



**NET-ZERO
INDUSTRIES**
MISSION

The Currency of Trust

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About Net-Zero Industries & Mission Innovation

Mission Innovation (MI) is a global initiative of 23 countries and the European Commission (on behalf of the European Union), catalysing a decade of action and investment in research, development and demonstration (RD&D) to make clean energy affordable, attractive and accessible for all. These efforts accelerate progress towards the Paris Agreement goals and pathways to net zero.

Mission Innovation's Net-Zero Industries Mission was established to unify the actions of key stakeholder groups, to support the heavy emitting sectors in accelerating the **adoption of decarbonisation technologies**.

Energy intensive industries are responsible for around 25% of global greenhouse gas emissions. RD&D over the next decade will be critical to develop and validate innovative industrial processes and technologies that enable radical emission cuts beyond 2030 at lowest costs¹.

The current investment from industry is falling behind the rate of change required to meet global emission targets for 2030, let alone 2050. The time required to demonstrate and gain industry acceptance of new decarbonisation technologies is significant and requires immediate action if we are to make a positive change in the industry understanding, confidence and **investability** of decarbonisation technologies in time for 2030.

In building this **global industrial trust** in the feasibility of decarbonisation technologies a collaborative approach is required, to motivate and accelerate the uptake and investment in decarbonisation. One that maximises the shared learnings and synergies across national and corporate boundaries.

We discuss here the value of building such **trust**, and the mechanisms deployed to maximise the rate and quality of trust generated.

¹ [Action Plan](#), Net-Zero Industries Mission, 2023

The Currency of Trust

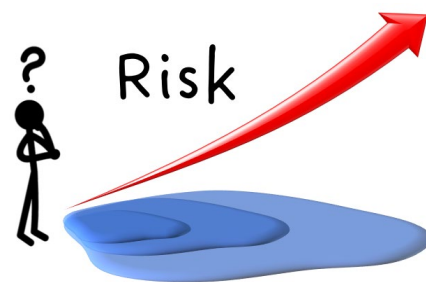
Trust is an often-utilised word, and it applies to a multitude of scenarios. Here we are focused on industrial decarbonisation, and the critical role trust plays in helping accelerate the acceptance and adoption of these technologies.

We must acknowledge first that adoption of new technologies introduces uncertainty and risk². Proven solutions are well understood, and the considerations required to invest in and adopt them are typically focused on their accepted economic benefits. The primary difference with investing in any new and unproven technology is related to the level of trust in its technical and economic claims. To invest, a higher level of trust must be established. This is not a standardised measure, but influenced by the technology, circumstances and individuals involved. Proven technologies have achieved that trust, new technologies must earn it.

As we are discussing investment in new technologies and we accept that trust must be earned, it is appropriate that we

An Analogy

Consider the linkage between the level of risk and the amount of trust required. You are walking along a path, and you encounter a puddle. If the puddle is small, you can subconsciously step over it without breaking your stride.



Consider the puddle getting larger. At a certain size your brain will start to question if you should take a jump to get over the puddle, and at another you will stop to question if you can get over it at all, or if you need to make alternate plans.

You have encountered a level of uncertainty and risk where you need to adapt your actions to build the trust that you will not get wet feet.

² ["Innovation and HROs"](#), Kastle, University of Queensland Business School, 2021

depict the amount of trust we need as a **currency**.

To invest in a technology, we must amass enough trust currency to achieve a threshold that satisfies our investment. We might consider a proven solution to come complete with a moneybox full of trust currency, but we must fill the empty moneybox of any new technology with trust currency before it is afforded the same level of trust for investment.

Decarbonisation technology adoption by heavy industry can involve significant or complete process change, such as in the case of green steel production³. The level of risk in multiple parallel technology adoption is far greater than normally experienced even in highly innovative new technologies, and the level of trust currency required for that technology solution is much higher than would normally be experienced.

As the risks and uncertainties of a new technology get larger and more intimidating, our reaction is the same as it would be for the largest puddle discussed in our side analogy. When we do not know how to earn sufficient trust to invest in / adopt the technology, we look for other options. Sadly, in the case of decarbonisation, there is little choice but to delay the decision, as giving up, or trying to find a way around the problem is not going to be acceptable with your shareholders, the public, or indeed the regulatory environments in which you operate.

Industrial decarbonisation then, has one of the largest trust barriers to overcome. Telling industry to take the risk and jump isn't the answer, and it is unlikely that any single endorsement will provide enough trust currency to suffice. How then do we help industry to build the considerable levels of trust they need? When you have insufficient trust, what mechanism will give you enough trust to invest and adopt the technology solutions?

In recognising there is a level of trust and it can increase, we acknowledge it can be measured, at least with a qualitative scale, even if we cannot define

³ ["DOE Industrial Decarbonization Roadmap"](#), US DOE

it to the nearest dollar. How then does a decision maker or investor faced with a technology adoption decision, increase their level of trust currency?

Trading in Trust

Trust does not have to be self-generated. If every animal had to learn solely from their own mistakes, Charles Darwin would have written a very different book⁴. One of humankind's greatest strengths is its ability to learn, and gain trust from others. **Like a currency, trust can be transferred or traded between individuals.**

We add a complexity to that transfer of trust because all learnings and sources of trust are not equal. **The currency of trust has an exchange rate.** Imagine again a scenario where you have to choose a direction at a diverging path. One leads to a dangerous cliff, and the other to a safe haven. A complete stranger may tell you the path to the right is the safe one, however, a respected or experienced person with authority may advise you to take the path to the left. The amount of trust currency you gain from the latter will typically be much higher. Having trust in the integrity and quality of the

Measures of Trust

Technical - The Technical Readiness Level (TRL) is used to define the technical level of trust. Low level TRL 1-4 comprise concepts and theories, TRL 5 and 6 reflect the first physical laboratory and pilot scale demonstrations, TRL 7 and 8 are the large scale and full commercial scale demonstrations, and TRL 9 is a trusted industry solution.

Economic - The Commercial Readiness Index (CRI) recognises the economic trust levels for a technology and its role in a supply chain. It ranges from CRI 1 -3 for hypotheses, trials and demonstrations of technology, to CRI 4 to 6 where the maturity of the technology increases from the first few applications to becoming what is defined as fully trusted, or a bankable asset at CRI 6.

Social - No quantitative measure exists, as the social requirements change by region and political climate, as well as by continuously changing community and regulatory expectations.

⁴ "On the Origin of Species", Darwin, 1859

information given to you by a source you trust, generates a higher value in the trust currency you gain to make the correct decision. There is more value in the advice you accept from a source that you already trust, or have reason to trust.

How then, with a world wide web full of contrary positions, spam, sales spiels, facts and lies, do we filter out the low-value trust and identify the high-value trust? Who and what do you choose to trust, and can this be a problem shared, instead of a personal challenge for every individual?

It is also worth noting that there are two primary categories of this trust currency. We will describe them as **evidentiary** and **reputational** trust. There are the facts and numbers (evidence) you choose to give greater trust currency to, and there are people and parties (reputation and relationships) you ascribe with a higher trust exchange rate. Both categories play a vital role in helping build the level of trust currency needed to overcome the trust barrier in making an investment decision.

Application in the Real World

Industry faces the problem of building up a bank of trust currency in adopting decarbonisation technologies. The puddle size is one of the largest anyone has ever encountered, and there are multiple aspects to the uncertainty faced. They include technical, economic, and social elements. Measures exist to help us quantify the level of trust required^{5,6}.

The trust currency from each of these components are combined in a well-established industry process followed to make an investment decision, called Front End Loading or FEL⁷. This is a stage-gate methodology that combines technical, commercial, regulatory and social information under an engineering design and management process to provide proof of the project investment viability, or feasibility. It provides the trust in the questions of “can it be built”, “can it be approved”, “will it work”, and “will it provide a

⁵ [“Technology Readiness Definitions”](#), Australian Defence Force

⁶ [“Commercial Readiness Index for Renewable Energy Sectors”](#), ARENA

⁷ [“Managing the Front End”](#), Morris, Project Management Institute, 2005

return on the investment and risk”. Each of these factors needs to achieve a trust threshold for industry to invest and adopt the technology, and where that currency of trust comes from may differ in each case.

Because of that need for different people and parties to be the source of trust currency, both reputational and evidentiary, we must consider the role of stakeholders – or those who are most likely to be the source of the highest value trust currency available – for each type of trust we seek to build a bank of.

The Role of Stakeholders

Engaging the right stakeholder to provide the relevant currency of trust is essential. You don’t ask a banker to validate the technical performance of a

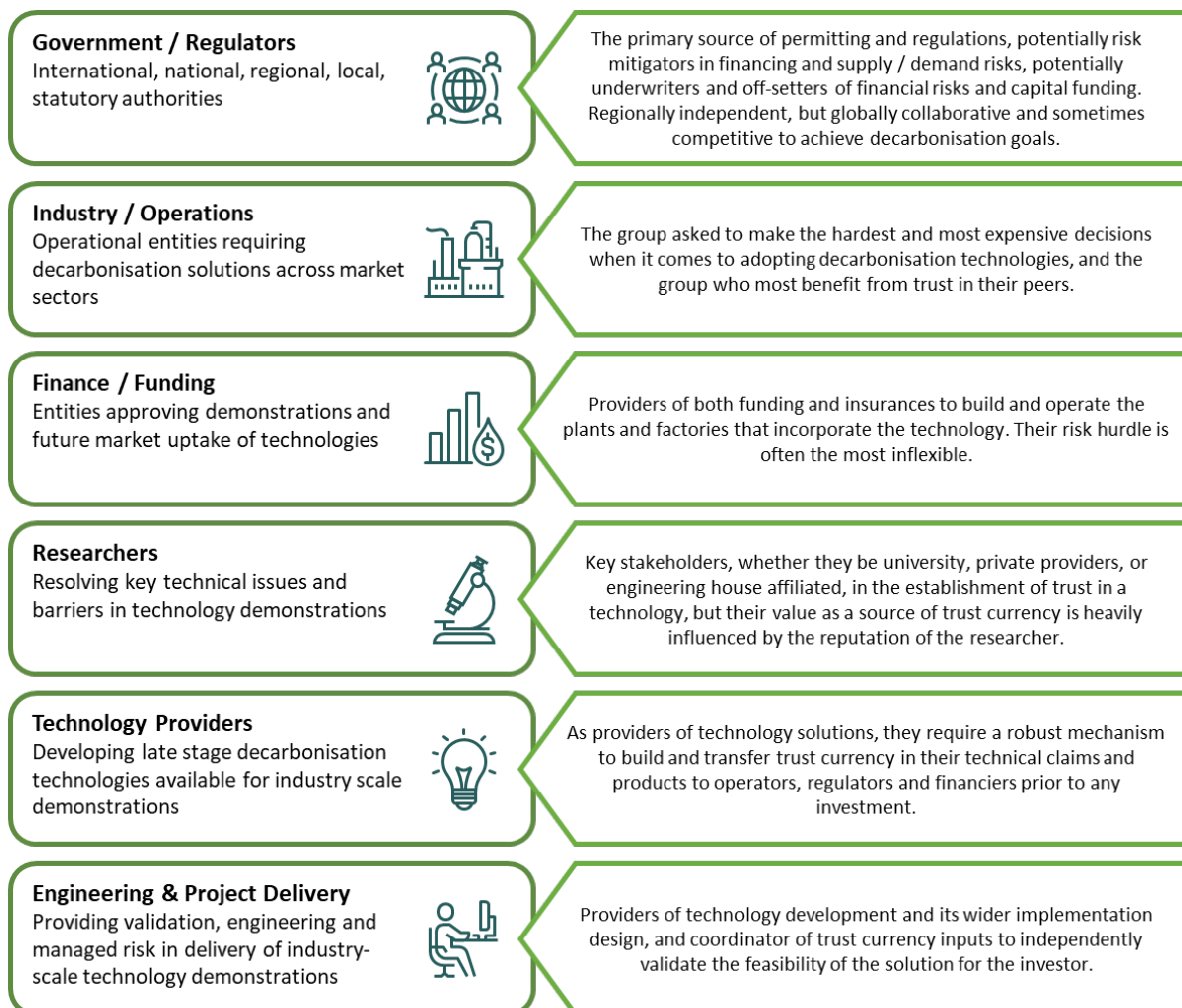


Figure 1 Key Stakeholders in trading Trust Currency

technology, and you don't ask a researcher to say whether it is investable or insurable as an operating solution.

The Net-Zero Industries Mission has identified six primary stakeholder groups who are the providers of trust currency to industry operators in making an investment decision to adopt a technology. Each provide trust to the investing industry operator, and many require their own trust thresholds to be met, either from peers in their stakeholder group or others, to provide their support and endorsements of the technology projects and investment.

A common relationship has the industry operator engaging an engineer as their independent representative, to coordinate the inputs from other stakeholders, including governments and technology providers to prepare a feasibility study.

This feasibility study report is presented to the financiers and other gateway approvers as an independent assessment of the project's overall investment and adoption feasibility.

Technology Investment at Global Scale

The decision to invest in a technology is harder if the technology is new and less trusted by the operating community (industry). With each subsequent deployment of a technology, the opportunity to share trust currency grows, which helps reduce the barrier to investment for fast-following adopters. We see this value of reputation transfer highlighted in the CRI, with trust increasing from CRI-4 with the first commercial demonstrations up to CRI-6 where the adoption of the technology is well trusted and considered business as usual for industry.

The technology commercialisation journey can happen by good fortune, but there are methods deployed by technology providers and industry to reduce risk and increase the rate at which the technologies are adopted. These methods rely on the transfer of trust as a currency.

Accelerating technology adoption by fast-followers can only work if there is a transfer of the trust currency generated in the first demonstrations into the group of potential fast-followers. If the first demonstrations are delivered in total isolation, if that evidence and experience is hidden from the world, then the second demonstration is effectively just a brand new first implementation as far as trust in the technology is concerned. How then do technology providers play a role in helping to bridge that divide?

The most common tool used by a technology provider is the “technology user group”⁸.

It is in the technology provider’s best interest for the adoption of their technology (commercialisation) to happen sooner rather than waiting for every potential buyer to raise their level of trust independently. Consider two industry operators, one who had enough trust currency to invest and adopt the technology, and another who is still considering their decision. The technology provider knows that the sharing of trust currency from the early adopter to the potential adopter is likely to result in a higher level of trust for the potential adopter. It is in the technology provider’s interest to facilitate the interaction of communication, knowledge sharing, and building of professional relationships between operators who currently trust in and have adopted the technology, and the pool of potential adopters who do not yet have enough trust currency in the technology to make their own investment and adoption decision.

These facilitated interactions are often called technology user groups, or licensee groups. They provide value to all participants, but of primary interest here they provide an independent and valuable pool of trust currency (both reputational and evidentiary) to the group of potential technology adopters. Actively curating the group also increases the speed of trust currency transfer, making investment and adoption decisions happen sooner.

⁸ [“Why User Groups are Integral to the Success of Today’s Technology Organisations”](#), Rotoli, Forbes.com, 2021

Technology user groups are well understood and accepted by industry. The transfer of trust currency from the existing operators to the potential adopters is a highly effective method of raising the trust currency exchange rate of information from potentially biased (from the technology provider), to highly trusted (from peers). Even when it is exactly the same information, recommendation or evidence used to provide the trust currency.

Conclusions

The level of trust you build needs to reach a threshold, to enable decisions to take risks that are considered safe and reliable. This trust isn't gained solely from independent and quarantined actions, but is more effectively gained from an exchange or transfer of that trust from another party. The level of trust and reputation between the parties exchanging trust currency impacts the exchange rate of that trust, and proven mechanisms exist to increase the likelihood and timeliness of both the trust transfer occurring for technology adoption, and the trust exchange rate being maximised in that transfer event.

The trust currency for investment in new decarbonisation technologies needs to come from a range of stakeholder groups, and the credibility and independence of that trust currency, both in reputation (including recommendations) and the evidence shared, impacts the value of the trust level transferred.

Global industrial decarbonisation introduces an unprecedented need for the rapid uptake of many new technologies across multiple processes in heavy industry. Each of product and feedstock substitutions, new low or zero-carbon fuels, renewable powered electrification for heat generation, and emissions capture for containment or reuse, introduces its own challenges when applying it to the wide variety of industrial applications and their local inhomogeneities. The problem is not how to build five or ten new green solutions for industry, but how to implement hundreds, or even thousands of new technology solutions in each industry.

For each of these technologies, in each of the various heavy industries, there will be a first demonstration project facing some of the highest risks, then a second implementation, and then hopefully a snowball effect as the risks become more understood and the feasibility of the technology becomes more trusted. Without an effective mechanism to trade and share that trust currency to this vast pool of stakeholders who need to make technology investment and adoption decisions, the technology uptake progress is liable to be slow and inefficient.

Adopting the best principles of technology user groups, the Net-Zero Industries Mission is establishing communities of practice to facilitate reputational trust currency transfer, and is compiling and promoting the sharing of a global project experience library in decarbonisation technology demonstrations, to support the evidentiary trust currency transfer required.

Together, these initiatives promote access to the experienced individuals and evidence to provide trust currency, not just to one potential technology adopter, but the future pipeline of technology adopters needed to reach the World's decarbonisation goals for heavy industry.

Promoting this network of experienced people and the library of project information (with links to shared project experience and reports from across the globe and the various heavy industry sectors), through seminars and workshops to raise awareness, the Net-Zero Industries Mission aims to provide a valuable source of trust currency to assist heavy industry to accelerate the investment required to reduce their 25% share of global carbon emissions.

Imprint

Publisher Mission Innovation Net Zero Industries Mission. Main contacts:

Mission Director Elvira Lutter, Program Manager, Austrian Climate and Energy Fund (Leopold-Ungar Platz 2, Stiege 1/ 4.OG / Top 142, Vienna, Austria)

Global Mission Coordinator Dr. Alan Monaghan, Senior Vice President – Technology and Expert Solutions, Worley (Level 23, 123 Albert Street, Brisbane QLD 4000, Australia)

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