Ammonia Skills & Training

BRIAN INGLIS

JUNE 2025

INGLIS PUCKRIDGE

Agenda

- Ammonia Manufacturing
- PMA Training Packages
- CQU Ammonia Skilling Project
- Managing Risk
- LNG Industry – Shared Lessons
- Future Needs to skill up emerging Ammonia Manufacturing Industry

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Intro & Background

Australia Pacific LNG

Brian Inglis
Hydrogen & Ammonia Community Manager

The Competency Alliance
PetroSkills | NetZeroSkills | RenewableSkills
Part of RelyOn

Inglis CONSULTANTS
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Inglis Puckridge – Everything Counts

Both ex industry operations, management and training, Rob Puckridge and I work together on industrial workforce skilling projects

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Ammonia Manufacturing

Existing	New
IPL - Phosphate Hill QLD	WAH2 – Pilbara WA
DN – Moranbah QLD	Perdaman – Pilbara WA
QNP – Moura QLD	Murchison Green Ammonia WA
Orica – Newcastle NSW	Allied Green Ammonia NT
CSBP – Kwinana WA	Other
Yara – Pilbara WA	

Similar to LNG industry ten+ years ago, there will be an impact on existing and new industry workforce capability.

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Ammonia Manufacturing Skills

Ammonia Skills & Workforce Capability

Ammonia Manufacturing Industry

Ammonia Manufacturing Skills

Ammonia Skills & Workforce Capability

Likely to Grow

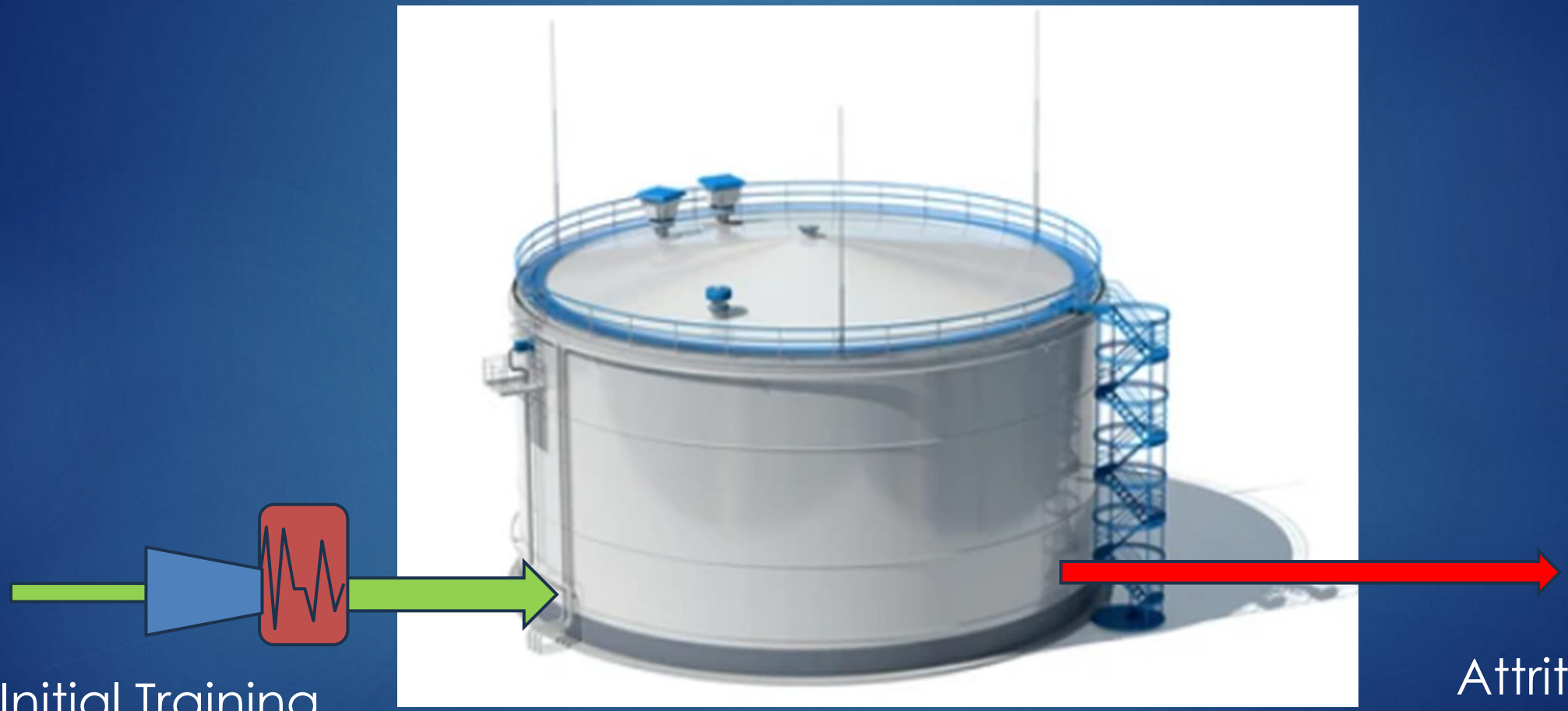
Ammonia Manufacturing Industry

Skilling Process & Competency Management

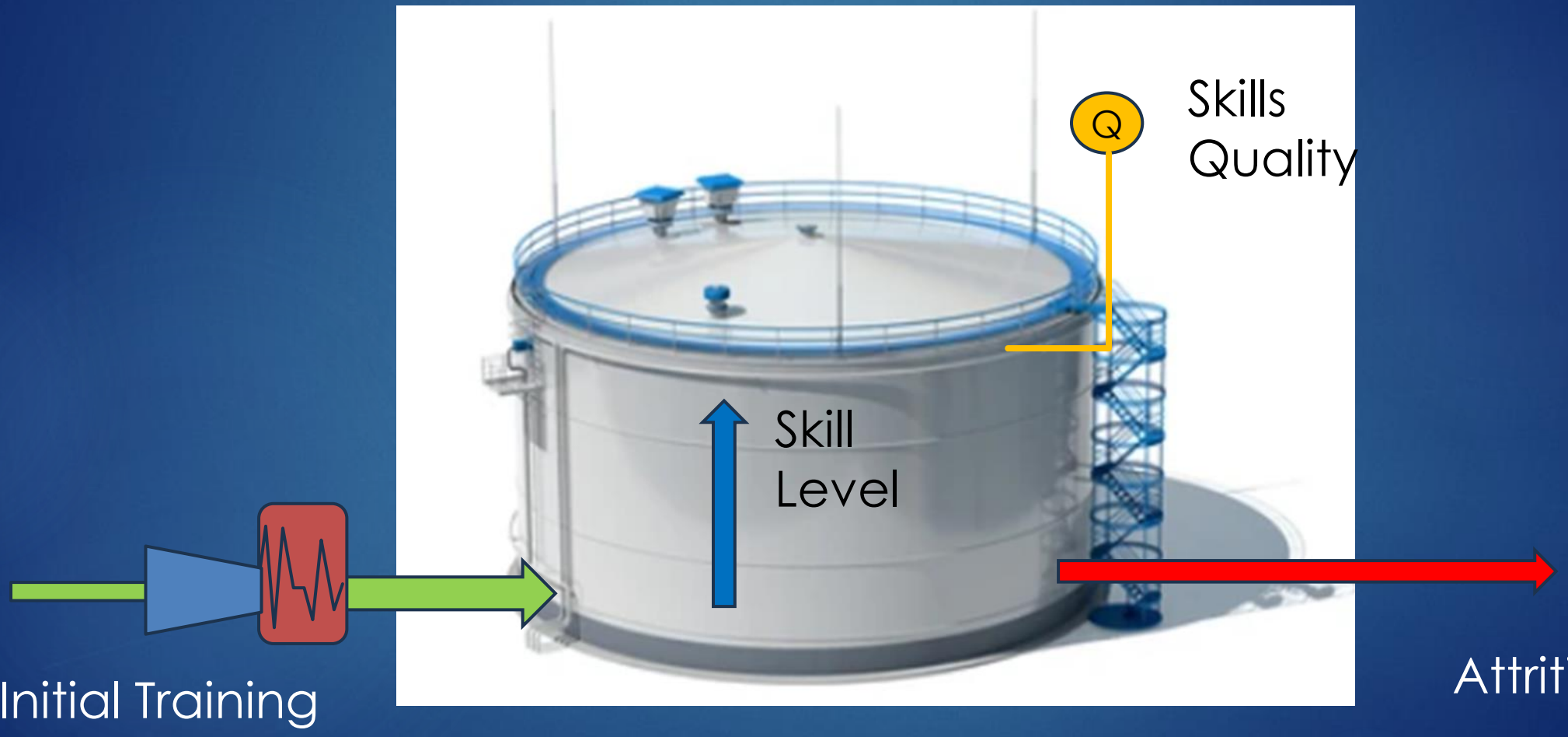
Recruitment

Attrition

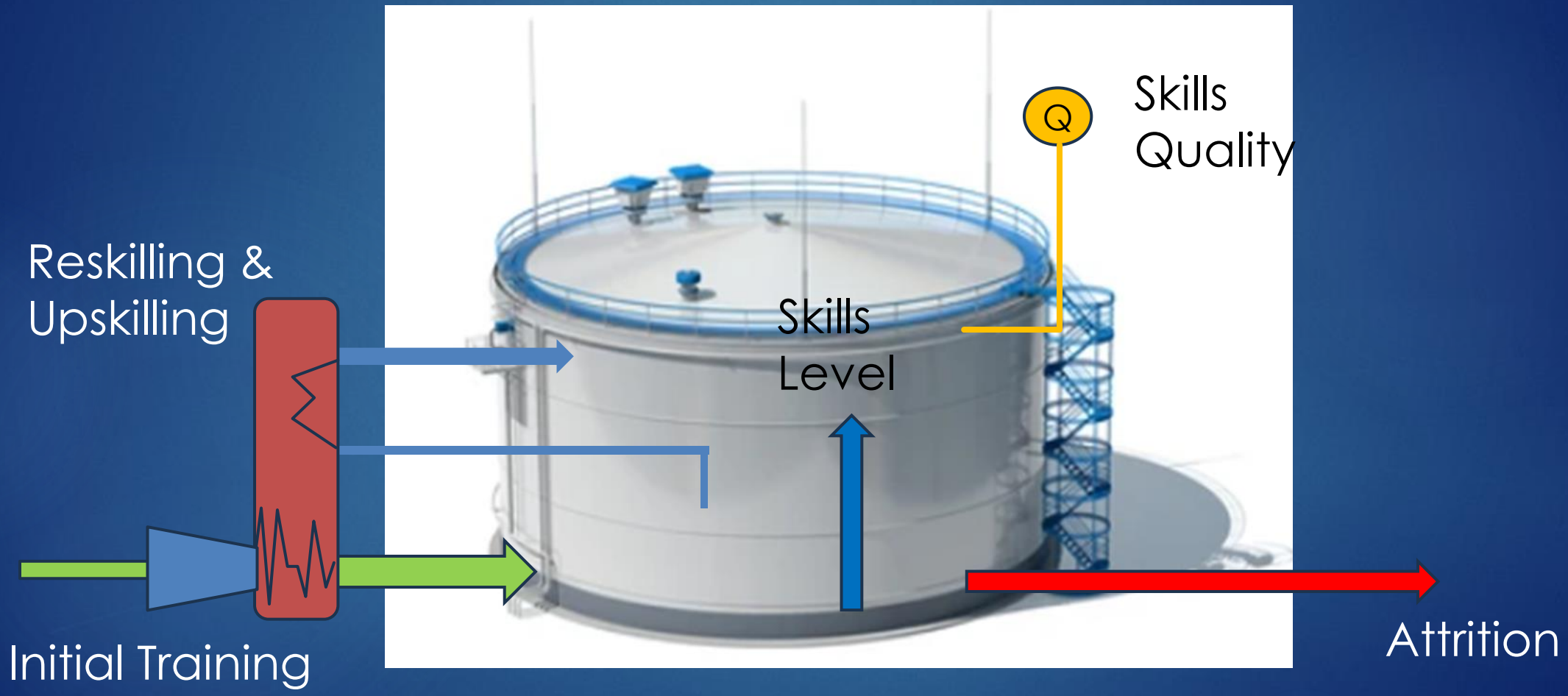
Skilling Process & Competency Management



Skilling Process & Competency Management



Skilling Process & Competency Management



Activity 1 – to cater for new Ammonia projects – how do we supply and train new personnel? – 5mins

Enterprise & Accredited Training

Accredited Training	Enterprise
Nationally Recognised: Meets formal standards (e.g. AQF levels, ASQA compliance). **Leads to Qualifications**: Certificates, Diplomas, or Statements of Attainment. **Regulated**: Delivered by Registered Training Organisations (RTOs). **Portable Skills**: Recognised across industry and employers. **Examples**: Certificate III in Process Plant Operations, Diploma of Engineering.	**Customised for the Business**: Tailored to specific roles, procedures, equipment, or systems. **Non-Portable**: Usually not recognised outside the company. **Flexible**: Can be delivered quickly, adapted to operational needs. **Focus on SOPs/Safety/Competency**: Targets site-specific capabilities and compliance. **Examples**: Shutdown induction, plant start-up procedures, ammonia handling refresher.

Example only – there are other training providers and vendors

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PMA Training Package

- PMA Chemical, Hydrocarbons and Refining

Code	Title	Qualification Level
PMA20116	Certificate II in Process Plant Operations	Certificate II
PMA30120	Certificate III in Process Plant Operations	Certificate III
PMA40116	Certificate IV in Process Plant Technology	Certificate IV
PMA50116	Diploma of Process Plant Technology	Diploma
PMA60116	Advanced Diploma of Process Plant Technology	Advanced Diploma

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PMA Training Package

Certificate III – Process Plant Operations

- Qualification description
- This qualification reflects the role of advanced operators and operations technicians who use production equipment to directly produce product.
- Plant operations, typically of integrated plant units in accordance with the operating procedures and apply their knowledge to anticipate problems.
- Expected to solve a range of foreseen and unforeseen problems, using product and process knowledge to develop solutions to problems that do not have a known solution, or a solution recorded in the procedures.

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Activity 2
What skills and capabilities will be required? – 5mins

CQU Ammonia Skills Project 2024/25

Thank You - John Mott

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MANUFACTURING SKILLS QUEENSLAND

Incitec Pivot

Fortescue

Queensland Government

MCottam Consultants

ORICA

DYNO Dyno Nobel

QNP

ARK ENERGY

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Manufacturing Industry Skills Alliance

CQU Ammonia Skills Project 2024/25

- Started Feb 2024
- Supported by QLD gov
- Managed by CQU
- Engagement with QLD industry
- Six new units were identified
- Module packages developed
- Module packages validated and piloted with industry
- ASQA registration underway
- Project completed June 2025

CQU Ammonia Skills Working Group

- Six new units developed:
  - Ammonia Safety, Properties, Characteristics
  - Synthesis Compression & Conversion
  - Refrigeration & Storage
  - Pumping & Distribution
  - Nitrogen Production
  - Hydrogen Production

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MANUFACTURING SKILLS QUEENSLAND

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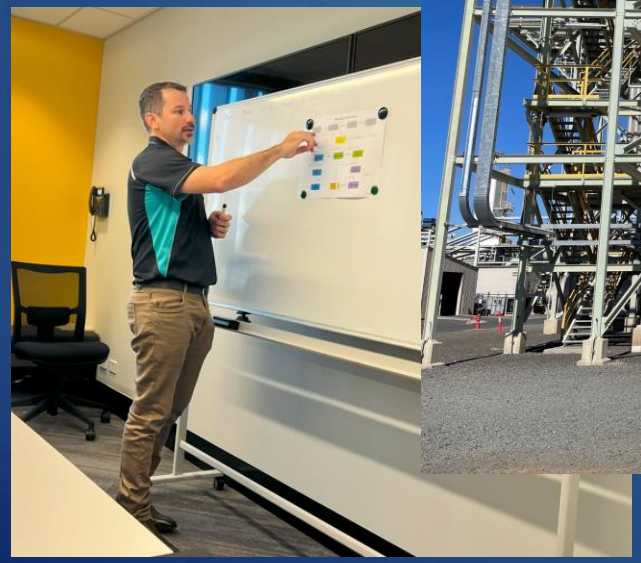
Manufacturing Industry Skills Alliance

CQU Ammonia Skills Project 2024/25



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CQU School of Manufacturing

CQU Packages

- Hydrogen Electrolysers
- Hydrogen Storage
- Hydrogen Blending
- Gas Turbines
- SCADA
- Cryogenics
- Many more …

CQUniversity AUSTRALIA

Workforce Skill Development

- Value ‘skill development’ as an investment to be managed, not a cost to be controlled
  - Risk Reduction – estimate risk weighted cost of training Vs no training
  - Time to Competency – calculate net cash flow of building Vs hiring the skills you need
  - Full cycle project economics – compare investment economics of upgraded Vs normal skills

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Example: Effect of Organisational Capability on Typical Deepwater O&G Project

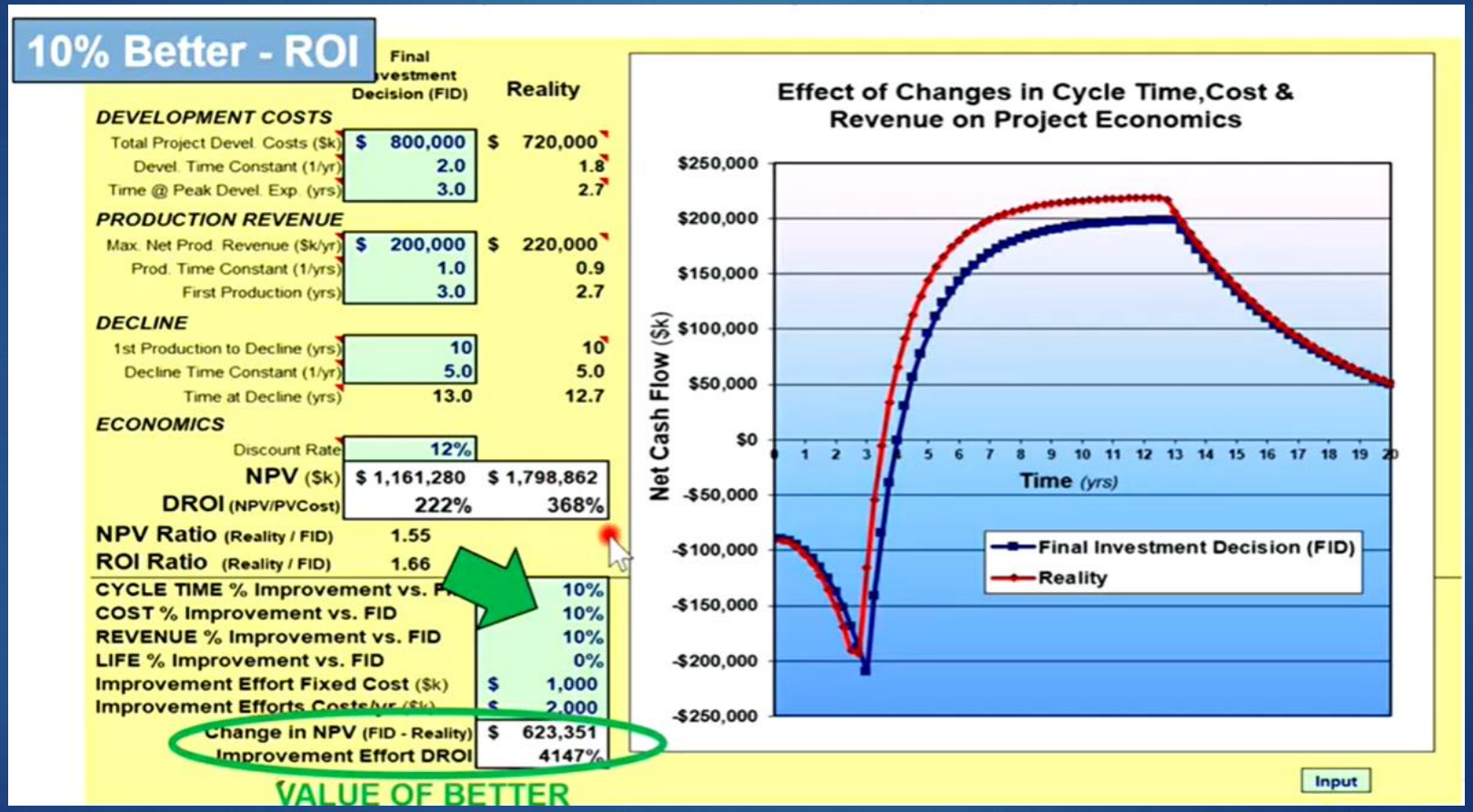

Image: The Competency Alliance

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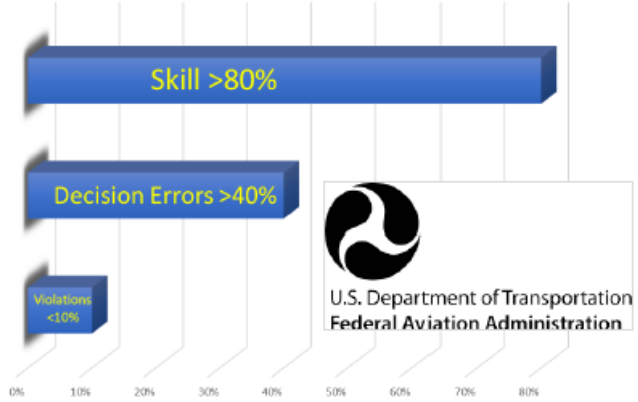
Workforce Capability Risk

Even in high reliability organisations, human factors cause >95% of all incidents

Petroleum business performance is sensitive to people's skills



> **"Risk comes from not knowing what you are doing"**
>
> *Warren Buffett*

Image: The Competency Alliance

⚠️ 1. Safety Risks

Training Type	Risks	Implications
Accredited	May lack site-specific hazard training	Gaps in real-world readiness if not supplemented
Enterprise	If poorly designed/delivered, can skip critical safety principles	Increased incident risk, especially for high-risk processes

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2. Production Impact

Training Type	Risks	Implications
Accredited	Too generic for efficient site operations	Slower ramp-up, inconsistent plant performance
Enterprise	May prioritise speed over rigour	Errors due to shortcuts or incomplete knowledge

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📜 3. Compliance Risks (Legal & Regulatory)

Training Type	Risks	Legal Consequences
Accredited	Low if kept current and correctly delivered	Generally defensible in audits or investigations
Enterprise	Not formally recognised – must be well-documented and competency-based	High risk if training records or outcomes are inadequate
	Poor documentation or proof of training	Prosecution under WHS laws (e.g. breach of duty of care)

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4. Incident Consequences

Training Type	Post-Incident Exposure
Accredited	Easier to prove due diligence (recognised qualification, assessed competency)
Enterprise	Heavily scrutinised – must show that training was robust, assessed, and documented Failure = potential for legal action (e.g. negligence claims, regulator penalties)

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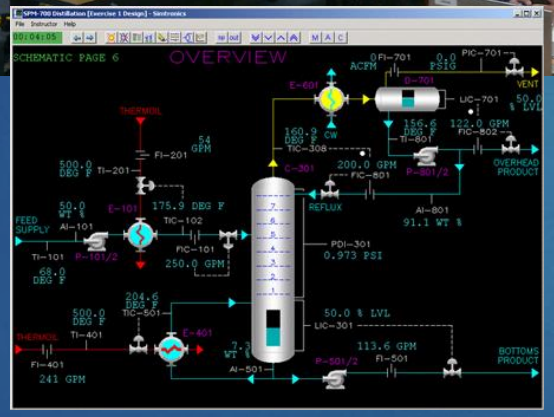
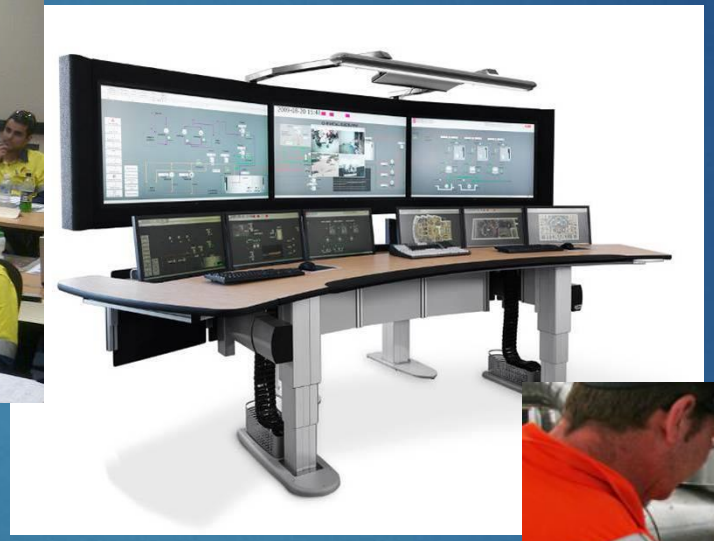
Activity 3
Is training an investment or cost?
How do we manage risks associated with workforce development and capability?
What are the key indicators of effective training? – 5mins

Lessons from Australia Pacific LNG





Extensive training strategy designed and implemented prior to commissioning and start-up

Lessons from Australia Pacific LNG

Process Operations Traineeships/Apprenticeships

Key Takeaways

- Plan learning well in advance – early work in design and development is critical
- Collaborate on training & skilling programs
- Competency matters – things can and will go very wrong (Trevor Kletz)
- Some ‘Grow Your Own’ – add to the skills tank – don’t just extract
- People planning to retire – don’t go – the energy transition needs you
- Competency erodes - check, verify and improve your people & systems
- Mentor a new/existing employee
- Encourage high school and uni students to consider a career in industry

Activity 4
What do we need to start to do, to anticipate growth and success for the Ammonia manufacturing industry? – 5mins

Activity 5
How do you think AI can be used for training and skilling? – 5mins

Questions

For access to the group responses during the session, please reach out directly to Brian (contact next slide)

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Thank You

Your Energy Training Advisors

Skilling Your Workforce

Everything Counts

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