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Frozen Aliens and Superpowers

TEAtime Talks

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19th November 2013

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Workshop Outline

- Women in Engineering
- Cryogenics (lots of demos)
- Superconductivity (even more demos)
- The Future of the Grid (group activity)
- Round-up & questions

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Women in Engineering

What does engineering mean to you?


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THIS IS
ENGINEERING

Some unsung heroes

- Ada Lovelace (1815-1852) World's first computer programmer
- Emily Warren Roebling (1843-1903) Brooklyn Bridge Chief Engineer
- Valentina Tereshkova & the Mercury 13 (1963, 1959)
- Lene Hau (1959-present) Quantum Computing pioneer
- Mars Curiosity Rover Engineers (2013)

WISE

Science Women

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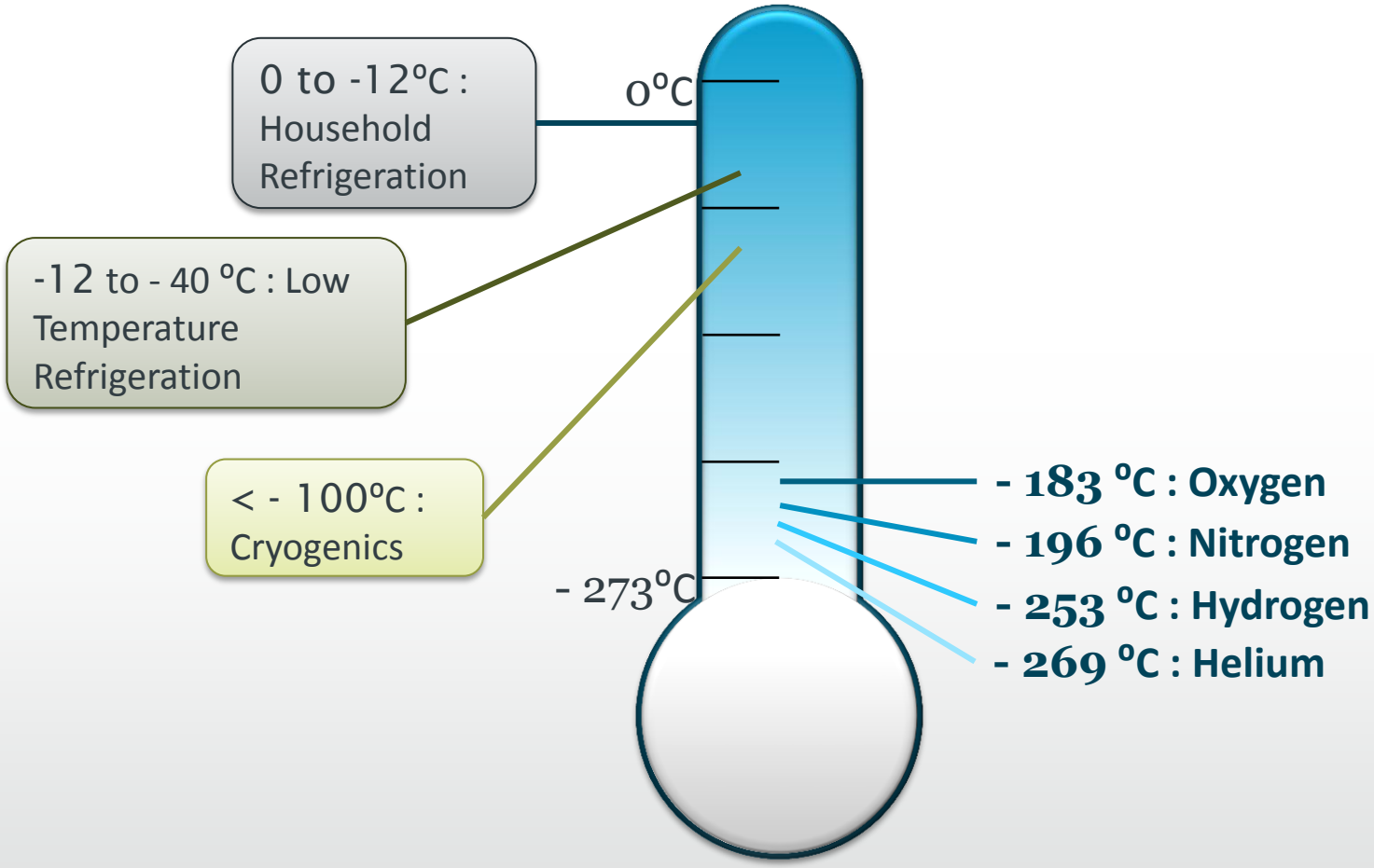
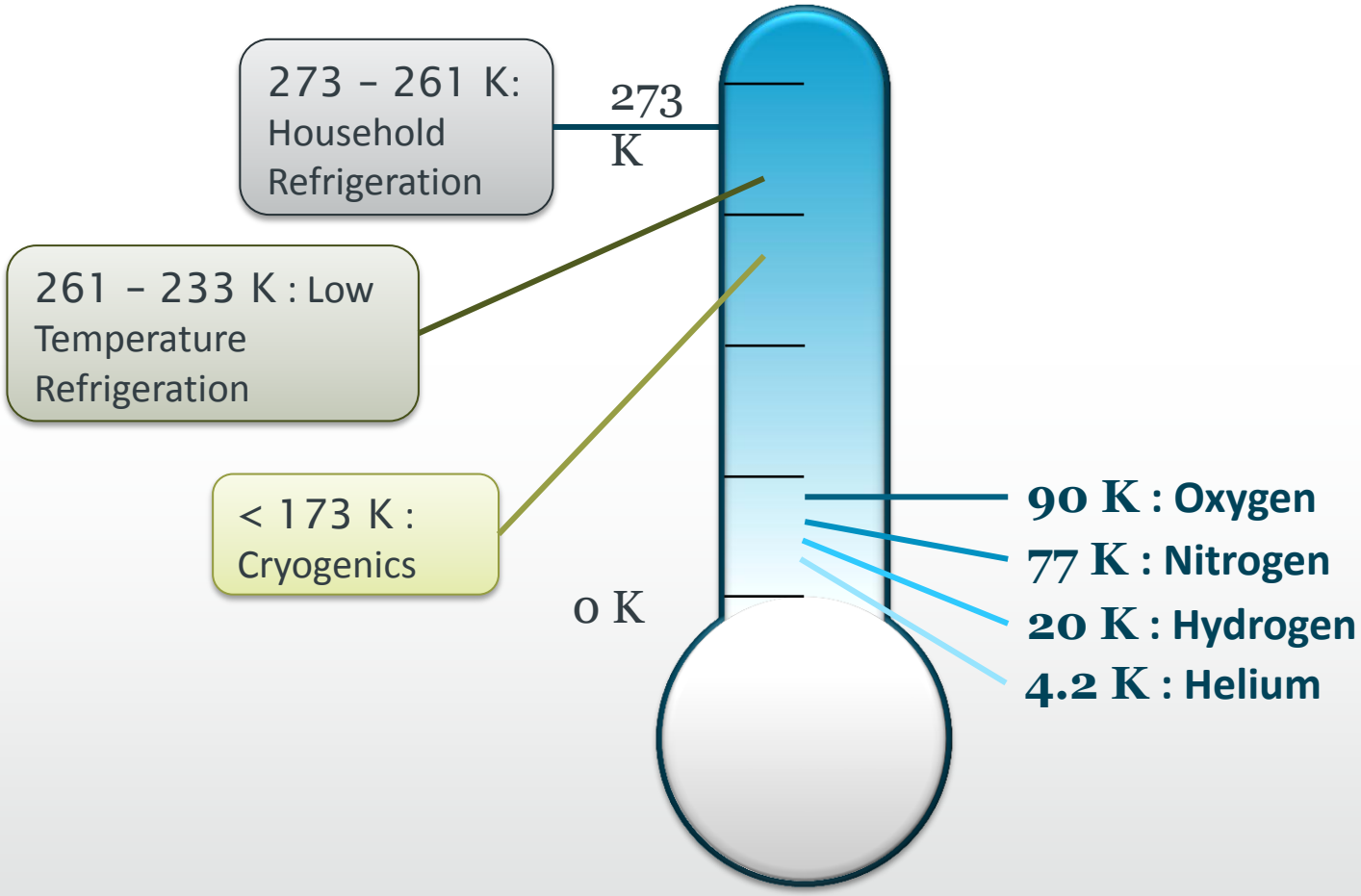
What is Cryogenics?

Cryogenics


0 to -12°C : Household Refrigeration
-12 to - 40 °C : Low Temperature Refrigeration
< - 100°C : Cryogenics
0°C
- 273°C
- 183 °C : Oxygen
- 196 °C : Nitrogen
- 253 °C : Hydrogen
- 269 °C : Helium

Cryogenics (Kelvin)




Science

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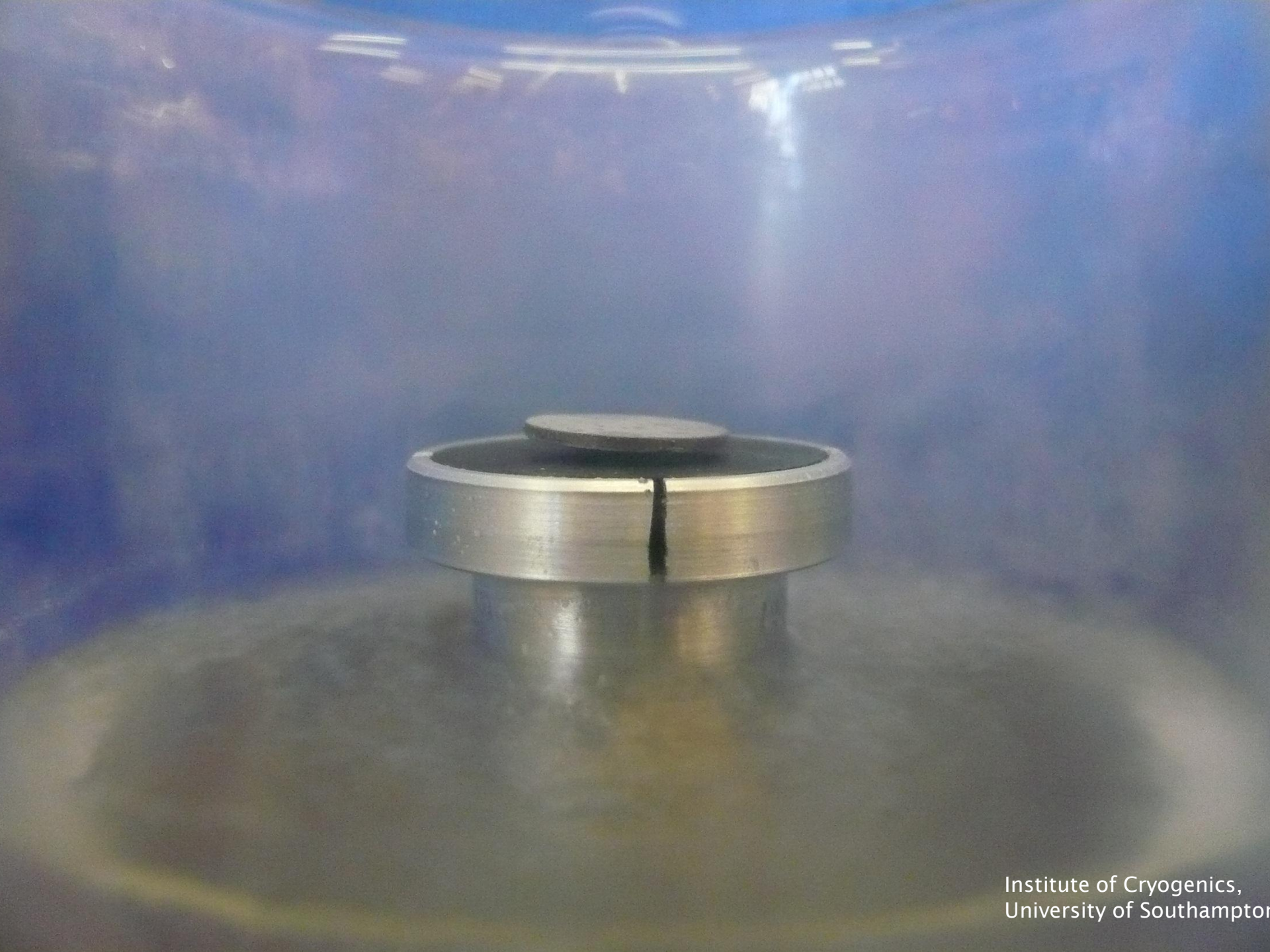
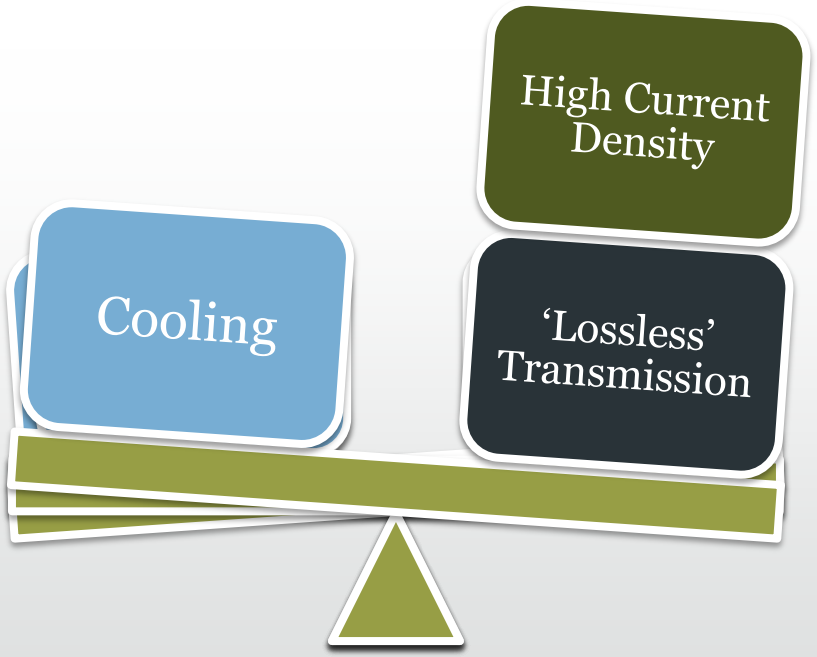
Superconductivity


Institute of Cryogenics,
University of Southampton

Superconductors vs Copper/Aluminium

Disadvantages	Advantages



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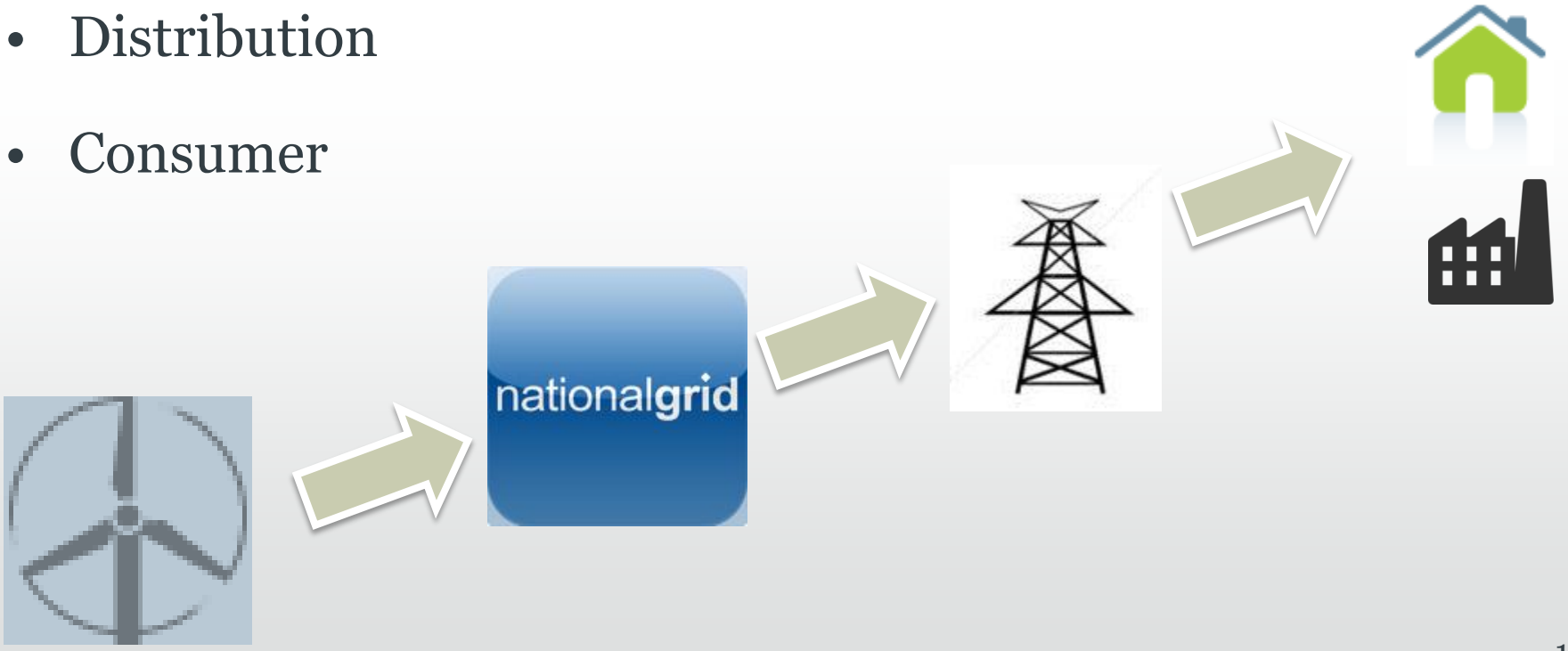
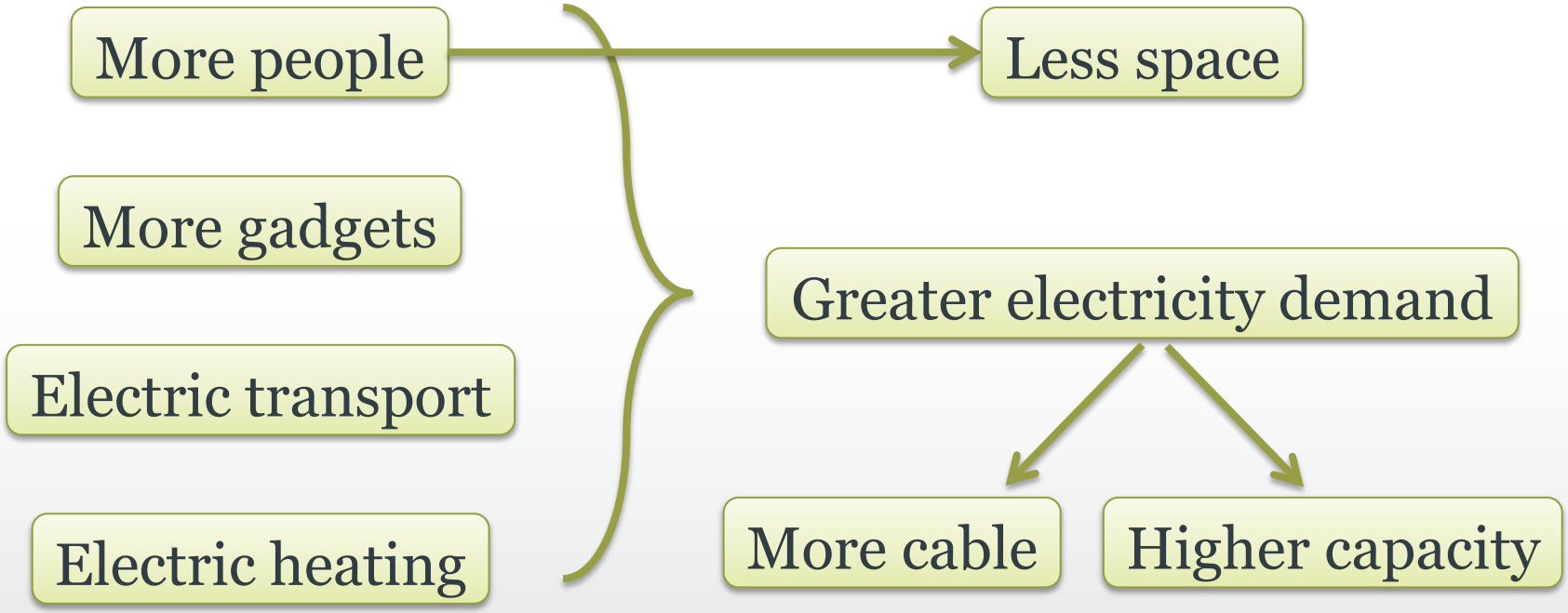
The Future of the Grid

Making Electricity Flow – Today's Grid

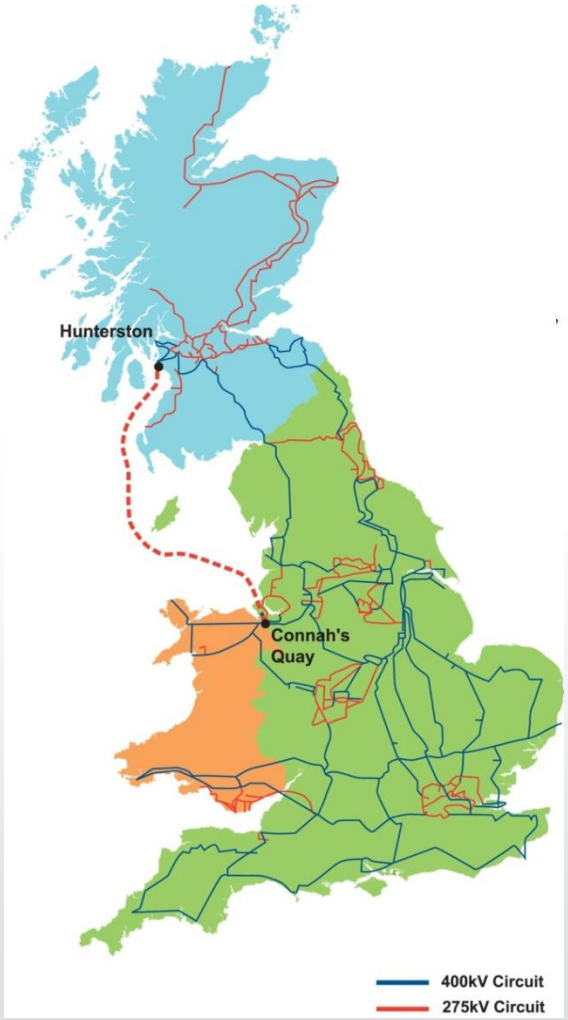
- Generation
- Transmission (high voltage)
- Distribution
- Consumer

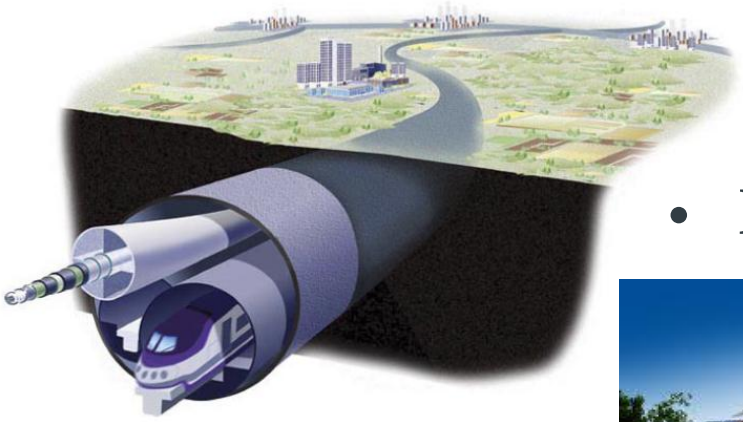


Making Electricity Flow – Challenges



Grid Solutions





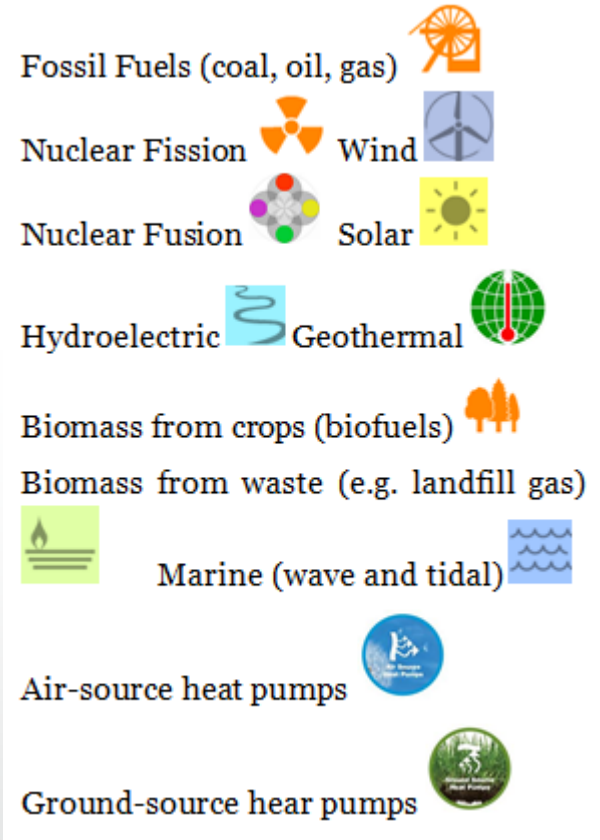
- Supergrid

- Microgrids

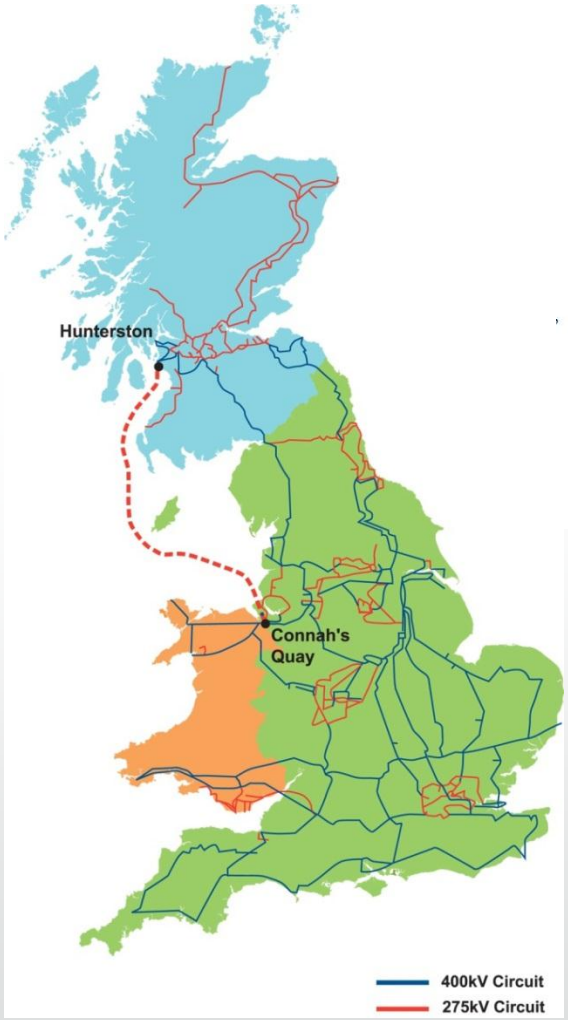
- Smartgrids

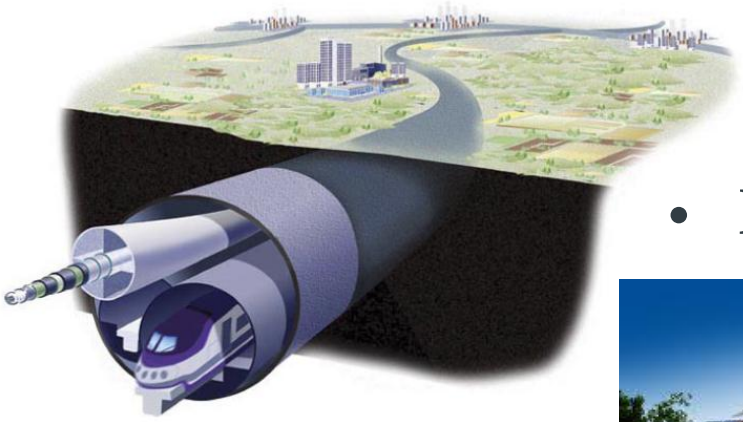
Designing the Grid of the Future

- Energy sources –where can they go?
- Transmission line:
  - Conventional vs Superconducting
  - Overhead vs underground
- Substations and consumers:
  - Transmission & distribution
  - Supergrids and microgrids
- Social/economic considerations



Grid Solutions





- Supergrid

- Microgrids

- Smartgrids

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Thanks for staying awake!