



In the short term, reducing demand could be bad for the environment, but the long-term view is brighter. Gustavo Durán

Reducing peak demand: lowering prices, but what about emissions?

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The past year has seen several processes to reduce the price of electricity to consumers. Each has highlighted the importance of “demand management” - consumers reducing use at peak times to reduce the amount of new infrastructure. But no one has asked whether this will reduce emissions as well as prices.

Demand management can theoretically provide a range of environmental benefits. These include emissions reductions, lower urban air pollution, lower overall consumption, responsiveness to fluctuating supply, facilitating integration of intermittent renewable generation and electric vehicles, lower transmission losses and limiting the resources and land-clearing needed for infrastructure to meet peak demand.

But will it lower emissions? Given the National Electricity Objective, by which all National Electricity Market policy is measured, does not include environmental concerns, this has not been a question on policymakers' minds.

A [discussion paper](#) from the Total Environment Centre (TEC) suggests assessing the environmental effects of demand management is not as easy as it may seem.

In most countries, baseload power is provided by the cleanest generators. Only when demand is high are the older and less-efficient generators switched on. In this context, reducing demand at peak times can significantly reduce emissions by taking the dirtiest plants offline.

In Australia, we have the opposite situation: we get almost all of our baseload power from black and brown coal-fired generators. We only turn on the efficient gas-fired generators at times of high demand.

In this context, reducing peak demand may actually increase emissions by increasing the amount of demand met from dirty coal-fired generators.

One reason for this is the “rebound effect”: energy consumption foregone at peak times is subsequently made up by consumers following the peak. However, the effect overall does not appear to be significant - an analysis of two peak reduction programs in California found that only 22% of participants increased off-peak payback usage to offset peak reductions. In Australia any such shift from peak to baseload would mean some increase in emissions.

But research suggests there is also a “conservation effect”. This means consumers actually save energy as a result of demand management programs. These programs increase energy awareness and provide feedback for consumers on their usage behaviour, promoting more efficient consumption overall.

Also, there will be no need to make up some of the foregone usage. For example, an office that dims its lights will not need to be overlit later on. Likewise, an air conditioner which is cycled at a peak time won't be set higher later to ‘overcool’ a house.

One study assessed 100 dynamic-pricing programs. Results varied from a 5% increase in consumption to a 20% reduction. No clear variables correlated with the conservation effect, but combining different types of programs provided the best benefits.

Demand management programs can also help deploy more renewable energy. Renewables' intermittent nature can be balanced with demand management resources, which saves on building expensive gas-fired plants as back-up power. The International Energy Agency has recognised demand management as one of six areas of structural change that will directly benefit renewables.

So where does this leave the environment in the current push for demand management? In the short-term, we are likely to see some increase in emissions as peak demand is shifted away from our cleaner gas-fired power plants and down to our dirtier baseload coal plants. This will be mediated by some conservation, but initially this will likely be less than the rebound energy use.

In the medium-term, as consumer awareness and renewables grow, negative environmental impacts are likely to be neutralised.

It seems paradoxical that reducing consumption could increase emissions. Yet this is just one small curiosity in an energy market that is struggling to deal with the challenges presented by climate change.

It is feasible, and likely cost-effective, to introduce demand management initiatives that also benefit the environment, and we should be better integrating demand management policies with climate, renewables, energy efficiency and planning policies. Unfortunately, the current National Electricity Law and Rules do not support such a holistic perspective.

Reforms are needed at the highest level. The National Electricity Objective should be revamped to ensure that environmental issues are integrated into energy policy making.

In the long-term the environmental benefits are much clearer. Demand management will be an essential part of a well-balanced energy system, helping users to manage their usage, facilitating renewable energy deployment, and shifting usage away from gas-fired peaking plants to renewable sources.