

'Smart' fridges stay cool by talking to each other

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CSIRO's Sam West demonstrating the workings of the interactive management screen on one of the demonstration 'smart fridges'

(PhysOrg.com) -- 'Smart' fridges that run on renewable electricity and are capable of negotiating the most energy efficient way to keep food cold have been developed by researchers from CSIRO's Energy Transformed Flagship.

CSIRO's Intelligent Energy team have developed a fridge capable of maintaining its average temperature while regulating its power consumption from renewable-energy generators, such as solar panels (photovoltaics) or wind turbines.

CSIRO Engineer, Sam West, says the smart fridges work as a network of distributed fridges, each fitted with control technology that allows them to communicate with each other via a network to share and store the energy provided by renewable-power generators.

“The fridges are designed to talk to each other, negotiating when it’s a good time to consume electricity and when it’s better not to,” Mr West says. “These scheduling decisions improve the quality of electricity produced by renewables and can help increase renewable uptake in the energy market.”

During the day, for example, supplies of electricity generated from photovoltaics can be interrupted by cloud cover resulting in periods of variable power supply.

“These fluctuations are bad for the electricity grid,” Mr West says. “Rapid variations in electricity flow can destabilise the grid and result in blackouts and other unwanted side-effects, but your fridge can help smooth out these fluctuations if it turns on and off at the right time.

“The fridges work together to decide when to cool down, and thus consume power, based on how much surplus power will be available. They are able to anticipate power shortages and change their running schedules accordingly to use as little power as possible during these times. In short, the fridges are working cooperatively to use the available power supply efficiently.”

The fridges can also be used to store energy.

“The surplus electricity produced by solar panels can be used to lower the fridge temperature a few degrees more than necessary to create a thermal energy store which will keep the fridge’s contents cold during the night,” Mr West says. “Another benefit is that by reducing the

amount of electricity required during peak-demand periods, we can avoid the need to build more network infrastructure such as new power stations.

“Using less electricity is always preferable to generating more and is the simplest way to reduce greenhouse gas emissions. Refrigeration can be very energy intensive but by harnessing renewable power this technology offers a low-emission solution to keeping food and other perishables cold.”

CSIRO is currently seeking commercial partners to further develop the technology.

Provided by CSIRO

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