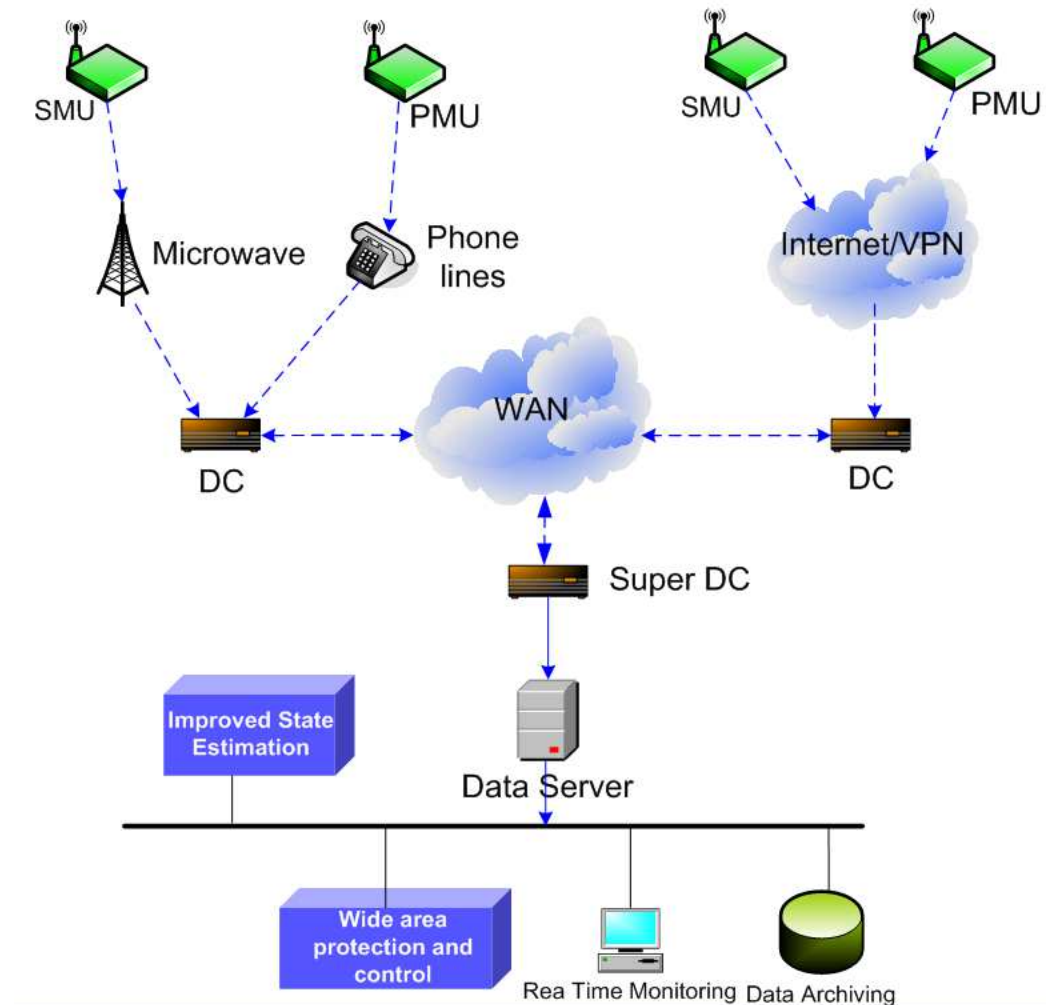


# GB Wide Area Monitoring Protection and Control (WAMPAC) Projects

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30 April 2018, Manchester, UK

# Generic SM-Based WAMPAC System



- **SMART Frequency Control Project**

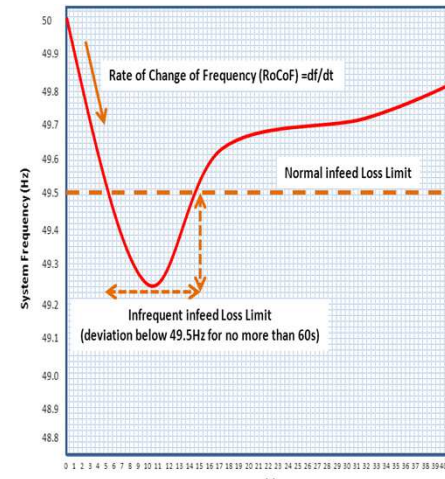
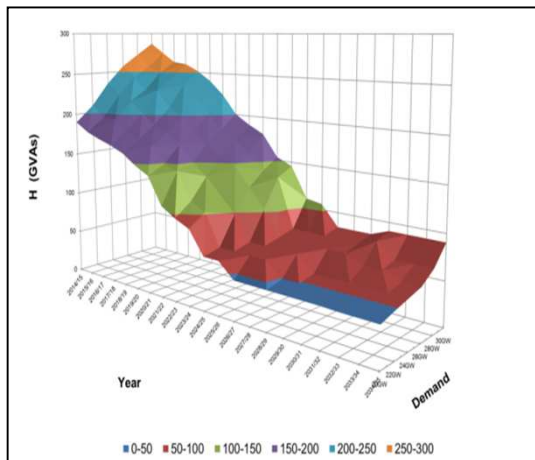
RIIO Network Innovation Competition funding scheme

# SMART Frequency Control

## RIIO Network Innovation Competition (Enhanced Frequency Control Capability, EFCC)



# Reducing Inertia: Potential Solutions



New Services

Solution

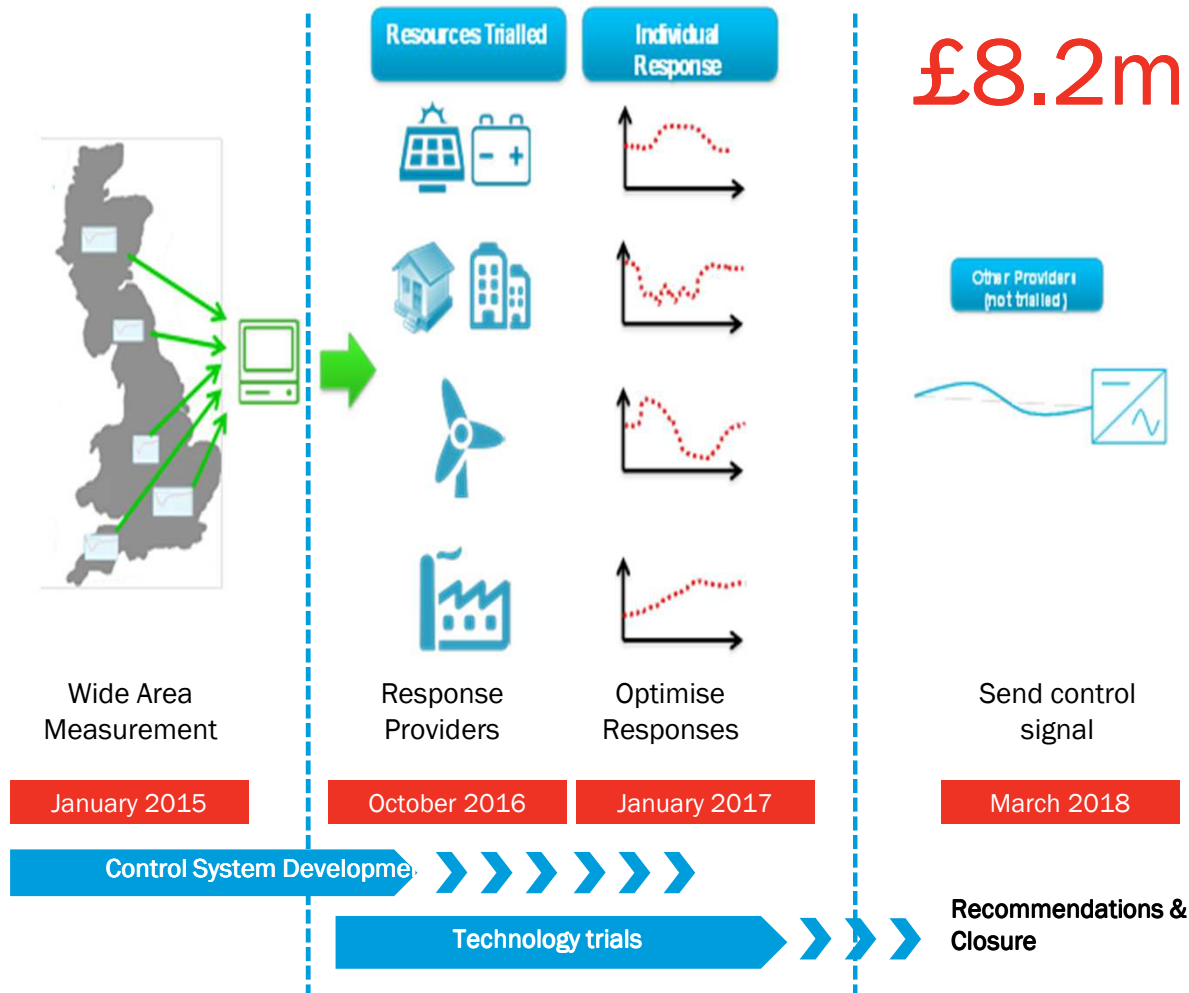
Enhanced Frequency Control (Fast Response)

Low Load Operation of Thermal Plants

Synchronous Compensator

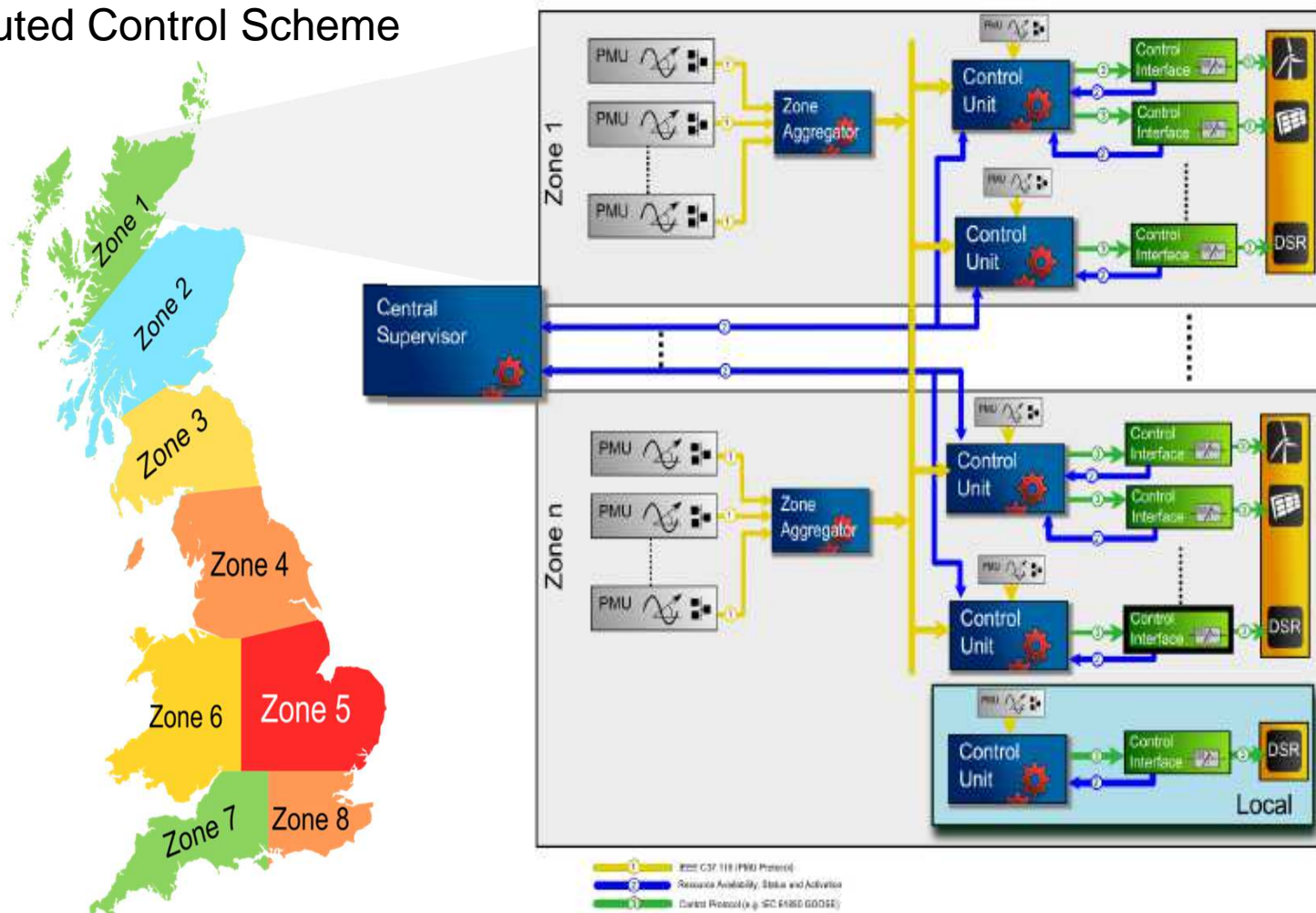
# SMART Frequency Control (SFC)

## EFCC - Enhanced Frequency Control Capability



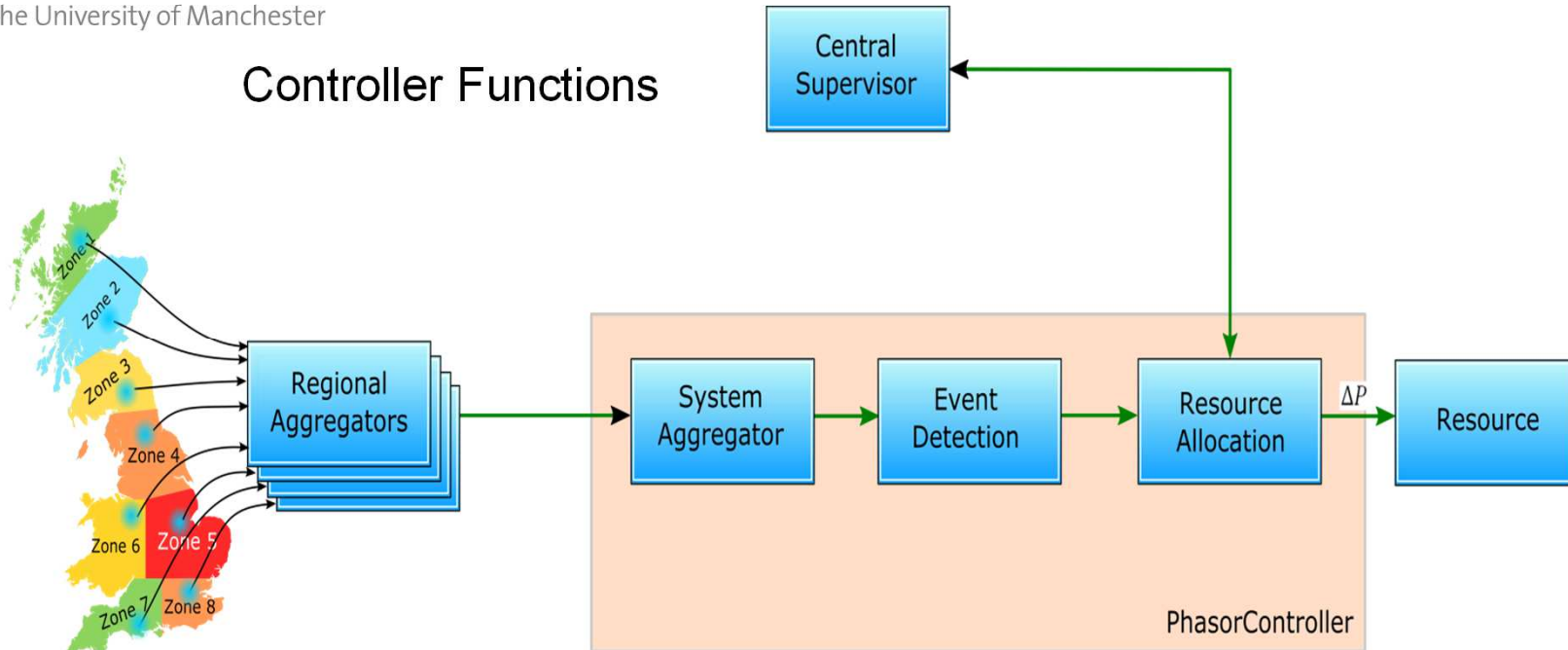
# SFC Wide Area Distributed Control

## Distributed Control Scheme



# SFC PhasorController

## Controller Functions



- System aggregator – confirmation of a true frequency event
- Event detection – measures Rate of Change of Frequency
- Resource allocation
  - Availability, capacity and ramp rates of resource
  - Optimise response requirement (speed vs cost)
  - Resources initiated to respond to specific event
- Activates response output



# SFC Summary

- Harness fast capability for much more rapid frequency movement in low carbon network
  - Many resource types & sizes, existing & new:*
    - storage, interconnector, demand, renewables, natural inertia*
  - Co-ordinated services...*
    - flexible to accommodate transmission, distribution & industrial needs*
    - combined for predictable, locational grid response*
- Wide area control for...
  - Accelerated & locational response, improving grid stability*
  - Avoiding negative effects: spurious triggering, distribution power quality, oscillations*

Opens fast response service to many diverse participants  
co-ordinated to provide predictable response, enhancing grid stability



The University of Manchester

**Thank You!**

# GB WAMPAC Projects

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