

FOUR STEPS TO NET ZERO EMISSION BY 2050 – STEP 1

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 1.

REDUCE ENERGY USE

You've probably heard the term 'energy efficiency'. It means choosing equipment and assets that use less energy and getting more out of the energy we do use. And it most certainly includes choosing appliances with a higher number of energy efficiency stars, insulating your home really well, and switching to low energy light bulbs.

But on a larger scale, it also means greatly improving our energy efficiency in all energy end-use sectors (the points where the energy ends up going). It includes:

- Improving the efficiency of passenger and goods transportation, by doing things like improving vehicle technology.
- Designing smarter infrastructure and more energy efficient urban spaces including residential and commercial. This may be achieved through improved architectural design, building practices and construction materials.
- Improving the efficiency of industry, including equipment, material efficiency and production processes in all industries, and doing clever things like re-using wasted heat.

Here's a snapshot of what could happen with energy efficiency across several key sectors in Australia:

BUILDINGS

In the buildings sector, we could achieve a reduction in energy use per household of over 50% compared to now, while commercial sector energy use per square metre could be reduced by just under 50% compared to now.

Even though this sounds like a HUGE improvement compared to where we are at right now, it doesn't actually require a big technological (or expensive) leap as these goals can be achieved through ensuring that new buildings are as efficient as possible, and by replacing existing equipment with best practice models when they reach the end of their useful life.

For example, LEDs (light-emitting diode) are light bulbs that can use at least 75% less energy - and last 25 times longer - than incandescent (standard) lighting.

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Similarly, some buildings are now being built with an 8-star energy rating. These use 80% less energy use for heating and cooling compared with current homes. In most cases, the cost of energy saved over time will more than offset the additional up-front costs.

INDUSTRY

In manufacturing, the energy intensity of production could fall by approximately 40% by 2050 (not including emissions achieved through shifting to cleaner fuels, as discussed in Step 3). This can be achieved through process improvements and equipment upgrades for existing plants as well as implementing best practice technologies during the construction of new industrial facilities.

For existing plants, improvements could include things like reducing thermal losses from heating processes such as furnaces, kilns and boiler systems, or capturing waste heat to preheat materials. It also means reducing the fuel inputs required to perform other industrial processes. For companies, these improvements will usually generate financial savings and reduce production costs.

In mining, similar levels of energy efficiency may be achieved. In the short term, operational improvements such as changing the gradient of the slope where vehicles travel, reducing the amount of time vehicles stop and start and improving load management will increase efficiency.

In the longer term, technological improvements such as geological analysis and early ore and waste separation, or effective crushing and high pressure grinding rolls, will deliver significant additional savings.

However, the energy efficiency improvements of mining will likely be counterbalanced by an increase in energy intensity.

IN THIS CASE, ENERGY INTENSITY REFERS TO THE AMOUNT OF ENERGY REQUIRED TO GET THE MATERIALS THAT ARE BEING MINED.

Past energy intensity trends show that every year, around 3% more energy is needed to extract a similar volume of minerals as the year before, largely due to degradation in ore quality and increasingly difficult access to good resources. As a result, mining energy intensity is expected to double between today and 2050.

TRANSPORT

In the transport sector, a 70% improvement in the energy efficiency (i.e. litres per 100km) of cars and light commercial vehicles could be achieved. This could be done mostly through electrification of vehicles, combined with fuel efficiency improvements and a continued trend towards smaller vehicles.

These technologies are already commercially available: for example, some hybrid vehicles are already 65% more fuel-efficient than an average car.

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We also require a 30% improvement in aviation energy efficiency by 2050. Again this is not an impossible dream: if you consider that the Airbus A380 of today is already 18% more efficient per passenger than the previous generation of large aircraft, then we can assume that further efficiencies will be introduced into newer generations of planes.

As for freight, we need trucks to improve their efficiency by 15% by 2030, while rail and marine freight should improve by 17% and 22% respectively by 2050.

GOING EVEN FURTHER

Other advances in technology should see other energy efficiency improvements. These could include new technology developments such as material efficiency to reduce the amount of resource extraction and primary metals production (e.g. through 3D printing), or in mining energy efficiency (e.g. through moving to landfill mining or other innovative practices).

Likewise in the transport industry, we could see improved energy efficiency through reducing travel activity (e.g. through increasing the use of public transport, a growth in choosing teleconferencing over business travel, and an increase in local sourcing of products meaning many of the things we need in our lives won't need to be shipped half way around the world to get to us.)