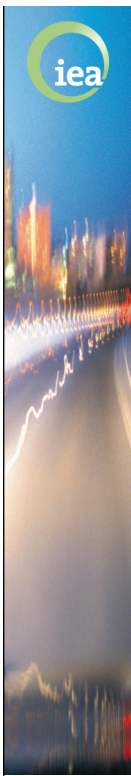


Educating in a hurry: the role of information campaigns in mitigating electricity shortfalls

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Agenda

- **What is an electricity shortfall?**
 - Recent examples
- **How can educating the public help mitigate an electricity shortfall?**
 - The role of information campaigns in emergency energy-saving programmes.
- **What works?**
 - Proven practice for emergency information campaigns.

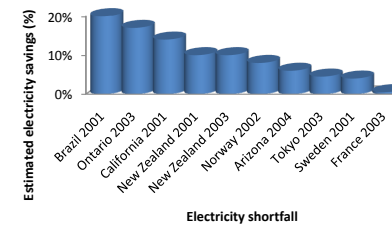
By the end of this session, you should have an idea of:



Saving electricity in a hurry 2005

- Programmes used a range of tools such as **rationing, price signals, technology replacement and information campaigns** to encourage energy savings. These tools stimulated and enabled consumers to quickly curb wasteful energy practices, delay certain activities to non-peak times and replace old technologies with more energy-efficient ones. Countries achieved energy savings ranging from **0.5% (France) to 20% (Brazil)** as a result of these energy-saving programmes (Figure 1).

Figure 1. Estimated savings achieved through emergency energy-saving programmes



Source: Adapted from IEA, 2005.



Electricity shortfalls

- Occur when demand outpaces electricity available to customers.
- Undermine economic activity and well being
- Can be minimised by implementing energy-saving strategies.
- Are a great opportunity to educate the public about energy.

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1) Electricity shortfalls (drought leaves hydro facility dry, political dispute disrupts gas imports, etc.) can be caused by shortages in energy supply for electricity generation and/or insufficient generation, transmission and distribution capacity.

2) The impact of an electricity shortfall on an economy can be high. Prolonged electricity shortfalls can reduce economic competitiveness by creating uncertainty in electricity supply and increasing electricity costs. The environmental impacts of a prolonged electricity shortfall can also be significant. Faced with mandatory rationing or indiscriminate blackouts caused by load shedding, consumers often invest in expensive on-site electricity generation produced by air-polluting fuels such as diesel (ESMAP, 2010).

3) IEA analysis shows that many of the negative impacts experienced as a result of an electricity shortfall can be avoided, or at least minimised, with the application of proven energy-saving strategies that are anchored on educating the public about energy use and conservation. In particular, educating the public in times of crisis can lead to big energy savings by encouraging people to quickly curb wasteful energy practices, delay certain activities to non-peak times and replace old technologies with more energy-efficient ones.



Recent electricity shortfalls

- **Japan (ongoing) tsunami/earthquake**
- **Alaska (2008) avalanche**
- **New Zealand (2008) drought**
- **South Africa (ongoing) lack of investment/plant failures**
- **Chile (2007/08) drought/fuel disruption/technical problems**

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Mention that educating the public has been a key strategy used for managing all of these shortfalls:

In Japan: An earthquake and tsunami struck Eastern Japan on 11 March 2011, forcing several large nuclear and thermal power stations out of service [now all of Japan's nuclear facilities are out of service for political reasons]. A team of policy makers and an advertising consultancy, led by ANRE/METI, was tasked with preparing a multi-dimensional energy-saving information campaign. Elements included displaying electricity forecasts on peak-power/supply-demand balances on web sites, in major train stations and on television; promoting casual and cooler clothing through the Super Coolbiz campaign; publicising electricity-saving tips; creating a power-saving contest in the residential sector; and offering rewards² to residential and commercial customers for meeting electricity -saving targets.

In 2008, an avalanche severed Juneau's transmission link to its hydroelectric power supply, prompting the utility to switch immediately to reserve diesel generators. Diesel fuel supplied almost all of the city's demand until the line was repaired six weeks later. Juneau's municipal government realised the only way to prevent skyrocketing electricity bills was to prompt consumers to cut consumption. The city led the way by switching off alternating streetlights, certain equipment and lights in public buildings. With the city's approval, the Juneau Economic Development Council (JEDC) organised a city-wide energy-saving campaign. The information campaign, called "Juneau Unplugged", provided end users with advice on how to quickly and safely conserve electricity. This mass-media campaign (using radio, newspaper and internet) was relatively inexpensive and easy to establish. The impact of the campaign exceeded expectations. Juneau's electricity consumption fell more than 40% in six weeks. Adoption of energy-saving practices accounted for most of the savings achieved. The crisis made it socially acceptable to reduce lighting and appliance use, turn down thermostats, hang clothes to dry and take shorter showers. Surveys show that 50% to 80% of residents took these actions.

NZ – New Zealand faced the risk of an electricity shortfall in 2008 as a result of a drought. An information campaign was launched and included advertisements in newspapers, television, radio, public transport and websites. Officials also established a dedicated website with news, feedback on consumption data, regional comparisons of savings and information on hydro lake levels and inflows.

South Africa - An acute electricity shortfall that first struck in January 2008 continues to affect South Africa. The shortfall was brought on by insufficient generation supply relative to growing demand, maintenance closures and unplanned generator outages. One such tool is a "Power Alert" message, displayed at 30-minute intervals on the internet and on television between 17:30 and 20:30, which provides real-time information on the electricity shortfall. The 49 Million Initiative (launched in March 2011 by Eskom, the government and business partners) is another information campaign targeting the residential and commercial sectors. This initiative seeks to encourage 49 million South Africans to embrace energy savings as part of their national identity and culture. The campaign mobilises businesses and media to disseminate key messages such as "switch it off". To spread energy-saving messages in areas without televisions, South Africa implemented innovative information campaigns in the form of road shows and demonstration projects. In the residential sector, the government and Eskom are also implementing programmes to provide residents with technologies for efficient lighting, solar water heating, installation of aerated shower heads and geyser blankets.

In 2007/08, Chile experienced an electricity shortfall brought on by a drought, interrupted gas imports from Argentina and technical problems arising from fuel switching in thermal power stations. Chile was able to avoid electricity interruptions by implementing a package of measures within the framework of the National Energy Efficiency Programme (*Programa País Eficiencia Energética* or PPEE), including public information campaigns and a programme to distribute CFLs.



Recent electricity shortfalls

Table 1. The role of energy-saving programmes in recent electricity shortfalls

	Japan 2011	Juneau, Alaska 2008	New Zealand 2008	South Africa 2008/09	Chile 2007/08
Decrease in electricity consumption (%)	15% for most sectors during summer peak period	25% to 40% across all sectors	3.6% to 6.7% in the residential sector	20%, primarily for industry	No electricity demand growth despite GDP growth
Approximate duration	Since March 2011	6 weeks	June-July 2008	January 2008-end 2009	Several months
Increase prices		X	X	X	X
Request changes in behaviour	X	X	X	X	X
Technology replacements	X	X (CFLs only)	X	X	X
Rationing	X	X		X	X
Fuel switching		X	X	X	
Daylight-saving time					X

Japan 2011

- **Challenge: lack of sector and end-use specific load data**
- **Targets of 15% energy savings for most sectors**
- **Mandatory rationing for large industry, information campaigns, technical energy savings assistance**
- **Many businesses and industry shifted their working hours and week to achieve savings**
- **Issues: Japan already very energy efficient, need regulation to ensure 15% savings, regional governors refuse to keep nuclear inline**

Japan 2011

■ Setsuden mass media power saving campaign



Household Power Saving Menu Agency of Natural Resources & Energy
Check the actions below and prepare measures of your household.

Suggested Menu for Household Power Saving Actions	Power Saving Effect		Check
	Reduction Rate	Power Reduction	
A/C			
① Set room temperature at 28°C.	10%	130W	<input type="checkbox"/>
② Use "sudare" or "yoshizu" (Japanese shades made of rattan and reed) to decrease sun exposure.	10%	120W	<input type="checkbox"/>
③ Turn off A/C and use electric fan.	50%	600W	<input type="checkbox"/>
Refrigerator			
④ Change the refrigerator temperature setting from powerful to medium, minimise opening doors and limit amount of food kept inside.	2%	25W	<input type="checkbox"/>
Lighting			
⑤ Turn off lights during the day and reduce lighting in the evening.	5%	60W	<input type="checkbox"/>
T.V.			
⑥ Use energy savings mode, decrease brightness, and switch off when not in use.	2%	25W	<input type="checkbox"/>
Toilet heater /water shower			
⑦ Switch off seat-heating & hot-water functions.	Reduction by either one of the two		<input type="checkbox"/>
	>1%	5W	
Rice cooker /air			
⑧ Cook rice for the day and store it in the refrigerator rather than keeping it warm in the rice cooker.	2%	25W	<input type="checkbox"/>
Standby Power			
⑨ Unplug unused appliances.	2%	25W	<input type="checkbox"/>

Apply ①②③&④ measures even when you are away from home.
Save power by more than 15% (sum of power reductions) % W

! Beware of heat stroke. Save power with flexibility and comfort.

※Numbers listed for power saving effect are estimated as reduced power consumption and their % changes from the average-daytime power consumption of about 1200W at 14:00 when family member(s) is(are) at home (ANRE estimation).



Juneau, Alaska 2008



- **Avalanche cut hydro supply**
- **'Juneau Unplugged' city led by example**
- **Mass media campaign**
- **40% savings in 6 weeks**
- **25–30% reduction a year after event**
- **largely energy savings, not EE appliances**
- **No price signals**
- **50–80% of hh participated**



New Zealand 2008

- Drought causing hydro shortfalls
- Short-term mass media campaign to generate energy savings in the commercial and residential sector after price signals failed to reduce industrial sector usage
- 3.6–6.8% savings but only short-term
- Worries that short-term campaigns cause consumer fatigue and resentment, Electricity Authority working on compensating consumers in future shortfalls



South Africa 2008/09

- Supply failed to meet growing demand
- Power rationing across the economy, but especially industry
- Compulsory 10% savings programme in large industry (cf 2006 baseline)
- 'Power alert' message every 30mins between 17.30 – 20.30 on TV & web (500MW reduction if brown-out alert)
- '49 million initiative'
- Road shows and information for households without TV





Chile 2007/08

- Drought and interrupted gas supply from Argentina
- Public information campaigns, distributed CFLs, long-term financing for energy-efficiency investments, rationing, extended daylight-saving time and financial incentives for conservation. On the supply side, officials installed back-up turbines and engines, and converted combined-cycle gas turbines (CCGTs) to allow operation with diesel.
- Pricing played a central role in combating the crisis
- Demand kept flat, economy grew 3.2%



Electricity shortfalls: an opportunity to educate the public about energy

1. How is electricity generated?
2. What are energy service needs for different groups?
3. What tools can be used to temporarily/ permanently change energy service needs?

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These are some key questions that can be answered in different education campaigns.



3 steps for officials to mitigate electricity shortfalls

- Step 1** Analyse the **cause and duration** of an electricity shortfall before designing an energy-saving programme. Each electricity shortfall has a different character, and not all energy-saving measures are appropriate for every crisis.
- Step 2** Identify **opportunities for energy savings**, including the sectors and end-users from which energy savings can be captured at the least economic, social and political cost.
- Step 3** Implement a **comprehensive and balanced package** of energy-saving demand-side tools. These tools can include rationing, price signals, information campaigns, technology replacement and market mechanisms.

Constraint type	Definition	Causes
Energy	Demand exceeds energy input available for electricity generation.	Hydro power drops due to drought Fuel or supply disruption
Capacity	Functioning infrastructure is insufficient to meet demand during peak hours.	Plant breakdown. Loss of transmission or distribution capacity. Growth in peak demand outstrips capacity.



Table 4. Demand-side tools for managing electricity shortfalls

Measure	Description	Prerequisites
<i>Price signals</i>		
Industrial tariffs	Signal crisis intensity through prices.	Ability to adjust prices and advanced billing systems and metering.
Residential tariffs	Signal scarcity to residential users through prices.	Ability to adjust prices, data on residential price elasticity, political will, time of use (TOU) pricing, smart meters.
<i>Behaviour change</i>		
Information campaigns	Raise public awareness, advocate voluntary energy-saving measures.	Ability to select/coordinate media and messages.
<i>Technology replacement</i>		
Lighting replacement	Replace less efficient bulbs with more efficient ones (CFLs, LEDs, traffic lights, street lights, etc.).	Requires a promotion capability, financing scheme, distribution channels and a mechanism for disposing of old bulbs.
Appliance and equipment replacement	Replace targeted inefficient appliances and equipment.	Requires a promotion capability financing scheme, distribution channels and a mechanism for disposing of scrapped appliances.
<i>Rationing</i>		
Voluntary rationing	Request voluntary reductions in electricity use.	Requires analysis to set reasonable reductions by customer type commensurate with economic impact.
Compulsory rationing	Mandate restricted electricity use.	Requires analysis to set reasonable reductions commensurate with economic impact, social safety nets and penalties for non-compliance.
Load shedding	Engineered electrical power outage.	Easy to implement but can cause large and unpredictable economic losses, considered a rationing tool of last resort.
Load control	TOU or dispatched current limiters or appliance control.	Need to identify end-uses to control, feasible control algorithms and compensation.
<i>Market mechanisms</i>		
Bilateral trading of power quotas	Large energy users are afforded an opportunity to trade load reductions between themselves.	Requires contractual mechanisms, a third party referee, a basis for verification, and compensation.
Secondary markets	Over the counter or other mechanism for trading load reductions among multiple end-users.	Requires creation of a trading desk or OTC mechanisms, contracts, third party arbiter, and a basis for verification.

Source: Adapted from ESMAP, 2010.

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Information campaigns: the key to successfully implementing energy-savings tools

- **Price signals**
- **Technology replacement**
- **Rationing and market mechanisms**

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These demand-side tools complement one another and are often used simultaneously to mitigate electricity shortfalls.

Rationing, for example, is often implemented in conjunction with price signals.

Information campaigns often reinforce technology replacement programmes.

The mix of measures put in place depends on the shortfall context and opportunities for energy savings.



Proven–practice information campaigns

- Analyse the determinants of desired behaviour change
- Identify the target group
- Choose the most effective communications channels
- Convey urgency while keeping an upbeat tone

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Information campaigns are very effective at stimulating energy-saving behaviour.

They can be designed and launched quickly, and impact large number of consumers by reinforcing messages via multiple media (e.g. television, radio, newspapers, road shows and the internet).

- 1) Campaigns must motivate and enable changes by improving awareness, creating understanding of the issues, and changing social norms and attitudes.
- 2) Officials should identify the group that they wish to target with the information campaign (Kyung-Hee, 2007). The target audience can be anyone from school children (in Chile) to professionals in the industrial or commercial sectors (South Africa). Many aspects of the information campaign will depend on the target group, including the message(s) and the channel(s) used to communicate.
- 3) Traditional mass media, including televisions, are still the most commonly used communication channels for energy-saving information campaigns. Some developing countries, such as South Africa, have implemented road shows and demonstration projects to spread messages in areas without televisions.
- 4) Several studies advocate that campaigns convey saving energy as “fun and feasible” rather than as “onerous tasks of self-deprivation” .



Key lessons from educating the public in crises situations

- Don't kill the messenger
- Keep the population informed, the end is in sight
- Short-term crises can lead to long-term savings
- Experiencing multiple shortfalls may lead to faster reductions or crisis fatigue
- The threat of higher prices may be as effective as actual price increases



Questions

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