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ENERGY NEWS FROM THE REGION, COUNTRY AND WORLD | OCTOBER 2021

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WITT NEWS

WITT commits to a Sustainability Pathway

Dr Ellie Khagani (Energy Lead, WITT)

The United Nations Sustainable Development Goals (SDGs) are 17 global goals to eliminate poverty by 2030.

The progress is measured by addressing social issues like poverty, hunger, health, education, climate change, gender equality, and social justice.

In alignment with UNSGs, Te Pūkenga is implementing "He Pou A Rangi", the Climate Change Commission's final advice to Government, within ITPs and is establishing sustainability initiatives such as having ITP's engage with EECA to access the State Sector Decarbonisation Fund for replacing coal boilers, developing feasibility studies for replacing gas boilers and to access the LED lighting project.

Te Pūkenga Deputy Chief Executive Operations Vaughan Payne said "Te Pūkenga will shortly begin drafting a sustainability strategy with clear objectives to ensure our sustainability mahi is connected and builds on work already underway.

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Dr. Ellie Khaghani

Ellie joined the Western Institute of Technology at Taranaki (WITT) in 2019. She currently teaches engineering courses at WITT and acts as Energy Lead.

WITT commits to a Sustainability Pathway

WITT NEWS

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"It is important to keep sustainability at the forefront of what we do as it contributes to the success of our learners, their whānau and our people."

"The strategy will take a holistic approach to sustainability, aligned with the United Nations Sustainable Development Goals (SDGs). This means maximising the positive impact we have environmentally, socially, culturally, and economically, and working to eliminate negative impacts," he said.

Te Pūkenga's Sustainability Space is a platform for everyone to share the best practices regarding sustainability.

Te Pūkenga is establishing a sustainability committee and will be consulting with emission management providers around the country to investigate how they can assist the decarbonisation journey within ITP's.

Sustainability is one of WITT's main pillars.

The sustainability journey has already started at WITT by adding a 'sustainability lens' in decision-making, with a longterm focus on:

- Sustainable learning ensuring inclusive and equitable quality education that promotes lifelong learning opportunities for all.
- Developing an 'Energy Hub' of educational opportunities.
- Working with a broad community, both nationally and internationally.
- Developing a sustainability related education curriculum.
- Developing micro-credential courses to equip and inform those in the workplace.

Working with EECA

WITT is working closely with the Energy Efficiency Conservation Authority (EECA) to lower their carbon footprint as an education leader in Taranaki and participate in a low emissions future for Aotearoa.

A signed collaboration agreement is in place to complete a feasibility study by BECA to replace the gas heating system with an electric heat pump when it needs replacement.

There are other sustainable practices at WITT including:

- Using LED lamps and sensor lighting.
- Using water efficient shower heads in the new gym facility.
- Using coloured rubbish bins based on council guidelines for better handling of waste.
- Recycling waste cooking oil.
- Using electric vehicles and planning replacement of high emission vehicles with low and zero emission alternatives.
- Installing EV chargers.

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Sustainable Development Goals (SDG's)

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- Removing and replacing refrigerators that have R22 refrigerant.

WITT has embedded sustainability principles in teaching and learning by moving some courses to the iQualify platform. This enables a blended learning environment with a mixture of online and face-to-face teaching. This creates educational access to the broader community, such as full-time employees where they have the opportunity to access sustainability-related knowledge in their study programmes.

WITT is encouraging low carbon lifestyles by promoting sustainable transportation. WITT encourages staff and students to use the free regional bus service, carpooling, walking, or cycling whenever possible.

Engaging with industry on sustainability curriculum.

WITT is developing sustainability and solar courses and has invited Taranaki stakeholders to provide feedback on proposed future courses. The purpose is to identify the gap in knowledge between currently available courses and industry requirements, to ensure WITT is offering the right skillsets and programmes needed to support the energy transition the country is facing. WITT will be offering courses to upskill individuals with emerging technologies.

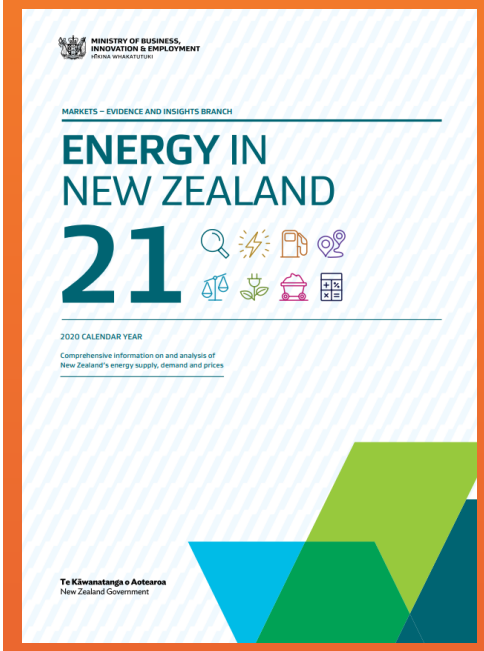
WITT has partnerships in the region to help them understand the range of sustainability issues. Agreements are in place with:

- Waka Kotahi (Sustainability conference). This is co-hosted in May for last 20 years.
- NPDC & Talent pipeline members (Build a Bridge - Walkway access bridge).
- Venture Taranaki (Member of the Energy Action Group).
- National Advisory Group for NZIHT – NZ School of Engineering, Energy, and Infrastructure.
- Te Pūkenga has a MOU in place with Energy Skills Aotearoa. Their stakeholders are Ballance Agri-Nutrients, Beach Energy, Business NZ, First Gas, Fonterra, Hiringa Energy, Methanex, OMV, and Todd Energy.

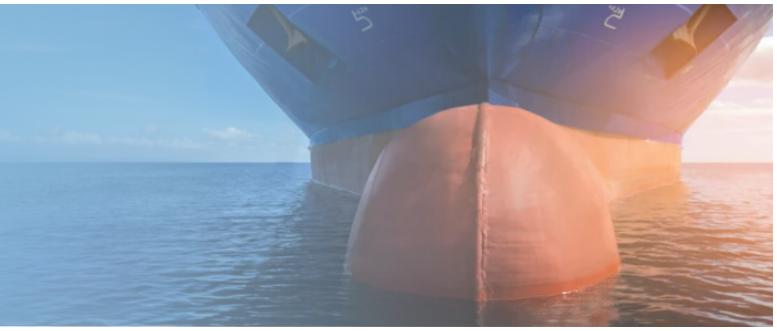
"Our network is already embracing sustainability. It is our responsibility to make sure we are doing everything we can to ensure this is consistent across the network and to take steps to improve the social, economic, environmental, and cultural wellbeing of our communities and future generations."

Te Pūkenga

Useful Links



"Shipping in" Shipping Fuel



The Maritime Transport (MARPOL Annex VI) Amendment Bill.

The bill is currently being debated in Parliament after the Economic Development, Science and Innovation Committee completed hearing public submissions on the bill.

This Bill seeks to address the impacts of shipping emissions through the alignment of domestic legislation with Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL).

This Bill provides a power for the Minister to make marine protection rules in relation to Annex VI substances and for the Director of Maritime New Zealand to conduct inspections and audits and detain ships that are in contravention of MARPOL Annex VI requirements.

The International Maritime Organisation (MARPOL) has set rules reducing the sulphur allowed in marine fuel oil by 80 per cent – down to 0.5 per cent by volume from the previous 3.5 per cent limit. This means New Zealand will have to import more shipping fuels as the refinery is curtailing its refining operations.

Refining NZ says they won't be producing low-sulphur fuel oil. It will need to be shipped in.

Alternative Shipping Fuels

Ammonia

Emitting zero CO_2 when combusted, ammonia has long been considered as one of the most promising alternative marine fuels to reduce greenhouse gas (GHG) emissions within the shipping industry. In particular, green ammonia possesses great potential as it is produced from only renewable electricity, water and air with no CO_2 emission.

Merask shipping line is currently researching the feasability of Ammonia. Their study aims to cover the entire end-to-end supply chain of ammonia bunkering, which includes the development of a cost-effective green ammonia supply chain, design of ammonia bunkering vessels, as well as related supply chain infrastructure. Relevant government agencies and experts in Singapore will be engaged in working towards the standardization of safe operation and regulations. The study will assess the supply of ammonia including potential synergies with Liquefied Petroleum Gas (LPG) as a starting point. Considering the comparable requirements for mild refrigerated storage, vessels or barges initially designed for LPG can also handle brown3, blue2 and green1 ammonia.

https://www.maersk.com/news/articles/2021/03/10/maritime-industry-leaders-to-explore-ammonia-as-marine-fuel-in-singapore

Methanol

New Zealand's Energy News reports "International assessments of a dozen different fuel types in 30 different hypothetical market and regulatory scenarios, found ammonia and methanol are among leading options for cleaner deep-sea shipping fuels. New Zealand produces both, with methanol and ammonia the best options for retrofitting diesel engines.

Methanol burns cleaner than conventional fuels and produces significantly lower atmospheric traces of sulphur oxide, nitrogen oxide, particulate matter, and carbon dioxide. It is a clean-burning, low-emission fuel that biodegrades rapidly in water. Its use as a fuel has been growing – about 50 per cent of global methanol production is now used as a fuel.

Methanex Taranaki produces up to 2.4 million tonnes annually.

https://www.energynews.co.nz/news-story/ammonia/62208/methanol-ammonia-clean-marine-fuels

Big Batteries and big projects

NZ Generators Work Together

Grid Scale Batteries set to cost $1M per megawatt

Meridian Energy has its eye on an upper North Island industrial site for a 100-megawatt grid-scale battery.

Meridian are in discussions with Contact Energy to co-develop the battery, discussing how the $80-100 million capital costs will be shared as well as the commercial operating arrangements for the battery.

Recent blackouts and the growing pressure to decarbonise the electricity system mean there is more need for storage that has despatchable capability in order to back up intermittent renewables, so power can be supplied reliably if there is a sudden drop in wind effecting the output from wind turbines.

Meridian Energy and Contact Energy are cost-sharing the $2M feasibility study of the Southern Green Hydrogen project in Southland where South Island electricity can be utilised once the Tiwai Point closure commences in 2024.

Tiwai Point utilises about 13% of the country's electricity generation and represents close to 40% of Meridian's revenue base.

They both contributed investment into the preliminary preparations for building out the Upper Clutha, Waitaki grid connection that would free Manapouri power to be sent north. The 100MW battery project is the third significant collaboration in recent years.

Renewables needs Battery backup

The persistent variability of renewable energy sources such as solar and wind power underscores the need for large scale storage of clean energy.

This need, alongside technological breakthroughs in clean hydrogen solutions, has led hydrogen to become a key contender for the most promising low-carbon replacement for fossil fuels.

According to BloombergNEF's Hydrogen Economy Outlook, hydrogen could meet as much as 24% of the world's energy needs by 2050, with the right support in place.

According to the Net Zero by 2050 report from the International Energy Agency (IEA), hydrogen electrolysers are one of the biggest energy innovation opportunities, together with advanced batteries and direct air capture and storage (CCUS) of greenhouse gases. Similarly, the IEA identifies hydrogen and hydrogen-based fuels as one of the key pillars of decarbonisation.

https://www.openaccessgovernment.org/storage-vital-for-hydrogen-to-solve-renewable-energy-challenges/117942/

Collaboration

On the Southern Green Hydrogen website, the companies say:

"Meridian and Contact are competitors in the New Zealand electricity market. Under the Commerce Act 1986 (New Zealand's competition law), competitors may work collaboratively where the scale, complexity, investment requirements and risk profiles of projects are such that neither party is likely to be able to progress the project independently. Southern Green Hydrogen is one such project."

https://www.southerngreenhydrogen.co.nz/

Powerco supplies a big battery to the Whangamata community

The Battery Energy Storage System (BESS), situated at Powerco's substation just south of Whangamata, is a large-scale dedicated battery and bespoke generator with state of the art switching system to provide stand by power to the CBD.

Whangamata is supplied by a single 33,000 Volt line running through some rugged and environmentally sensitive terrain from Waihi. Due to that rugged terrain and the occaisional severe weather, the line remains subject to a high level of risk. When damage occurs to that line all power is cut to more than 5,700 properties.

Powerco believe the BESS will provide a step change in their network performance for the CBD.

The BESS will automatically fire up if there is a power cut in the bulk supply to Whangamata and will power up around 1,000 properties in and around the CBD – essentially keeping businesses open in commercial heart of the towns CBD.

https://www.powerco.co.nz/news/bess/

Green Gasoline for Porsche

EVs are the future, but vehicles with internal-combustion engines are not going to disappear any time soon, which is why synthetic fuels could provide a greener option for the vast majority of the cars on the road today.

The eFuels that Porsche is testing use CO_2 and hydrogen ingredients and are made using renewable energy, which significantly lowers the greenhouse gas emissions compared to petroleum-based fuels.

Porsche is far from first to dip into synthetic-fuel research. Audi, Bosch, and McLaren have all been talking about and working on the technology for years.

In the race for greener mobility, nearly every automaker is now focused on electric vehicles. But buying an EV doesn't change the fact that the vast majority of cars being sold today are powered by gasoline, and they're going to remain on the road for a long time. As a way to make driving existing vehicles more sustainable, Porsche has been working on synthetic fuels it calls eFuels that the company says can make an internal-combustion engine as clean as an EV.

Porsche's eFuels are made out of CO_2 and hydrogen and are produced using renewable energy. The final result is a liquid that an engine will burn the same as if it was gasoline made from crude oil, but an eFuel can be produced in a climate-neutral manner, at least in theory.

Speaking at the recent launch of the new 911 GT3, Porsche vice president of Motorsport and GT cars Frank Walliser said the company will have its first small test batch—just 130,000 liters, or 34,340 gallons—of eFuel ready by 2022.

"Synthetic fuel is cleaner and there is no byproduct ,and when we start full production we expect a CO_2 reduction of 85 percent," Walliser said.

"From a 'well to wheel' perspective—and you have to consider the well-to-wheel impact of all vehicles—this will be the same level of CO_2 produced in the manufacture and use of an electric vehicle."

In a similar vein, E85, a non-carbon neutral gasoline substitute made from 85 percent corn-based ethanol, has been promoted in the U.S. since the 1990s, with more than 100 E85-compatible models sold since then, from the Mercedes-Benz CLA250 to the Chrysler 300, from the Chevrolet Impala to the Ram 1500.

To oversimplify, the eFuel process uses renewable energy to crack hydrogen from water and then move the hydrogen to a process that results in synthetic gasoline. It's not a new idea: The so-called Fischer-Tropsch process dates back to the early 1920s and is said to have accounted for 9% of Germany's military fuel use in World War II and 25% of civilian vehicle fuel use during that same period.

https://www.caranddriver.com/news/a35577611/porsche-synthetic-efuel-clean-emissions-testing/

Decentralised energy system needed to reduce barriers to full-scale adoption of renewables in Europe

European Commissioner Kadri Simson in January 2021, shared a vision of a future where Europe could be the first climate-neutral continent by 2050 and reduce at least 55% of emissions by 2030. The increase required in renewables to achieve these ambitions is huge, indeed, renewable energy sources must at least be doubled in all sectors.

Tereza Borges, International Business Development at Lumenaza says "Europe needs a decentralised, distributed system in which prosumers, energy communities and collective self-consumption take centre-stage. Their role as crucial drivers of the energy transition has been acknowledged by the EU in its Clean Energy Package, one of the instruments to realise the ambitions of the European Green Deal."

The technology to harness renewable energy on a large scale exists and more end-customers are interested in making a personal contribution to the energy transition than ever before. The EU's Clean Energy Package provides a solid basis for enabling end-customer empowerment.

https://www.openaccessgovernment.org/energy-barriers-to-the-full-scale-adoption-of-renewables/106269/

Nuclear Fusion: U.S. and China race to build world's first commercial plant

Both the U.S. and China are investing in nuclear fusion, and expecting results. Fusion's unresolved engineering challenges (getting more power out than you have to put in) must be overcome first. If achieved, it offers the prospect of an almost inexhaustible source of energy. As Dan Yurman explains, this month the U.S. passed a bill that includes $2.8bn for fusion energy-related projects and research. The U.S. Fusion Industry Association said that figure still isn't enough and will result in missed opportunities and the initiative shifting to other countries. Like China, where two tranches of $900m are supporting the development of an Experimental Advanced Superconducting Tokamak. The device has achieved world records for maintaining plasma temperatures. Timescales are long, with 30 years from construction of the first plant to commercial operation. But the goal should be worth the wait.

https://energypost.eu/nuclear-fusion-u-s-and-china-race-to-build-worlds-first-commercial-plant/

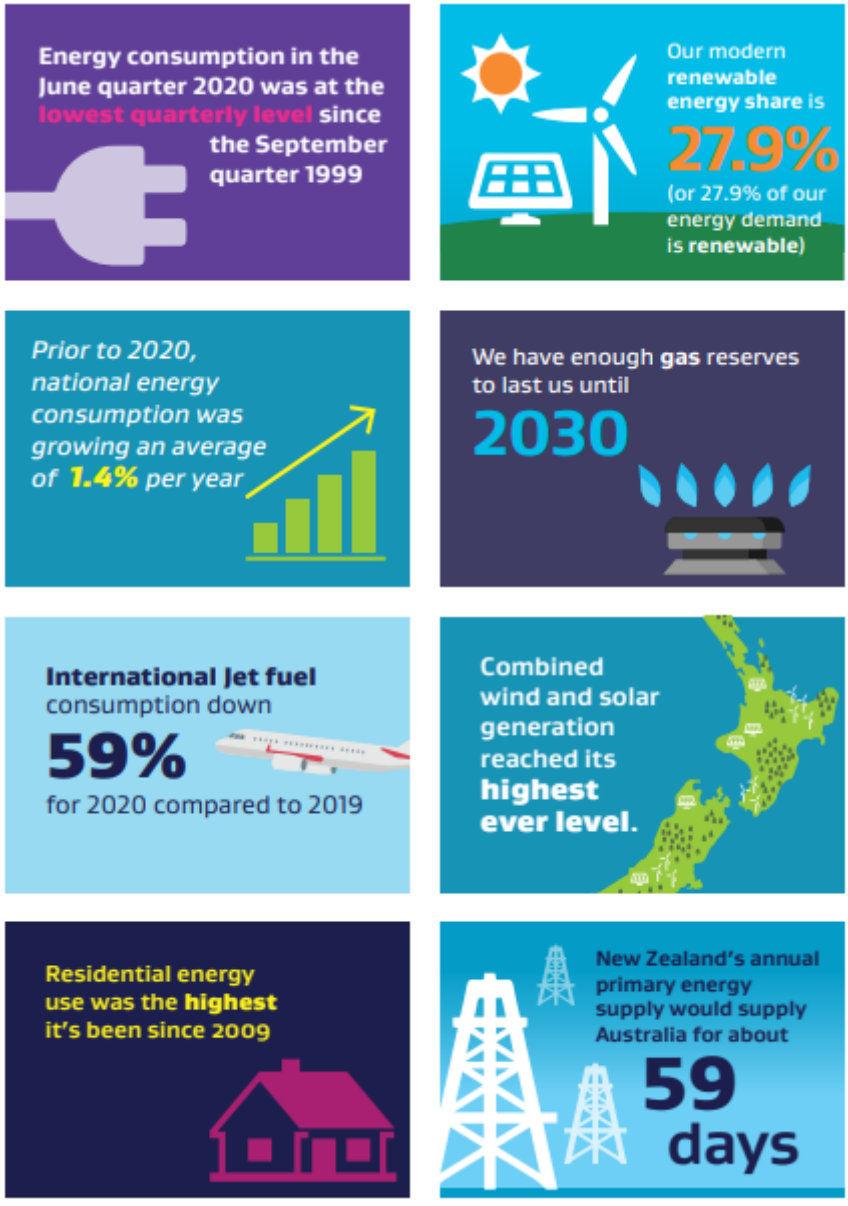
Record global power sector emissions by 2022, because Renewables aren't growing fast enough.

The International Energy Agency (IEA) is forecasting that renewables will cover only half the projected increase in global electricity demand in 2021 and 2022. Despite renewables' impressive growth, coal and gas will cover the rest. That means emissions will rise to record levels. That will be the reverse of the IEA's (and many others') "Roadmap to Net Zero by 2050" pathway, where three-quarters of global emissions reductions between 2020 and 2025 come from the electricity sector, requiring coal-fired electricity generation to fall by more than 6% a year.

Most of the increase in electricity demand is expected to come from the Asia Pacific region, mainly China and India. There have only been two years when renewables growth has exceeded demand growth: 2019 and 2020. Even then, it was largely due to exceptionally slow or declining demand. The day when renewables' growth can be relied upon to outpace electricity's has not yet come.

https://energypost.eu/record-global-power-sector-emissions-by-2022-because-renewables-arent-growing-fast-enough/

Energy in New Zealand 2021 Factsheet



SOURCE: Ministry Business Innovation and Employment

Government invests in reducing industry emissions

The Government has announced 23 new projects that will receive government co-investment from Round Two of the Government Investment in Decarbonising Industry (GIDI) Fund. The recipients will receive $28.7 million and will match this with $54.5m of their own funding. These 23 projects will deliver annual savings of 142,591 tonnes of greenhouse gas emissions, amounting to 2.8 million tonnes over their lifetime. That's the same as taking nearly 46,000 cars off the road.

https://www.beehive.govt.nz/portfolio/labour-2020-2023/energy-and-resources

Contract awarded for NZ Battery investigation

A consortium of specialist firms has been awarded a contract to advance the New Zealand Battery Project's feasibility investigation into a pumped hydro storage scheme at Lake Onslow.

The contract signals the start of targeted engineering, environmental planning and geotechnical feasibility investigation for Lake Onslow. The first part of the investigation will look at the design and environmental effects as well as determining the geotechnical fieldwork programme. The fieldwork investigations are likely to include drilling shallow and deep boreholes to better understand the underlying geology, the best route for a tunnel and the best location for a potential underground powerhouse.

https://www.beehive.govt.nz/portfolio/labour-2020-2023/energy-and-resources

Kiwis to have their say on plan to reduce waste

New Zealanders are invited to have their say on proposals for a new waste strategy and options for new waste legislation. New Zealand is one of the highest generators of waste per person in the world. On average, every year each New Zealander sends approximately 750kgs of waste to landfill, and much of this could be recycled, re-processed or reused.

https://www.beehive.govt.nz/release/kiwis-have-their-say-plan-reduce-waste

"Low-user" charges on electricity bills to be phased out.

Phasing out the regulations on 'low-use' electricity plans will create a fairer playing field for all New Zealanders. The regulations will be phased-out over five years, starting from 1 April, 2022, with support for households who might be affected by the changes. Currently, the cost of delivering electricity through lines charges to those on low-use plans is supplemented by other households on standard-use plans. The 2019 Electricity Price Review panel found the low fixed charge regulations are poorly targeted and are not equitable – and recommended the change.

https://www.beehive.govt.nz/release/power-bill-changes-bring-fairness-charges

Opportunity to shape NZ's first Emissions Reduction Plan

The Government is inviting New Zealanders to inform the country's first Emissions Reduction Plan with the release of a consultation document. The Emissions Reduction Plan will set the direction for climate action through to 2035. It will set out action to reduce greenhouse gas emissions across a range of areas, including energy, transport, waste, agriculture, construction and financial services.

A copy of the discussion document is found here.