



Systems theory for beginners

By Dr. Fiona Simon on Apr 01, 2021 | [Translate](#)

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Over the past 20 months or so – since I started in my role at Australian Hydrogen Council (AHC) – I have regularly been struck by the different systems in play across the hydrogen ecosystem and our need to find a way to connect them both now and into the future.

There are the societal sub-systems of law, politics, economics and science, which are observed and negotiated by any actor in society. Then there are the sector sub-systems or communities that are touched by hydrogen's potential: transport, natural gas, electricity, international trade and industrial processes. And each has its own sub-systems or communities, such as the car, bus, truck, forklift, marine and aviation aspects of transport.

For the hydrogen industry to reach its potential we need to understand and work with the way the various systems consider:

- Their core values, such as the legality of practices (law), policies to help governments stay in power (politics), where the money is (economics) and what is and isn't true/verifiable (science)
- Risk
- Time, and their key decision-making timeframes.

For example, we know that to develop the global hydrogen industry we need to secure investment, and that this is required to some degree into the long term – ten to thirty years. How do we do this? Well, we need to start with understanding how the economy 'sees' things.

Economic view

The medium of the economic sub-system is money, and 'risk' for the economy is financial risk. Important factors for the economic sub-system (which is largely the way industry sees things) relate to investment cycles, financial reporting periods and market values. Economic decisions relate to these and ultimately need to show profit over loss.

If we are to understand and incentivise industry players, we need to see that industry puts significant investment into markets where there is at least a reasonable return in the short-to-medium term, relative to other investment opportunities. In understanding industry better we need to ask: what are the competing cases for an industry player when it comes to spending money? Is there a

sufficient short-to-medium term business case for investment? What is this timeframe and when does it run out? How does industry see its risk and how can risk be managed?

Given the clean hydrogen industry isn't yet commercial, investment must come from the public sector as well, at least in the more immediate term. This then means we need to identify and unpack how governments see investment.

Government view

It should not be controversial to point out that the overall driver in a government decision will be to support the government staying in power. This will mean different things at different times, depending on the politics of the day and the position in the election cycle. Governments need to be able to demonstrate public benefit from investments while managing the political risk from opposition and special interest views, all within a 24-hour news cycle. We need governments to make long term decisions in the public interest but governments have only three or four years in office at a time.

So, if we are to understand governments and encourage them to invest, we need to see the context for political decisions and understand how these decisions need to be made from the perspective of the political system. What are the competing cases for government attention? Is there sufficient political capital generated from investing in a certain industry compared with other things? How does this align with political timeframes for elections and budget announcements? How does government see its risk and how can risk be managed?

And, of course, if we are to grow the emerging hydrogen industry we need to connect the different sub-systems. Government and industry appetites to act must be of the right amount and at the right time. Questions that arise now include: What are the appetites we need to see (to do what, and by how much), and by when? What can be done in increments and what needs a bigger push now?

There are many of us trying to answer these questions right now. We are trying to connect the dots and learn from the past. We are trying to collaborate and make long term plans for the future, despite the difficulties in forecasting for a transition, in a pandemic, and when today's market and political values and timeframes do not necessarily support tomorrow's public benefit. And the nature of the parties in the collective 'we' is also ever evolving.

Industry, academic and government enthusiasm for hydrogen is huge and it's still growing. This is fantastic. But if we are to close the investment gap for the hydrogen sector, we need to translate this enthusiasm into action – into funding and policy, into larger scale projects and infrastructure rollouts.

This means improving partnerships between the private and public sector to share risk. It will require both industry and government to improve their perspective-taking. We at the AHC are working on this, and I also encourage everyone who needs to make a case to consider how it can be translated into someone else's value.

I will come back to the topic in future months. I have barely scratched the surface in this brief article, and of course we haven't touched the other sub-systems!

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