

# ANNEX

## Summary

I. Introduction	2
II. Methodology	3
III. Preliminary results	3
IV. Main takeaways per sector	11
Inputs from the NGO environment	11
Energy	12
Waste management	13
Annexed documents	14
1. Interview guide for energy, agriculture, waste management representatives	14
2. Interview guide for relevant actors	15
3. Data collection table	17

## I. Introduction

The report details the preliminary results of a qualitative research developed by 2Celsius Association and its partners in Poland (WISE Europa) and Lithuania (DVC), between February-July 2024. The study is part of the project "An integrated approach for the methane emissions abatement in Romania, Poland and Lithuania", financed by the German Federal Ministry for Economy and Climate Action through the European Climate Initiative (EUKI) program. **The aim of research** is to gather data from energy, agriculture and waste management companies in order to contribute to the improvement of practices, legislation and public policies regarding methane gas emissions.

The **research objectives** aimed to:

- Identify the monitoring, verification and reporting of methane gas emissions practices and/or future strategies of companies
- Identify the practices and/or strategies for the abatement of methane gas emissions
- Explore the industries' representatives' knowledge about the legislative or public policy framework and actions take to adapt to it
- Identify the perceived barriers and opportunities to reducing emissions
- Identify main actors and describe the collaboration between the private, public, non-governmental and academic sector

- Identify recommendations and necessary actions for more efficient gas emissions abatement.

This report focuses on the presentation of the data gathered from interviews with representatives of the energy, waste management and agriculture industries, as well as from the non governmental environment in **Poland** (PL).

## II. Methodology

The research employed a qualitative method (semi-structured interviews) that aimed to explore the opinions of representatives from the three industries largely responsible for methane gas emissions, and from non governmental organizations (NGO).

**Convenience sampling** was used to identify representatives willing to take part in interviews. The research team encountered significant difficulties in the respondents' selection, due to an overall reluctance to take part in interviews. Over 100 interview requests were sent, however, only seven respondents agreed to take part in the interviews. The agriculture sector was the hardest to contact therefore no interview was organized with an industry representative. The research team offered as a possible explanation the fact that methane gas emissions abatement is a new topic on the public agenda and there might be a lack of knowledge on the subject, leading to reluctance in taking part in interviews. The team also considers that the difficulties in selecting respondents might be caused by the political climate: local elections and the national government formation in January – February that led to significant changes in the administration of the state-owned companies. Given that most industry actors are state-owned (by the central or local government), most of the persons contacted didn't want to share their opinion to avoid political risks, even when they were assured of anonymity. A special section in the results chapter is dedicated to inputs from the NGO representatives that offer other possible explanations for the difficulties in identifying participants to the research.

**The research instrument** (interview guide) for the industry representatives and NGOs consisted of open-ended questions that tackled all aforementioned objectives. The data analysis was done using open coding and the preliminary results are presented in the following chapter. The data was anonymised and respondents were provided with an informed consent and GDPR form.

## III. Preliminary results

### **Insights regarding the local context and respondents selection difficulties**

According to a NGO representative (1\_PL\_Ex), the agricultural sector in Poland is highly fragmented and not affected by the current methane regulation, so there is no

pressure on the topic and this could explain the low participation of industry representatives in the research. Moreover, the same representative argued that, as agriculture in the European Union (EU) has always been a sensitive area since the beginning of the single market, with potential social costs, hope may persist among potential respondents that this area will also be treated more favourably. The mobilising power of the agricultural industry has shown that there is an indication that keeping a 'low profile' might be a good strategy. On the other hand, in the energy sector, that has competence centres and where decarbonisation pathways are established, planned emission reduction measures might be easier than in the agricultural sector. The same respondent also mentioned the specificity of the structure of methane emissions in Poland, which is different from the EU, where agriculture has the largest share of methane emissions (56.1%). In Poland, the share of the energy sector in methane emissions is 4 times higher than in the EU (44.3% in PL vs. 10.9% in the EU) and the share of agriculture is 39.4%, according to European Environment Agency (EEA) data. The share of the waste sector in Poland is more than three times lower than the EU average (6.6% in PL vs 23.7% in the EU), according to EEA data cited by the NGO representative.

Another NGO representative (2\_PL\_Ex) considers that emissions from agriculture are underestimated and that the available studies show that emissions from the agricultural sector are massive. The low responsiveness on the part of the agricultural sector may be explained on account of fears of future regulations and obligations, which farmers feel will be difficult to cope with. The respondent argued that there is a lack of long-term vision on how to reduce emissions from agriculture without arousing public protests. Recent protests by farmers may cause a backlash against policy makers to start discussing the need to reduce methane emissions from the agricultural sector. Therefore, the respondent concluded that any regulation in the agriculture sector is politically very difficult.

Another interviewed NGO representative (3\_PL\_Ex) considers that there are disproportionately higher discussions regarding coal and that the EU's methane regulations raise concerns as they have not been openly discussed, despite the fact that the regulations will have significant implications for energy policy. The respondent added that gas companies are reluctant to discuss restrictions on the market. On the other side, farmers are significantly uninformed and believe that livestock production is important and necessary. However, despite the fact that agriculture is a significant contributor to climate change, the policy makers are reluctant to address the issue. Moreover, farmers have the potential to mobilize in opposition. According to the respondent, these issues can be summarized as a lack of understanding and a lack of comprehensive knowledge. There is also a reluctance to hold farmers accountable for their practices, which is an example of the so-called "ostrich tactics" – a strategy of postponing engagement with a subject until the relevant knowledge is acquired. In the case of the Green Deal, the respondent claims that the lack of knowledge among farmers represents a significant obstacle to progress.

### **3.1. Monitoring, verification and reporting of methane gas emissions practices and/or future strategies of companies**

#### **Energy**

The companies use measurements for emissions, although one (1\_PL\_E), in the field of open pit mining, has only recently, in 2021, started taking steps in this respect. The other (2\_PL\_E) regularly has several methods of measuring and reporting in compliance with Mine Operation and environmental regulations, detailed in Table 3.1. An NGO representative (2\_PL\_Ex) considers that, due to the lack of accurate and verified data on emissions in the energy sector, it is likely that they are actually higher than the values indicated in the literature.

### Waste management

One company (2\_PL\_W) doesn't measure the emissions, while the other calculates them on the basis of the annual biogas capture, the amount, type, age and biogas-forming potential of the waste deposited at the landfill, as well as taking into account a correction factor for methane productivity depending on the landfill type, according to the Intergovernmental Panel on Climate Change (IPCC) estimation-based method (1\_PL\_W).

Table 3.1. Main data about monitoring, verification and reporting of methane gas emissions practices

Industry/Sector	Main results
Agriculture	-
Energy	<p>- In the area of open cast lignite mining, minor methane emissions can be identified. Coal going to the power plant is burnt and the methane contained in it is oxidised to CO<sub>2</sub> and emitted into the atmosphere. The company has taken steps to accurately determine methane emissions for the open-pit mines. In 2021, the company began work to determine a methane emission factor for a mine, on the basis of which it is possible to calculate spoil-related emissions for a given year. The latest results show that CH<sub>4</sub> emissions in 2022 at a mine were estimated at 24 Mg CH<sub>4</sub> (approx. 600 Mg eCO<sub>2</sub>) and at 15.59 Mg CH<sub>4</sub> at another mine. The quantities of the above methane emissions from open pit mines has not yet been verified (1_PL_E).</p> <p>- Compliance with all the requirements of the Mine Operation and environmental regulations. Control laboratory tests of ventilation air composition are also performed once a month. With regard to methane emissions from de-methanation stations, a measurement and settlement system for the quantity and quality of de-methanation gas has been in place at JSW since 2012, covering all mining plants. All parameters measured at the de-methanation station are available in the system. The system performs calculations and shows the methane intake, the flow to consumers and the emission to the atmosphere through the technological blowout. As far as reporting is concerned, the data is transmitted by the mines to the relevant departments in the Management Office - the Production Safeguard Office and the Office of Demethanation and Methane Management, from where it is forwarded to the relevant authorities and institutions. Currently, methane emissions from post-mining activities are not monitored or reported. Monitoring of such emissions is not possible with measuring equipment and can only be estimated on the basis of emission factors. Methane emissions are reported in accordance with current legal requirements both to the National Balancing and Emission Management Centre (KOBIZE) and to the Integrated Pollutant Release and Transfer Register at Community level (European PRTR) (2_PL_E).</p>
Waste Management	<p>- Methane emission volumes are reported annually to the national agencies. In addition, until 2021, methane emission reductions are also presented in a CSR report published by the plant every 2 years. These emissions are calculated on the basis of the annual biogas capture, the amount, type, age and biogas-forming potential of the waste deposited at the landfill, as well as taking into account a correction factor for methane productivity depending on the landfill type. This is the IPCC's estimation-based method, a detailed description of which can be found in the 2010 methodological guide on PRTR for municipal landfills (1_PL_W).</p> <p>- No monitoring measures (2_PL_W).</p>
NGO	<p>- Due to the lack of accurate and verified data on emissions in the energy sector, it is likely that they are actually higher than the values indicated in the literature (2_PL_Ex).</p>

### 3.2. Practices and/or strategies for the abatement of methane gas emissions

#### Energy

One company (1\_PL\_E) argued that they do not know the possibilities of reducing methane emissions from open cast lignite mines, therefore no practices are in place. For another company (2\_PL\_E), methane represents 74% of its carbon footprint and they developed a timetable for the methane emission reduction programme until 2025, that includes improving the efficiency of de-methanation, building a pipeline, and building additional cogeneration engines. They also developed studies and programmes in this respect, detailed in Table 3.2.

#### Waste management

One company (2\_PL\_W) has no measures aimed directly at reducing methane emissions. The other two companies have various practices of reducing emissions (more details in Table 3.2), for example, sealing of slopes and top of landfill to minimise uncontrolled emissions of biogas containing methane, increasing the tightness of the system to minimise uncontrolled emissions of methane-containing biogas, reduce biogas flaring, minimize landfill of biodegradable waste etc.

Table 3.2. Main data about practices and/or strategies for the abatement of methane gas emissions

Industry/Sector	Main results
Agriculture	-
Energy	<p>- Methane emissions from lignite mining are fugitive emissions and there is no way to target them, as they occur superficially during extraction through the entire spoil (mined coal). In order to target/reduce these emissions, either extraction must be reduced or mining must be carried out in a 'closed' manner, both of which are unfeasible. Therefore, they currently do not know the possibilities of reducing methane emissions from open cast lignite mines (1_PL_E).</p> <p>- The most important assumptions of the developed Environmental Strategy of the company for 2022-2030 focused on four main areas: air protection, respect for water and biodiversity, closed loop management and land reclamation, in line with the main environmental goals of the UN's Agenda 2030. The company has been taking action in the field of the environment and climate, including the reduction of greenhouse gases, for years and the current strategy is a continuation and development of the direction adopted to date. Significant emphasis in the strategy has been placed on the area of emission reduction. A target of reducing greenhouse gas emissions (carbon footprint) by 30% by 2030 has been adopted and there is a commitment to work towards climate neutrality by 2050.</p> <p>Given that 74% of the company's carbon footprint is made up of methane, they developed a timetable for the methane emission reduction programme until 2025, taking into account the economic methane utilisation programme implemented to date and new conceptual measures necessary to achieve the assumed level of methane emission reduction. Among other things, these include improving the efficiency of de-methanation, building a pipeline, and building additional cogeneration engines.</p> <p>For the needs of the company, a study was developed with the following goals: analysis of the ventilation network in coal mines, analysis of the de-methanation network, analysis of the mining, ventilation and de-methanation systems, detailed determination of methane inflow from post-mining goafs to ventilation air and sealing of these goafs to limit methane emissions to the atmosphere, development of a range of activities and directions for an individual strategy for limiting methane emissions into the atmosphere. The study became the basis for the Programme for Reduction of Methane Emissions at the company's plants. Another programme was launched in 2022 with the main objective to capture with the de-methanation system at least 50% of the methane emitted during mining and to use it to</p>

	produce electricity and heat in cogeneration systems. Successful implementation will also enable the Global Methane Pledge to be fulfilled (2 PL E).
Waste Management	<ul style="list-style-type: none"> <li>- They rehabilitate landfills (objective: sealing of slopes and top of landfill to minimise uncontrolled emissions of biogas containing methane), modernize landfill degassing systems</li> <li>- Drilling new degassing wells, running new pipelines (objective: increasing the tightness of the system to minimise uncontrolled emissions of methane-containing biogas), reduce biogas flaring, minimize landfill of biodegradable waste, ongoing monitoring of biogas parameters and the amount of biogas captured (1_PL_W).</li> <li>- No measures aimed directly at reducing methane emissions (2 PL W).</li> </ul>

### 3.3. Knowledge about the legislative or public policy framework and actions take to adapt to it

Table 3.3. Main data about industry representatives' knowledge about the legislative or public policy framework

Industry/Sector	Main results
Agriculture	-
Energy	-
Waste Management	<ul style="list-style-type: none"> <li>- Detailed knowledge about the European Green Deal, European Parliament position on the Methane Regulation, the draft regulation, in line with the EU methane strategy, adopted by the European Commission (1_PL_W).</li> <li>- Information regarding a draft regulation on the reduction of methane emissions in the energy sector and the EU strategy (2 PL W).</li> </ul>

### 3.4. Perceived barriers and opportunities to reducing emissions

#### Energy

Due to the specificities of the lignite mining, one company (1\_PL\_E) representative argued that it is not feasible to target fugitive emissions or they are not aware of any methods. For the other company (2\_PL\_E), the main barrier lies with the fact that the industry is not prepared, and the law makers did not take this aspect into account that investments to comply with the provisions are time consuming. On the other had, the latter company considers that there are opportunities in implementing measures to reduce methane gas emissions, chiefly the value of methane extracted and captured through demethanation that is converted in electricity, for which goal they have implemented a programme that can help use 95% of the methane capture which in turn can support company's objectives for energy self-sufficiency.

#### Waste management

The main barrier identified by one representative (1\_PL\_W) is the fact that the waste management sector faces the lack of innovative technologies and has financial constraints that limit its ability to implement effective solutions. On the other hand, opportunities are seen in the positive impact on climate change mitigation, prevention of financial losses, enhancing process safety, and increasing public acceptance by reducing odors.

Table 3.4. Main data about perceived opportunities and barriers to reducing emissions

Industry	Main results
Agriculture	-

Energy	<p>- <b>Barriers:</b> No way to target fugitive emissions in lignite mining, as they occur superficially during extraction through the entire spoil (mined coal). They do not know today the possibilities of reducing methane emissions from open cast lignite mines (1_PL_E).</p> <p>- <b>Barriers:</b> the creators of the law did not take into account the readiness of the "industry" to introduce rigorous provisions. Provisions of the Public Procurement Law are time-consuming. Investments are carried out in the fastest possible manner, respecting all procedures. De facto, the Company has 6 months (from the date of announcement of the regulation to its entry into force) to comply with the requirements of the regulation. In the current legal and business environment, it is not possible to make these investments in such a short time. A major problem is the use of methane from ventilation air. Due to regulations, in the event of the need to reduce methane emissions from ventilation shafts, the company will be forced to build a methane utilisation-only installation. <b>Opportunities:</b> In the 21st century, the value of methane extracted by de-methanation as an energy fuel was recognised and investment work was started to exploit it. These have been carried out with varying intensity, depending on the financial possibilities. Now, following the 'Methane Emission Reduction Strategy' announced by the EU in 2020, methane is also seen as an environmental hazard. As a result, the company began a programme to reduce methane gas emissions. They intend to use more than 95% of the methane captured by the de-methanation system. Electricity production from methane is very important as the company strives for energy self-sufficiency. An important element is also the possibility of obtaining funds for the implementation of investments related to the reduction of methane emissions. (2_PL_E)</p>
Waste Management	<p>- <b>Main barriers:</b> the waste management sector faces the lack of innovative technologies and the financial constraints that limit its ability to implement effective solutions. <b>Opportunities:</b> positive impact on climate change mitigation, prevent financial losses, enhance process safety, and increase public acceptance by reducing odors (1_PL_W).</p>
NGO	<p>- <b>Barriers.</b> In the agricultural and waste sectors, there may be structural barriers (concentration/fragmentation of sectors, opportunities for networking and strategic action) and social barriers (social costs, risk of raising rubbish fees, socially sensitive issues). There are also political and competence barriers. In highly granular sectors, it is more challenging to cultivate cadres who can exemplify the values espoused by the organisation. In the energy sector, there are technical and capital barriers (related to the difficulty of obtaining financing). The structure of the waste sector, which is fragmented with different local governments owning the entities, can also be a barrier. <b>Opportunities:</b> The methane regulation can be an incentive for member states to address methane emissions in a broader context. Two areas can be distinguished: Area 1. Seizing the opportunity in the area in methane emissions, not only in the energy sector; Area 2. Identifying barriers and social costs - relevance of implementing transition programmes, need for strategic action (1_PL_Ex).</p> <p>- <b>Barriers:</b> The low responsiveness on the part of the agricultural sector may have to do with fears of further regulations and obligations, which farmers feel will be difficult to cope with. There is a lack of long-term vision on how to reduce emissions from agriculture in the least burdensome way that will not arouse public protests. Any regulation of agriculture is politically very difficult. Recent protests by farmers may cause a backlash among policy makers to start discussing the need to reduce methane emissions from the agricultural sector. A big barrier is the low public awareness of methane emissions. Methane is not a 'popular' greenhouse gas in the public consciousness, unlike CO<sub>2</sub>. Therefore, each initiative is quite niche and there is little public or political interest. This translates into social and political impact and effective resistance from industries to reduce methane emissions. A first step could be to publicise the topic of methane emissions in Poland. However, they have a communication and 'marketing' problem. Emissions from the shaft are more difficult to show. Therefore, all initiatives should include an element of making the public aware of the harmful effects of methane emissions. (2_PL_Ex).</p> <p>- <b>Barriers:</b> Overtalk on coal. Gas companies are reluctant to discuss restrictions on the market, which they wish to retain as much as possible. Farmers are significantly uninformed and believe that livestock production is important and necessary. These two issues can be summarized as a lack of understanding and a lack of comprehensive knowledge. There is a reluctance to hold farmers accountable for their practices, which is an example of the so-called "ostrich tactics" – a strategy of postponing engagement with a topic until the relevant knowledge is acquired. In the case of the Green Deal, the lack of knowledge among farmers represents a significant obstacle to progress. The gas industry is reactive and wishes to maintain its reliance on natural gas for as long as possible. It is not contemplating the transition to biogas or green hydrogen. The construction of infrastructure is intended to facilitate this transition. <b>Opportunities:</b> the methane as an explosive gas in mines represents a significant safety concern, with the potential to cause</p>

	fatalities among miners. While methane is not the sole cause of these incidents, it is a key factor. Therefore, it is essential to consider alternative solutions that can replace methane while also addressing the broader energy efficiency and demand-supply adjustments. The potential of green hydrogen and biogas as alternatives to methane has not been fully explored. Similarly, questions about the role of industry in this context have not been adequately addressed (3 PL Ex).
--	--

### 3.5 Main actors and collaboration between the private, public, non-governmental and academic sector

EU institutions (European Parliament and the European Commission) are seen as the main actors in driving methane gas emissions both by the energy and waste management sectors' representatives. The NGO representatives also added the local ministries and specialized agencies as key actors. One NGO representative considers that the most difficult cooperation seems to be between the public and private sector, but whether it will be defined by cooperation or confrontation depends on the state's strategy towards methane emissions and the companies' strategy. The cooperation between NGOs and the public sectors is seen as inconsistent as NGOs don't necessarily see a willingness to dialogue, only some degree of participation from the authorities to meetings organized by NGOs. Another NGO representative considers that business and central administration are not doing enough, and that the nongovernmental sector is more involved.

Table 3.5. Data about the main actors and collaboration between the private, public, non-governmental and academic sector

Industry/Sector	Main results
Agriculture	
Energy	- The European Commission is seen as the main actor in reducing methane gas emissions. The company has been involved in detail in the entire legislative process concerning the reduction of methane emissions in the EU, from the announcement of the Strategy for Reduction of Methane Emissions in the European Union in October 2020. They participated in consultations regarding the topic. The company participated in all discussions concerning the final shape of the European Parliament's Regulation on the Reduction of Methane Emissions in the Energy Sector. They also work with the International Methane Emissions Observatory (IMEO). The company is part of various programmes/projects for the reduction of methane emissions, some with a research component (2 PL E).
Waste Management	- European Parliament and the European Commission are considered the main actors driving methane gas abatement (2_PL_W).
NGO	- In response to a parliamentary interpellation of 2022, it was suggested that the topic of methane emissions is currently coordinated in Poland by various entities, including the Ministry of State Assets and the Ministry of Klimau and the Environment, as well as - in legal terms - by the competent authorities for agriculture, mining, etc. This means that there are several 'project owners' on the state side. It is important in this context to distinguish between formal and informal coordination of activities - state-owned companies play an important role here. As in many cases, there may be more work to be done on methane reduction and it is essential to look for synergies in the functions of the different sectors. There is considerable capacity to collect and analyse data. There is a lot of work going on in the public sector - the most important entity for emissions data is KOBIZE (The National Centre for Emissions Management). Tensions are highlighted in the context of the Regulation - Article 7 introduces the possibility to complain when the complained entity does not implement the requirements. It is worth noting that anyone can also file a complaint, including NGOs. This provision strengthens NGOs, for whom reducing methane emissions is important. The most difficult cooperation seems to be between the public and private sector. The public sector will implement, audit, etc., because these are the tools it has. There is a potential for confrontation here, but whether it will be cooperation or confrontation depends, on the one

	<p>hand, on what the state's strategy towards methane emissions is and what the companies' strategy is in this area. It should also be noted that mine management companies are not a homogeneous group. They differ in size. The large companies are the most important, as they have the largest output and emissions. However, this does not change the fact that they cannot be treated in a uniform way (1_PL_Ex).</p> <p>- A lot of actors declare action, but it is difficult to say whether this is true: it is difficult to verify action if we do not know the emission levels. Main actors to control the reduction: Central Mining Institute for the mining industry, maybe KOBIZE (the question is whether it will have control competences?), maybe environmental inspections (which also deal with many other issues). There are few organisations in the Polish NGO sector that deal with methane. As far as the NGO cooperation with the public and private sector on methane emissions they have mixed feelings. On the one hand, they did not feel any desire for dialogue from the previous director in the ministry responsible for the gas sector. On the other hand, the director responsible for methane emissions at the gas company turned up at our invitation to a meeting at the organisation. They did not engage in other discussions with the private sector. There was a difficult collaboration with the mining sector (second-hand information). (2_PL_Ex).</p> <p>- Neither business nor central administration (which is supposed to be the most important) is doing much. In fact, NGOs and the climate coalition are doing more. The Environment and Climate Ministry declares reductions in methane emissions. Nevertheless, gas remains a crucial energy source, and its utilisation is on the rise in the policies that have thus far been proposed. This includes gas-fired power plants, which are large combined heat and power (CHP) plants. The primary tenet of this approach is the replacement of gas-powered energy sources with nuclear energy, with the support of the construction of gas-powered plants. In addition, renewable energy sources (RES) are to be utilized as a supplementary energy source. The objective is to fortify the position and strength of the gas industry, which is concerned about the fate of the coal industry. The gas industry is reactive and wishes to maintain its reliance on natural gas for as long as possible. It is not contemplating the transition to biogas or green hydrogen. The construction of infrastructure is intended to facilitate this transition. (3 PL Ex).</p>
--	---

**3.6. Recommendations and necessary actions**

The main conclusion from the NGO representatives is that methane regulation regarding measurements and reduction practices needs to be adopted, as any enacted document is better than no regulation. Among other recommendations they mentioned: public debates, awareness and information campaigns for the public regarding methane emissions effects; fines for those that don't comply with regulations; phasing out of the use of gas in the electricity sector; energy vouchers; campaigns aimed at educating the public to reduce meat consumption; coherent coordination for sectors.

**Energy**

The main needs from one energy representative interviewed (2\_PL\_E) are of financial nature as they would require incentives or discounts for companies to make investments to reduce methane gas emissions (more details in Table 3.6).

**Waste management**

No relevant data was collected.

Table 3.6. Main data about respondents' perspectives regarding necessary actions and recommendations

Industry/Sector	Poland
-----------------	--------

Agriculture	-
Energy	- In view of the very difficult market and legal environment, the most effective way to reduce methane emissions would be to introduce incentives or discounts for companies making investments aimed at achieving this goal. Especially when it comes to reducing methane emissions from ventilation shafts. Existing technologies only allow the utilisation of methane from ventilation air. This is related to the low concentration of methane in the air. Therefore, these installations are by their nature economically unjustifiable (2 PL E).
Waste Management	-
NGO	<p>- From a climate policy perspective, any enacted document is better than potential documents. At the strategic level, analyses at a higher level of granularity are necessary. Public debate on the delegation of resources to implement individual actions is also important. Combined consideration is important: coherent coordination for sectors (1_PL_Ex).</p> <p>- First recommendation: the application of the methane regulation and the regulatory framework in this regard. Regulations should be based firstly on the collection of emissions data and secondly on the development of a reduction pathway. Provisions are also needed to penalise those who do not comply with the regulations. It is important to give non-governmental organisations and private entities an effective avenue of redress for damages caused by methane emissions and the possibility to enforce preventive measures. There is a lack of regulation that would effectively lead to a reduction in methane emissions. All initiatives should include an element of making the public aware of the harmful effects of methane emissions. NGO representative considers there has been too little education and information provision in the process of the Green Deal regulations, which would explain the nature of the regulations and their actual effects. The way sensitive regulations are communicated should always be preceded by an information campaign for the public (2_PL_Ex).</p> <p>- It is recommended that the use of gas in the electricity sector be phased out by 2030-40. In order to facilitate this transition, an exit path should be prepared with legal solutions and protective measures for local residents (fuel poverty). Potential solutions include energy vouchers and other measures. A concrete programme to move away from natural gas in the energy sector is also recommended. The issue of agriculture is particularly challenging due to the intertwined nature of the various factors involved. Unlike the other sectors, the choice of whether to use natural gas in agriculture is not solely dependent on the availability of alternative energy sources. Instead, it is a matter of cultural preference, tradition, financial considerations, and the influence of advertising. If the culture, diet, and consumption patterns of the general public were to undergo a significant shift away from meat, it would have a profound impact on the entire agricultural industry. This would result in a reduction in the emissions associated with animal agriculture. To achieve this, it is essential to implement strategies that aim to reduce emissions through the use of feed additives and other innovative solutions. A programme should be created with defined dates and solutions for the transition to a more sustainable energy system. This programme should be presented for discussion and implementation. Proactive planning is essential to ensure the least costly transition possible. The earlier this transition begins, the more cost-effective it will be. Rather than a defensive strategy, a solution strategy should be employed (3 PL Ex).</p>

## IV. Main takeaways per sector<sup>1</sup>

### Inputs from the NGO environment

- **A general reluctance of industries' representatives to participate in the research** can be attributed to the following: the topic is new on the public agenda and lacked a larger, open debate; a knowledge gap, especially in some industries like agriculture; aversion to take political risks, especially in the case of state owned companies and in the context of new government formation and changes to the administration of many public companies.
- **Planned emission reduction measures might be easier in the energy sector than in agriculture** because it has competence centres and decarbonisation pathways are established. Higher contribution of the energy sector to methane gas emissions in Poland and lower for agriculture compared to the EU.
- **Low level of knowledge on the topic in the agricultural sector, farmers have a high mobilizing power and there are fears among policy makers that the regulations might cause protests/opposition.** There is a lack of long-term vision on how to reduce emissions from agriculture without arousing public protests. Farmers might adopt the strategy of keeping a low profile in hope of favourable regulations and might delay the implementation until until relevant knowledge is acquired. The agricultural sector is viewed as fragmented and there are concerns that farms will have a difficult time to adapt to the new regulations.
- **EU institutions (European Parliament and the European Commission), local ministries and specialized agencies as key actors are seen as the main actors** regarding the implementation of methane gas emissions abatement.
- **Most difficult cooperation seems to be between the public and private sector, while the collaboration between NGOs and the public sector is seen as inconsistent as the latter isn't open to real dialogue.** A NGO representative claims that the nongovernmental sector is more involved in the subject.
- **The main recommendation from the NGO representatives is that methane regulation regarding measurements and reduction practices needs to be adopted,** as any enacted document is better than no regulation. Among other recommendations they mentioned: public debates, awareness and information campaigns for the public regarding methane emissions effects; fines for those that don't comply with regulations; phasing out of the use of gas in the electricity sector; energy vouchers; campaigns aimed at educating the public to reduce meat consumption; coherent coordination for sectors

---

<sup>1</sup> As no interview was done with agricultural representatives, there is no dedicated section for this sector. Some conclusions are presented based on inputs from NGOs.

## Energy

- **Monitoring, verification and reporting.** The companies use measurements for emissions, with one only recently starting to take steps in this respect. The others regularly use several methods of measuring and reporting in compliance with the current regulations. An NGO representative considers that, due to the lack of accurate and verified data on emissions in the energy sector, it is likely that they are actually higher than the values indicated in the literature.
- **Practices and/or strategies for the abatement of methane gas emissions.** One company is not aware of any measures to reduce emissions can be taken, while the other developed a timetable for the methane emission reduction programme until 2025, that include improving the efficiency of de-methanation, building a pipeline, and building additional cogeneration engines.
- **Perceived barriers to reducing emissions.** Due to the specificities of the lignite mining, one company representative argued that it is not feasible to target fugitive emissions or they are not aware of any methods. For the other company, the main barrier lies with the fact that the industry is not prepared, and the law makers did not take this aspect into account, especially since investments to comply with the provisions are time consuming.
- **The main opportunity in implementing measures aimed at reducing emissions relate to the value of methane extracted and captured through demethanation that is converted in electricity,** that can help companies in their goal of energy self-sufficiency.
- **The European Commission is seen as the main actor in reducing methane gas emissions** by one company that has been involved in detail in the entire legislative process concerning the reduction of methane emissions in the EU.
- **Recommendations and necessary actions: the main needs from one energy representative are of financial nature,** as they would require incentives or discounts for companies to make investments to reduce methane gas emissions.

## Waste management

- **Monitoring, verification and reporting:** one company doesn't measure the emissions, while the other calculates them on the basis of the annual biogas capture, the amount, type, age and biogas-forming potential of the waste deposited at the landfill, as well as taking into account a correction factor for methane productivity depending on the landfill type, according to the IPCC's estimation-based method.
- **Practices and/or strategies for the abatement of methane gas emissions:** one company has no measures aimed directly at reducing methane emissions, while the other two companies have various practices of reducing emissions, for example, sealing of slopes and top of landfill to minimise uncontrolled emissions of biogas containing methane, increasing the tightness of the system to minimise

uncontrolled emissions of methane-containing biogas, reduce biogas flaring, minimize landfill of biodegradable waste etc.

- **Perceived barriers and opportunities to reduce emissions.** The main barrier identified by one representative is the fact that the waste management sector faces the lack of innovative technologies and has financial constraints that limit its ability to implement effective solutions. On the other hand, opportunities are related to the positive impact on climate change mitigation, prevention of financial losses, enhancing process safety, and increasing public acceptance by reducing odors.
- **The European institutions (European Parliament and the European Commission) are considered the main actors driving methane gas abatement.**

## Annexed documents

### **1. Interview guide for energy, agriculture, waste management representatives**

#### **INSTRUCTIONS FOR THE INTERVIEWER**

Interviewers should approach the interview as a guided conversation as the semi-structured interview allows for flexibility. It is not mandatory that the questions be asked in a fixed order and they can be minimally reworded to suit the experience and status of each respondent. However, it is important for operators to ensure that the interview will cover all the essential topics in the interview guide.

Participants will receive an Informed Consent Form and a GDPR Information to read and sign.

#### **INTRODUCTION**

Thank you for your willingness to participate in this interview.

My name is ..... and I am an interviewer in the study "An integrated approach for the methane emissions abatement in Romania, Poland and Lithuania", conducted by the 2Celsius Association and its partners.

Duration: I will ask you a series of questions. The discussion will last approximately 60 minutes, depending on how much time you have available and how many discussions will be generated from the questions.

Structure: This interview will cover the following topics:

- Monitoring, verification and reporting of methane gas emissions (practices and future strategies)
- Company's practices regarding the abatement of methane gas emissions (future practices and strategies)
- Knowledge about the legislative or public policy framework and actions take to adapt to it
- Opportunities and barriers to reducing methane emissions

Consent: You previously received the informed consent form. Have you had a chance to review it? It would be good to go through the key points of the form so that they are clear before proceeding.

## QUESTIONS

1. What are the externalities, the marginal costs of methane emissions for your company?
2. What monitoring (emission calculation), verification and reporting measures for methane gas emissions does the company you represent carry out?
3. When available, please mention the relevant indicator.
4. What other monitoring (emission calculation), verification and reporting practices are you aware of to be used in the industry in which you operate?
5. What actions are currently being taken by the company you represent to reduce methane gas emissions and what specific targets does it have?
6. What actions to reduce methane gas emissions are used in the industry in which you operate?
7. Are there actions within your company related to innovation or good practices in monitoring (emission calculation), verifying, reporting and reducing methane gas emissions?
8. What knowledge do you have about the current and future legislative framework for the abatement of methane gas emissions?
9. (*If applicable*) What are the company's plans/actions to adapt to the legislative framework?
10. As an industry representative, what would be the ideal legislative or public policy measures to reduce methane gas emissions in the short, medium and long term?
11. What are the main barriers to initiatives aimed at methane gas emissions abatement for the industry in which you operate? But for the company you represent?
12. What are the main opportunities related to the initiatives aimed at methane gas emissions abatement for the industry in which you operate? But for the company you represent?
13. In your perspective, who are the most important actors involved in reducing methane gas emissions?

### Closing remarks:

- Is it something I haven't covered but you feel it is worth mentioning?
- Do you agree with us using the information you provided, to quote you anonymously in the report? As mentioned before, your name or other

identifying information will not be used in the report (Please revert to the consent form).

- Would you like to recommend someone else for us to interview?

## 2. Interview guide for relevant actors

### INSTRUCTIONS FOR THE INTERVIEWER

- *Interviewers should approach the interview as a guided conversation as the semi-structured interview allows for flexibility. It is not mandatory that the questions be asked in a fixed order and they can be minimally reworded to suit the experience and status of each respondent. However, it is important for operators to ensure that the interview will cover all the essential topics in the interview guide.*
- *Participants will receive an Informed Consent Form and a GDPR Information to read and sign.*

### INTRODUCTION

Thank you for your willingness to participate in this interview.

My name is ..... and I am an interviewer in the study "An integrated approach for the methane emissions abatement in Romania, Poland and Lithuania", conducted by the 2Celsius Association and its partners.

Duration: I will ask you a series of questions. The discussion will last approximately 60 minutes, depending on how much time you have available and how many discussions will be generated from the questions.

Structure: This interview will cover the following topics: collaboration regarding relevant actors for methane gas emissions, monitoring methane gas emissions and actions aimed at reducing them in agriculture, energy and waste management, legislative framework and barriers in reducing methane gas emissions.

Consent: You previously received the informed consent form. Have you had a chance to review it? It would be good to go through the key points of the form so that they are clear before proceeding.

### QUESTIONS

1. Please tell us a couple of words about your experience regarding methane greenhouse gas abatement, more specifically methane.
2. In your perspective, who are the most important actors involved in reducing methane gas emissions?
3. How would you describe the collaboration between the private, public and nongovernmental sector for reducing methane gas emissions?

4. What is your opinion on the current legislative framework for the abatement of methane gas emissions?
5. In your opinion, what would be the ideal legislative or public policy measures to reduce methane gas emissions in the short, medium and long term?
6. What are the main barriers to initiatives aimed at methane gas emissions abatement for the three industries?

### Optional questions

7. *Based on your interaction with the private sector, what monitoring, verification and reporting measures for methane gas emissions do the companies in energy, waste management and agriculture use?*
8. *For the same industries, what actions are you aware of that are currently being taken to reduce methane gas emissions? (Including about target if the case)*
9. *Can you think of any good practices in monitoring, verifying, reporting and reducing methane gas emissions for the three industries?*

### Closing remarks:

- Is it something I haven't covered but you feel it is worth mentioning?
- Do you agree with us using the information you provided, to quote you anonymously in the report? As mentioned before, your name or other identifying information will not be used in the report (Please revert to the consent form).
- Would you like to recommend someone else for us to interview? *(If appropriate)*

## 3. Data collection table

No.	Respondent code (no_country_sector/industry acronym)	Industry and/or sector	Country
21	1_PL_E	Energy (public sector)	Poland
22	1_PL_Ex	NGO (Energy)	Poland
23	2_PL_E	Energy	Poland
24	2_PL_Ex	NGO	Poland
25	3_PL_Ex	NGO	Poland
26	1_PL_W	Waste management	Poland
27	2_PL_W	Waste management (public sector)	Poland
28	3_PL_W	Waste management	Poland
29	4_PL_Ex	Consultancy (Energy)	Poland