# ENERGY PRODUCTIVITY AND GREENHOUSE GAS EMISSIONS REDUCTION ACTION PLAN

Prospects, potentials and policy options for New Zealand.

With some simple but focused actions, New Zealand can save on the costs of purchasing international carbon credits and improve its productivity and competitiveness at the same time.

New Zealand can invest capital wisely in its own low carbon low waste future rather than paying for offshore carbon credits that go towards improving competitiveness offshore.

The following actions will tip the scales in favour of New Zealand making wise investments:

- Establish an expert group to work with key export industries to ensure they are accounting for the carbon in their value chain and focussing on identifying the key opportunities to reduce their emissions,

## Commercial Buildings

Following are the current energy sources used in the commercial sector and their related emissions.

| | Non Transport Energy in Commercial Sector (GWh) | Total CO2 equivalent (Tonnes) |
|---|---|---|
| Electricity | 9,334 | 1,460,313 |
| Gas | 2,125 | 412,443 |
| Coal | 406 | 134,476 |
| Other (wood, bio gas, geo) | 785 | 460,689 |
| **Total** | **12,650** | **2,467,921** |

Source: Energy End Use Database

The following three scenarios outline what is achievable by 2030

ETS price assumption. $25-$50 medium price by 2030 assumption provided by the Minister. Assume $25 by 2030 and $50 by 2040.

| **Commercial BAU:** 10% reduction in energy use = total reduction of 1,265 GWh. Made up of: | |
|---|---|
| 12 % electricity | 1,120 GWh @ 156.45 CO2 = 175,225 T CO2e |
| 5 % gas | 112 GWh @ 194.09 CO2 = 21,738 T CO2e |
| 8 % coal | 33 GWh @ 331.22 CO2 = 10,930 T CO2e |
| **Total** | **1,265 GWH = 175,225 T CO2e** |

**Encouraged Growth:** 20% reduction

Interventions:

- KPI for CEOs: Based on contribution made to increasing energy productivity and reducing carbon intensity / GHG
- Carbon Price of at least $25/tonne
- NABERSNZ: Make 4 star compulsory for all new central and local government accommodation and require existing space to be brought up to this standard by 2030. Signal that a NABERSNZ rating will be required on all space leased or sold by 2020
- Enable grants for upgrades of commercial plant, boilers, chillers and controls on basis savings are determined by EMANZ members, measured and building owner commits to EECA commissioning and review
- Upgrade the building code on insulation, shading and air tightness
- Make it mandatory for building owners to share energy information monthly and use of BMS systems with tenants. A requisite for any funding
- Continue to fund industry based training for practitioners through EMANZ

| **Commercial Encouraged Growth:** 20% reduction | |
|---|---|
| 24 % electricity | 2,240 GWh = 350,450 T CO2e |
| 10 % gas | 224 GWh = 43,476 T CO2e |
| 16 % coal | 66 GWh = 21,860 T CO2e |
| **Total** | **2,530 GWH = 415,786 T CO2e** |

**Accelerated Growth:** 40% reduction

Interventions over and above those in the Encouraged Growth scenario above:

- NABERSNZ rating mandatory on all space leased or sold by 2020
- Moratorium on new coal boilers
- Enable funding of commercial plant upgrades to be registered on the title and collected through rates. Central government to provide security for the funds
- Accelerated depreciation on all energy efficiency upgrades certified by EMANZ members. Rather than straight line depreciation at 12.5% allow the spend to be written off over 3 years after implementation and commissioning
- EECA to fund EMANZ to develop standard documentation for Energy Performance Contracts.
- Develop a template energy efficiency green addendum for leases with a process for landlords and tenants to commit to working together to reduce energy use. A requisite for any funding

| **Commercial Accelerated Growth:** 40% reduction | |
|---|---|
| 48 % electricity | 4,480 GWh = 700,900 T CO2e |
| 20 % gas | 448 GWh = 86,952 T CO2e |
| 32 % coal | 132 GWh = 43,720 T CO2e |
| **Total** | **5,060 GWH = 831,572 T CO2e** |

## Industrial Process Heat

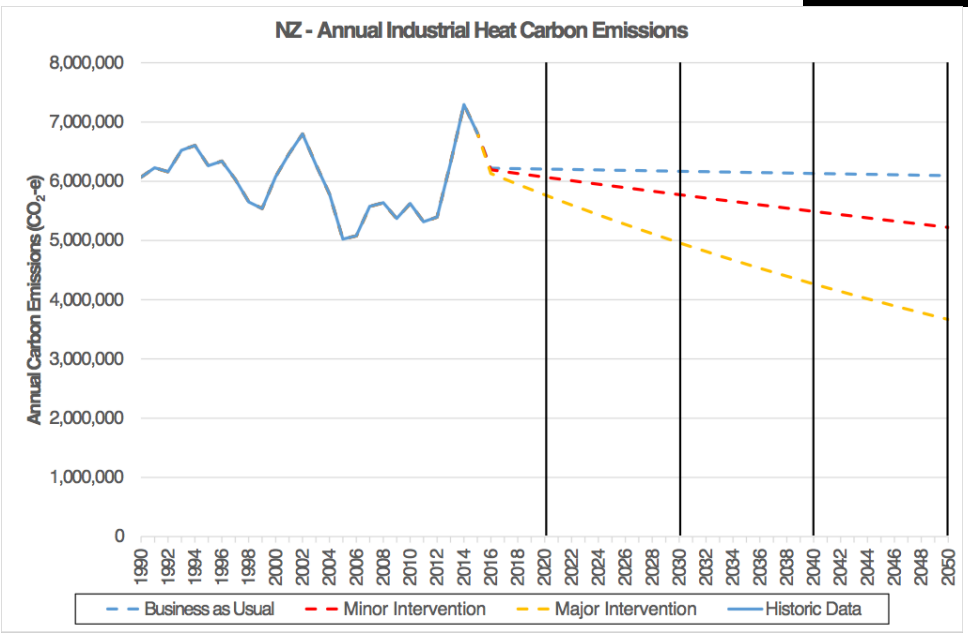
Current Situation

| | Total Energy Consumption (PJ) | 2011 Emission Factor | Total Annual Emissions ($tCO_2$-e) |
|---|---|---|---|
| **Coal** | 22.82 | 2.08 $kgCO_2$-e/kg | 2,260,000 |
| **Oil** | | | |
| LPG | 3.09 | 2.89 $kgCO_2$-e/kg | 190,000 |
| Diesel | 13.72 | 2.66 $kgCO_2$-e/L | 960,000 |
| Fuel Oil | 1.26 | 2.94 $kgCO_2$-e/L | 90,000 |
| **Natural Gas** | 61.59 | 53.7 $kgCO_2$-e/GJ | 3,310,000 |
| **Renewables** | 54.00 | 0 | 0 |
| **TOTAL** | **156.48** | | **6,810,000** |

Numerous examples exist of meaningful and significant opportunities for carbon emission reductions through energy management. The following table summarises the implemented improvement opportunities by EMANZ members in three key NZ industrial sectors:

| | Energy Productivity Improvement | Carbon Emissions Improvement |
|---|---|---|
| Meat Processing | 14.5% | 11.4% |
| Milk Processing | 6.8% | 6.7% |
| Wood Processing | 9.6% | 17.3% |

The following graph summarises three modelled scenarios, BAU, Encouraged Growth, Accelerated Growth:




**Business As usual = 0% reduction.**

**Encouraged Growth =7% or 0.5% Per Annum**

To improve industrial emissions by 0.5% beyond BAU (0% improvement) by 2030 the following actions are taken

- Mandatory reporting of energy consumption and carbon emissions in Annual Reports
- Mandatory carbon mitigation and management plan for all organisations with stationary carbon emissions exceeding 5,000 T per annum (~200 NZ industrial businesses)
- Development of "Best Practice Guides" for Industrial Boiler Efficiency
- Carbon cost of $25/T
- "Green Loans" or low interest loans for carbon reduction projects
- Promotion and awareness campaigns targeted at NZ Board Members highlighting the strategic "low-carbon" opportunity and global positioning potential
- Active stimulation of the biomass market
- Active stimulation of the ammonia industrial heat pump market
- Continued support of EECA, specifically the business programmes

**Accelerated Growth = 21% reduction (1.5% reduction per annum)**

To improve industrial emissions by 1.5% beyond BAU the following additional actions are needed:

- Mandatory carbon mitigation and management plan for all organisations with stationary carbon emissions exceeding 2,000 T per annum (~1,000 NZ industrial businesses)
- Mandatory industrial boiler efficiency targets
- Carbon cost of $100/T
- Development of Energy and Sustainability Engineer as a discrete study stream at New Zealand Universities
- Moratorium on new industrial coal boilers
- Active stimulation of the ammonia industrial heat pump market
- Major expansion of support of EECA, specifically the business programmes

## Street Lighting

- Accelerating New Zealand's adoption of LED street lights to 100% over the next ten years through Government leadership would save 96 GWh of electricity and 16,000 tonnes of carbon assuming no adoption of LED under BAU.

## Waste Recovery

- 6-7 PJ of energy, in the form of methane, could be captured from municipal waste and converted to electricity onsite, or injected into the natural gas network (once treated to the NZ Standard).
- A further 2PJ of methane could potentially be captured from dairy waste from milking sheds and other buildings constructed to house dairy herds.