

Innovation by Digitalisation

The future of Electric Energy and what skills do Engineers need to realise it?

Presentation to NSW Annual Electric Energy Conference 2018

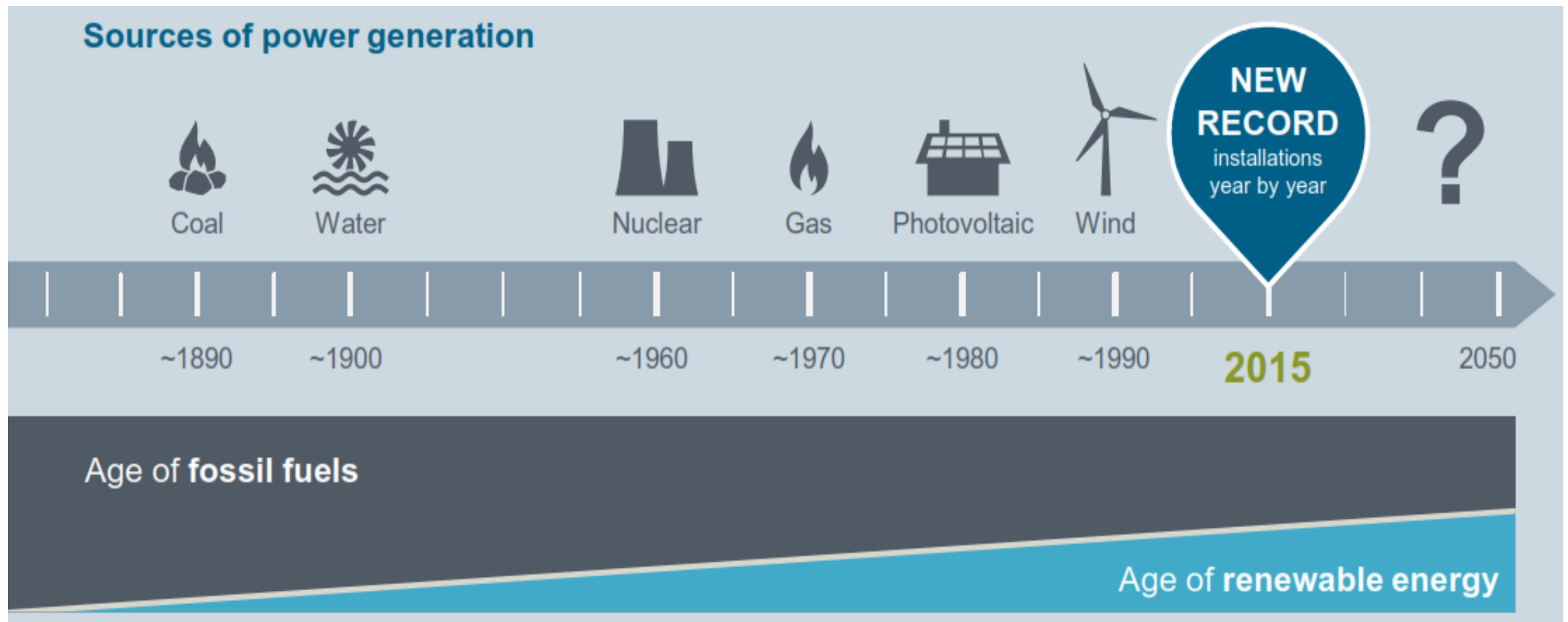


Robert Ceic - CPEng FAIE

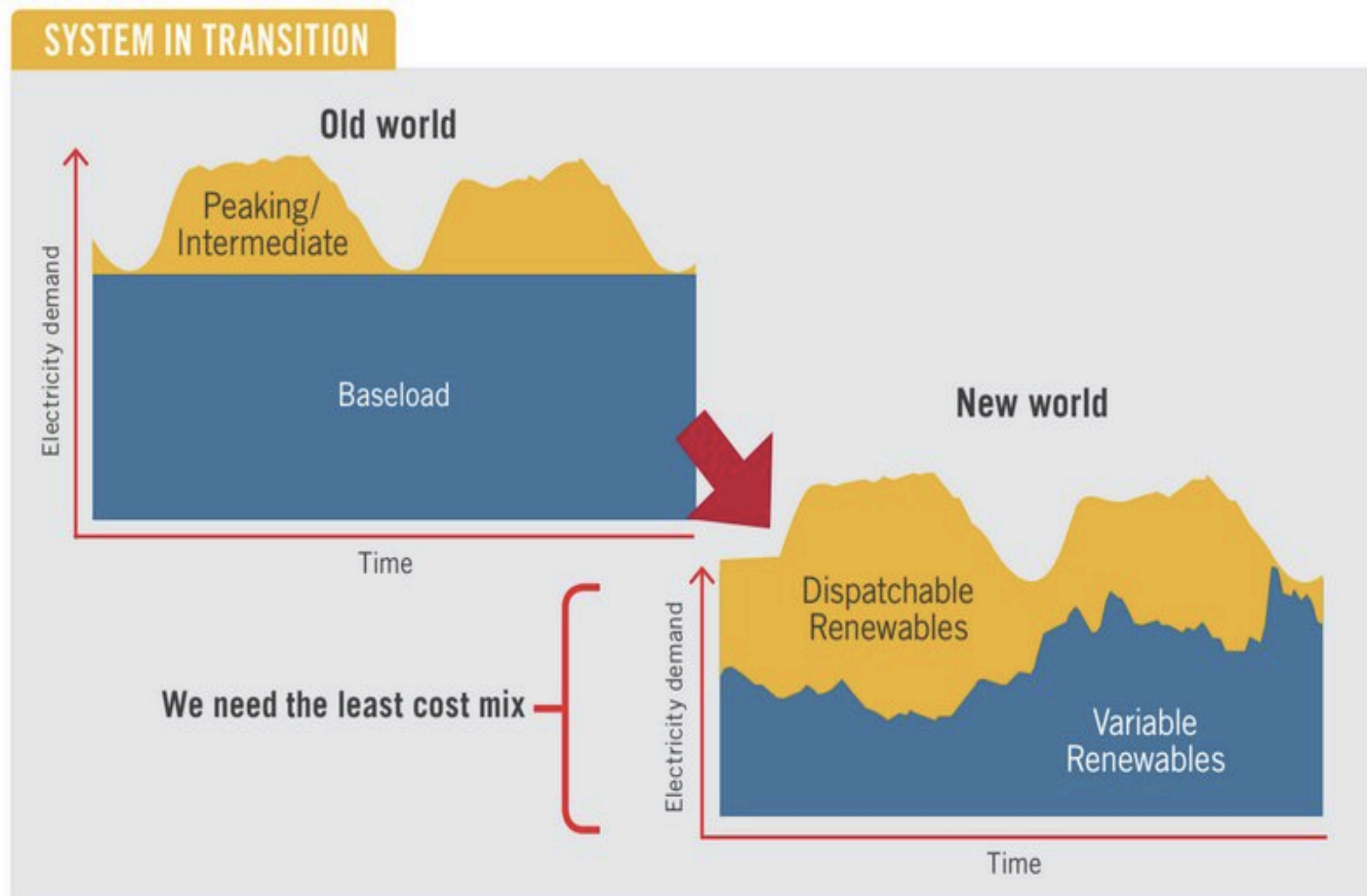
Service Line Leader - Power Generation & Renewable Energy



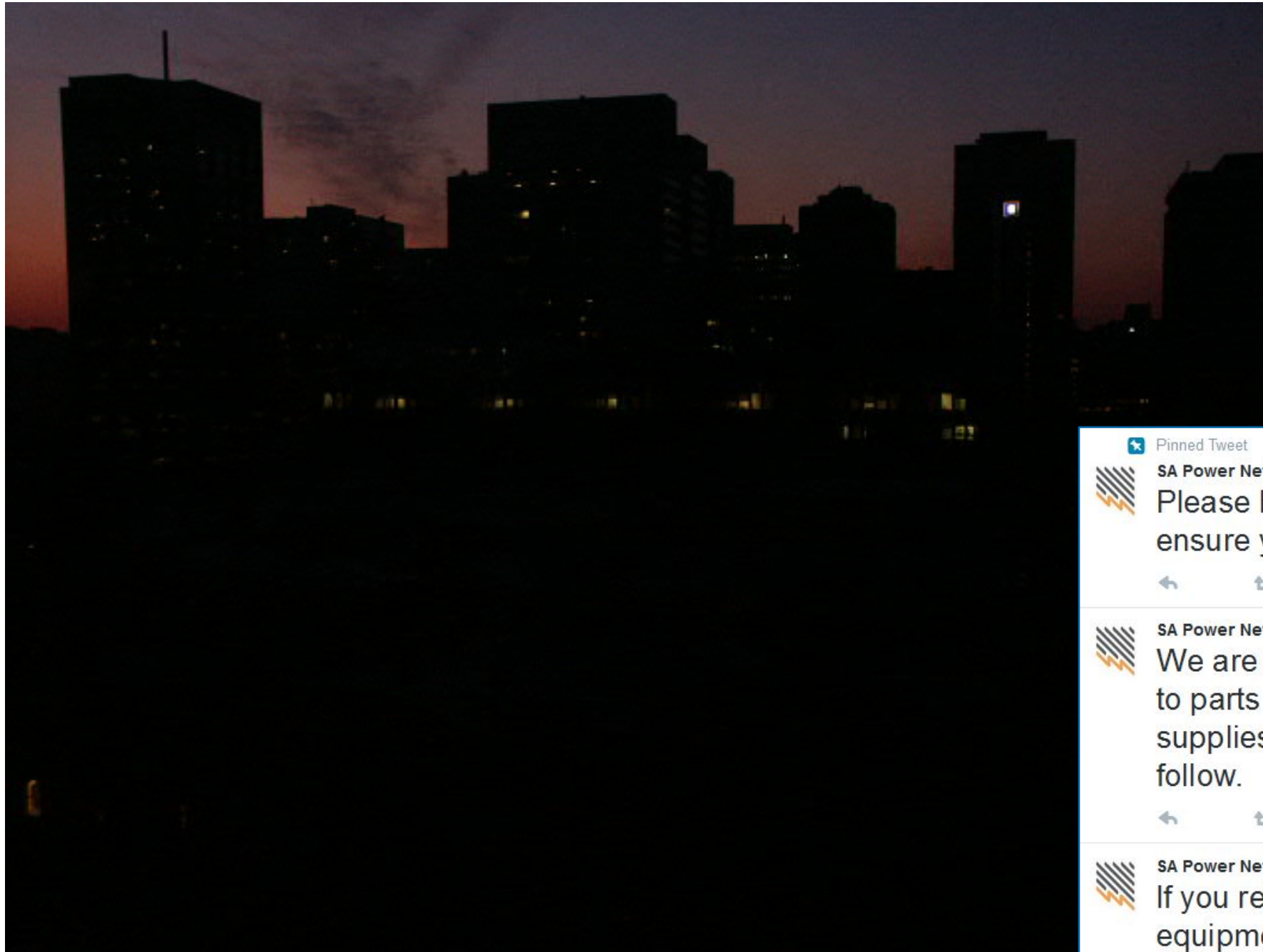
The Energy Transition




Cost!





South Australia



Pinned Tweet

 **SA Power Networks** @SAPowerNetworks · 6h
Please brace for extended outages and ensure you conserve mobile device battery.

 **SA Power Networks** @SAPowerNetworks · 4h
We are in the process of restoring power to parts of the metro area as transmission supplies become avail. More updates to follow.

 **SA Power Networks** @SAPowerNetworks · 6h
If you rely on power supply for medical equipment be prepared to action your back up plan.

The background of the slide is a dark blue gradient with a subtle grid pattern. Overlaid on this are numerous glowing blue lines and arrows of varying thicknesses, some pointing right and others in various directions, creating a sense of digital connectivity and data flow. Some lines have small white dots at their ends.

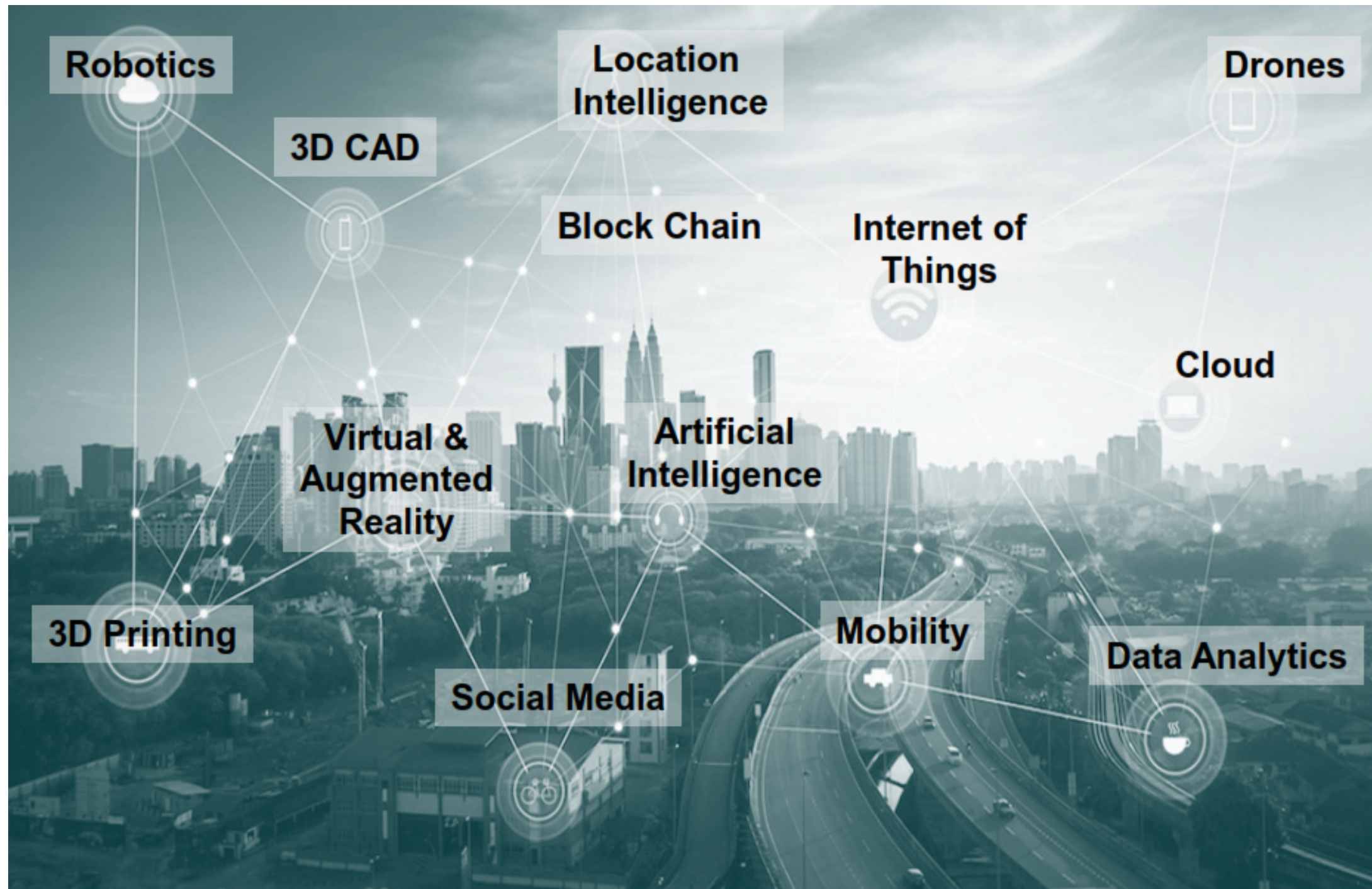
Digitalisation...

**DISRUPTIVE
FORCES
ARE
IMPACTING
OUR
INDUSTRY
&
SOCIETY**

Zero Cost of Computing
+
Internet
+
New Business Models in Power Sector
=
Disruptive Innovation



Digital Technologies



Source – GHD Digital Strategy 2018

The Digital Utility of the Future



Source – McKinsey & Company 2018

Examples....



Big Data

Digital Twin Power Generator
Optimised Operation
Concept to Commissioning

Machine Learning

Algorithms Self Tune Performance
Identify Patterns

Minimal Human Intervention

e.g. Cloud forecasting Solar PV,
Gas Turbine emissions tuning

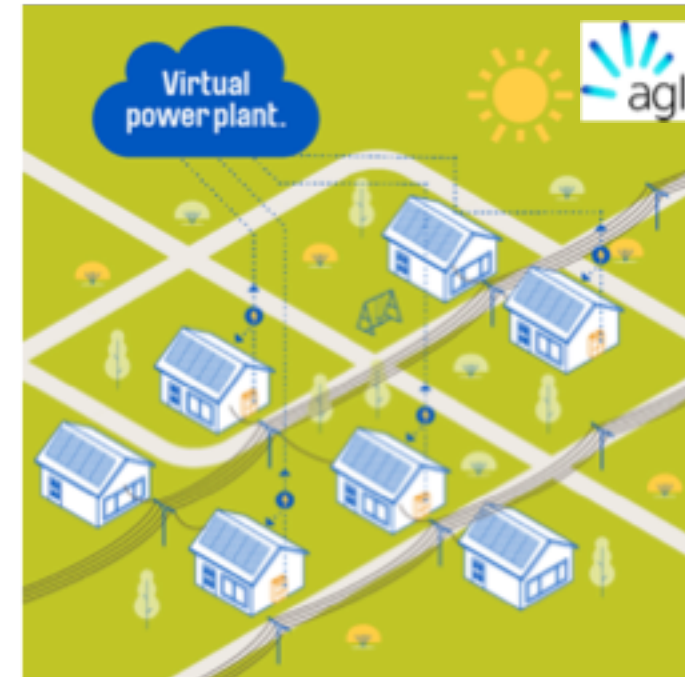


Virtual Power Plant

Distributed

Aggregates the capacities of DER's
Enhances Generation (and Trading)

Wide application of IoT



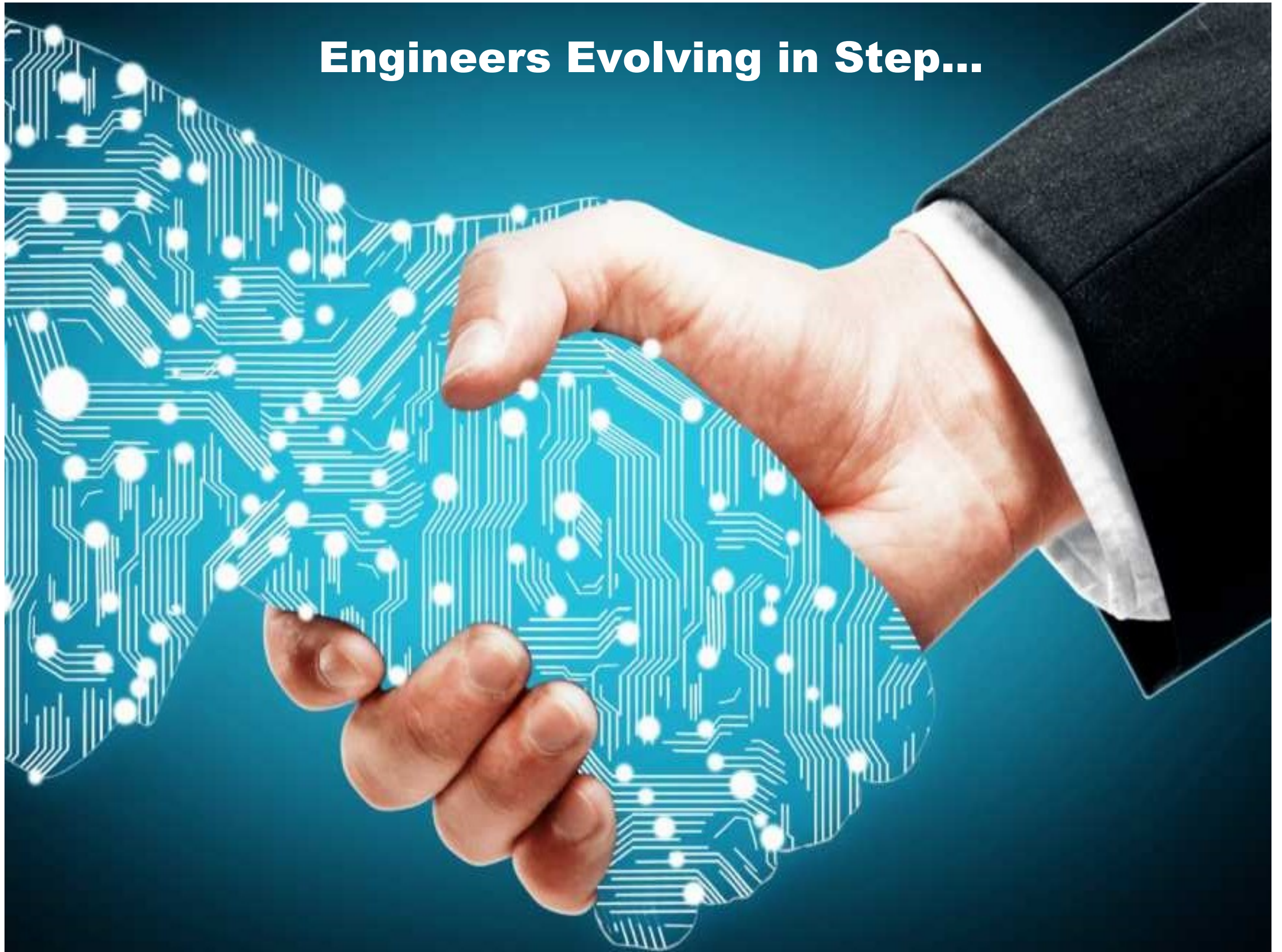
3D Printing

Advance Manufacturing

From concept to install

Parts printed not machined

Engineers Evolving in Step...



“...Australia’s energy future will require the expertise of Australia’s engineering profession. Engineers have the critical skills that can prosper in a future economy with reduced emissions, and engineers will be vital to a successful transition”



ENGINEERS
AUSTRALIA

The Future of Australian Electricity Generation

2017

Future Engineering and Engineers

- The power sector needs to and will to embrace digitalisation to address concerns of skills shortages
- Learning and training will include vocational training in Big Data or Drones for example
- Digitalisation will allow value engineering higher up the value chain
- At GHD we have implemented.....

BIM for Project design
and delivery

Drones for survey of HV
transmission
infrastructure



3D Printing

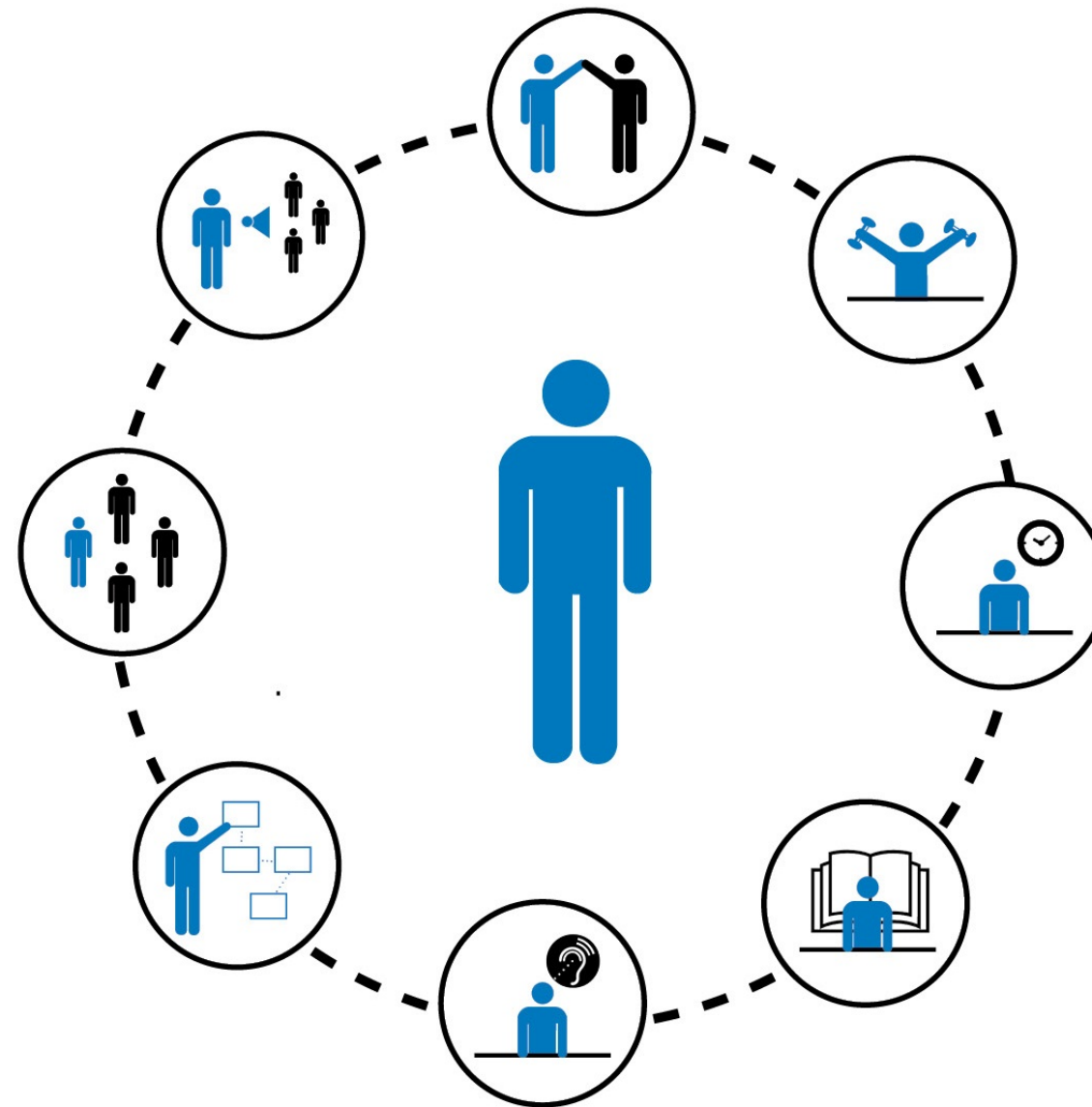
VR / 3D walkthrough for
plants and facilities



Unlimited Potential



The SOFT SKILLS! – let me explain



One millennial described the potential impact of a digital era by saying, “Digitization is forcing us to rethink work in general, even more with the rise of cognitive computing. We are going to see a shift in the skills we value.”

GHD Services for Power Projects



Hornsdale Wind Farm & Tesla Battery



DeGrussa Copper Mine - Solar Farm



Onslow Distributed Energy Resource (DER)
Microgrid Project



Carnarvon Battery Storage Trials

Thank You!



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