DID YOU KNOW?

Carbon Capture Utilisation and Storage - CCUS

CCUS is spruiked as *"can provide an effective means of reducing carbon emissions from large energy projects without having to make significant changes to energy supply infrastructure"* [ref 1].

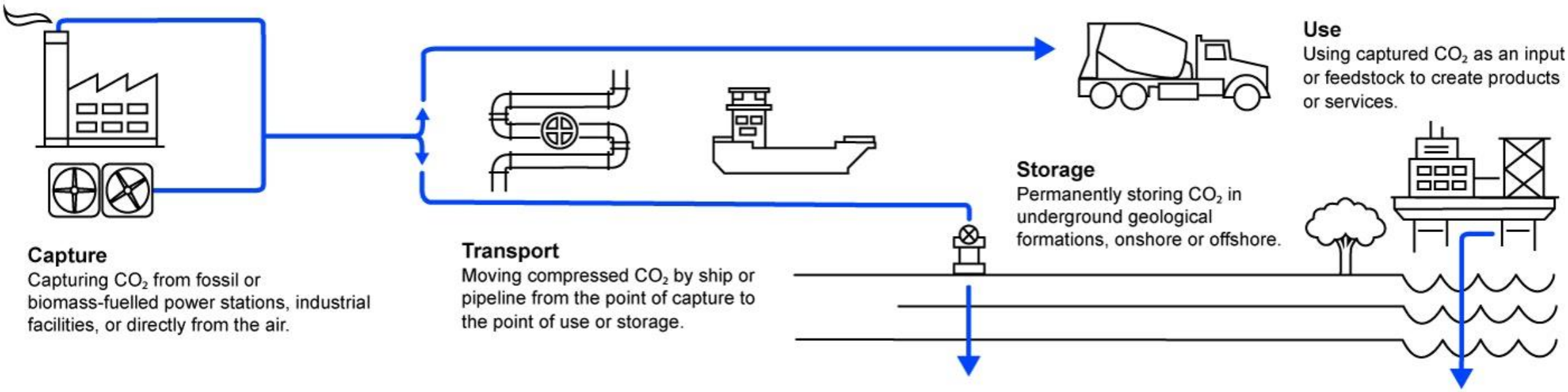

Image courtesy of IEA

Ref 1 https://energyproducers.au/fact_sheets/low-emissions-technology-ccs-ccus/

CCUS- Facts

CCS is being actively promoted by the Oil & Gas industry as a means to support the continued use of hydrocarbons.

CCS and CCUS are largely unproven as an effective (technically and commercially) means of managing CO2 emissions at scale.

Opportunities for re-use of CO2 are miniscule compared to the scale of the emissions. Whilst there are more opportunities for CCS, these are still small compared to actual emissions.

CCS covers two potential application areas:

- **Pre-combustion** where there is a high value gas reservoir stream at high pressure. Here the separation of CO2 from the gas stream is standard oilfield practice using well established gas treatment facilities designed to meet pipeline transport and liquefaction plant specifications;
- **Post-combustion** where there is a waste stream at low pressure. This makes CO2 capture energy intensive and expensive. Post combustion CCS includes process related emissions from cement production.

Pre-combustion CCS where the CO2 is separated, treated, compressed at high pressures and then stored, often in suitable deep geological formations. Reinjection into a reservoir is very sensitive to a number of factors and as a result has had mixed success. The storage element presents the largest challenges and residual risks.

This Institute for Energy Economics and Financial Analysis (IEEFA) article gives a good overview of CCS performance.

CCUS- Facts

Post-combustion CCS does not have the advantage of having the CO2 at high partial pressure relative to the removal media or being a valuable product, as in the case of oil & gas reservoir fluid stream.

The hot flue gas from the combustion process needs to be compressed thus adding to the cost and complexity.

Post-combustion capture (PCC) was spruiked by the coal industry as part of the failed 'clean coal' campaign in the 1990s.

The performance of PCC has been disastrous with many projects being cancelled at various stages of planning, construction and even operation.

Carbon Dioxide Enhanced Oil Recovery (CO2-EOR) is a process to lower reservoir fluid viscosity by dissolving CO2 under pressure into the oil, thus increasing reservoir mobility into the production well and increasing recoverable reserves. The CO2 is often shipped in by road tanker and recycled through the production process but is not permanently stored. CO2 is usually vented when field oil operations cease production. CO2-EOR is often mentioned in the literature as "CCS" whilst in fact it is not CCS, it is CO2-EOR.

Direct Air Capture (DAC) technologies extract CO2 directly from the atmosphere at any location and is even more inefficient than CCS.

CCUS- Facts

The “U” in CCUS is “utilizing” the captured CO2 as an input or feedstock to create products or services.

Worldwide, approximately 110 million metric tons per year of carbon dioxide are used as a raw material for the production of urea, methanol, polycarbonates, cyclic carbonates and specialty chemicals (Arakawa et al. 2001).

So whilst some captured CO2 could be re-used it is not consider technically and commercially feasible in the West Australian context to develop a chemical industry to make use of a waste product.

CCS and CCUS are **clever and expensive distractions** slowing the phase-out of burning hydrocarbons and slowing the clean energy transition.

The industry wants the taxpayer to pay for CCS, for the public to clean up their waste: **private profit, socialised costs**.