

POSTER PRESENTATION SUMMARY

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ACTIVE & PASSIVE SYSTEMS COMBINE IN ZERO NET ENERGY HOME

My poster describes the evolution of my own passive solar home built in 1984 into a zero net energy home in 2016. Originally constructed to reduce the space heating load in northern New Jersey with a two story sunspace and earth sheltering, we later added a solar water heater, mini ductless heat pumps, a 5 KW solar photovoltaic system (with central inverter), and finally a 4 KW solar PV system (with micro inverters) .

Along the way we created energy models of the home (originally using LCR & SLR, later Energy10, and finally BeOpt software) and found that the models generally predict more solar benefit than actually achieved, but they serve to encourage energy conservation which we monitored.

To help others achieve a renewable energy society, I'm please to share these lessons learned during the evolution of my home: earth sheltering and a two story sunspace definitely stabilize indoor temperatures year-round; PV systems with micro inverters are best for locations with some shading; a decentralized HVAC system using mini ductless heat pumps is extremely efficient; and it's best to over-size a PV system so excess power is available to use for future electric vehicles.