

Local Solar Factories

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ABSTRACT

The economics of solar energy is improved if the solar panels are made locally. The paper discusses the issues in local manufacturing from local factories to local financing to local pride. Several alternative business models for local distribution of solar are presented.

INTRODUCTION

Solar panels today are dominated by the very low costs of Chinese photovoltaic (PV) panels. Chinese suppliers use a penetration pricing policy – initially price low to force out competitors – common among Eastern manufacturers. Western producers using a skim policy find it difficult to compete. They require a much higher margin to maintain the interest of their investors.

METHODOLOGY

How to break China's lock on the solar panel industry? One way is through the use of cooperatives that buy raw materials at low international rates and combine them into solar panels without the margin demanded by investors. Unfortunately, PV manufacturing is a capital intensive industry requiring expensive equipment to produce the PV wafers from which solar panels are made. The Chinese government has put billions into new wafer factories that currently operate slightly above costs to make a very low priced solar panel. Low cost panels are good for consumers, but not for the local community.

This paper investigates how Concentrated Photovoltaics (CPV) using low-cost reflectors (i.e., mirrors) can replace most of the PV wafers in a conventional solar panel. Thin film reflectors have been shown to have a 20 year lifetime and are cheaper and more durable than glass mirrors. Instead of requiring expensive PV wafer factories, solar panel manufacturing becomes similar to furniture making. The skills required to make a reflecting CPV solar panel are little different than those

of a cabinet shop worker. Tools are simpler too: saws, planers, bending brakes and drill presses. More important, local factories produce jobs. The skills needed require little training and are common in both developed and undeveloped countries. Local factories can make a reflecting CPV solar panel that creates local pride. The panel isn't made in a far away foreign land, it's made just down the street by workers you know. The factory jobs have a multiplying effect since the workers needed to install each panel far outnumber the workers that produce that same panel. Typically 3 installers are required for each factory worker.

Certainly the entire panel cannot be produced locally. Certain components, such as the absorber, cannot be made locally. But the absorber typically uses only 5% to 10% of the wafers required by conventional panels. Other components like the microcontrollers that drive tracking motors are often too complex for local production. However, the vast bulk of a reflecting panel can be made locally. In tests of such a concept, 70% to 75% of a mirrored solar panel could be produced with local labor.

Cooperatives can save even more money by allowing the locally made components to be purchased collectively. If several factories belong to a buying cooperative, they can buy raw materials for the panels at higher volumes than can any single factory. Higher volumes mean lower costs because suppliers can plan production for longer runs with fewer changes to the product mix that drives costs up. Moreover the components can be bought in international markets where competition is high giving the lowest prices.

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