Milwaukee Energy Efficiency (Me2)

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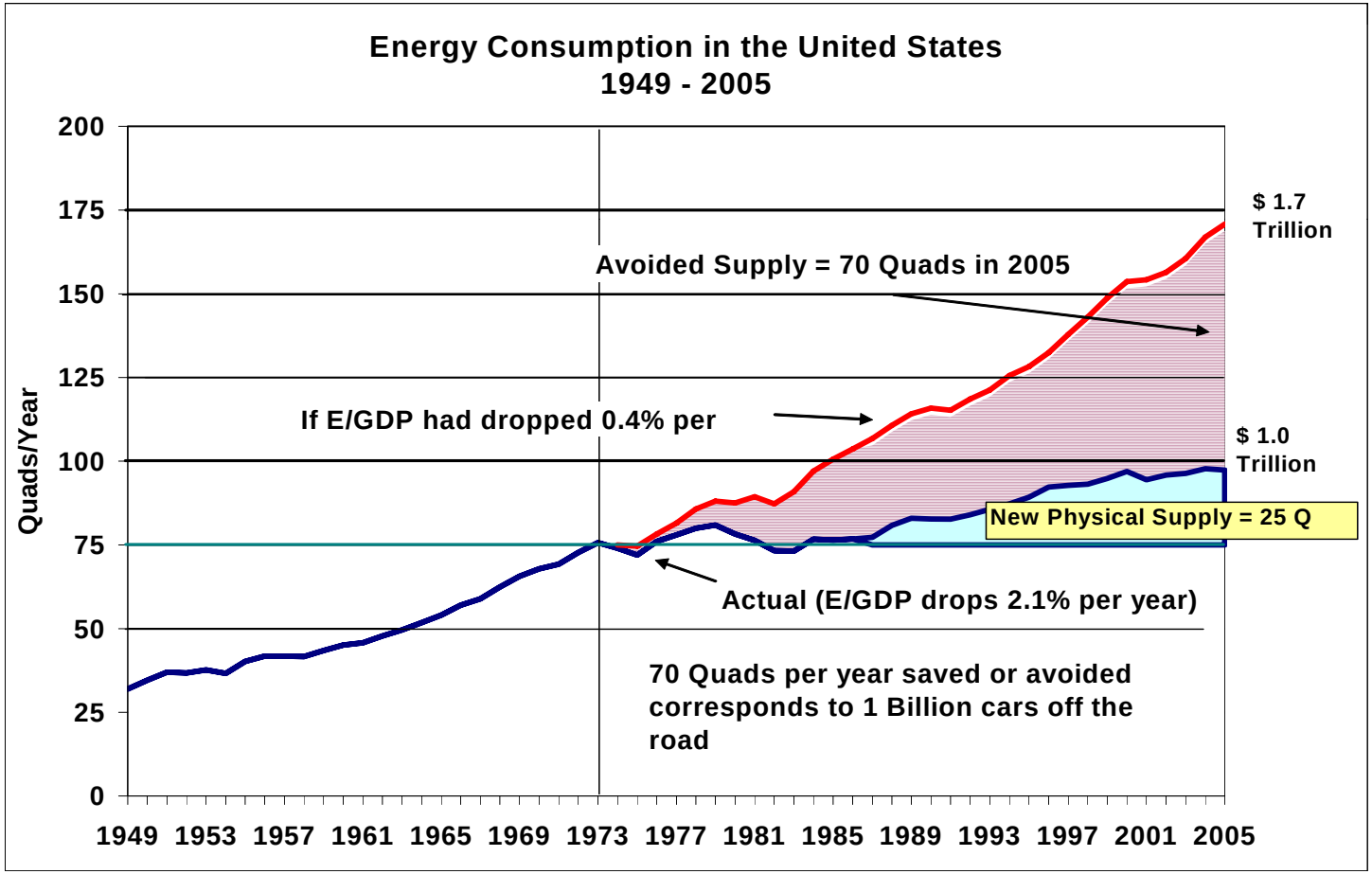
What I'll talk about

- Why building efficiency?
- Why it's typically not done, and some reasons for hope
- Me2

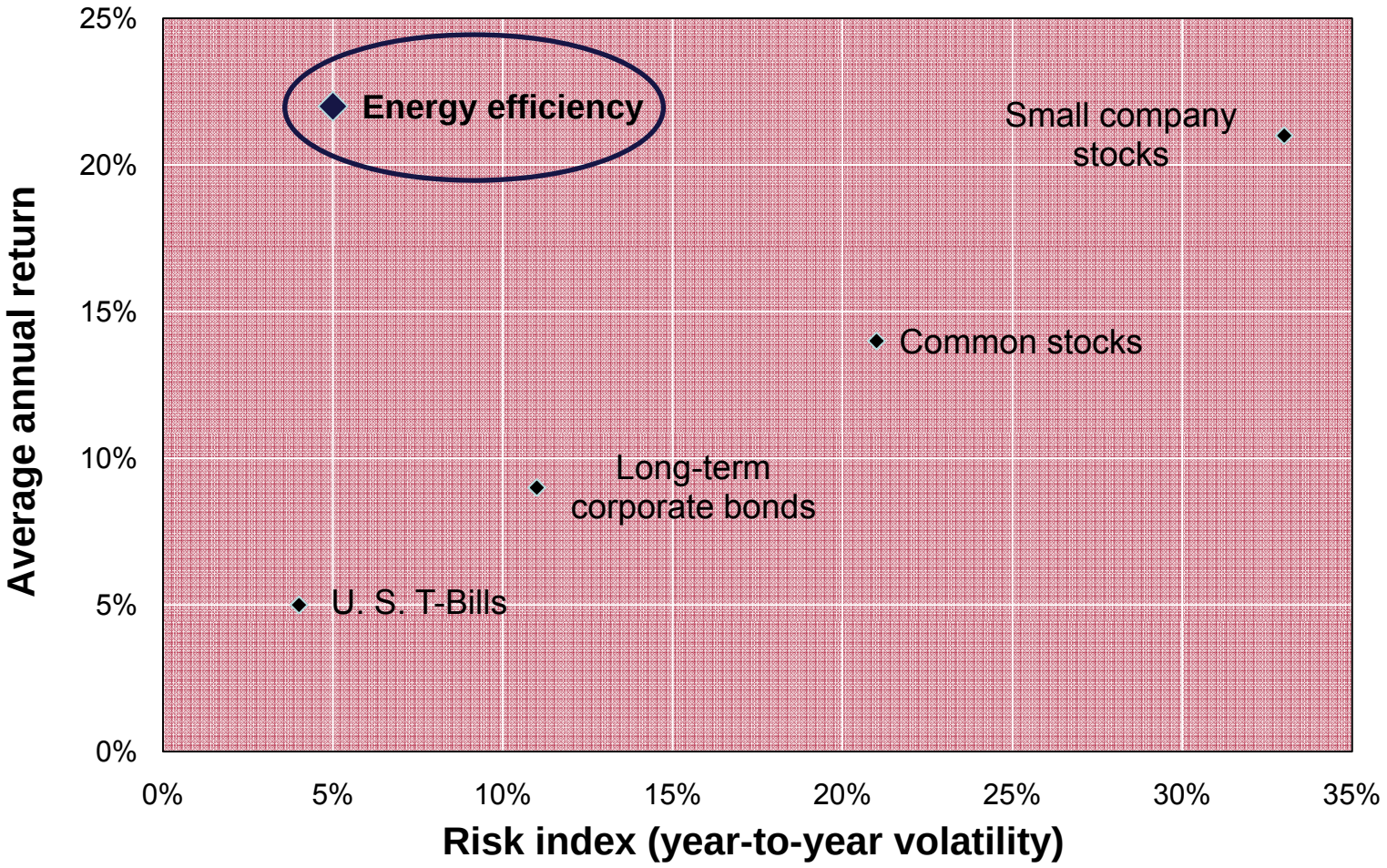
Why building efficiency?

Efficiency is the first fuel



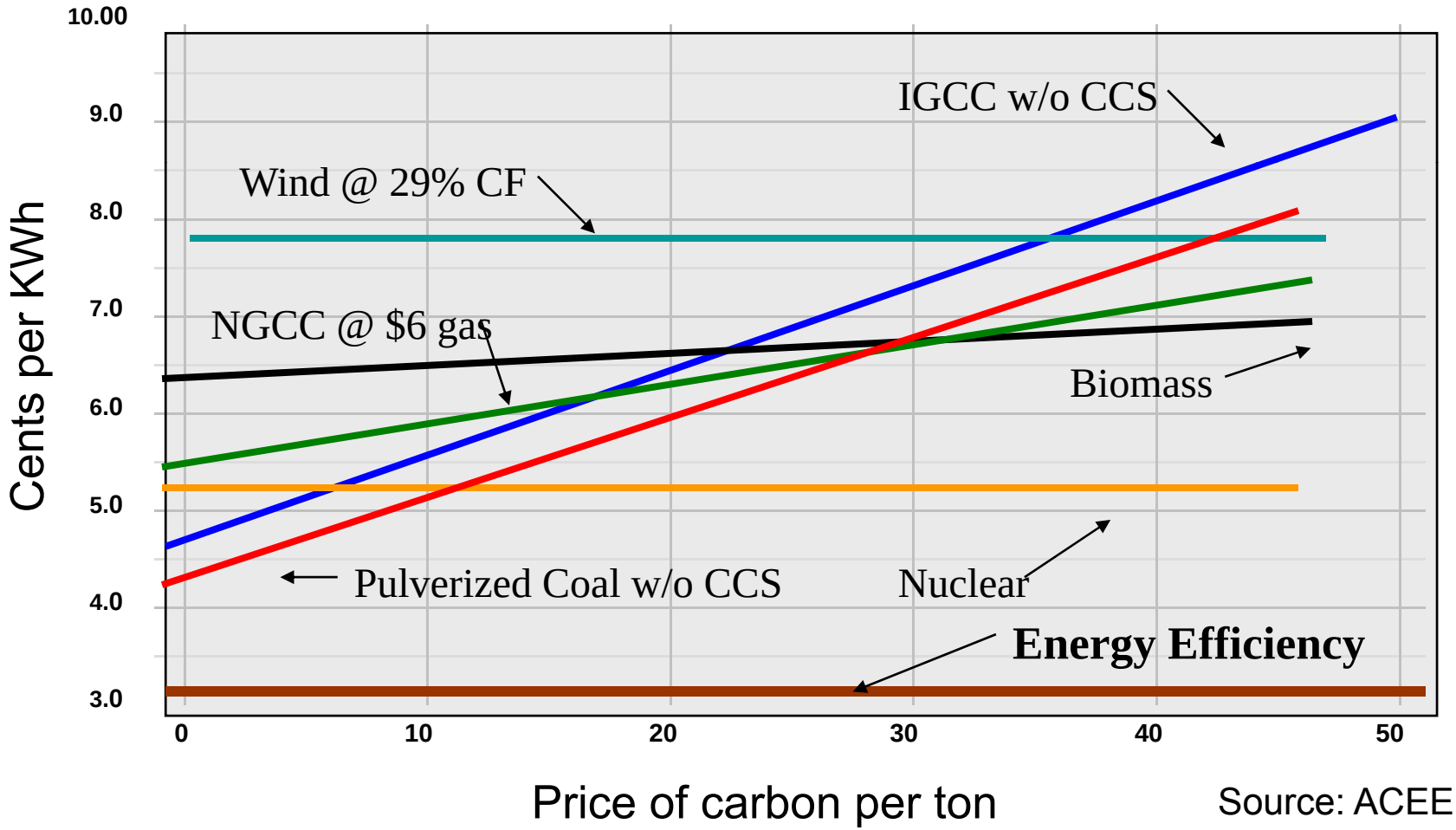
Source: ACEEE

A good investment



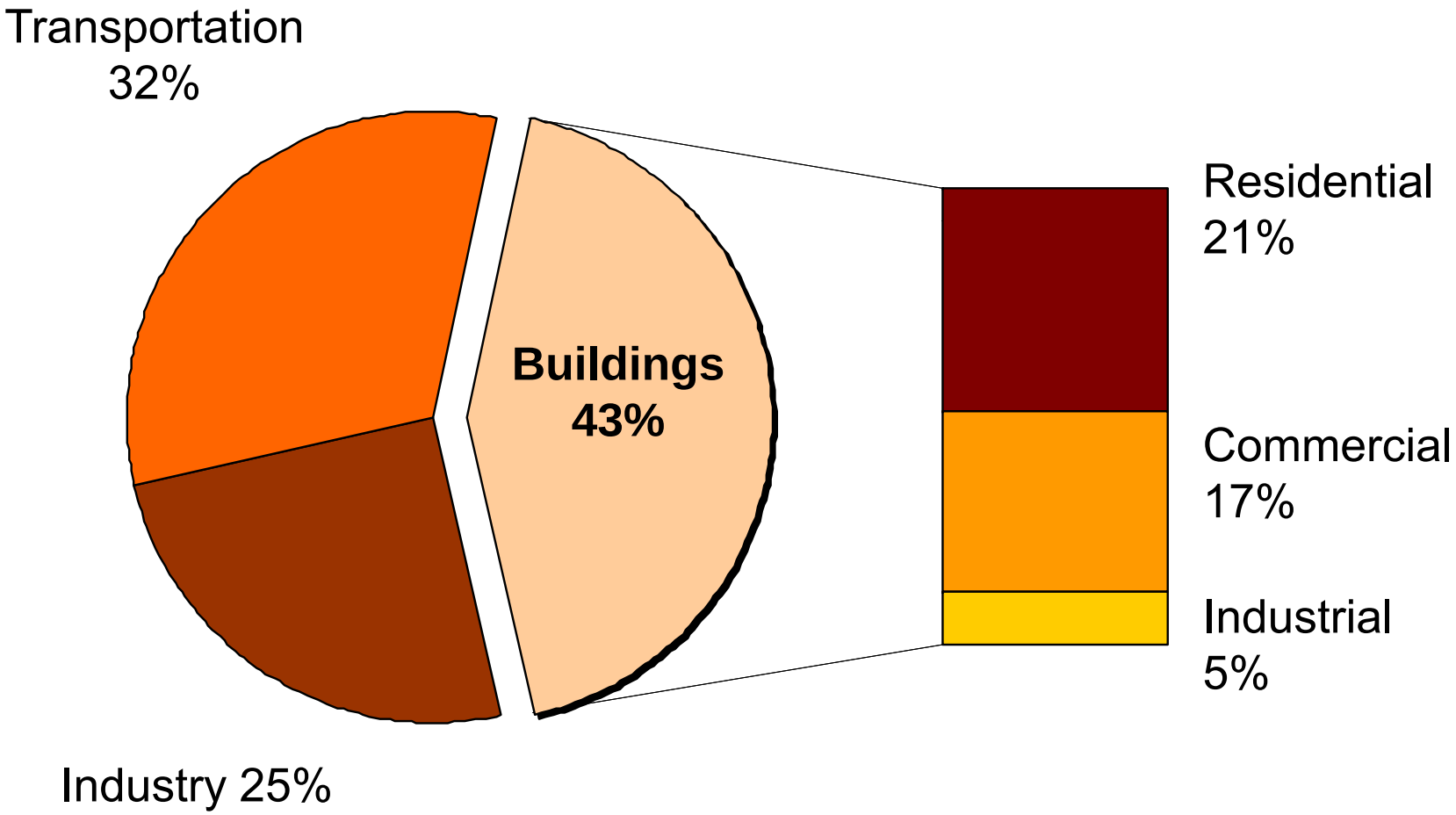
Source: ACEEE

Cheap and getting cheaper



Source: ACEEE

Building contribution to CO_2 emissions



Source: Pew Center on GCC

Typical residential retrofit measures

- Shell
  - Insulation (wall, ceiling, floor, rimjoist)
  - Infiltration reduction
- Heating
  - Furnace replacement
  - Boiler replacement
  - Boiler controls
  - Boiler pipe insulation
  - Fuel switch
- Appliances
  - Refrigerator replacement
  - Washer replacement
- Hot water
  - Temperature reduction
  - Heater replacement
  - Heater wrap
  - Fuel switch
  - Showerhead
  - Pipe insulation
- Lighting
  - LED exit lights
  - Fixture/bulb replacements
  - Lighting controls

Benefits of building retrofits

- Climate and public health
- Income to tenants and owners
- Higher property values
- Extended building life
- Tenant/occupant health and productivity
- Jobs ($1M ≈ 10 person years of employment for direct installation, another 3-4 for materials)

So why not realized?

The unclaimed value

RRIDDLLS

- Regulatory surround is bad
- Risk aversion among tenants and owners, especially given uncertain duration of tenancy/ownership
- Information problems on everything (benefits, cost, reliable service)
- Disaggregated savings
- Disruption
- Lack of capital
- Lack of interest
- Split incentives (tenants vs. owners)

What's changed?

Greater interest: Greater public, industry, policy concern; greater awareness of climate risk

Better technology: Improvements in technology (better materials, more efficient appliances, wireless throughout, micro CHP, smart grid, etc.)

New markets: New market opportunities using efficiency savings (demand response, forward capacity, carbon trading, etc.)

What generally hasn't … strategy

- Technical assistance (information, energy audit, arranging)
- Subsidized customer purchase (rebates or tax credits)
- Financed customer purchase (loans, e-mortgages, on-bill financing, ESCO shared savings)
- All three (technical assistance, subsidy and financing)

Problems with SBCs

- ✓ Designed-in free riding
- ✓ Effective iron ceiling on funds
- ✓ Political vulnerability
- ✓ Often requiring large up-front payments or participant debt
- ✓ High administrative & transaction costs

Result is low take-up and missed cost-effective measures

Me2

Basic idea of Me2

Combine a mix of private and public financing for comprehensive application of cost-effective retrofit measures to Milwaukee's building stock, using on-bill payment of services, private financing, and maximum local capture of benefits.

On conservative assumptions, this would generate about 4300 person years of employment for measure installation (more counting administration, manufacture of measures, and multipliers) and save Milwaukee residents more than $120M annually.

An offer they can’t refuse?

“Me2 can buy and install cost-effective energy efficiency measures in your home or business with no up-front payment, no new debt obligation, an assurance that your utility costs will be lower, and a guarantee that your monthly payments for this service will continue only as long as you remain at or own this property and the measures continue to work.”

One opportunity … residential

Type	# of Units	Avg unit cost	Total cost	Avg unit annual savings	Total annual savings
Rental	126,793	$1,278	$162.0M	$482	$61.1M
Pre-1960 owner-occupied	83,052	$911	$95.8M	$251	$22.2M
Total	**209,845**	**$1,158**	**$243.1M**	**$397**	**$83.3M**

Source: ECW/COWS

Another …commercial

(excluding industrial processes)

Energy source	Total cost	Total annual savings
Electric	$176.4M	$39.2M
Natural gas	$8.3M	$1.8M
Total	**$184.6M**	**$38.0M***

*Total is less than sum of electric and gas savings due to interaction effects.

Source: ECW/COWS

Combined

Type	Total cost of measures	Total annual savings
Residential	$243.1M	$83.3M
Commercial	$184.6M	$38.0M
Total	**$427.7M**	**$121.3M**

Source: ECW/COWS

Elements of design

- Measures limited to those (a) with full payback within 75 percent of useful life and (b) with annual costs (less rebates) no more than 75 percent of annual savings. This ensures that participant savings greater than costs.
- Measures installed at no cost to customer
- Customer pays tariffed charge on utility bill, with standard penalties for non-payment.
- Payment obligation for permanent measures is assigned to the location, not the person (“runs with the meter”)

Key actors

1. Me2 … coordinating entity, private or public, for profit or not
2. Bank … ordinary bank, pension funds, foundations, bond
3. Utility … electric or gas utility, or water utility, or provider of municipal services
4. Customers/participants .. Residential and commercial owners and tenants
5. Auditor … to assess needed work and verify
6. Contractor … to do the work

Key contracts

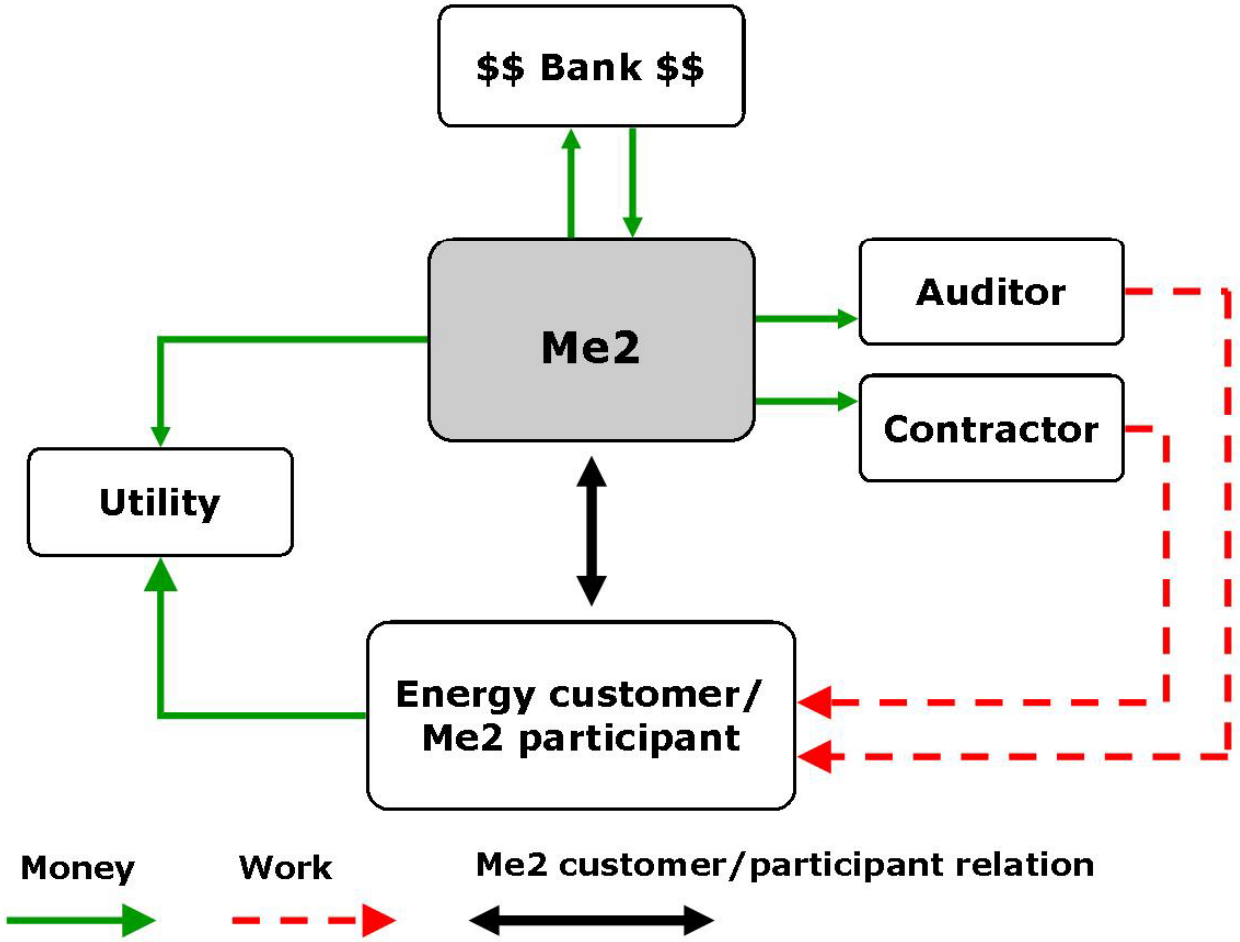
1. Between Me2 and bank (ideally a revolving loan fund or line of credit)

2. Between Me2, customer, and utility, with customer agreeing to pay for the costs of installed working measures during period of tenancy/ownership on his/her utility bill

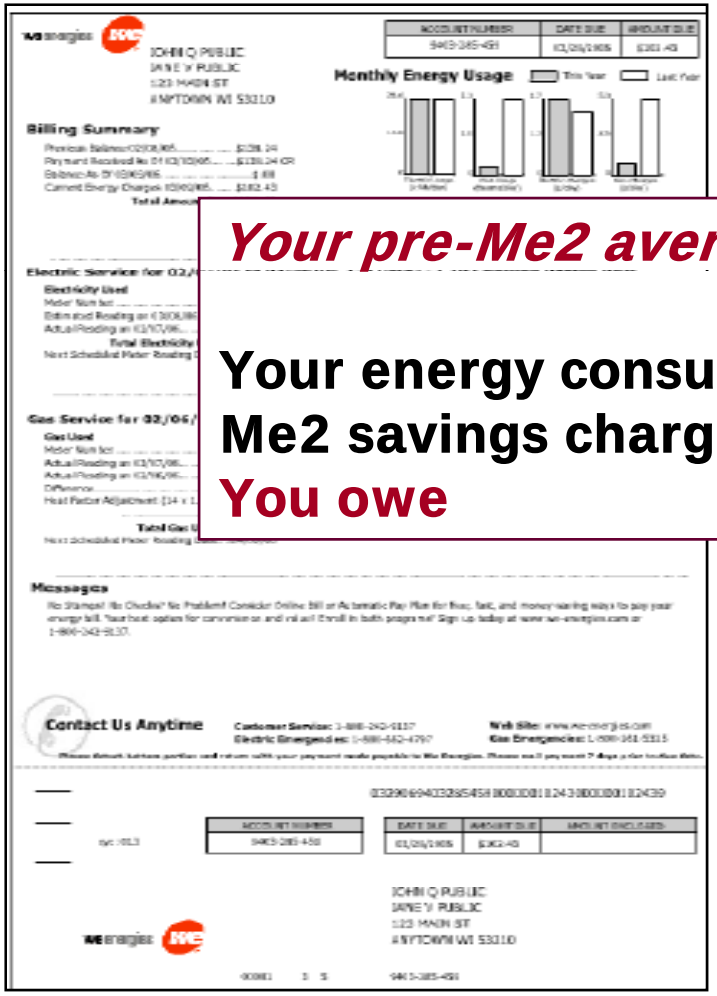
3. Between Me2 and auditor to recommend measures and verify installation and performance afterward

4. Between Me2 and contractor, to do approved work

Me2 work and money flows



Potential utility bill



Your pre-Me2 average energy bill	***$170***
Your energy consumption this month	**$135**
Me2 savings charge	**$ 25**
You owe	**$160**

High leverage

Energy costs for 2,252,800 Wisconsin households		20% savings
Total cost of residential energy (gas, electricity, fuel oil, propane) consumption	$4,572,463,104	$914,492,621
Average *monthly* cost per household	$169.14	$33.83
Available capital under Me2-styled program		
Average available capital per household if amortized over 10 yrs at 6% interest and $33.83/month		$3,047
Total available capital (2,252,800 X $3,047)		$6,864,281,600
Current direct WI public spending on residential energy efficiency		$80M
Ratio of available capital under Me2-styled program to current WI public spending		~ 90/1

Distributed generation?

Sure …

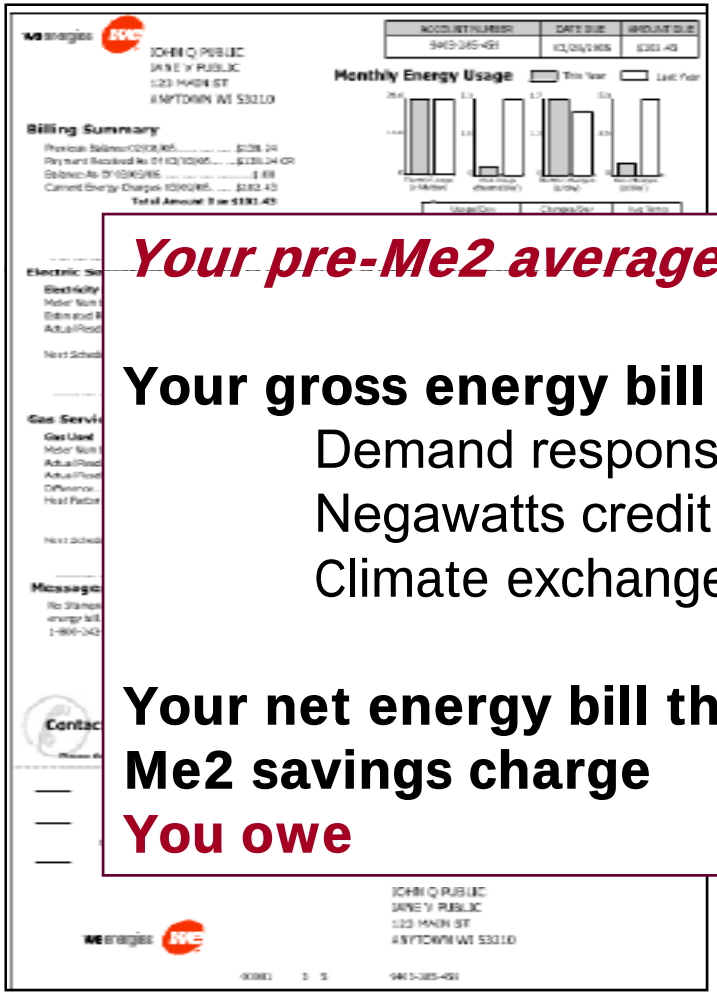
- Full effect of course depends on net metering and pricing by utility
- But whatever portion of costs paid back within agreed period could be covered

Efficiency attributes?

Sure …could aggregate for

- Demand response
- Forward capacity
- Carbon trading

Future utility bill ☺



Your pre-Me2 average energy bill	***$170***
Your gross energy bill this month	**$ 135**
Demand response credit	($ 30)
Negawatts credit	($ 30)
Climate exchange credit	($ 30)
Your net energy bill this month	**$ 45**
Me2 savings charge	**$ 25**
You owe	**$ 70**

What's needed to make this work

- Political leadership
- Community buy-in
- Utility and regulatory cooperation
- Capital
- Market-ready operations plan

Key issues for Me2

- PSC approval
- Financing details (public and private, tax-sheltered and not)
- Depth of intervention vs. participation
- Training, career ladders, equity
- Governance structure, other legal
- Assignment of attribute benefits
- Marketing strategy

Payoff to replication

What would spending $10M in TA to establish 20 city plans do? Based on the Me2 example:

- $500K for planning would yield ~ $500M in private investment. That's a 1,000/1 return on investment.
- $500M would yield ~ 5K person years of employment (with multipliers, easily ~ 10K).
- $500K in initial investment would thus generate community jobs at the cost of from $100 (to as low as $50) per job.

For more information

www.cows.org/me2

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