



**NEW  
PRODUCERS  
GROUP**  
Governments helping  
each other



## Summary of Training, Webinars and Workshops: Minimising GHG Emissions from the Petroleum Sector

26 May to 23 June & 27 June - 8 July 2022

With support from partners



**Norad**



The Commonwealth

### Background

The New Producers Group delivered a training to its member countries between 26 May – 8 July 2022 with support from the Norwegian Agency for Development Cooperation, the Commonwealth Secretariat and the African Natural Resources Centre of the African Development Bank.

The training explored the technologies, processes, and oversight available to new producers for minimisation of a project's GHG footprint.

Training participants were assembled in cross-governmental delegations from Ghana, Mauritania, Mozambique, Namibia, Senegal, Suriname, and Uganda, and 1-2 participants each from Brazil, Guyana and Kenya.

They were given pre-course reading and each delegation was asked to provide information on the type of petroleum discoveries the country had, any existing (or planned) regulations or guidelines related to GHG emission estimation and reporting, relevant climate and emission pledges, and institutional roles associated with emissions and the petroleum sector. These provided information useful for guiding the course material and grouping countries for the breakout sessions.

The training sessions were preceded by a series of webinars recommended for attendees (and open to other NPG countries). These sessions covered key topics that underpinned the training:

- Understanding the sources of emissions in the petroleum sector
- International initiatives to control emissions
- National carbon offsets
- Carbon capture, storage and utilisation (CCUS)- what can new producers do in this space?
- Why design low emissions and even net zero?

The training sessions were a mixture of plenary sessions with presentations on various topics, with Q&A and also breakout sessions where countries could discuss their concerns and challenges in more detail.

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## Key Learnings

- 70% of scope 1 emissions can be cost effectively abated at a carbon price of US\$40/tCO<sub>2</sub> (IEA)
- Companies should focus on mitigation and rely on offsets and CCUS for residual emissions
- Signing up to zero routine flaring and the global methane pledge add credibility as does having an ambitious NDC
- Governments need to understand emissions profiles, not rely on emissions factors or data provided by operators
- Independent audit of GHG intensity at project level is the best way to make companies invest in emissions reduction (no chance of hiding a poor performing project in portfolio average)
- Real time public reporting of data is valuable for estimating emissions and establishing credibility
- Governments need to price carbon into their investment decisions (as per their target export market) and encourage emissions reductions
- Understand which emissions are controllable and focus on minimising those
- Roles and responsibilities are not always clear in estimating and monitoring emissions from the petroleum sector
- Many countries do not have explicit emissions reporting requirements
- Allowed exceptions for flaring are often not defined and there may be conflicts of interest in the granting of exceptions.
- Clear, complete rules and greater implementation may lead to a virtuous circle of oversight
- Plans for gas take longer than plans for oil
- Both export and domestic options are risky

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## Day 1: Estimating Project and National GHG Emissions

Minimising greenhouse gas (GHG) emissions will become increasingly important in an era with fewer petroleum projects. The international investment community is increasingly hostile to oil and gas projects; to attract finance, projects will need to be lower emissions as well as low cost. There is an opportunity for new producers to design and regulate their sectors for this future rather than trying to adapt legacy assets and regulation.

In a poll conducted by the NPG of over 100 participants from eight countries, 88.5% of respondents agreed with the statement “Do you think it is important to understand the emissions profile of petroleum projects in your country?” In response to the question “Do you think that low emissions intensity will be a condition for the development of your sector?” 25.8% said yes, today, 42.3% said yes, in five years and 32% said yes, in 10+ years. However, in response to the question “do you feel that your regulator is able to require this?” only 41.7% responded yes, 32.3% responded no and 26% responded don't know.

While the majority of emissions from oil are Scope 3 (demand side), the majority are scope 2 (supply side) when it comes to gas, with the vast majority being variable methane emissions. Thus, the sector must address methane to get as close as possible to Net Zero. Governments have made commitments in their NDCs under the Paris Accord that require reductions of GHGs from all sectors. Estimating the emissions accurately will help monitor reductions and apply incentives/sanctions as appropriate.

A case study was presented on ANP Brazil and how it produces a view of the emissions from the sector. ANP is the regulator, with responsibility to provide regulation and plan strategic environmental assessments. Introducing an emissions-reduction focus to a long-established oil and gas sector, such as Brazil, carries challenges, not least related to legacy design and practices and companies' unwillingness to share information.

ANP has defined a process for introducing emissions reporting, starting with a survey of operators (using mostly emissions factors, which we learned in a later session are general rather than specific). Next ANP intends to establish design guidelines and develop project management processes that make carbon a factor in decision making. The intention is to use lifecycle analysis for greater accuracy.

Brazil has the intention of becoming competitive with other countries, such as Norway, on carbon as well as cost of production. However, regulation is less stringent than in the US. For example, the shadow carbon price used in Brazil is 35 Euros instead of 40 Euros in the US, a difference which changes project assessments drastically.

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## Day 2: Workshop on Estimating Emissions

This session emphasized again the importance of designing to minimise emissions initially versus retrofitting, particularly with pressure from importing countries and investors to reduce the emissions intensity of production.

An expert presentation demonstrated that emissions factors (standard values for various aspects of oil and gas production) are not accurate for specific projects and underestimate the actual life-cycle emissions intensities as determined by the actual characteristics of each project. It is important for governments to consider what emissions intensity they can affect, and that which they cannot:<sup>1</sup>

Uncontrollable factors:

- Hydrocarbon type
- Production volumes
- API gravity
- Impurities
- Reservoir complexity
- Depth and age

Controllable factors:

- Volume of gas flared
- Amount of methane and CO<sub>2</sub> vented
- Process and design decisions
- Fuel used
- Takeaway capacity for all product streams
- Robust leak detection and repair programme (installation and maintenance of meters)

RMI has developed the OCI model (<https://ociplus.rmi.org>), which enables countries to quantify and compare GHG emissions from their oil and gas assets. The model also has interactive features allowing countries to identify where GHGs are emitted and how they can be reduced. Data sources include operating inputs and satellite images. The OCI is clearly a valuable tool, but countries will require further training to use it to its fullest capacity (this will be offered as follow up to the training).

The government of Guyana is a leader in disclosure and posts the operator's near real time operational data (1 hour) giving oil, gas & water production, and values for both flared and vented gas. It is prepared for satellite detection and provides verifiable reporting to government, civil society groups and investors. The next step would be to verify the data obtained from the regulator.

Presentations emphasized that the most powerful ways of minimising climate change impact are reducing flaring and methane leakages. In practice, there are challenges associated with implementing ZRF and near-zero methane leaks, such as:

- Policy dynamics (domestic and international) for example NDC commitments
- Relationships with operators, which can facilitate efficient running of the regulatory system

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<sup>1</sup> Refer to Deborah Gordon (2021). [\*No Standard Oil\*](#), Oxford University Press

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## Breakout Sessions

Common themes emerged from these lively discussions. Some countries do not yet have emissions reporting requirements (Mauritania, Mozambique, Namibia and Suriname though all stated the ambition to do so) while Senegal, Uganda, Guyana and Ghana do have, but noted some areas of potential strengthening of the reporting and verification processes. Countries are not expected to have fully developed reporting requirements, as this is a new regulatory area.

Country	Current requirements	Requirements planned
Mauritania	No emissions reporting requirements	In government roadmap plan
Senegal	Operator and government separate emissions estimate using emissions factors	Plans for stricter reporting requirements and monitoring
Mozambique	No emissions reporting requirements but emissions are reported (with limited challenge)	To be included in legislation under review
Namibia	No emissions reporting requirements	Early discussions – recent discovery
Uganda	Emissions reported by operators	
Guyana	Real time published reporting of operations data	Verification needed
Ghana	Emissions reporting requirements but these are not detailed enough	EPA developing stricter requirements

Common concerns across countries included the following:

- Clarity on which institution is charged with collecting emissions data and more broadly on roles of different actors in the sector
- Operators not sharing their methodology for estimating emissions, which makes verification difficult
- Limited information sharing and coordination across government departments and agencies
- Capacity to verify/audit data
- Existence of appropriate sanctions for breaches of regulations
- Need for capacity building and training for management of data, monitoring and verification including training on the use of equipment.
- The importance of understanding how operators calculate data
- Communication between all players and trust between them
- Need for sufficient political will to put the right legislative and regulatory regimes in place
- Political will to invest in enough human resource to make the on-going scrutiny of emissions from the sector effective.

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### Day 3: Reducing Venting and Flaring of Methane

An independent oil company, operating primarily in Ghana, shared the pressure from shareholders and other stakeholders to reduce GHGs, and methane in particular. In response, the company has set a net zero plan, which it intends to pursue irrespective of the local emissions requirements. This does not mean that governments needn't design a legislative/regulatory regime that encourages ZRF and near-zero methane, nor that the operator's data should not be monitored, challenged and verified, nor that there could not be violations requiring suitable fines or other sanctions. It does mean that there can be a common purpose between countries and operators to minimize emissions.

A recurring theme throughout the training was that it is far more efficient to design projects to minimise emissions rather than retrofitting. This was underlined by the oil company operator, who cited challenges with retrofitting related to space constraints on the platform, costs, length of time remaining on the licence, and non-availability of renewable energy.

A key takeaway of this session was the value of having a regime in place to govern emissions at the beginning of the design process. Governments could include a requirement for operators to present a GHG emissions management plan as part of field development plans.

It was striking that although the independent oil company spoke about its plans to address scope 1 and scope 2 emissions, primarily by addressing operational flaring (including by de-bottlenecking the gas supply chain), a significant portion of residual emissions (43%) would need to be handled via offsets. This points to the challenges of achieving net zero targets. The scale of offsets that will be required by the industry will be significant and, as pointed out in the pre-course seminar on the topic, the quality of those offsets must be scrutinised and audited to avoid greenwashing (by governments/operators/investors) and the offset projects should be carried out in-country (and not traded).

The independent operator had commissioned a baseline measurement of their emissions and identified a series of reduction projects. They made the point that the shadow or real carbon price used makes a very big difference to the NPV of different schemes. They produce for internal purposes only a measure of the carbon intensity of their production and compare themselves with peers (where data is available). There is not yet a standard methodology for measuring carbon intensity.

The bulk of this operator's scope 1 emissions come from flaring. They flare under permit as Ghana does not have the capacity to take more gas onshore (a second gas processing plant is being built). They outlined the challenge of establishing a secure value chain from the producer, via the processor to the downstream purchasers with guaranteed payments and appropriate pricing.

The session also included a presentation on Brazil's handling of gas flaring. Most gas flaring in Brazil is of associated gas. The sector is large and complex (300 onshore fields, more than 100 offshore production units) and limited capacity at the regulatory agency ANP means that they are directing their resources first to address "the most relevant flaring".

Lessons emerging from the Brazilian experience point to the importance of having a clear policy and a well-designed framework of legislation and regulation to give the regulator more power over operators. Any changes in regulation to introduce emission controls need a transition period and to allow time for older assets with technical limitations to adjust. Again, retrofitting is expensive and less efficient.

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## Day 4: Eliminating Methane in the Gas Value Chain

The sources of methane emissions in the sector are:

- Venting 61%
- Fugitive emissions 29%
- Flaring 10%

A reduction of more than 70% of methane emissions is possible using existing technology. New producers have the advantage of being able to design this in (or require the operators to do so) rather than having to retrofit existing systems. Despite the many advantages of reducing methane, these emissions have often not been a priority.

The Commonwealth Methane Action Group can support governments by strengthening carbon capacities, supporting the introduction of national regulations to embed voluntary practices, highlighting the opportunities to obtain commitments and data from operators through the governments' approval of field development plans, and by developing pilot projects and knowledge exchanges.

A 45% reduction in global methane emissions is needed by 2030 to be consistent with the Paris Accord's 1.5 degree warming target. The IEA has been focusing on reducing methane for some time and is targeting a 75% global cut in methane emissions from fossil fuel operations by 2030. Oil and gas operations are the second largest emitters of methane (after agriculture). Implementing tried and tested policies would halve emissions. At a gas price equivalent to the average of the last five years, 40% of methane emissions could be abated at no net cost. If all emissions could be captured and sold the revenues would be three times the cost of doing so. This could enable African countries to develop energy intensive industries such as steel or cement.

Oil and gas operations are the second largest emitters of methane (after agriculture)

The IEA methane toolkit<sup>2</sup> consists of:

- Early replacement of devices
- Replacement of pumps
- Replacement of compressor seals or rods
- Replacement with instrument air systems
- Replacement with new electric motors
- Installation of new devices
- Vapour recovery units
- Blowdown capture
- Installation of flares
- Installation of plungers
- Leak detection and repair both upstream and downstream

### Methane certification

Certified gas is likely to be a way of differentiating gas, and, depending how the market evolves, could garner a premium or improve access to certain markets. MiQ which is an independent, not for profit foundation that exists to certify gas (about 4% of daily global gas production to-date) (<https://miq.org>). MiQ provides producers with an independent certification of their gas that can be audited. Although the certification is a voluntary standard, it could be useful for regulators particularly where gas is exported to a market with specific standards. This could be a differentiator for gas producers, and, depending how the market evolves, could garner a premium or gain access to certain buyers.

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<sup>2</sup> <https://www.iea.org/reports/driving-down-methane-leaks-from-the-oil-and-gas-industry/regulatory-toolkit>

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## Day 5: Associated Gas

Dealing with associated gas is complex.<sup>3</sup> If the decision is taken to develop crude oil that presents associated gas, there are a number of options available for the gas:

- LNG
- Re-inject into the reservoir
- Flare
- Produce LPG and condensates if the gas is 'wet'
- Supply gas to the local market
- Export gas via a pipeline
- Use it as a feedstock for hydrogen, methanol, GTL

Flaring is no longer an appropriate strategy. Re-injection may be appropriate in some cases (though expensive). All the other options are complicated, require infrastructure and take time, which does not necessarily co-ordinate with the development of an oil project (particularly if that oil project is fast tracked). LNG requires a huge capital investment and can take many years to deliver (projects tend to run over time and budget). Almost no LNG projects rely on associated gas. It is possible that smaller scale floating LNG (FLNG) may make liquefaction more viable, especially if associated gas can be aggregated from several projects (untested so far).

Gas pipeline exports are, by definition, limited by access to pipelines which are expensive and take many years to build. There is limited gas pipeline infrastructure in Africa (West Africa, Southern Africa and North Africa). The distance to markets can be a limiting factor. Cross-border pipelines involve particular legal complexities.

Local domestic pipelines seem more straightforward but, again, are complicated. Building infrastructure is a major investment and financing is difficult. Designing an appropriate domestic pricing structure is extremely difficult with the need for the gas to be affordable for the end users but also provide a return to the operator, pipeline owner, gas company etc. Devising a gas masterplan that is realistic is challenging and risky when there are so many different interests.

IOCs see the following risks with local gas projects, which create significant disincentives:

- Government control tends to mean lower prices
- Billing and payments are less certain
- Local currency is a risk
- Local contractors may not have suitable expertise
- Maintenance and safety issues
- Community displacement
- Low returns (even with incentives)
- Difficult to finance
- Not usually required as a condition of the concession

More associated gas ends up being flared, as these are oil projects, and flaring is the simplest, most cost-effective solution to associated gas, though it ignores the environmental damage. To effectively prevent routine flaring and venting, the following recommendations were offered:

- Efficient design and monitoring to reduce methane emissions

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<sup>3</sup> Refer to the following resource for a discussion and recommendations: CCSI, "[A Policy Framework to Approach the Use of Associated Petroleum Gas](#)"

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- Development plan and enforcement of zero routine flaring
  - Domestically, gas should displace higher carbon fuels
  - Limit incentives to investors and subsidies to consumers to avoid distortions (and they are hard to reduce or remove at a later date)
  - Only undertake viable projects (not to create jobs etc), with a realistic payback period
  - Address community impacts (communication, transparency)
  - Accept that not all projects can be viable

In the break-out discussions that followed, governments also emphasized the importance of designing a new project to deal with associated gas and raised the challenges of dealing with it in existing projects. They also noted the challenge of enforcement and monitoring compliance. Countries early in their development of the sector are thinking had about allocation of roles to deal with associated gas and with flaring. It was also noted that the pressure on publicly quoted companies can support the governments' efforts (SEC requirements can be a significant constraint for publicly listed companies). All the countries recognised the importance of data monitoring and validation and the roles of both best technical equipment and training human capacity to make this happen. They also recognised the importance of effective sanctions.

Other points:

- When considering the options, regional issues are important
- Combining a number of small projects can create a more economic scale
- Geography matters: it can be more efficient to export than to supply domestically over long distances, depending on the existing infrastructure
- Collecting gas in kind, rather than taking royalties, perhaps using a DSO (domestic supply obligation) could work in some cases

Finally, discussions highlighted that climate risk must always be considered and factored in to net present value calculations by governments. First, because gas infrastructure has a long lifespan, so it carries the risk of policy restrictions or carbon taxes tightening and secondly because in the early years of a project (typically the first 7-10 years) the value accrues to the operators so the risk in the years beyond that period, which will be more exposed to climate change restrictions, overwhelmingly sits with governments.

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## **Days 6 & 7: Integrating Renewables into Petroleum Operations**

There are significant opportunities to minimize emissions from operations by introducing renewables, notably to replace diesel and gas (and stop the use of produced hydrocarbons in operations). Use of renewables in the petroleum sector can also provide the impetus for governments to grow renewables in the wider energy sector. This requires planning at a national level for oil, gas and renewables (including consideration of the cost of renewables, grid capacity, and capital availability).

The risks of renewables projects are much lower than those for oil and gas projects. They are typically smaller scale and much quicker to market, so both capital at risk and time at risk are lower for renewables projects.

IRENA has developed resource assessments for many of the countries in the New Producers Group and specifically for those attending the training. These assess the potential for renewable projects by making a zoning assessment (based on the technical potential, clustering the best areas into zones, calculating economic potential and narrowing down to the most favourable zones). Those most suitable are also assessed for proximity to the grid, to roads, capacity factors and levelized cost of electricity. Modelling of potential projects using detailed technical data produces generation profiles and financial modelling assesses the economic viability of potential projects. IRENA assessments could be made more precise with the contribution of detailed data by interested countries. IRENA is guided by government requests and the members of the NPG requiring assessments of offshore renewable potential could approach the organisation.

In the breakout discussions, governments raised the importance of political will (and messaging) and the ambition of the NDCs to encourage the deployment of renewable energy in petroleum operations, but even more so to seek out opportunities to leverage that deployment for greater national access to clean energy. Coordination between ministries is also important. Participants also pointed to the value of requiring companies to assess the potential for renewable energy in environmental impact assessments.

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## Day 8: Wrap Up and Next Steps

Reducing emissions from the oil and gas sector is a no regrets strategy for new producers, who are at an advantage compared with legacy producers. Since designing projects, infrastructure, and regulation to minimise emissions is much cheaper and more efficient than retrofitting or abating emissions from legacy assets, new producers have a huge opportunity to gain a competitive advantage in a market where reduced/lower emissions are becoming a valued characteristic (for operators, financing, sale of carbon credits etc). But capacity is a challenge for new producers in implementing such strategies.

Many of the operators with which the new producers partner are members of OGCI with commitments to zero venting and flaring, and near zero methane emissions and this alignment of ambitions should be an advantage, though performance must be monitored and reinforced with appropriate sanctions for breaches.

A poll asked participants “What’s your greatest worry when it comes to reducing emissions?” Responses were multiple choice and resulted in the following:

1. 65% Lack of co-ordination across government
2. 61% Capacity
3. 55% Weak legal/regulatory framework
4. 42% Political will
5. 42% Commercial feasibility
6. 23% Lack of commitment from operators
7. 19% Too many priorities
8. 6% other

Countries may not always be aware of what they can require from operators – notably, feasibility assessments, emissions estimates (and the methodology used), real time data (as Exxon has done in Guyana), design to minimise emissions, etc.

This can be done using:

- The FDP process
- EIA
- Incentives
- Penalties
- Legal/Regulatory framework
- Disclosure (transparency)

In the discussion, governments identified what support they required to implement low emission strategies:

- Capacity building:
- Analysing/monitoring emissions
- Standard reporting systems for emissions and how to select the most appropriate/training
- Systems for data collection and analysis (sharing among countries)
- Sharing of information and benchmarking
- CCUS; method and technology (with detailed guidance about application). Details of the UK first bidding round for carbon storage (regulatory framework). Potential webinar subject
- Assistance/guidance about regulatory frameworks with a focus on international best practice
- Integrating renewable energy into operations with field experience (practical case studies)
- Guidelines for reviewing emissions management plans.

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The NPG suggested the following next steps, with others to be defined in response to the above requests:

- Expert clinics
- Policy paper with recommendations
- In person training workshop guided by Norwegian Petroleum Directorate
- Commonwealth Methane Action Group will provide support (Countries, World Bank, NPG, UNEP, IEA etc.)
- RMI will provide on-going support for GHG assessments, including simplifying the model as appropriate
- IRENA will provide support with detailed assessments, including offshore