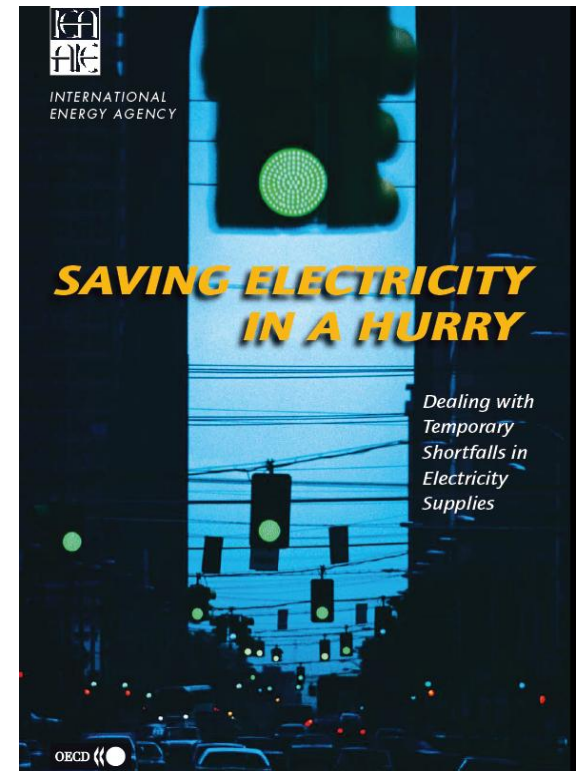
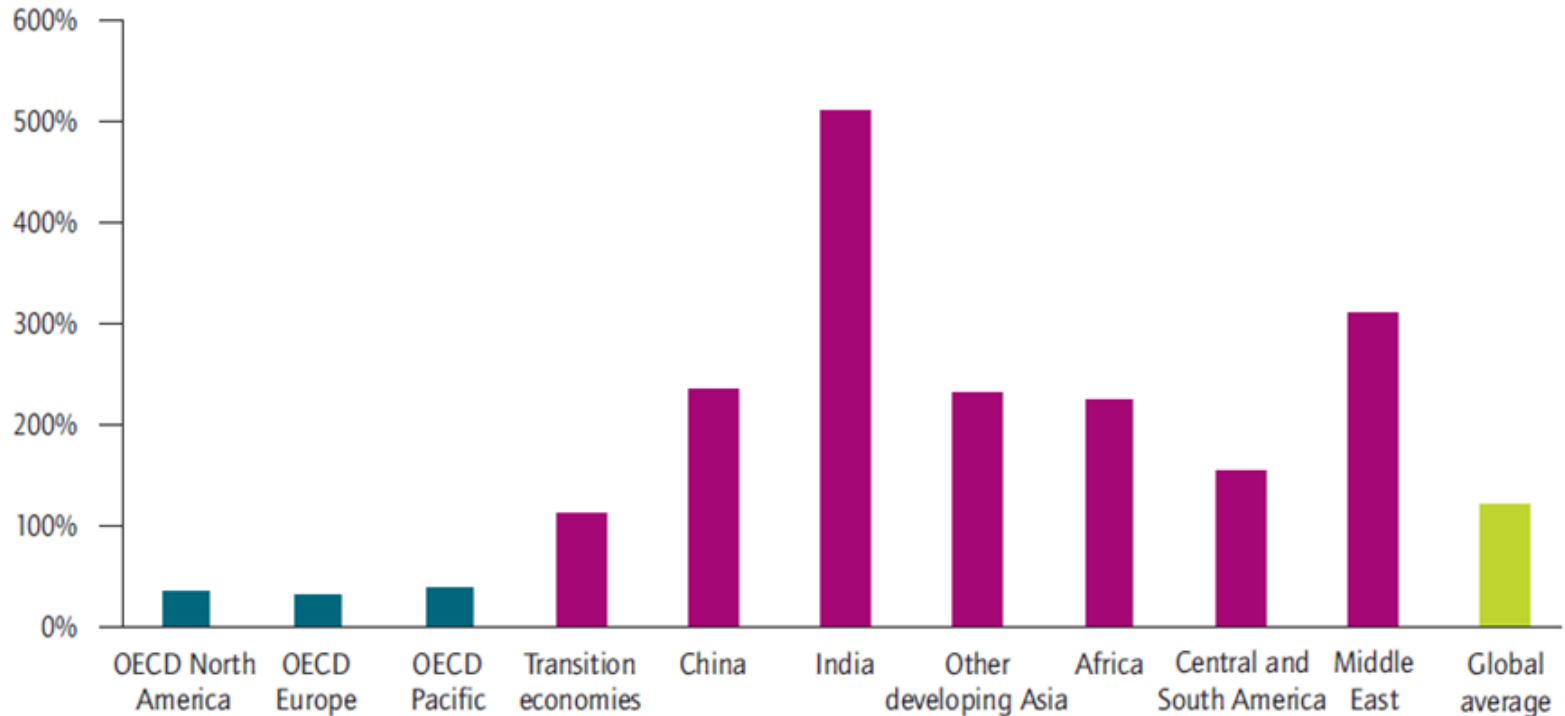


The original *Saving Electricity in a Hurry* 2005

- Based on a workshop and research conducted by the IEA
- Described the increasingly-common problem of temporary but serious shortfalls in electricity supply
- Key examples:
 - 2001 Brazil power crisis
 - California's 2001 power crisis
 - Europe's Hot Summer 2003
 - New Zealand's double drought
 - Norway's 2003 dry, cold winter
 - TEPCO's 2003 Nuclear Plant Shut Down
- Highlighted proven coping strategies that relied on quick action by consumers



Accommodating electricity demand growth is a challenge around the globe



- Electricity demand growth is accelerating
- Governments hard-pressed to finance new supply
- Siting and technology choices are sensitive

**Saving Electricity in a Hurry
in New Zealand**

**SERC / IEA Workshop
Saving Electricity in a Hurry**

23 February 2012 Beijing

Robert Tromop IEA



International
Energy Agency

What's the problem?

- **NZ electricity system is 70% hydro with limited (40 day) river system storage and considerable inertia in annual snow melt.**
- **Hydrological inflows fluctuate significantly with the pacific ocean weather patterns:**
 - **Southern Pacific Oscillation, 10 year cycle**
 - **La Nina - El Nino, 3 year cycles**
 - **Chaotic as well as complex**
- **Some transmission constraints: 11000km, 178 GXP system, 350Vdc 700MVA link from lakes in South to load centers in North.**
- **Sometimes things go wrong**

Large industrial customers

- **Pricing: industrial users carry both hedge and spot contracts according to load type and are incentivised to respond.**
- **Get half hourly spot price signals that they analyse against prevailing business environment and make operational decisions in short run;**
 - Reduce / alternate output
 - Shed load
 - Use alternative generation, fuel switching...
- **In the long run;**
 - Energy efficiency decisions, alternative energy sources, plant upgrades, etc

What about residential and small commercial consumers?

- **Sect 42 of the Electricity Act requires:**
- **Pricing; Customer Compensation Scheme (March 2011)**
- **Households get NZD10.50 per week during a Public Conservation Campaign (PCC)**
- **Based on estimated value of consumer conservation.**
- **PCC initiated by System Operator (Transpower) when risk is >10% for more than 1 week.**

What are the smart network companies doing? Orion Networks NZ

- 20+ years of effective demand response pricing, avoiding investment in new transmission.
- Pricing; Major customers face control period demand prices for 80-100 hrs during three winter months
- Developed EE, LPG, and tech solutions
- Lowest cost provider of network services in NZ
 - Asset Management Plan
 - Network Quality Report
 - Load Management Dashboard
- www.Orion.co.nz/load_management

Electricity Efficiency Programmes supplement market policies

- Lighting – residential and commercial
- Electric motors and drives
- Heated towel rails
- Compressed air
- Funded by levy on all electricity sales
- \$11M/yr scheme funds projects with c/kWh saved costs below LRMC of generation
- www.eeca.govt.nz

System Management

- **System Operator, Emergency Management Policy**
www.systemoperator.co.nz
- **Managing Security of supply risks 2011**
- **Stress test regime 2011**
- **Review of 2008 Winter**
- **Buy-back consultation document 2008**
- **Annual Security Assessment 2007**
- **2007 Reserves Assessment**
- **Proposal for rolling outage regulations and planning 2006**
- **Security of Supply Policy Development 2004**
all at www.ea.govt.nz/search

Key Features

- Key players in the market (the regulator, generators, transmission, distribution, retailers and large users) all have response plans and strategies in place before the event;
- A clear understanding of “when is this a problem”, the emergency zone definitions provided real clarity that all can understand;
- A market which enable rational responses from users by sending “appropriate” price signals
- Information which enables robust decisions including hydro reserve and output data for all to understand;
- Consultation and co-operation between government, regulator, suppliers and users enabled industry led initiatives.

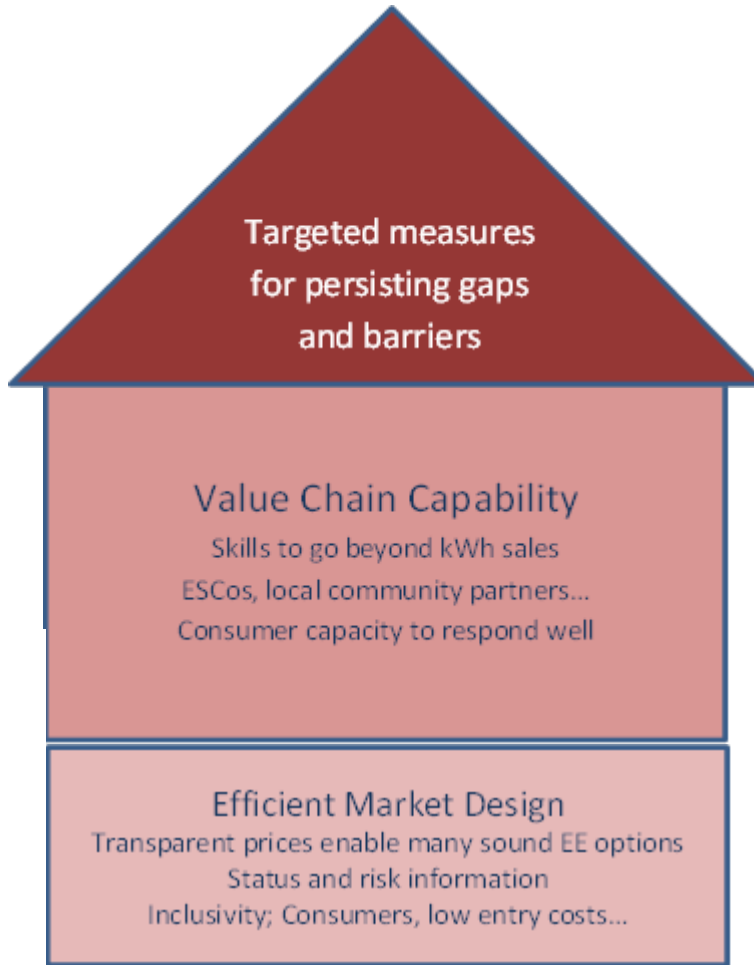
So what have we learned on the way?

- When you identify that you have a supply problem – its too late; *ad hoc responses are more disruptive and ineffective than necessary*
- Setting up the electricity system to reflect supply risks by information and price is key to stimulating efficient innovative responses and rewarding economically efficient demand responses
- If you accept that ‘things can go wrong’ and have dynamic market signals; *supply and demand side players innovate a range of cost effective and more durable options*
- *Increased responsiveness supports other policies; minimum prices, increasing renewables, ETS*
- *Need to continue learning, reviewing, reporting.*

Concept Model for Effective Security and Energy Efficiency in Electricity Systems

Grants
Obligations
Programmes
Certificates
Tax policy
Regulations...

Market rules
Disclosure
information
Obligations
Tariffs....



Electricity efficiency projects; motors, comp air, lighting...

Escos, Best practice programmes, Training,

System risk analysis
Options analysis
System operator response rules
Information for all

Summing up....

- **Successive dry year crises have compelled government to ensure that:**
 - **the NZ electricity market is set up to send clear price signals and system information to reflect supply risk**
 - **Market participants are enabled to manage this risk and develop many innovative responses**
 - **Consumers can receive market intelligence as well as spot price signals to encourage timely action**
 - **Everyone, including consumers, learns to weigh up costs and benefits of a range of cost effective load shedding, EE, and alternative supply options**