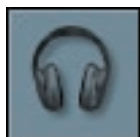
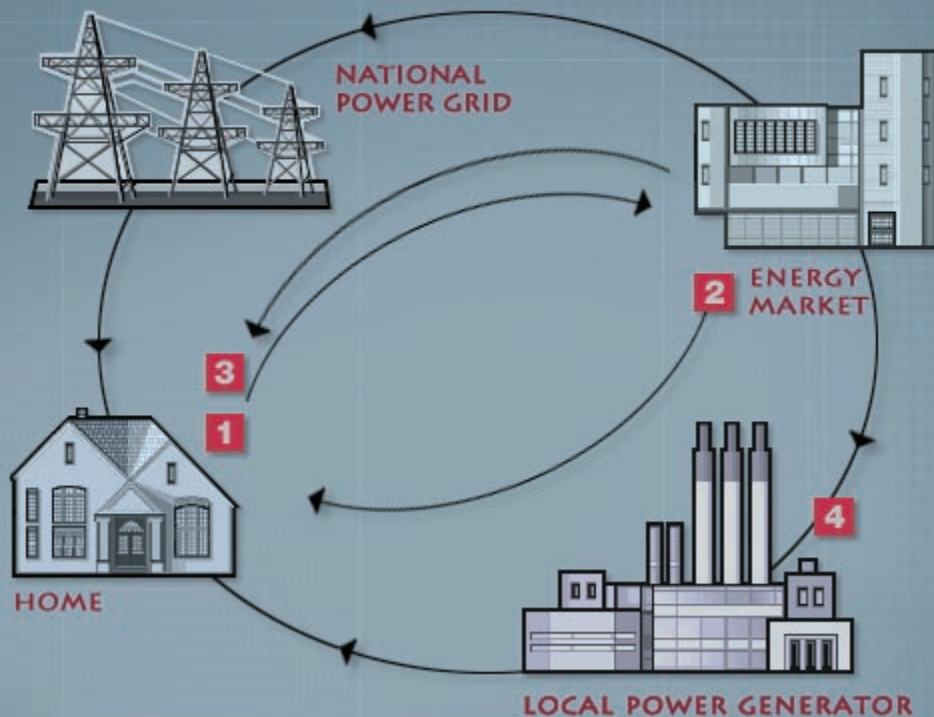


The Intelligent Utility Network



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Overview


Power miser or energy indulgent: what kind of energy consumer are you? This is just one of the insights some 120 volunteer homeowners are learning as they pilot a year-long GridWise™ project in the Pacific Northwest that monitors electricity usage based on real-time pricing rather than fixed rates. Here's how it works.

Participants decide how much they are willing to spend, and energy consumption adjusts as prices fluctuate. The potential benefits are enough to warm up anyone: energy savings of up to 25% per household, along with less stress on the grid-and therefore less danger of blackouts, such as the one that happened in the summer of 2003. It may also stave off building more power facilities in an environmentally sensitive region.


The U. S. Department of Energy is funding the project, which includes resources from its Pacific Northwest National Laboratory (PNNL). IBM and Invensys® are providing the technology.



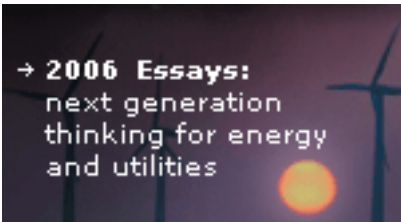
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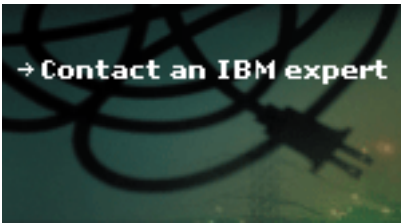
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1 The home: Some like it hot

First, the homeowner registers on a Web site and programs her appliances [hot water heater and thermostat] to optimize for comfort or cost. Each appliance wirelessly connects to an Invensys gateway box, which provides the raw data and control connections to IBM's middleware. The middleware then bids, on behalf of the house, into a local [shadow] energy market.

2 Don't like the price? Wait five minutes

The energy market receives real time data from a variety of sources: bids from participating households and businesses, a Dow Jones energy price feed and rates from generators. The data is sliced and diced: prices are analyzed, cleared and reset every five minutes.

3 Home again

The new electricity price is then interpreted by the IBM middleware, and control signals are sent back to the house where the appliances react, according to the parameters originally set. Cost-conscious consumers have heating and cooling switched off as prices spike, and turned back on again when prices fall. Adjustments only occur when needed, based on classic supply vs. demand behavior. The goal is that the system be invisible to the homeowner but responsive to market conditions. The homeowner can override the system at any time.

4 Buy local

Increasingly, regions are developing localized sources of power to ease the stress on the national grid. This GridWise pilot market includes a local "micro-turbine." As demand surges and prices climb, the micro-turbine kicks in, feeding electricity into the market, easing stress and lowering prices. Eventually, this intelligent network could handle many new sources of locally-generated power, from businesses to residential housing developments.

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