Energy Economics and Tax Incentives for Starting and Running a Clean Energy Business

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Quick Introduction

Key Consulting Practice Areas:

1. Energy Efficiency Consulting,
2. Renewable/Alternative Energy,
3. Renewable Transportation Infrastructure (EVs/LNG/CNG)
4. Sustainability-Related Incentives (Grant Writing & Management)
5. Strategic Sustainability Management Consulting
Our Company Mascot
wells fargo cultural campus

duke energy center

tvsdesign
Our Power Source At Work

Outer Banks, North Carolina
Sunrise
September 2014
Part I:

Incentives and Clean Energy Finance
The State of Clean Energy Finance 2017-2018

• How We Got to Now

USE OF SOLAR ENERGY IS NEAR A SOLUTION

German Scientist's Improved Device Held to Rival Hydro-electric Production.

TELEVISION IMPETUS SEEN

Sound Films and Automatic Control Instruments Also May Be Aided by the New Cell.

NEW POWER AGE PRESAGED

Dr. Bruno Lange, Inventor, Says Technical Advances Promise to Be Astonishing.

Copyright, 1931, by Science Service.

BERLIN, April 3.—The problem of using the vast energy of the sun for human purposes is nearing a solution. Dr. Bruno Lange of the Kaiser Wilhelm Institute here has recently perfected a device which converts sunlight into electric current more completely than ever before, at a price which may compete with present hydro-electric installations.

The exhaustion of the world's coal supply in a few hundred years is no longer to be feared if Dr. Lange's claims are justified. On the contrary, there would be more power than ever before. An expansion of for man throughout the future history of the world. It is just possible the world is standing at a turning point in the evolution of mechanical invention to that which followed the invention by James Watt of the steam engine.

For coal is not only limited in amount. It is also an extremely inefficient vehicle for the sun's energy. The power which can actually be used—for instance, in an incandescent lamp—is a small fraction of 1 per cent of the total sunlight stored in part in the coal, the burning of which at the generating station produces the electric current. Dr. Lange's invention promises to put much of the other 99 per cent to use.

Serious problems will, of course, be raised by the fact that the supply of sun-power will not be continuous. Whether these will be solved by some form of storage arrangement or by operating the photogenerators in conjunction with some other kind of generator cannot be said at present. The energy storage problem is closely linked with that of power sources.

Some $25,000 per kilowatt is the estimate that Dr. Lange has made of the cost of installing the copper sandwich on a large scale as a means of trapping the power of sunlight. This at first seems impossibly large, as a hydro-electric station can now be erected at a capital cost of $100 to $300 per kilowatt of capacity.

A steam turbine plant using coal is, of course, cheaper to install, but the running costs in labor, fuel and maintenance of equipment are much greater.

Further Improvement Likely.

The hundredfold increase in efficiency by using silver selenide in place of copper oxide, however, appears to bring the cost within the economic range for competition in the power industry. Apart from this it is likely that further improvements in the form of the cell will be made.

The idea is still in its infancy. A square yard of copper oxide sandwich can produce several watts of energy in full sunlight, Dr. Lange says. Using this as a basis for calculation, it is easy to see that a large power station of 300,000 kilowatts would require an area of about one square mile of the silver selenide cells.
The State of Clean Energy Finance 2017-2018

• How We Got to Now..
The State of Clean Energy Finance 2017-2018

- How We Got to Now

Cost Reductions Since 2008

- Land Based Wind (-41%)
- Distributed PV (-54%)
- Utility-Scale PV (-64%)
- Modeled Battery Costs (-73%)
- LED Bulbs (-94%)

Notes: Land based wind costs are derived from levelized cost of energy from representative wind sites. Distributed PV cost is average residential installed cost. Utility-Scale PV cost is the median installed cost. Modeled battery costs are at high-volume production of battery systems; derived from DOE/US Advanced Battery Consortium PHEV Battery development projects. LED bulb costs are cost per lumen for A-type bulbs. See full report for full citations and details.
The State of Clean Energy
Finance 2017-2018

2017-18: The Best of Times for Clean Energy

2017-18: The Worst of Times for Clean Energy
The State of Clean Energy Finance 2017-2018

New Advancements Continue to Bloom & Thrive In Financial Investment Models: Joint Ventures, Public-Private Partnerships, Sale-Leasebacks, PACE Financing, Community Solar Developments, USDA REAP Opportunities, Third-Party Ownership, etc.
The State of Clean Energy Finance 2017-2018

It's All About The Math (Fundamentals)

Impact of Living in Age of Accelerations (T. Friedman): Technology (Moore’s Law) Globalization Climate Change

Despite It All...I Remain Optimistic
Incentives Still Influence Behavior in Clean Energy (+)
Georgia electric vehicle sales shrink 80% in wake of tax credit repeal
Overview of Tax and Financial Incentives for Clean Energy
Renewable Energy
Renewable Energy:
Federal Investment Tax Credits -30%/10%
Available Through 2022

Capital Cost Recovery:
Accelerated Depreciation (2019)

§179 Expense Election (Permanent)
Renewables: State Investment Tax Credits e.g. South Carolina

Utility Rebates for Solar in South Carolina (~1.00/watt)
Energy Efficiency and Energy Cost Saving Measures
Energy Efficiency:
- Energy Efficient Commercial Building Deduction (§179D)

Cost Recovery:
- Bonus Depreciation
- §179 Expense Election
Energy Efficiency:
Utility Rebates
Duke Energy
Smart $aver
Program®

Energy Star®
ECMs

Vending Machines = Easy Savings
ECMs

Digitizing Building Operations
Many ECM Opportunities....

even complex lighting situations
ECMs

Before: 400watt Metal Halides
ECMs

**After: LED Tube Lighting**
ECMs

Passive Solar
Utilizing Natural Sunlight
ECMs

Occupancy Sensors

Savings of ~75% on Energy Costs
Clean energy tax credits mostly go to the affluent. Is there a better way?

Updated by David Roberts | @davvox | david@vox.com | Nov 24, 2015, 1:20pm EST

One of the main ways US policy encourages the uptake of new clean energy and energy efficiency technologies is through the use of tax credits. There are tax credits for qualified windows, boilers, air conditioners, insulation, and more.

The US is something of an outlier in this. In the KPMG Green Tax Index—a ranking of countries according how much they use tax penalties and incentives to
Taxation and Legislation Policy
Theory

Tax Incentives = Behavior

Causes Tension Between Algorithmic and Heuristic Tasks and Transactions
Incentives are used to encourage desired behaviors in the marketplace.

Objectives for Renewable Energy Incentives:

- Encouragement of Private Sector Investment
- Long-term Business and Economic Growth,
- Increased Employment and Opportunity
- Increased Deployment of Renewables
GOAL:

Over time the expectation or most incentive policy theory is that the incentives will create a market where the growth levels mature and prices decline.
3 Essentials for Effective Incentive Deployments

Awareness

Comprehension

Execution
**Awareness:** Have the respective Federal and state authorities educated the taxpayers/investors regarding the availability of the incentives? Are they aware that such incentives exist?

**Comprehension:** With awareness of the incentives, are taxpayers taking action steps to educate themselves to determine if they can utilize and take advantage of the incentive(s)?

**Execution:** With action steps taken, are the taxpayers able to implement an effective deployment?
Other Considerations and Theories on Incentive Effectiveness

The ‘Please Sir, I Want More’ Theory (i.e. The Incentives Are Not Big Enough)
Other Considerations and Theories on Incentive Effectiveness

The **IF THEN** Incentive

VS

The **NOW THAT** Incentive
Other Considerations and Theories on Incentive Effectiveness

The Incentive Fatigue Theory
Other Considerations and Theories on Incentive Effectiveness

The Presenter’s Paradox Theory: More Can Be Perceived As Less
Part II:

Key Strategies for Successful Clean Energy Start-Ups
Lucas Tax + Energy Consulting
I-4 Strategic Success in Clean Energy Start-Ups

Inclusion: The Foundation

Imagination

Intelligence: AI = IA (Friedman, 2016)

Incentives

Investments
Final Thoughts

NOTHING WORTH HAVING COMES EASY
References


Questions, Comments, & Answers
Recommended Reading

- Thank You for Being Late
  - An Optimist's Guide to Thriving in the Age of Accelerations
  - Thomas L. Friedman

- How We Got to Now
  - Six Innovations That Made the Modern World
  - Steven Johnson

- The Upcycle
  - Beyond Sustainability—Designing for Abundance
  - William McDonough

- Strategic Sustainability
  - Michael Braungart

- Locas
Thank You For Your Time.

Contact information for a copy of today’s presentation:

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