



# Environmental Aspects of Solar & Other NYS Energy Options

Doug Lee 2014

# Energy = Jobs, Economy, National Security

## It's not free

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- Coal - Cheap but dirty
- Oil – Expensive, Vulnerable Supply
- Nuclear – Safety Issues
- Solar – Expensive, Inefficient, Polluting
- Natural Gas – Cheap, Clean, Hydrofrac controversy



# Solar Energy

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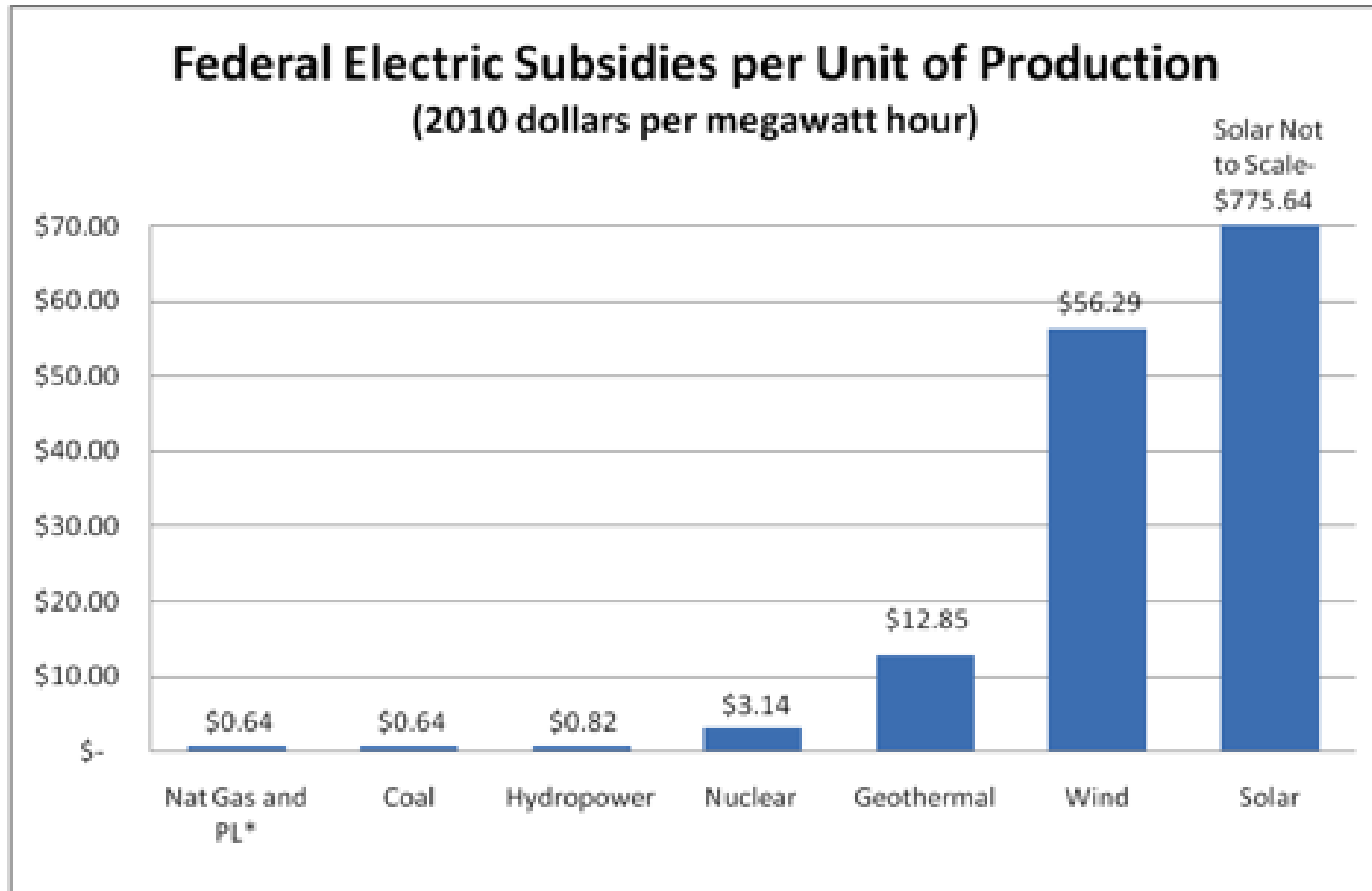
- Immature technology
- Toxic waste from manufacturing
- CO<sub>2</sub> saved barely cover COAL power used
- Uneconomical even with huge subsidies



\$1,200/yr return on a \$40,000 system (Fed subsidies additional)

Contributed photo : Sullivan County Democrat

# Solar Subsidies ...



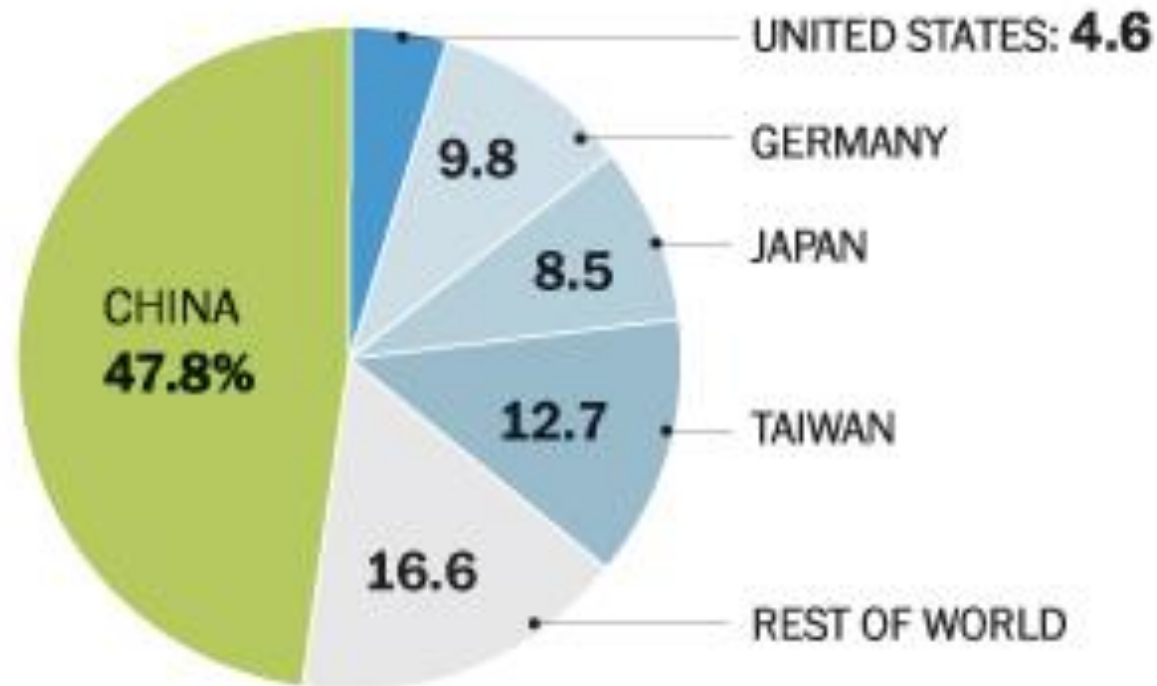
Source: Energy Information Administration 2012

# Solar Subsidy for Whom?

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## Solar cell market share

In 2010



Sources: Photon International, Earth Policy Institute, Wiley Rein. Graphic: Tobey/The Washington Post. Published on December 16, 2011, 11:30 a.m.

# Stanford Study: Solar Industry A Net Energy Producer?



Sections

NationalJournal



BY TODD WOODY, QUARTZ

## Inconvenient truth...

Production of PV panels has consumed more electricity  
than the panels themselves generate

Environ Sci Technol. 2013 Apr 2;47(7):3482-9. doi: 10.1021/es3038824. Epub 2013 Mar 12.

**Energy balance of the global photovoltaic (PV) industry--is the PV industry a net electricity producer?**

Dale M<sup>1</sup>, Benson SM.

# Solar Panels: Toxic Manufacturing Process

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- 3 parts toxic byproduct for every part of panel material - silicon tetrachloride
- Explosive silane gas
- Carcinogenic cadmium sludge
- Cheap solution: EXPORT MANUFACTURING

Massive toxic waste  
buried  
..... or dumped!



# Solar Panel Pollution in US

msn news

us crime & justice world sci/tech pop culture in depth

## The dirty side of clean solar energy

500 thousand pounds

### Exporting CA solar waste

More than 46 million pounds of waste was generated from solar companies in California between 2007 and mid-2011. While 97% of the waste remained in California, almost 1.4 million pounds of the hazardous material was shipped to other sites across the country.

400  
300  
200  
100





# Solar Panel Recycling?

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- No recycling in US
- Europe recycling 20% effective
- Panels dumped after 25 years
- **Panels leach toxins** into landfills – water pollution?



# Solar Panel Pollution in Asia

## Chinese Protesters Accuse Solar Panel Plant of Pollution



Reuters

Protesters and police officers faced off on Saturday at a plant in the Chinese province of Zhejiang. The unrest began Thursday.

By **SHARON LaFRANIERE**

Published: September 18, 2011



# Environmental Cost of Solar Energy

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April 17, 2014, 8:36 p.m. EDT

## China: 20% of our arable land is polluted

20 Comments



Watchlist Relevance  
**LEARN MORE**

By Josh Chin

BEIJING--The extent of China's soil pollution, long guarded as a state secret, was laid out

## Almost 60% of China's water is contaminated, government report finds

APRIL 28, 2014 [No Comments](#)

REUTERS / January 21, 2014, 11:00 AM

# China pollution crossing Pacific to U.S.: Study



Vehicles are driven along a road on January 16, 2014 in Beijing, China. Beijing Municipal Government issued a yellow smog alert this morning. / **CHINAFOTOPRESS, GETTY IMAGES**

5 Comments / [f](#) 10 Shares / [t](#) 17 Tweets / [S](#) Stumble / [@](#) Email

More +

**BEIJING --** Pollution from China travels in large quantities across the Pacific



# Germany's Failed Experiment

- World leader in solar and wind installations
- High electric rates
- Wind & Solar only produced 12.4% of total energy.
- Germany resorts to dirty coal
- **Most Polluting in Europe**

## NEWS

### Germany now worst polluter in European Union.

08/05 12:27 CET



Share this article Like 52 Tweet 33 +1 1

The latest figures from the EU's statistics agency, Eurostat, show that [Germany](#) is the worst offender when it comes to [pollution](#).



# The Herricks School Solar Panels

- \$125,000 grant for solar energy system
- \$300,000 total cost to taxpayers
- Electricity produced only worth \$4,000/yr
- \$100,000 lifetime production at best
- **Waste of tax payer money plus pollution!**



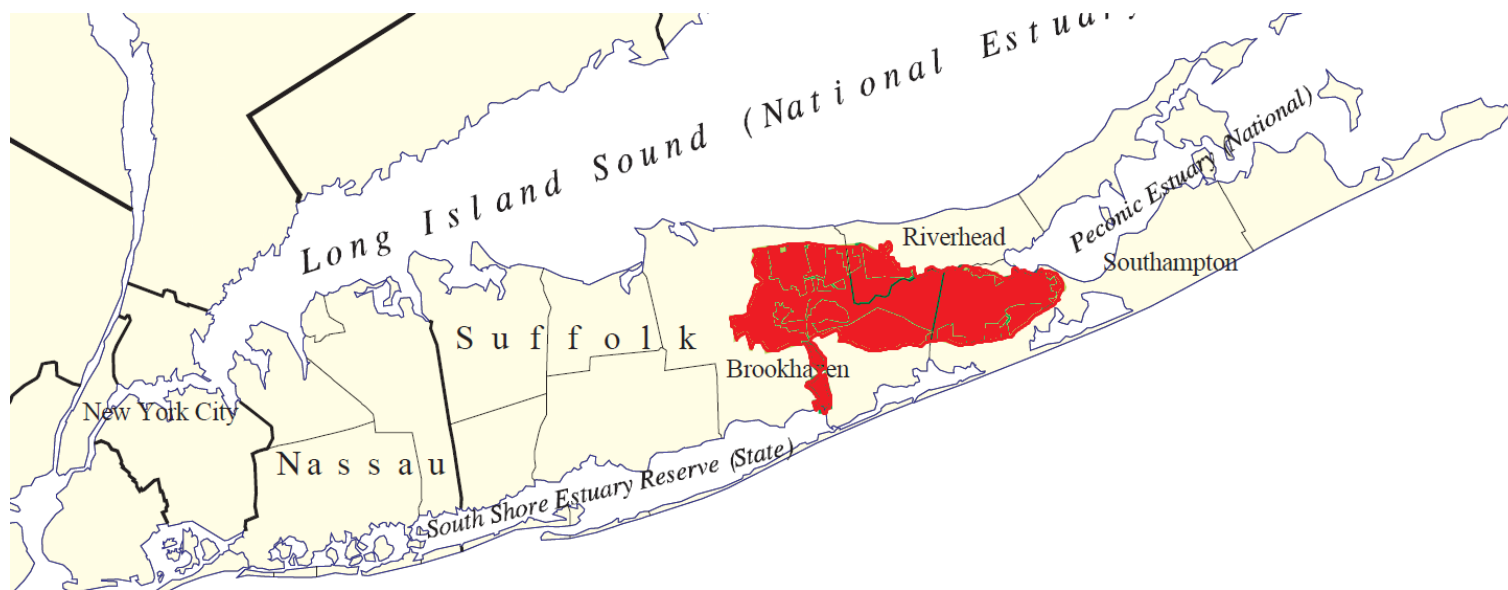
# The Long Island Solar Farm

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- Clear cutting of 200 acres of Pine Barrens
- Endangered Tiger Salamander habitat
- Undisclosed Fed & State subsidies
- \$300,000,000+ net cost to LIPA customers
- Only 5 MW of net power

# LI: Want to go 100% Solar?



- 100,000 acres needed\*
- Cover all of Pine Barrens (area in red)
- Average electric bill \$8,310/yr\*\*
- Does not work – need batteries

\* Based on 2011 LIPA total energy & LISF net efficiency of 40ac/MW

\*\* Based on LISF added cost \$.60/M/Customer

# Ivanpah – Green Ecologic Disaster

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- 6 square miles of fragile nature decimated
- \$1.6+ billion in public funding
- Produces only 75 Mw of electricity
- Tortoise killer
- Bird killer



# Power Generation: Solar vs Natural Gas

	LI Solar Farm	Ivanpah (Solar)	Cricket Valley (gas)
Cost	\$1 Billion?*	\$2.2 Billion+	\$1.4 Billion
Land Use	200 Acres	4,000 Acres	200 Acres
Net Capacity	5 Mw	75.4 Mw	870 Mw
Cost / KWh	\$0.34**	\$0.21**	\$0.06



\* \$298 million + Fed & State subsidies



\*\* Batteries not included



**Solar is still experimental – Costly & Polluting**



# NY-Sun:

Wasting \$1 Billion on Solar Energy

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*"The long-term commitment to solar energy represented by NY-Sun will make New York State a leader nationally in solar development."*

*New York Governor Andrew M. Cuomo on the NY-Sun Initiative  
State of the State Address, January 2013*

SOLAR POWERING NEW YORK

RESOURCES

INNOVATIONS

= High rates + high taxes + pollution

# Solar Panels: A Polluting Industry

- Typically polluting manufacturing practices
- US Manufacturers amongst worst offenders!

	EPR	Emissions Transparency	Chemical Reduction Plan	Worker Rights, Health, Safety	Supply Chains	Conflict Minerals	Module Toxicity	C2C Recycling	Prison Labor	Biodiversity	Water	Energy & GHGs	Overall Score
MAXIMUM SCORE	20	10	5	15	10	5	10	5	5	5	5	5	100
Trina	14	5	5	15	7	3	10	4	5	2	3	4	77
Yingli	9	4	5	14	8	3	10	4	5	5	3	5	75
SunPower	7	6	5	14	7	3	10	4	5	3	2	4	69
Upsolar	14	4	0	13	8	3	10	2	3	5	0	4	66
SolarWorld	9	10	5	14	7	0	0	3	5	0	5	5	64
REC	10	10	5	8	7	0	0	1	4	5	3	4	57
First Solar	12	6	0	13	7	3	0	4	3	0	2	5	55
Axitec	4	0	0	10	8	3	10	4	3	5	0	0	47
Suntech	9	2	5	10	7	3	0	0	4	5	0	2	47
Mitsubishi	0	4	5	4	7	0	10	0	0	5	5	5	45
Aleo	10	0	0	11	7	0	0	4	3	5	0	3	43
Renesola	2	0	0	12	7	0	10	1	3	5	0	1	41
LDK	4	0	0	12	0	3	10	3	3	5	0	0	40
Avancis	9	0	0	8	7	3	0	0	4	5	0	0	36
Solon	9	0	0	8	7	0	0	0	4	5	0	0	33
Panasonic	0	7	5	0	0	3	0	0	0	5	5	5	30
Astronergy	4	6	5	2	0	0	0	0	0	5	4	3	29
Samsung	0	4	5	0	0	0	0	0	0	5	5	5	24
Calyxo	5	0	0	2	7	0	0	0	3	5	0	0	22
Motech	4	0	0	0	7	0	0	0	3	5	0	3	22
Sharp	0	3	5	0	0	0	0	0	0	5	3	5	21
Solopower	5	0	0	4	0	3	0	0	3	5	0	0	20
Kyocera	4	4	5	0	0	0	0	0	0	5	2	0	20
Eurener	9	0	0	0	0	0	0	0	3	5	0	0	17
Solar Frontier	0	0	0	0	0	0	10	0	0	5	0	0	15
Hareon Solar	4	0	0	0	0	0	0	0	0	5	0	0	9
Hyundai	4	0	0	0	0	0	0	0	0	5	0	0	9
Jinko	4	0	0	0	0	0	0	0	0	5	0	0	9
Hanwha SolarOne	4	0	0	0	0	0	0	0	0	5	0	0	9
Fluitechnik	0	0	0	0	0	0	0	0	3	5	0	0	8
JA Solar	0	0	0	0	0	0	0	0	3	5	0	0	8
Canadian	2	0	0	0	0	0	0	0	0	5	0	0	7

A PROJECT OF THE SILICON VALLEY TOXICS COALITION

## 2013 SOLAR SCORECARD



www.solarscorecard.c

# Global Industry Oversight Needed

## Solar Energy Firms Leave Waste Behind in China

*By Ariana Eunjung Cha*  
Washington Post Foreign Service  
Sunday, March 9, 2008

PHOTOS 

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"It's poison air. Sometimes it gets so bad you can't sit outside. You have to close all the doors and windows," says Qiao Shi Peng, 28, shown in front of a dumping site in his village, who worries about his 1-year-old son's health. (Zhang Quanfeng - Photo By Zhang Quanfeng)