

Solar Farms

using the
Tensioned Cable System (TCS)
for mounting
Solar PV Panels

Developed by
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In cooperation with:
Hub City Solar
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9/20/2013



TCS G1 Installation June 2012 in Findlay, OH

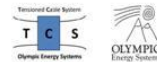
Basic
Building Block
for
Solar Farms

TCS System Components G1 (Ground)

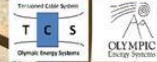
- Tensioned Cables – PV & Opposing
- Stanchions – End & Mid
- PV Hangers
- PV Clamps – End & Mid
- End Cables & Earth Anchors
- Turnbuckles (End Cables)
- Pull Tensioners (PV Cables)

US Patent 3,448,390
Issued May 28, 2013

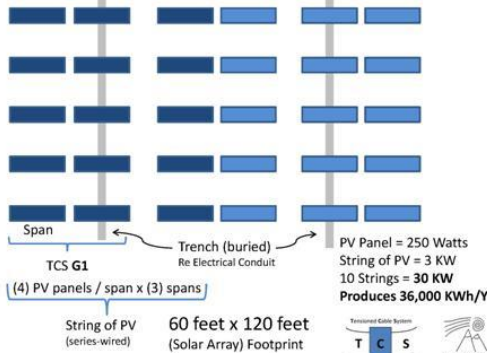
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University of Findlay
Findlay, OHIO



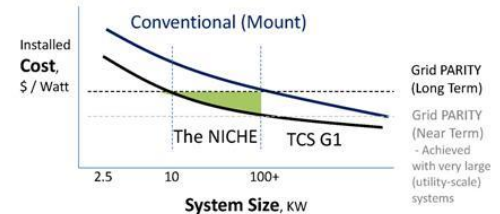
30 KW Solar Farm



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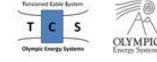
SYSTEM COST



COST depends mainly on SYSTEM SIZE (Scale) and PV Panel Selection

WITHOUT
Financial Incentives

PROJECT ANALYSIS (Cost Trends)



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Case for 30 KW Solar Farms

The \$64,000 Question

FARMERS...What can they do to earn \$64,000?

- Provide **Land** (¼ acre)
- Prepare **Paperwork** (re Incentives and Loan Application)
- Plant **Solar** (via a Developer)
- Put **NO MONEY DOWN** – Take a Bank Loan of **\$90,000** for a **30 KW** system

PAY BACK in 7 years (paying off the Bank Loan), with Incentives

EARN \$64,000 With **NO** further Incentives, \$0.10/KWh for 18 years

- If electricity prices do not go up for 25 years, then the Farmer achieves a \$50,000 profit
- If electricity prices continue to climb at the current rate of 3% per year, the Farmer achieves a \$78,000 profit

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FORECASTS

GLOBAL Electric Generation to increase 56% between 2010 and 2040, from these Sources: *

- Renewables up 2.8% per year
- Natural Gas and Nuclear up 2.5% per year
- Coal up 1.8% per year (mostly in Developing World and China)

WORLD NET Electric Generation *

- 20.2 Trillion KWh 2010
- 39 Trillion KWh 2040
 - 5.4T KWh added RE: 52% from Hydro, 28% from Wind, 20% from Solar etc.

*Demand for electricity
will double in 30 years!*

WORLD Coal Consumption to rise about 1.3% per year through 2040 *

- 75% of Coal Consumption in 2040 expected from China, US, and India (up from 70% in 2010)

WORLD CO2 Emissions **

- 31.2 Billion Metric Tons of CO2 in 2010
- 45.5 Billion Metric Tons of CO2 in 2040 [Up 46%]

- Liquid Fuels 14.7B
- NG 10.1B
- Coal 20.6B

**ELECTRICITY
(Sources of Energy)**

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WHY the TCS?

LOW TECH Design means **LOCAL JOBS** NOW

The design is based on **Principles**, not High Technology, as part of a new **DESIGN SCIENCE** around tensioning

HIGH TECH Production Potential means **FUTURE LOCAL JOBS**

MARKET CAPTURE IS HIGH in The Niche (10 KW to 100 KW Range)

LOW COST Shipping (especially to foreign markets)

GROWTH PROVISIONING by customers enabled by the TCS scalability
LEASING (roofs from and equipment to customers) enabled by the TCS portability
LESS EXPOSURE to Future Cost Increases due to low overall material content
Lower CO2 Emissions due to the LOW Embodied Energy (combats Climate Change)

LOWEST COST TRULY SUSTAINABLE MOST BENEFIT

FARMERS, with no money down, obtain a revenue stream for 20 years

Bank financed loan paid back in about 5 years
30 KW System Size represents a "Sweet Spot" niche

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