OPINION PIECE

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Green hydrogen requires an appetite for action

The International Renewable Energy Agency (IRENA)'s *World Energy Transitions Outlook 2022*, which sets out in precise detail the route to achieving 1.5°C by 2030, argues in favour of using hydrogen to achieve full decarbonization (IRENA, 2022). This means raising global production to five times the current production, or 614 megatonnes of hydrogen per year, to reach 12 per cent of the final energy demand by 2050. Green hydrogen is expected to make up the vast bulk of this production.

Discussion of green hydrogen arrives at the right time. Renewable power generation costs have plunged over the past decade, driven by rapidly improving technologies, economies of scale, competitive supply chains and an ever-improving developer experience. To use just one example, electricity costs from utility-scale solar photovoltaics fell by 85 per cent between 2010 and 2020.

Unlike fossil fuels, renewable energy can potentially be produced by every nation. It is energy-fair. The same can be said of green hydrogen, which is a process of conversion, using water and electrolysis technology powered by renewable energy. The method could radically transform the way global energy is traded.

Green hydrogen can also be economical in locations with the optimal combination of abundant renewable resources, space for solar or wind farms, and access to water, matched with the capability to export to large demand centres. New power centres could be built in places that exploit these factors to become hydrogen hubs for its production and use.

Until recently, however, there has been no cost-effective way of transporting renewable electricity over long distances to link low-cost production sites with demand. Suitable transmission lines are rare and extremely expensive to construct. The use of hydrogen as an energy carrier could provide the answer, enabling renewable energy to be traded across borders in the form of molecules or commodities such as ammonia.

To make trade cost-effective, production of green hydrogen must be sufficiently less expensive in the exporting region than in the importing region to compensate for transport costs. This cost differential will loom large as the scale of projects increases and technology develops to reduce transport costs. Hydrogen trade can lower energy supply cost energy since cheaper energy is tapped into. It can also lead to a more robust energy system with more alternatives to cope with exploding crises.

We still have much to do. For the hydrogen trade to truly flourish globally, a market needs to be created to generate demand, promote transparency, and connect suppliers and end users. Underpinning the market, nations need to produce a market regulatory framework containing the flexibility to promote growth. And there must be an internationally accepted certification scheme accepted by all. Finally, innovation must dramatically improve the available technologies that reinforce the integrated value chain.

Green hydrogen is not going to leap on to the world's energy stage fully formed and ready to salvage efforts to achieve 1.5°C by 2030. It is going to require decisive action and dynamic innovation to create new production centres and stimulate demand. Above everything else, it will take ambition and clear-sightedness about our future prospects. The world must be prepared to extend its reach to grasp every opportunity for energy transition. Taking the first step is simple: we just have to reach out.