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The Many Links Between Energy Efficiency, Jobs and a Robust Economy

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Understanding and Communicating Job Benefits of Energy Efficiency Investment to Policymakers

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Common Terms Used in Job Impact Assessments

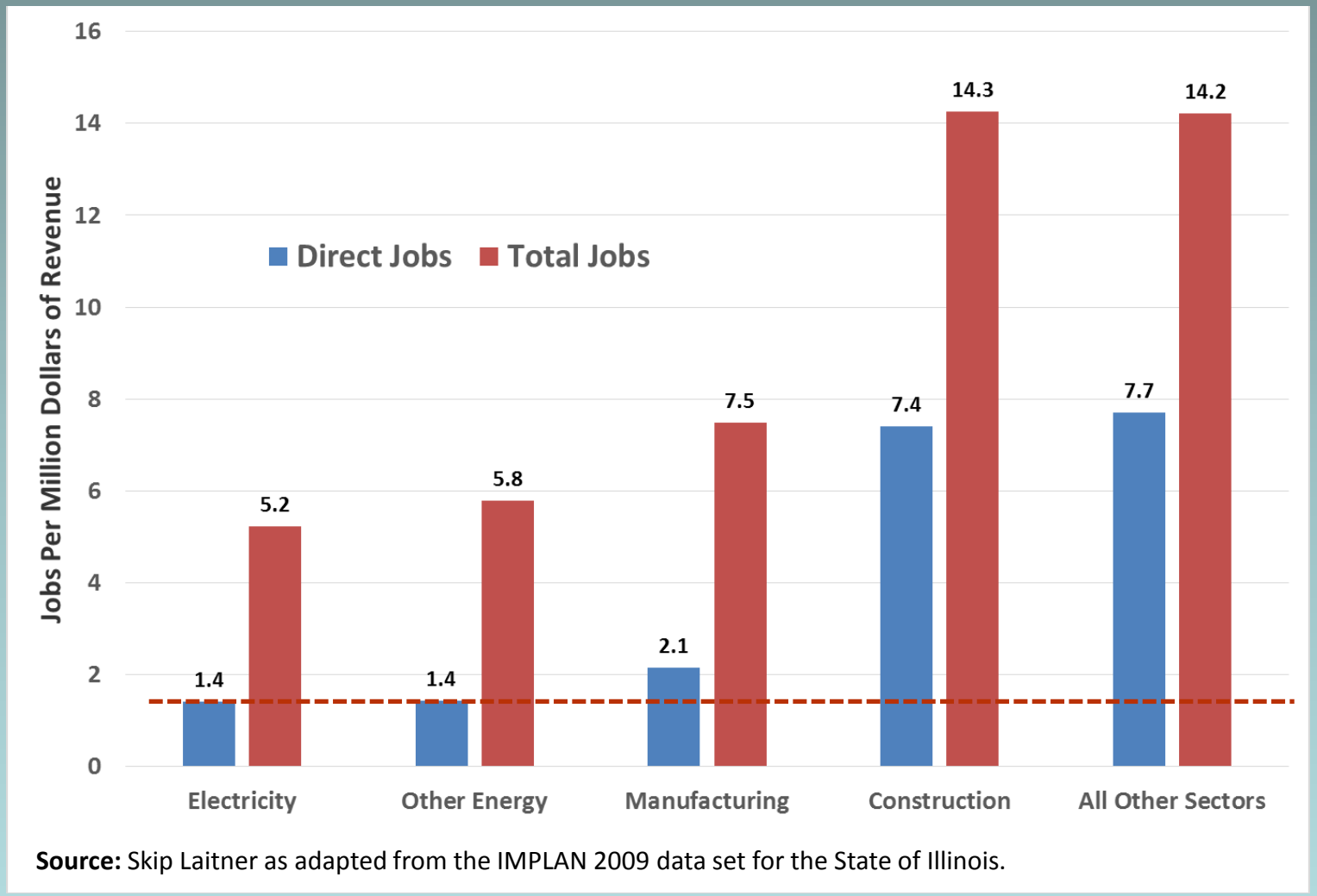
Term	Major Impact
Job	Resources to support one person working one year
Labor Intensity	Number of jobs supported by a million dollar expenditure
Direct Jobs	Onsite employment supported by an initial expenditure
Indirect Jobs	Jobs within the supply chain that supports an activity
Induced Jobs	Regional jobs supported by direct and indirect income
Gross Jobs	Total jobs supported by a set of expenditures
Net Jobs	Total jobs supported less the potential jobs lost

The 7 Major Drivers of Employment

Effect	Primary Impact
Intensity Shift	Moving away from capital-intensive to labor-intensive
Supply Chain Build-up	Greater local capacity
Energy Price Reduction	Cost savings for efficiency and non-efficiency
Productivity Boost	A more robust economy while minimizing rebound *
Managing Volatility	Smoothing out the price shocks
Minimizing Disruption	Avoiding the inconvenient interruption of supply
Innovation Plus	Cost breakthroughs in the delivery of energy services

* With much more to be said about this topic, but rebound by itself is neither big, nor inevitable, nor always bad. . . Nor is it any reason to forego the huge benefits of either energy conservation and energy efficiency investments.

Job Coefficients from Key Illinois Sectors



Source: Skip Laitner as adapted from the IMPLAN 2009 data set for the State of Illinois.

What is the Correct Number?
The Many-Headed Hydra of Job Estimates

- If we were to ask the question for the Great State of Illinois, what is the number of jobs for a million dollar of expenditures on energy efficiency programs, the correct answer could be:
  - 14
- Or it could be:
  - 41, 61, 35.4 or even 2.4
- It all depends on what we are measuring. . .

My Own Professional Bias. . .

- Is to estimate the number of "net jobs" over the average life of the energy efficiency measures (here 15 years), accounting for:
  - Program expenditures (including both administrative costs and incentives),
  - Consumer Match (if any),
  - Costs of borrowing (if any), and
  - Energy Bill Savings, plus
  - Non-Energy Benefits (if calculated). . .
  - Plus a few other adjustments (such as labor productivity, externalities, and price changes)!

An Illustration: Job Impacts from Manufacturing Energy Efficiency Improvements

Expenditure Category	Amount (Million $)	Employment Coefficient	Job Impact
Installing Efficiency Improvements in Year 1	1.0	14.3	14.3
Diverting Funds for Energy Efficiency Improvements	-1.0	7.5	-7.5
Energy Bill Savings in Years 1 through 15	3.6	7.5	27.0
Lower Utility Revenues in Years 1 through 15	-3.6	5.2	-18.7
Productivity Benefit ~40% of Energy Savings	1.4	14.2	20.4
Net 15-Year Change (Job-Years)			**35.5**
Average Annual Change (Jobs per Year)			**2.4**

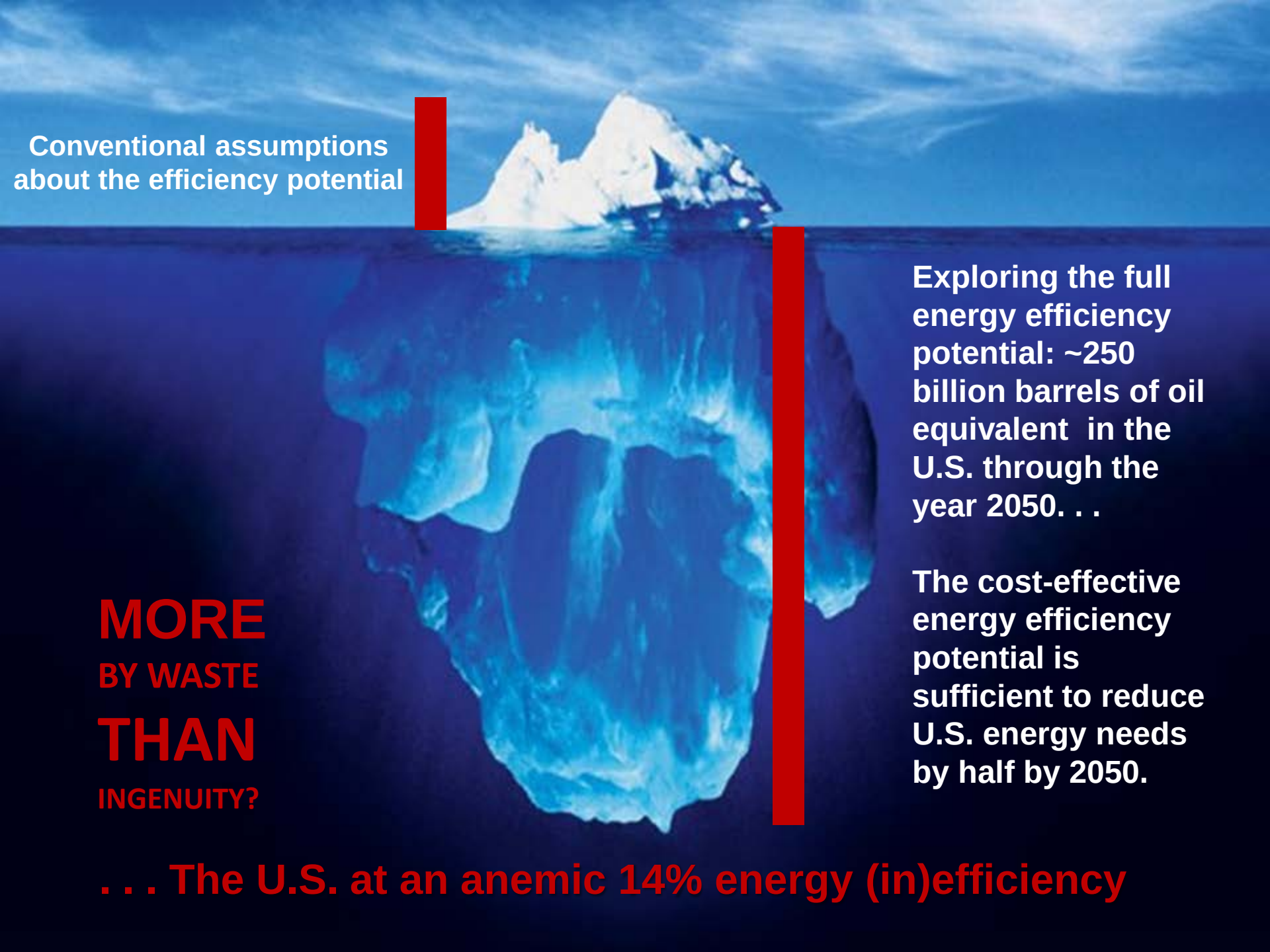
Note: The employment coefficients are taken from the appropriate sectors found in the previous Figure. Annual energy bill savings are assumed to have a 4-year payback, or about $250,000 per year with only one-half available in the first year. The jobs impact is the result of multiplying the row change in expenditure by the appropriate row coefficient. On average, this manufacturing upgrade would be said to support a net gain of about 2.4 jobs per year for 15 years. These results do not include energy price reductions or other externalities.

Now Illustrating Magnitudes of the Six-Year EEPS Programs Over a 15-Year Period

Expenditure Category	Amount (Million $)	Employment Coefficient	Job Impact
Installing Efficiency Improvements in Year 1-6	2,680	14.3	38,321
Diverting Funds for Energy Efficiency Improvements	-2,680	7.5	-20,098
Energy Bill Savings in Years 1 through 15	7,399	7.5	55,490
Lower Utility Revenues in Years 1 through 15	-7,399	5.2	-38,473
Productivity Benefit ~40% of Energy Savings	2,959	14.2	42,025
Net 15-Year Change (Job-Years)			**77,264**
Average Annual Change (Jobs per Year)			**5,151**

Note: Again, the employment coefficients are taken from the appropriate sectors found in the previous Figure. Consumers provide one-half the cost of the EEPS Programs. Annual energy bill savings are assumed to have a 4-year payback. The jobs impact is the result of multiplying the row change in expenditure by the appropriate row coefficient. On average, this set of economy-wide upgrades would be said to support a net gain of about 5,200 jobs per year for 15 years. These results do not include energy price reductions or other externalities.

Stepping back a moment to explore the larger perspective. . .


Conventional assumptions about the efficiency potential
Exploring the full energy efficiency potential: ~250 billion barrels of oil equivalent in the U.S. through the year 2050. . .
The cost-effective energy efficiency potential is sufficient to reduce U.S. energy needs by half by 2050.
MORE
BY WASTE
THAN
INGENUITY?
. . . The U.S. at an anemic 14% energy (in)efficiency

Some Further Perspectives

- Employment benefits and economic returns are diminishing on what my colleague Jeremy Rifkin calls “Second Industrial Revolution” technologies.
- A major reason for those diminishing returns is the hugely inefficient use of energy, water and other resources which, in turn, creates an array of direct and indirect costs that constrain and erode the economic process.
- A social and economic transformation is clearly needed – driven by large-scale purposeful effort that includes both directed actions and targeted investments in energy efficiency and productivity.

Preliminary Comparison of First Order Economic and Environmental Impacts*

Category of Impact	Metric	Energy	Efficiency
Employment	Direct-Indirect-Induced Jobs/$MM	~9	~17
CO_2 Emissions	Million Metric Tons per Quad	56	Minimal
Average Cost/User	Dollars per Million Btu	~14	~0 to 7
Water Use	Per Energy Equivalent	Large	Minimal

* Working estimates drawn from a variety of data and resources

The difficulty lies not with the new ideas, but in escaping the old ones. . . .

John Maynard Keynes

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