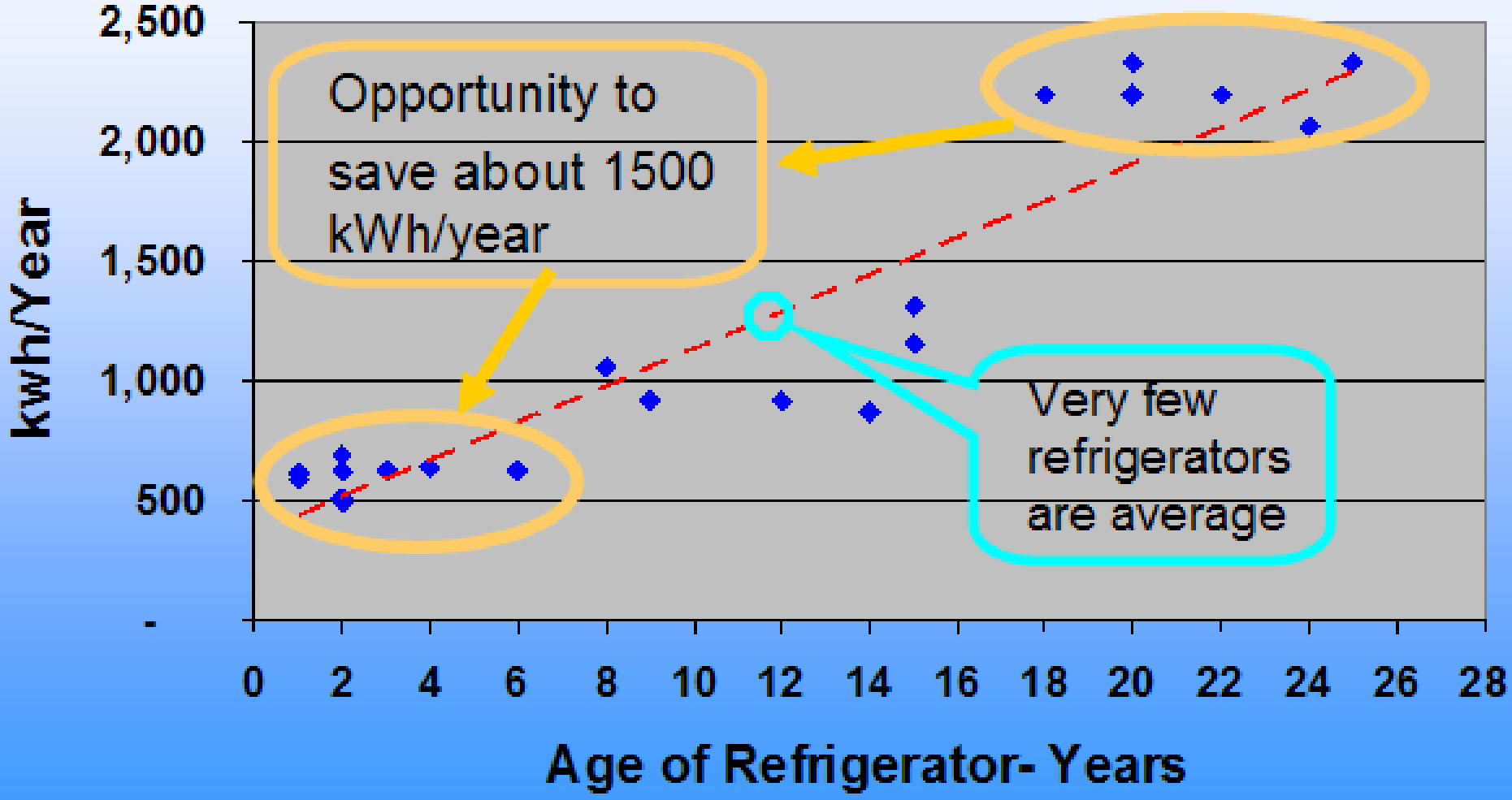
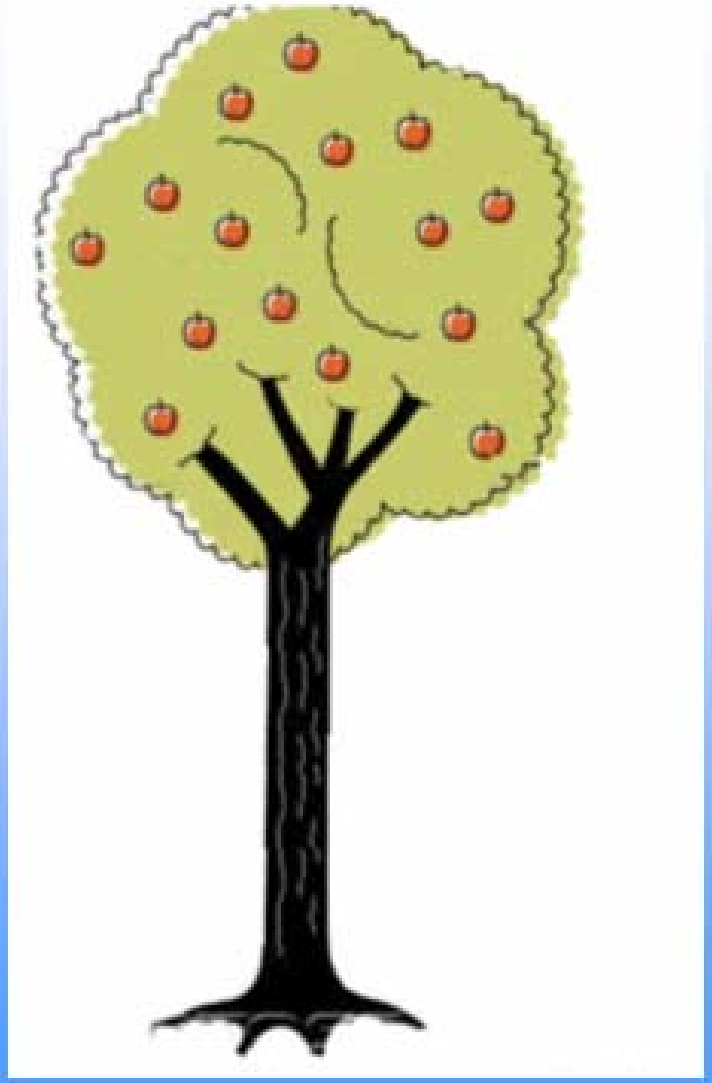


Refrigerator Economics 101:

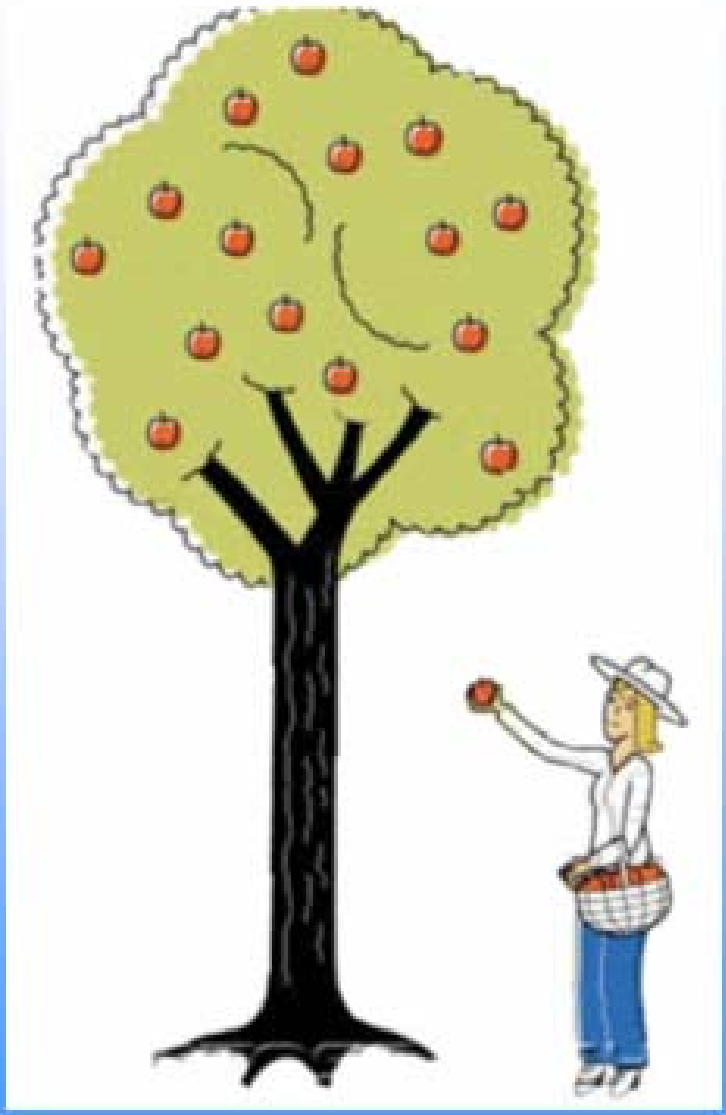
	Years to break even when saving 1500 kWh/yr		
electricity $/Kwh	cost of refrigerator		
	$ 500	$ 1,100	$ 2,200
$ 0.10	3.3	7.3	14.7
$ 0.15	2.2	4.9	9.8

Consumers' Energy Efficiency decisions: *individual preferences, information and financial resources.*

- EE may be the lowest hanging fruit



- EE may be the lowest hanging fruit
- But the EE fruit may be in a very tall tree



Unrealistic Wind Expectations

- **Environment Ohio** says 20% of Ohio's electricity can come from wind turbines on Lake Erie

Ohio's Annual Electric Use	**160 million MWH ***
20% of Annual Electric Use	**32 million MWH**
2 MW Wind Turbine Annual Output	**6,154 MWH**
Number of Wind Turbines Needed	**5,200**

* EIA/DOE Data Tables for 2005

** Based on 35% Annual Capacity Factor

5,200 Wind turbines in Ohio's portion of Lake Erie

30 Wind Turbines North-South by
175 Wind Turbines East-West

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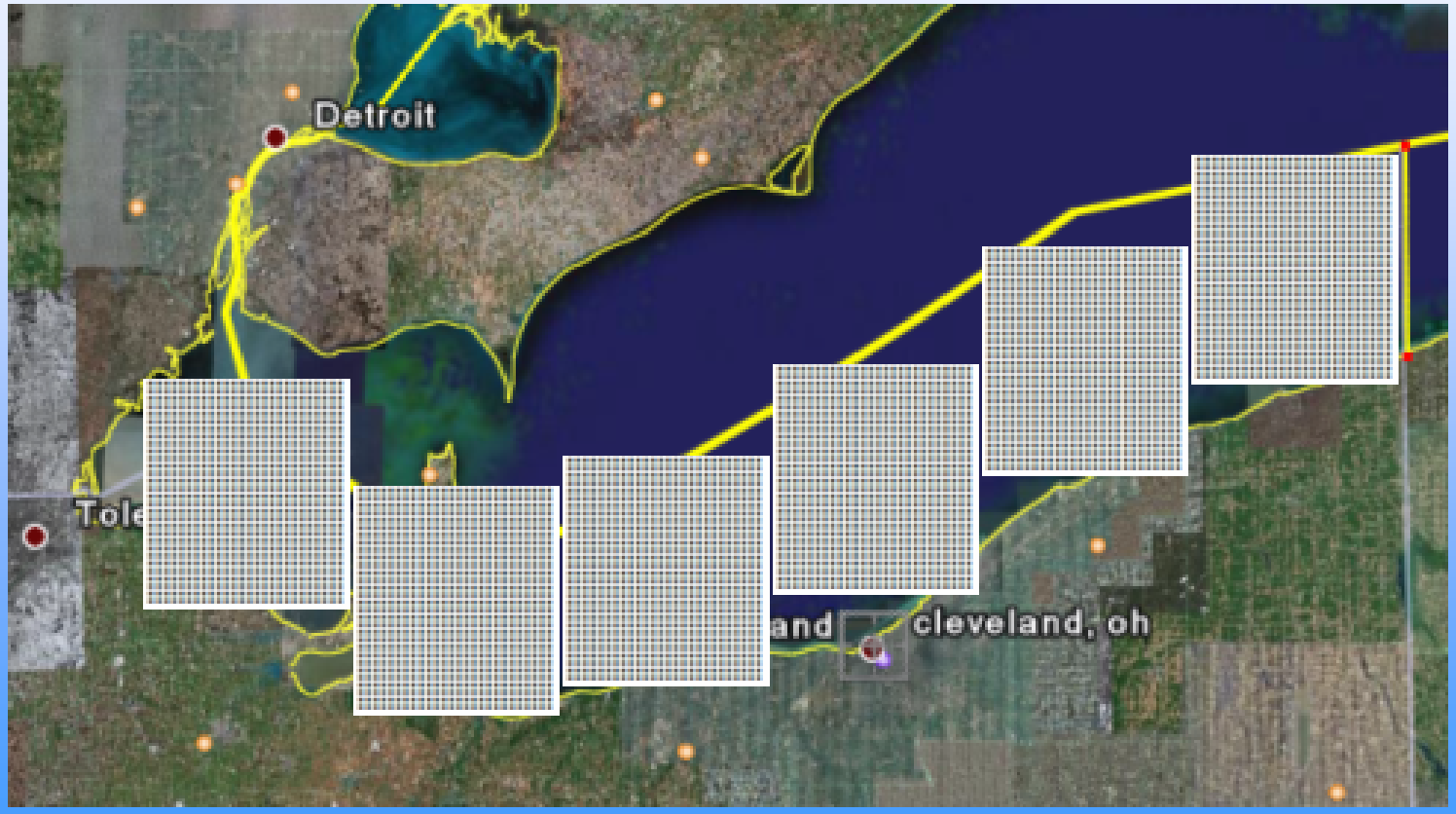
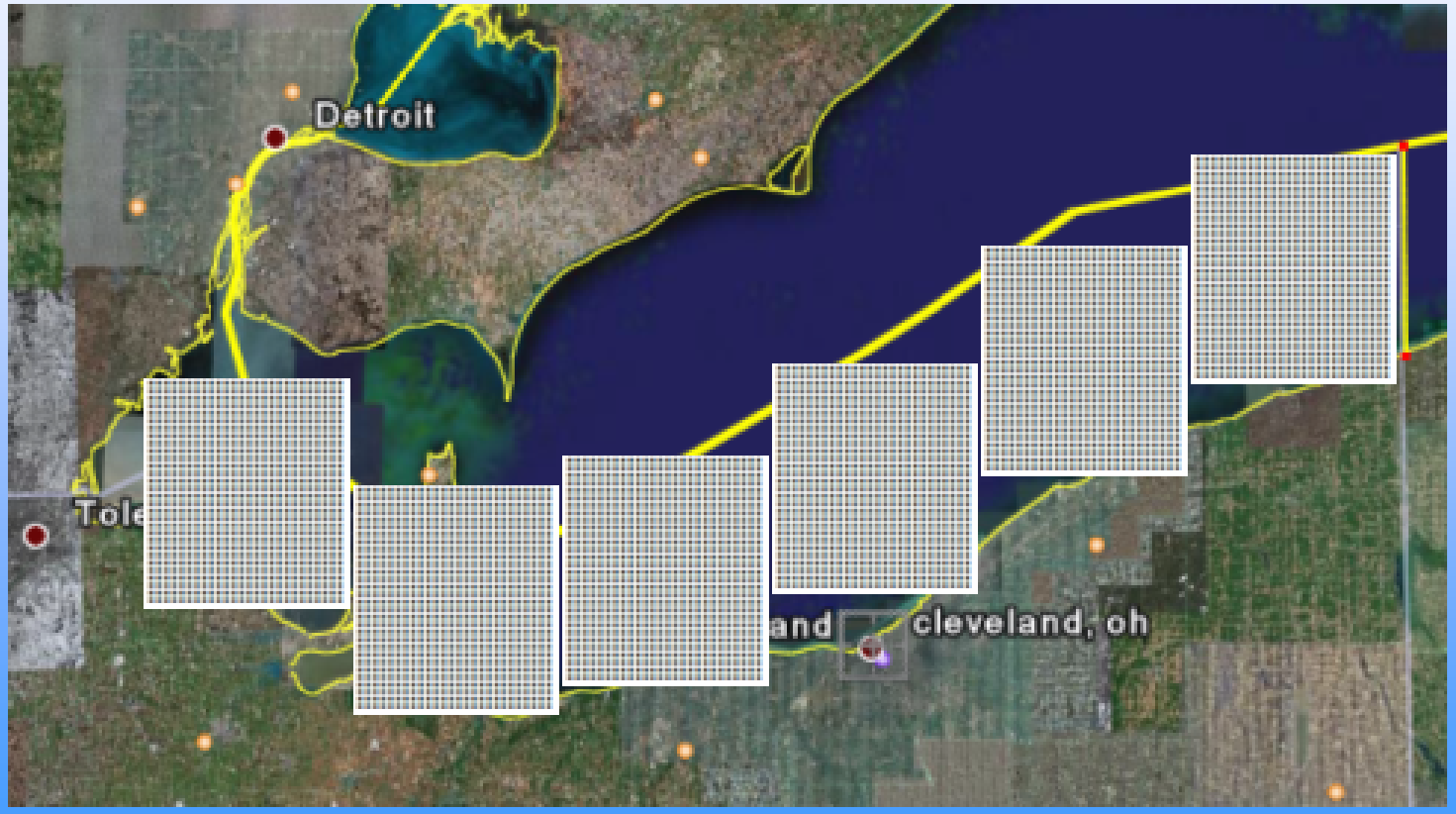


5,200 Wind turbines in Ohio's portion of Lake Erie

Is this really practical?



Many things are possible, but not all are practical

- There is much for rural communities to be excited about with alternative energies. …but, expectations may exceed realities.

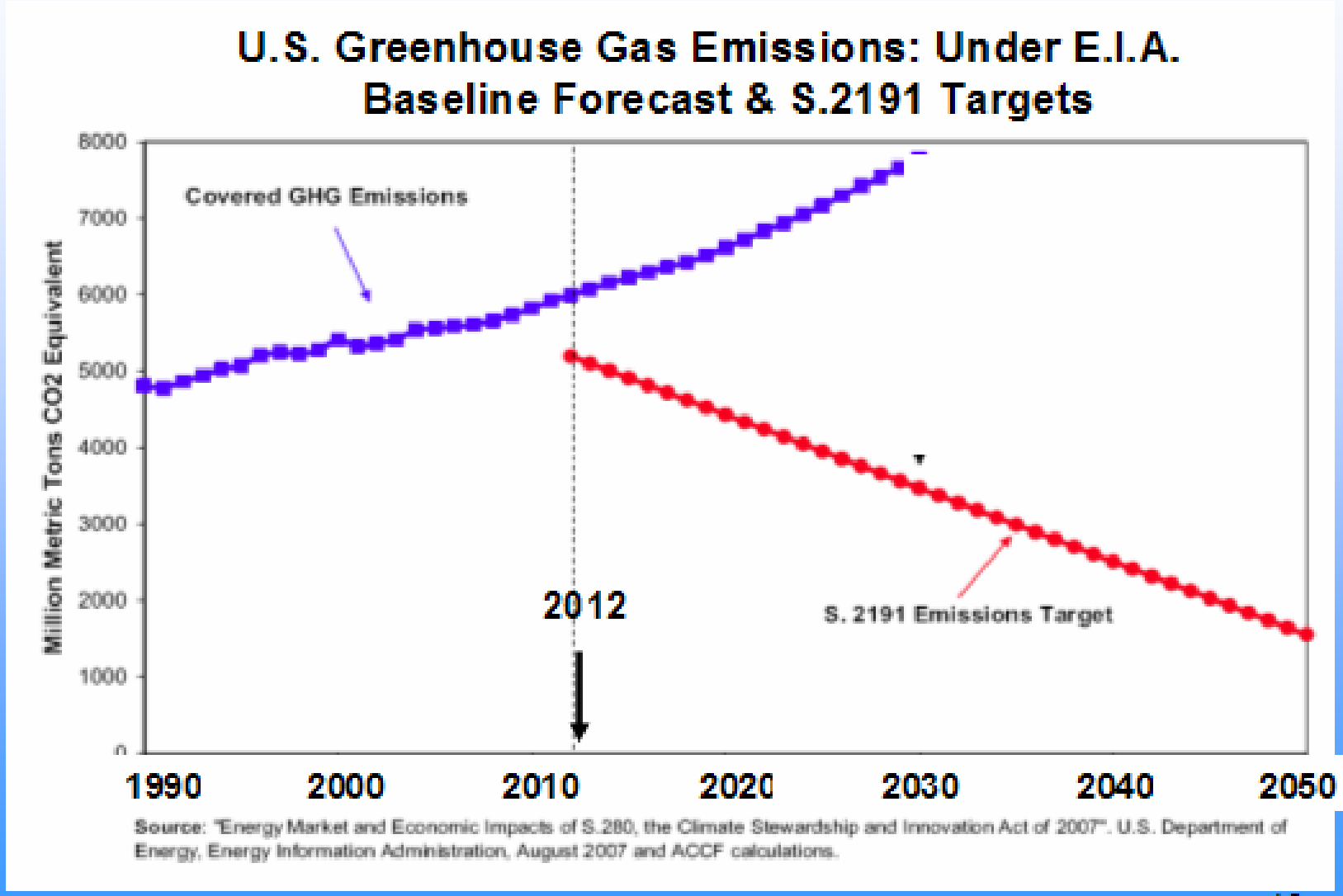
- There is a new factor that will significantly affect the rural energy economy:

Global Climate Change legislation

"Lieberman-Warner Climate Security Act of 2007" (S.2191)

- approved by the ***Senate Committee on Environment and Public Works*** and forwarded to the full Senate.

S. 2191 requires substantial reductions in "covered emissions"



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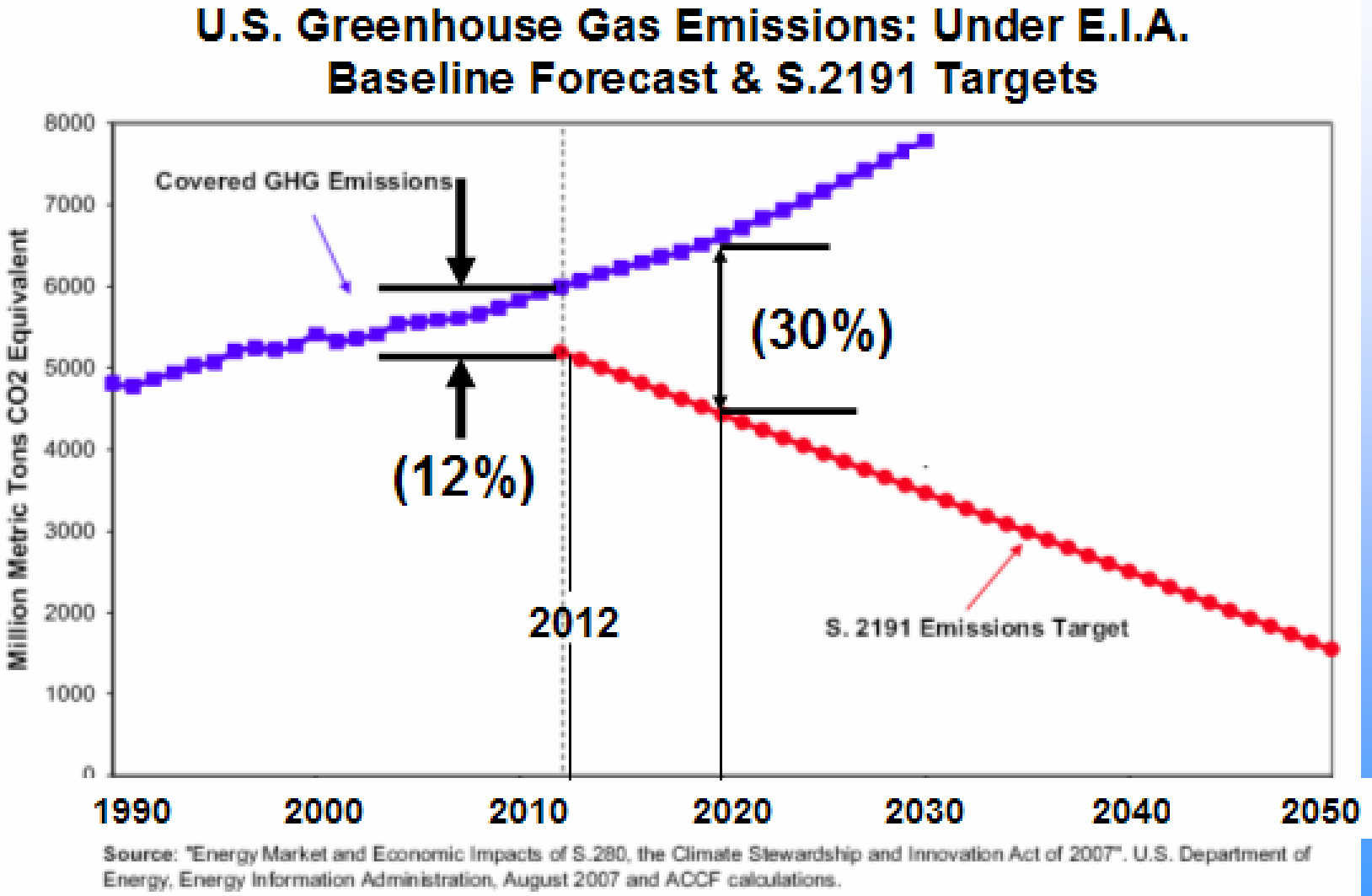

S.2191 will increase fossil fuels prices

MIT estimates CO_2 at $55/ton in 2015 (1)

Affect of CO2 Adder	
1 gallon of gasoline	$ 0.49
1 gallon of diesel	$ 0.56
1000 ft3 of natural gas	$ 3.03
1 kw-hr from U.S. gen mix	$ 0.03
1 kw-hr from coal	$ 0.06

(1)"**Assessment of U.S. Cap-and-Trade Proposals**" MIT Report issued by Joint Program on the Science and Policy of Global Change, April 2007

Affect of *$55/ton CO_2 on the typical U.S. household*

- $30-$60/month more for electricity
- $30-$50/month more for gasoline
- $30-$50/month more for heating

Total = $90-$160/month

Global Climate Change legislation could boost economic development in rural communities

- Non-fossil fuel alternative energy businesses might flourish in some areas.
- Energy efficiency businesses might flourish.

But, GCC legislation will significantly change the energy economy of rural communities

Higher energy prices will hurt economic development of rural communities

- Low income people will have more difficulty paying energy bills
- Discretionary spending in the local economy will be reduced
- Marginal businesses may not survive
- Existing energy intensive businesses will leave, new ones won't come

Electric utility options to reduce CO_2 emissions at $55/ton by 2020

- Coal to natural gas switch (not economical)
- Coal w/ Carbon Capture & Storage (not ready)
- New nuclear capacity (limited impact)
- Wind turbines (could provide 2-3% at current annual rate of additions)
- Solar PV (too expensive $0.70/kwh)
- Energy Efficiency (will offset some growth)

Thoughts for State Legislators

- Proposed solutions need to be ***properly vetted***; don't be afraid to ask for details.
- ***False starts and reverses*** in the energy arena can be detrimental to the economy.
- Economic growth and energy use are highly correlated; ***S.2191 ignores this correlation***
- How to ***close the gap*** between the needs of a growing economy and requirements for declining CO_2 emissions?

What will it take to close the gap?

Thomas L. Friedman
9/19/07 NYT Op-Ed piece
"Doha and Dalian"

"That's why we're fooling ourselves. There is no green revolution, or, if there is, the counter-revolution is trumping it at every turn. Without a **transformational technological breakthrough** in the energy space, all of the incremental gains we're making will be devoured by the exponential growth..."

Transformational Technological Change Takes Time

Sources of U.S. Energy (% by year)