FOUR STEPS TO NET ZERO EMISSION BY 2050 – STEP 2

Projections in the Pathways Report and work done by ClimateWorks Australia and Australian National University, together with CSIRO and the Centre of Policy Studies at Victoria University provide four simple steps that help us achieve zero net emissions by 2050.

NET ZERO EMISSIONS – THIS MEANS THAT THE EMISSIONS WE RELEASE INTO THE ATMOSPHERE ARE NO GREATER THAN THE EMISSIONS WE REMOVE.

STEP 2.

PRODUCING CLEANER ELECTRICITY

So much of our lives are dependent on electricity. We also have vast swathes of infrastructure that support our use of electricity. The key to reducing the emissions generated as a result of our electricity use is to change the way we produce that electricity. We need to move away from burning fossil fuels that produce greenhouse gas emissions, to using cleaner, low emissions alternatives such as wind and solar (also known as low carbon electricity).

EXAMPLES OF LOW CARBON ELECTRICITY INCLUDE:

- WIND POWER – ELECTRICITY GENERATED FROM THE WIND
- SOLAR POWER – ELECTRICITY GENERATED FROM THE SUN
- HYDROELECTRIC POWER – ELECTRICITY GENERATED THROUGH THE USE OF THE GRAVITATIONAL FORCE OF FALLING OR FLOWING WATER
- GEOTHERMAL POWER – ELECTRICITY GENERATED FROM THE HEAT EMANATING FROM THE EARTH'S CORE
- TIDAL POWER – ELECTRICITY GENERATED FROM THE TIDES

The Pathways Report modelled several options for low carbon electricity. Each of these could be achieved at similar costs. These include:

- 100% renewable energy
- Renewables plus carbon capture and storage (CCS)
- Renewables plus nuclear

All three scenarios would lead to similar emissions intensities by 2050, with the 100% renewables grid resulting in the lowest emissions by 2050.

FOUR STEPS TO NET ZERO EMISSION BY 2050 – STEP 2

MODELLING FOR THESE THREE SCENARIOS PRODUCED SOME IMPORTANT FINDINGS:

- All scenarios include a dominant share of renewables, driven by the decrease in cost of renewable technologies such as solar and wind over recent years. At this rate we could see 48% of our energy being produced by 2030 and 71% by 2050. They are expected to be the lowest cost technologies to achieve decarbonisation until their penetration requires significant additional costs for the management of variability. The wind doesn't always blow or the sun always shine, so there has to be systems in place to provide back-up for any energy shortages due to the variability of wind or sunshine).

DECARBONISATION – TO REDUCE THE AMOUNT OF GREENHOUSE GASES RELEASED INTO THE ATMOSPHERE AS A RESULT OF HUMAN ACTIVITY.

- The major difference between scenarios is how the variability of wind and solar is managed. In the CCS and nuclear scenarios, back-up for variability is met by these technologies combined with peaking gas (gas that is only supplied during peak times). In the 100% renewables grid scenario the variability is met by combining storage with renewables and use of non-variable renewable technologies such as geothermal (geothermal energy comes from the heat of the earth which remains at a constant temperature and therefore doesn't have the problems of variability associated with solar and wind power).

- Solar could become the dominant technology by 2050. The high share of solar power (either photovoltaic or solar thermal) in the electricity generation mix is a reflection of both their cost advantages and also that a third of electricity consumption occurs in Western Australia, due to increases in mining activity and electrification of mining processes, where conditions for solar power are particularly favourable. Taking into account the need to invest in back-up capacity to cover variable supply, solar will more profitable than wind power by 2050.

- Analysis of retail electricity prices under the 100% renewable grid scenario showed households using only electricity today could expect the percentage of household income spent on electricity to halve by 2050.

GOING EVEN FURTHER

The results of this step could be further enhanced if demand for electricity was reduced - doing this in the mining sector alone would significantly impact total electricity generation in 2050.

On the supply side, additional technologies could be considered, such as:

- Biomass with Carbon Capture and Storage (CCS), generating electricity with net negative emissions, or the use of biogas to power remaining gas turbines without CCS. Both of these options would need additional biomass feedstocks.
- Accelerated reduction in the cost of low carbon energy technologies and storage could also speed up this step.