

# System Operator Workshop

December 2009

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# Introduction and Overview of 1<sup>st</sup> August Event

Kevin Small

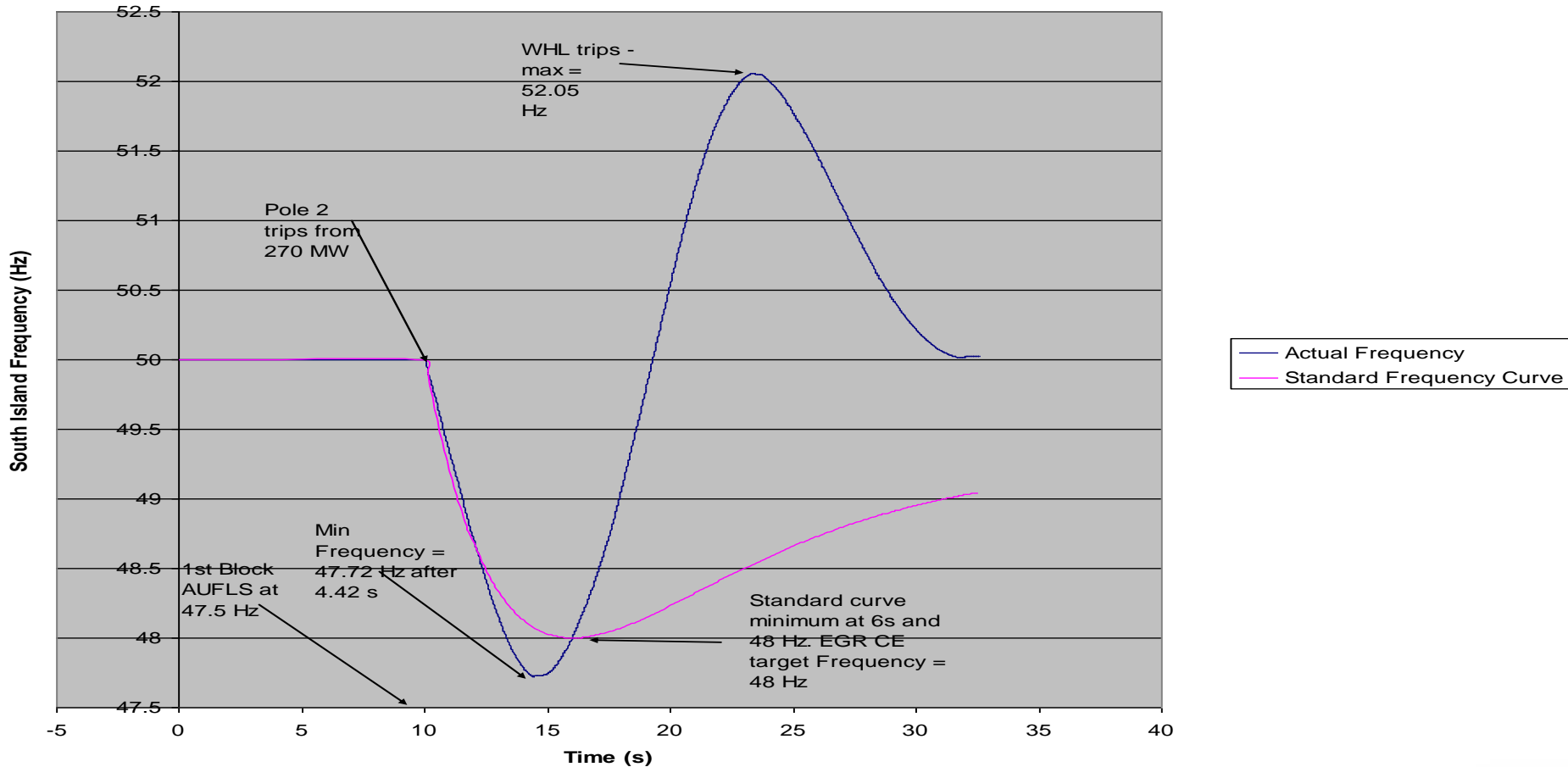
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# The event

Frequency Curve for DC tripping 1/8/09 04:30:52



# South Island Under frequency event 1 August 2009

Steven Nutt

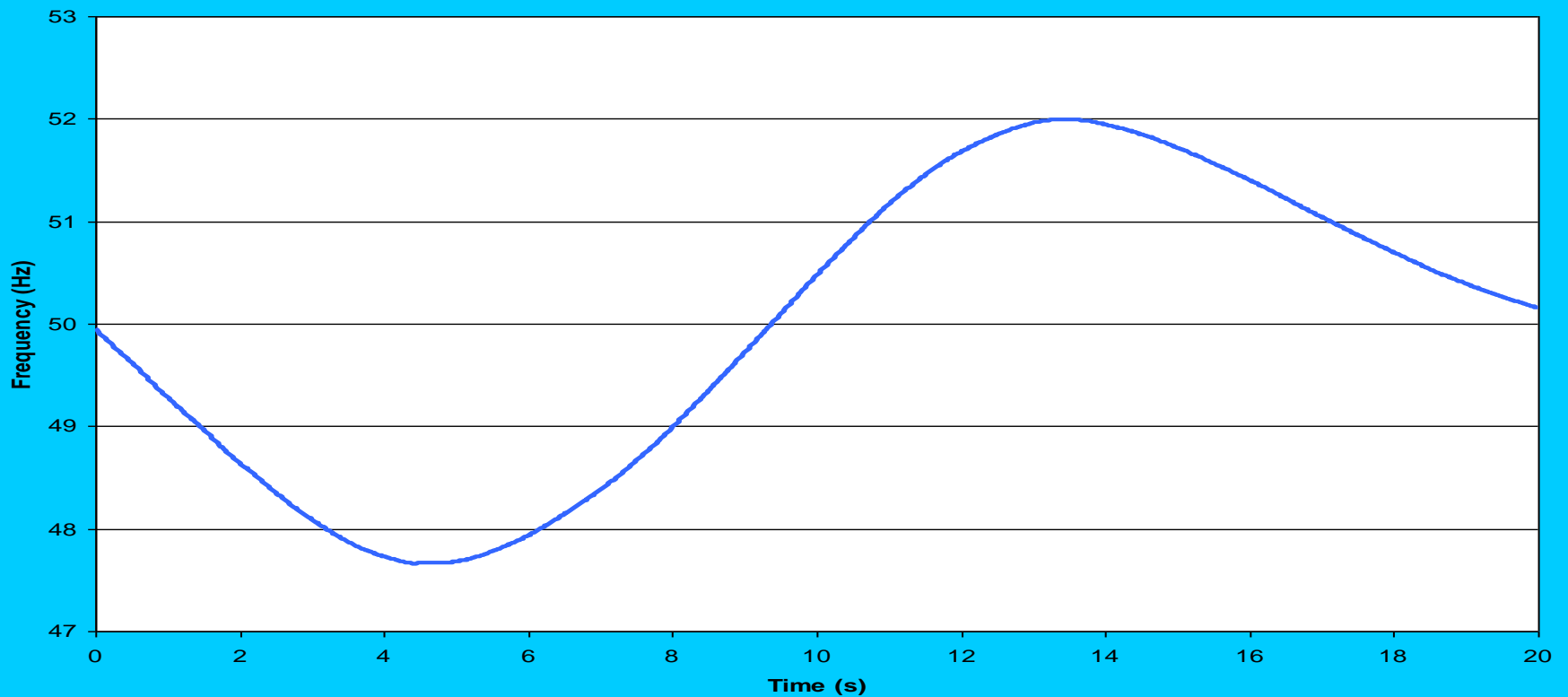
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# The event

Recorded system frequency

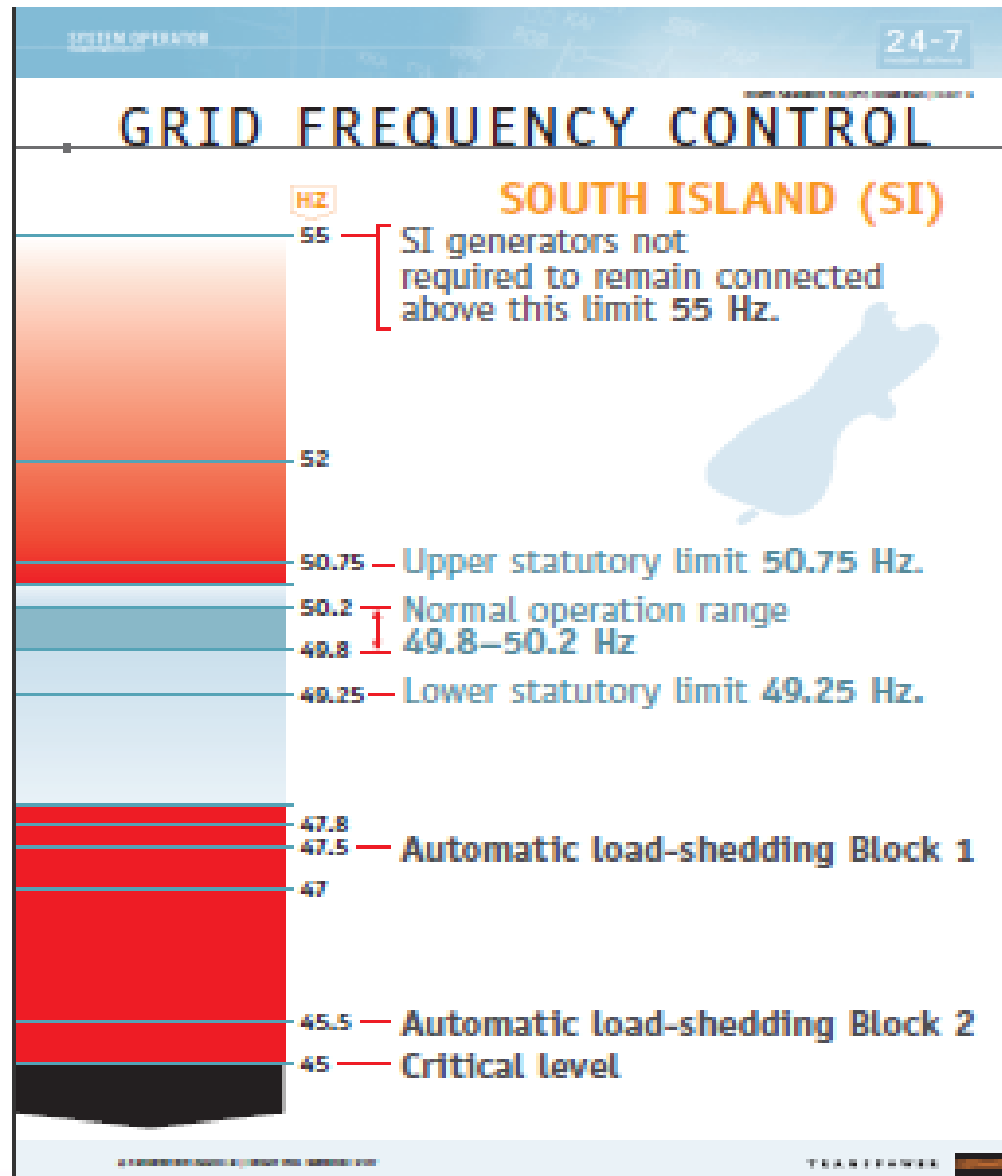


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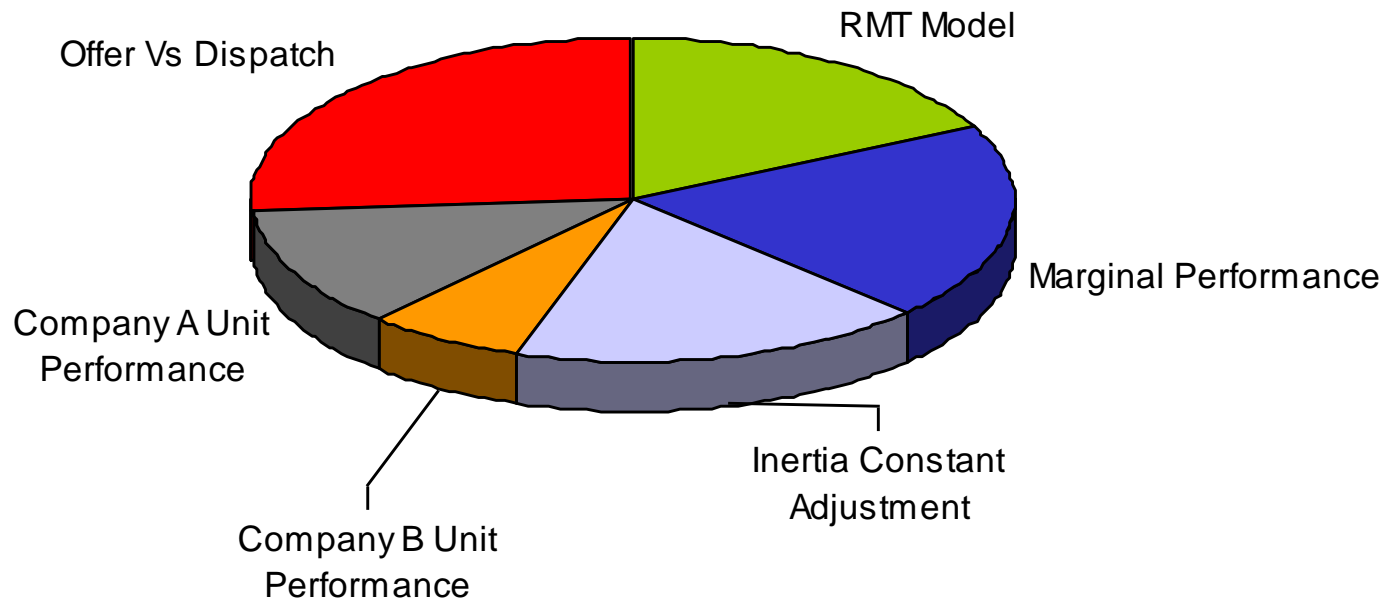
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# Almost!



# Findings



# Reserve Management Tool (RMT)

Mike Phethean

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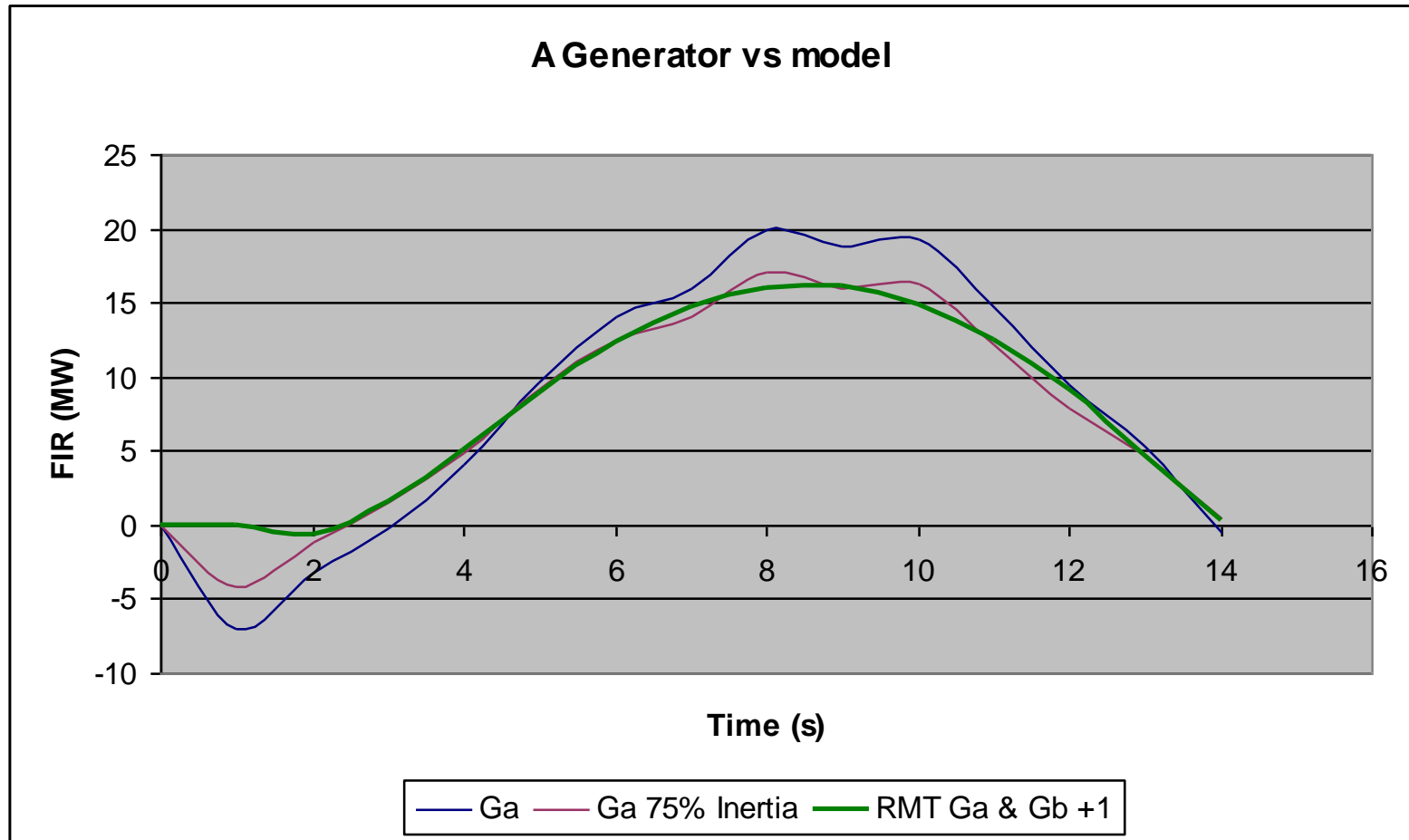
# Issues

- Modelling
- Governor Changes
- End to End Testing

# Modelling Issues

- TWD Flag fault (AVI & ROX)
- Inertia Constants
- PTI reports
- Incorrect ACS data

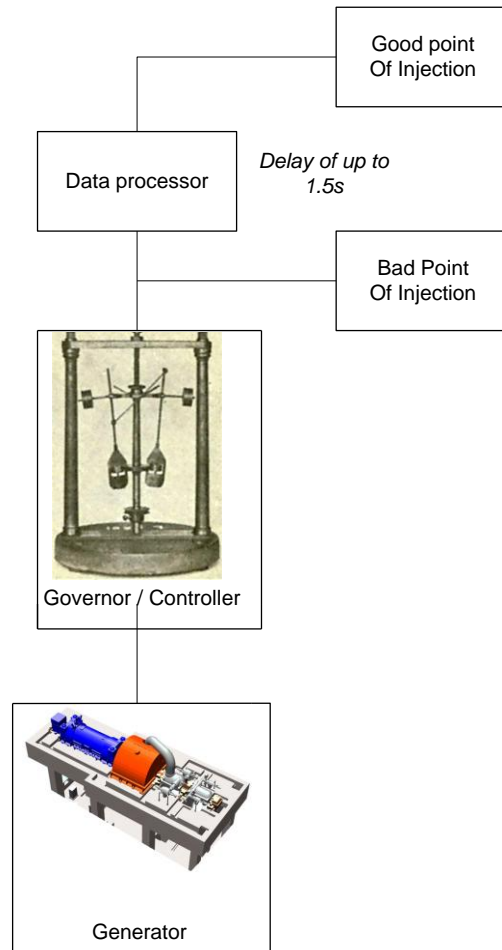
# Changing Inertia Constants



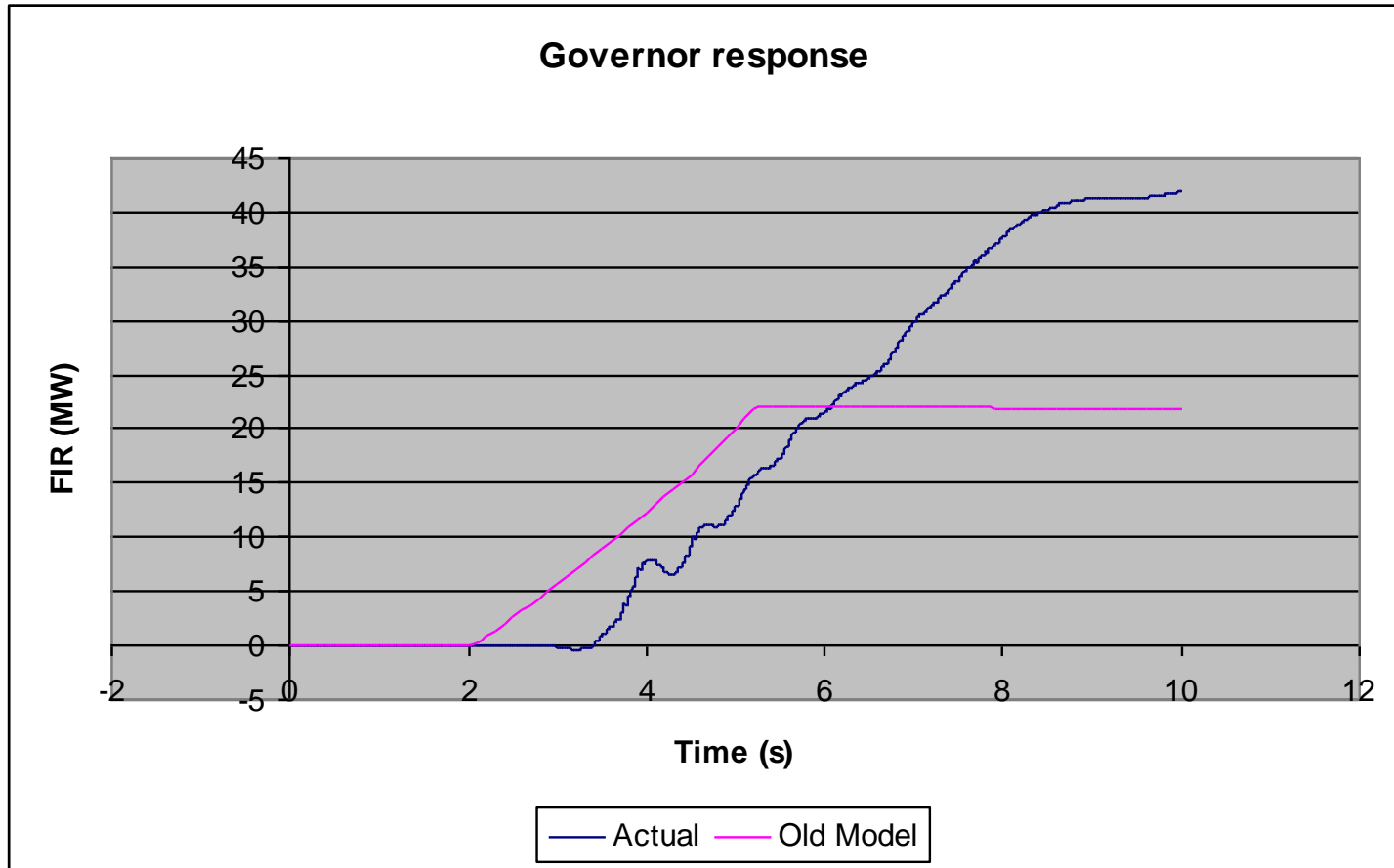
# After a change to a generator governor

- Inform the system operator
- Retest (End to End)
- Send results and new settings to SO
- Reserves contract may be changed

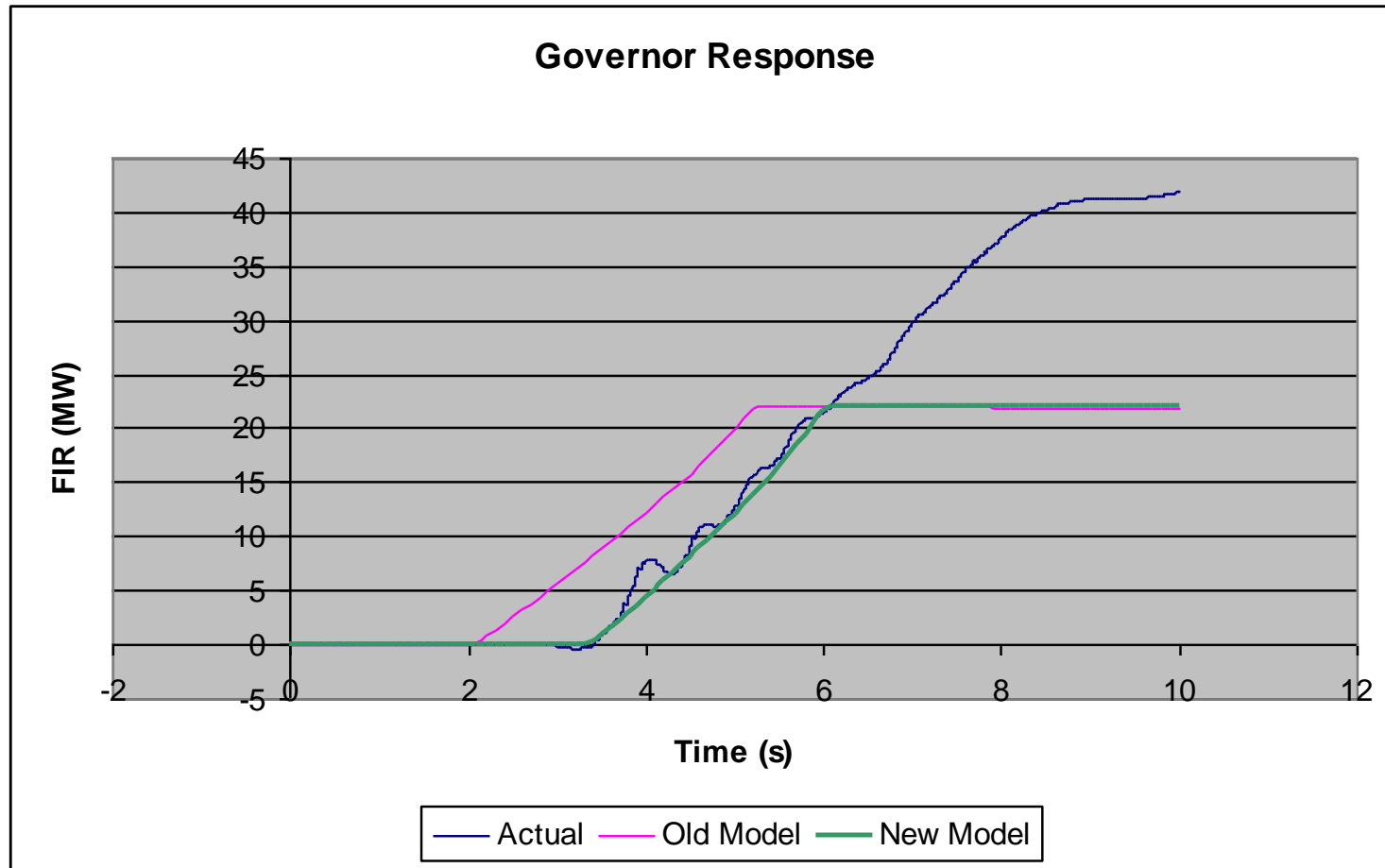
# End to End testing



# Accurate Modelling



# Accurate Modelling



# A complicated journey



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# Operational Perspective - Dispatch

Tim Connolly

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# The Reserve Process

PLSR/TWD (offers)

*versus*

SPD/RMT (computation)

*versus*

FIR/SIR (dispatch)

# Reserve Issues

FIR/SIR Dispatch Instructions

*versus*

PLSR/TWD conversion

# Reserve Issues

PLSR/TWD conversion

*versus*

Block Dispatch Implementation

# Potential Solutions

- Dispatching a PLSR/TWD instruction
- Having a maximum proportional mix of PLSR and TWD
- Identifying real time shortfalls and re-dispatching additional reserves
- Raising the target minimum frequency

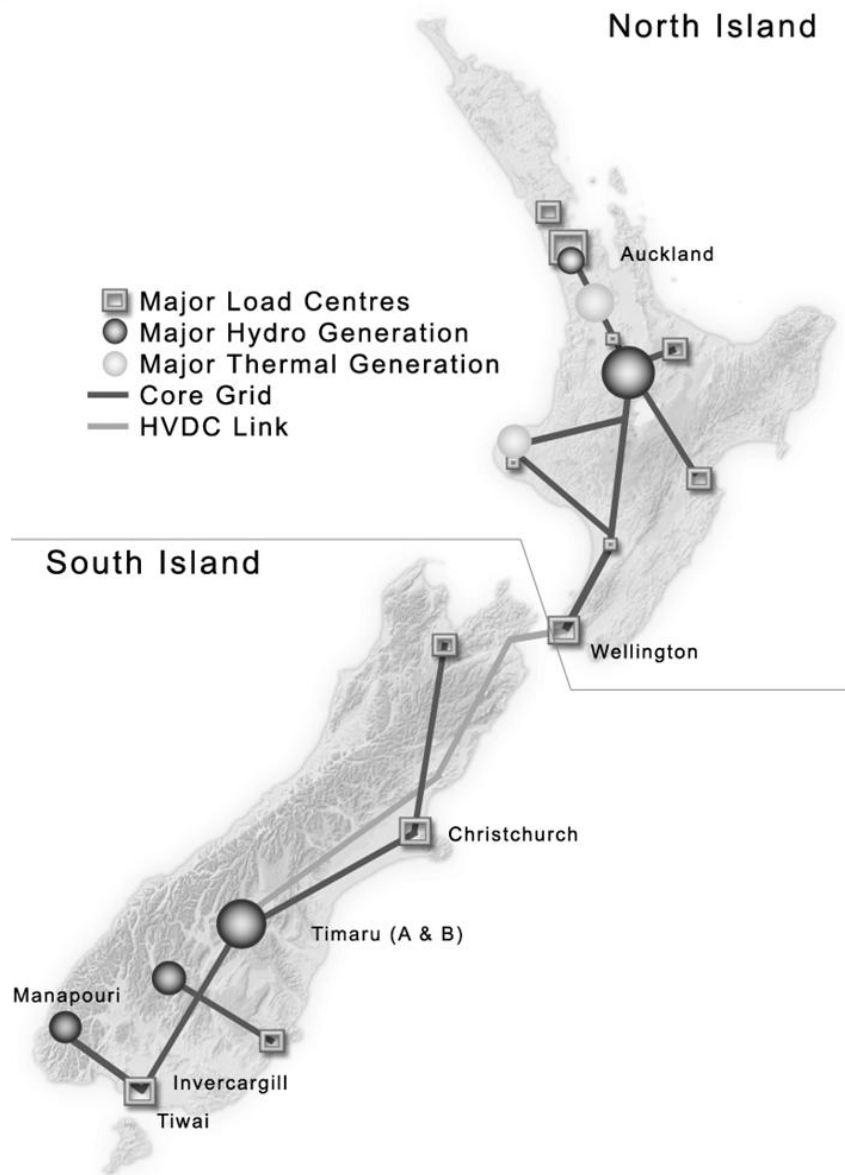
# 1<sup>st</sup> August 2009 DC Trip Event North Island Frequency Response

Vong Nyuk-Min

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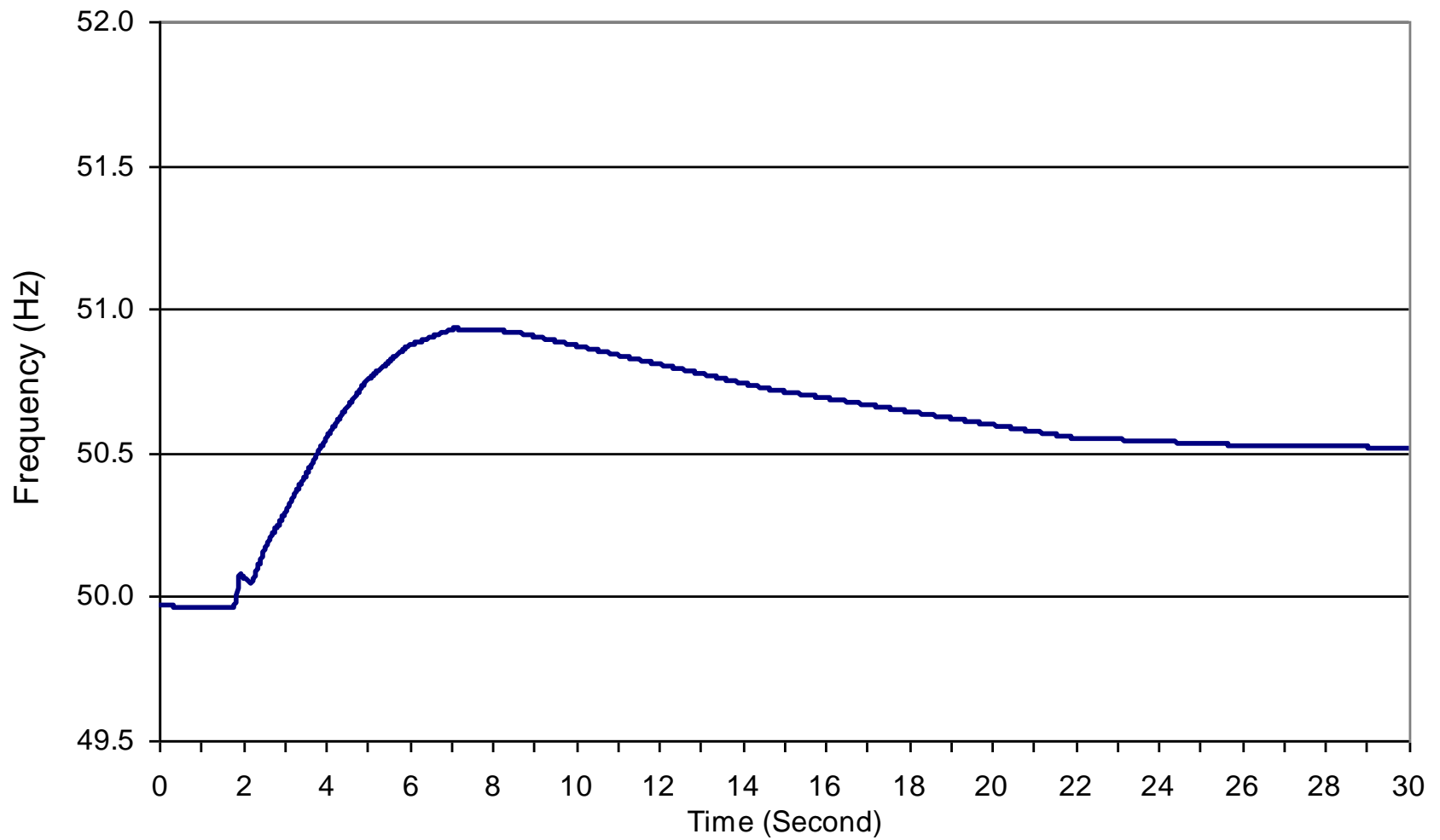
# Lights Still On

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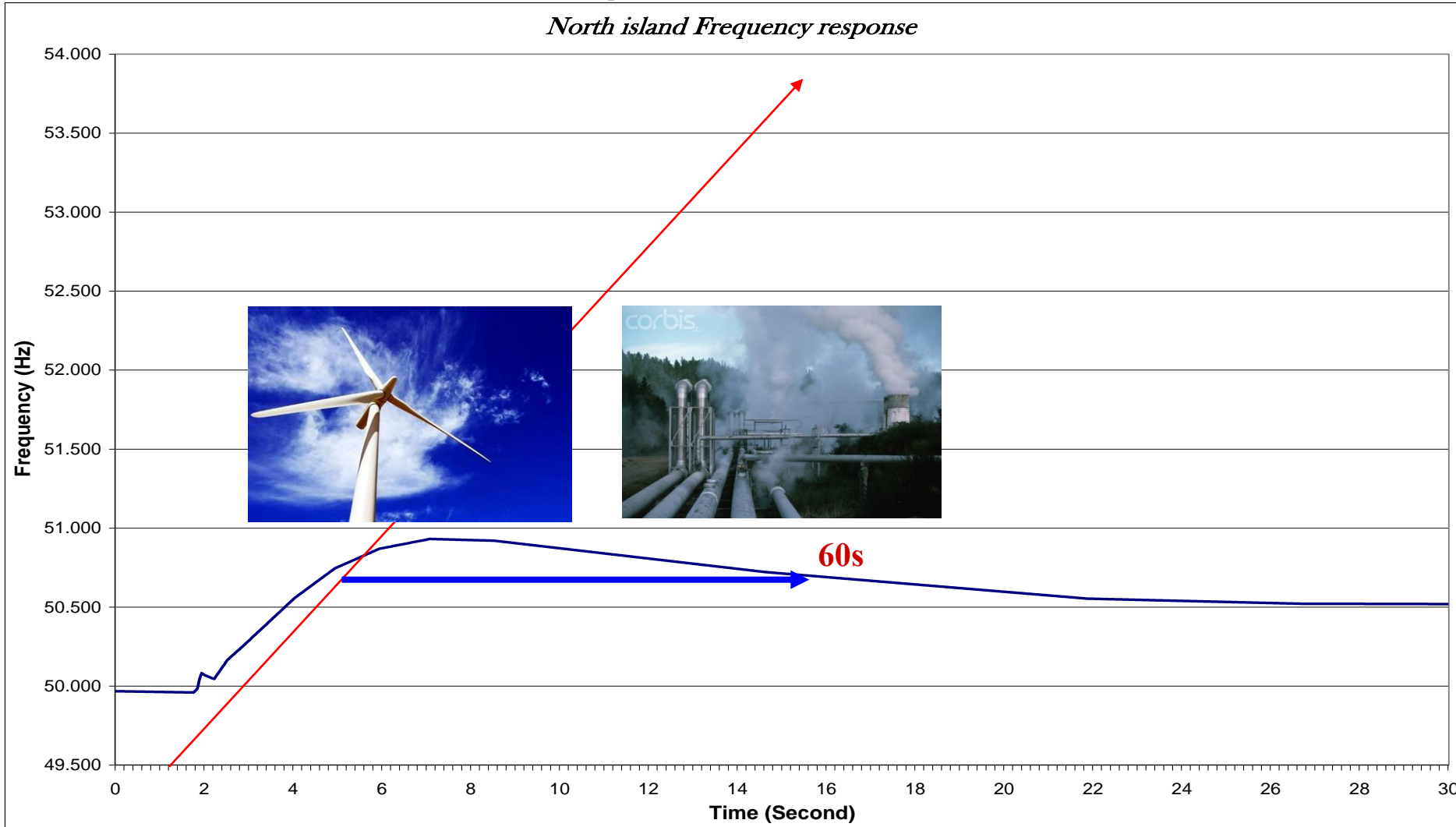
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## North Island Frequency Response



# Potential Consequences



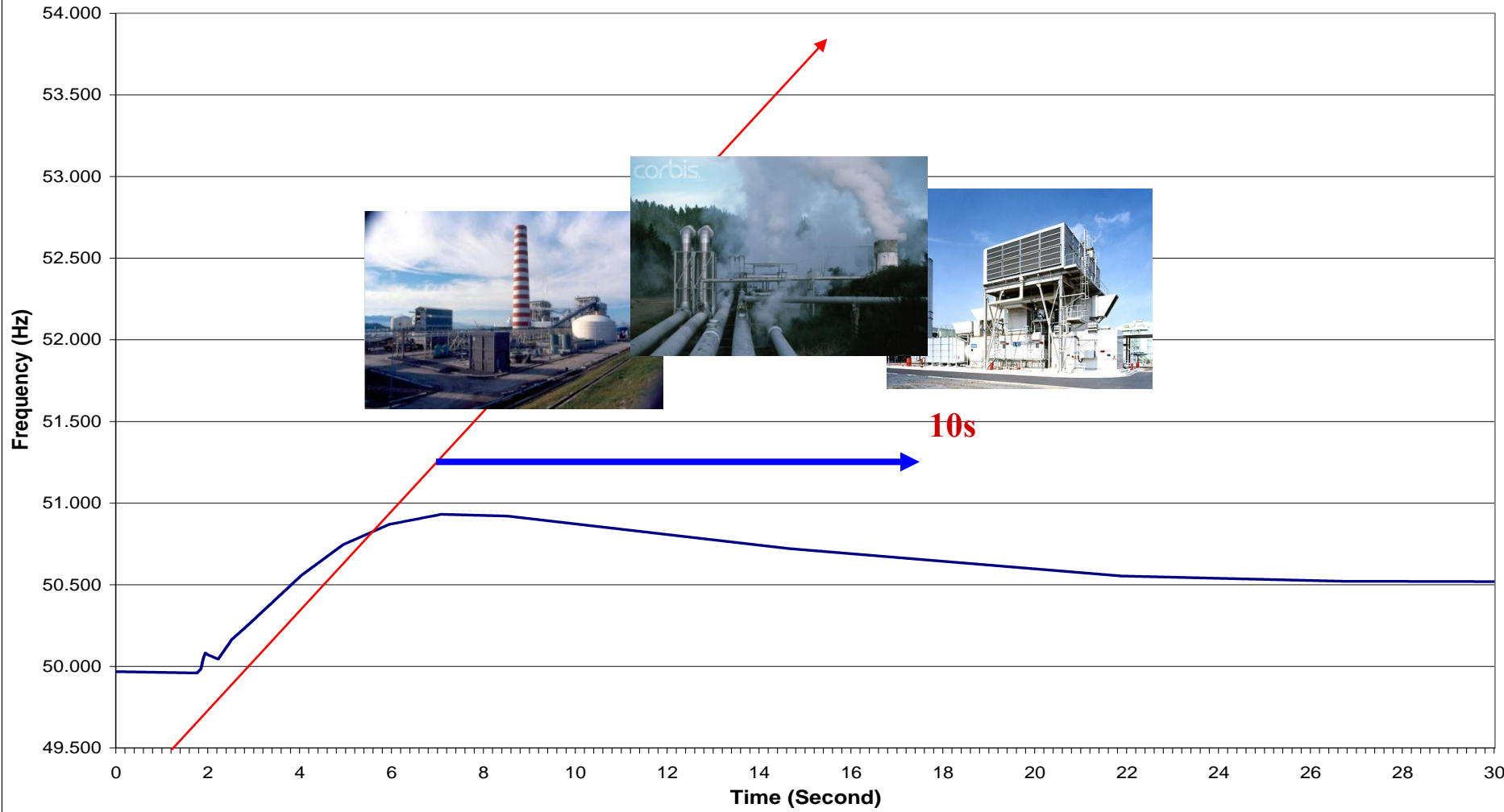
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# Potential Consequences

*North island Frequency response*

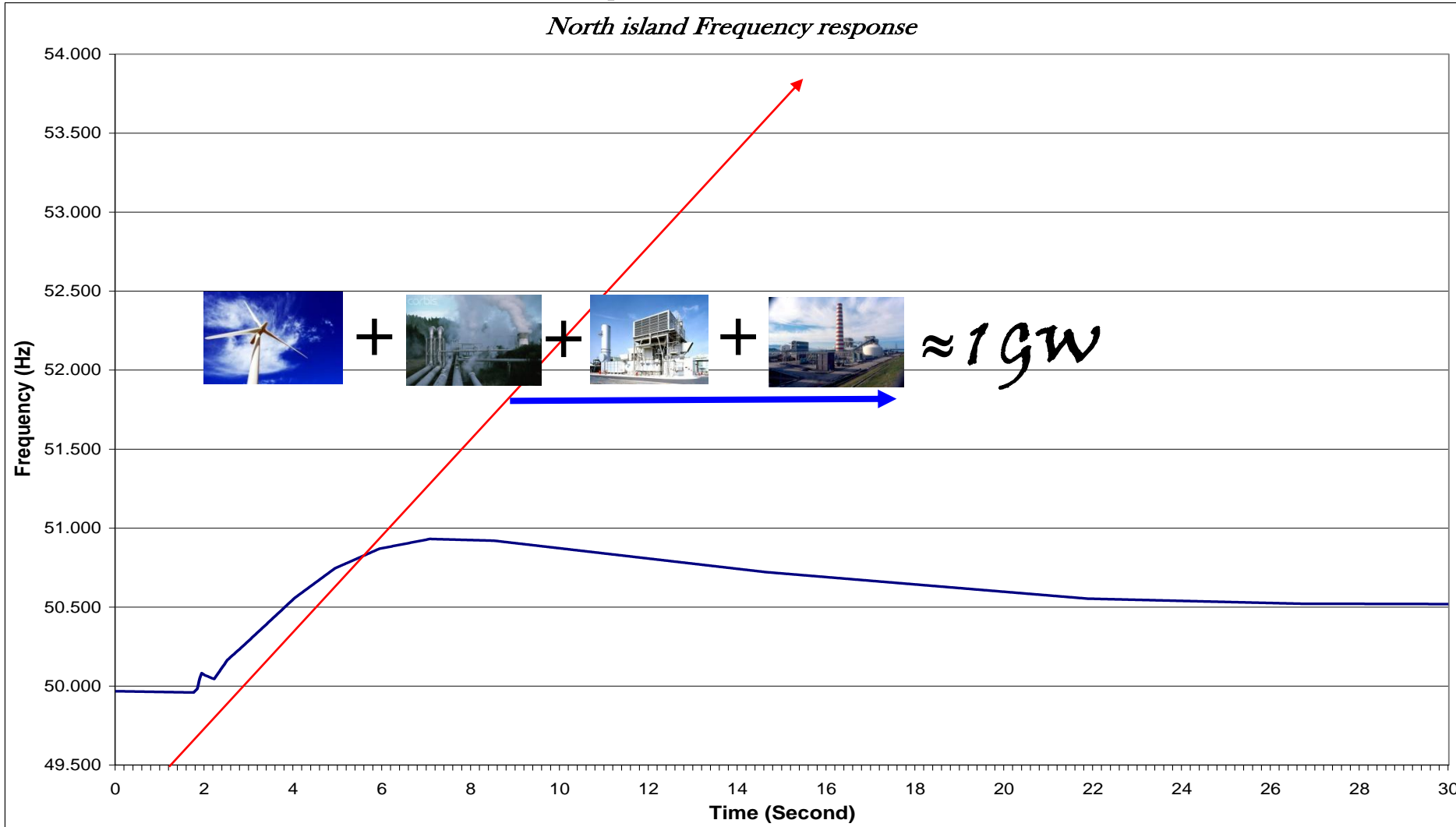


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# Potential Consequences

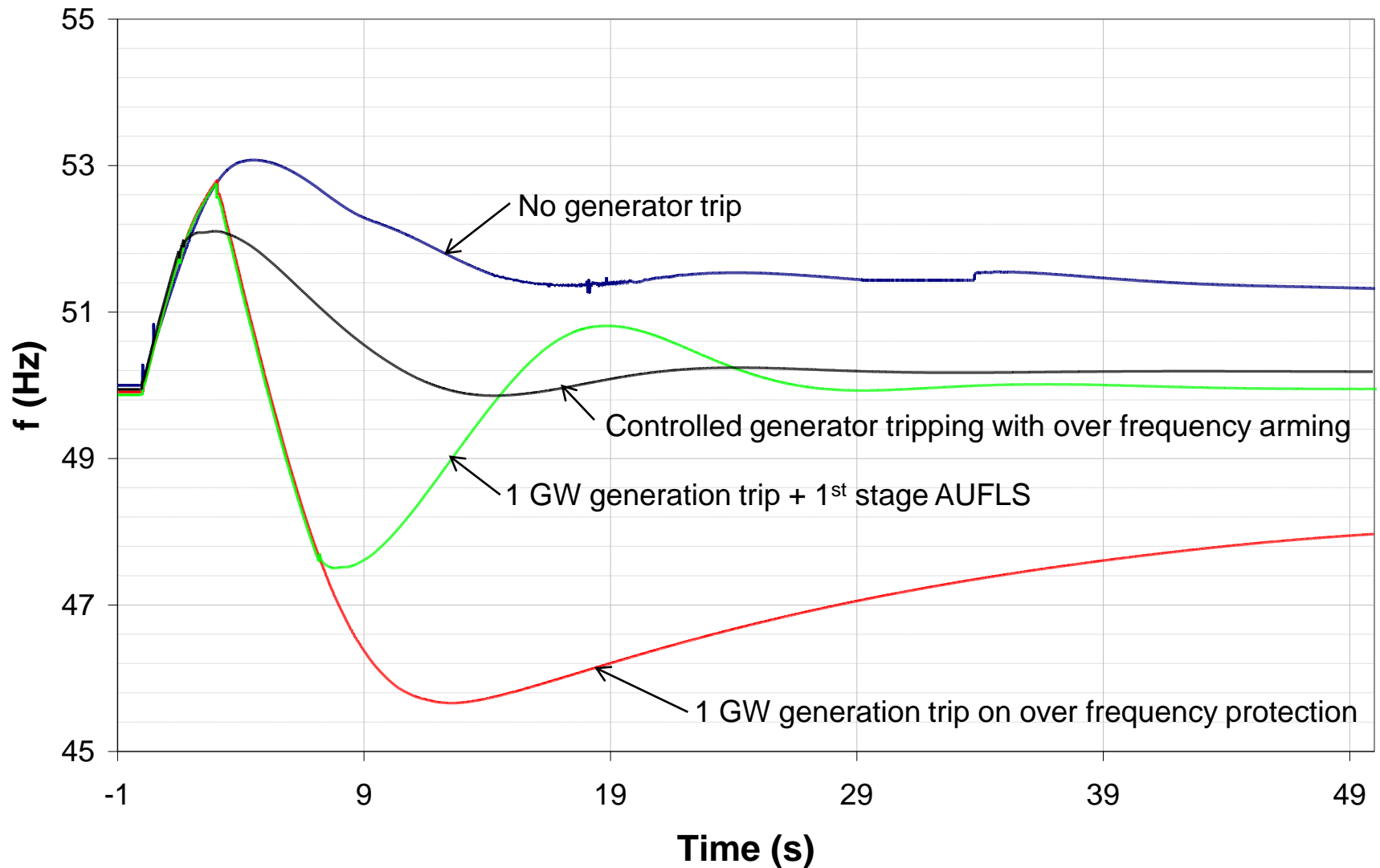


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# Power system responses .....



# We need to manage this

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# Possible measures

- Steam dump/bypass for steam turbine including geothermal
- Control tripping of wind generator – Stage tripping of 40% site turbine
- Other solutions?

# Ways forward

- Produce report on NI system for 1 August event
- Initiate discussion with generator on over-frequency management early next year
- Simulation study to determine power/frequency characteristics

# Operational Perspective - AUFLS

Andrew Twaddle

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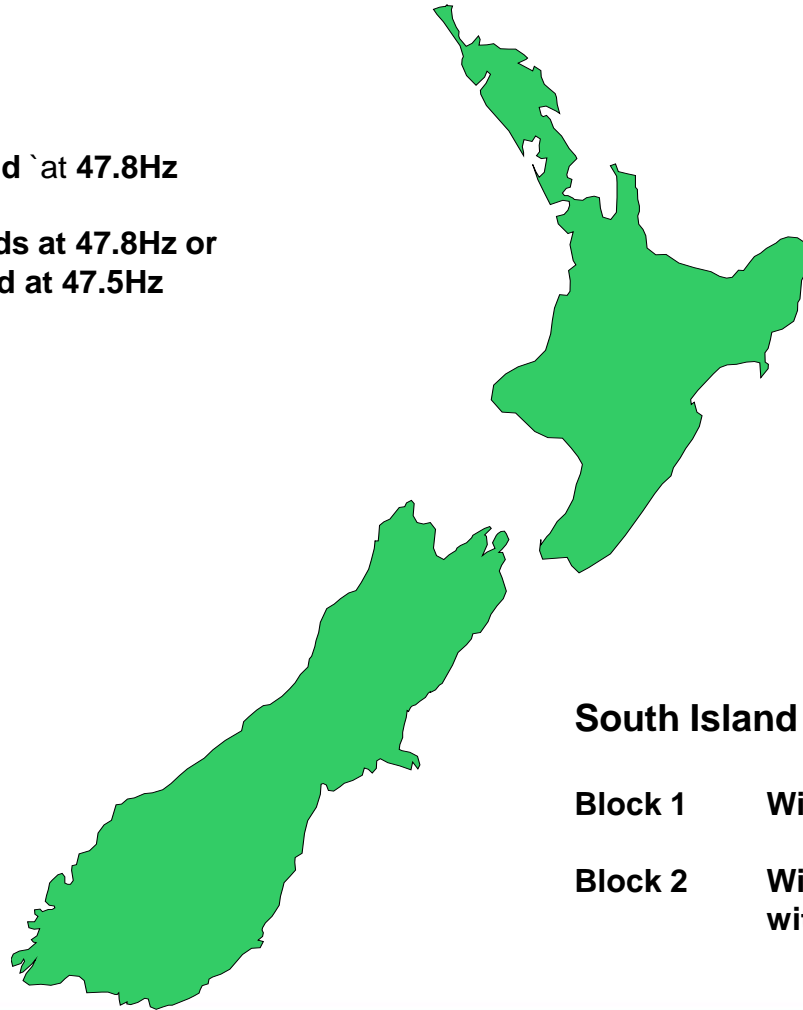
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# AUFLS, an overview

## North Island

**Block 1**      **Within 0.4 second` at 47.8Hz**

**Block 2**      **Within 15 seconds at 47.8Hz or  
within 0.4 second at 47.5Hz**



## South Island

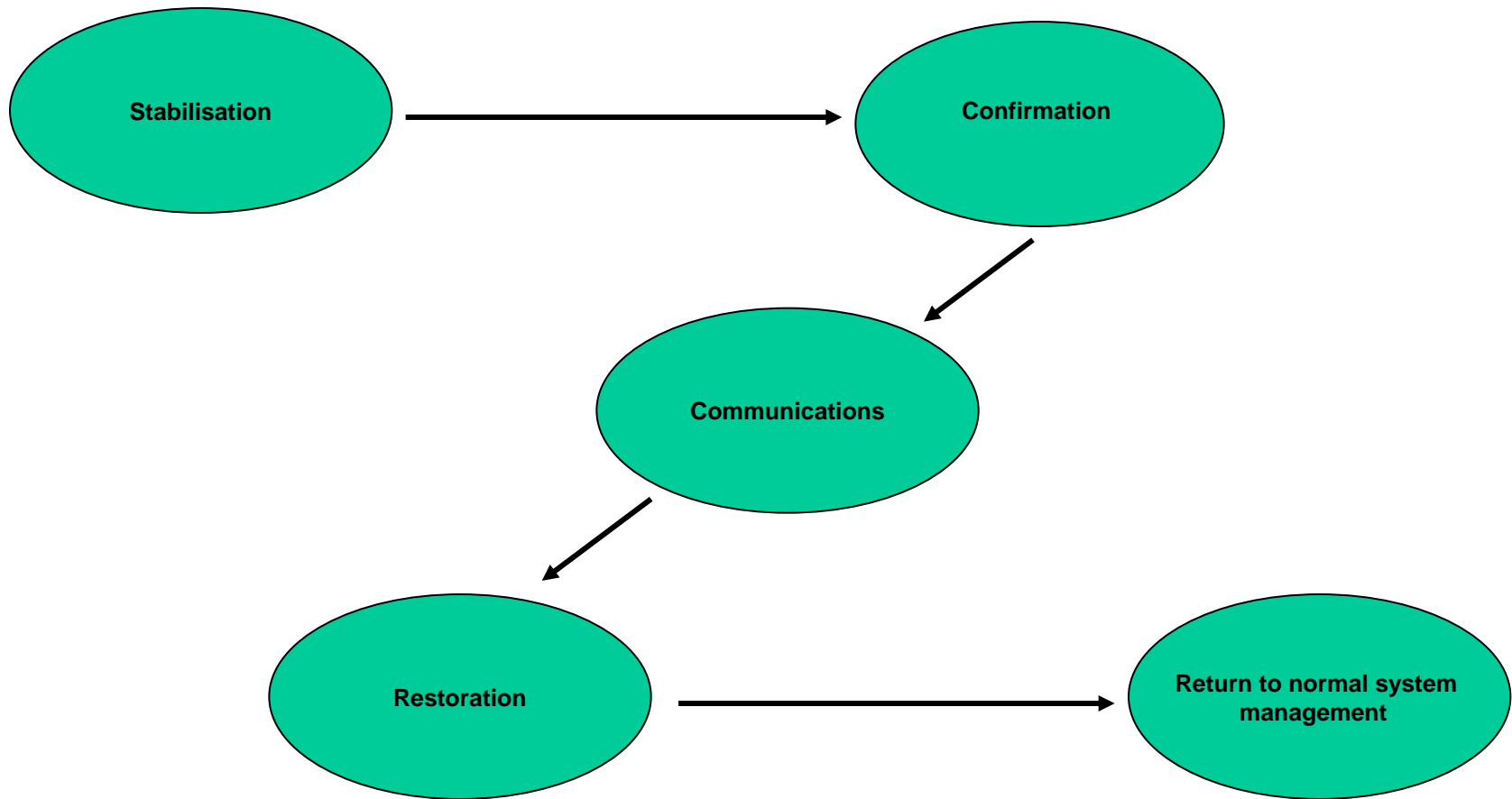
**Block 1**      **Within 0.4 second at 47.5Hz**

**Block 2**      **Within 15 seconds at 47.5Hz or  
within 0.4 second at 45.5Hz**

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# Managing an AUFLS event



# Summary of Issues

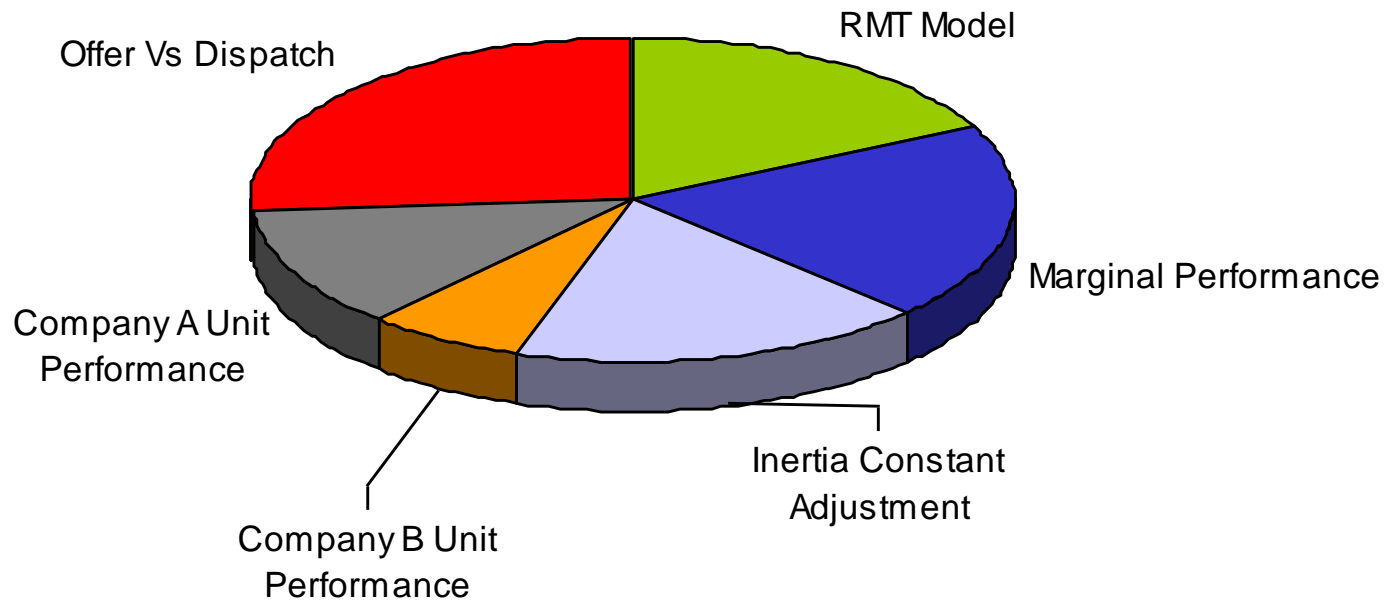
Steven Nutt

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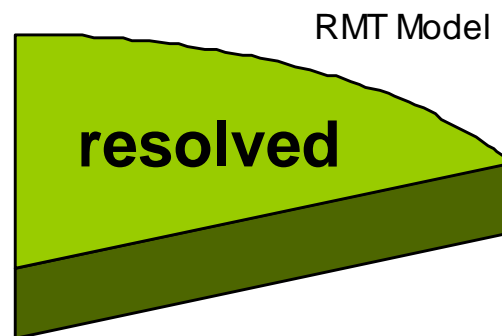
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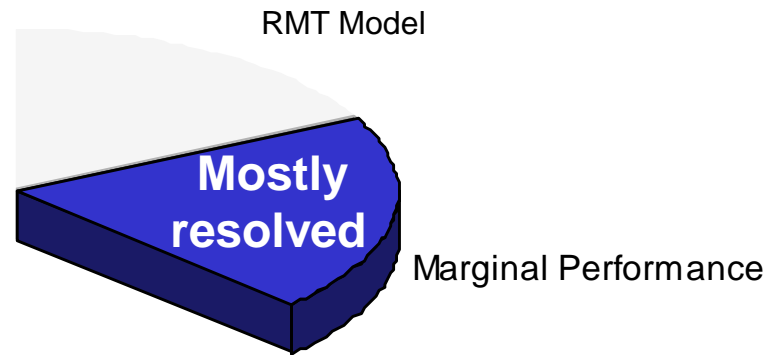
# Summary of findings



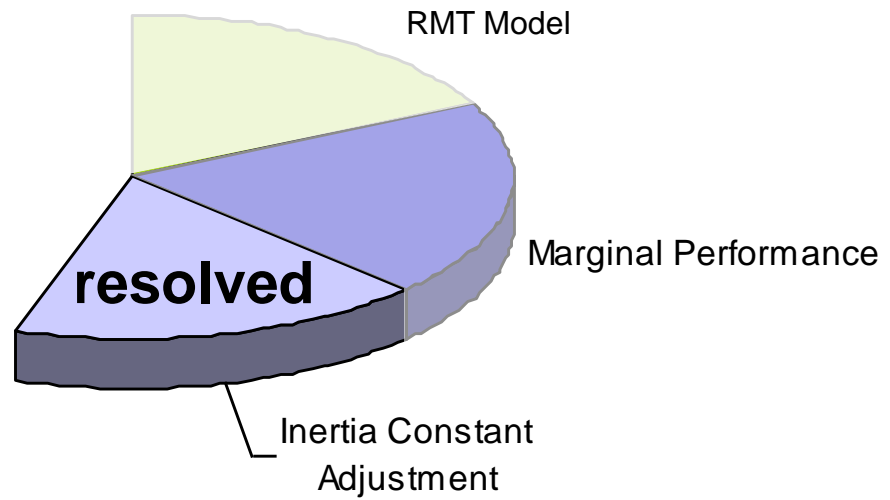
# Findings



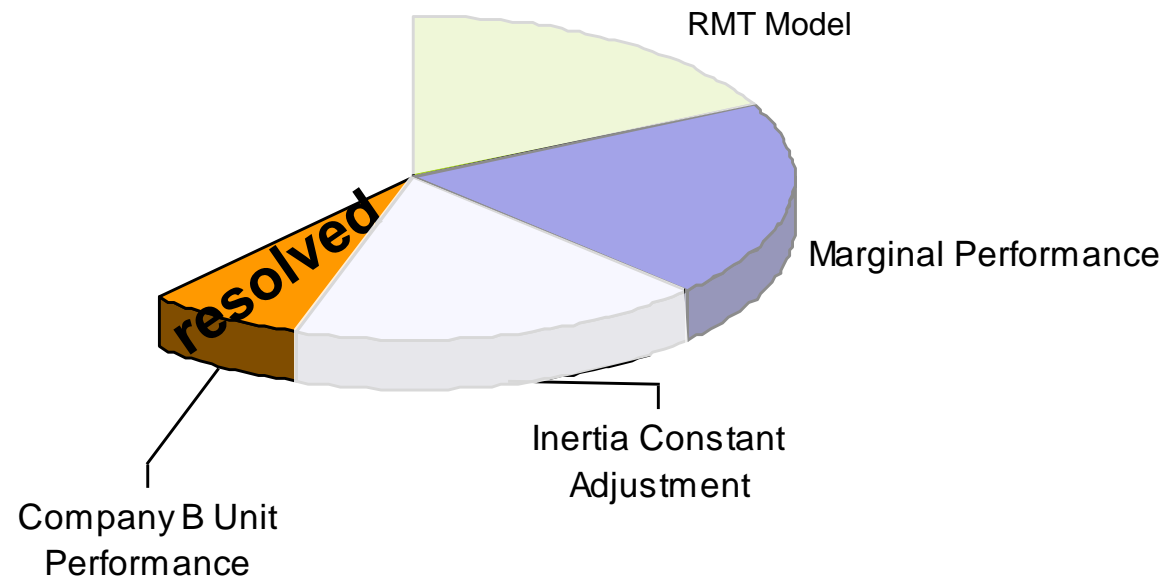
# Findings



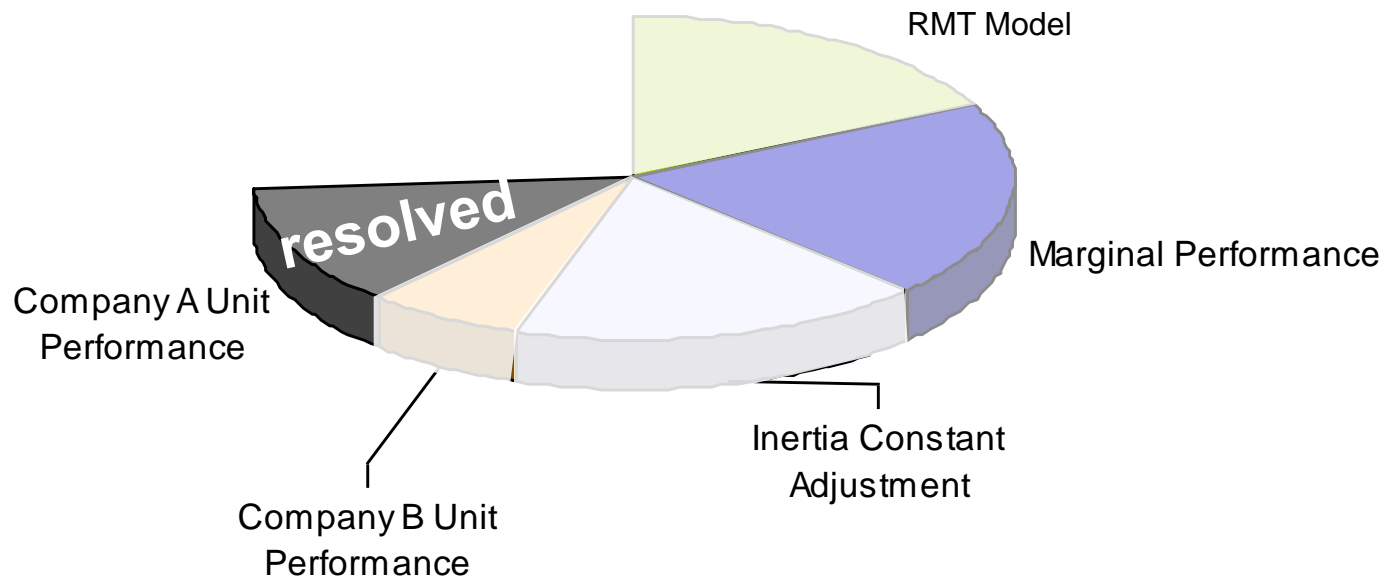
# Findings



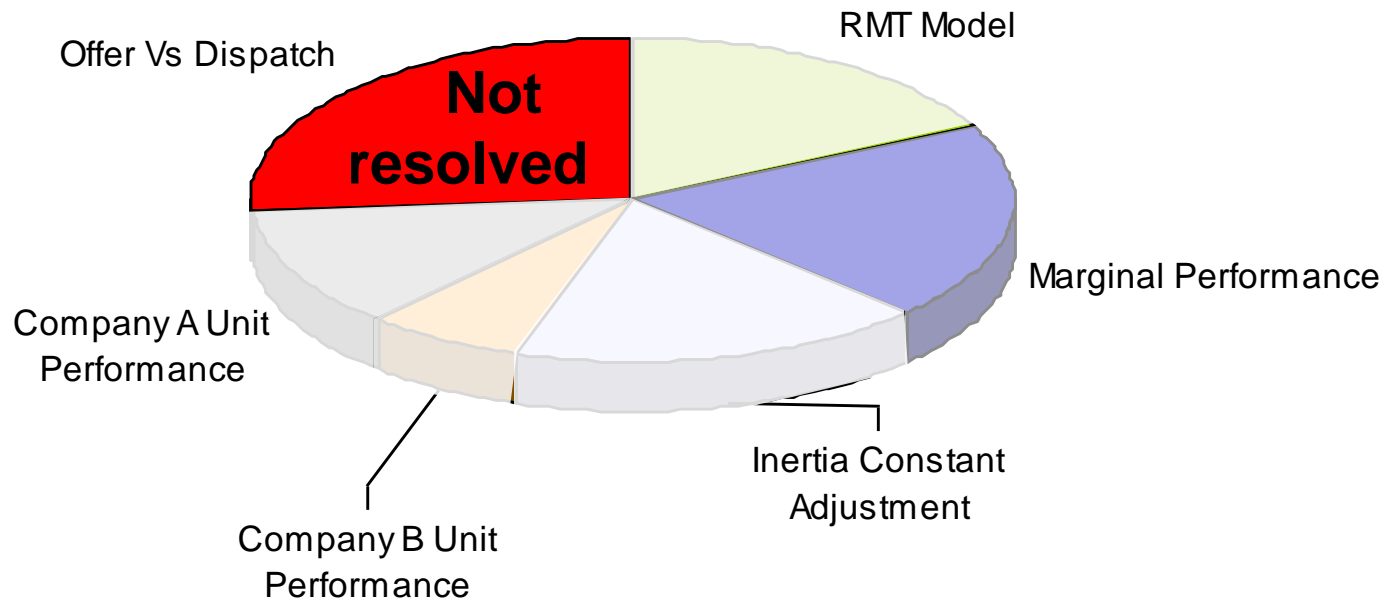
# Findings



# Findings



# Findings



# End of technical session

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