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# Active Fault Level Management

Jonathan Berry

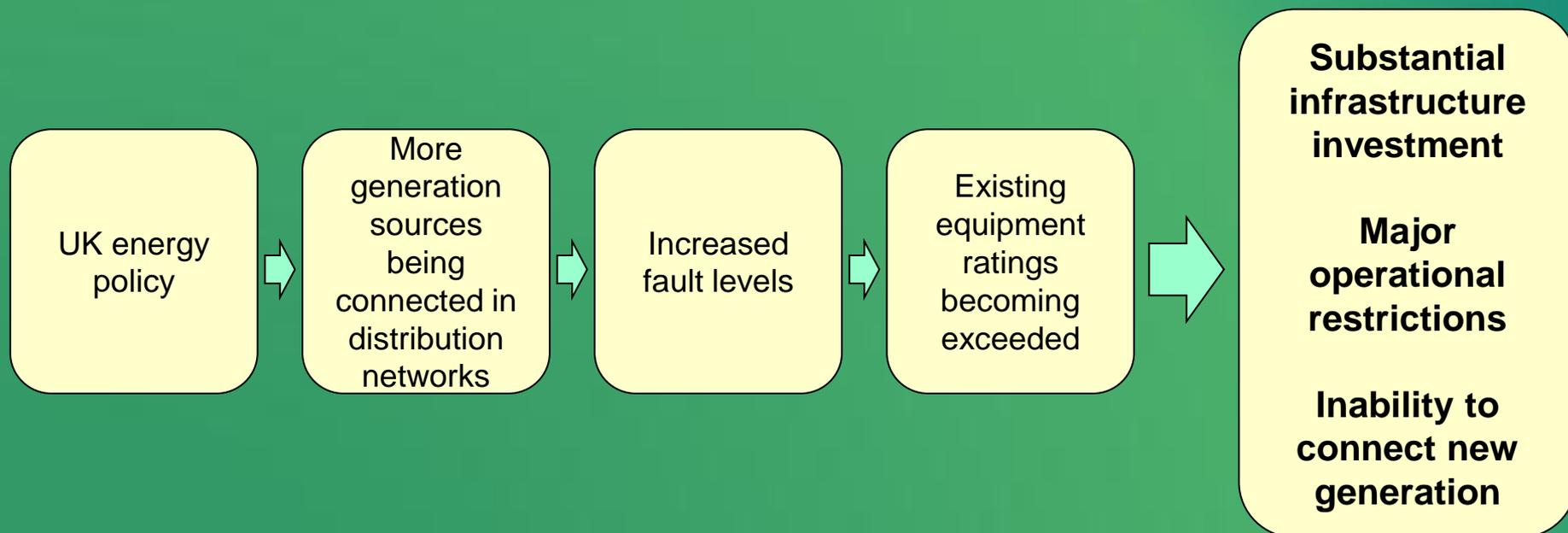
LCNF Conference

25<sup>th</sup> October 2012

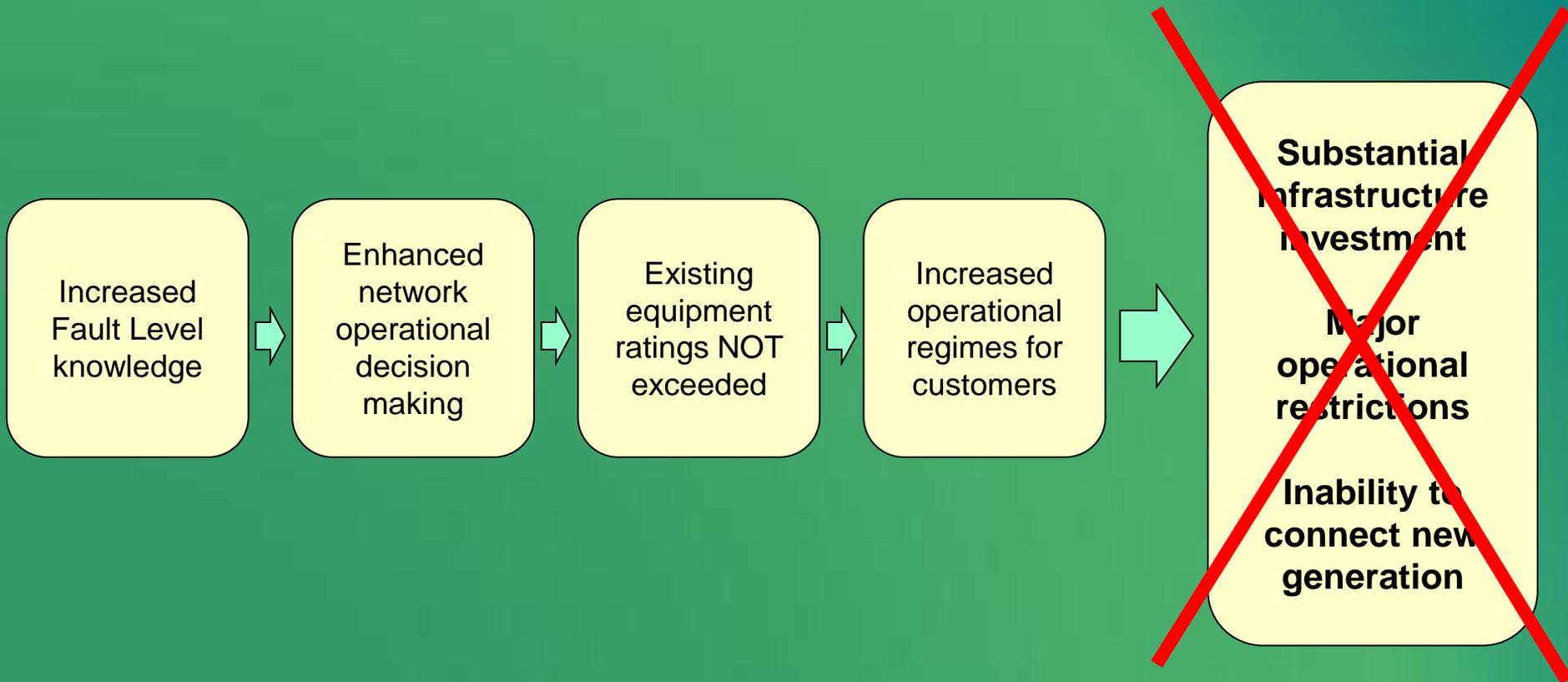
# Agenda

- Why monitor Fault Level?
- Development and testing of an active FL monitoring device
- Next steps for the Project

# Why Monitor Fault Level?



# Why Monitor Fault Level?



# Development of an Active System

- Move from natural disturbance to artificial disturbance detection
- Device to create an artificial, non-customer affecting, disturbance



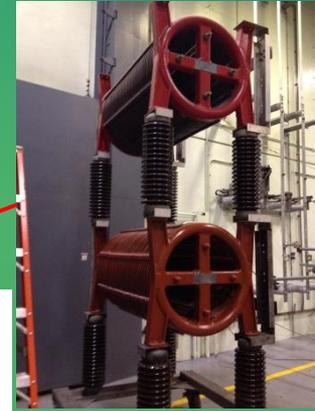
S&C IntelliRupter



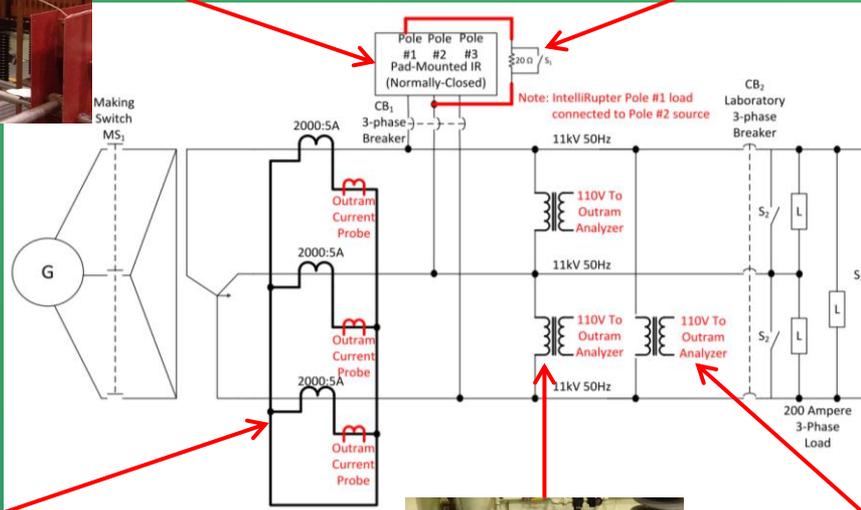
# Active FLM Testing



IntelliRupter



Inductor



Current Transformers



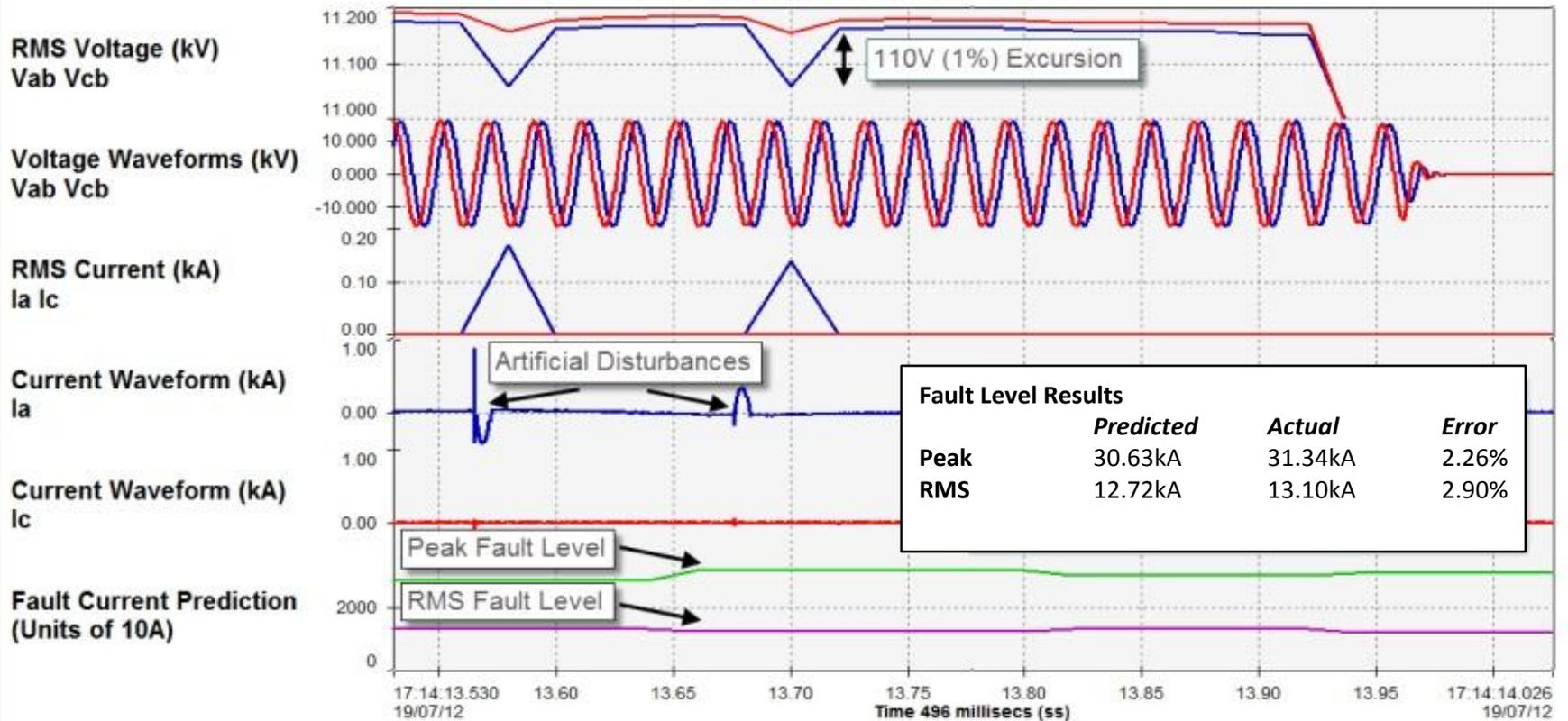
Voltage Transformers



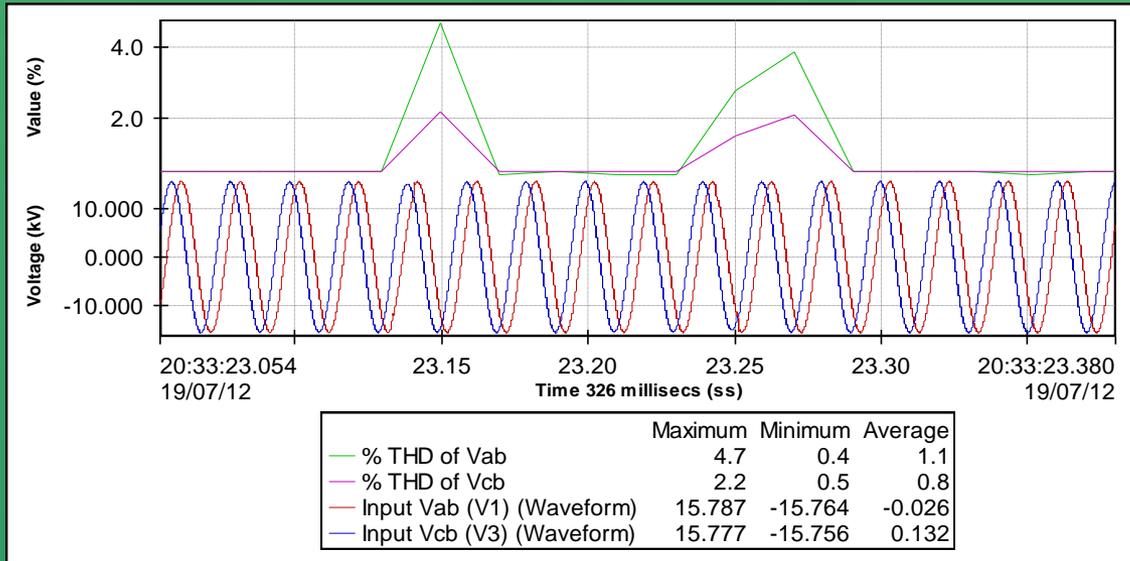
PM7000 - FLM

# Active FLM test results

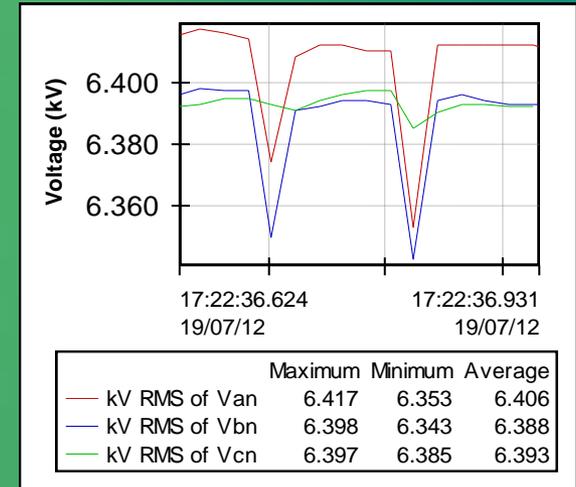
Fault Level Factory Tests July 2012



# Harmonic and Voltage test results



Harmonic distortion caused by FLM



Voltage fluctuation caused by FLM

**Both tests were carried out using the factory acceptance test arrangement**

- **Maximum voltage fluctuation is 1% in a 300ms timeframe**
  - This result is ER P28 compliant
- **Maximum Total Harmonic Distortion is 4.7% in a 300ms timeframe**
  - This result is ER G5/4 compliant
- **Fault Level prediction accuracy within 4.5%**

# Development and Next Steps

## Natural disturbance monitoring

- Utilise network events to monitor changes in voltage and current
- Fault Level data stored for analysis

## Artificial disturbance monitoring

- Utilise artificial events to create changes in voltage and current
- Determine Fault Level in real-time

## Real-time Fault Level monitoring

- Use natural and artificial disturbances to monitor Fault Level
- Connected to 11kV network
- Real-time Fault Level values to be communicated to central control centre

# Thank you

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