

Saving Electricity in a Hurry– Global Experience Using Energy Efficiency To Mitigate Supply-Demand Gaps

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A Special Kind of Crisis

- A temporary shortfall in electricity supplies
 - Usually days to months
 - Typically caused by a *combination* of technical and social problems
- Not enough time to bring replacement equipment or finish repairs
- The grid is intact, so delivery of power to customers is not a problem
 - Chronic electricity shortages and rapid long-term growth are related problems
- The goal is to avoid blackouts and allow near-normal economic activities

Technical Failures Take Time to Repair

Replacement Transformer for Westwing



This replacement transformer was moved 2000 km!

What Causes the Crisis?

Droughts, Malfunctions, Planning Failures, Market Manipulation, Floods, Regulatory Failures

- A drought in Brazil
- Flawed deregulation in California
- Tsunami in Japan
- Safety flaws in Japan
- Transformer explosion in Arizona
- Refinery explosion in Australia
- Avalanche in Alaska
- Cold waves in Sweden, Norway, Korea
- Heat wave in Europe, United States, France
- Unexpected increase in demand from economic development in South Africa, Korea

Strategies to Balance the Grid

1. Rolling blackouts
2. Raise the price of electricity
3. Ration electricity
4. Reduce demand quickly through voluntary measures

Blackouts are the Worst Possible Strategy to Balance Supply & Demand

Some blackouts may be needed in the beginning if the crisis is unexpected but prolonged blackouts are bad because they:

- Have high costs to business
- Endanger health and safety
- Undermine public confidence and morale
- Lead to extra costs to economy

Why Not Just Raise the Price of Electricity to Reduce Demand?

- The problem may be peak demand, not electricity consumption
- Technical obstacles to changing price
 - Impossible to quickly change billing procedures
 - No smart meters
 - How long will it take before consumers are aware of the higher prices?
- Political obstacles
 - People distrust politicians, utilities
 - Who should pay the higher prices?
 - Is there really a shortage?

As a result , higher prices play a small role in most programs to quickly reduce electricity use.

Ration Electricity

Options include:

- 15% less than last year
- Consumers must use less than XXX kWh/month
- An alternative to raising electricity prices
- Different strategies for domestic, commercial and industrial customers

Rationing is difficult to implement and unfair to some groups, but it gives everybody a goal and spreads responsibility among all users

Voluntary Measures to Conserve

Changes in behavior can happen very quickly (within hours) and lead to rapid reductions in demand. Steps to conserve:

1. Convince the public that a crisis exists
2. Explain to the public how their actions can help solve the problem and what actions to undertake
3. Provide incentives, feedback and encouragement
 - Effective programs are expensive

**If you're not
using it,
switch it off.**

Difficult eh?

Switching the power shortage isn't rocket science. Many households could go a long way to saving 10% just by switching appliances like washing machines off at the wall when not in use. Call 0800 55 00 55 or visit www.target10.co.nz

T A R G E T 1 0 %

**If you sing
in the shower,
choose
shorter songs.**

Water heating can amount to almost half the power usage of an average home, so having shorter showers will save you heaps of power. Call 0800 55 00 55 or visit www.target10.co.nz

T A R G E T 1 0 %

**Used 4 hours a week.
On 24 hours a day?**



If an appliance isn't off on the wall, it's still using power. Stop the waste by switching it off at the wall. Call 0800 55 00 55 or visit www.target10.co.nz

T A R G E T 1 0 %

Advertisements from
New Zealand using
humor to communicate
message

Voluntary Measures

- Use **mass** media
 - Generation of electricity is a highly centralized activity but **the consumption of electricity is highly dispersed and diffuse.**
Mass media is the only way to influence consumption quickly
 - TV, newspapers, radio, websites
- Use **social** media to target special user groups
 - Facebook, social media, websites
- Make saving electricity fashionable (popular)
 - Use television stars, actors to deliver message
 - Use humor to encourage behavior change
 - Start contests, competitions
- Pay for savings with incentives, rewards, prizes

Never Waste a Crisis!

Prepare to save electricity gradually

- Improve electricity pricing and feedback
 - Adjust tariffs to reflect cost of supply
 - Install smart meters
 - Organize “Demand Response” for large customers
- Introduce new energy-efficient technologies
 - Minimum efficiency standards (MEPS) & accelerated appliance replacement
 - Fuel switching
- Encourage consumers to maintain their energy-saving behaviors

Real-Time Display of Supply & Demand

きょうの需給状況

2012年2月22日(水)

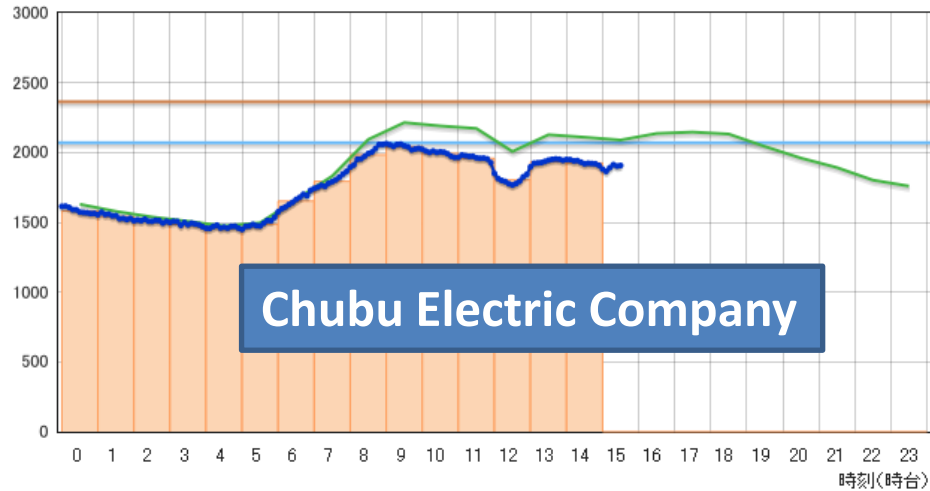
電力需要は、平日、土曜、休日毎に類似気象日にはほぼ同様な傾向となりますので、本日の節電の目安としてご活用ください。

電力需要・供給力
(万kW)

前週同曜日実績表示

前日実績表示

両実績表示

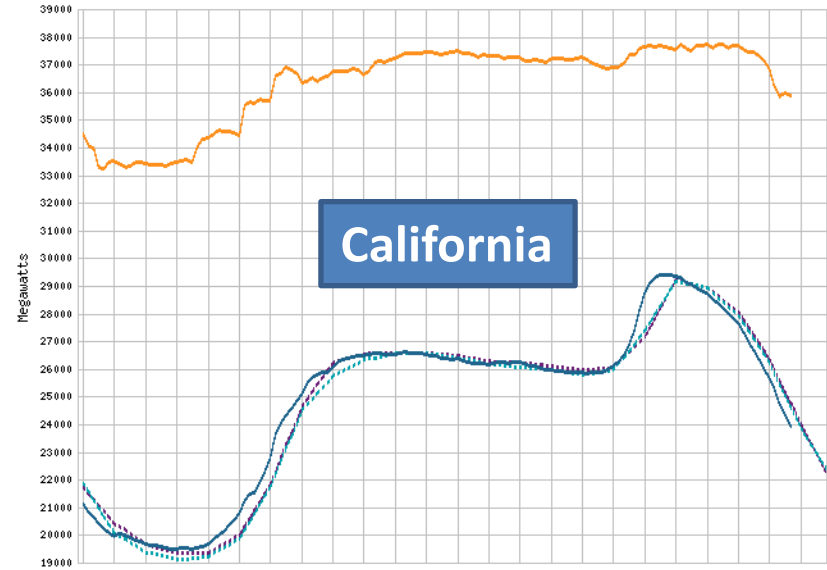


ピーク時供給力

予想最大電力

当日実績 (瞬時値)

Today's Outlook



2012.02.22 오후 03:35

실시간 전력 사용 상황실

소비전력 상황실

실시간 예비전력 (만 kW) 5분마다 갱신됩니다. 날 10시 수요예측 6,930 운영예비력



현재 운영 예비율 **18** %

현재 운영 예비력 1,141 만 kW

현재 전력 부하 6,456 만 kW

Korea



날씨예보 (시정·도청기준)

서울

날짜 02/22 02/22 02/22 02/23 02/23 02/23 02/23 02/23 02/23 02/23 02/23 02/24
시간 15:44 17:18 19:38 21:35 03:35 09:35 15:35 현재

End – Thank You

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extra slides follow ...

We Can't Confidently Answer These Questions

- How much can be saved?
 - 1 – 30%
- How long will the savings persist?
- What happens if there is a second crisis?

Examples Of Special Actions

- Real-time display of electricity use (California)
- Re-scheduling baseball championship to an off-peak time (Japan)
- Funny advertisements to encourage conservation (New Zealand, California)
- Changes in clothing requirements (Japan and Chile)
- Symbolic actions (Japan, Brazil)
- Competitions between cities (Brazil)
- Shutdown of aluminum production (Norway, Brazil, NZ, USA)

Also Available

- Videos from Norway, New Zealand, California
- Real-time displays of grid status from Japanese utilities, California, Korea, etc.
- Case studies:
 - Juneau's loss of transmission line
 - Arizona's loss of transformer, transmission lines
 - California
 - Scandinavia's 2003 drought and cold wave

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