



**Georgia**Institute  
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# Switching to Solar Power

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# Why switch to solar power?

- ▶ One of the most available form of renewable energy.
- ▶ Reduction of carbon emissions related to electricity generation.

Company	Average lbs CO <sub>2</sub> per kwh (1)
Dominion Resources	1.11
FPL Group	1.22
Exelon Corp	0.65
Duke Energy Corp	1.23
Southern Co	1.42
American Electric Power	1.63

Fig. 1: Market-leader emissions per kilowatt-hour[1]

- ▶ American household on average uses 12000 kWh electricity, equivalent to approx. 13000 lbs of carbon emissions[2].

# Why switch to solar power?

- ▶ Reduction of electricity bills, it pays for itself over years depending on the size of the system.
- ▶ Solar Investment Tax Credit(ITC) gives 30 percent tax credit for solar systems.
- ▶ Solar panels give houses aesthetic modern look



# Things to consider

- ▶ Pros and cons of financing and paying upfront.
- ▶ Geographic location as peak sun hour varies.

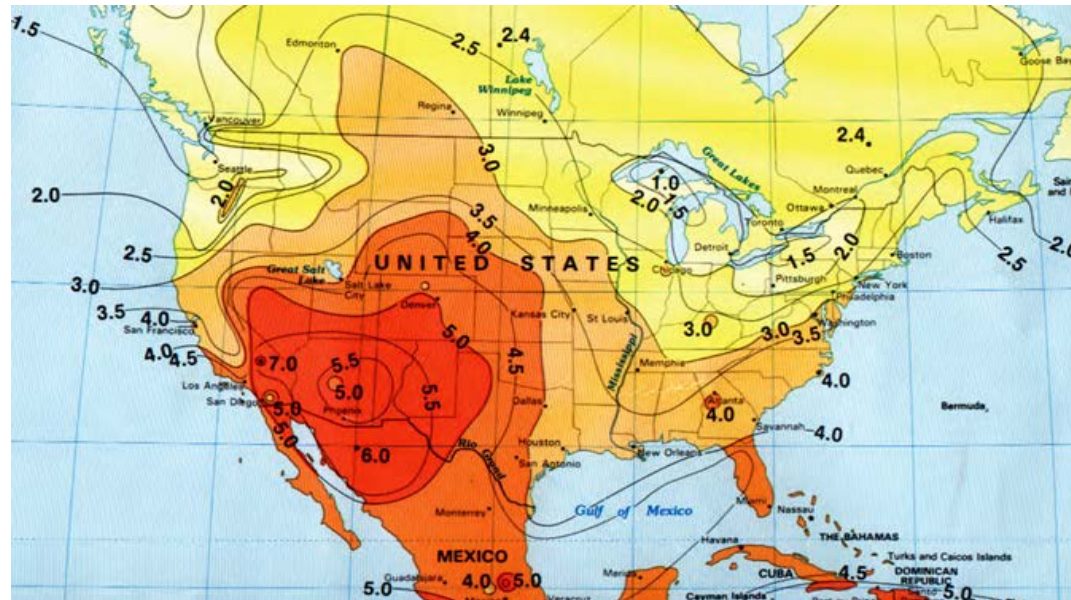


Fig. 2: Peak sun hour throughout the United States[3]

- ▶ Obstruction of light reaching to the panel.
- ▶ Grid-tied(e.g. 70-30 %) or Off-grid 100% power system.

# Things to consider

- ▶ Incentives from contractor, e.g. installation, warranty etc.
- ▶ Combination of panel amount and efficiency for producing enough power.
- ▶ Orientation and tilt of the panels.

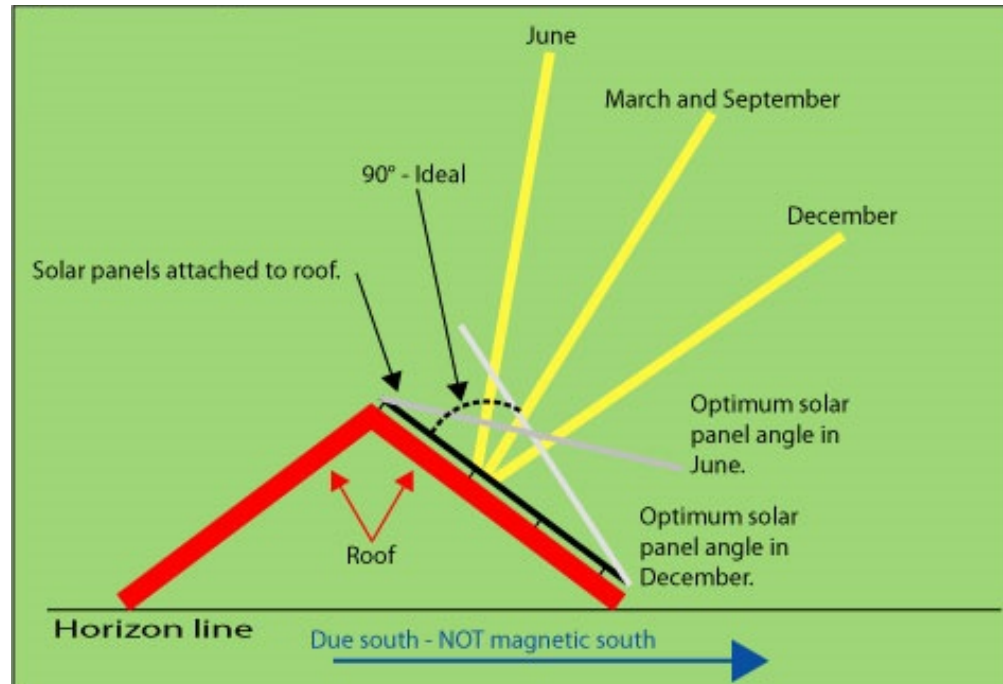


Fig. 3: Variation of panel tilting throughout the year[4, 5]

# An example of a transformation

## ► Specifications

- ❑ Power consumption: ~11000 kWh/year; ~950 kWh/month
- ❑ Current bills: ~\$110/month
- ❑ Roof view: Clear
- ❑ Peak sun hour: 5 hours
- ❑ Method: Grid-tied 70% solar – 30% grid
- ❑ Tilt angle varied based on seasons and location
- ❑ System: ~4500 W; 18 panels (Kyocera 260 W, 16% efficiency)
- ❑ Cost: ~\$22k. After incentive and tax credit net cost ~\$14k
- ❑ Payback period: ~15-16 years.

# Resources

- [1] <http://blueskymodel.org/kilowatt-hour>
- [2] [http://www.eia.gov/consumption/residential/reports/2009/state\\_briefs/pdf/ga.pdf](http://www.eia.gov/consumption/residential/reports/2009/state_briefs/pdf/ga.pdf)
- [3] <http://www.bluepacificsolar.com/solar-incentives/lowest-peak-sunhours.html>
- [4] [http://mymilescity.com/how-to-solar-power/tilting\\_solar\\_panels.html](http://mymilescity.com/how-to-solar-power/tilting_solar_panels.html)
- [5] <http://solarelectricityhandbook.com/solar-angle-calculator.html>
- [-] <http://www.energy.gov/>