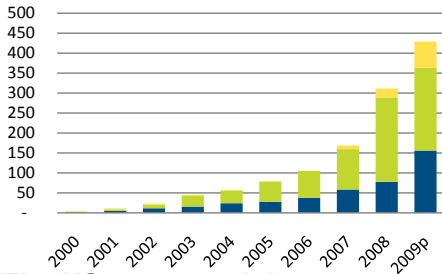




CdTe in Grid Connected Systems

background

Grid-Tied PV Capacity Additions



The US energy crisis necessitates the growth of its solar cell market.

- Growth rate of Grid-Tied PV Additions is over 40%
- Top US producer: FirstSolar (CdTe)



KEY CONSTRAINT: MODULE COST

Minimizing Manufacturing Cost. CdTe solar cell producers (FirstSolar & Abound Solar) have manufacturing costs of less than \$1/watt.

Improving Cell Efficiency. Average efficiencies (~10%) are less than theoretical (20%). Efficiencies are also less than commercial silicon cells (20%)

issues

ANALYSES:

Cost is the key constraint because the area available for grid connected systems is not limited
 Use low-cost photovoltaics to increase the growth of grid connected systems
 Production of CdTe is high throughput (because of vapor transport deposition & automation) & low cost

HOW IT WORKS (MODELS):

Improve CdTe cell design to maximize efficiency: glass, TCO: tin oxide (also functions as antireflective coating), cadmium sulfide (n-type), cadmium telluride (p-type), back electrical contact, glass
 Promote mass production of CdTe cells within the US with financial incentives

ASSUMPTIONS AND LIMITATIONS:

- Continued exponential growth of solar manufacturing capacity (30%)
- Sales of solar cells produced in US only domestic
- Increasing tellurium costs don't discourage growth of CdTe companies
- Use of government subsidies to encourage growth of manufacturing & sales

consequences

Land displacement. Acquisition of land necessary for grid connected systems may displace homes or nature reserves.

Increased mining. Expanded needs of cadmium & tellurium may have negative impacts around areas of new mines.

Bankruptcy of other cell manufacturers. Growth of CdTe manufacturers might push manufacturers of other cell types out of the market.



OVER 3300 GW FROM SOLAR ENERGY IN 50 YEARS POSSIBLE

recommendations

Implement CdTe photovoltaics for use in grid connected systems

- Offer financial incentives for CdTe manufacturers & consumers
- Invest in the research & development of CdTe cells

The deployment of CdTe cells for grid systems can help solve the current US energy crisis!

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