Topic 6: System Services

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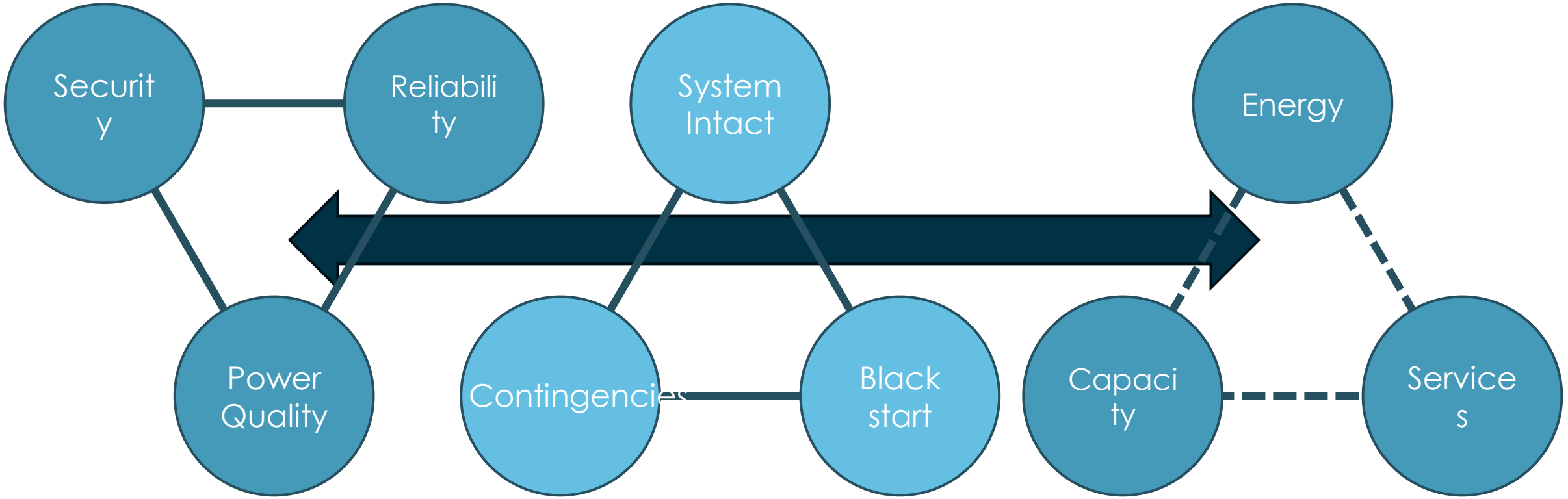
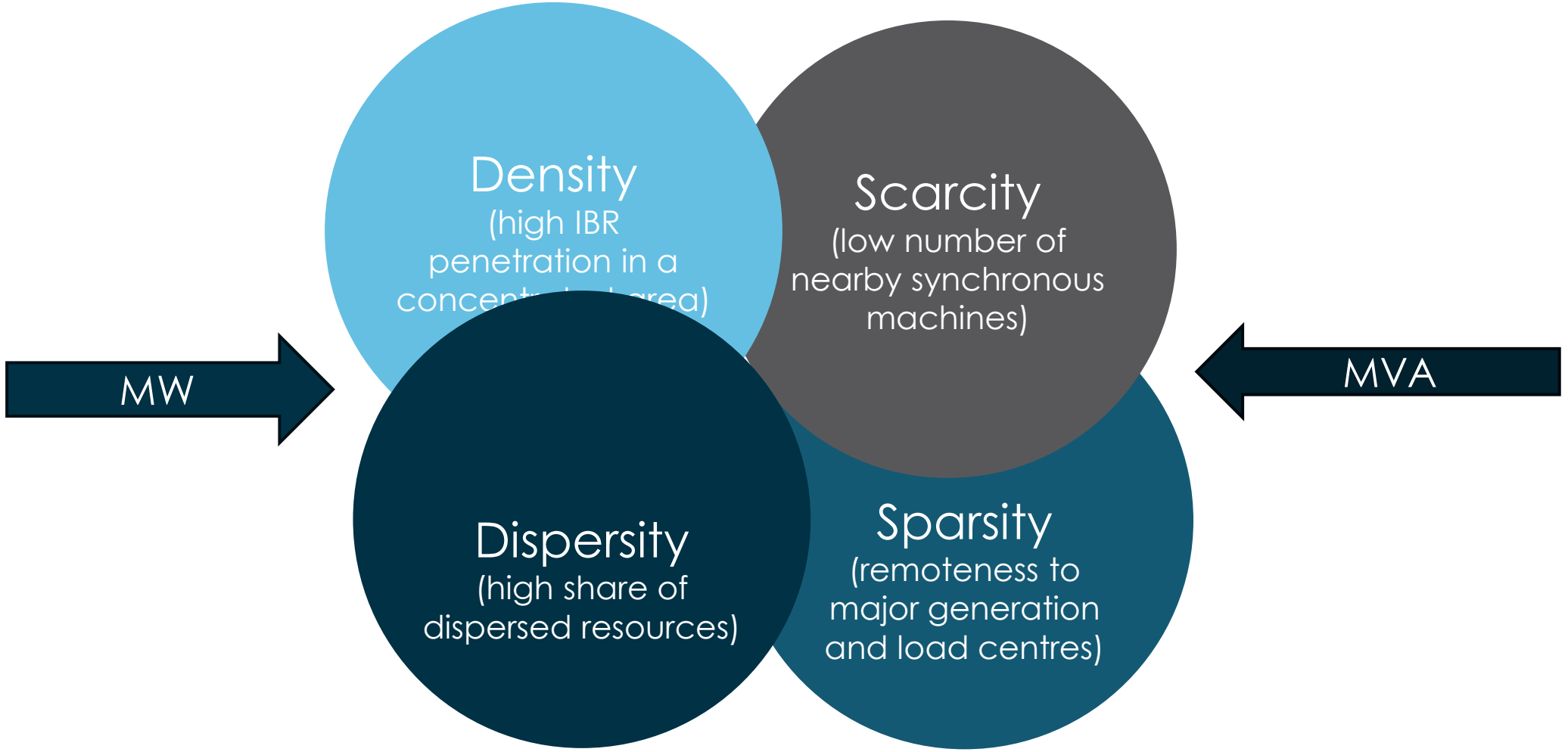
Power system needs



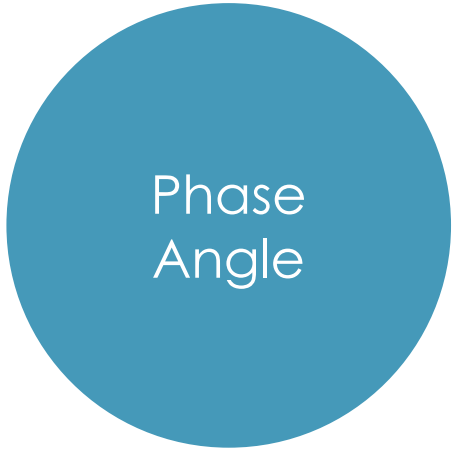
System attributes impacting stability



Essential power system attributes

Why voltage is important?

- Voltage stability
- Fault ride-through capability



- Synchronisation
- Phase jump / RoCoF withstand capability

- Harmonics
- Unbalances
- Interactions and resonances
- Protection

- Harmonics
- Unbalances
- Protection

Are all IBRs the same?

GFL vs. GFM

More capable vs less capable grid-following

With vs without ancillary equipment

Short-term vs long-term storage

Storage vs wind/solar

Large (wind) vs small (BESS/solar) footprint

Types of system services considered

Stability

Protection

Power quality

Restoration

Balancing

Emergency response

Steady-state reactive power

Network utilisation

Variability management

2024 Investigation areas

- Revisit of the research roadmap
- Development of a suite of EMT models to determine services evolution to 100% renewables
- Investigation of zero rotating machine NEM scenarios
- Explore translatability of conclusions to PDT modelling domain

Key considerations

Delineation between technical performance requirements and system services

The level and type of modelling details required to assess potential system services

Determining changes in system needs as the power system and generation mix evolves

Replicability of the results with an open-access model


Thank you