



ATCO | CLEAN ENERGY INNOVATION HUB LESSONS

ARENA INSIGHTS FORUM

November 2019

ATCO | Our Australian Operations

Customers

750,000

Distribution

14,000 km

Asset Value

\$1.5 billion

Gas Throughput

25,500 TJ p.a.

Power Generation

266 MW

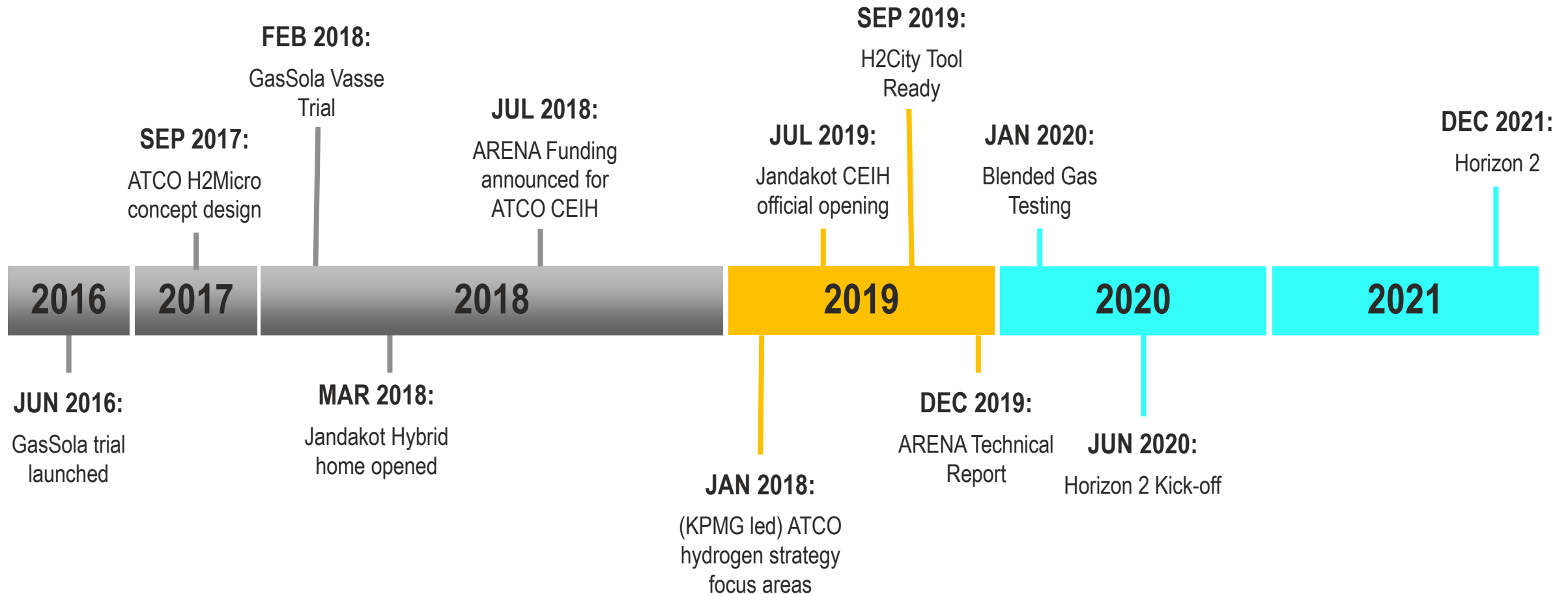
AUSTRALIAN FOOTPRINT

ASSETS
\$1.5 BILLION

EMPLOYEES
1200 INCLUDING
CONTRACTORS



Our Clean Energy Journey | Phases



ATCO | Clean Energy Innovation Hub



WHAT IS ATCO CLEAN ENERGY INNOVATION HUB



An Australian first that integrates hydrogen production plus fuel cell technology with a standalone power system to establish a sustainable **clean renewable energy eco-system** in a “living lab” microgrid setup.



CEIH builds on **ATCO’s residential Hybrid Energy System (HES)** demonstration adding “green” hydrogen generation capacity from water electrolysis.

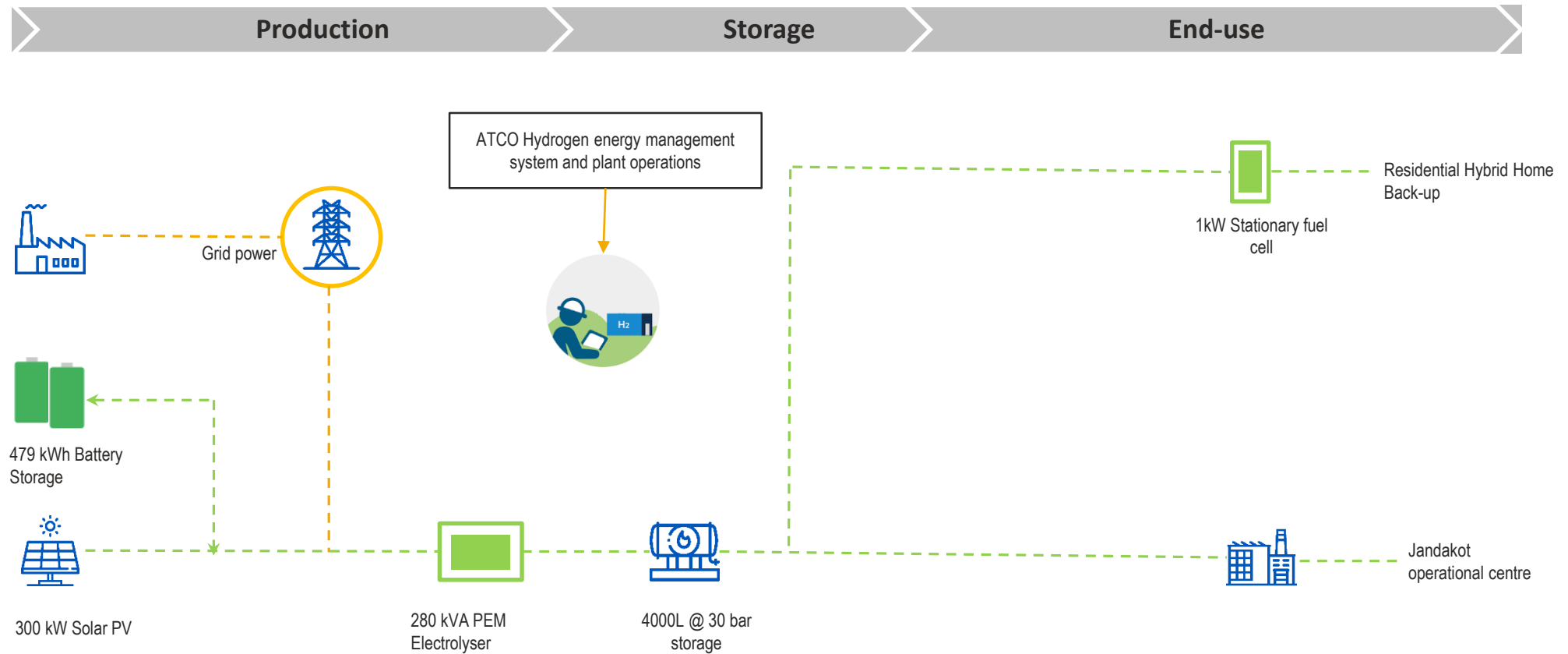


A showcase facility that demonstrates the important role of existing gas distribution assets and the fundamental role of hydrogen in a **clean, reliable and affordable** energy future.

\$3.9M total investment
\$1.7M grant from ARENA

ATCO | CEIH Concept

ATCO has built and is currently operating a 0.25 MW (65 kg per day) hydrogen production facility in Jandakot, WA. Hydrogen produced at the CEIH is used for blending, direct fuel testing and to power a fuel cell for residential energy back-up power. The Hydrogen Production plant is designed to operate as a dispatchable load utilizing spilled clean energy.





ATCO | CEIH



ATCO | CEIH



CEIH | Lessons Learned



H₂



PROJECT GOVERNANCE:

- 3 Level Issues Resolution Governance framework. L1 meet weekly.
- Draft design>Design Review>Draft design review>Final design>Equipment procurement
- Be cautious around speed of delivery as you risk carrying out a design to fit equipment.
- Include an additional 2 weeks for FAT to minimize issues during commissioning.

REGULATORY:

- Engage Buildings & Energy (Safety Regulator) at draft design stage.
- Downstream assets and assets classified under Consumer Pipework and Appliances (AS/NZ5601).
- Safety Regulators position on Type A and Type B appliance approvals.
- Performance Based Solutions versus International Standards have significant gaps.
- Production plant and PRS classified under Hazardous Area and Dangerous Goods.

TECHNICAL:

- Document and seek design approval ahead of equipment selection and construction.
 - Essential for Dangerous Goods compliance
- Vent stack design – horizontal versus vertical. Horizontal widens HA and non-compliant. Vertical inflicts water ingress issues.
- Mass Flow Controller must be intrinsically safe. 14 mechanical fittings between the pressure transmitter and the MCF.
 - Ensure HA Inspector assessment and approval.
- >30 bar pipe fitter shortage.

DANGEROUS GOODS:

- Undertake Consequence modelling studies to determine blast and fire ball radius.
- Placarding and Safety Data Sheets.
- Risk Assessments and HAZOPS documented and action plan has realistic completion dates.
- <5000L storage does not require Dangerous Goods permit.



CEIH | Lessons Learned

EQUIPMENT:

- *Mass flow controller vs Internal Control Mods (Remote Current Demand) to accept direct 4 - 20mA signal to adjust the rate of hydrogen production.*
- *Flash Back Arrestors on vent pipes. Undertake a thorough risk assessment for it requirements.*
- *PEM vs Alkaline Electrolysers.*
 - *Environmental obligations may prevent Alkaline technology due to presence of caustic.*
 - *Alkaline was found to be cheaper on a \$/kW basis.*
- *Chiller and Dew Point Monitor are fundamental process and safety requirements.*
- *Water Treatment required for corrosion control and Legionella treatment.*
- *Actuated Valves are long lead time and ensure they are intrinsically safety.*
- *Safety control system should be fully integrated with flame detectors to cover plant area but extend to Hazardous Area zones.*



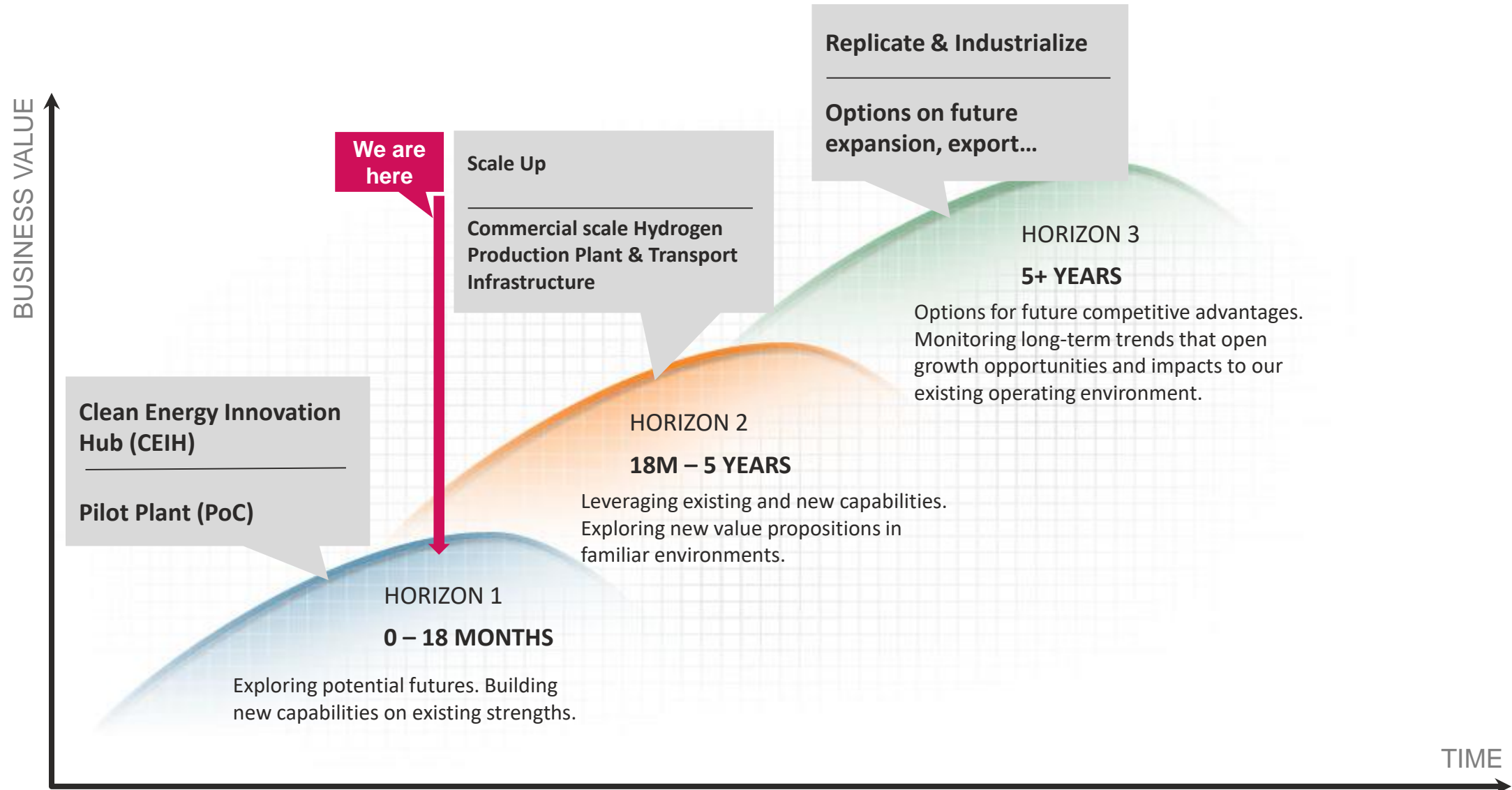
CEIH | Lessons Learned

Resources:

- *Interim report: [Clean Energy Innovation Hub](#)*
- *Hydrogen Communities & H2City Tool: [Report & Tool](#)*
- *Researching our clean energy future: [ATCO resources](#)*



Roadmap | Hydrogen strategy



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