

Economic and Human Dimensions Research Associates ...

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The Economic Imperative of Greater Resource and Energy Efficiency in the Global Economy

A Critical Role for ICT-Enabled Networks and Services

John A. “Skip” Laitner

ACEEE Intelligent Efficiency Conference

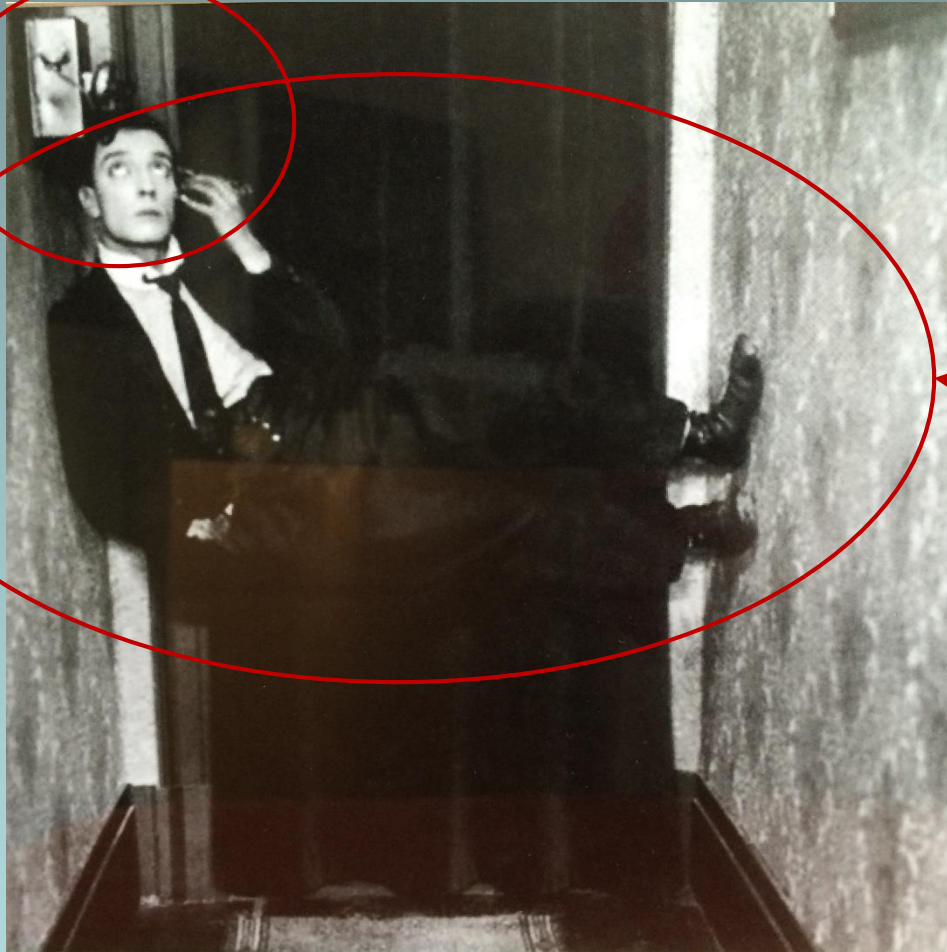
**Boston, MA
December 8, 2015**

Some Opening Thoughts

- The economic benefits of the “Second Industrial Revolution” technologies are diminishing.
- A ***social and economic transformation*** is clearly needed – driven by purposeful effort that includes a new social perspective, directed actions, and targeted investments.
- As enabled by a fully digitalized economy, the more productive use of all resources—whether materials, water, food, and especially energy—must be the underpinning of this social and economic transformation. Europe may be leading the way. . .

Perhaps this Useful Metaphor?

Relying entirely too much on 20th century perspectives, technologies, markets, and institutions. . .

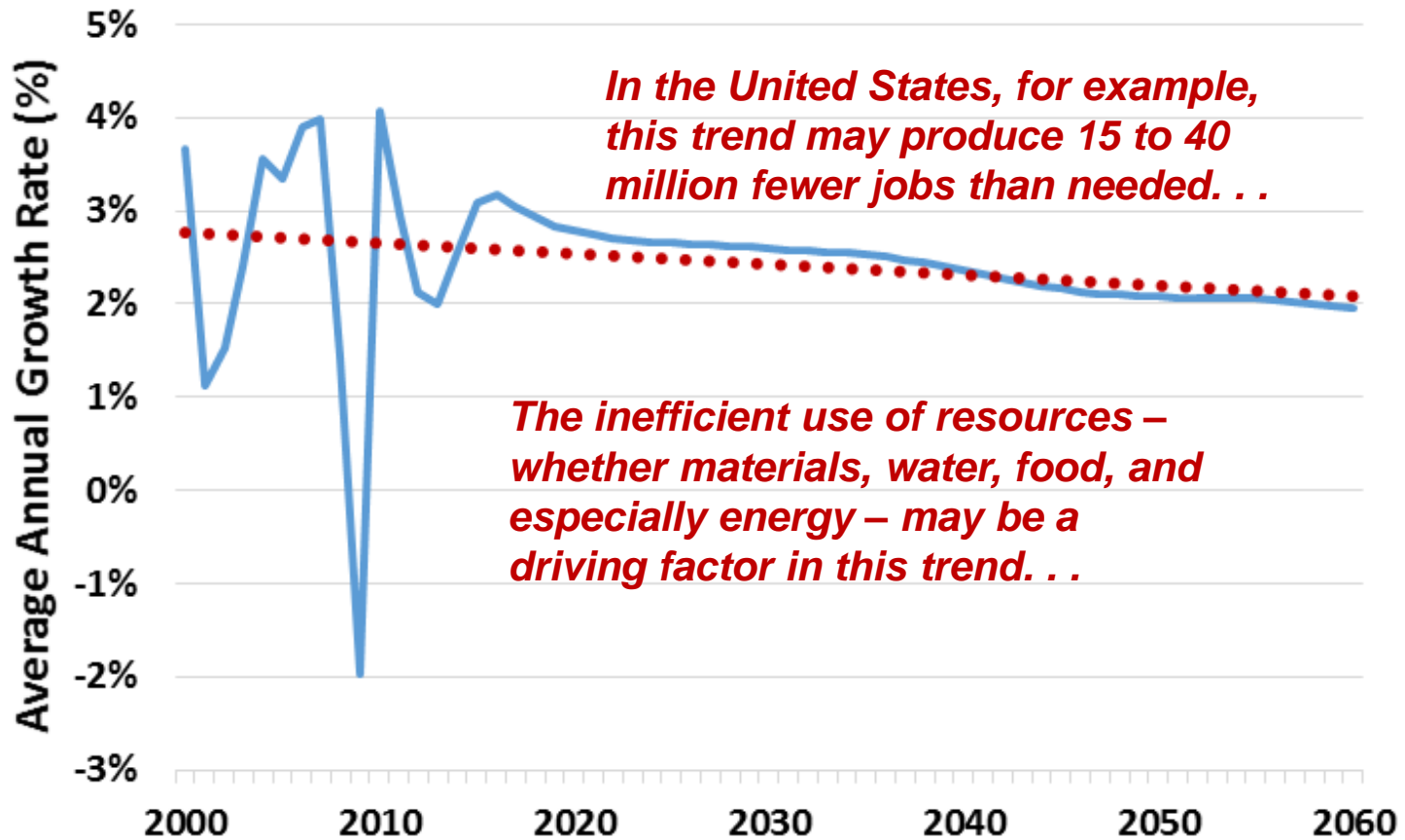


Approaching the problem from entirely the wrong perspective. . .

The Short Road Ahead

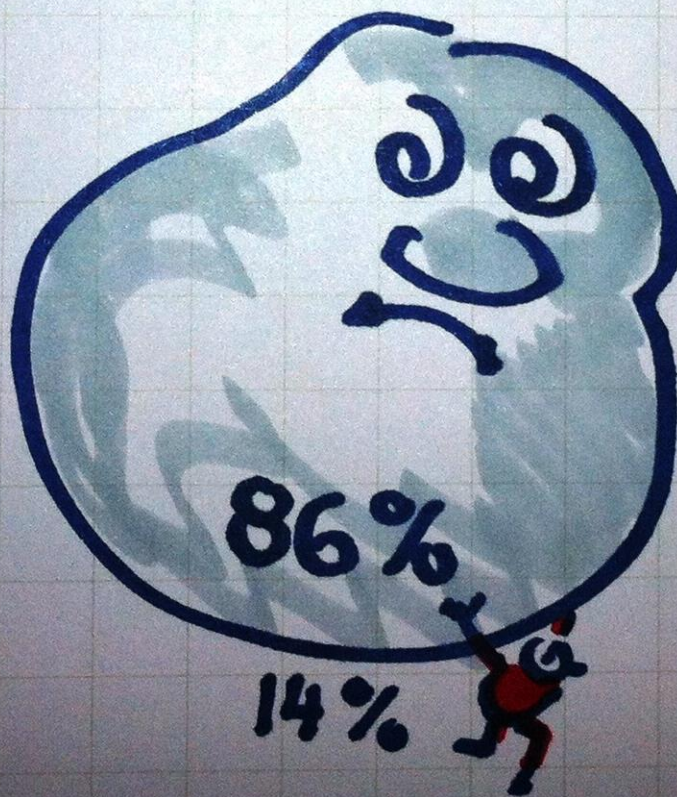
- There is a critical need to track energy as ‘work’ rather than energy as a ‘commodity’.
- There is also a very critical need to understand the economic imperative of energy efficiency.
- Finally, if we are to galvanize the requisite scale of a full social and economic transition, a new economic vision is required—one that complements, and goes well-beyond, the idea of smart regulation alone.
- Hence, the importance of the larger vision of the *Third Industrial Revolution*.

Trends in Per Capita GDP for the Global Economy



Source: Calculations by Laitner based on OECD Long-Term Economic Projections (2014).

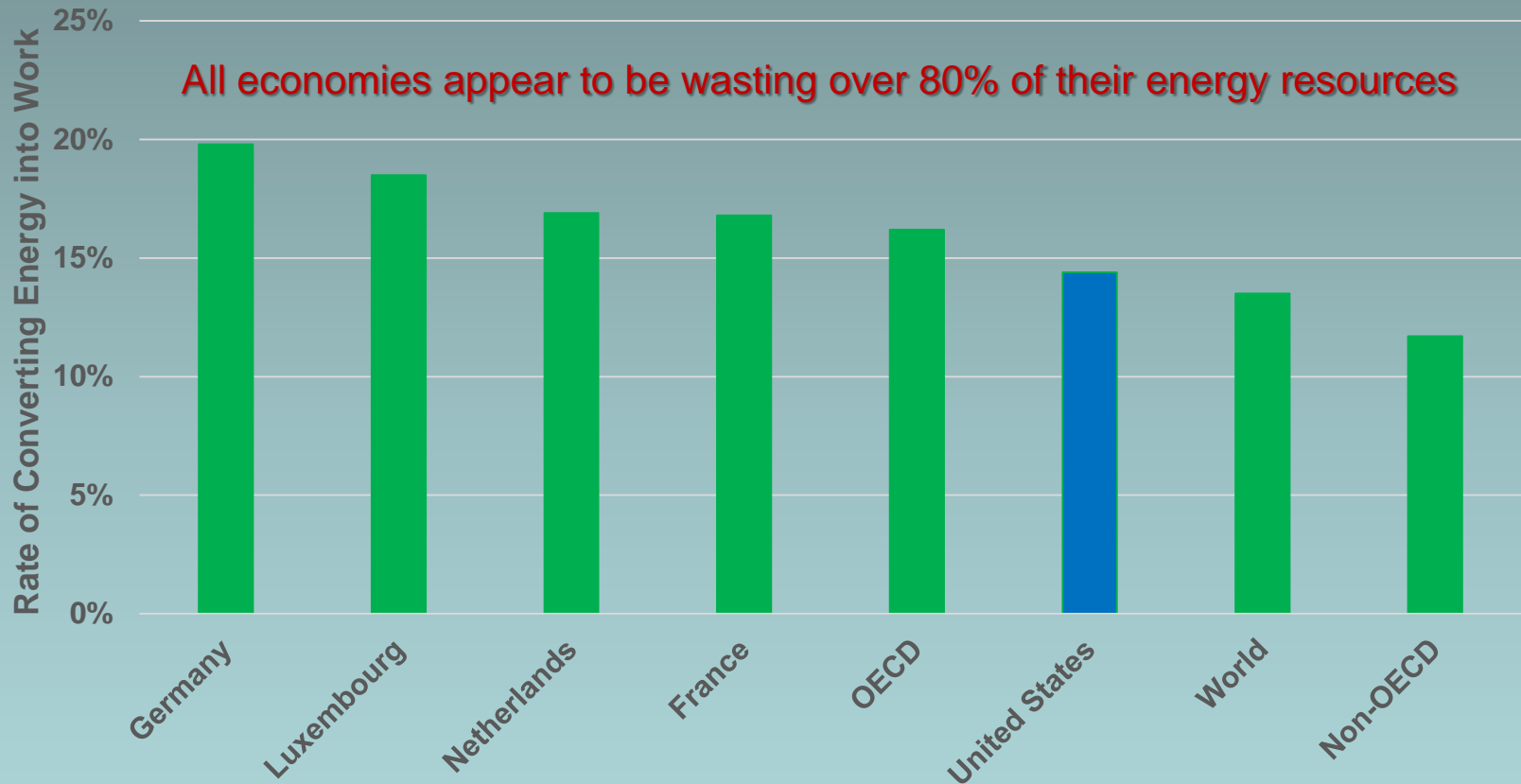
86% OF ENERGY IS WASTED
IN US



Source: Laitner
<http://www.aceee.org/blog/2013/08/thinking-big-about-energy-efficiency>

WWW.VISUELLE-PROTOKOLLE.DE

The Energy Efficiency of the Global Economy



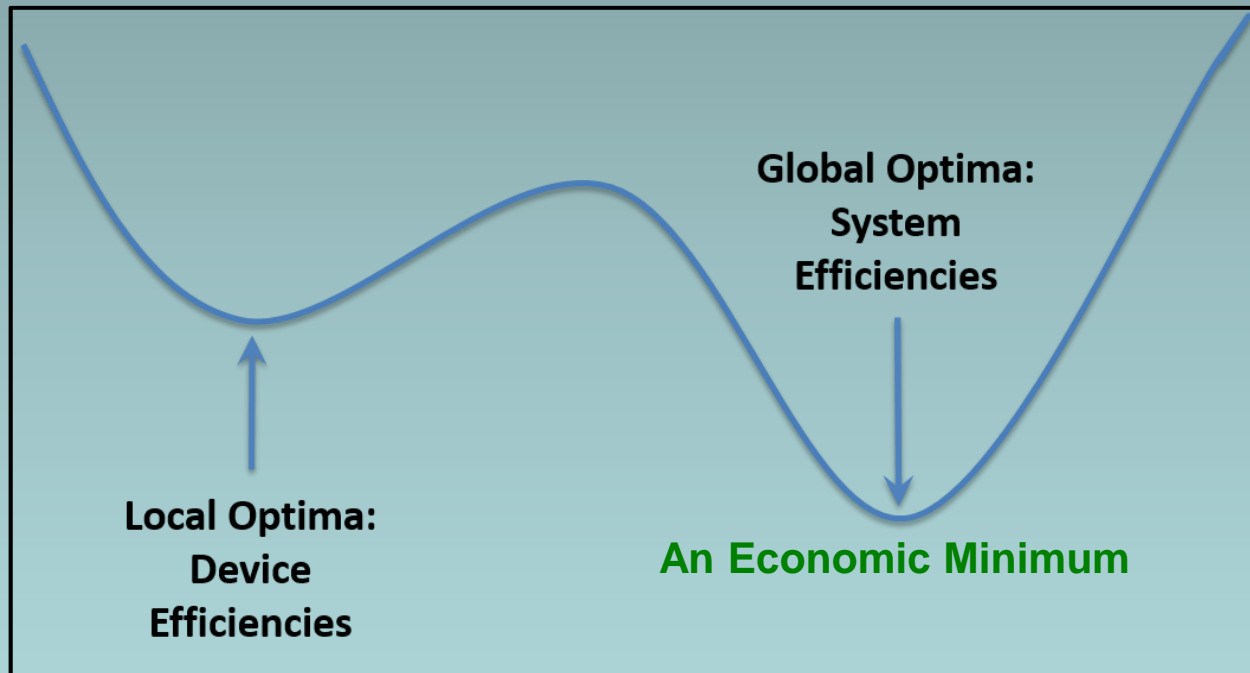
Source: Calculations by Laitner based on IEA Key Energy Statistics (2014).

“We shape the world by the questions we ask”

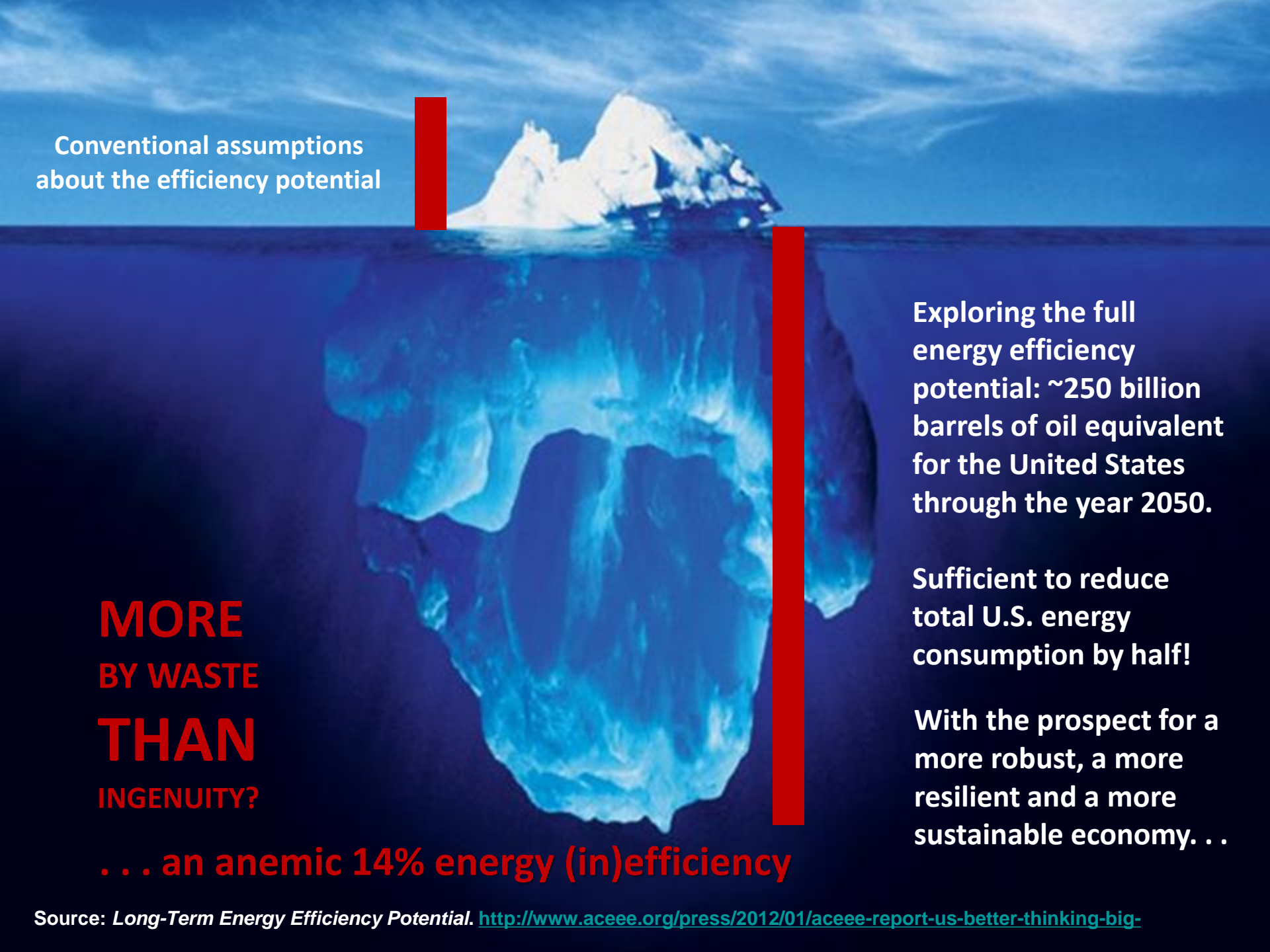
Physicist John Wheeler

Local versus Global Optima—Moving from a Device to a System Energy Perspective

Current Level of Energy Use



Source: Laitner, McDonnell and Keller (2015).

An iceberg floating in the ocean. The tip of the iceberg is above the water line, while the vast majority of the iceberg is submerged below the surface. Two vertical red bars are positioned on either side of the iceberg, extending from the water line down to the bottom of the submerged portion, highlighting the disparity between the visible and the hidden parts.

Conventional assumptions
about the efficiency potential

Exploring the full
energy efficiency
potential: ~250 billion
barrels of oil equivalent
for the United States
through the year 2050.

Sufficient to reduce
total U.S. energy
consumption by half!

With the prospect for a
more robust, a more
resilient and a more
sustainable economy. . .

**MORE
BY WASTE
THAN
INGENUITY?**

. . . an anemic 14% energy (in)efficiency

Rather than the Purely “Regulatory Route” in Nord-Pas de Calais. . .

- In a remarkable talk given by my colleague Jeremy Rifkin at the World Forum for a Responsible Economy (Lille, France) in November 2012, the seeds were planted to lift Nord-Pas de Calais onto the path of the Third Industrial Revolution.
- Jeremy notes that any time you have a coming together of a new form of communication and a new form of energy, you’ve laid the foundation for a new industrial revolution:
 - The 1st Industrial Revolution – roughly corresponding to use of print media and coal/steam energy
 - The 2nd Industrial Revolution – telephone/telegraph coupled with the internal combustion engine and electricity generation
 - ***The emerging 3rd Industrial Revolution – interactive communication and distributed clean energy technologies anchored by large-scale energy efficiency.***

With an active and large-scale involvement by the Regional Council, the Chamber of Commerce, and leading businesses, consumers and citizens



The concluding session of the 3-day Executive Seminar May 13-15, 2013

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Introduction

Pour comprendre l'ampleur d'une réelle efficacité énergétique, une projection économique

Si Nord-Pas de Calais réduit la **demande globale d'énergie de 50% grâce à l'efficacité énergétique d'ici 2050**, en tenant compte des fonds pour soutenir les infrastructures et systèmes d'énergies renouvelables, le coût annuel moyen de l'investissement serait de **3 à 5 Md €, soit 5% du PIB régional**.

Dans le même temps, les gains de productivité, par eux-mêmes, peuvent stimuler l'économie régionale de **4 milliards € d'ici à 2020** – et atteindraient **20 milliards € en 2050**.

Une question : est-ce que le Nord-Pas de Calais pense «assez grand et loin» pour saisir les opportunités complètes liées à l'efficacité énergétique et les 5 piliers de la Troisième Révolution Industrielle? Ce potentiel sera exploré dans le Master Plan de la 3ème Révolution Industrielle.

In Loos-en-Gohelle where the coal miners once assembled. . .



Where once the miners entered the coal mine itself. . .



In front of the tailings from the coal mine. . .



In October 2013 the Master Plan was Unanimously Received



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What Happens Next?

- In Nord-Pas de Calais—more than 250 projects now underway.
- We've just met with officials from Rotterdam and Den Haag, and also from Luxembourg, to begin the Master Plan process in those two regions.
- We have active discussions with other regions both in Europe and in China.
- And in all of these projects, the European Union and China are embarking on a bold new course to create a high-tech 21st Century smart green digital economy.

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

John Maynard Keynes

THE DIFFICULTY
IS TO ESCAPE
THE OLD
IDEAS



Selected References

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For Further Information

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