

# Milwaukee Energy Efficiency (ME<sup>2</sup>)

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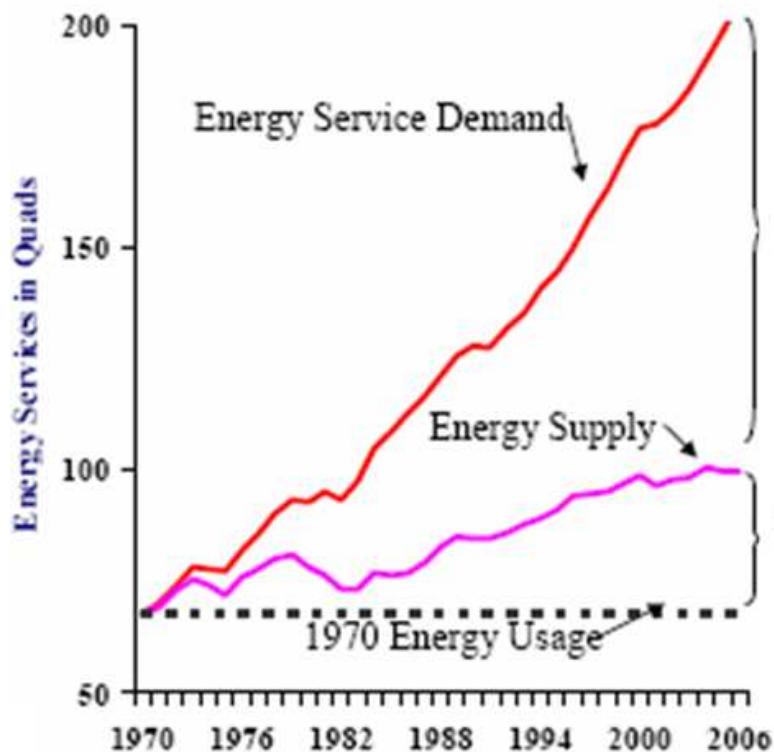
**Prepared for Midwest Energy Efficiency Alliance**

***Midwest Energy Solutions: Leading the Way, Chicago, January 9, 2008***

# What I'll talk about

- Why building efficiency?
- What's involved, why it's typically not done, and how to fix that
- ME<sup>2</sup>

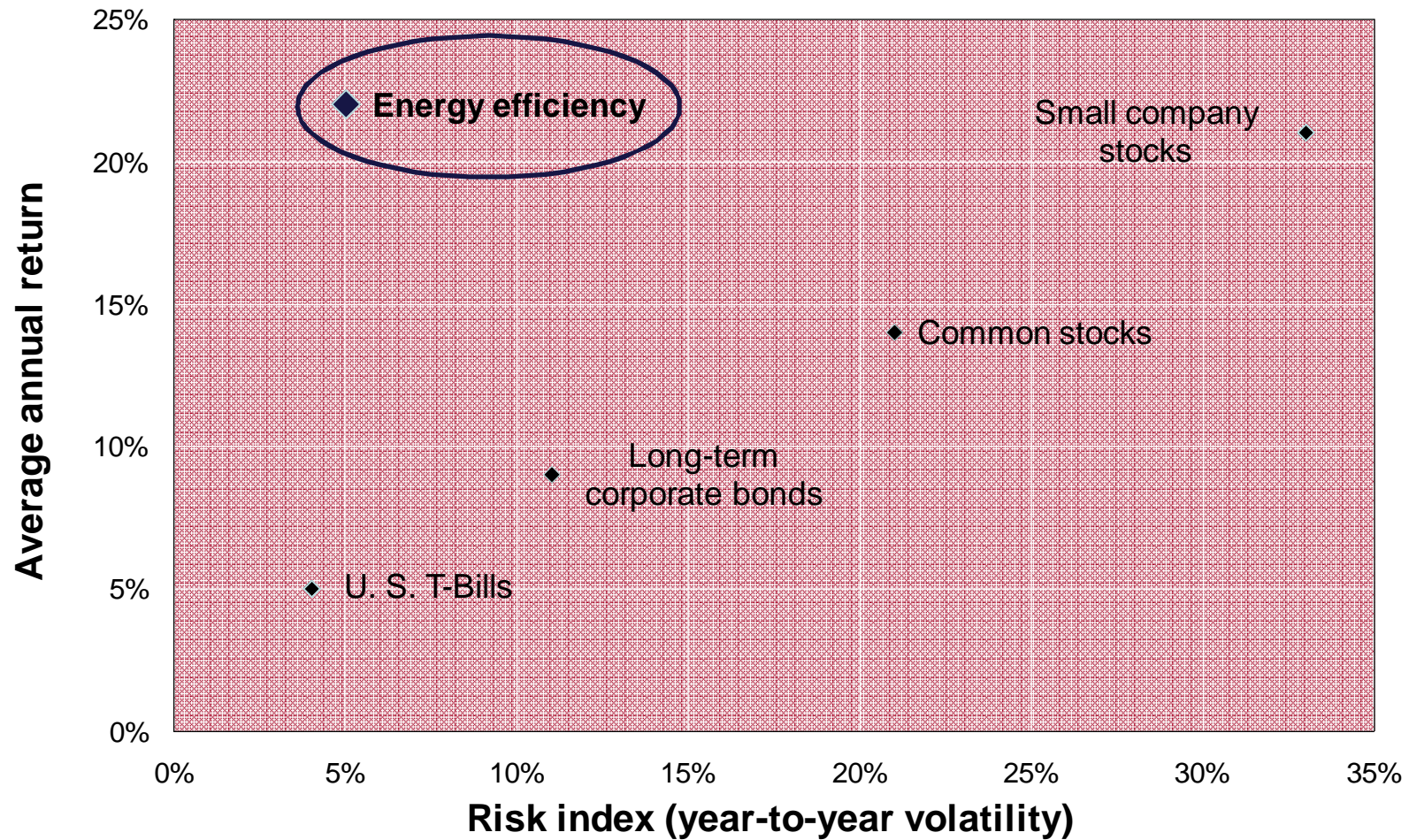
# Efficiency as a source of energy



Since 1970, **energy efficiency** has met 77% of new energy service demands in the U.S., while **new energy supplies** have contributed only 23% of new energy service demands.

Source: ACEEE

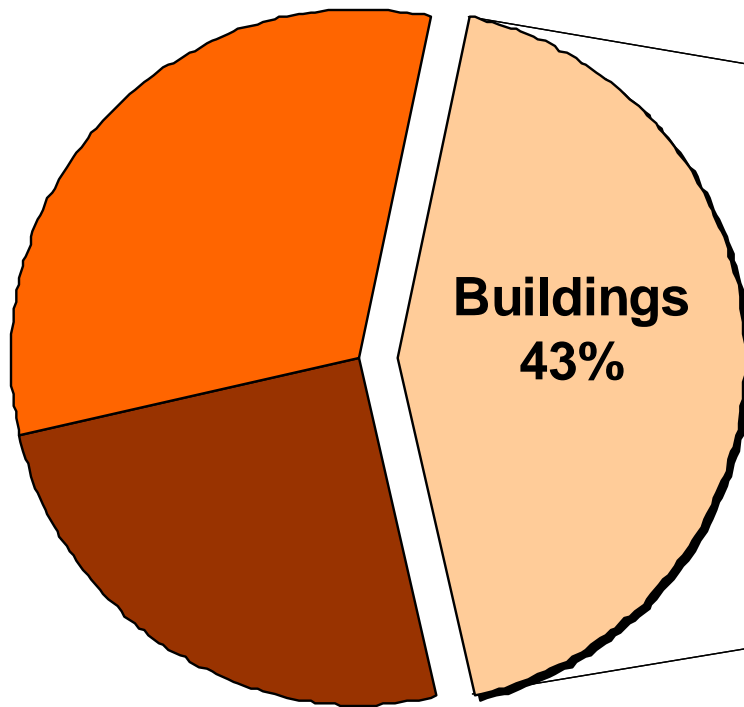
# A good investment



Source: ACEEE

# U.S. CO<sub>2</sub> Emissions

Transportation  
32%



Industry 25%

Residential  
21%

Commercial  
17%

Industrial  
5%

Source: Pew Center on Global Climate Change

# What's involved in an energy retrofit?

## In houses and apartments

- 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

- External environmental benefits
- Internal benefits including improved worker/student health and productivity
- Savings to residents and property owners
- Higher property values and local wealth
- Non-outsourcable jobs
- Pathways out of poverty

# A \$20 bill on the sidewalk



# Why aren't energy savings picked up? RRIDDLLS

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

# Other cities

The logo for planNYC, featuring the word "plan" in white and "NYC" in blue, with a vertical bar to the left.

**A GREENER, GREATER  
NEW YORK**

Mandated and subsidized efficiency retrofits of large residential buildings

Average cost: \$39,000 for owner, \$21,000 subsidy

2-3 year payback

Investment of \$100 million over five years

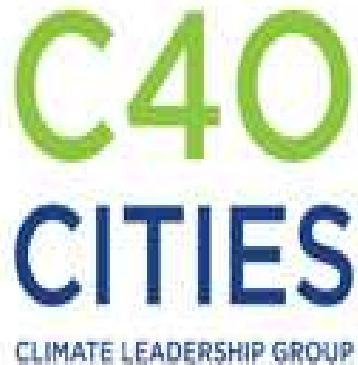
80 percent private funding, including revolving fund

Projected economic savings: \$160 million in 10 years



**CAMBRIDGE**  
**Energy Alliance**  
Saving Money & the Planet

# Clinton Climate Initiative



- U.S.: Chicago, Houston, New York
- Energy audits and retrofits by Johnson Controls, Trane, Siemens, Honeywell
- \$1 billion each from 5 banks; no net cost to owners
- Municipal buildings and incentives for private buildings



# ME<sup>2</sup> model

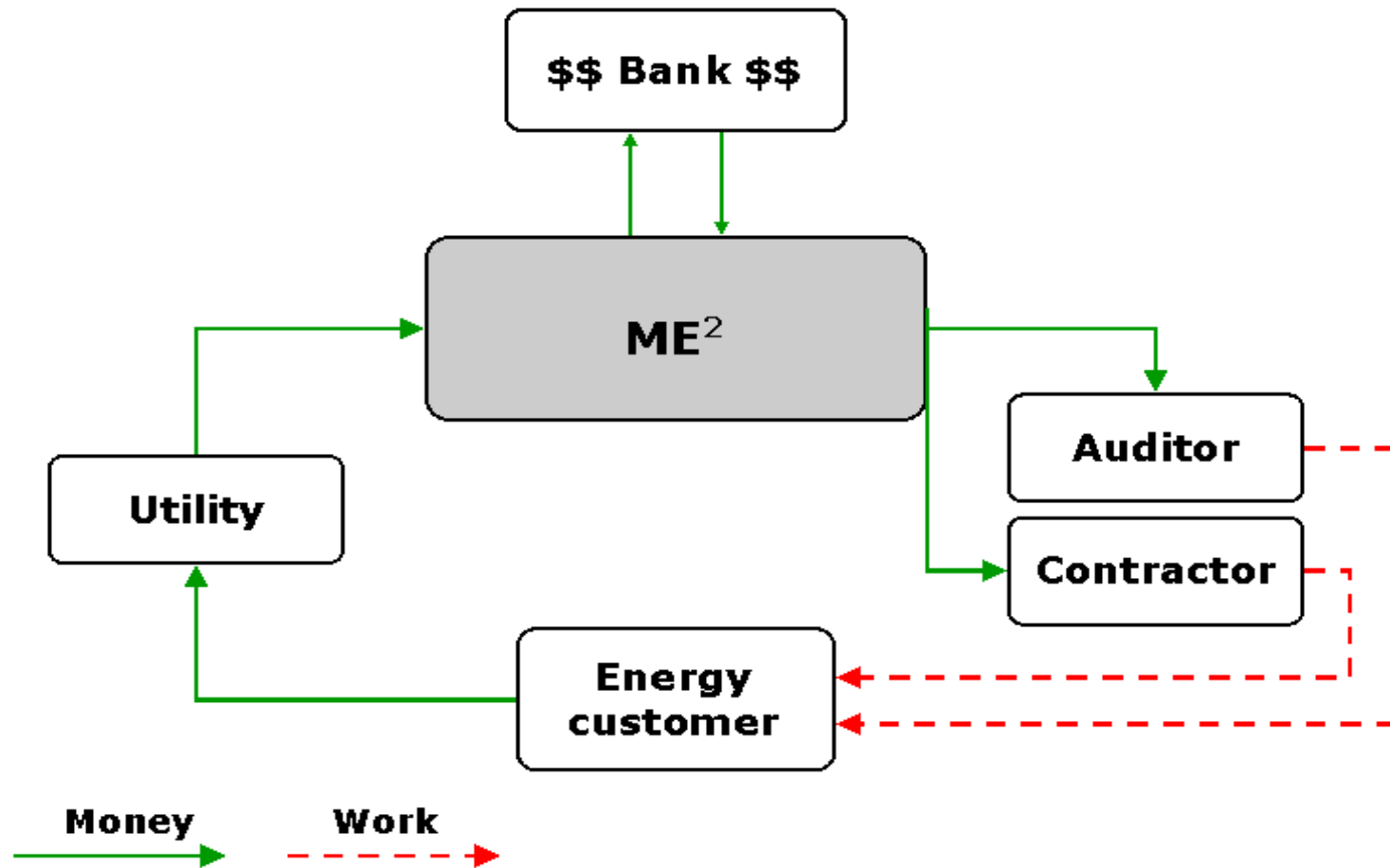
## **Six actors**

(1) ME<sup>2</sup>, (2) bank (3) utility, (4) customers,  
(5) auditor, (6) contractor

## **Four contracts**

Between (1) and ... (2), (3)(4), (5), (6)

# ME<sup>2</sup> work and money flows



# Utilities with metered savings payback

- New Hampshire Electric Cooperative
- Public Service Co. of New Hampshire
- Hawaiian Electric Company, Inc.
- Hawaii Electric Light Company, Inc.
- Maui Electric Company Ltd. (Hawaii)
- Kaua`i Island Utility Cooperative (Hawaii)
- Midwest Energy Inc. (Kansas)

# One opportunity ... residential

## Milwaukee housing stock

Type	Occupied units
Rental	126,793
Older owner-occupied (pre-1960)	83,052
<b>Rental + Older Owner-occupied</b>	<b>209,845</b>

## Cost and savings from 10-year payback measures


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
Older owner-occupied	83,052	\$911	\$95.8M	\$251	\$22.2M
<b>Total</b>	<b>209,845</b>	<b>\$1,158</b>	<b>\$243.1M</b>	<b>\$397</b>	<b>\$83.3M</b>

Source: ECW

# Potential to raise billions for residential EE

	Annual cost	20% savings
State annual cost for residential energy (gas, electricity, fuel oil, propane)	\$4,572,380,000	\$914,476,000
Avg monthly cost per household	\$169.14	\$33.83
Max household loan (@8% for 84 months)	\$2,170.50	
Max leverage for Wisconsin	\$4,889,702,400	

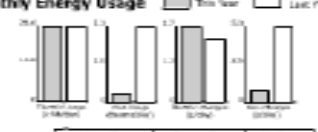
# Sample Utility Bill

**WE Energies** 

ACCOUNT NUMBER: 9463-345-491      DATE DUE: 10/24/2005      AMOUNT DUE: \$201.43

JOHN Q PUBLIC  
JANE Y PUBLIC  
123 MAIN ST  
MPTOWN WI 53110

**Monthly Energy Usage**



Month	This Year	Last Year
9/01	~1.5	~2.5
9/15	~1.0	~2.0
9/29	~1.2	~2.2
10/13	~1.8	~2.8

**Billing Summary**

Previous Balance 02/06/05 ..... \$28.24  
 Payment Received As Of 03/09/05 ..... \$28.24 CR  
 Balance As Of 03/09/05 ..... \$ 00  
 Current Energy Charges 03/09/05 ..... \$182.43  
**Total Amount Due \$182.43**

	Usage/Day	Charges/Day	Usage	Charges
Electric	20.17	34.03	20.17	34.03
Gas	48	5.28	5.00	65.04

**Electric Service for 02/07/06 to 03/06/06 (29 Days) - 1,107 Heating Degree Days**

**Electricity Used**  
 Meter Run fee ..... \$105.00  
 Estimated Reading as of 03/06/06 ..... \$24.47  
 Actual Reading as of 02/07/06 ..... \$154.2  
 Total Electricity Used 175 kWh  
 Next Scheduled Meter Reading Date ..... 04/06/06

**Current Electricity Charges**  
 Residential Electric Service - RGL 29 Days  
 Facilities (20 days x \$2.20 TOU day) ..... \$44.00  
 Non-Transferable Customer Charge ..... \$2.28  
 Energy Charge (kwh x \$0.0088) (175 kWh) ..... \$1.54  
**Total Electricity Charges \$78.83**

**Gas Service for 02/06/06 to 03/02/06 (29 Days) - 1,123 Heating Degree Days**

**Gas Used**  
 Meter Run fee ..... \$105.00  
 Actual Reading as of 03/02/06 ..... \$154.2  
 Difference Reading Fee ..... \$1.00  
 Next Scheduled Meter Reading Date ..... 04/02/06

**Current Gas Charges**

**Costs for Energy: \$135.31 (ME<sup>2</sup> savings: \$33.83)**


**ME<sup>2</sup> Charge: \$26.00**

**You owe: \$161.31**

***Without ME<sup>2</sup> improvements, you would owe an estimated \$170***

ACCOUNT NUMBER: 9463-345-491      DATE DUE: 10/24/2005      AMOUNT DUE: \$201.43

JOHN Q PUBLIC  
JANE Y PUBLIC  
123 MAIN ST  
MPTOWN WI 53110

**WE Energies** 

00001 3 5      9463-345-491

# Another opportunity ... public

## 2006 City of Milwaukee non-transportation energy expenditures

Department	Electricity	Natural Gas	Steam	Total
DPW-ISD (Street Lights & Traffic Controls)	\$3,842,875	\$0	\$0	\$3,842,875
DPW-Operations	\$1,179,212	\$612,973	\$275,878	\$2,068,063
Fire	\$324,538	\$337,977	\$10,588	\$673,103
Health	\$126,750	\$84,426	\$0	\$211,176
Library	\$538,877	\$72,708	\$58,017	\$669,602
Parking	\$340,528	\$4,060	\$65	\$344,653
Police	\$798,063	\$294,397	\$179,229	\$1,271,689
Port	\$21,782	\$10,560	\$0	\$32,342
Sewers	\$36,785	\$243	\$0	\$37,028
Water Works	\$4,706,005	\$724,532	\$0	\$5,430,537
<b>Total All Departments</b>	<b>\$11,915,415</b>	<b>\$2,141,876</b>	<b>\$523,777</b>	<b>\$14,581,068</b>

# Another opportunity ... commercial

## Milwaukee county energy consumption

Sector		
Residential	\$	667,798,183
Commercial	\$	605,646,181
Industrial	\$	386,142,417
Agriculture	\$	61,935
Total		\$1,659,648,716

Source		
Petroleum	\$	172,848,356
Natural gas	\$	598,726,062
Coal	\$	17,759,348
Electricity	\$	870,253,015
Total		\$1,659,648,716

# ME<sup>2</sup> progress so far

- Good buy-in from labor, business, community, civic, political elites in Milwaukee and state
- Basic research on opportunity done
- Assurance of private financing if we get the meter-based billing scheme
- Assurance of public financing to directly support work (not yet credit enhancement)
- Partial foundation support of planning, though we need more! 😊 HELP!

# Key issues

- Financing details
- Depth of intervention
- Training, equity, career ladders
- Insurance and other legal
- Governance structure
- Capturing collateral benefits
- **Participation rate**

# For more information

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