

## Long Term Value

What could be the long term value of a solar factory? How much could the owners of a factory hope to gain in 10 or 15 years? Consider energy sharing in a typical 3 kW residential installation using the U.S. average for energy costs and sunlight available. The system would have 8 modules.

The yearly energy income from the homeowner supplying both electricity and heat will be about \$1700. Giving the homeowner a 40% discount, the annual income to the factory will be about \$1000. The market price for such a system today is \$5 per peak Watt, giving a price for tax purposes of \$15,000. With a combined federal and state tax rebate of 40%, the factory can get \$6,000 of subsidies from this installation, paying for much of the materials cost.

For an energy share system, the value over its 20 year life is \$10,000, by taking the revenue stream from the system over the next 20 years.

Value  $\approx \frac{1}{2} \times 20 \text{ year life} \times \text{yearly energy income} = \frac{1}{2} \times 20 \text{ years} \times \$1000/\text{year} \approx \$10\text{K}$

Here the factor of  $\frac{1}{2}$  is due to Net Present Value of the income stream. The value of office buildings in a finance project is found in a similar way:

Building value  $\approx \frac{1}{2} \times 20 \text{ years} \times \text{yearly lease income}$ .

Once the income stream is proven – the customers pay their energy bills regularly – the system can be sold for its asset value of \$10,000. Since a factory can install 100 residential (house heating) systems a year, that's 1500 systems that it can install in 15 years. The asset value of those 1500 systems installed is:

15-year asset value  $\approx \$10\text{K} \times 1500 \text{ systems} = \$15 \text{ million value}$

Suppose the factory has 5 partners in its team, the five people who originally started the factory. With a total partner share of perhaps 35% of the factory, each partner is entitled to 7% of the assets:

Partner share  $\approx 7\% \text{ of } \$15 \text{ million} \approx \$1 \text{ million}$

Each partner could be a millionaire in 15 years by methodically installing 100 residential systems a year.

Alternatively, the factory could decide to keep the 1500 systems instead of cashing them out. The income from the 1500 systems would be:

Annual Income:  $\$1000/\text{year} \times 1500 \text{ systems} = \$1,500,000/\text{year}$

If the partners chose to give out that annual income as a dividend, each of the five general partners in the factory would get \$100,000 annually, enough to retire.

Dividends per general partner =  $7\% \text{ of } \$1,500,000/\text{year} \approx \$100,000/\text{year}$

But won't a factory run out of houses to solarize? Consider towns and small cities in America. They are mostly neglected by corporations and governments in favor of large cities and their votes. Yet each one town could potentially be the home of a solar factory.

The demographics are that there are 4,000 U.S. cities and towns with a population over 10,000. The U.S. Dept. of Energy (DOE) has found that a town of 10,000 people will have, on average, 3,000 homes.

$10,000 \text{ population} \times \text{house}/3 \text{ people} = 3,000 \text{ houses}$

They also found that the commercial/industrial roof area of any jurisdiction is about equal to its residential roof area.

Commercial/industrial roof area  $\approx$  3,000 houses

That means a city of 10,000 people with 3,000 homes will have an equivalent commercial/industrial roof area of an additional 3,000 homes. Altogether, our typical town would have 6,000 equivalent homes to solarize.

Equivalent houses = 3,000 houses + 3,000 com/ind = 6,000 equivalent houses

But only half of those homes are suitable for solar. Some have large roofs pointing north instead of south, some have home-owner associations that forbid solar panels on rooftops and some homeowners just don't want solar on their roofs no matter how good a deal it is. If only half the equivalent rooftops are potential sales, then the homes that could be solarized are:

$6,000 \text{ equivalent houses} \times 50\% = 3,000 \text{ equivalent houses}$

How long would it take the factory to solarize those 3,000 rooftops? The factory can solarize 100 systems a year. At that rate it will take:

Time to solarize a town =  $3,000 \text{ roofs} / (100 \text{ systems/year}) = 30 \text{ years operation}$

A solar factory isn't a short term job where you are hired one day a laid off 6 months later. These are long term jobs that will help your town.