

A Feasibility Analysis of Powering a Cohousing Community Using Solar and Wind Energy

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Abstract

A radical alternative to the current, fossil-fuel dependent, massive electricity grid is possible. This study explored ways to structure local community energy production to favor renewable energy sources and decentralized democratic control. Within the realm of new ideas about cluster housing and "smart" development, energy considerations are paramount. We found intentional communities (condensed neighborhoods planned by people who share similar values and goals) to be the most promising avenue for realizing the vision of self-sustainable residential power through feasible power production using solar and wind energy.

Problem

The problem with society today is we are dependent on fossil fuels. We use fossil fuels for everything; heating, electricity, and transportation. These fossil fuels are polluting and destroying our environment. We need to break form these habits and part of the solution are these communities we are proposing. However, a problem lies within these communities.

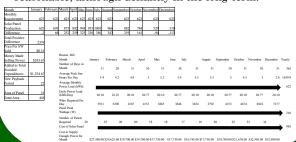
The problem is if a community was to produce a significant portion of its own energy, and that power production was spread unevenly between homes depending on the ideal conditions, it would be essential for all residents to be able to interact, cooperate, and make decisions as a whole in order for the community to successfully function. As individual homes are more isolated from the rest of their neighborhood communities today, it is crucial to find an innovative format for communities which will facilitate the necessary social interaction for the project to succeed.

Results

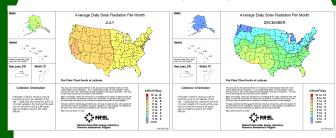
Wind: A 4kW to a 10kW wind turbine could power an average house consuming 800-2000kWh. Small wind turbines are also much cheaper than photovoltaic cell solar panels. A 400 watt turbine, costs \$699.00, which is less than double the price. However, the payback period is very hard to determine. It depends on the certain location and conditions encountered by the turbine.

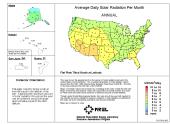
Intentional Community: Out of all the possibilities we have researched, we have found that cohousing is the best possibility for success. This conclusion is due to the fact that these communities have already provided successful environments for the necessary social interactions for this project to succeed, as the residents must all be able to agree upon all changes and decisions which are made within the community, and cooperate with one another in many aspects in order to keep it functioning. Thus we believe that cohousing communities would be the most efficient means of producing and consuming self generated energy in a social atmosphere.

Solar: A system in the Boston, MA area would consist of 28 panels, taking up a total of 448 square feet, and costing \$27,580. The system will meet the household's energy needs in January, but exceed them in every other month except November and December. Due to this, the house could sell its excess electricity to other houses in the area. At 10 cents a kWh, that amount would be \$244. That may seem small, but that coupled with the money the household won't be spending each yeah to purchase electricity leads to a payback period of 21 years. Considering the panels' warrantee of 20 years, and standard lifespan of 40, that payback period is reasonable, although defiantly in the long-term.



Results(cont.)





Conclusions

We have come to the conclusion that it is feasible to power a cohousing community in the Boston, MA area using solar and wind energy. The technology for both sources of power can produce enough power to power a house on its own. But a couple of months, the household will have to buy from the grid due to lack of sun or wind. However using both systems to produce energy, will produce enough power for a house or community year round with no need to buy from the grid at all. The combination of systems will have a payback period of between 15 and 40 years. This depends on the conditions of the location, size, government incentives, tax cuts, etc...

Acknowledgments

- •National Renewable Energy Laboratory Resource Assessment Program
- •Southwest Wind Power Air X