

# Queensland actions to Cut dangerous methane emissions

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Methane is a dangerous greenhouse gas.

Methane is around 86 times more powerful than carbon dioxide at warming the atmosphere when assessed over a 20-year period, and around 34 times more powerful over a 100-year period<sup>1</sup>.

Reducing methane emissions is a key part of keeping 1.5°C of global warming within reach.

In Australia, fossil fuels (coal, gas and oil) and agriculture (livestock) are two major sources of methane emissions from human activities.

Emissions from fossil fuels (sometimes referred to as fugitive emissions) are increasing due to fossil gas expansion, whereas agricultural emissions are falling<sup>2</sup>.

*This briefing paper has been prepared by the Australian Conservation Foundation and incorporates advice from the Environmental Defenders Office on how methane emissions can be better regulated in Queensland.*

## Methane is a critical climate concern

In Australia, methane emissions from fossil fuels (coal, oil and gas), agriculture (livestock) and waste make up around a quarter of all greenhouse gas pollution<sup>3</sup>.

The IEA's summary of Australia's methane emission sources shows that the most significant sources of methane emissions are from offshore gas and unconventional gas, and the majority of those emissions are vented.

Globally the fossil fuel sector contributes to 35 percent of methane emissions from human activities<sup>4</sup>.

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<sup>1</sup> <https://www.climatecollege.unimelb.edu.au/review-current-and-future-methane-emissions-australian-unconventional-oil-and-gas-production>

<sup>2</sup> <https://blog.csiro.au/emissions-of-methane-are-rising/>

<sup>3</sup> <https://www.industry.gov.au/data-and-publications/national-greenhouse-gas-inventory-quarterly-update-june-2021>

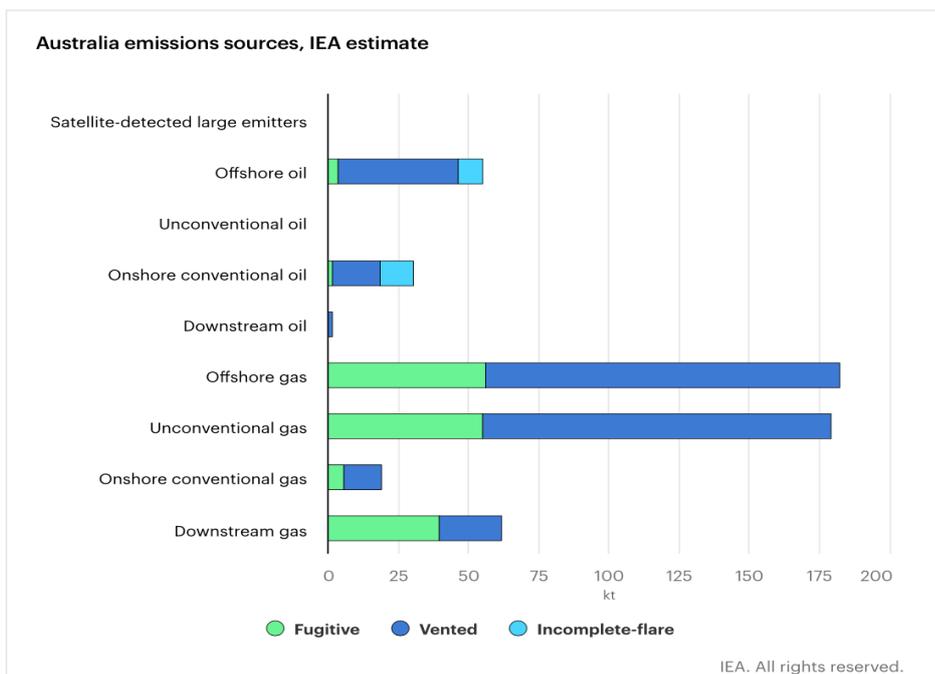
<sup>4</sup> [https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA\\_ES.pdf](https://wedocs.unep.org/bitstream/handle/20.500.11822/35917/GMA_ES.pdf)

Methane emissions result from all aspects of fossil fuel mining, transport, use and decommissioning. According to the IEA, methane makes up about 60 percent of emissions from the coal and gas supply chains, and around 35 percent of emissions from the oil supply chain.

Australian governments' inaction on fossil fuel methane emissions is unsustainable. At the Glasgow Climate Summit (COP26), more than 100 countries including the United States, Canada, United Kingdom, the European Union, New Zealand, Brazil signed the Global Methane Pledge to cut methane emissions by 30% by 2030<sup>5</sup>.

Methane emissions are becoming increasingly visible with satellite trackers providing detailed, publicly available data making it impossible to ignore methane emissions from coal, oil and gas.

This paper provides recommendations for the Queensland state government to reduce fossil fuel methane emissions in line with net zero emissions commitments.



Source: IEA 2021: Australian methane emissions sources (measured in kilotonnes of methane)

### Reducing methane emissions means phasing out fossil fuels, transitioning to renewable energy and other climate solutions and better managing mine sites, gas and oil wells and fossil fuel infrastructure

Measures available today could reduce emissions by 45 percent by 2030<sup>6</sup>. Most are low cost, with many measures paying for themselves through savings for industry and governments.

Queensland can take action to reduce methane emissions, solutions include:

1. Understanding the scale of the problem
2. Setting targets to reduce methane emissions

<sup>5</sup> <https://www.globalmethanepledge.org/>

<sup>6</sup> <https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions>

3. Implementing tougher industry standards and measures for coal, oil and gas projects at every stage of planning, operation and end-of-life
4. Transitioning rapidly away from coal, gas and oil to renewable energy, sustainable transport and energy efficiency.

Further detail for each of these actions is provided below, including legislative and policy proposals.

### 1. Understand the scale of the problem

#### Action required:

- *Require all fossil fuel projects to commission and make public independent direct field measurements of methane emissions for all project phases (before development, during operation and following decommissioning) and across the whole supply chain (mine sites and wells, pipelines and infrastructure, transport, production, combustion).*
- *Amend the Environmental Protection Act 1994 (Queensland) to:*
  - o *Require that applications for environmental authorities:*
    - *provide baseline data on current methane emissions in locations the project will occur*
    - *provide modelling which accurately predicts methane emissions throughout the project phases and supply chain.*
  - o *Mandate conditions for environmental authorities for methane emitting project which require:*
    - *monitoring and reporting of methane emissions across each stage of the project, and across surrounding environments (which may be impacted by migratory emissions)*
    - *leak detection and repair across the project stages, particularly on pipelines and key sources of fugitive and migratory emissions*
    - *capping of wells as soon as each well is decommissioned*
    - *ongoing monitoring and reporting of methane emissions at possible ongoing sources of emissions after the activities cease, with ongoing requirement to repair leaks upon discovery.*

In Australia there is currently very little direct measurement of methane emissions. This means that actual emissions from coal, oil and gas projects are largely unknown<sup>7</sup>. Lack of accurate reporting represents a risk to state governments achieving net zero emissions targets. Governments cannot afford to ignore methane emissions or continue to rely on standardised 'emissions factors'.

State governments should require *every coal, gas and oil project and proposal to commission and make public independent direct field measurements of methane emissions* from all aspects (mine sites and wells, pipelines and infrastructure, transport, production, combustion). This would include measurements of methane emissions: before every development is approved; after development; all aspects of operation

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<sup>7</sup> <https://www.climatecouncil.org.au/uploads/d15f6fc35d779951e8893693efdbbc10.pdf>

and the supply chain (including leaks, venting, equipment purging, migratory emissions and other sources); related infrastructure such as pipelines and transportation; end-of-life whether when mothballed/ after abandonment/ decommissioning.

This will assist in determining accurate emissions factors for gas production and generation and national greenhouse gas reporting and assist in the development of management measures.

New technology is being launched to shine a light on the world's greatest offenders. Australia, like other countries will be viewed by satellite trackers that will measure methane pollution from oil and gas facilities worldwide 'with broad scope and exacting precision.' MethaneSAT is one of these satellites. Due to be launched next year, MethaneSAT will focus only on methane and its data will be quickly made available for public use.

### **Case Study: Bowen Basin**

Data is already available from Kayrros, which uses satellite data from the European Space Agency to detect and measure methane emissions globally. Kayrros has reported that methane emissions from the Bowen Basin have the same impact on the climate as the carbon emissions of an entire mid-sized European country. They have further revealed that the Bowen Basin's average methane emissions per tonne of coal are 47% higher than the global average.

The Bowen Basin released an average of 1.6 million tonnes of methane into the atmosphere over 2019-20, which when converted into an equivalent amount of carbon dioxide is approximately 134 megatonnes of CO<sub>2</sub>-equivalent per year. This is about the same as the annual emissions from 30 million passenger vehicles.<sup>8</sup>

The data shows that emissions vary significantly across the Basin and several mines in the Basin use techniques to reduce their methane emissions for safety reasons. This is due to the risks of explosion in underground mines. Kayrros estimates that approximately 50% of the Bowen Basin's methane emissions are captured through well-known techniques that include capturing methane from coal seams before the coal is exposed and capturing methane from mine ventilation systems. If such techniques were required and employed across the entire Bowen Basin, methane emissions could be reduced by about 650,000 tonnes per year, the equivalent to removing 12 million passenger vehicles from the road.

As an increasing number of Australia's trading partners set penalties such as carbon border adjustment taxes for greenhouse emissions embedded in imports, use of Bowen Basin coal, which is estimated to add 26% to the carbon footprint of end use sectors such as steel<sup>9</sup>, will be a significant liability.

ACF recommends that the Queensland Government contract satellite tracking and methane measurement expertise to provide detailed data and analysis on the extent and exact location of the state's coal, oil and gas methane emissions. This data and expertise would provide a useful basis for monitoring, regulating, and reducing the state's methane emissions.

## **2. Setting targets to reduce methane emissions**

*Action required:*

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<sup>8</sup> <https://www.kayrros.com/blog/methane-emissions-from-australias-bowen-basin/>

<sup>9</sup> <https://www.kayrros.com/blog/methane-emissions-from-australias-bowen-basin/>

- *Set 2030 target to reduce methane emissions by 75 percent in line with international best practice.*
- *A 2030 target to reduce methane emissions could be legislated in a Queensland Climate Act, with a mandate for decision makers to undertake their regulatory duties in a way that accords with this target (and other emissions reductions targets). See EDO and ACF's report for detailed recommendations around a strong [Climate Act for Qld.](#)*

In addition to long term net zero emissions and interim emissions reduction targets, states should set interim methane emissions reduction targets in line with leading jurisdictions around the world.

International Energy Agency's Net Zero by 2050 report called for a 75 percent reduction in methane emissions from fossil fuel supply by 2030, which requires the elimination of all technically avoidable methane emissions by 2030.

At the Glasgow Climate Summit (COP26), more than 100 countries including the United States, Canada, United Kingdom, the European Union, New Zealand, Brazil signed the Global Methane Pledge to cut methane emissions by 30% by 2030<sup>10</sup>.

The Global Methane Alliance of governments, finance institutions and international organisations is calling for governments to set methane emissions reduction targets equivalent to:

- *"Absolute reduction target of at least 45% reduction in methane emissions by 2025 and 60% to 75% by 2030. These are realistic and achievable targets, especially in a sector where technology and financing are largely available, and innovation supports even larger reductions.*
- *Intensity target of "near-zero" methane emissions. Countries that select this approach should target an intensity of 0.25% or below."*

There are many examples of jurisdictions already setting methane reduction targets, strategies, regulations and funding such as:

- *California has set a target to reduce methane by 40% below 2013 levels and new regulations.*
- *The European Union is expected to set new methane targets/strategies this year covering the entire gas chain (e.g., transmission, distribution, storage, and regasification).*

### **3. Implementing tougher industry standards and measures for coal, oil and gas projects at every stage of planning, operation and end-of-life**

*Action required:*

- *Refuse approvals for all new coal, oil or gas projects or related infrastructure; implement tougher industry standards and measures; and establish a state-wide audit and timeline for rehabilitating all mothballed, abandoned and decommissioned oil, gas and coal sites paid for by industry.*
  - o *This could be provided for in the Environmental Protection Act 1994 (Queensland), via a new section which prevents applications for new coal, oil or gas projects or infrastructure that relates to coal, oil or gas projects.*

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<sup>10</sup> <https://www.globalmethanepledge.org/>

- *To ensure that infrastructure is caught, a similar amendment could be made to the Planning Act 2016 (Qld) and other key development acts which infrastructure can be approved under, such as the Economic Development Act 2012 (Qld) and State Development and Public Works Organisation Act 1971 (Qld). It is more efficient to prevent the applications being made, than require refusal.*
- *Implement tougher industry standards and measures*
  - *A requirement under the Environmental Protection Act 1994 (Queensland) for best practice standards to be met by all operators, including existing operators.*
  - *A fulsome audit be undertaken of existing environmental authorities for methane producing activities, which leads to a public report critiquing current methane emissions in Queensland and recommendations for best practice mitigation of methane emissions going forward. This report could trigger the review of existing environmental authorities such that conditions could be amended to provide for the best practice standards, including around venting, flaring, leak detection, leak repair, well capping, rehab, etc.*
- *Establish a state-wide audit and timeline for rehabilitating all mothballed, abandoned and decommissioned oil, gas and coal sites paid for by industry.*
  - *As above. This review must be done by an independent entity that is sufficiently resourced. It could be done by the Queensland Audit office.*
  - *Establish an inquiry into mine site rehabilitation and mine closure practices including the adequacy of existing regulatory regimes, the extent of financial liability and changes required to securely fund the long-term management of mining sites, the environmental, economic and social risks associated with un-remediated sites and the role of mine rehabilitation in providing employment opportunities in the post-mining boom era.*
  - *Building on the recent [extensive review](#) and reform of mine rehabilitation and financial assurance requirements in Queensland, a further review could be commenced which focuses more on the gas industry in particular and which considers the methane emissions of abandoned sites and how they can be better regulated.*
- *Implement a legal obligation for closure liability accounting and reporting on a site-by-site basis, to be included in annual financial statements and as a separate line item in company balance sheets*
  - *Amend the Mineral and Energy Resources (Financial Provisioning) Act 2018 (Qld) and Environmental Protection Act 1994 (Qld) to require that applications quantify predicted liabilities upon closure for monitoring, reporting and remedying methane emission leaks, so that this is financially accounted for prior to operations commencing. This amount must be provided by way of financial assurance from the start of the project, and must be reported in annual financial statements and company balance sheets transparently.*

Australia has more than 350 operating coal mines<sup>11</sup>, thousands of operating oil and gas wells<sup>12</sup> and hundreds of proposed new fossil fuel projects<sup>13</sup>. In addition, there are more than 50,000 abandoned mines<sup>14</sup>, and thousands of abandoned petroleum and gas wells.

Much of Australia's gas and oil infrastructure such as pipelines, storage facilities and wells were built in the 1970s and are now over 40 years old.

## Proposed

Analysis of fossil gas projects proposed in Australia concluded that they represent an annual climate impact more than half of Australia's annual emissions<sup>15</sup>. Australia's already identified gas resources, if burned, would have a climate impact larger than annual emissions from any country. Further resources pursued by governments and companies represent a climate impact larger than annual world emissions, taking up 28% of a 1.5°C carbon budget, or 8% of a 2°C budget.

Queensland should refuse approvals for all new coal, oil or gas projects or fossil fuel related infrastructure (such as gas pipelines) in line with the International Energy Agency's Net Zero by 2050 report<sup>16</sup>.

The IEA found to achieve net zero emissions by 2050, required:

- No new coal power stations can be approved
- No new oil and gas fields developed
- No new coal mines or coal mine extensions.

State governments should not provide policy support for new gas power plants or gas supply infrastructure. New gas infrastructure risks "locking in" expanded gas use and exploration for decades into the future, and carries risks associated with emissions, electricity costs and asset stranding.

## Operating

There are cost effective measures available today that can achieve cuts in methane emissions from coal, oil and gas.

Tougher industry standards and measures that should be applied to all coal, gas and oil projects including requirements for:

- detecting and repairing leaks
- reducing (and capturing) vented methane
- improving fugitive emissions control (cap unused wells, replace gas pumps and devices with electric or air systems and motors)

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<sup>11</sup> <https://data.gov.au/dataset/ds-ga-2724ef19-84b5-443e-9eda-6a5da27b931d/details?q=>

<sup>12</sup> <https://www.ga.gov.au/about/projects/resources/petroleum-data-repository>

<sup>13</sup> <https://www.industry.gov.au/sites/default/files/2020-11/resources-and-energy-major-projects-report-2020.pdf>

<sup>14</sup> <https://theconversation.com/what-should-we-do-with-australias-50-000-abandoned-mines-18197>

<sup>15</sup>

[https://d3n8a8pro7vhmx.cloudfront.net/auscon/pages/17901/attachments/original/1599539080/Weapons\\_of\\_gas\\_destruction.pdf?1599539080](https://d3n8a8pro7vhmx.cloudfront.net/auscon/pages/17901/attachments/original/1599539080/Weapons_of_gas_destruction.pdf?1599539080)

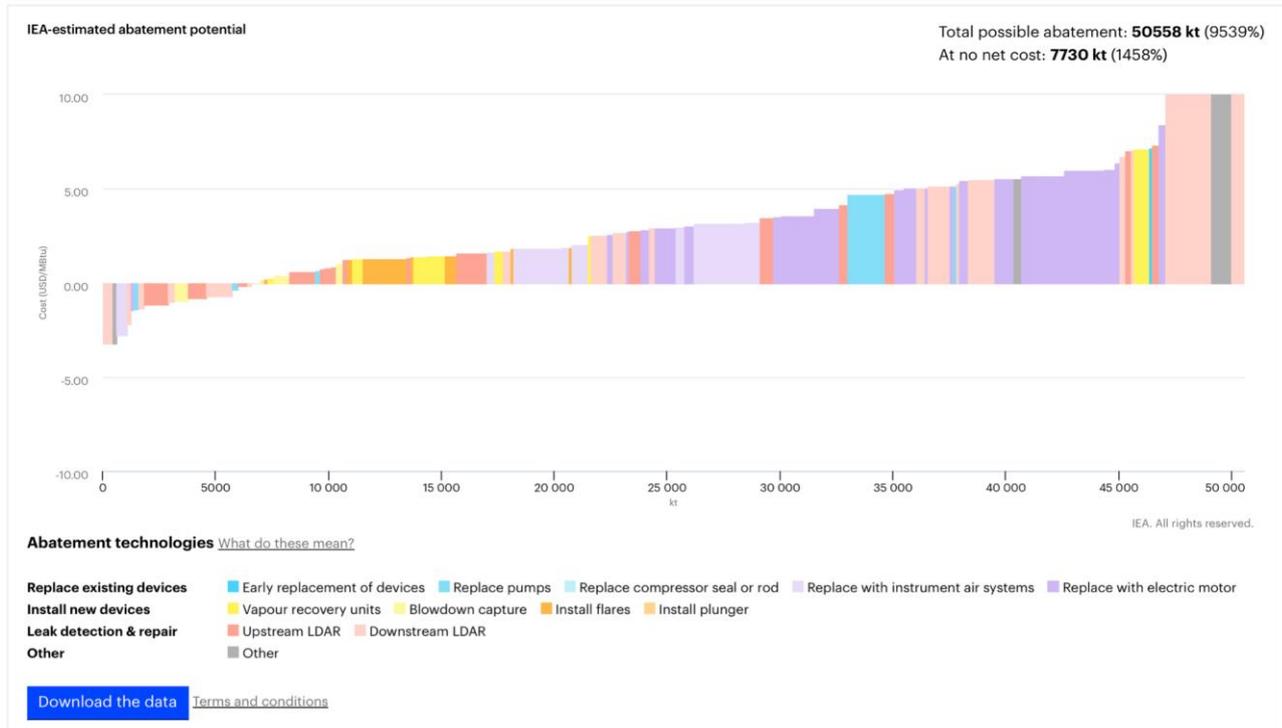
<sup>16</sup> [https://iea.blob.core.windows.net/assets/beceb956-0dcf-4d73-89fe-1310e3046d68/NetZeroby2050-ARoadmapfortheGlobalEnergySector\\_CORR.pdf](https://iea.blob.core.windows.net/assets/beceb956-0dcf-4d73-89fe-1310e3046d68/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf)

- managing coal mines (de-gasification, oxidising air methane, flooding abandoned mines).

There are technical, and engineering design solutions available to the gas, coal and oil industry to reduce and capture methane, outlined in Methane Guiding Principles best practice guides<sup>17</sup>.

The International Energy Agency has identified opportunities for global methane abatement including abatement technologies (see graphic below)<sup>18</sup>. Many can be applied at no net cost.

The agency has also released a toolkit<sup>19</sup> for policies and regulations to reduce methane emissions.



Source: IEA 2021

## End-of-life

State auditors general in New South Wales and Victoria have highlighted risks to the environment from abandoned or inadequately decommissioned mines and wells.

Aging infrastructure poses the risk of catastrophic failure in which thousands or millions of tonnes of methane can be released. In Australia there have been numerous major offshore and onshore gas well blowouts, some of which have taken months to stop. Pipelines, processing plants and power stations have also suffered major failures.

In 2016, the Climate Council of Australia detailed 18 major Australian gas infrastructure failures and well blowouts (Table 2, page 17)<sup>20</sup>. Other sources<sup>21</sup> list dozens more.

A recent ACF investigation highlighted the problem posed by mothballed mines that have not been rehabilitated. The investigation discovered that Glencore's Ravensworth underground coal mine in

<sup>17</sup> <https://methaneguidingprinciples.org/best-practice-guides/>

<sup>18</sup> <https://www.iea.org/reports/methane-tracker-2021/methane-abatement-and-regulation>

<sup>19</sup> <https://www.iea.org/reports/driving-down-methane-leaks-from-the-oil-and-gas-industry>

<sup>20</sup> <https://www.climatecouncil.org.au/uploads/d15f6fc35d779951e8893693efdbbc10.pdf>

<sup>21</sup> [https://en.wikipedia.org/wiki/List\\_of\\_environmental\\_accidents\\_in\\_the\\_fossil\\_fuel\\_industry\\_in\\_Australia](https://en.wikipedia.org/wiki/List_of_environmental_accidents_in_the_fossil_fuel_industry_in_Australia)

NSW, which was mothballed seven years ago, has leaked methane equivalent to more than a million tonnes of CO<sub>2</sub> despite being an unproductive mine. Australia-wide, fewer than 30 mines have ever been fully closed, rehabilitated, and relinquished. The others present an ongoing risk that requires government intervention.

To address and minimise these risks and to manage and reduce the cost burden on state governments and the public, governments should:

- Undertake an audit of all coal, gas and oil projects operating and abandoned
- Undertake a detailed assessment of costs for management and decommissioning
- Implement or increase decommissioning levies or bonds to be paid by industry and ensure they are sufficient to ensure governments and the public are not left with the cost of clean up or site rehabilitation
- Develop stringent requirements for decommissioning all projects
- Set a timeline for industry to decommission and rehabilitate all currently abandoned mines, wells or other emitting infrastructure or facilities.

Many of the recommendations made in ACF's 2016 mine rehabilitation report remain relevant today. Some of these include:

- Establish an inquiry into mine site rehabilitation and mine closure practices including the adequacy of existing regulatory regimes, the extent of financial liability and changes required to securely fund the long-term management of mining sites, the environmental, economic and social risks associated with un-remediated sites and the role of mine rehabilitation in providing employment opportunities in the post-mining boom era.
- Implement a legal obligation for closure liability accounting and reporting on a site-by-site basis, to be included in annual financial statements and as a separate line item in company balance sheets.
- Encourage and facilitate greater jurisdictional coordination. Adopt Australian minimum standards: (a) post closure assessment and reporting, (b) greater transparency and independent assessment of mining proposals and (c) environmental financial instruments.
- Legislate for and implement national annual reporting on the impacts of mine closure. This must include the financial liability from both mining legacies and post-mine management.

In addition, timing and enforcement related to the movement of mines from care and maintenance to decommissioning and rehabilitation should be reviewed and tightened so that closed mines are rehabilitated as quickly as possible to reduce long-term risks of fugitive methane emissions, and other toxic pollutants.

Other countries are moving to address the risks associated with abandoned or inadequately decommissioned mines and wells. For example:

- The Biden Administration has committed \$16 billion to clean up old mine sites and plug abandoned oil and gas wells.

In Queensland, the establishment of an independent Environmental Protection Agency, currently under consideration, is recommended to oversee an update to the state's methane regulatory settings and provide an ongoing assessment, compliance, investigation, and enforcement role.

#### 4. Transitioning rapidly away from coal, gas and oil to renewable energy, sustainable transport and energy efficiency

##### *Action required:*

- *Eliminate coal, gas and diesel from electricity systems by 2030, invest in clean recovery measures, phase out gas use in homes, schools, government buildings and businesses, provide targeted support to assist industry to get off gas.*

The IEA's Net Zero by 2050 roadmap sees methane emissions from fossil fuels fall 75 percent between 2020 and 2030. The decline comes from reducing fossil fuel consumption (roughly a third) as well as other measures.

One of the most effective ways for state governments to reduce methane emissions is to reduce reliance on coal, oil and gas for electricity, heating and industry.

State governments should transition rapidly away from coal, gas and oil to renewable energy, sustainable transport and energy efficiency.

This includes:

- Eliminating coal, gas and diesel from electricity systems by 2030.
- Implementing economic recovery measures that maximise opportunities for jobs and prosperity in clean energy, sustainable transport, energy efficiency, ecosystem restoration and other climate solutions.
- Phasing out gas use in homes, schools, government buildings and businesses, including banning gas connections in new residential developments.
- Providing targeted support to industry, business and manufacturing to get off gas (replacing use with electrification, renewable energy, energy efficiency and other solutions)<sup>22</sup>.

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<sup>22</sup> <https://www.climatecouncil.org.au/resources/gas-habit-how-gas-harming-health/>