

Emissions from recently approved fossil fuel projects in New South Wales

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INTRODUCTION

Significant greenhouse gas emissions will result from eight gas and coal projects approved by the NSW IPC since March 2018.

Conditions of consent for the following mines are unlikely to produce any significant measurable mitigation of their GHG emissions:

1. United Wambo
2. Rix's Creek South
3. Vickery Extension Project
4. Russell Vale U/ground Expansion
5. Maxwell Underground
6. Narrabri Gas Project
7. Tahmoor South
8. Mangoola Continued Operations

The impacts are dominated by Scope 3 emissions, which have been consistently ignored by local regulators. The Scope 1 and 2 emissions from these projects, for which local regulators do in principle accept responsibility, add up to some 89 million tonnes of CO₂-equivalent over the project lifetimes. In seven of the eight projects approved, there are no measurable emission abatement targets at all. In the case of Tahmoor South, the purchase of a small amount of solar energy is projected to reduce GHG emissions by 0.3 Mt. This would be the only definite quantitative achievement: 0.3 Mt out of 89.

On the most generous overall assessment, 7.7 Mt of the total lifetime emissions of 1386 million tonnes might be abated. This would be about 0.55 per cent of the total emissions. Even this is not guaranteed. The only possible conclusion is that the IPC has comprehensively failed to require mitigation of the greenhouse gas emissions from the projects it has assessed since March 2018.

Scope 2 emissions could be dramatically reduced, almost eliminated, by mandating use of clean electricity from solar farms or wind turbines. That policy would reduce Scope 2 emissions from the projected 23 Mt to close to zero.

By far the largest component of Scope 1 emissions is the release into the atmosphere of methane. Reducing these emissions should be a high priority. Rather than vague requirements for coal mine operators to investigate reasonableness and feasibility, or use "best practice management", there should be independent assessment of the ability of profitable projects to take responsible measures to reduce the release of methane.

Finally, Scope 3 emissions from the Narrabri Gas Project will add significantly to Australia's GHG inventory, since the project is designed to produce gas for local combustion. It would only decrease our contribution to climate change if it were to displace coal-fired generation of electricity. That claim is specious because the wholesale price of electricity from renewable energy is now less than the price of power from new gas or coal power stations.

TERMS OF REFERENCE

This report summarises the total predicted emissions of greenhouse gases from eight projects approved by the New South Wales IPC since March 2018 and analyses the scale of mitigation measures that are likely to be delivered by the imposed conditions of consent. Specifically, it answers the following questions:

1. What are the total GHG emissions predicted from the eight projects, and what is the breakdown amongst Scope 1, 2 and 3 emissions?
2. Of the total GHG emissions, what percentage of these emissions are subject to specific, measurable mitigation imposed by conditions of consent?
3. Of the total Scope 1 and Scope 2 emissions, what percentage of these emissions are subject to specific, measurable mitigation imposed by conditions of consent?
4. Are there feasible measures that are available that could result in significant, measurable reductions in Scope 1 and Scope 2 GHG emissions from new coal and gas projects in NSW, as alternatives to the current approach taken to conditions?
5. What proportion of the total Scope 1 and 2 emissions attributable to the eight projects below could be mitigated as a result of such measures if imposed?
6. How effective is the monitoring and enforcement of conditions of consent which purport to reduce/mitigate GHGEs and how big a problem is this?
7. In the context of a NSW push to net zero, and without effective mitigation, how significant is the total Scope 1 and 2 GHG emissions already approved from 7 new coal and 1 new gas projects?

OVERALL CONCLUSION

Significant greenhouse gas emissions will result from the gas and coal projects approved by the NSW IPC since March 2018. The conditions of consent are unlikely to produce any significant measurable mitigation of those emissions. Feasible actions that could produce significant measurable levels of mitigation have not been required of these developments. Given the timescale of the approved projects, they appear incompatible with both the NSW declared goal of net zero emissions by 2050 and Australia's commitment to the Paris agreement. Scope 3 emissions from these projects are also significant, since the reason customers purchase gas or thermal coal is to burn it. The accepted principle of product stewardship demands recognition of the inevitable consequences of exporting fossil fuels. While the Scope 3 emissions from exported coal are the direct responsibility of other countries, the Narrabri Gas Project explicitly aims to produce gas for local combustion, so if it goes ahead its Scope 3 emissions will be included in Australia's greenhouse gas inventory.

Coal mining now uses 3.0 per cent of all electricity generated in New South Wales. Just the Scope 1 and 2 emissions from mining coal add up to 16.1 million tonnes of carbon dioxide equivalent. To put that figure in perspective, it is 12.2 per cent of the State's entire greenhouse gas inventory and rather more than the emissions from all 'Industrial Processes and Product Use' in NSW ([12.8 Mt](#)). The policies now in place do not require any of the 42 operating coal mines in NSW to offset their emissions. While mining companies are required to report on their GHG emissions to the Clean Energy Regulator (CER) in Canberra, they are not required to report their emissions to the NSW Government (although some choose to do so voluntarily). Emissions data reported to the CER on emissions from individual coal mines is not publicly available, so there is little information about the performance of

individual mines. For ten of the coal mines currently operating in NSW, no data at all are publicly available. For some others, only graphs rather than figures are in the public domain. Most significantly, where actual data are available, it is obvious that little or no overall progress in reducing emissions has been made in recent years. Some operations have reduced their emissions over time, but others show no discernible trend, while many are steadily increasing their emissions. It is clear that simply urging operators to manage emissions responsibly or use best practice is having no significant impact.

BASIS OF THE CALCULATIONS

The following projects have been approved by the NSW IPC since March 2018 when it was created:

1. United Wambo
2. Rix's Creek South
3. Vickery Extension Project
4. Russell Vale Underground Expansion
5. Maxwell Underground
6. Narrabri Gas Project
7. Tahmoor South
8. Mangoola Continued Operations Project

Table 1 summarises the anticipated greenhouse gas emissions from these projects, in each case in millions of tonnes of CO₂ equivalent:

Table 1: projects approved by the NSW Independent Planning Commission (IPC)

Project	Date of approval	Total Scope 1 GHG (Mt CO2-e)	Total Scope 2 GHG (Mt CO2-e)	Total Scope 3 GHG (Mt CO2-e)	Total GHG - life of project (Mt CO2-e)
Mangoola	26/04/21	3.3	0.4	104.3	107.9
Tahmoor South	23/04/21	26.7	1.2	65.8	93.8
Maxwell Underground	22/12/20	9.9	1.1	326	337
Russell Vale	08/12/20	1.4	0.1	9.6	11.1
Narrabri Gas	30/09/20	15.5	18	94.3	127.8

Vickery Coal Project	12/08/20	3.1	0.8	366	369.9
Rix's Creek South	12/10/19	0.8	0.2	71.5	72.5
United Wambo	29/08/19	5.8	0.8	259.3	265.9
Total GHG emissions approved by NSW IPC		66.45	22.6	1,297	1,387
NSW IPC established	01/03/18				

From Table 1, it is clear that the greenhouse gas impacts of the projects are dominated by the Scope 3 emissions, almost 1.3 Gigatonnes of carbon dioxide equivalent. To put that figure in perspective, Australia's total emissions in 2020 had declined significantly due to the COVID pandemic but still amounted to 527 million tonnes of CO₂ equivalent. So the Scope 3 emissions over the lives of these approved projects add up to about two-and-a-half years of our total national contribution to climate change. It is irresponsible to ignore that as a problem for other countries. The only token acknowledgement of the issue in the approvals granted was a requirement that United Wambo export only to countries that are signatories to the Paris agreement or have in place comparable mitigation policies. The other projects are totally free to export their products and produce 1.04 Gigatonnes of greenhouse gases, about twice Australia's total annual contribution to the problem of accelerating climate change. Even if there were credible plans in place to reduce Scope 1 and Scope 2 emissions, they would be dealing with about 6.5 per cent of the problem and ignoring the other 93.5 per cent. As discussed in detail below, there are few imposed conditions that will produce measurable mitigation of the Scope 1 and Scope 2 emissions from these projects.

It is worth noting that Prof. Ross Garnaut, in his recent book *Reset*, singled out fugitive emissions from fossil fuel production as one of the three priorities to be tackled if we are serious about slowing climate change. He estimated that these emissions from coal and gas projects add up to about 10 per cent of our national contribution to climate change. Garnaut argues these could be eliminated by combining technically and economically feasible mitigation measures with requiring purchase of carbon offsets. That would be a responsible approach.

PUBLIC INVOLVEMENT IN SETTING TARGETS

When mining projects are approved, the proponents are required to develop Air Quality and Greenhouse Gas plans. In some of the eight projects approved since March 2018 – the Santos Narrabri Gas Project, the Wollongong Coal Russell Vale mine, the SIMEC Tahmoor South mine and the Glencore Mangoola Continued Operations Project – the IPC required the proponents to consult with their respective Community Consultative Committees in developing these plans. On the other hand, Community Consultative Committees have no role at all in the development of Air Quality and Greenhouse Gas plans for United Wambo, Rix's Creek South Mine, Maxwell Underground or Vickery Coal Project. This appears to be a significant oversight. With data often not available about the performance of individual

mines, community involvement in the development of overall air quality and greenhouse gas plans should be a requirement for any new project. The projects excluded from community involvement actually include those with the largest levels of greenhouse gas emissions: Vickery, Maxwell and United Wambo. While it is not possible to demonstrate a direct causal relationship between community involvement and more responsible environmental management, the data do suggest that there is a possible link, strengthening the case for mandating community consultation for any projects that are approved.

FEASIBLE MEASURES TO REDUCE SCOPE 1 AND SCOPE 2 EMISSIONS

Scope 1 emissions are direct greenhouse gas emissions that occur from sources that are directly involved in the project, such as fuel used in vehicles on the site and fugitive emissions. Scope 2 emissions are indirect GHG emissions associated with the purchase of electricity or other energy products.

In terms of mitigation, it is comparatively straightforward to reduce Scope 2 emissions by using only electricity from renewable sources such as solar farms and wind turbines. While these are not zero emissions sources, as some emissions are necessarily involved in producing solar panels or wind turbines, they involve orders of magnitude less emissions than electricity from the New South Wales grid, still dominated by coal-fired power stations. As a recent [CSIRO/AEMO report](#) showed that large-scale solar and wind with enough storage to be firm capacity is now much cheaper than the average wholesale price of power to the NSW grid, there would be no significant financial cost involved if these projects were required to eliminate Scope 2 emissions by using renewable electricity. In fact, there would usually be significant cost savings if operations moved from grid electricity or local diesel generators to using power from solar farms or wind turbines. That could be applied as a blanket rule to all new gas or coal projects. However, it is clear from the data in Table 1 that Scope 2 emissions are greater than Scope 1 only for the Narrabri gas project.

For the approved coal projects as a group, Scope 2 emissions are less than 10 per cent of the Scope 1 figure, so even eliminating Scope 2 emissions totally would only slightly reduce the damage these projects will do.

Reducing Scope 1 emissions requires using more efficient machinery, using vehicles that are either more efficient or powered by cleaner energy systems, and reducing or offsetting fugitive emissions. The opportunities for reducing Scope 1 emissions will vary from one project to another, so what follows is a brief analysis of what should be required of each project. As a general observation, the NSW IPC's logic for not requiring mitigation or offsetting of Scope 1 emissions is bizarre, saying that such requirements would be "of limited utility" because the reductions they could achieve are much smaller than the Scope 3 emissions. Even if it were considered acceptable to overlook the huge contribution to climate change of Scope 3 emissions from these projects, the Scope 1 and 2 emissions add up to 89 million tonnes of carbon dioxide equivalent; that is nearly 20 per cent of Australia's total national emissions last year. Reducing or, ideally, eliminating those emissions would be a significant contribution to our obligation to help slow climate change.

ANALYSIS OF CONDITIONS OF CONSENT - MITIGATION OF GHG EMISSIONS

United Wambo

This project is estimated to release 5.8 million tonnes of CO₂-equivalent as Scope 1 emissions and 0.8 Mt as Scope 2. The [approval](#) imposed no quantifiable requirement to mitigate or offset these emissions, although it did apply conditions concerning Scope 3 emissions, as discussed earlier. The approval includes the standard broad conclusion that the applicant must take “all reasonable steps” to improve energy efficiency and reduce greenhouse gas emissions. As discussed above, there is no agreed definition of what steps are reasonable and there are no legislated sanctions for failing to take those reasonable steps.

Rix’s Creek South Mine

The application estimated that the project would release, over its lifetime, 0.82 Mt of CO₂-e as Scope 1 emissions and 0.17 Mt as Scope 2. The [approval](#) simply required investigating opportunities to reduce emissions and taking “all reasonable steps” to “improve energy efficiency and reduce greenhouse gas emissions of the development”. The obvious problem is that the mining company, Bloomfield Collieries, and a government official together determine what is practicable. Since there is no requirement to reduce emissions and little financial incentive to do so, there is absolutely no reason to believe that any reduction will occur.

The mine’s [GHG management plan](#) - approved in December 2020 - contains no quantifiable commitments to reduce GHG emissions. For example, there is no plan or commitment to use renewable energy, instead the company pledges to “[c]onduct a review of alternative renewable energy sources”.

Vickery Coal Project

The applicant estimated that this project will release 3.1 Mt of CO₂-e as Scope 1 emissions and 0.8 Mt as Scope 2. Once again, the [approval](#) conditions simply require the company to ensure “best practice management is being employed” to “minimise the development’s Scope 1 and 2 greenhouse gas emissions”. As is the case with Rix’s Creek South, the mining company, in this case Whitehaven Coal, and the Secretary of the government department will together determine what is “practicable”. Once again, there is absolutely no reason to believe that any reduction will occur. Scope 1 and 2 emissions from Whitehaven Coal’s neighbouring mine at Maules Creek are on the public record and have been steadily increasing, from 0.726 Mt in 2017-18 to 0.850 Mt in 2018-19 and 0.905 Mt in 2019-20.

Narrabri Gas Project

This development would release 15.5 Mt of CO₂-e as Scope 1 emissions and 18 Mt as Scope 2. The [approval](#) imposed some conditions. It set a cap of 33.5 Mt of emissions over the life of the project. It obliged the applicant to ensure that all “reasonable and feasible” mitigation measures are employed to limit emissions to that pre-determined cap. Thirdly, it requires the proponent to develop cumulative emissions forecasts every three years and offset any emissions that exceed the cap. It should be noted that there is neither an

expectation nor a financial incentive to reduce emissions, only a requirement to offset any increase beyond the allowed 33.5 Mt. The IPC justified allowing 33.5 Mt of emissions without requiring an offset by accepting the proponent's claim of "expected emissions advantage from using CSG for electricity generation as compared to coal". There is no evidence that making CSG available for electricity generation will displace the burning of coal. There is no credible financial case for investing in coal-fired electricity; in fact, almost all new generating capacity installed in recent years has been solar or wind. If CSG is used to generate electricity, it is more likely to be competing with renewables and thus increasing emissions, rather than displacing coal and reducing emissions. The reality of the 2021 electricity system led Australia's former chief scientist, Professor Penny Sackett, to conclude:

"In my scientific view, there is nothing in the development application or its assessment by the NSW DPIE that would indicate the benefits of the Narrabri Gas Project are substantial enough that – on balance – they could outweigh the high-risk devastating consequences associated with continued expansion of fossil fuel production. Consequently, I reject the proposition that the Narrabri Gas Project represents Ecologically Sustainable Development."

In approving the project, the IPC also mandated the establishment of a Greenhouse Gas Emissions Advisory Group (GGEAG) to "provide advice on project-related greenhouse gas management issues", to advise on measurement of fugitive emissions and to "review and monitor cumulative total emissions". It also required the preparation of an "Air Quality and Greenhouse Gas Management Plan" in consultation with the EPA, NSW Health, the GGEAG and the CCC. These are reasonable measures to limit the scale of emissions from the project to the cap of 33.5 Mt, but they have no capacity to reduce emissions below that level, making it by some measure the worst of these projects, accounting for 37 per cent of all the Scope 1 and 2 emissions approved by the IPC since 2018. As this report was being written, a group of scientists led by Drew Shindell of the US Duke University released a new report to the UN, *Global Methane Assessment*. It pointed out that methane levels in the atmosphere are still increasing, with the current figure almost 1900 parts per billion compared with the pre-industrial level of about 700 ppb. The report noted that cutting leaks from gas wells reduces methane emissions at little or no cost; as stopping the leakages means more gas is available for sale, these reductions often pay for themselves. It would be good policy to require fugitive emissions from any approved gas projects to be eliminated, or at least significantly reduced from present operating levels.

The 18 Mt of Scope 2 emissions are the consequence of purchasing grid electricity, the majority of which is produced by burning coal. Requiring the project to use solar and/or wind power would totally eliminate that very large contribution.

Finally, the case advanced by Santos for the Narrabri Gas Project stated explicitly that the aim is to produce gas to be burned locally. That means that the Scope 3 emissions resulting from burning the gas are an inevitable local addition to Australia's greenhouse gas inventory. Taking that into account more than doubles the local greenhouse gas contribution from the projects approved by the IPC, from 89 Mt of carbon dioxide equivalent to 184 Mt.

Russell Vale Underground Expansion

When the IPC approved the Russell Vale Underground Expansion Project, they required Wollongong Coal "to take all reasonable steps to improve energy efficiency and reduce

Scope 1 and scope 2 greenhouse gases”. Once again, emissions reduction measures in the [approval](#) are worded in such a way that no legally binding emissions reductions are required. In addition, Wollongong Coal is not required to report its GHG emissions to the NSW Government. Wollongong Coal has not yet finalised its required Air Quality and Greenhouse Gas Management Plan, but the draft version has no measures that would quantifiably reduce emissions.

The Scope 1 and 2 emissions from this project are dominated by fugitive emissions of gas, amounting to 1.4 Mt of CO₂-e. Wollongong Coal claim that “[n]o established measures are available for controlling fugitive GHG emissions from the mine operations” despite [clear evidence](#) at neighbouring mines that measures are available (albeit at a cost that deters installation and operation of equipment in the absence of a carbon price). Regarding electricity use, the draft GHG plan commits only to “seek operational energy use efficiencies where commercially feasible” and to “review renewable energy opportunities as new technology is developed and becomes viable”. No offsets are proposed or required.

Maxwell Underground

This project would release some 11 Mt of CO₂-e of Scope 1 and 2 emissions, predominantly fugitive emissions. The [final consent](#) by the IPC required “best practice management...in respect of energy efficiency and the minimisation of greenhouse gas emissions”. However, once again there are no enforceable conditions. There is simply a requirement to take all reasonable steps to improve energy efficiency and reduce the fugitive greenhouse gas emissions which dominate the impacts of this project. The approval requires development of a gas management plan to maximise the beneficial use of methane “where reasonable and feasible”. The consent says this “means applying judgement in arriving at a decision, taking into account mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements”. A [draft GHG plan](#) has been lodged for Stage 1 of operations; it contains a commitment to obtain “electricity from renewables where available, and economically reasonable and feasible”. As explained above, there is now no credible argument that renewable electricity is not economically reasonable, since the CSIRO/AEMO reports show it is clearly less expensive than grid power or local diesel generation. Once again, there is no reason to have any confidence that the negotiations between Malabar Coal Ltd and the Planning Secretary will limit the damage to the projected 11 Mt of emissions or achieve any measurable reductions, and there is no requirement to offset the expected emissions.

Maxwell Underground produced its [GHG management plan on 21 May 2021](#). In this plan, Maxwell states it will reduce GHG emissions by:

- Investigating ways to reduce energy consumption during project planning phases and reviewing energy efficient alternatives.
- Undertaking regular maintenance of plant and equipment.
- Monitoring the consumption of fuel and regularly maintaining diesel powered equipment to provide operational efficiency.
- Monitoring the total site electricity consumption and investigating avenues to reduce the requirement.
- Sourcing electricity from renewable resources where available, and economically reasonable and feasible.

Tahmoor South

This project has the second-worst local emissions of all the recent approvals, with Scope 1 and 2 emissions adding up to almost 28 million tonnes of CO₂-equivalent. This is largely due to the volume of methane which would be released. The assessment gave grounds for expecting some abatement, but the scale is uncertain. The DPIE report said:

“Under the ‘abated’ scenario, around 35% of the methane gas would be captured and either flared or used for power generation. This would reduce Scope 1 and 2 emissions by around 26.5%. However, Tahmoor Coal has advised that the concentration of methane within captured gas is not always suitable for beneficial re-use and therefore flaring and power generation is subject to variability. Additionally, gas management infrastructure on the site is operated by a third party and is therefore subject to commercial contractual considerations.”

So, that advice was that abatement of about 35 per cent of the methane emissions could be achieved, which would reduce Scope 1 and 2 emissions by about 26.5 per cent, but that might not prove possible. This is difficult to reconcile with a more recent [DPIE statement in April](#), claiming that capturing and flaring of methane would reduce Scope 1 emissions from 26.7 Mt to 19.3 Mt, which would be a 28 per cent reduction. That later statement went on to observe that Tahmoor South is a gassy mine with “limited opportunity to cost-effectively capture and oxidise methane to carbon dioxide to further reduce Scope 1 emissions”. DPIE conceded that commercial systems are available, but at a high cost. SIMEC had claimed “it would cost around \$100 million to develop and operate” a treatment system. This is indeed a high cost, but it is by no means clear that it would make the project unviable. The Australia Institute pointed out that SIMEC had modelled a pre-tax profit for the project of \$698 million. The IPC did not require the project to incorporate this technology, “given the financial burden that immediate implementation of new technology would have on the continued operation of an existing mine”. It required the proponent simply to investigate whether such a measure would become “reasonable and feasible” at some time in the future.

This is a spectacular demonstration that reasonability and feasibility are very slippery concepts. It was seriously argued, and accepted by the IPC, that a 14 per cent reduction in pre-tax profits to reduce emissions is not “reasonable and feasible”. To put the figure of \$100 million in context, it would amount to abating emissions at a cost of about \$5.35 a tonne, compared with the current cost of purchasing Australian Carbon Credit Units of about [\\$18.50 a tonne](#). The new technology would actually provide very cheap abatement, so it would have been quite “reasonable and feasible” to have required it as a condition of approving the development. In similar terms, there is no reason why the project could not have been required to use solar power to eliminate Scope 2 emissions, rather than accepting its [undertaking to purchase a small amount of clean energy](#) to reduce its Scope 2 emissions by 0.3 Mt.

Even if the limited abatement promised is actually achieved, the project will still release more than 20 million tonnes of CO₂-equivalent. To reference a comparison made earlier in this report, Tahmoor South alone would be responsible for emissions - over the life of the project - which would be substantially more than the annual NSW emissions from ‘Industrial Processes and Product Use’ (12.8 Mt). Greenhouse gas management at the existing mine is inadequate, with Scope 2 emissions actually increasing last year. While the IPC required

“further investigation of abatement options” and “regular reporting of the project’s emissions”, there is no reason to believe there will be any significant reductions.

Mangoola Coal Continued Operations

This project proposes the extraction of an additional 52 million tonnes from the existing Mangoola mine. It would result in 3.3 Mt of Scope 1 emissions, 87 per cent of which are fugitive emissions of methane, and 0.4 Mt of Scope 2 emissions. It is technically possible to capture methane and burn it to reduce its impact, as discussed with reference to other projects. In this case, an assessment for Glencore by Umwelt concluded “it may be technically possible to pre-drain and combust mine waste gas”, but “the capital and operational costs required...makes the mitigation measure economically not feasible”. No figures are given to compare the costs of such a process with the expected profitability of the project, so there is no way of testing whether the abatement measure would be “reasonable and feasible”, even if there were an agreed quantitative measure of reasonability and feasibility.

The [approval](#) requires the proponent to ensure “best practice management” is employed “to minimise Scope 1 and 2 GHG emissions” and to improve energy efficiency. Again, there are no measurable indicators. While it is in principle possible for financial penalties to be imposed, as set out in Division 9 of the Environmental Planning and Assessment Act 1979, if the proponent fails to use “best practice management”, this does not guarantee that greenhouse gas emissions will be reduced. There is no agreed gold standard that constitutes “best practice management”, so it would be difficult to meet a legal standard of proof that this was not being followed. It is also possible for emissions to be increasing while “best practice management” is being employed. The IPC did require the applicant “to minimise post-mining fugitive emissions from coal seams”, but there is again no quantitative measure of the effectiveness of this condition.

SUMMARY

Significant greenhouse gas emissions will result from the projects approved by the New South Wales IPC since March 2018. The impacts are dominated by Scope 3 emissions, which have been consistently ignored by local regulators. The Scope 1 and 2 emissions from these projects, for which local regulators do in principle accept responsibility, add up to some 89 million tonnes of CO₂-equivalent over the project lifetimes. In seven of the eight projects approved, there are no measurable emission abatement targets at all, simply bland encouragements to take reasonable steps. In the case of Tahmoor South, the purchase of a small amount of solar energy has reduced GHG emissions by 0.3 Mt. This is the only definite quantitative achievement: 0.3 Mt out of 89.

There is a qualified commitment to pursue the possibility of capturing some of the methane that will be released by that project and either flaring it or using it for electricity generation, but the proponent advised that “the captured gas is not always suitable for re-use”, so there is neither a guarantee that the stated goal will be achieved nor any sanction for failing to deliver the projected mitigation.

On the most generous overall assessment, 7.7 million tonnes of the total lifetime emissions of 1386 million tonnes might be abated.¹ This would be about 0.55 per cent of the total emissions, or about 4.2 per cent of the emissions that will be counted in Australia's greenhouse gas inventory. Even this is not guaranteed. The only possible conclusion is that the IPC has comprehensively failed to require mitigation of the greenhouse gas emissions from the projects it has assessed since March 2018.

Scope 2 emissions could be dramatically reduced, almost eliminated, by mandating use of clean electricity from solar farms or wind turbines. That policy would reduce Scope 2 emissions from the projected 23 Mt to close to zero.

By far the largest component of Scope 1 emissions is the release into the atmosphere of methane. As the new report to the UN Environment Program argued, reducing these emissions should be a high priority. Rather than vague requirements for applicants to investigate reasonableness and feasibility, or use "best practice management", there should be independent assessment of the ability of profitable projects to take responsible measures to reduce the release of methane.

Finally, it must be recognised that the Scope 3 emissions from the Narrabri Gas Project will add significantly to Australia's greenhouse gas inventory, since the project is designed to produce gas for local combustion. It would only decrease our contribution to climate change if it were to displace coal-fired generation of electricity. That claim is specious because the wholesale price of electricity from large-scale solar farms or arrays of wind turbines is now much less than the price of any power that could be produced from new gas or coal power stations.

As this report was being finalised, the International Energy Agency released a report *Net Zero by 2050 - Analysis*. In the foreword, Dr Fatih Birol, Executive Director of the IEA said that while there are still pathways to reach net zero by 2050, they remain "narrow and extremely challenging, requiring all stakeholders – governments, businesses, investors and citizens – to take action this year and every year after so that the goal does not slip out of reach." The report sets out in concrete terms what the goal of net zero by 2050 means for the fossil fuel industries. "Beyond projects already committed as of 2021, there are no new oil and gas fields approved for development...and no new coal mines or mine extensions". The net zero pathway sees the least efficient coal-fired power stations closed by 2030 and few still operating by 2040. So approving new coal mines or gas projects is not just environmentally irresponsible, it is economically foolhardy.

¹ 7.7 Mt of potential abatement has been estimated based on 7.4 Mt of abatement planned at Tahmoor South from the flaring of methane emissions, with a further 0.3 Mt of abatement also planned at Tahmoor South from the purchase of renewable energy for a small portion of the Project's electricity needs.