"We are like tenant farmers chopping down the fence around our house for fuel when we should be using Nature's inexhaustible sources of energy — sun, wind and tide.… **I'd put my money on the sun and solar energy. What a source of power! I hope we don't have to wait until oil and coal run out before we tackle that.**"

– Thomas Edison (1931)

"If Edison had a needle to find in a haystack, he would proceed at once with the diligence of the bee to examine straw after straw until he found the object of his search. I was a sorry witness of such doings, **knowing that a little theory and calculation would have saved him ninety per cent of his labor**."

– Nikola Tesla (1931)

Ad Lucem

Modeling Market Transformation Pathways

Lawrence Berkeley National Laboratory
February 17, 2012

Is it Time for a "Sun Shot"?

$1/Watt Workshop
Washington, D.C.
10 August 2010

We need a new mindset on cost-reduction.

Things we've never paid attention to before will be the difference between success and failure.

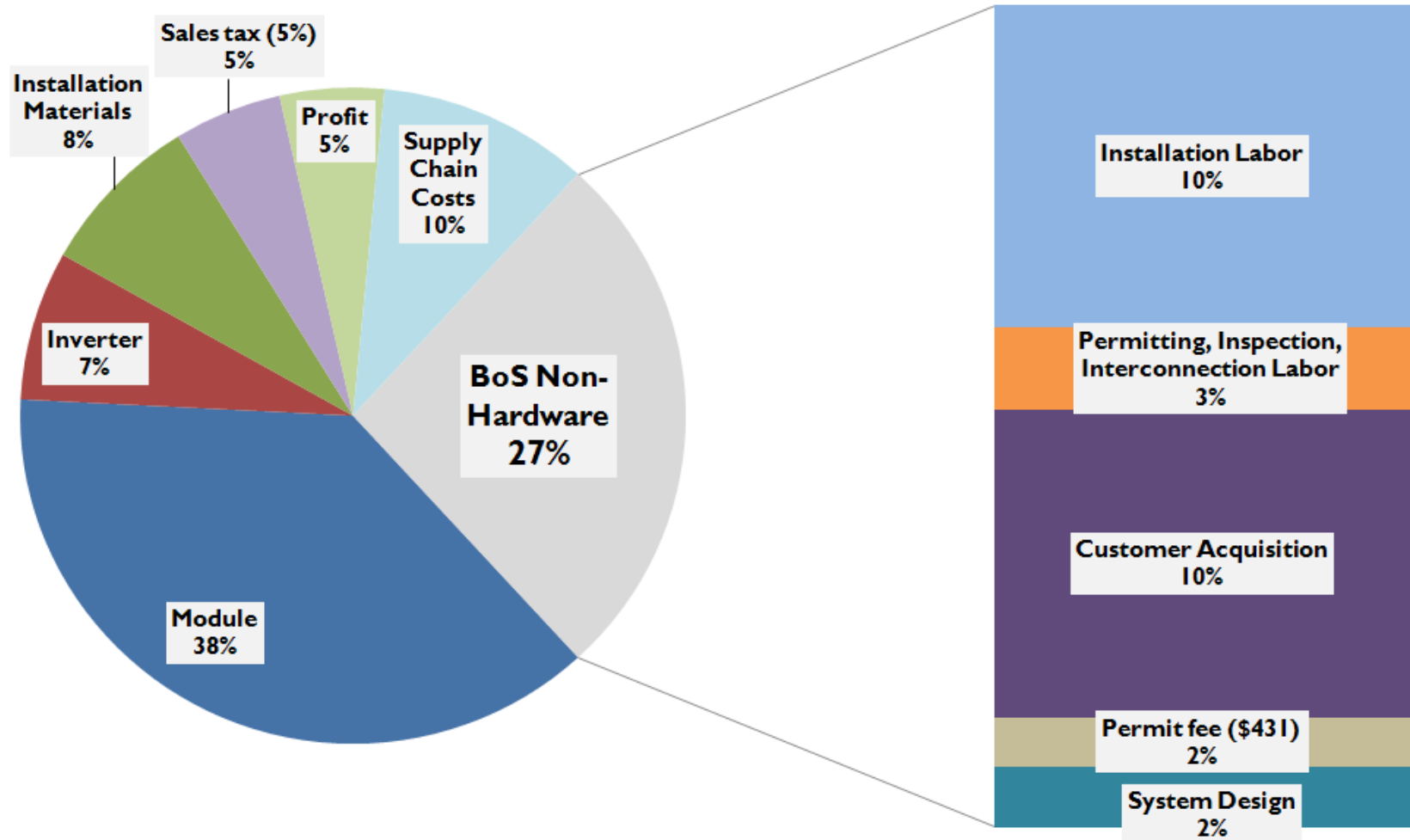What can we learn from other industries?

Agriculture

From this...

...to this.

- Laser-leveled fields
- Fertilizer measured by satellite
- Harvested with GPS-enabled precision combines

2010 cost breakdown of residential solar systems

SunShot Program Framework

Technology Readiness Level 1 ← → 9

| Material & Device Concepts | Device & Process Proof of Concept | Component Prototype & Pilot Scale Production | Systems Development & Integration | Technology Validation | Market Adoption | Large Scale Production |

Basic Energy Sciences

MURI

Next Gen PV

Program to Advance Cell Efficiency

SunShot Incubator

PV Supply Chain

Balance of Systems-Hardware

PV Manufacturing Initiative I

Power Electronics

SEGIS

CSP Components and Storage

CSP Advanced Technology Validation

High Penetration

Incubator – Soft Costs

PVMI II: SUNPATH

Rooftop Solar Challenge

Non-Hardware BOS

SunShot
U.S. Department of Energy

8

SunShot Program Framework

Technology Readiness Level

1 ← → 9

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Breakout Sessions

I. Modeling solar technology market dynamics
   Adam Cohen, Fellow

II. Modeling solar energy technology evolution
   Aimee Bailey, Fellow

III. Customer decision-making
   Christina Nichols, Market Transformer

Workshop Objectives

I.   Identify the most important questions
II. Identify potential tools to reach solutions

Workshop Outcomes

I.   Written summary
II. Continuing dialogue

Lada Adamic
Daniel Kammen
W. Cecyl Hobbs
Martha Russell
Ankur Asthana
Ramamoorthy Ramesh
Carrie Armel

Marta González
Varun Rai
Danny Kennedy
Russell Thomas
Antonia Bouchard
Andrew McAllister
Martha Russell

Estimating Street Usage

Activate Networks
Connections that matter.

Rachel Tronstein
Easan Drury
Ed Vine
Ryan Wiser
Jessika Trancik

Edward Vine
Ben Ho
Barbara Farhar
Varun Rai

Yevgeniy Vorobeychik
Severin Borenstein
Tamara Gishri
Charles Macal
Douglas Powell   Mark Hartney
Robert Margolis
Kenneth Gillingham
Daniel Villa
Roger Hill
Jonathan Burbaum
Christian Schneider
Phil Larochelle
Scot Litzelman
Chris Barrett
Galen Barbose
Jonathan Ozik
Rob Axtell

Areas of Expertise

- Network structure/dynamics
- Behavioral economics
- Agent-based modeling
- Technology diffusion
- Modeling market dynamics
- Social dynamics of technology choice
- Modeling energy markets
- Urban sustainability
- Science & technology policy

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