

Energy Transition

INTELLIGENCE BRIEFING

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SCROLL DOWN

SOLAR & WIND POWER BY COUNTRY FINANCING GREEN TECHNOLOGY INSIGHTS

“Keep Circular Economy Simple, Real and Relevant”

Hemant Chaudhary

Founder & Managing Director, Circular Economy Alliance Australia

How much progress has the circular economy made as a solution? There's been an improved understanding in the last few years but when it comes to progress, I feel it is painfully slow because we have not done enough work in demystifying the circular economy and keeping it simple, real and relevant to the community at large. There is a lot of work that needs to happen in that space.

Do circular economy solutions work best in a local setting? We need both a top-down and bottom-up approach. We need to realize that in a circular economy transition, individual actions are going to be very important. It is very much a social re-engineering movement because it is about the choices we make as consumers in terms of how we take, make, use, and dispose material and products. But to enable the community at large to make better choices, it requires work in a number of areas, especially in policy, education, technology, governance systems and even market instruments. We must make those choices in the way we consume, manage, discard, reuse resources, but at the same time, making proper choices means we need to consider the entire system.

Any low-hanging fruit where policies today can increase change and action? Start putting a price on pollution. This is one of the major game changers and incentives you need to put in place. Moreover, you cannot just say the polluter pays. I would go a step further and say the producer pays. This is where we must start introducing mandatory extended producer responsibility schemes. When you talk about a carbon tax, that is one way of introducing the polluter pays principle. But if you look at the circular economy, climate change is a major part of it.



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Circular economy from all accounts, can contribute up to a 50% reduction in our emissions by looking at the entire value chain. It is not just about the carbon footprint; it is also about resources. We return only about six or seven percent of what we currently extract into the value chain, leaving us with a huge 93% gap. And resources are not only the material we extract for use. They also include water and food. Any intervention which contributes towards either extending the life of the resource or keeping it in circularity is part of the circular economy.

Do companies have the incentive to engage in a circular economy? Companies can achieve significant benefits by practicing circular economy principles. While it is a relatively new term coined in the last ten years, there are various terms used in the past which capture some aspects of circular economy such as cleaner production, best minimization, pollution prevention, eco-efficiency, and resource efficiency. All these terms have been coined and used in the last 30 to 40 years. We implemented a cleaner production program in Southern Australia, and this was done in the 90s. We had about 48 companies from 18 different industrial sectors which participated in that program. We provided the technical and financial assistance to participating industries with a focus on the prevention and minimization of waste. After three years of the program, we did an independent economic evaluation of the program and for every dollar that we invested into it, the return on investment for the participating industries was about \$30. We spent close to \$2.2 million on that program and the cumulative economic and environmental benefits reached close to \$80 million. There are significant benefits and the industry gets that. The why part is getting more understood, but the how part is where we need more focus and effort.

What is the solution to plastic waste? Plastic, if it is properly captured and aggregated, and repurposed or recycled, can be used as a resource. When it goes into the environment, then it becomes a problem. Large companies are spending millions of dollars on improving the recyclability of their packaging but most of it still goes into the ocean, waterways, and landfill. So we are not getting the intended impact. About \$150 billion worth of plastic in value terms goes into the ocean. We need to move to a more collective impact of company efforts, and this requires far better multisectoral collaboration.

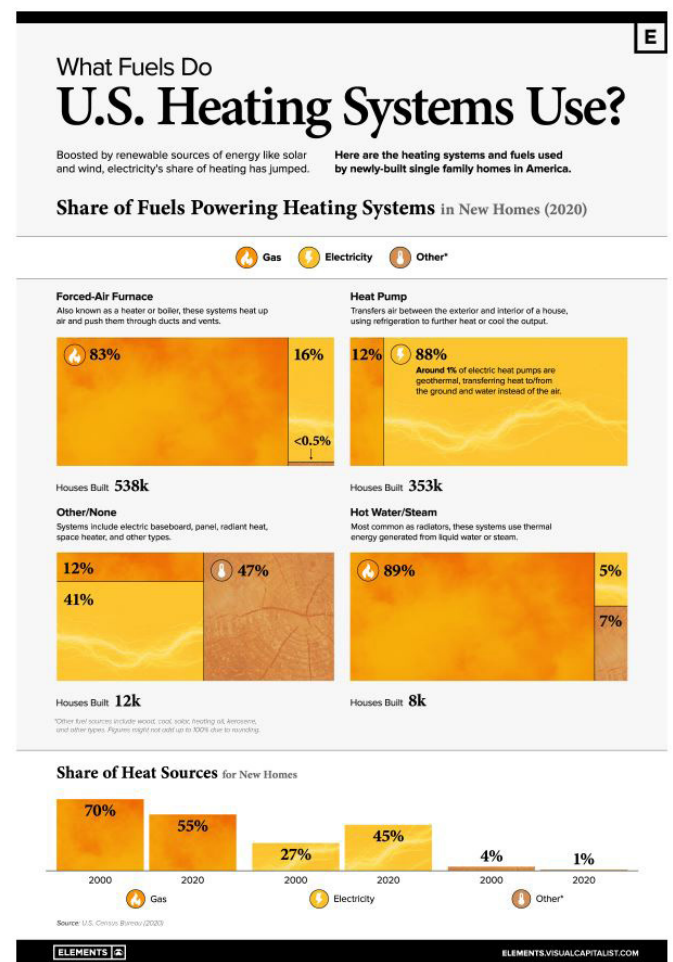
Do governments need to put more stringent penalties on consumers and companies? I would not say penalties, but perhaps a more robust policy framework that has to be regulated. We introduced a \$5 a ton levy on waste to landfill in South Australia in 1992, and it was not a very popular measure at that time and was seen as a tax collection exercise. But the intention was that half of that \$5 per ton would go towards better enforcement, and half for giving more incentives and creating education programs. What started at \$5 a ton in 1993 is now \$145 a ton. It has provided a very strong

foundation for incentive programs, for community education programs, and also brought in the solution providers into the market. Sustainable procurement can become part of the solution. I will always strongly advocate a policy framework and proper levies and charges, but it must be backed up with education, community partnerships and research and technologies. We have to look at the entire picture.

Is circular economy getting the attention it needs at platforms such as COP? I think a lot of those deliberations are focused on a very narrow prism. You cannot just put everything in the net zero approach and assume that is the only way to deal with the problem. You have to look at prevention, at the value chain, the supply chain. We are still talking about Scope 1 and 2 emissions mostly. What about Scope 3? We cannot address greenhouse gas emissions in isolation. More emphasis must be given to the entire aspect of our consumption - the whole economic model, which we can now see has reached the point where it is causing serious issues. It is not just about climate change - we are already reaching the finite limits of material extraction but it's not being understood very well. Do we have a substitute? That's the elephant in the room and we cannot ignore it.

[FULL INTERVIEW HERE](#)

HOME HEATING SYSTEMS IN THE US



INSIGHTS

At the World's Largest Oil Refinery, the Energy Transition Gets Underway



Bill Spindle
Council on Foreign Relations
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Reliance Industries' facility processes about 1.4% of all the oil produced in the world every day. Even here, the transition to renewable energy is gaining momentum.

Few places capture the promising yet perilous state of the world's energy transition better than where I visited earlier this week: The world's largest oil refinery, situated in a once-empty desert along the Gulf of Kutch on the Arabian Sea.

Here Reliance Industries Ltd. takes in 1.4 million barrels of crude each day from tanker ships offshore. The facility is a sprawling forest of pipes, tanks, boilers, generators and catalyzers, all landscaped very attractively with flower beds, greenery and ponds hosting geese and ducks and migratory birds.

It operates 24-7-365, turning oil into the full array of fossil fuel-based products the world demands. These include everything from gasoline, diesel and jet fuel to the petrochemicals used in plastic packaging and clothing. The facility grew in three rounds of rapid development between the late 1990s and the mid-2000s, transforming Reliance into a global energy titan and its leader, Mukesh Ambani, into one of the world's wealthiest and most powerful magnates.

These days, in a previously unused corner of the complex, something else dramatic is getting underway. Another vast expanse of sandy soil has been flattened, just as the rest of the land once was. The foundations are being laid for the most ambitious integrated renewable energy project in the world.

Ambani, whose father founded Reliance and built it into an oil and gas giant, is building a huge solar panel



factory here. That's just for starters. This will be followed by a massive factory to produce batteries for storing renewable energy produced by the solar panels. Then will come another giant factory to make hydrogen electrolyzers, a carbon-free technology coming into view as a potential mainstay of the new energy age for making steel and fertilizers, as well as powering ships and perhaps someday even planes. Following the electrolyzer plant will come another factory that will manufacture fuel cells. These will deploy the hydrogen to power trucks and buses, perhaps cars. It's an ambitious plan that starts with Reliance itself reaching net-zero carbon status by 2035 and builds from there to help India reach its national goals along the way to net zero by 2070. Ambani has vowed to pour \$80 billion of investment into the project before the end of the decade, a scale and speed rivaling anything Reliance has done.

No doubt he's serious. The Jamnager refinery rose with stunning speed, defying skeptics and inculcating a determined corporate culture.

Text scrolling around and around a complex of massive flashing screens in Jamnager's control rooms display words ascribed to Ambani's father, Reliance founder Dhirubhai Ambani: "For those who dare to dream, there are worlds to win." Senior managers routinely, without a trace of irony, say things like, "The word 'impossible' doesn't exist here." This corporate promotional video about the construction of the Jamnager complex gives you a sense of how the company, and many employees, view their mission. The Ambanis have also carefully aligned their ambitions with those of Prime Minister Narendra Modi, first during his stint as the chief minister of Gujarat and, since 2014, as he has solidified his position as India's most significant leader since the country's founding prime minister. The company's success, flowing in no small part from its ability to secure regulatory approvals and maximize government policies to its advantage, has helped Modi as well.

[FULL ARTICLE HERE](#)

Getting Hydrogen to Scale By 2030 Can't Be a Stroke of Luck

Dr. Fiona Simon

Chief Executive Officer, Australia Hydrogen Council

Does Australia have the funding to become a major hydrogen player by 2030? With the government investing \$1.4 billion into hydrogen, Australia probably ranks as reasonably high on the global list of countries. We are still however a long way away from where we need to be. So much more needs to be done – one area is in developing storage, which is very costly. We could be looking at many tens of billions of dollars that need to be spent by the government, which would need to be matched to a degree by funding from the private sector. Still, some progress is better than none. We have not been through this energy transition before, and it's also happening faster than some people might have thought. At the same time, we have to deal with the inevitable inertia that comes from institutional structures, political agendas and set investment cycles. More clarity from the government on its strategy and end goals would also make it easier to see whether we are on track or not. Just looking at our electrolyzer sizes, our largest one at present is 1.25 megawatts and we need to reach one gigawatt by 2030. It is not yet clear how we can make that evolutionary jump.

How important are cross-border hydrogen pricing mechanisms? More comprehensive cross-border pricing mechanisms are great enablers to get us where we need to be. To get the industry to scale and be commercial will require a cumulative effort. We absolutely need policy mechanisms, and ideally, they should be global. But to expect us all to somehow turn around and adjust to a very fast transition when we do not seem to have adjusted well to the slow beginning of it, appears difficult.

Which part of the hydrogen supply chain needs most attention? One of my main concerns is storage and how we bring those costs down. Land and water resources and usage is another area and vital to the process. We have to engage with communities on how they get shared benefits of the land used for hydrogen and make them feel they are part of the solution. We should be clear on where water resources will come from and in

what volumes. That might mean accepting things that people might not have initially considered as a vital part of a business case, such as committing to desalination, compared to assuming access to fresh water. The sooner the industry and all stakeholders clarify their positions on these things, the sooner we can move forward responsibly and transparently.

Are ESG concerns getting the attention of your members? It is becoming much more prevalent. We are also having conversations well beyond our members with governments and academia. Shifting to a low to zero emissions economy is inevitable and hydrogen is an essential part of that solution.



[FULL INTERVIEW HERE](#)

Financing Green Technology

Energy Transition Needs Empowerment, Deployment, and Focus



Jonathan Blackburn
Manager of Partnerships and Transactions
RWE Renewables



Claudia Zuluaga
Founder
The Future Is 50/50



Faris Al Kharusi
Principal Business Transformation Consultant
Petroleum Development Oman

Are we seeing enough investment into green technologies?

Claudia P. Zuluaga: We have shifted all the investment to developed countries. New technologies are helping the energy transition there to get where it needs to be but it's not reaching the developing world where the majority of the global population live, and that's a major problem. It is important that we educate this greater part of the human population. Otherwise, the energy transition is not going to happen. We should have methods and business models and innovative approaches that allow us to shift the investment to these countries. One example is getting the technologies that are probably obsolete already in Europe, but which can be considered new in emerging markets. They may not be the best technology, but to democratize and accelerate the energy transition, we need to help everyone in the ecosystem. We need to make investments more accessible, not only to traditional investors, but also to the man on the street. Educating and training consumers on the energy transition is perhaps the most important part as they are the ones that will purchase and execute the solutions.

What challenges remain in the renewables market to be invested into?

Jonathon Blackburn: What I like about solar and wind is that the technology has been proven for decades. It is a very safe investment for example for a pension fund insurance company, providing an annuity for 30 to 40 years. The counterpoint to that is that the returns are getting compressed as the investment becomes less risky. We can get 70% or 80% of the way to our decarbonization targets with the technologies that we have today and so deploying as much renewables as we can has to be a key focus. But it's not going to get us all the way where we need to be, and this is where we need to look at other sources such as green hydrogen.

Do policies in this region support public private partnerships in the green tech space?

Faris Al Kharusi: It's a mixed bag. According to a report by PWC's Strategy& Middle East, the GCC has approximately \$2 trillion worth of green finance opportunities to come in the next five to ten years and one million jobs to be created. But you see policymakers in the region still focused mostly

on flagship projects. The move to solar and wind has been evolving and maturing for over two decades, and now we have new entrants in hydrogen, so it's quite a fragmented marketplace of choices for a portfolio and this is where policymakers start to stumble because they get pulled in different directions. They are also limited in their choices because these are not very big countries.

How critical is it that we have an international carbon credits and offsets mechanism?

Faris Al Kharusi: Any modern national oil company or IOC that operates in this region has most likely already accounted for possible carbon tax and carbon penalties and included them in their long-term fuel development plans. The other thing to bear in mind is that policymakers in general have the tendency to revise their plans and commitments. Many don't believe the current targets are very sincere. If you look at some countries' plans, they are not as focused on efficiencies or alternatives as much as most people who want to get off the hydrocarbon train, would want.

What should the priority be for investors in the next five years?

Jonathon Blackburn: The next key step is deployment. We have the technologies to get us a large part of the way of where we need to be. Let's now deploy them on a massive scale all around the world. Also, the next chunk of deep carbonization is likely to come from a fuel switching regime. We see the transport sector already switching from petroleum to batteries for example. My hope is that we can continue to ride down the cost curve of battery technology in the same way that has happened with wind and solar. In the US, we are seeing the deployment of a massive number of utility scale batteries in Texas alone. There's 10 to 20 gigawatts set to come online in the next few years.

Claudia P. Zuluaga: This energy transition requires more empowerment around the world - we do not have enough of it. And those that do have it, do not know how to execute or help the groups or consortiums that need to develop these green technologies for the energy transition to take place.

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Transforming Energy System with 5G Mobile Communication Technologies

Information and Communication Technologies (ICT) are transforming our societies. They also have the potential to accelerate energy transition by making the infrastructure-heavy energy system “lighter and more flexible”. Energy companies worldwide have been among the biggest users of ICT digital technologies.

However, in no other country than China, have we witnessed a government-directed national action plan to promote one particular ICT technology in the energy field. The “Implementation Plan for the Application of 5G Mobile Communication Technology in the Energy Sector” (the Plan), jointly released by NDRC (National Development and Reform Commission), NEA (National Energy Administration), Ministry of Industry and Information Technology (MIIT) and State Council’s Network and Information Office in July 2021, not only shows how strong the policymakers’ aspiration is in transforming the energy system with ICT technologies, it also demonstrates how detailed a government-directed plan could be around one specific technology.

Advantages of 5G mobile communication technologies:

From the appearance of the first generation (1G) mobile phone in 1986, mobile communication has evolved from

simple transmission of voice to text and email enabled 2G in 1994, videos and games supporting 3G in 2000, App supporting 4G around 2010, to today’s 5G with bigger data transmission capability, faster speed and lower latency. Starting from 4G, smart phones have enabled and empowered a large number of Apps allowing online shopping and digital payment on your palm at your fingertip, but it is only with 5G that industrial applications become viable thanks to its powerful data transmission capability.

In ICT professional terms, 5G has the following three key features:

- 1) **Massive Machine-Type Communication (mMTC)** allowing for machine-to-machine communication that is the basis of all internet of things (IoT) industrial applications;
- 2) **Enhanced Mobile Broadband (eMBB)** allowing for connections of larger number of machines to the communication system; and,
- 3) **Ultra-Reliable Low Latency Communication (URLLC)** allowing for remote surgeries and automatic driving, among other applications.

Source: © CN Innovation (www.cn-innovation.tech).

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Mapped: Solar and Wind Power by Country

Rank	Top Countries	Solar/Wind Power Share
#1	Denmark	51.9%
#2	Uruguay	46.7%
#3	Luxembourg	43.4%
#4	Lithuania	36.9%
#5	Spain	32.9%
#6	Ireland	32.9%
#7	Portugal	31.5%
#8	Germany	28.8%
#9	Greece	28.7%
#10	United Kingdom	25.2%

Source: <https://elements.visualcapitalist.com/mapped-solar-and-wind-power-by-country/>



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