





Methane regulation

Moving forward from weak commitments to strong implementation

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Introduction and report summary

While the new EU methane regulation published on December 15 of last year is now being discussed in the European Parliament and Council for adoption - with the final regulation expected in early 2023 - much more needs to be done to give it real teeth and ensure it is meaningful, especially as Member States and stakeholders may not be full-heartedly on board. The present report explains:

- The broad shortcomings of the current draft and how the EU methane regulation can be strengthened, particularly in a post-February 24 world (Part A)
- Case study Romania: the status-quo and what can be done to implement strong methane reduction measures in EU's second-largest gas producer country, especially as there is currently little awareness, political will or stakeholder motivation to do so. The measures envisaged in the present report concentrate on Leak Detection and Repair (LDAR) and on Monitoring, Reporting and Verification (MRV) and less so on the other key points of the EU methane regulation which we find easier to implement. These include the ban on regular venting (though the topic is relevant for Romania) and flaring (which is not particularly relevant for Romania), which do not require additional major decisions or significant implementation capacity at national level beyond what would be anyway required for LDAR and MRV. (Part B)

Key recommendations

A. Strengthening the draft EU regulation:

Much more ambition is required on gas imports as the EU must indeed become a global leader in reducing methane emissions. One must assume high emissions for gas from non-independently certified gas supply chains and tax or price them accordingly and immediately. This will align methane reduction ambitions with energy security imperatives of decoupling EU from Russian energy supplies, which is the new strategic line of EU's future energy policy. Supporting certified imports - where much of the US LNG (liquefied natural gas) already has an advantage, as well as imports from Norway - will greatly accelerate global reductions of methane, positioning indeed the EU as the global trend-setter and stimulate even further the US certification initiatives, which do not yet cover all its gas, though the trend is clear. It will further drive certification for gas from other sources, from the UK to Qatar or Algeria. Last but not least, a credible approach to imports will also help the EU save face from the major reputational risks associated with the failure to act decisively in addressing the methane emissions from Russian imports in the draft regulation of December 15, 2021.

- A clear road map for effective pricing or taxing of methane emissions can and must be put forward long before comprehensive data is collected for all gas consumed in the EU. This is critical as methane has 80 times stronger short term climate impact than CO₂ and action must be taken now. Too many substantial discussions took place in the year between the publication of the EU methane strategy and the draft methane regulation to just avoid the topic. A type of Carbon Border Adjustment Mechanism (CBAM) in taxing methane emissions from imports can be introduced immediately - based on assuming high emissions for non-certified gas and taxing based on EU ETS (European Union Emissions Trading Scheme) prices and CO₂-CH₄ equivalence on climate impact. In the future, methane can be included in the EU ETS or a similar trading mechanism. This can be introduced gradually for the domestic industry as more data becomes available.

- Supporting EU domestic gas production to actively reduce emissions, understanding that the current approach (gas industry should be directly co-interested in putting wasted gas to productive use), while reasonable globally, is not equally valid for the aging gas industry inside the EU, mostly Netherlands and Romania. Not addressing the issue may stimulate divestment of aging assets for which expensive LDAR and MRV does not pay in cost-benefit terms, reducing domestic gas production and creating abandoned wells for which measures to reduce leaks cannot be easily enforced. This will have a self-defeating effect on overall methane emissions.

- All deadlines must be accelerated in the current regulation. The long timeline for critical actions in the regulation (3 years for operators reporting at "gold standards", 5 years for revision of regulation etc.) only ensure that little action is taken now and the first actual reductions of emissions can be expected only from 2026-2027 onwards. This is much too late.

While data collection is important to refine the best methane abatement measures, there is no need to wait until we have comprehensive data; for non-certified gas chains on which we have reasonable expectations that the infrastructure is old and environmental regulations weak there is no reason why we cannot assume the worst level of leaks and operational practices, hence a reasonable assumption that overall emissions are high.

B. Case study - Romania. Romania is the second-largest producer of gas in the EU, with declining production, aging infrastructure and poor administrative and institutional capacity to support an EU ambitious policy.

Using the IEA toolkit and roadmap for effective methane regulation, the recommendations summarize the needs of reforms and actions to be taken by key decision-makers to ensure the implementation of EU methane regulation. The 10 steps to be followed are:

Step 1: Understand the legal and political context: Effective methane regulation requires a solid understanding of the key public sector actors (mineral resource agency, agency for environment protection, ministry of environment, energy regulator, labor inspection agency), their current functioning, institutional gaps and needs for additional responsibilities.

Step 2: Characterize the nature of your industry: Romania has all industry segments in oil and gas – production, transmission, storage, distribution, supply; it is also an importer of gas. Romania should consider also potentially new gas developments, such as offshore production and grid extensions. The recommended option is to apply high standards for new developments, while using a phased approach for compliance with MRV, LDAR and replacement equipment standards for existing assets. The regulation could be complemented by prescriptive measures (replacement of certain equipment with best-available technologies within a given timeframe) and performance-based measures (reduction of emissions per facility). Though most operators in the oil and gas sectors already have in place LDAR programs, the main challenge remains the capacity of the regulators to assess their quality and monitor implementation. The regulatory costs of LDAR will have to be assessed for transport, distribution and storage of gas by regulator ANRE (Autoritatea Națională de Reglementare în domeniul Energiei) to decide what costs to be recognized in tariffs and passed on to consumers; The European Union Agency for the Cooperation of Energy Regulators (ACER)'s benchmarks every 3 years can provide guidance. The oil and gas production may need state aid schemes to implement LDAR and MRV for aging assets.

Step 3: Develop an emissions profile: Moving beyond the current National GHG Inventory, additional information will become available from other sources, such as satellite imagery, industry- and facility-specific estimates and then actual bottom-up measurement data. Additional sources of data can be the ROMEO project and authorities may use Clean Air Task Force - CATF's CoMAT tool to determine abatement potential even when there is very little data available. Reporting requirements can start from using templates from other countries such as Norway with increasing levels of granularity in time. The focus of the regulators should be to impose as soon as possible the reporting of actual measurement data on "hot spots" (high-risk items for emissions), based on the IEA methane tracker or Global Methane Emissions Dashboard. The types of equipment, possible thresholds for mandatory MRV in the first years, as well as mandatory LDAR should be agreed upon transparently with the industry to ensure 1) achievable results in the first years of implementation and 2) a gradually increasing level of ambition for more accurate data, and a gradually increasing level of ambition for leak detection and repairs, depending on the capacity of companies to implement.

Step 4: Build regulatory capacity: Expertise can be built quickly if there is political will and Romania must not remain as always a policy taker, given the fact that its industry is among the largest in Europe. Political commitment is first demonstrated by appointments - competitively, transparently and based on competence. Romania must join as soon as possible the global debate on the topic, such as by joining the Global Methane Initiative. There would also be significant scope for EU grant financing in the next years for studies and capacity building. The public sector bodies with responsibilities also must be properly budgeted.

Step 5: Engage stakeholders: An ambitious methane regulation requires a constant, high quality dialogue with the regulated industry, with NGOs and the public, and with international peers. In Romania, there will be rather strong resistance to regulation from companies operating in the oil and gas industry, given the state of most of the assets under operation, if the potential emission abatement measures would be perceived as too costly. Authorities should engage with stakeholders, particularly with the industry, for an initial scoping of the issues, to build trust, and find the right pace for the gradual adoption of the most complex, time-consuming or expensive items in the regulation

Step 6: Define regulatory objectives: Romania has several targets resulting from overarching global commitments (COP26 Global Methane Pledge), which will translate into Methane National Action Plans with national targets; and specific EU regulatory instruments, such as the EC methane regulation. The Romanian methane framework would have to go beyond just the implementation of the EC methane regulation as it reads today and accommodate future increases of ambition on climate targets. The institutional setup and the regulatory capacity needs to be built to deal with such potential changes of scope in mind.

Step 7: Select the appropriate policy design: The set of measures could consist of:

- Information-based – application of EC methane regulation on MRV (with increasing level of accuracy in years 1-4) and LDAR (with coordination with other EU member states)
- Economic – given the age of the assets, there is a risk that a higher share of MRV and LDAR investments and methane abatement measures would not be cost-effective and would require economic incentives (e.g. state aid schemes), penalties (taxation of emissions) or rewards (grants for specific investments).
- Performance-based – additional, facility- or operation-specific methane reduction targets may be instituted to major sources of emissions, allowing operators to find cost-effective actions
- Prescriptive – emission standards for equipment for new developments (new pipelines, new gas extraction, onshore or offshore) or for replacements of existing infrastructure.

Step 8: Draft the policy. Regulation does not need to be “one-off” and certain items may be introduced gradually, as more information becomes available or more capacity is being built. While flexibility is good, ad hoc policy making and frequent, unexpected adjustments (a regular occurrence in Romanian policy-making) must be avoided.

Step 9: Enable and enforce compliance: This will happen only if regulators are credible, competent, and rules are perceived as fair by all stakeholders involved. Given resource constraints and to enhance credibility, the verification of emissions must be ensured by independent accredited verifiers (as per EC methane regulation) and inspections can also be subcontracted to professionals. Data on emissions should be public.

Step 10: Periodically review and refine your policy: Romania does not have an established practice of policy review, assessment of results, and evidence-based adjustments, but methane regulation is a great place to start. The methane abatement regulation is a massive exercise to collect information on methane emissions, with increasing levels of details, and of company practices and efforts to reduce such emissions. The results of the regulation can be easily monitored, including by the general public, if the information is reported and processed in a public format. Any regulatory change must be based on this wealth of information..



This report is structured in two parts

Part A reflects the current shortcomings of the draft EU methane regulation and recommends amendments.

Part B covers the case of Romania, explaining the context of the domestic industry and key players, as well as legal and regulatory shortcomings that could pose major challenges to the implementation of effective methane regulations. It applies the IEA regulatory roadmap and toolkit to the specific case of Romania, with the view of identifying the possible steps to implement a sound regulatory framework for the MRV and LDAR based on best international practices, focusing on the oil and gas sectors - these are precisely the types of reforms needed to implement also the EC methane regulation after adoption.

The annexes present a likely timeline for various elements of EU methane policy and Romania implementation; and a brief description of a set of country or local regulations for methane regulations from around the globe – acknowledging that there is no one-size-fits-all policy that would be transferable regardless of local specificities. Since such best practices cannot be easily transposed, depending critically on local conditions (types of resources, diversity of operations of oil and gas industries, industry segments represented in the country, administrative culture etc.), Part B provides guidance on what parts of international best practices (briefly detailed in Annex II) can realistically be implemented and what are the prerequisites for effective enforcement.

The report does not address the ban on routine venting and flaring (which would not pose additional challenges to those on the MRV and LDAR). It also does not address methane abatement from coal mines, as coal mining should be treated separately. Adopting an implementable regulation in this area would likely be very difficult, considering Romania's probable coal phase-out planned by 2032. Allocating proper responsibilities between state and state-owned companies (going bankrupt or divesting assets) for methane abatement from abandoned or closing mines would be a very contentious and protracted process. (In principle, it should be easier than for the on-going operations of the oil and gas industry, but requires strong political will to acknowledge the problem and devote resources to it. The process would be different than for the oil and gas industry analyzed below, requiring less regulation and more direct action funded by public money in the public sector).

EU methane regulation today

The new EU methane regulation is forthcoming, after the draft prepared by the EC and published on December 15, 2021 is already being discussed and amended in the European Parliament and Council. The regulation is not yet approved and the text may be substantially revised. Though the draft regulation contains valuable requirements (concrete measures such as ban on flaring and venting, mandatory LDAR and initial steps for mitigation of emissions, reporting and gradual collection of data, both bottom-up and top-down), it can be consistently improved and there are hectic debates on certain provisions:

- Zero ambition concerning imports, though these represent over 80% of fossil fuels consumed in the EU. Addressing imports is key to ensuring that the EU indeed becomes a global leader in reducing methane emissions driving others to follow suit. The regulation as it still reads now pushes further down the line the discussion on effective measures for imported gas for several years until comprehensive data is collected. However, intermediate steps could be taken even before such data is available.

- Long before the recent massive shift in EU energy policy to decouple from Russian gas, this particular point has been a core issue in all debates on the regulation over the last year. In general, not taking any serious action about imports in the draft methane regulation, the failure to seriously address emissions from Russian gas as soon as possible, despite repeated calls to do so by most analysts, sheds a bad light on the EU on how powerful the Russian lobby is likely to have been prior to February 24. This must be corrected now.

- The easiest way is to use **plausible assumptions for emission intensity for imports for which there is no independent verification and tax accordingly**. One must assume these emissions are high - e.g. for imports from countries where we know infrastructure is old, state capacity is weak and environmental regulations are likely not enforced. Any assumptions should also not rely on the own assessments or statements of companies that produce the gas imported in the EU without an independent check. For example, last spring Gazprom sent a detailed position on the EU methane policy; in it, Gazprom affirmed it fully applies Oil and Gas Methane Partnership - OGMP 2.0 monitoring standards, and has only 0.02% losses in production, 0.29% in transport and 0.03% in underground storage. This would probably make Gazprom the best-performing company in the world: for comparison, Shell's standards for production are about 10x higher. Such self-assessments should simply be cast aside given that much of Gazprom's infrastructure has been built in Soviet times and given Russia's track record on environment or climate - which, if not known, can be reasonably gauged from Kremlin's general treatment of environmental activists for decades. Of course, after February 24 Russia became totally disinterested in participating in the international order, in taking commitments seriously or, generally, in telling the truth.

- Using high assumptions on emission intensity for non-certified imported gas and taxing accordingly would also incentivize European consumers to purchase gas with certified emissions along the supply chain and would make a substantial difference for the global reduction of methane emissions. This will not negatively affect imports from countries such as Norway - already a leader on emission abatement and is also consistent with the imports of certified LNG gas from the US. For more than a decade, exports of responsibly resourced gas from the US have grown from a niche market to mainstream; many US oil and gas companies have included methane emissions in their Environmental, Social and Governance factors (ESGs) and there are various voluntary certification efforts with independent third-party auditors, such as MiQ. EU's encouragement of certified gas and taxation of non-certified imports can greatly help accelerate this already-existing trend, with a global impact on the reduction of methane emissions. It will help stimulate gradually a similar approach from other gas sources, from Algeria to Qatar.

- On the other hand, on EU domestic production, a key issue is the implicit assumption that it is almost always in the self-interest of oil and gas companies not to waste gas, but recover it for profit. While globally this may be true, it is not so for Europe. As the internal production in the EU, most of which in countries such as the Netherlands and Romania, is old and declining and infrastructure has been in operation for decades, the assumption is simply overoptimistic. Most companies would not invest in expensive LDAR and MRV for wells and pipes expected to be taken out of operation a few years down the line and may find it more cost-efficient to simply divest them faster. Experience with many environment regulations so far across the globe shows that enforcement for abandoned wells and assets is much more challenging, as liability is not as easily established and enforceable as we may wish. Divesting assets faster would miss the goal to effectively reduce methane emissions, while substantially damaging EU's energy security in the post-February 24 context. Thus, adequate cost-recognition in regulated tariffs for gas distribution and transport are a must, whereas gas producers may need state aid schemes to undertake such investments. Otherwise, there is a high risk that member states would seriously oppose the implementation of the regulation if it is perceived as going against energy security imperatives (or, alternatively, national stakeholders will be strongly encouraged to use energy security arguments to delay implementation). Enforcement of the regulation on the member states through infringement procedures would also be difficult as energy security will dominate the public discourse. It should also be taken into account that the expected EU policy on decoupling from Russian energy supplies as soon as possible could anyway prompt decision-makers to revisit key provisions in the methane regulation, and not necessarily in the right way - e.g. to stimulate LNG imports vs some of the pipeline gas by introducing a form of taxation applicable immediately for the latter or exemptions for the first. However, given the context, this is also an opportunity - to accelerate the focus on EU imports of gas with certified emissions, which is doable and may be consistent with the new policy to support US LNG imports.



- Despite that, in the draft regulation so far there is currently no visibility for future methane pricing / taxation, to ensure incentives for the industry to accelerate reduction of emissions while ensuring level play between domestic production and imports. Though early, at this stage at least the possible options of future methane pricing should have been mentioned. There have already been substantive discussions of the pros and cons on mechanisms such as the possible inclusion of methane in the EU ETS; the introduction of another methane-specific emission trading scheme; or a CBAM-type of pricing mechanism for imported methane. The CBAM tax can be calculated at the beginning based on the climate impact equivalence of CO₂ and CH₄ (84x, maybe with some adjustments given the shorter persistence of methane in the atmosphere). As mentioned above, changes are likely to be made on this point in the draft regulation, probably more "administrative" in the first stage at least. That is, to introduce not a market-based mechanism (given there is also no adequate assessment of emissions for imported gas), but immediate high taxation for imports from not independently-verified supply chains of gas and a longer-term discussion on pricing mechanisms for the domestic industry. As explained in the country examples in Annex II, the pricing of methane emissions is crucial to stimulate emission abatement even in very progressive countries such as Norway where there is large societal consensus on the topic and it is complementary to and reinforcing all the other policy measures.

- Last but not least, the regulation is very unambitious on all implementation deadlines. E.g., the "gold standard" of reporting would be reached only in 2026-2027; revisions of the regulation would take place every 5 years etc. The timeframe for reaching OGMP 2.0 level 5 is too long: 36 months for operated assets (likely around mid-2027) and 48 months for non-operated assets (around mid-2028). In comparison, participating companies in OGMP 2.0 will have already achieved OGMP 2.0 Level 5 for operated assets by around 2023 and for non-operated assets by around 2025. At the same time, methane emissions are 86x more potent than CO₂ in the short-run, which makes it critical for reductions to occur as soon as possible; in addition to missing targets, long timelines also do not convey the urgency of taking effective actions. As we argue in Part B of this report (and following also IEA recommendations), states and the EU do not need to wait until better or perfect data is available to take action: prescriptive measures can be taken immediately, adjusting and fine-tuning as more data arrives. Also, the frequency of checks should be increased to monthly; components found to be leaking methane during a survey should be repaired or replaced as soon as possible (no later than 5 days). LDAR programs must have minimum requirements, established via a delegated or implementing act - this would ensure harmonization and comparability across the EU. The obligation of member states to ensure the certification and accreditation schemes are available must also be strengthened.

Though EU regulations, once approved, become effective immediately in member states, the actual implementation of the regulation in each country depends critically on the setup of proper institutional frameworks, in increasing roles and responsibilities of regulatory bodies and in refining administrative details.

ROMANIA CASE STUDY

1. Status quo:

Emissions. According to EEA, total (human-caused) methane emissions in Romania amounted to 22,939 ktCO₂e, o/w 35% (8,304) in energy supply. Methane emissions in the energy sector dropped significantly in recent years, representing about half of what they were in 2003 – this corresponds to an overall significant decline in energy production (oil and gas, closure of inefficient gas-fired capacities) and energy-intensive industries. IEA estimates Romania's total methane emissions in the oil and gas industry (90 kt) represent 0.1% of global emissions, o/w the largest shares consist of fugitive emissions in downstream gas (19 kt); venting in downstream gas (11 kt); fugitive emissions in onshore conventional gas (14 kt); and venting in onshore gas (31 kt). The oil sector, upstream and downstream, represents only about 10% of methane emissions; flaring is already quite low.

These figures, however, are probably heavily underestimated. The figures result almost exclusively from the country's reporting to UNFCCC as the National Emissions Inventory at the lowest level of reporting - "Tier 1" (estimates for each sector are derived based on non-country specific factors combined with just minimal real-life observations, where available). Romania uses the 2006 IPCC methodology according to which, for each activity the same world-wide average-default emissions factors are applied to the quantities of oil & gas produced, transported or traded on the market, length of the transport routes etc. Thus data, though submitted bottom-up by emitters and verified locally, do not consider the real-life particularities of the infrastructure on the ground, age or deterioration, equipment handling procedures etc. (e.g. the transport grid Transgaz submits data based on transported quantities, length of transport routes, and only applies the standard emission factor for gas transport).

As for third party assessment, there is a research project (ROMEIO) which looks quite promising in proposing to the oil and gas industry some initial ideas on where to start measuring methane leaks and losses and prioritize actions to reduce such losses / LDAR. **The project only covers upstream – production of oil and gas, for a sample of sites, while acknowledging a broad variability of sites maintenance and operation across the country.** For the moment, the initiative can suggest effective ways by which producers - Romgaz, Petrom and smaller oil and gas producers - can implement an MRV and prioritize LDAR in upstream. However it cannot by itself provide data at this point that can be extrapolated and used for reporting at national level and for the EU methane strategy.

In brief, the project looked so far at several representative oil and gas extraction sites in the country of both Romgaz and Petrom, for which methane leaks were monitored at equipment level; facility level; and basin level, using a combination of ground based and aerial measurements which were then reconciled. They identified methane emissions from roughly half of the facilities, with emissions rates ranging from 0.01 g/s and 100 g/s for individual facilities; no gas flaring; but also limited gas collection from oil wells. Key findings quoted from the study:

- Oil wells emissions were mostly caused by facility design/state (e.g. open pipes), operational procedures (e.g. not properly closed valves) and only partly due to leaking equipment (e.g. flanges, pressure gauges). Oil wells with H₂S emissions are much better maintained and emit much less.
- Gas wells have generally lower emissions but large measured methane concentrations caused by improperly closed valves/vents and (less often) leaking equipment.
- Compressor stations: high numbers of leakages at individual flanges, valves, vents, pressure regulators etc.
- Considered easily fixable by LDAR team.
- Storage facilities (different types): storage tanks often require maintenance (holes in tanks), but many facilities are also designed to vent (no gas collection), especially older facilities.
- Collection manifolds: generally in good state and few leaks

State of infrastructure. In Romania, the oil and gas extraction has an over 120 years old history and much of the gas wells and infrastructure currently in use have been in operation for 30-60 years. There are two large producers (Romgaz - gas only; Petrom - oil and gas), which cover over 90%, and smaller companies. In the past 4 years, domestic production declined by about 17% (almost 30% at Petrom, while Romgaz has introduced a new onshore gas deposit which allowed it to register a slower decline of just 10% and recently it slightly increased production). In the Black Sea, there are two major gas sources - Petrom-Exxon (/Romgaz) Neptune Deep deposit (42-84 bcm, with little chances of ever coming to the market because of legal and regulatory obstacles) and BSOG's smaller shallow offshore (10 bcm, which could in theory enter the market in Q2 2022, though likely to be delayed for the same legal and regulatory issues that blocked the Neptune Deep project).

Romania also has storage facilities and transport and distribution grids which have been largely developed starting in the 1950s, with minor improvements in the past 30 years.



a. Production / upstream

While gas flaring as a practice is already minimal, the IEA methane tracker suggests fugitive leaks and venting may be quite high. Apart from the decline in reserves, the reduction of production has been further stimulated by regulatory and legislative investments in recent years that have also not encouraged investments. Royalties - linked artificially to gas prices at Baumgarten gas exchange - may be excessive, at least when the prices at which gas is traded in Romania are lower; on top of declining reserves, this could be one of the reasons for the acceleration of production decline. The current taxation mechanism also includes a distortionary "windfall tax" – Government Ordinance 7/2013 – that recognizes only partially the investments in existing domestic production for tax deductions. Recently, the windfall tax has been extended under new legislation designed to contain price increases to energy consumers - Emergency Ordinance 27/2022; the law also regulates gas prices for households and cogeneration in district heating, thus further affecting investment incentives and energy efficiency at end-consumers.

Overall, this legal framework **discourages investments in the ongoing onshore production, including any investments that would be needed to implement MRV and LDAR**. Petrom had recently envisaged a relatively sharp closure of half of its wells between 2019-2024 – launching in 2019 a procurement procedure for works required to shut down 3877 of 7500 wells. Even for 2022, at record gas prices and tightness in gas markets, Petrom announced a further reduction of production by 7%. This would have the following consequences:

- lower incentives to invest in MRV and LDAR, as the remaining useful life of the wells would not allow the recovery of such investments
- some incentives to minimize emissions as long as there is a third-party assessment and no need for own MRV investments. E.g., if minimizing emissions would require only a change of equipment handling procedures and not costly investments, such a measure would be feasible – however, the identification of the leak in the first place requires a costly investment that companies would not be willing to make at this stage. (As an example, Petrom made an announcement of change in practices after CATF visited the Campina site, but would have probably not done it or even discovered the leaks without the visit of CATF).
- an increasing number of closed sites with leaks that would not be monitored after closure and unclear responsibility of who would possibly have to pay for the cleanup (Romanian state or OMV Petrom). While in theory the responsibility would remain with Petrom, this may not be easily enforceable in practice.

So far, both Petrom and Romgaz have undertaken some small steps to monitor and reduce methane emissions, with Petrom slightly more advanced than Romgaz. Thus, Petrom is implementing investments to monitor and reduce methane emissions, most importantly an LDAR (loss monitoring) program in upstream and downstream, and has already started a modernization program for pipelines and compressor stations and targets zero gas flaring by 2030. Romgaz is less advanced. It undertook in 2020 a study on methane emissions endorsed by the National Agency for Environment Protection (ANPM) to monitor leaks and own technological consumption and propose maintenance and investment works to reduce such leaks. The report highlights a reduction of 29% of gas losses and 21% of gas flaring in 2020 compared to 2019.

However, neither company provides any self-reporting or even a rough assessment of overall methane emissions that would exceed the details in the National Inventory of GHG and, as indicated above, would have minimal incentives to do so voluntarily for the existing production. The situation may change if the two companies, together with BSOG, invest in the Black Sea gas deposits; the equipment would be new, the incentive to minimize leaks would be stronger than for the onshore mature production and the companies would also have a stronger stake in EU's methane policy, particularly in competition with imported gas.

b. Mid- and downstream

Transport and distribution networks report low losses (e.g. Transgaz reports "own technological consumption" of just below 1%) whereas storage operators Depogaz and Depomures have no measurement of leaks and losses. Indeed, at least in the case of Transgaz, the losses reported have declined significantly in recent years (e.g. ANRE reports for Transgaz a reduction of "own technological consumption" by about 60% over 2011-2015, as a result of energy efficiency investments in compressor stations and sealing of pipes). However, it implemented only partially its own investment plan on monitoring equipment (about 65% in 2020). What is more, judging from its own reporting on losses, it should be among the best-performing TSOs in Europe, which is not plausible. This reduction of "own technological consumption" has been achieved by implementing certain measures, such as better metering at equipment level, SCADA, repairs and changes in some handling procedures.

One of the possible explanations why the losses in the transport grid are not as high as one might expect given the age of the infrastructure is also that Transgaz operates the grid at a much lower pressure than its neighbors (about 14-15 bar compared to 45-55 bar in all the neighboring countries). However, this mode of operation causes other problems, such as technical difficulties to export to countries with higher grid pressure and the fact that increasing pressures in the future for exports would probably also increase the losses overall in the system, unless the export routes would be virtually isolated from the rest of the grid.

In storage, Depogaz implemented a leakage detection system, which alerts in case of a leak and can close the storage if the leak exceeds a certain threshold – mostly for safety reasons, but does not measure the actual losses. In distribution, EON (DELGAZ) reduced technological consumption by 40% in 2020 compared to 2013 and installed equipment for rapid detection of leaks. However, Engie does not report investments targeted at reducing losses or leakages. There is no monitoring or estimates on gas leaks at end-consumers.

The above-mentioned results and initiatives come from self-reporting of companies and there is no form of external validation.

The total losses downstream should be relatively easily checked (as difference between input and output in the network); however, without an adequate MRV and LDAR, it is difficult to spot the exact place where such losses occur and intervene.

2. A roadmap for methane regulation in Romania in general and on MRV and LDAR

In principle, a significant reduction of methane emissions can be achieved in cost-effective ways across the globe. 80% of the measures to tackle methane emissions from the energy sector globally could be implemented at negative or low cost, according to the Global Methane Assessment of the CCAC and UNEP. As a result, we have seen until recently primarily a reliance on voluntary actions from companies, and the willingness of the oil and gas industry in participating in devising innovative technologies and processes to reduce losses of methane along the supply chain, in initiatives such as OGMP 2.0. However, the case for regulatory intervention emerges because of several barriers to achieving rapid reductions of emissions. Particularly in the case of methane, which is much more potent as a GHG than CO₂ in the short run, time is of the essence. Regulatory bodies need to accelerate the reduction of emissions much faster than would happen without intervention. IEA identifies three such barriers to laissez-faire, operator-driven reduction of emissions:

- information gaps in many companies about methane emissions, environmental impact, abatement technologies, and benefits of capturing gas that is otherwise lost to sell it on well-functioning markets
- infrastructure gaps, e.g. in capturing associated gas from oil extraction, processing, transporting and bringing it to productive uses
- poor investment incentives, mainly the opportunity cost of investing in abatement technology when there may be more profitable alternative uses for the capital needed for such investment.

In addition, the situation inside the EU may not be very similar to the global oil and gas industry, given the long history of fossil fuel extraction and use and the aging infrastructure. What is cost-effective in the global industry may be prohibitively costly in countries with a long tradition in extractive industries, where expensive investments may not pay off for declining production, as explained in Part A.

The IEA regulatory roadmap and toolkit provides a starters' guide to implementing a sound methane framework, which needs to be specifically tailored to the local needs and administrative capacity and practices. We use the Roadmap to identify the specific steps that must be taken by the Romanian authorities to set in place the institutional mechanisms for the implementation of EU's forthcoming methane emissions policy, which would already introduce certain regulatory directions for member states. In summary, there are 10 steps to consider, illustrated below.

10 steps in implementing new regulations



Source: IEA, Driving Down Methane Leaks from the Oil and Gas Industry - A regulatory roadmap and toolkit regulatory roadmap and toolkit

Based on international regulatory practices, IEA defines a taxonomy of regulatory interventions:

- Prescriptive regulations (e.g. imposing a mandatory replacement of certain types of equipment with a lower-emission one. This seems relatively easy at first sight, but in practice is quite restrictive and cannot keep pace with the technological developments, while requiring strong regulatory capacity and knowledge of the technologies used by all operators – see **California** in Annex II)
- Performance or outcome-based (imposing a mandatory performance target, e.g. reduction of emissions to a certain level or by a certain factor, but which can be achieved with different measures at company level, leaving more discretion to the operators and focusing on the end-result. This allows room for innovation – see **Canada**, in particular **Alberta** in Annex II)
- Economic (financial "sticks and carrots", such as taxes or penalties for emissions, subsidies for research or investments in projects that reduce emissions; taxation generally requires prior good knowledge of the emissions estimates in the sector. It changes the set of incentives for operators directing investments specifically to emission reductions – see Norway carbon tax and Canada federal and province grant funding in Annex II)
- Information-based (enhanced requirements for reporting on emissions, e.g. at facility level instead of generic estimates, direct measurement as opposed to equipment- or industry-specific emission factors – see **Norway** and **Canada, Saskatchewan** in Annex II).

The countries and states described in Annex II generally use a combination of all the above. The "right" mix of regulatory interventions however depends on what could reasonably work in the given setup. While prescriptive, performance and economic regulatory interventions seem more straightforward and more in line with typical regulatory action, in practice the major challenge for any evidence-based policy is having accurate, reliable information of the problem. This, as we will see, does not preclude taking some prescriptive measures even in the absence of perfect information. However, gathering information is key and hence the increasing regulatory focus, including in the draft EU methane regulation, is on imposing mandatory MRV and LDAR, both of which require increasingly adequate capacity to collect real-life information about equipment performance and capacity of national regulators to impose rules and verify implementation. While the other provisions of the EU methane regulation such as ban on routine flaring and venting are also important, these are not addressed in the current report. Flaring is not an issue in Romania, though venting is certainly a problem - from gas compressor stations, oil storage tanks, and during oil and gas separation.

The preparation of an effective methane regulation that would effectively cover mandatory MRV and LDAR would require a step-by-step approach, as recommended by the IEA. The steps illustrated in the figure above are applied to Romania's case.



Step 1

Understand the legal and political context

The first step to effective regulation requires an understanding of the existing institutional setup, regulatory framework, market context and availability of information on emissions.

Currently, in Romania the following institutions could be in charge with various elements of a future methane regulation:

- ANRM (mineral resource agency) – provides licenses for operation of oil and gas companies and charges royalties for oil and gas, which are a publicly-owned resource that is concessioned to operators. ANRM could institute royalties for wasted gas / vented gas (this is done in Brazil or US states), considering that the gas is property of the state for whose use ANRM is broadly responsible. ANRM could also use the example of Canada, where the ministry in charge with mineral resources at federal level supports non-regulatory research and development of methane abatement equipment and practices, which could be later on adopted as standards, in collaboration with ANPM.

- ANPM (national agency for environment protection) – provides technical inputs for environment legislation, authorizes operations based on compliance with environment legislation, monitors environment indicators. The agency is subordinated to the Ministry of Environment and it is currently in charge with the reporting on the National GHG Inventory. ANPM could institute methane abatement standards, possibly in connection to air quality in populated areas (such as in Canada). Given its responsibility for the reporting of the GHG inventory, it has at least in principle the legal authority to enhance the quality and granularity of information to be received from operators in a national reporting system; it will very likely be designated as the main regulatory authority in Romania for the EC methane regulation in the upstream sector.

- Ministry of Environment, in charge of climate policies and strategic policy directions in areas related to the environment. The Ministry could set national targets for emissions (e.g. reduction by 75% by 2030, as recently committed to by Canada in COP26); ANPM, ANRM and others would be responsible to come up with measures conducting to the implementation of the nationally-assumed targets.

- ANRE – regulation of transport and distribution networks for gas. ANRE, which is in charge with the detailed methodology for network tariffs and implementation, could enforce more stringent conditions for technological losses on the network, supporting the abatement of methane emissions by lowering losses recognized in tariffs passed on to consumers. ANRE is a member of CEER (European energy regulators body) which allows it to participate in knowledge-sharing and benefit information on the increased regulatory ambitions for transport, storage and distribution networks. CEER has been a very active stakeholder in the discussions on the EU methane regulations and in the consultations of the EU methane strategy – unlike the much less regulated activity of production, the “infrastructure” / “natural monopoly” components of T&D and storage already have considerable regulations in place that could be enhanced across the EU in support of methane emission reductions.

It should also be noted that most of the countries illustrated in Annex II focus on emissions from upstream (particularly in areas where oil and gas operations take place far from densely populated areas). Thus, the reduction of emissions along the entire chain should build on existing regulatory practices that can be slightly repurposed to also achieve climate goals, instead of just safety and efficiency (reduction of excessive cost pass-through to clients in monopoly activities). Very likely, it will be the regulatory body designated by Romania for the mid- and downstream sectors of gas, and will have to cooperate with ANPM for a comprehensive regulation of the entire supply chain.

- Labor inspection agency – in charge of labor safety. The Labor inspection could revisit safety standards concerning the oil and gas industry, e.g. currently replacing safety rules that do not prevent methane venting with improved ones which meet safety standards without venting.

A major constraint is the lack of capacity in the Romanian public administration, particularly in highly technical regulatory areas where the industry has attracted considerably more capacity than the public sector and in new areas of regulation for which there is virtually no prior experience. A first step could be for Romania to join officially and immediately as a partner country the Global Methane Initiative (of which it is not yet a member, unlike countries in the region with significantly less oil and gas industry such as Poland, Albania or Serbia); also the Climate and Clean Air Coalition. GMI and CCAC membership can help access the invaluable resources of a global network of decision-makers and stakeholders which shares practices and experiences on methane emissions reduction since 2004.

Step 2

Characterize the nature of your industry

Romania has all industry segments in oil and gas – production, transmission, storage, distribution, supply; it is also an importer of gas, for which it would apply rules that would be defined in Brussels for the entire EU (and would be much interested to do so, so that level play with domestic producers can be ensured).

The oil and gas industry is segmented, with different operators in each segment. Companies, including state-owned, operate (at least in principle) at arm's length with the owners and tutelary authorities.

Romania should have in view not only the existing oil and gas facilities, but the potentially new developments, such as the offshore gas, and the extension of the gas network infrastructure (large interconnecting pipelines and new distribution grids planned for access of consumers from the rural areas) as well as older/abandoned/decommissioned and soon to be decommissioned facilities (particularly wells). A key challenge is the fact that Romanian existing oil and gas production is quite old, with most of the pipelines and a large share of the wells built more than 40-50 years ago; also, the onshore production of oil and gas is declining (see previous reports). It is much more difficult to apply methane abatement investments on existing infrastructure and unclear responsibilities for abandoned wells. In general, the industry would have much less economic incentives to invest if the assets are close to the end of their useful life, and the remaining time of use is below the payback period.

By contrast, building a new low-emission facility is comparatively easier than retrofitting old assets. One option would be to **apply high standards for new developments, while using a phased approach for compliance with MRV, LDAR and replacement equipment standards for existing assets** – the approach is used in **Canada**. The regulation could introduce first mandatory requirements to meter and report emissions for existing infrastructure, to get a better sense of the size of the real-life emissions (as required anyway by the draft EC methane regulation) and, where the case, companies may already discover they have incentives to reduce losses where the asset closure is not imminent.

The regulation could be complemented by prescriptive measures (replacement of certain equipment with best-available technologies within a given timeframe, as in **California**) and performance-based measures (reduction of emissions per facility, as in **Canada**). The latter would pose an additional challenge in the selection of the baseline from which companies are required to reduce emissions. Currently, as the only data available on methane emissions consists of Tier 1 reporting for the National GHG Inventory (global industry emission averages), the baseline emission data is likely understated. Using this data as the baseline may impose excessive conditions for the companies, as operators may in reality fare worse than global averages because of the aged equipment used in Romania. At the same time, however, this approach would not penalize companies which may have already made some improvements in operations and may have installed equipment for methane abatement before the regulation is put in place – such improvements would not be captured in the baseline of average emission factors.

Most operators in the oil and gas sectors already have in place LDAR programs. The main challenge remains the capacity of the regulators to assess the quality of the LDAR programs proposed by the companies (e.g. whether ambitious enough) and monitor their implementation. According to US regulators, the potential methane emission reductions due to the periodicity of LDAR surveys are as follows: 40% for annual surveys, 60% for semi-annual surveys, 80% for quarterly surveys and 90% for monthly surveys.

The regulatory costs of LDAR will have to be assessed for transport, distribution and storage of gas by regulator ANRE, which will have to decide what costs are economically justified so as to be recognized in tariffs and passed on to consumers. The provision in the EC methane regulation provides some support by requiring ACER (the European Union Agency for the Cooperation of Energy Regulators) to prepare a benchmark every 3 years, and ANRE can also use the network of CEER to learn from the practices of other EU member states.

The oil and gas production may need state aid schemes to implement LDAR and MRV for aging assets, to reduce the incentives to abandon wells close to the end of their useful life where such investments cannot be recovered; this approach is needed also because of the new energy security imperatives and to reduce the opposition of member states to the implementation of the EU methane regulation.

Step 3

Develop an emissions profile

Currently, the only source of data is from the National GHG Inventory, which is based solely on global average emission factors; the IEA 2022 Methane tracker has shown that emissions are 70% higher than what reported from national government. Following the implementation of the EU methane strategy and regulation, additional information will become available from other sources, such as satellite imagery, plus, in time, industry- and facility-specific estimates and then actual bottom-up measurement data. In the efforts to reconcile data, at a first step (in the first year) the global industry averages would be refined to more country-specific or region-specific averages, e.g. starting from the extensive research from the ROMEO project that should be published this year. The government should be prepared to adjust and update its estimated emissions accordingly, however, it is likely that not all stakeholders would fully accept the figures reported by this research. Also, the Ministry of Environment may look into CATF's CoMAT tool which can help determine abatement potential even when there is very little data available.

ANPM could implement fairly quickly a more comprehensive reporting requirement for companies in the oil and gas industry, and this should be done preferably in parallel with the process of adoption of the EU methane regulation and its phased implementation. Also note that the OGMP 2.0 framework, referenced in the EC methane regulation, provides a broad framework with reporting principles, not a "template" in excel for companies to fill in; whereas the EC methane regulation draft gets more specific, proposing in Art. 12 a phased implementation of reporting: 1 year for source-specific emission estimates for all sources; 2 years for direct measurements of all operating assets; 3 years for direct measurements of all sources + sites and sampled non-operated assets, 4 years for all, operated, non-operated, and full sites. To note that the requirements on LDAR are less specific as they cannot be uniformly regulated – operators are required to prepare and implement LDAR plans and regulators verify whether they are conducive to methane abatement in an efficient way and the compliance of operators with their LDAR plans. Hence some discretion on the actual template of MRV reporting, which would require a judgment call from the national authorities on how they would process and interpret the data, at least in the first years when data would be partial and require some prioritization. There is even more discretion on LDAR, which requires in-depth knowledge from the regulator to judge the quality of the proposed plans and whether they most effectively (as opposed to possible alternative measures and investments) contribute to overall emission reduction goals, at facility level.

A useful start would be to base the reporting requirements template on guidelines from other countries, e.g. **Norway**, with increasing levels of accuracy for emissions depending on equipment and specificities of operations in future years. Thus, the initial reporting on methane emissions would be based as currently on global industry averages, but information would be gathered concerning each type of facility, equipment and usage patterns, which will also provide a better understanding of the age of the infrastructure and areas where methane abatement could make economic sense for the operators. In following years, data would be refined with adjustments of the estimates based on more specific emission factors of similar equipment; and later on with actual measurements (in line with the phases in the EU methane regulation requirements). While following the calendar in the EC methane regulation, some data might be more easily obtained, or its immediate collection would be of higher value. The focus of the regulator should be to impose as soon as possible the reporting of actual measurement data on "the usual suspects", i.e. equipment that generally has high leaks; and from larger facilities, the approach used by **Canada**. A starting point to identify such "hot spots" could be the IEA methane tracker or Global Methane Emissions Dashboard which provide some estimates of the types and patterns of emissions and compile data from more sources than just the national inventories; also IMEO could support member states and ROMEO project can provide more information for Romanian decision-makers.

The types of equipment, possible thresholds for mandatory MRV in the first years, as well as mandatory LDAR should be agreed upon transparently with the industry to ensure 1) achievable results in the first years of implementation and 2) a gradually increasing level of ambition for more accurate data, and a gradually increasing level of ambition for leak detection and repairs, depending on the capacity of companies to implement.

Gathering detailed information about company assets and – very importantly – operation patterns, as a first step, would currently be a major breakthrough to better understand the size of the problem, which is virtually unknown in Romania. It would help identify assets or asset categories for which companies would be self-interested to reduce methane emissions through improving their LDAR programs, as well as assets where such investments cannot be recovered from the market. It will help regulators such as ANPM and ANRE to better understand the scope of the activities they would have to regulate and ask for advice from international peers as soon as possible. It will guide the discussion on prioritization of measures and on possible incentives for companies to implement specific LDAR measures, such as grants for methane abatement (in the upstream) or a combination of grants and tariff recognition (mid- and downstream). It should be noted that methane emissions are not "costed" like CO₂ emissions in the EU ETS, and the new EC methane regulation does not show a clear path for future taxation of methane. As a result, the incentives of operators for leak detection and repairs may be limited and some prescriptive regulations may be required, coupled with grants to install up-to-date equipment (as in **Canada**).

The Romanian government, through research institutes such as INCAS and using information from the ROMEO project, may also consider (like **Norway**) to undertake separately an independent assessment of the oil and gas overall infrastructure and facilities, or a survey to identify major sources of methane emissions – super-emitters, including for abandoned wells. The study could also provide information on potential abatement measures and costs. This would help Romanian authorities in the dialogue with the industry on the future regulation on MRV and LDAR and there would likely be available funding (from EU) and extensive expertise (e.g. from the GMI network and resources) to ensure a good quality of such analytical work.

Step 4

Build regulatory capacity

Capacity is a key constraint for the effective implementation of methane regulations, which requires understanding of the challenges of methane emissions, understanding technologies, writing rules, communicating effectively with stakeholders and building trust with the industry and general public, and enforcing the regulations after adoption.

Expertise is in principle the easiest part to build – as long as there is indeed political commitment to reduce methane emissions and strengthen institutions to do so. The signals are not particularly encouraging, as Romania, despite being part of the EU and having a comparatively large oil and gas industry among the member states, did not send a clear signal such as signing the Global Methane Pledge at COP26 and all stakeholders, state and private, are virtually absent from the extensive debates in Brussels on the topic. Most likely, the authorities would have to adapt once the EU methane regulation becomes effective, but they will do so reactively, instead of proactively trying to shape the final regulation in a way that balances the interests of Romanian stakeholders while reaching climate objectives. It should also be noted that operators such as Romgaz and Petrom (the largest gas and oil and gas producers), Transgaz (gas transmission operator), Engie Romania and EON (distributors and suppliers of gas) have not been engaged in any kind of dialogue at national or international level concerning the new policy direction of abating methane. Most likely, all players would be “surprised” in 2-3 years as the EU methane regulation kicks in with stringent regulatory conditions.

Political will is first demonstrated by appointments in the core institutions responsible nationally for the regulation. Key expertise and leadership of the main public sector authorities can be acquired by competitive selection, based on transparent, competence-based selection at the top and among the professionals that would populate various departments in institutions such as ANRE, ANRM, ANPM, or the Ministry of Environment. This point cannot be emphasized strongly enough: it is essential that key decision-makers and government officials working on the topic have a solid professional track record and reputations, as the effective implementation of methane regulations would require a significant increase of trust among all stakeholders, public sector, industry, environment NGOs and the general public.

It is also essential to join as soon as possible the global debate on the topic. As recommended above, Romania should join the Global Methane Initiative, where governments as well as other stakeholders (private sector, development banks, NGOs) participate. GMI is essentially an extensive network to share international expertise and facilitate the coordination of policies as well as transfers of best practices among countries, where adaptable to local contexts. There are a host of various international initiatives that provide knowledge-sharing and networking on the methane topic. Below, a (not comprehensive) list of international organizations with which dialogue can be initiated to build the Romanian capacity in both state and non-state actors concerned in methane abatement in the oil and gas sectors.

There would also be significant scope for EU grant financing in the next years for studies and capacity building, such as in the operational programs and technical assistance that are currently being prepared (with delays) for the 2021-2027 budgetary cycle; even after the finalization of the OPs, there is still room for reallocations to respond to new challenges (once we realize that methane abatement is indeed a priority). Subsequently, once the needs for investments in various industrial facilities and segments are discovered, there would be opportunities to use EU funds to support the implementation of investments and equipment related to MRV and LDAR, where pure market forces are not enough.

The public sector bodies with responsibilities also must be properly budgeted to attract talent (but not excessively budgeted to attract sinecures) and undertake additional tasks. The discussions on budgets required depend critically on the types of regulations and mainly on enforcement that is envisaged, e.g. after rules are put in place, ANPM would have to consider whether to hire more inspectors or subcontract third-party inspections and verification of data reported by the companies or LDAR programs submitted by the operators. The equipment for verification and data collection / validation from inspections is also to be considered. Data resulting from monitoring emissions must be collected in a database (requiring an IT platform that remains viable and stable for years to come, but allows flexibility once more granular data becomes available or new activities are developed – biogas? Offshore gas? Etc.), which would also be public.



Step 5

Engage stakeholders

Introducing an ambitious methane regulation that focuses on the most difficult aspects of MRV and LDAR requires a constant, high quality dialogue with the regulated industry, with NGOs and the public, and with international peers. In Romania, there will be rather strong resistance to regulation from companies operating in the oil and gas industry, given the state of most of the assets under operation, if the potential emission abatement measures would be perceived as too costly. This might impact also on the willingness of the companies to implement MRV, as granular information would reveal the true dimension of the losses, particularly related to fugitive methane leaks, and could fear additional costs, either from mandatory LDAR measures or future costs for emissions that could be adopted at EU level and implemented later on in member states. There is relatively little awareness or interest from the society at large on the topic, whereas the official Romanian policy is to expand, rather than reduce the role of gas as a transition fuel (Romania has been officially a supporter of the introduction of gas in the EU taxonomy).

In view of the adoption of the EU methane regulation, authorities should engage with stakeholders, particularly with the industry, for an initial scoping of the issues, mitigating antagonism and ensuring stakeholders that their concerns would be properly considered before the adoption and enforcement of regulations. It would not be the first time when regulations are put in place, but not enforced (e.g. ANRE meets with difficulties in penalizing deviations from investments that are not realized according to the previously-agreed network development plans). Cooperation from the industry is critical and the industry must feel that MRV and LDAR regulations (as well as ban on routine flaring and venting) would support rather than hinder the business. As mentioned before, while the EU methane regulation could become effective few months after adoption, the main provisions on MRV and LDAR are phased, and realistically the implementation in Romania may take even longer, though at least the direction should be clear and consistent. It is essential to start the discussions now to raise awareness on methane emissions with the broader Romanian public (which would in turn lend more credibility to regulations), while also engaging with international counterparts to benefit the experience and knowledge on the topic of countries and industries which are well ahead.

As mentioned in Step 3, Romanian authorities could consider contracting an independent study with an experienced national research institute, such as INCAS or an international company or consultancy to get initial data on the real scale of the methane emissions on the ground. This will not mean, however, that we need to wait for the results of the study to start implementing policies and regulations. The results of the consultancy, which would also require access to facilities and cooperation from the industry, could be the basis of a reasoned discussion between authorities and the industry when implementing the new rules (authorities would not start from zero knowledge of the situation). This approach could also facilitate effective engagement with the companies during the study to build reciprocal trust, a prerequisite for effective consultations during the preparation of future regulations.

Step 6

Define regulatory objectives

Romania will likely be a "policy taker" on EU-driven methane abatement policies, judging from the already-mentioned involvement (or rather lack of it) in any international discussion on the topic. There will be two policy "layers" to watch for:

- Overarching global commitments, such as the COP26 Global Methane Pledge, where the EU committed to a collective goal of reducing global methane emissions by 30% by 2030 compared to 2020. This will translate into Methane National Action Plans with national targets, which follow from the EU's international commitments and strategies and the ensuing "split" of such commitments by member states which must each do its part. As a result, the broad, externally-anchored regulatory objective would be to reduce methane emissions by (we recommend) 75%, compared to a baseline, probably 2020. This would mean an economy-wide methane reduction goal, with possibly specific targets for energy sectors (such as in California); these must be taken into account when designing national methane regulations

- Specific EU regulatory instruments, such as the EC methane regulation, which must be viewed as a (partial) instrument to reach the objectives of broader EU strategies and commitments; additional regulations in related fields may follow, even if we consider only the oil and gas sectors (meaning, apart from waste and agriculture, the other main items in the EU methane strategy). The methane regulation itself is a part of a broader package, the EU framework to decarbonize gas markets, promote hydrogen and reduce methane emissions, and which includes a directive and regulation to shift from fossil gas to renewable and low-carbon gasses.

The distinction is relevant, because the Romanian methane legislative framework would have to go beyond just the implementation of the EC methane regulation as it reads today and accommodate future increases of ambition on climate targets. In the following years, this may translate into, for example, amendments of the NECPs or other broad strategic documents at national level related to climate change policies. This trend is global – e.g. **Canada** introduced in 2016-2018 comprehensive regulations for methane, which are again currently undergoing substantial revisions, first at federal level, to be followed by provincial governments, resulting from Canada's signing of the Global Methane Pledge in October 2021 which steps up from the Global Methane Alliance commitments of 45% reduction by 2025.

In practical terms, Romanian authorities (Ministry of Environment and possibly Energy, for the NECP) may adopt strategy changes in line with future EU policies and the EU may insist on following up periodically on implementation. Considering these changes, ANPM and ANRE may be required to impose regulatory targets that go beyond the requirements of the current EC methane regulation, e.g. specific, facility-based emission reduction targets for certain large types of facilities or methane-intensive operations in the oil and gas supply chains (such as **Mexico** and **Canada**); more stringent conditions for authorization of new operations; plus specific regulations concerning the integration of renewable gasses (green hydrogen? biogas?) in transport and distribution networks. The institutional setup and the regulatory capacity needs to be built to deal with such potential changes of scope in mind.

Step 7

Select the appropriate policy design

Following the previous steps, Romanian authorities need to make a choice for a set of prescriptive, performance-based, economic and information-based regulations to support methane abatement. To summarize, the set could consist of:

- Information-based – application of EC methane regulation on MRV (with increasing level of accuracy in years 1-4) and LDAR (with coordination with other EU member states, to ensure level play of oil and gas operators across the EU). The phased implementation of MRV may face delays, however, the direction should be clear and improvements in monitoring, verifying and reporting emissions must be consistent in time.

- Economic – given the age of the assets, there is a risk that a higher share of MRV and LDAR investments and methane abatement measures would not be cost-effective in the absence of economic incentives, penalties (taxation of emissions) or rewards (grants for specific investments). There will probably not be a nationally-set “methane tax” before an EU-wide adoption of such a mechanism, plus there will be hot debates on the topic to ensure level play for operators across the EU and of EU domestic producers with gas imports. The Romanian government, e.g. Ministry of Environment (to which ANPM is subordinated) may consider financial support schemes for implementation of methane-reducing investments, monitoring and LDAR-related equipment etc. EU grants may be available for methane abatement measures that are not cost-recovery, including from reallocations of OP funding in 2021-2027; Romania should consider also the institutional setup to absorb such money (e.g. who should be the program coordinator, launching calls, selecting projects etc?).

ANPM (and ANRE), which will have the most information on technologies and needs must be involved in the design of such schemes. Alternatively, some investments may be deduced from the applicable taxation or royalties.

- Performance-based – additional, facility- or operation-specific methane reduction targets may be instituted to major sources of emissions. This would allow operators to find the most cost-effective way to achieve the target and encourage innovation and technology transfers

- Prescriptive – emission standards for equipment for new developments (new pipelines, new gas extraction, onshore or offshore) or for replacements of existing infrastructure could be introduced.

Step 8

Draft the policy

All of the above proposed measures must be properly analyzed and the impact carefully considered. Regulation does not need to be "one-off" and certain items may be introduced gradually, as more information becomes available – from the MRV and LDAR monitoring, from the possible study on methane emissions that could be contracted by ANPM etc. For example, prescriptive measures could be introduced once there is higher capacity in regulatory bodies and there is a better knowledge of technologies compatible with local and operational specifics. Extensive consultation with stakeholders (industry, NGOs, public) and knowledge sharing with the international community are essential.

While flexibility is good, ad hoc policy making and frequent, unexpected adjustments must be avoided. All adjustments must follow a review of the implementation so far (Step 10). Lack of regulatory and legislative predictability is the main cause of concern for companies operating in the oil and gas industries and Romania does not have a credible track record on such changes.

Step 9

Enable and enforce compliance

The compliance of operators with the regulation can be achieved if regulators are credible, competent, and rules are perceived as fair by all stakeholders involved. Public sector institutions involved in methane policy and regulation should be adequately staffed and led by competent decision-makers who are credible, determined and well-reputed in the sector.

Given the difficulties in finding enough staff to meet all the new regulatory challenges, and to enhance the credibility of the regulation, 1) the verification of emissions must be ensured by independent accredited verifiers (required anyway by the EC methane regulation) and 2) inspections can also be subcontracted to professionals. Such professionals could be trained using the resources of international networks which provide substantial technical expertise and even highly specialized training programs on various topics related to methane abatement technologies.

Data on emissions should be public. This would allow NGOs and the broader public to better understand the challenges and also monitor the increase of accuracy of data, pushing for the implementation of the phases of MRV.

Step 10

Periodically review and refine your policy

Currently, no policy in Romania has a mechanism in place for a review, assessment of results so far, and evidence-based adjustments. The methane abatement regulation is however a massive exercise to collect information on methane emissions, with increasing levels of details, and of company practices and efforts to reduce such emissions. The results of the regulation can be easily monitored, including by the general public, if the information is reported and processed in a public format.

Revisions of the methane regulations should take into account a review of the progress of implementation and adjustments need to be made to accelerate the collection of more accurate data and increase the scope of LDAR programs implemented by the industry. A mechanism for periodic review could be considered. Implicitly, the EC methane regulation requires such assessment given the phased implementation of MRV and, if delays (as expected) would occur, national authorities would need to explain such delays and provide justifications, including on increased efforts to enhance implementation. Particularly in the case of LDAR and of prescriptive regulations such as on MRV and LDAR in transport, storage and distribution networks, periodic reviews are encouraged to ensure regulations remain up-to-date with the latest technology and justified investment costs are properly recognized in end-user tariff components for networks.



Annex I

EU - implementation of methane strategy in oil & gas / key elements of the EU methane regulation	Explanation
<p>- Compulsory measurement, reporting, and verification (MRV) for all energy related methane emissions, building on the Oil and Gas Methane Partnership (OGMP 2.0) methodology + Extension of the OGMP framework to more companies in the gas and oil upstream, midstream and downstream as well as to the coal sector and closed as well as abandoned sites</p>	<p>Most member states do not have legislation and will adopt only when implementing EU regulation. EU will likely impose OGMP 2.0 (possibly with some amendments - it would not want to be perceived as accepting nothing more ambitious than a standard proposed by the industry, at the same time, it would not have capacity for enforcement of higher standards, even external verification of OGMP reporting is a capacity challenge).</p>

Status of EU methane policy and timeline for Romania implementation

Timeline for first proposal	Romania	Calendar
Q4 2021, Likely final regulation in Q1 2023	Currently no national legislation. Romania (Ministry of Environment) only estimates methane emissions for the national GHG inventory - "Tier 1" IPCC level, based on emission factors. Needs legislative provisions e.g. setting up monitoring agency or unit inside existing agency, staffing, capacity building / training	At least 2-3 years of legislative changes and operationalization

Note: there is no clear agreement on how to ensure level play with imports, given that most oil&gas consumed in the EU is imported from third countries, e.g. LNG, Russia, Azerbaijan etc. The issue is relatively little-addressed in the strategy, though there is consensus it is an issue, at least in terms of "exporting methane emissions". Two different views, prior to December 15 draft: EU needs to "show the way" (unilateral commitment), self-imposing ambitious targets and trying to deal with suppliers from other countries later in international negotiations; vs finding some way to ensure methane emissions are not exported and local players are not disadvantaged. The second view was (luckily) prevalent - but not addressed in the draft regulation as of December 15. Proposals discussed to deal with the issue were various, but not very convincing. E.g., introduce standards for imports from third countries, which can be either verified (e.g. for those who apply OGMP such as Norway) or assumed (for those who have no independent verification); for lower standards, impose a much higher methane levy. Or introduce a mechanism like the proposed CBAM (carbon border adjustment mechanism), de facto also a methane levy. The problems have been Gazprom's lobby capacity and dishonest behavior (see Nord Stream, behavior after EC's decision on abuse of dominant position etc.) and lack of any way of objectively assessing the real emissions, which would allow substantial discretion. The International Methane Emissions Observatory (already set up in March 2021, though yet to be completed with staff and data will probably gather the best available information, such as from Copernicus satellite, but it would still be unreconciled with bottom-up data; unless the EU regulation makes a serious point of this, assessments will be challenged by Gazprom. With the new EU stance on Russian gas imports, the position on this topic should also be strengthened.

Q4 2021 draft regulation
disappointing on imports

Obligation to improve leak detection and repair (LDAR) of leaks on all fossil gas infrastructure, as well as any other infrastructure that produces, transports or uses fossil gas, including as a feedstock.

On LDAR, the regulation is likely to be "light" and orientative - to allow flexibility for different technologies, different standards for equipment etc. There may be allowances for countries with obsolete infrastructure in CEE. Will be much easier to enforce on transport & distribution than on generation, given existing safety regulations and regulations to limit acceptable gas losses in tariff distribution. Most likely, LDAR regulation for T&D could be structured in two components: investments to monitor leaks - full cost pass through, to ensure high quality of data; reduction of leaks and losses - incentive-based tariff methodology and losses cap, to allow regulated companies to identify most cost-efficient ways to reduce losses and not overcharge users.

Consideration of legislation on eliminating routine venting and flaring in the energy sector covering the full supply chain, up to the point of production

May be considered in LDAR plus imposing some additional standards on flaring / venting (e.g. requirement to have more efficient flaring equipment to reduce leaks and allowing venting & flaring only for safety reasons)

Supportive legislation

- Amendments to ETS directive to include trading of methane and possibly also Market Stability Reserve

Includes energy generation. Currently under revision in 2021, though revision does not include methane. Methane likely to be included in the ETS scheme only after emissions can be properly measured; the EU ETS scheme may be amended also considering the 2021-2022 CO₂ price crisis. Probably the reductions target baseline would be for the first year of adequate MRV. Note: there is still considerable discussion whether methane should be included in the ETS and how (as separate gas or as CO₂ equivalent, or separate trading altogether). Some view that markets should be different for short-lived and long-lived GHG, as the economics of abatement cost and benefit is different.

<p>Q4 2021 draft; Q1 2023 in force</p>	<p>Production of oil and gas - new unit to enforce LDAR, could be envisaged inside energy regulator ANRE. Transmission and distribution: ANRE. Needs changes to tariff of transport and distribution to include in regulated asset base LDAR. Needs coordination with ACER and other regulators inside CEER to harmonize tariff regulation</p>	<p>Production: 3-5 years. T&D: 2-3 years</p>
<p>Included in draft regulation in Q4 2021</p>	<p>Not particularly relevant (flaring already low; possibly venting)</p>	<p>2-3 years</p>
<p>Most likely, revision to include methane will be beyond 2023</p>	<p>Amendment to Government Decision 780/2006 revised</p>	<p>after 2025</p>

- Amendments to the Effort Sharing Regulation

The "non-ETS" instrument, does not cover energy generation (focuses mostly in sectors where an ETS-type of market is more difficult to organize; basically mandates member states to reduce GHG by certain levels, depending on emissions and wealth). If methane is in the end not included in the ETS, it will probably be addressed here. Currently under revision in 2021. Unlike ETS, ESR also includes non-CO₂ GHG (including methane). De facto, it will have an effect on methane only after emissions can be properly measured. Probably baseline would be the first year of proper monitoring

Amendments to Industrial Emissions Directive

Currently, IED is the main EU instrument to deal with emissions of pollutants in industry and deals with environmental permitting considering the environmental performance of the plant; emission limits based on BAT; environmental inspections; but also allows flexibility. Amending IED to include additional methane emitters and providing BAT may be essential, and especially so if methane will be difficult to include in ETS; it can also deal with second-level pollution (e.g. ozone derived from methane).

- E-PRTR amendments

The European Pollutant Release and Transfer Register is the database for environmental data from industrial facilities across EU. Must be amended to include methane. The revision would be connected to the IED amendments (in oil and gas, E-PRTR would cover the same industrial emitters)

- National Emission Reduction Commitments Directive (2016/2824)

Possible revision to include methane

Same	Regulation applicable directly	after 2025
Possibly 2023	Amendments to Law 278/2013 revised	Possibly 2024
Possibly 2022-2023	Though applicable immediately (regulation), ANPM is responsible and would need additional capacity for the additional reporting	2024
2025-2026		2027

Annex II

Country examples of regulations for MRV / LDAR (summary of legislation)

Norway is generally considered a global leader in the regulation of methane emissions across the supply chain and indeed the methane emission intensity of Norwegian gas is just about 0.2% (about 30% of the estimated average for the gas consumed in the EU). However, the Norwegian regulatory model cannot be easily replicated elsewhere. Virtually all Norwegian oil and gas production is offshore; the largest player, Equinor, is majority state-owned; there are but few players in the sector, so equipment is relatively similar across the industry; and regulations are prepared and updated in a continuous collaboration between the industry and the government, which requires trust and competence on both sides. Specific regulatory measures on MRV and LDAR also need to be understood in the broader legislative context, as it creates additional incentives for the government and industry to properly measure and mitigate methane emissions. The broader legislation includes:

- reinjection or utilization of the associated gas is required to get the initial approvals of the development and operation plans of the companies
- there is ban on routine flaring and venting since 1970 (except for safety and the vented gas needs to be quantified); and
- methane emissions are taxed, based on EU ETS price + a top-up amount for leaks, and a tax on vented gas. The GHG tax, which is paid to the Norwegian Petroleum Directorate, is calculated based on the relative GHG impact of methane vs CO₂, so it provides a right incentive for companies to internalize costs and mitigate emissions in cost-effective ways.

The main regulatory framework concerning specifically MRV and LDAR consists of:

- Legislative act M-107/2014, by which all operators are required to submit an annual report to the Norwegian Environment Agency, which comprises air emissions including methane. The document covers all operations in the production and supply chain of oil and gas, as defined by the Petroleum Act, and provides detailed, clear explanations on how the data needs to be reported, and the operator also needs to describe in the report the types of activities, variations of emissions, measures undertaken to reduce emissions etc. Data needs also to be reported in an online database which is publicly available as open data.
- To ensure consistency of data, Guideline 044 and subsequent annexes provide details on how the emissions should be measured or formulae to calculate based on equipment specifics. It should be noted that not even in Norway can all emissions be directly quantified for all emission sources and some estimates must be relied on, but the focus is as much as possible on specific emission factors and estimation methods instead of generic ones. The Guidelines is a broader reporting framework, concerning not only methane emissions, but a comprehensive template of reporting of all pollutants from the industry, from chemicals used in gas extraction and treatment to discharge of used water. Very importantly, the Guidelines are prepared by Norwegian Oil and Gas Association (NOROG) in collaboration with the authorities and are reviewed and updated as the technology evolves, the initiative coming from the industry. E.g., a new amendment in January 2022 comprises a standard for OGI inspections, providing detailed advice for the industry, from planning of the scanning to how to operate cameras to ensure accuracy of data.

- LDAR is relatively superficially addressed by regulations – as there is no need for it. The regulatory focus is on adequate measuring and reporting of methane emissions; coupled with taxation of methane emissions, companies will have incentives to implement mitigation measures that are cost-effective without stringent regulatory requirements to do so.

As mentioned, the specific regulations on MRV are a result of a collaborative effort of the industry and Norwegian authorities – this requires reciprocal trust and high capacity in the public sector authorities, such as the Norwegian Environmental Agency (NEA) or the Norwegian Petroleum Directorate. Internationally, Norway is able to report its emissions inventory at very high standards, a combination of Tiers 2 and 3 of UNFCCC and NEA undertook a 2-year study in 2016 with a consultancy, in cooperation with the industry, to further refine and detail the breakdowns of emissions by sources; the new information fed into revisions of the reporting by companies according to Guideline 044, as new emission sources were identified and facility-specific quantification methods could be refined. The study also considered small leaks recommending their quantification as a small mark-up on top of the overall quantification of the emission estimates. It also assessed emission abatement opportunities and best available techniques to reduce methane emissions, estimating reduction potential at 10% from existing installations.

Canada's approach to methane emissions is substantially different in scope from the Norwegian model because there is no carbon taxation functioning as in Norway and because the regulation of oil and gas operations is split between federal and provincial governments. Before 2018, methane emissions were regulated mostly at provincial level, e.g. through safety and waste prevention measures. Canada's national GHG inventory was also based on periodic emission studies which were based on equipment inventories, production accounting data, general or specific emission factors, and frequency and duration of emitting activities. There is widespread agreement among Canadian decision-makers and stakeholders that the approach likely underestimated emissions as not all sources were taken into account.

Since 2016-2018, there has been increased ambition in regulating methane emissions and the stakes are even higher after COP26, with a substantial revision planned to reach newly-committed targets (75% reduction by 2030). Thus, in 2016 the Government of Canada committed to reduce by 2025 methane emissions from the oil and gas industry by 40 to 45% compared to 2012. By 2018, Canada adopted a national legislative and regulatory package to reduce methane emissions in the entire chain of oil and gas, including the initiation of investment funding programs such as the Emissions Reduction Fund; provincial regulations followed suit. Canadian methane rules include inventories of emitting components at upstream facilities; reports on volumes of gas vented, destroyed, and delivered off-site; and results of leak detection and repair (LDAR) inspections and monitoring. For federal-province policy coordination, equivalency agreements were signed by 2020 between the federal government and the governments of the main 3 provinces with oil and gas industry - British Columbia, Alberta and Saskatchewan. These allow region-specific approaches to methane mitigation considering the differences in industry profiles across the provinces, while ensuring comparable environmental outcomes for national reporting; it also minimizes regulatory duplication and provincial regulations can replace federal regulations for up to 5 years.

Federal methane regulations of 2018 apply to up- and midstream oil and gas facilities – there is no specific regulation for the reduction of methane emissions from distribution, which are partly covered in the existing safety and operational efficiency regulations of distribution grids, though the discussion may be reopened. The focus of the regulation is to prioritize large facilities with substantial risk of emissions – facilities producing or processing over 60,000 m³ of gas, compressors, and certain fracking operations. Emissions covered by the regulation concern leaks and venting (production, pneumatic devices, compressors etc.). There are emission limits and requirements for the industry to inspect and repair equipment to reduce emissions where the limits are exceeded. The regulation allows flexibility to companies concerning technical solutions and stimulates innovation; the assumption is that mitigation efforts are cost effective in most cases.

A summary of main provisions in provincial regulations is listed below:

- Alberta (2018): control measures to reduce fugitive and venting emissions from the upstream. Control measures are more strict than federal regulations for new facilities starting in 2022; for pneumatic controllers and introduce specific requirements for certain types of equipment; it is less strict than the federal regulation on the leak detection frequency and slightly more lax on venting.
- On LDAR, Alberta has different requirements for different types of facilities (e.g. gas plants and compressor stations conduct surveys three times a year). The regulation defines accepted methods for surveys (e.g. gas-imaging cameras), yet also allows for the use of equally capable equipment. It regulates the type of equipment that must be surveyed, personnel training requirements, and reporting and repair directives. LDAR protocols may be a part of a fugitive emissions management plan. On abandoned wells, Alberta implements an upstream oil and gas liability management system, providing a loan for the Orphan Well Association to speed up work on legacy sites which decommission such wells. The loan will be repaid by the industry through an existing orphan fund levy. This regulator has also recently launched a Site Rehabilitation Program to provide grants to oilfield service contractors to perform well, pipeline, and oil and gas site reclamation work.
- British Columbia (2018): more strict control measures for facilities beginning in 2021, most requirements for existing facilities applicable starting from 2022. More extensive coverage of facilities than the federal government regulation, lower leak detection frequency, slightly more lax on venting. It requires operators to check each well for surface casing vents, at key moments in well development and as part of routine maintenance. If vents are discovered, operators must notify the regulator and eliminate the hazard. If gas migration is discovered, the operator must notify the regulator and submit a risk assessment. It also requires a fugitive emissions management programme, based on the Fugitive Emissions Management Guideline.
- Saskatchewan (2019): company-level GHG emissions intensity limits to venting and flaring emissions, limits vary depending on year, location, facility type. The allowed emissions intensity declines from 2020 to 2025, after which it remains constant until 2030. Mandatory LDAR for certain gas facilities; enhanced measurements and quantification of emissions.

There is funding available at federal and provincial level for investments in research, innovation and implementation of emission-reducing projects.

In the **US**, the methane regulation at federal level is complicated by the very different approaches to climate change policies of successive federal administrations (e.g. Obama's introduction of methane regulations in 2016, Trump's decisions in 2016-2020 to weaken EPA, the rules on methane and to exempt transport and storage from methane regulations in 2020, then Biden's reversal of policy in June 2021 canceling amendments under the Trump administration). There is still certain confusion on the applicability of various regulations; several litigations ongoing in courts will likely be consequential on EPA's roles and capacities on the matter.

However, some US states such as California have very progressive legislation concerning the reduction of methane emissions. The regulatory package on oil and gas methane regulation (2017) covers the reduction of fugitive and vented emissions from new and existing oil and gas facilities in the upstream and midstream (production, processing, storage, transmission). The regulation imposes standards for main types of equipment, introduces mandatory LDAR provisions and requires facilities above certain emission thresholds to install vapor collection. There is a phased introduction of best practices management plan and a technical assessment of control equipment by 2019, with follow-up controls for emissions by 2020.

On Leak Detection and Repair (LDAR), daily audio/visual inspections and quarterly leak measurements of various components on the oil and gas production and transmission chain are required, as well as daily or continuous leak monitoring at injection/withdrawal wellheads. The operators must submit monitoring plans for approval to the authority in charge (California Air Resources Board, a part of the environment authority). Leaky compressors must either be replaced with lower-emission equipment or leaked gas must be collected.

Companies are required to submit annual reports comprising detailed information on facilities, equipment, tests, LDAR results, monitoring of storage, annual concentrations or flow rates for compressors and pneumatics. The regulation is expected to have a budget impact of 27.3 mn USD (considering also the gas savings), with emission savings estimated at more than 1.4 million MT of CO₂ equivalent per year, using a 20 year Global Warming Potential for methane.

Mexico (Guidelines for the prevention and comprehensive control of methane emissions from the hydrocarbons sector) - apply to new and existing sources, and Mexico has facilities in all segments of the value chain. The focus is on mandating the reduction of facility-level emissions. Facilities are required to prepare a Program for Prevention and Integrated Control of Methane Emissions (PPCIEM). Facilities must first identify all sources of methane and calculate an emissions baseline (within the last 5 years). Companies must then set an emissions reduction goal for their existing facilities; new facilities must maintain their baseline emissions. All facilities establish an implementation schedule for mitigation measures similar or superior to certain benchmarks explicit in the law. The regulation includes emissions control measures, including technology (better equipment) and operational improvements (reducing emissions from pipelines). Companies must prepare quarterly Leak Detection and Repair programs.

Existing facilities must complete mitigation actions in 6 years and demonstrate annual progress towards their goal. Facilities must maintain records related to methane emitting components and activities for 5 years.

Mexico requires companies to contract annually the services of an authorized third party to verify the fulfillment of the related LDAR program. All compliance submissions must then be submitted to the regulator following review by an authorized third party. Third-party verifiers will be a multidisciplinary group with experience on emissions reductions, including know-how on the management of such programs, familiarity with oil and gas projects, and emissions quantification skills.



