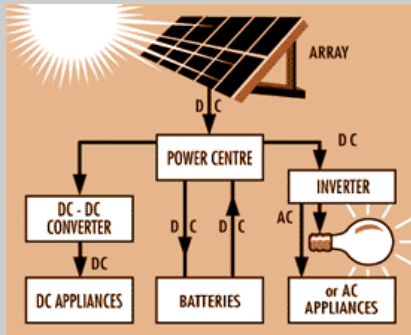


# Solar Energy



❖ For a system with enough solar panels to match a consumer's energy consumption, one should consider installing approximately 22 panels that occupy 300 ft<sup>2</sup>. The payback period on such a system is 20 years. The consumer will have a net profit of \$10,000 after a 30 year period of using a photovoltaic system.

❖ Nine quadrillion (9,000,000,000,000,000) kilowatts/hr. of solar energy fall on the continental United States.

❖ This is the equivalent energy available from 4.25 trillion barrels of oil.

❖ The utilization of less than .001% of this renewable resource would satisfy all our energy requirements.

❖ 350 square feet of solar panels can decrease greenhouse gas (CO<sub>2</sub>) emissions by 81 tons during a 25 year period.

PV Capacity Rating (Watts)

PV Module Efficiency (%)	100	250	500	1,000	2,000	4,000	10,000
4	<b>30</b>	<b>75</b>	<b>150</b>	<b>300</b>	<b>600</b>	<b>1,200</b>	<b>3,000</b>
8	<b>15</b>	<b>38</b>	<b>75</b>	<b>150</b>	<b>300</b>	<b>600</b>	<b>1,500</b>
12	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>	<b>200</b>	<b>400</b>	<b>1,000</b>
16	<b>8</b>	<b>20</b>	<b>40</b>	<b>80</b>	<b>160</b>	<b>320</b>	<b>800</b>
18	<b>6</b>	<b>15</b>	<b>30</b>	<b>60</b>	<b>120</b>	<b>240</b>	<b>600</b>

\*Square footage needed for paneling in bold.

# Consumer's Guide to Alternative Home Energy

## ABSTRACT

This consumer's guide gives the average American citizen knowledge and directions on how to power their household with alternative energy options. Research was done to find cost effective ways of installing a photovoltaic system and/or a micro wind turbine system. The payback periods were calculated of each system to give the consumer a realistic expectation of the long-term financial benefits of solar and wind energy. The values displayed in this guide are based off the residential information of Chatham, Massachusetts and the consumer can use our sources to determine statistics pertaining to their own home.

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## CONCLUSION

In conclusion, data pertaining to Chatham, Massachusetts was used in this guide to present the feasibility of integrating a micro wind turbine system or photovoltaic system into an average American household. This guide shows that in Chatham, a medium sized wind turbine (3kW) is the most cost effective micro wind turbine system in terms of a payback period (See graph). With one of the highest rated solar panel systems, the payback period is approximately 20 years. The consumer would be advised to install a medium sized wind turbine or enough solar panels, roughly 22 panels, to surpass their residential energy consumption bill. This decision helps the movement towards environmentally friendly energy and eventually allows for the individual to save money on their energy bills.

# Wind Energy

## Technology

- Two types of wind turbines, they both work in the same way.
  - Vertical axis micro wind turbines
  - Horizontal axis micro wind turbines

## Social

- Conflicts of interest are caused by wind turbines.
  - Good for environment
  - Takes away from aesthetics of a location

## Geographical/Topographical Location

- If wind is greater, energy production increases.
- Should be built so that the micro wind turbine is higher than obstructions or placed away from them.

Wind Turbine Payback Period

