WESTERN POWER DISTRIBUTION
FALCON

DEVELOPING FUTURE POWER NETWORKS

ASSET MANAGEMENT

LCNI 2014 Wednesday 22nd October

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MILTON KEYNES

LCN Fund Low Carbon Networks • ALSTOM • Aston University Birmingham • CGI • CISCO • Cranfield UNIVERSITY

Asset Management

"Efficient asset management ensures that risk is effectively managed and returns on investment are ensured, whilst prolonging operational lifetimes and ensuring high levels of safety"
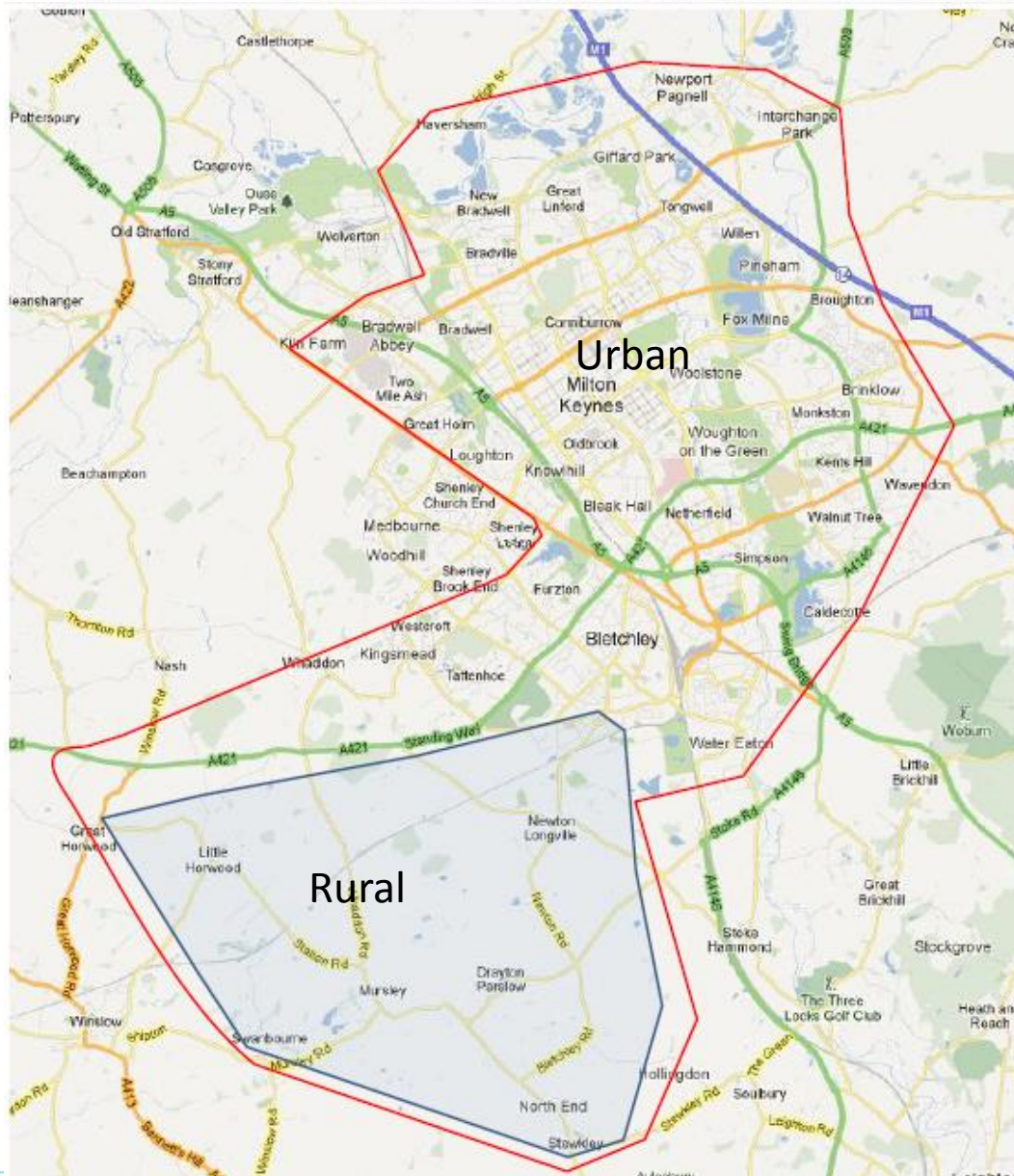
Presentation Outline

- What is FALCON

- How may FALCON influence Asset Management in the future

- Early Lessons Learnt & Reflections

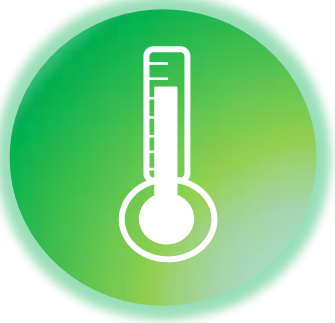## Flexible Approaches to Low Carbon Optimised Networks
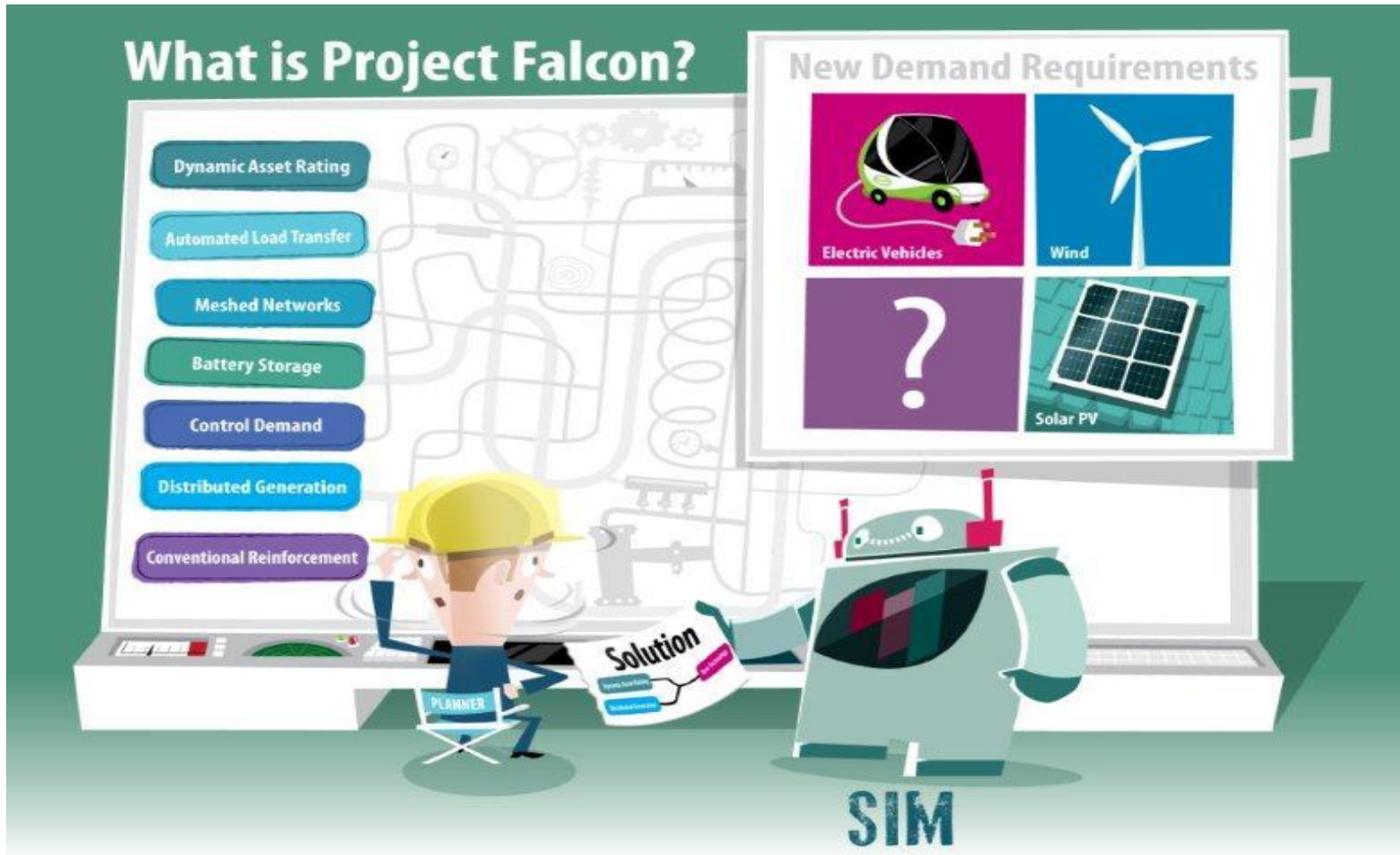
Milton Keynes

200 Substations in FALCON Trials

- 9 Primary Substations
- 800 Secondaries in trials area- c.195 have comms
- 50 have active equipment involved in trials
- Mix of Urban & Rural

Engineering Techniques

Dynamic Asset Rating

- ➤ Real-time asset monitoring to increase capacity.

- ➤ Transformers and Underground Cables

- ➤ Consider additional lifetime degradation

- ➤ Planning basis - understanding of profiles.
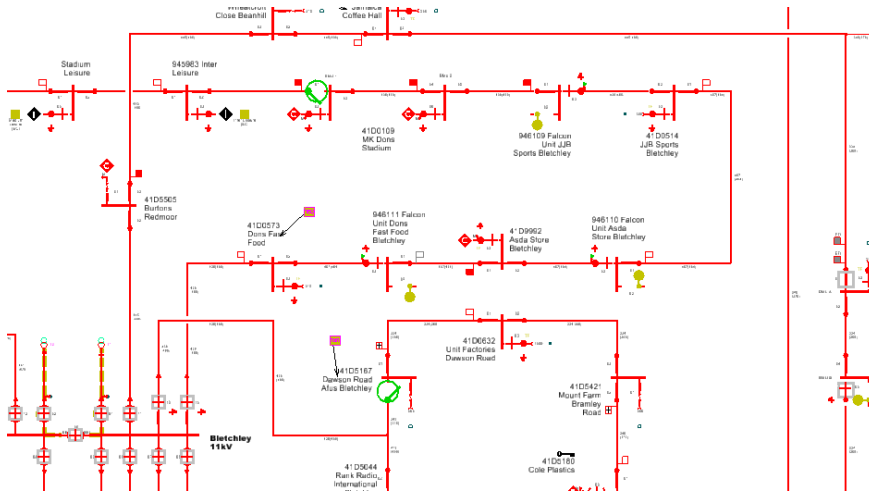
Engineering Techniques

Automated Load Transfer

- ➢ Real time transfer of load across feeders and primary sub stations

- ➢ Active network management maximising utilisation of existing capacity

- ➢ Automated load transfer during peaks

- ➢ Voltage regulation

Engineering Techniques

Meshed Networks

- ➤ Creating rings from radial networks – alter protection.

- ➤ Better load distribution , releasing spare capacity and reducing losses.

- ➤ Improved Voltage regulation and stability , making distributed generation easier to connect.

- ➤ Reduced customer impacts from circuit faults

Engineering Techniques

Battery Storage

➢ Reducing peak flows in HV feeders

➢ Voltage support

Commercial Techniques

Load Reduction

Distributed Generation

1. Control customer demand using innovative commercial arrangements. Relieve pressure on network for short term peaks.
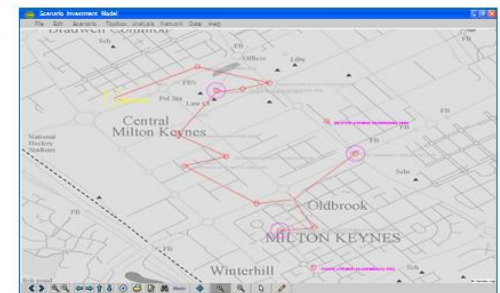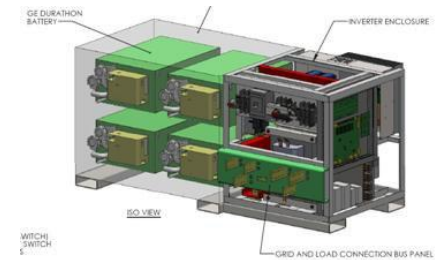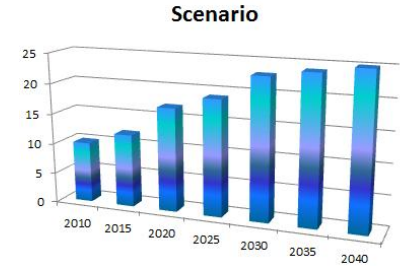
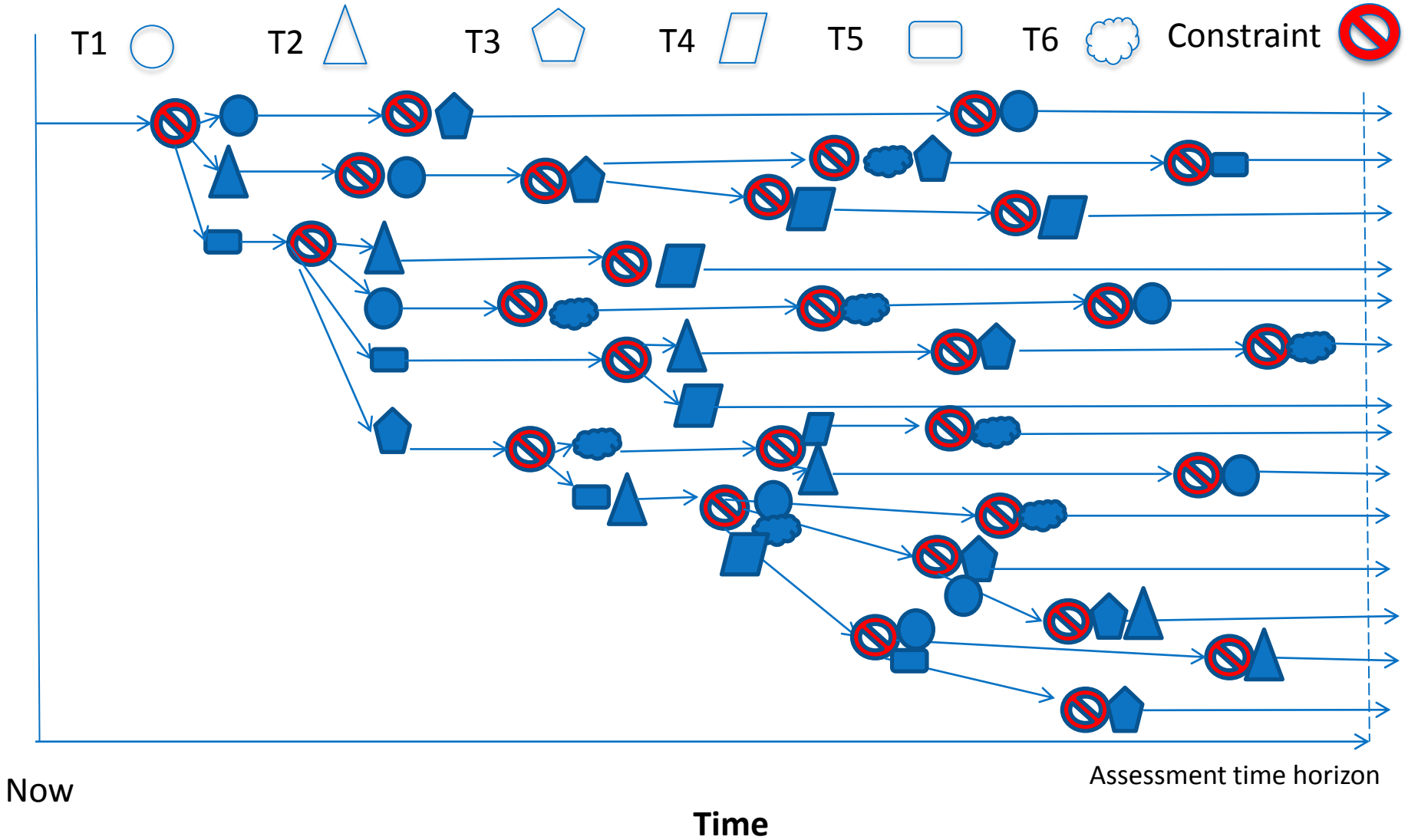2. Control of distributed generation using innovative commercial arrangements

Authorised Network Model

- Algorithm for combining data from Control room, GIS ,Asset Management and other systems.

- Make a model supporting more than just 'vanilla' power flow & fault level studies – asset characteristics - fixed data.

- Report data inconsistencies - Incorporate some prototype data correction and quality reporting utilities

- Configurability e.g. to support other regions' POF set-up.
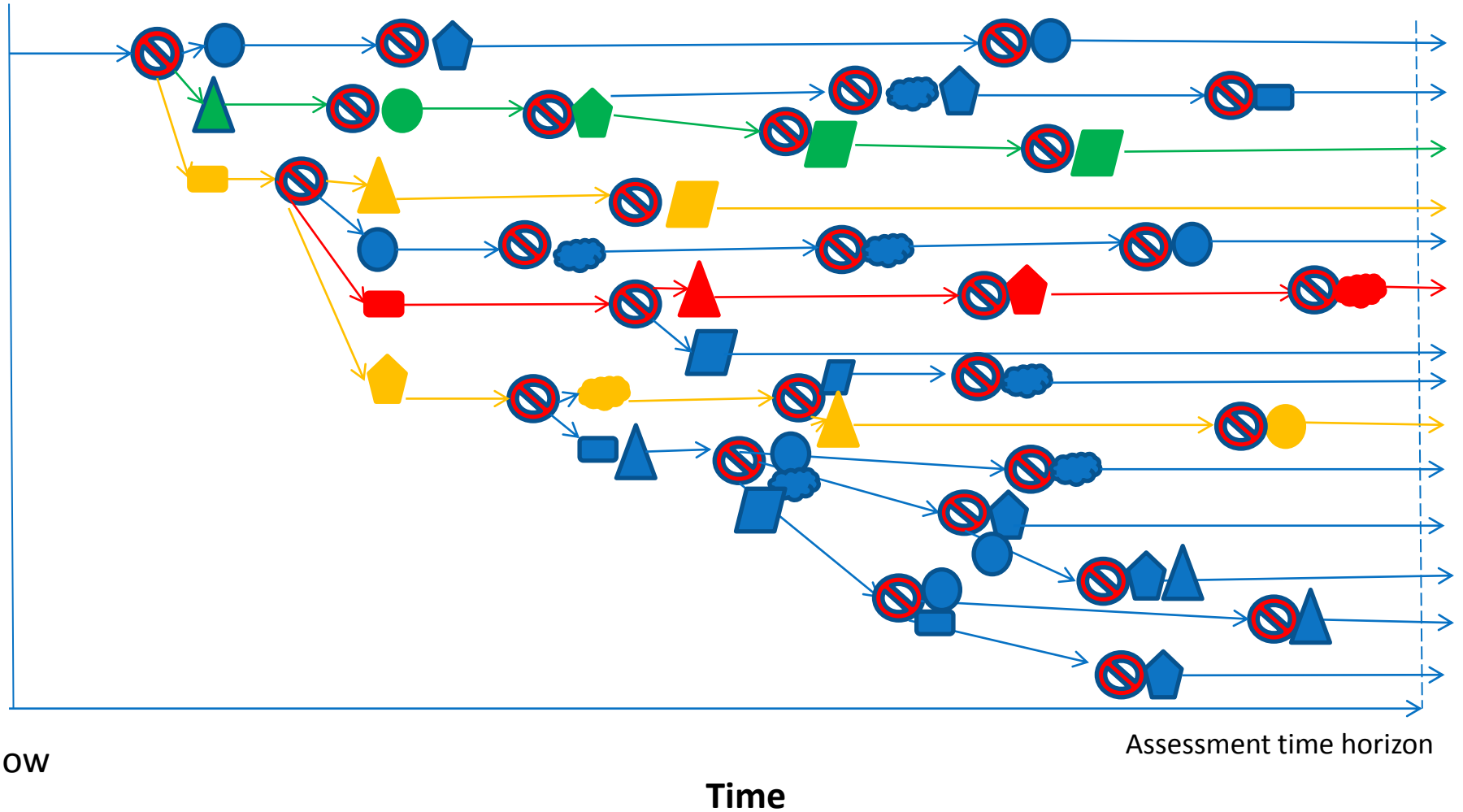
What is the SIM?

- Brand new concept rather than traditional 11kV planning tool

- Use of extended time horizon

- Looks into future network scenarios

- Assess solutions against multiple criteria (cost, customer disruption etc.)
  Analysis & visualisation of results
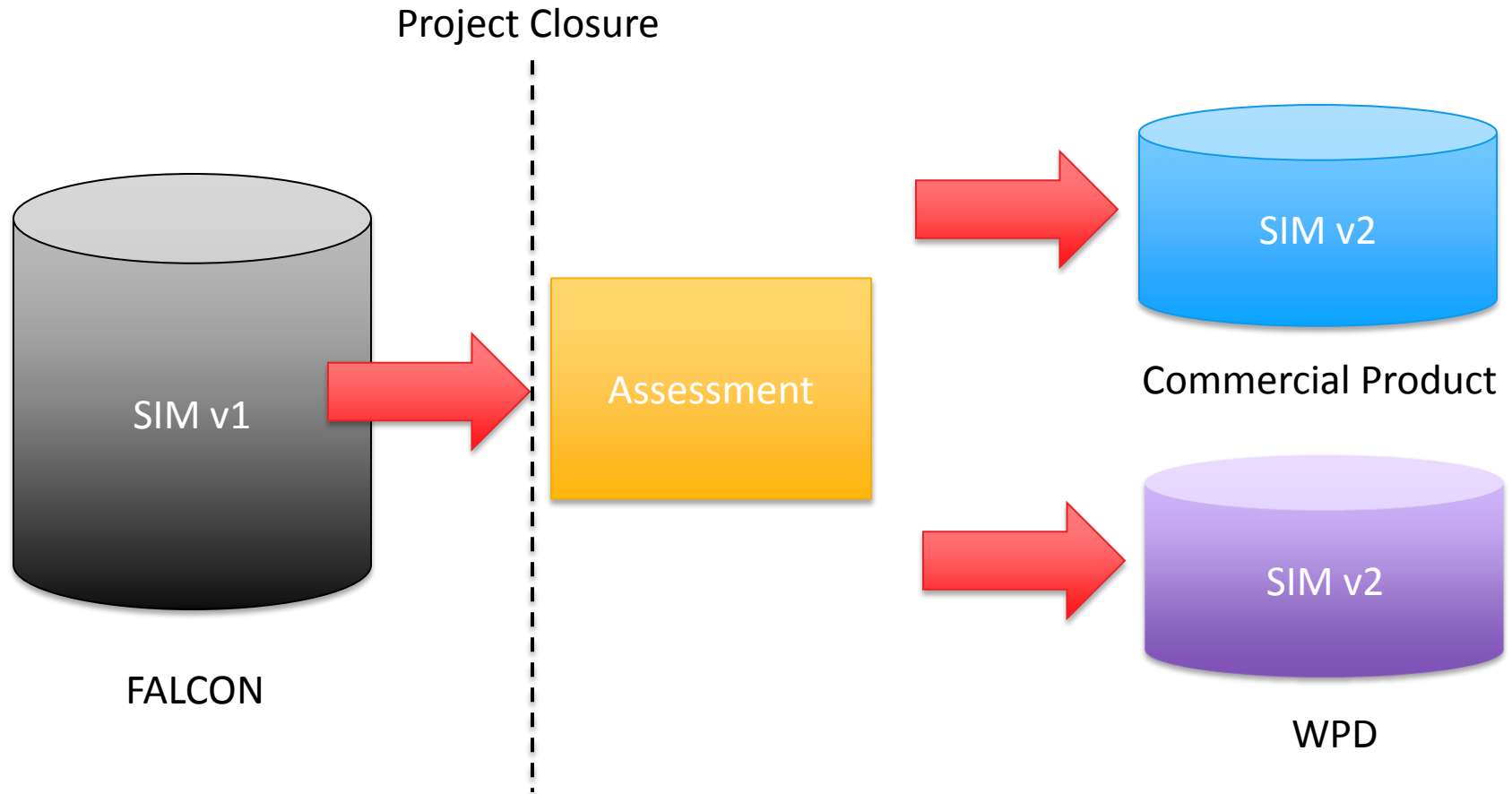
- IPSA – used as Network Modelling Tool

T1 ◯ T2 △ T3 ⬠ T4 ▱ T5 ▭ T6 ☁ Constraint 🚫

Now

Assessment time horizon

Time

Optimisation

Now

Assessment time horizon

Time

How may FALCON influence Asset Management in the future

If SIM is proven to be valuable

- At project closure SIM will be assessed

- Further development either with or independent of WPD

- Additional functions could be :

  - Extend the range of techniques

  - Extend the range of networks - LV, 33kV, 66kV

  - add remaining useful life and health data into key intervention decisions i.e. coordinate load related reinforcement with asset health driven replacement program

  - infeed data could be delivered by an innovative data management tool

  - deploy advanced visualisation

Lessons Learnt/Reflections

- SIM has shown value of having an integrated data model (encompassing asset data information)

- Having a definitive list of assets and equipment is crucial especially when implementing (telco's and assets etc.)

- Clear that existing data and tools will need to be refreshed for smart(er) grids

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Serving the Midlands, South West and Wales

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