The Influence of Rebates and Incentives on the Solar Industry; What Obstacles Remain for US National Adoption of Solar PV?

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ABSTRACT

In 2006, 1,744 megawatts of solar power was installed across the world. The United States, with plenty of sunlight and a high potential for solar energy, only contributed 140 MW or 8% of that total while Germany, with sun-hours that rival Anchorage, Alaska, installed 968 MW, leading the world in the amount of solar installed.

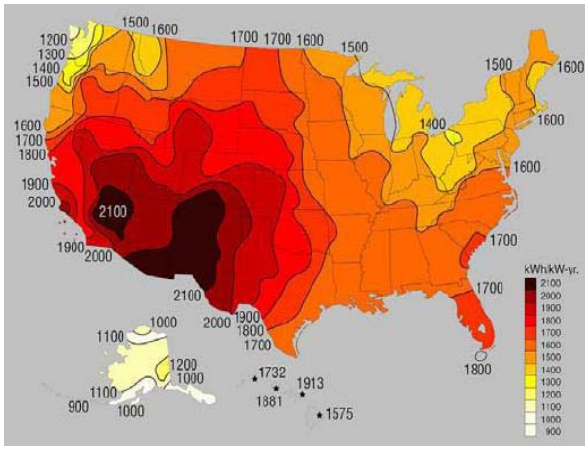
While Germany has a simple, national, and uniform incentive, the United States has more than 50 rebate and interconnection programs administered at the state and local level. These programs have large discrepancies in structure, funding, and success which impact the adoption of solar, or lack thereof, across state boundaries. Until the U.S. implements a national solar policy, it will not become a global leader in solar energy.

Keywords: solar energy, rebate structure, incentives, Germany

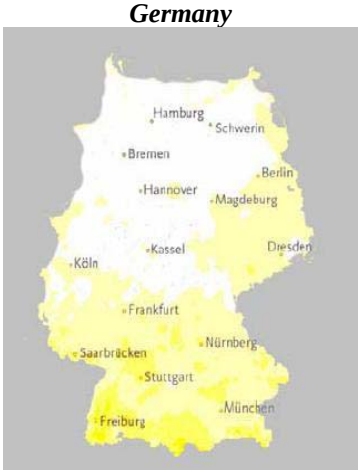
1 US POTENTIAL FOR SOLAR ENERGY

From the graphs below, it's readily apparent that the U.S. has greater potential for solar energy than Germany. Why has Germany installed more solar power if the United States has more readily available sun energy? The discrepancy is due to the number and design of available incentives in each country as well as their federal policies for renewable energy.

Amount of Sun Energy Available United States



Amount of Sun Energy Available Germany



2 US SOLAR INCENTIVES

In Germany and the U.S. alike, the adoption of solar power is not driven by the sun-hours but by the financial incentives. Because money drives the solar market, the only way to increase installations is by increasing the availability of funding for solar energy.

Only when these localized rebates are paired with the existing federal incentives does solar become a financially viable energy option. These rebates, when existent, differ in size, sustainability and funding source, drive the adoption of solar.

The United States has a very minimal national incentive for solar energy. The tax credits for both homeowners and business owners are set to expire this year. Alone, these federal tax credits are not enough to encourage homeowners and business owners to install panels.

For a business in Massachusetts, the state rebate and federal tax credit can refund two-thirds of the cost of the system. In states without a vibrant solar program, a business owner only will receive 30 percent of the cost of the system in the form of the Investment Tax Credit.

Homeowners in Massachusetts with a 5 kW solar system, valued at roughly $40,000, will receive from $10,000 to $25,000 in rebates, depending on their income and home value, from the Massachusetts Technology Collaborative. From the federal government, they receive a flat $2,000 regardless of system size. In states without a

rebate program, the $2,000 savings on a $40,000 system does not encourage homeowners to choose solar. A 5 kW system with just the $2,000 federal tax credit would have an approximate payback of 31 years, depending on the local utility rates.

Meanwhile, commercial and municipal rebates for solar electric systems in Massachusetts are capped at $1,000,000 per site making large scale projects (over 500 KW) financially difficult. Markets with larger caps on rebates and incentives allow for greater economy of scale and therefore a more economically viable solar market.

3 GERMAN SOLAR INCENTIVES

When comparing Germany to the United States, the power of federal support and financial incentives for solar becomes clear. The payback period for a solar installation is estimated at eight to nine years in Germany. German farmers have been significant adopters of solar power as they have discovered that the investment in panels on their barns brings a greater return to their bottom line than new farm equipment.

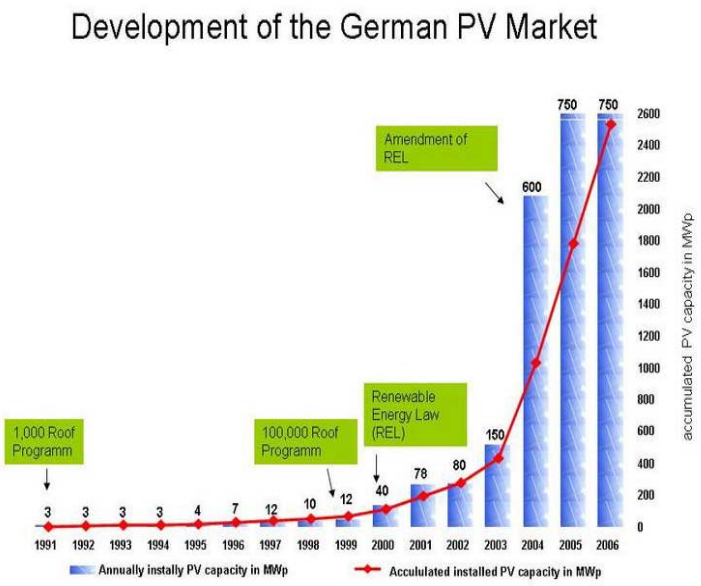
As mentioned, Germany's push toward solar energy started in 2000 with the passage of the Renewable Energies Act, committing Germany to doubling its percentage of its power generated by the sun. Germany implemented a "feed-in tariff," requiring the operators of electric grids to pay approximately 54-57 cents per kilowatt-hour for solar power – 30 cents above the price for traditional forms of electricity. This tariff is guaranteed through 2020 but must come down by 5 percent each year.

Because a feed-in tariff model is independent of the need for electric load, the German market has been successful in deploying solar where it is most productive rather than where electricity is needed most. Without the need for an individual facility's load, Germany has incentivized the best producing sites, which has resulted in greater kWh per KW production than programs that require power to be used onsite or sold back to the utility at retail or wholesale rates.

With the tariff, Germans who installed solar panels received a 15 to 20 percent return on equity, according to the Solar Energy Industries Association.

The results have been apparent. A rough calculation of solar installations in Germany for 2007 suggests that almost 1.1 GW of solar was installed last year. Also in 2007 53,000 jobs were created in the German solar industry, ranking solar alongside automobile and high-tech sectors in size and viability.

But it wasn't until the Renewable Energy Law (REL), was restructured, and a strong national incentive was created in 2000 that solar became a popular energy choice. From the chart below, there is a spike in the number of solar installations and cumulative PV capacity after the REL was created.



http://www.epia.org/index.php?id=86

4 INCENTIVES DRIVE INSTALLATIONS

When looking at the areas without incentive programs in the United States, the difference in solar installations becomes significant. By combining state level programs, there would be an opportunity for the United States to become a world-wide leader in solar energy. To do so, this would entail the creation of long-lasting, publically approved incentives. In some states, such as New Jersey, the incentives immediately increased the number of installations only to have the programs fall apart as the funding expired. Predictability is very important in the creation of a market that will encourage economic development in the renewable energy space. The adoption of a national solar incentive plan should be based on the successes of the long term California and German markets, with lessons from the fits and starts of New Jersey Program.

4.1 California Solar Market

California has lead the United States solar market since the adoption of a statewide program in 2001.. In 2001, the California Energy Commission increased the rebate for solar electric systems, and in 2002 a Renewable Portfolio Standard was established. The Renewable Portfolio Standard calls for retail sellers of electricity to have 20% of their retail sales coming from renewable energy resources by 2010. Both of these events brought about awareness for solar energy. As evidenced in the graph below, the number of installations increased dramatically. Then at the end of 2005, the California market changed with the "Million Solar Roofs" initiative, the California Solar Initiative, and a restructuring of the already existing programs. From the chart below, there is also an increase in installations after 2005, when the impact of the new incentive programs were implemented.

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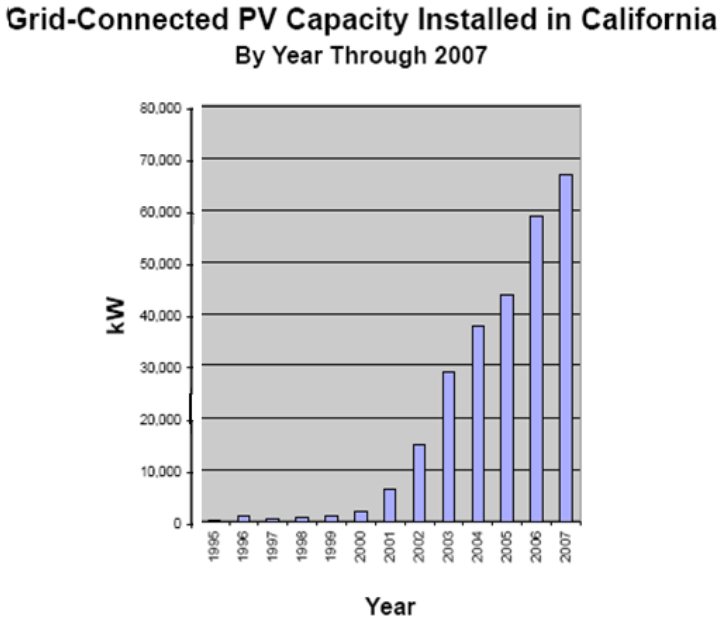
The increased incentives as well as consistent restructuring of the solar programs have proved to be successful in California.



4.2 Massachusetts Solar Market

In 2001, the Massachusetts Technology Collaborative decided to use $47 million from the Renewable Energy Trust to support loans and grants to promote green power. To date, the Renewable Energy Trust has awarded more than 750 projects, which total over $150million across Massachusetts. In 2007 the Governor of Massachusetts announced Commonwealth Solar, to promote solar energy in Massachusetts. Beginning in 2008, over $68 million is available for funding solar electric projects.

While this program is less generous per project than those of other states, it has provisions that keep funding predictable and consistent over the 4 year span of the program. Massachusetts also has a Renewable Portfolio Standard asking retail sellers of electricity to have 9% of their retail sales coming from renewable energy resources by 2009, increasing 1% each year thereafter. The Massachusetts governor, backed by the Renewable Portfolio Standard, plans to expand this program tenfold. The promise and plan to install 250 MW by 2017 in the Commonwealth of Massachusetts allows businesses to make a long term, and therefore more successful commitment to the solar industry in the Northeast.

5. CREATING A TRULY SUSTAINABLE, NATIONAL SOLAR INCENTIVE PROGRAM

Secured funding and sustainable initiatives have proven to be successful for driving solar power in the United States. There are opportunities for the federal government to borrow elements from the more successful state programs, to implement a larger plan to drive solar installations in the United States.

5.1 National Renewable Portfolio Standard

A Renewable Portfolio Standard (RPS) is a regulatory policy that requires the increased production of renewable energy sources such as wind, solar, biomass, and geothermal energies. Twenty-seven states currently have a Renewable Portfolio Standard that governs their adoption of renewable energy technologies. As various states have begun to shape their policies for the next decade, the inclusion of a carve-out for solar PV within the RPS has become more popular. States such as Arizona, with a 4% solar carve out by 2025, and Maryland, with a 2% solar carve out by 2022, have created an increased market for solar energy due to solar carve out requirements within their Renewable Portfolio Standards.

With a RPS that includes a solar carve out, the federal government could build a predictable, increasing solar market for the United States. This regulatory requirement creates an opportunity to drive the allocation of funding, which in turn will drive the business community to create a market for solar energy.

5.2 Sources of Funding

California's solar program allocated $3.2 billion over ten years. To create a 10-year solar incentive on par with that, the federal government would need approximately $30 billion. For comparison purposes, note that the Congressional Budget Office estimates the war in Iraq, to cost $9 billion per month.

There are a few mechanisms for collecting this funding. In most states, solar incentive program funding is currently collected as a tax on ratepayers' bills. This cost amounts to pennies per month for customers, yet accumulates to millions per year in state incentive programs. National adoption of the "renewable energy charges" on ratepayers' bills could be one solution for a necessary source of funding.

One only needs to look to the heavily subsidized oil and gas industries to find a source for renewable energy funding at the national level. There is ample money from the existing incentives for oil and gas. In February, Congress proposed rescinding $18 billion in tax breaks over ten years for the five largest oil companies and redirecting this money toward incentives for wind, solar and energy efficiency. In 2004, Congress classified oil companies as "manufacturers" and lowered their effective tax rate from 35 percent to 32 percent and lost $1.8 billion a year in tax revenue from these companies. As of March 2008, the White House had threatened to veto the measure. Should it pass at a future time, that $18 billion could also be a solution for necessary funding.

Beyond the aforementioned tax break, oil companies have received a break on paying royalties for oil and gas leases on federally-owned land, where about one-quarter of oil and gas production in the U.S. is derived. In June 2007, the royalty payments were raised from 12.5 percent to 16.7 percent for offshore drilling, allowing for the federal government to obtain another $4.5 billion over 20 years. But the increase did not affect any of the existing offshore leases nor correct a loophole in existing leases which allow oil companies to evade as much as $10 billion in royalties over the next five years.

By tightening up these leases and royalties, American energy incentives could be redirected to a national solar incentive program. The United States has also begun to discuss carbon taxes and cap-and-trade programs as an answer to pollution problems. Any one or all of these revenues could be directed specifically toward renewable energy incentives.

There exist ample opportunities within current frameworks and programs to fund a national solar incentive program that would rival that of Germany. With the correct structure and forward-thinking, the United States has the opportunity to overcome the barriers to accelerating the adoption of solar energy world-wide.

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