

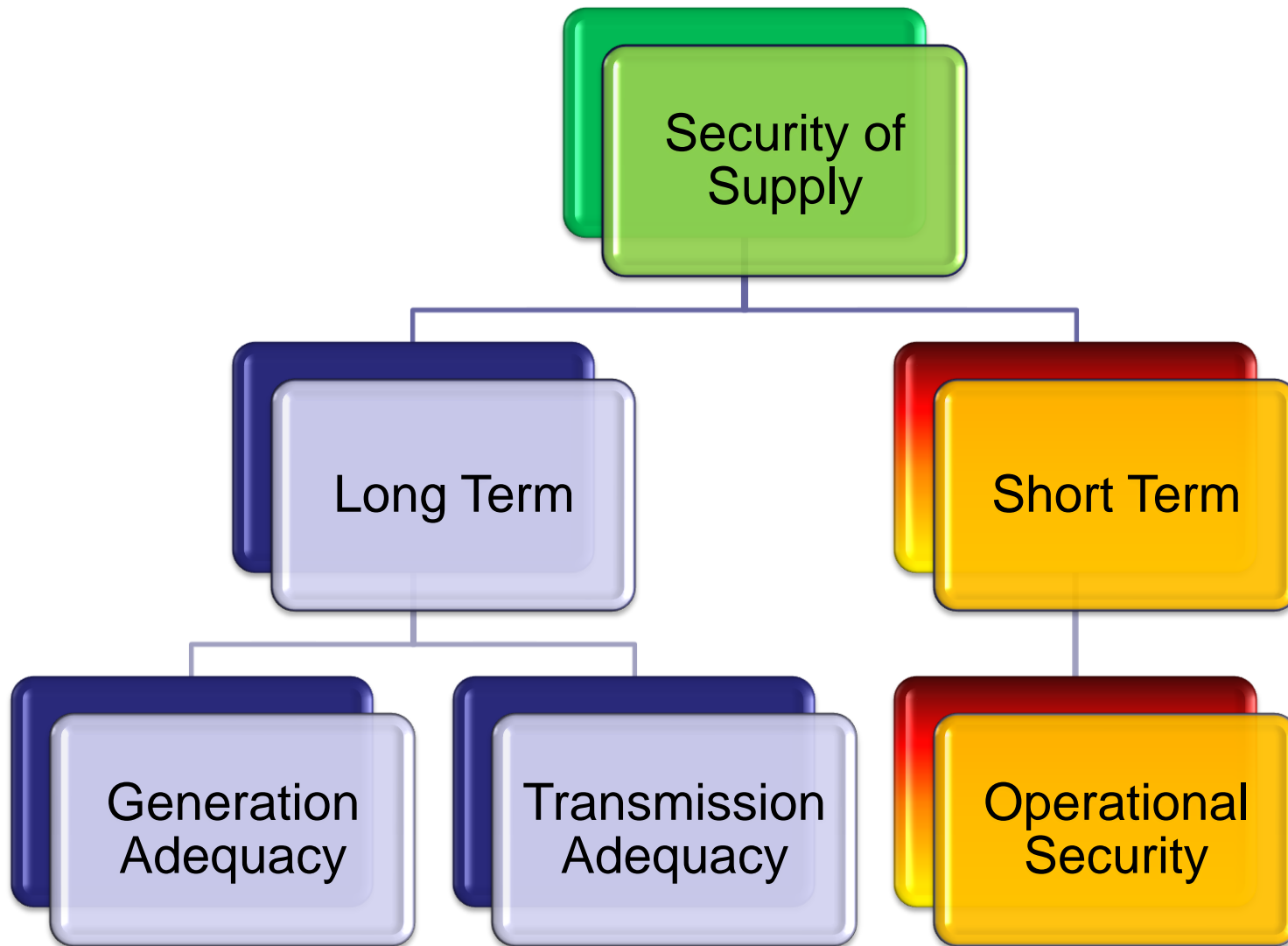
Managing the impact of supply disruption on electricity customers

Marie Hayden

Manager Power System Operational Planning

Presentation

- Managing Security of Supply
- What can go wrong?
- Capacity schemes for large users
- Where can I find out more?

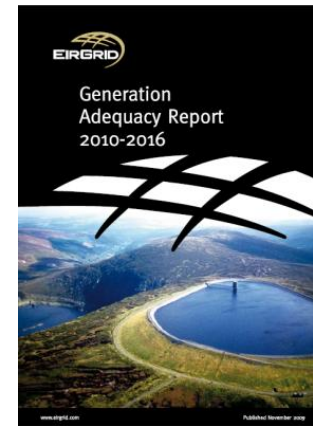


Long Term Security of Supply

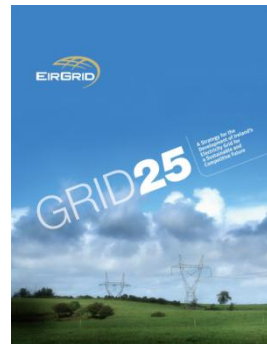
**GENERATION &
TRANSMISSION ADEQUACY**

Long Term Security of Supply

- Generation Adequacy Report



- Grid 25



- East West Interconnector



Short Term Security of Supply

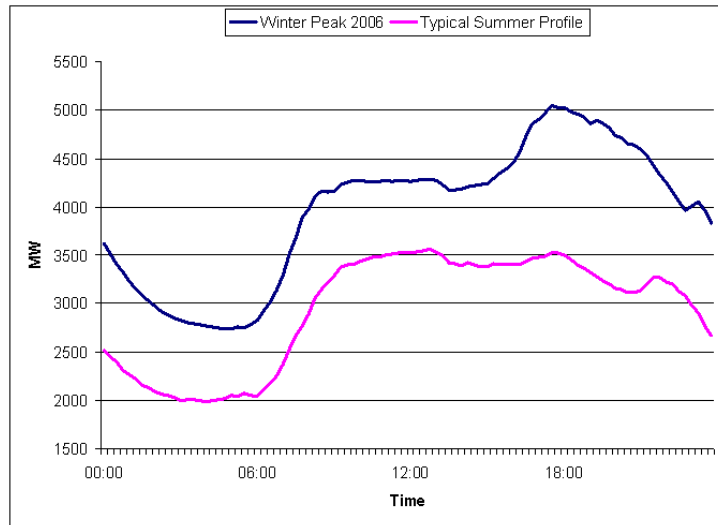
OPERATIONAL SECURITY

EirGrid's National Control Centre

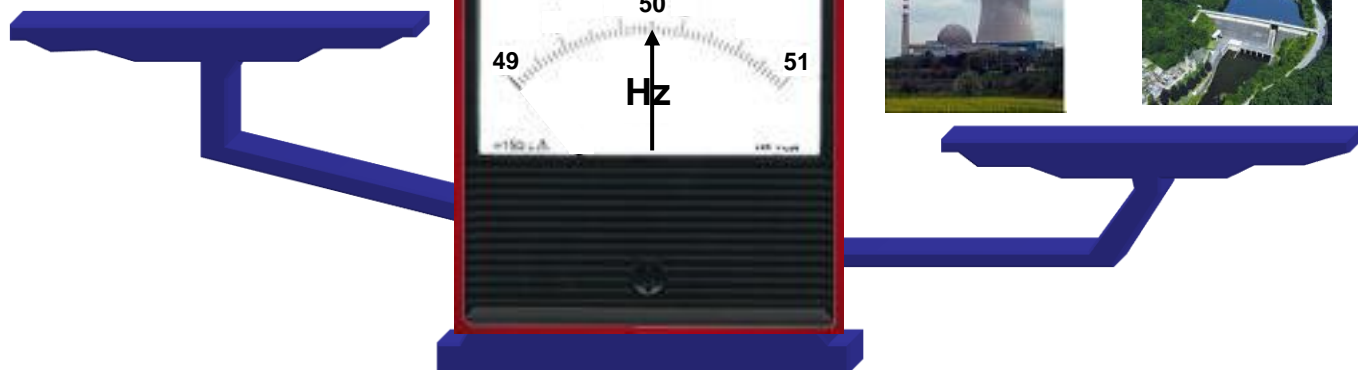
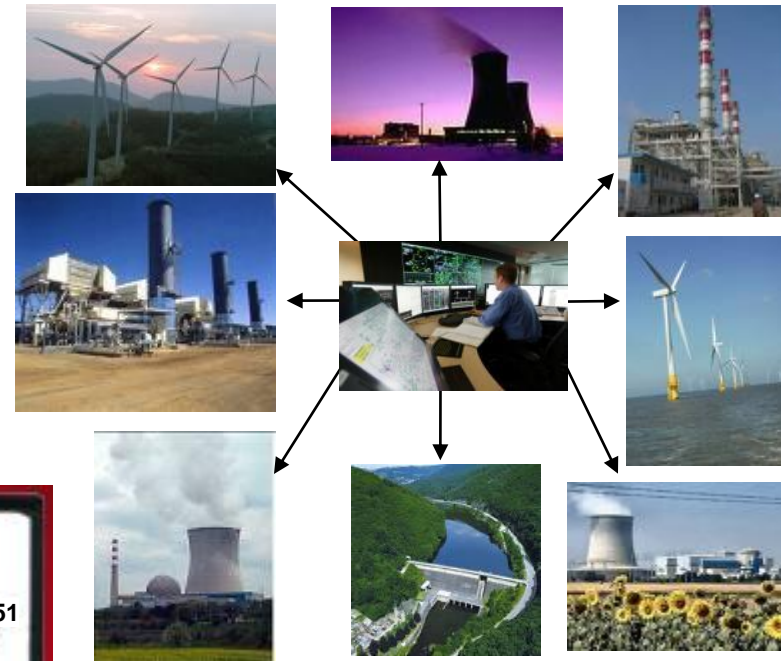


Demand – Generation Balance

Load changes through the day ...

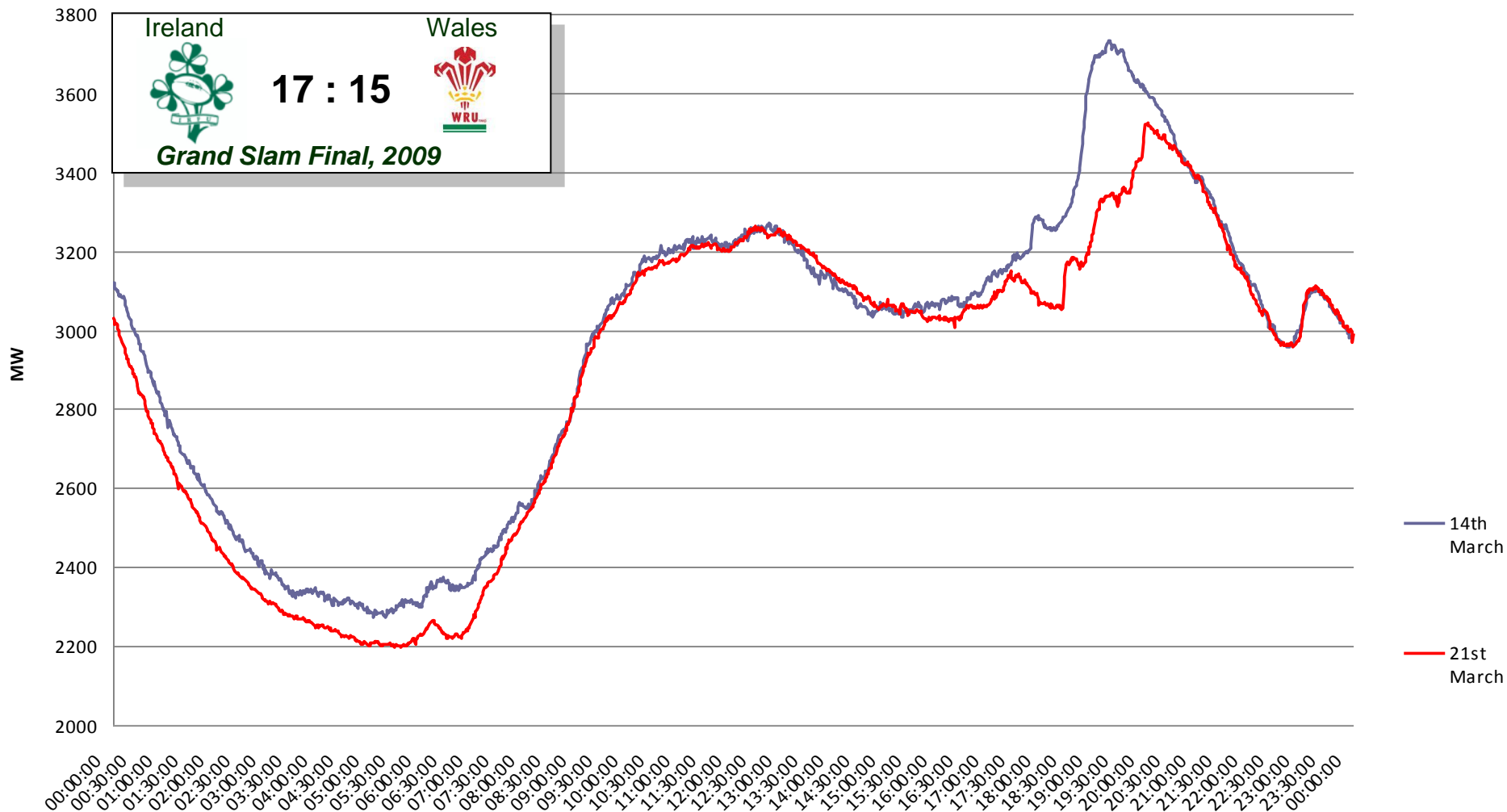


...Generation output must match this



Demand is usually Predictable

Impact of Grand Slam Rugby: Saturday 14th March v. Saturday 21st March



What can go wrong?

Generation and Transmission Events

What can go wrong?



Insufficient Generation to meet demand

Possible Causes

- ▶ A generation unit or units trip
- ▶ There is not enough generation scheduled on to meet the demand
 - ▶ Demand is much higher than expected
 - ▶ Wind Generation is much lower than expected
- ▶ There is not enough capacity installed (long term)

Managing generation events

- Operating Reserve is used to manage the unexpected loss of the largest generation unit
 - **Operating Reserve could be called on to operate several times a week**
- Under-frequency load shedding relays are used to disconnect up to 60% of demand for larger losses
 - **UF Relays were last called on to operate in August 2006**
- Rota Load Shedding is used when shortfalls are significant and foreseen
 - **Rota Load Shedding was last called on to operate in April 1991**

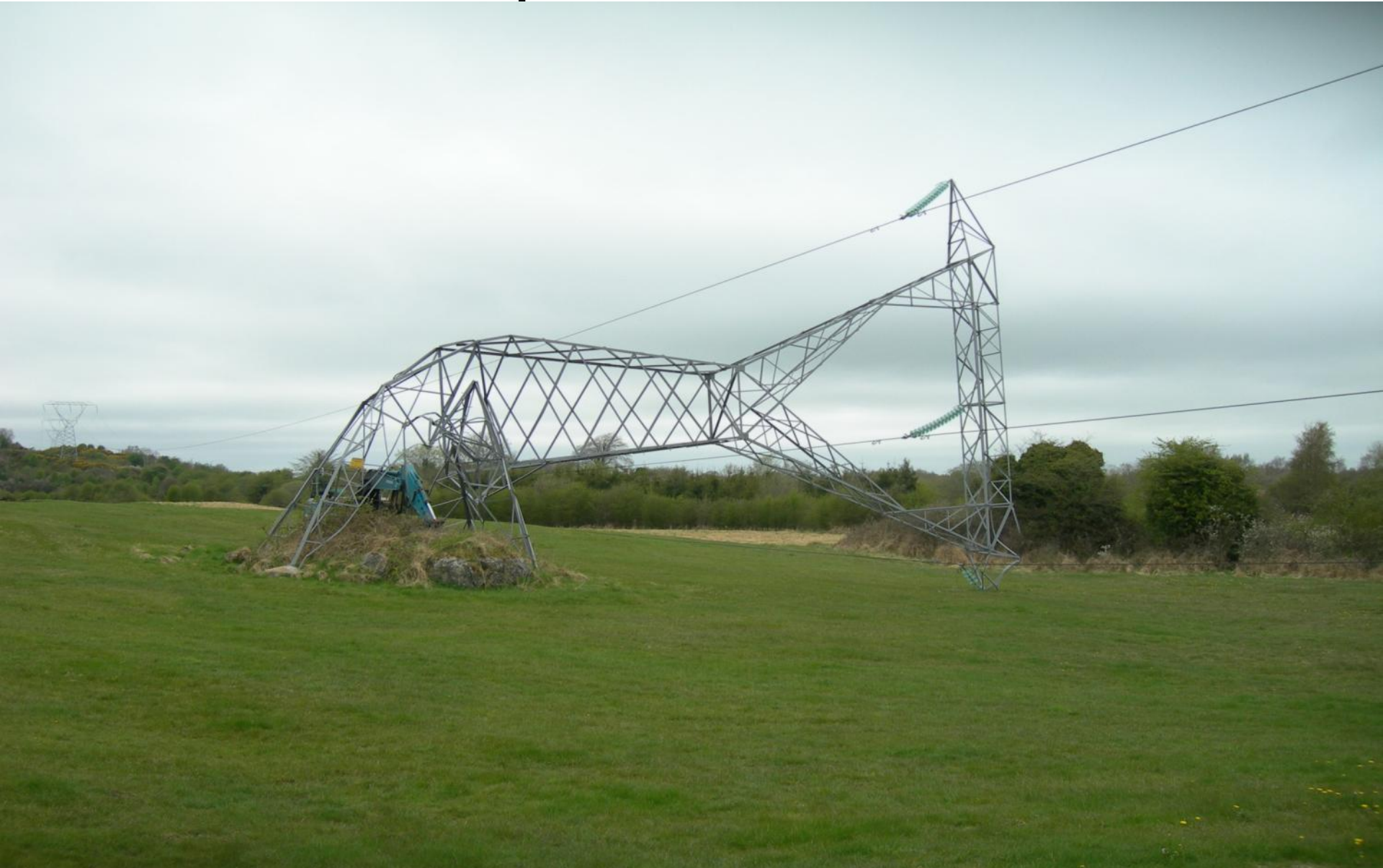
Transmission Faults

CAUSES

- Environmental Factors
 - Lightning
 - Storms
 - Wind
- Indirect Causes
 - Mal Operation of Protection
 - Trips for un-cleared faults
- Equipment Failure
- Human Error



A less predictable event



Feeder Fault Rates

Voltage Level	10 Year Average Faults per KM per year	2009 Faults per KM per year	2009 Number of Faults
400kV 439 kilometres	0.21	0.23	1
220kV 1725 kilometres	0.93	0.46	8
110kV 3890 kilometres	1.13	0.44	17

63% of faults that impact the transmission system occur on the transmission system with the remainder originating elsewhere

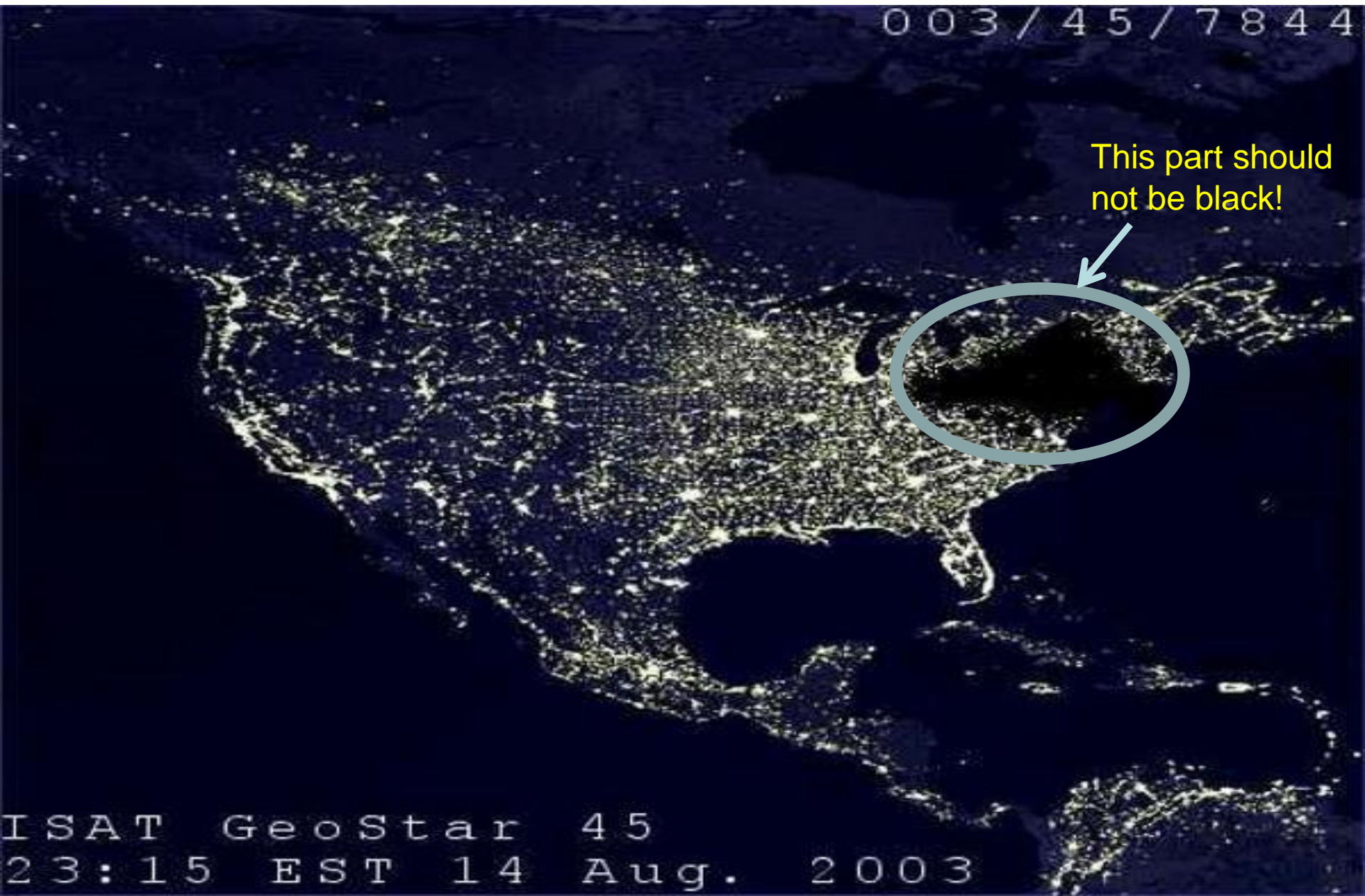
What can go wrong?



Managing transmission faults

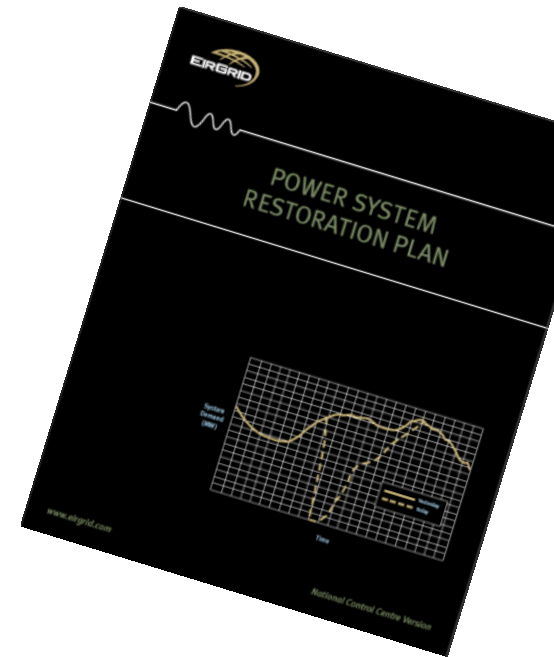
- The system is operated to ensure that it remains stable following the loss of any one item of transmission plant
- Protection Relays are used to clear faults off the system very quickly to minimise power quality issues

Worst Case – The Blackout



Planning to Manage a Blackout

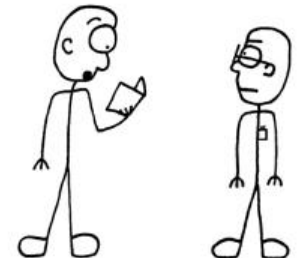
- Typically power system blackouts are caused by one of two things:
 1. A major generation event
 2. A major transmission event – more common
- We plan and operate the transmission system in a way that aims to prevent a blackout.
- In the event that we fail to prevent a blackout, we have a plan to manage one.



Power System Restoration Plan

- A plan to restore the power system following a total blackout
- Assumes no generation station has any power supply
- Based on “Blackstart” stations – power stations that can start without any external supply
- Continually reviewed and updated
- Regular Testing & Training

Crisis Management Center



I'm not sure "everyone dies"
is a great emergency plan.

Crisis Communications

- Having effective communications plans and systems in place is critical to managing emergencies
- At EirGrid there is a strong focus on reviewing, testing and training our emergency communications plans
- This renewed focus is also happening at a government level and we closely work with
 - Task Force for Emergency Procedures
 - Department of Communications, Energy and Natural Resources
 - Commission for Energy Regulation

Capacity Schemes for Large Energy Users


Capacity Schemes Involving Large Energy Users

Demand Side Management Schemes

- Short Term Active Response (STAR)
 - **Customers make some/all of their load available for interruptions (day hours only).**
 - **Immediate interruption, without notice.**
- Winter Peak Demand Reduction (WPDRS)
 - **Rewards reduction in customer loads from 17:00 to 19:00 each business day over the November to February winter period.**
- Power Save
 - **Incentivises voluntary reduction in customer loads at times when a shortage is foreseen by EirGrid**

Where can I find more information?

www.eirgrid.com or e-mail us on
info@eirgrid.com



The screenshot shows the EirGrid website homepage. At the top, there is a search bar and navigation links: Home, Contact Us, Publications, Site Map, and Legal. Below this is a menu with links to About Us, Customers, Operations, Transmission, Renewables, Gate 3, East-West, SEMO, and SONI. The main content area features a large image of a wind turbine with the text "Welcome to EirGrid". To the right of the turbine, there are sections for "LATEST NEWS" (Company announcements and news releases) and "PROJECTS" (Updates on the Cavan Tyrone, Cork Harbour, Donegal 110kV, East-West Interconnector and Meath Cavan power lines). Below the main content, there are three columns: "Publications" (Documents published by the company, as well as other sources and details of the legislation establishing EirGrid, with a link to Download Publications), "GRID25" (Securing Ireland's electricity supply and reaching green targets, with a link to Find out what's happening in your area), and "System Information" (Supply, demand and performance information used to operate the electricity transmission system in real-time, with links to CO2 Emissions, System Demand, Weekly Peak Demand, Wind Generation, and System Performance Data).



This collage features several EirGrid documents and a photograph of a control room. The documents include:

- Winter Outlook 2010-2011**: A document with a cover image of a power plant and a summary section.
- Demand Side Management (DSM)**: A document titled "You are here: Operations > Ancillary Services > Demand Side Management (DSM)". It states: "DSM has been and is expected to remain a key operational service to maintain system security for the Island. EirGrid currently operate a number of peak demand reduction programmes to reduce demand, particularly during the peak periods and tight capacity margins. The main schemes are as follows:"
 - [Winter Peak Demand Reduction Scheme \(WPDRS\)](#)
 - [Powersave](#)
 - [Short Term Active Response \(STAR\)](#)
- Operations**: A document titled "Operations" with a list of links:
 - » Ireland's Power System
 - » National Control Centre
 - » System Performance Data
 - » Ancillary Services
 - » Quick Links to Current Activity
 - » Consultations & Workshops
 - » AS & Other System Charges
 - » Dispatch Balancing Costs
 - Demand Side Management (DSM)
 - » Winter Peak Demand Reduction Scheme (WPDRS)
 - » Powersave
 - » Short Term Active Response (STAR)

The background of the collage shows a control room with multiple computer monitors displaying various graphs and data, and a person working at a desk. At the bottom right, there is a photograph of a large reservoir or lake with a dam, surrounded by green hills.



Thank You