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# ERICA

Environmental monitoRIng  
through Civic engAgement

## FOCUS GROUP REPORT



*Illustrations by Storyset*



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## 1. Introduction

The research methodology used in the ERICA project is grounded in participation, ethnography and comparative case studies. The task dedicated to the collection of local experiences, existing environmental monitoring techniques, problems and needs, was implemented through participatory design and conducting at least one focus group interview at each pilot site. Ethnographic interviews made it possible to identify guidelines on effective strategies and experiences to facilitate the use of citizen science data, such as environmental data that has been used for various purposes including local resistance against the fossil fuel industry, environmental education and awareness raising. The focus groups were designed to involve participants in identifying their requirements for the e-booklet of best practices, development of educational modules and design of the e-learning platform. The objective of the meetings was also to establish contacts with potential end-users, disseminate the project within the residents of pilot sites and begin to create a community related to the project.

The report provides the methodological guidelines for the focus groups, the approach chosen by each pilot partner, the profile of the participants and a synopsis of all the interviews. The text is divided into thematic blocks, corresponding to the questions asked. Synopses from each pilot site are followed by overall comparison, resulting in recommendations for an e-booklet of good practices and an e-learning platform. The final section of the report includes the results of a satisfaction ranking that assessed the conduct of each interview.

## 2. Approach

The local team may have chosen between various strategies for carrying out the focus group interviews depending on their local context. Three of them were proposed in the initial stage of the project: confrontational, aligned and mixed. The first assumes that through confrontation of very diverse views it is possible to obtain a rich picture of a given matter or work out new perspectives. Participants in a confrontational interview should represent a variety of groups, including those



with opposing interests, i.e. environmental activists and fossil fuel industry employees. The role of the moderator is vital in this case, as that person should be able to mitigate potential conflicts and moderate the discussion towards constructive outcomes. In this scenario, one focus group interview could be organized to involve all of the recruited participants. Aligned approach suggests a discussion among people representing similar viewpoints on an issue or holding similar positions in the local community. This provides an in-depth understanding of a particular group of citizens and outlines a perspective unique to them. Participants in an aligned interview should represent groups that share certain experiences, viewpoints, perspectives, that work together or are similarly positioned in a given context. The role of the moderator is to encourage participants to delve deeper into their experience, get a better understanding of it, search for similarities and differences, or think about the uniqueness of their situation as compared to other groups of citizens in a given context. Using a mixed-methods approach, the local research team may have decided that due to a unique perspective or an aggressively confrontational stance toward other groups of citizens, better results could be obtained by conducting a separate focus group interview with a specific category of citizens, while everyone else could participate in another. Prior to the discussion it was advised to write down a short code of conduct for the meeting where mutual respect and avoidance of any kind of hate speech should be agreed upon, that is, a short set of basic rules for good communication during the meeting, i.e. respecting what others have to say, not taking too much time and letting others speak too and listening carefully.

All pilot site teams were to recruit at least 10 people from among the residents of the local communities around the industrial area. The group invited to the study should have been diverse in terms of their jobs and sectors of the local economy, as well as gender and age. Prepared before the research, the scenario recommended recruiting representatives from locally dominant economic sectors (i.e., agriculture, specific industry or tourism services such as the hotel or food sector), public administrations, (institutions involved in environmental monitoring, officials in charge of environmental impact assessment procedures, institutions



that collect environmental information and are required to provide it to citizens), physicians, local practitioners, especially those who are locally active in various local civic forums; citizens involved in environmental or climate change movements and groups; administration of fossil fuel industries in the region responsible for environmental monitoring and rehabilitation of industrial sites; teachers involved in environmental education for children; other types of locally active members who may be specific to the region, (local museum experts, local environmental journalists, officials responsible for "just transition" programs, locally active university researchers). According to the snowball sampling method used in the study, each participant should be asked to recommend another locally active person who might come to the meeting.



**Fig.1.** Map of the ERICA project pilot sites in Spain (Tarragona Petrochemical Complex), Italy (Basilicata region with COVA and Tempa Rossa oil fields) and Poland (Konin Lignite Region). Author: Marek Jaskólski (P4).



## 2.1. Tarragona (Spain)

Two focus group interviews were conducted at the Tarragona (Spain) pilot site. The first focus group was held via Teams on April 23, 2024, from 9:30 am to 12:00 pm. It was attended by 10 participants, including a journalist, a former industry worker, a lawyer, and various activists from organizations such as Ecologistes en Acció, GEPEC, Enginyers sense Fronteres, and INSTA. The session was moderated by Martí Orta and Neus Roig from the University of Barcelona.

The second focus group was also conducted via Teams on April 29, 2024, from 3:00 pm to 5:00 pm. This session included 8 participants, mainly activists from the organizations Cel Net and Good Karma Project. The moderators for this session were Martí Orta and Gorka Muñoa from the University of Barcelona.

The primary goal of both focus groups was to identify and characterize all civil society initiatives in the region related to the impacts caused by the petrochemical complex, instances of citizen science, as well as limitations, results obtained, and operational improvements of the companies within the complex. In the second focus group, special attention was also given to pollution caused by the massive release of plastic pellets into the environment.

Both sessions were recorded with the prior consent of all participants. All participants received a one-page project description, which included information on funding sources and consortium partners. At the beginning of each meeting, a brief round of introductions was conducted, where participants stated their names and briefly discussed their affiliations.

## 2.2. Konin (Poland)

There were two focus group interviews conducted at the Polish pilot site. The first was organized using a confrontational approach. It was attended by seven participants, including representatives of mining company, non-governmental organizations oriented towards environmental protection and the citizen actions against the fossil fuel industry, officials of environmental departments, municipal climate advisors and academic researchers. The session was carried out online, using Microsoft Teams software, on March 27, 2024 from 10:00 am to 1:00 pm. As planned in the scenario of the confrontational approach, at the beginning of the meeting, moderator Dr. Karolina Dziubata-Smykowska of the Institute of





Anthropology and Ethnology at Adam Mickiewicz University in Poznań outlined a short code of conduct for the session where mutual respect and avoidance of any kind of hate speech was agreed upon.

The second focus group was held on April 5, 2024, at the headquarters of the Konin District Museum, located next to lakes that are part of the open cooling system of nearby power plant. The session was prefaced by an open information meeting, during which the moderator presented the objectives and schedule of the entire project. The open meeting was attended by 10 people, of which 7 stayed for the focus interview. This time an aligned approach was used, as the interview participants included representatives of regional associations, official climate advisors and residents interested in environmental issues. Nevertheless, the moderator decided to reintroduce the code of conduct from the previous interview. Including the open meeting and lunch break during the focus interview, the meeting lasted from 11:00 am to 3:00 pm.

Each interview was documented in the form of a photograph and an audio recording, which participants agreed to before the discussion. Participants received 1 page of the project description, including information on funding sources and consortium partners. At the beginning of each meeting, a short round of introductions was arranged, in which participants introduced their names and briefly talked about their affiliation.

### **2.3. Basilicata (Italy)**

The area of investigation is that of Tempa Rossa oil field, the most recent fossil project active in the region. In a radius of a few kilometers Tempa Rossa concentrates: an oil centre, 5 production wells, tens of kilometers of interconnecting oil pipelines, an LPG centre, a landfill for special and oil waste and a deposit of chemical additives for drilling. The site's production rates are more than 50 thousand barrels of crude oil per day, as well as gas and sulphur.

The focus group was organized in Corleto Perticara, the main municipality of the oil concession called Tempa Rossa. It is the municipality that from 2016 to today



has provided COVA Contro, organizer of the focus group, with the greatest support in terms of reporting and logistical support for our environmental investigations.

The interview took place in July, taking advantage of the return for the summer holidays of many inhabitants of the area, including university students. The meeting was held on June 27, from 8 pm onwards, and with 25 guests including representatives of the main oil company operating in the area, local students of all levels, members of the local administration, representatives of the local church and trade associations, traders, pensioners, small agricultural entrepreneurs, artists, teachers. By the end of the meeting, 13 of the initial number of participants were present.

The meeting lasted from 8pm to 11.30pm, also including dinner during the proceedings. The approach chosen by COVA Contro was a mixed one, seeking dialogue with an offer of content, discussion with institutions and citizens, and where possible, with the energy company Total Energy - the owner of the oil field. The confrontational approach was limited to specific situations that required it - COVA Contro sought in its activities a divergent dialogue, i.e., addressing topics that no one talks about, but in a diplomatic and constructive manner, without giving anyone the legitimacy to verbally attack or insult those with differing views. However, the chosen approach and method of moderating the interviews allowed for constructive but polite criticism based on precise information.

The "Le Gourmet" restaurant, which has always been a meeting point for the COVA Contro association and its partners who come to Basilicata to study Tempa Rossa, was reserved as the venue for the meeting only for the event.

In profiling the participants, the moderators started with those who have been supporting COVA Contro's work for some time, and then sought to reach out to local students and senior citizens to compare different generational viewpoints. Most of the participants were different levels supporters of COVA Contro. The profiles present were:



- employees of oil companies but open to discussion and curious to understand whether this ERICA project was a direct threat to them or not;
- local pensioners who read and follow the Cova Contro website, former employees of private companies not connected to mining;
- theatrical authors and actors;
- unemployed parents with minor children (16 years old);
- teachers;
- freelancers.

The interview lasted over two hours, and after the written compilation of the questionnaire, saw a fruitful debate which not only led to an expansion of the written answers in the questionnaire, but also started a comparison between the various factions present at the focus group.

A mixed approach was used for the focus group, and it was attended by a local administrator, an employee of an oil company, as well as a former worker also from the oil industry. The discussion between the parties was always polite and constructive, obviously the unease and criticism of those present with respect to the oil issue prevailed, and during the proceedings the host room was photographed from the outside by passersby whom we could not identify. The energy company Total Energies did not respond to the invitation. The local school showed closure toward the event, including local youth who do not want exposure to events seen as critical of the status quo.

The moderator and organizer of the evening was Giorgio Santoriello, legal representative of COVA Contro. At the beginning of each meeting, the facilitators explained the details of the questions, the goals of the interviews and the relevance for future development of their activities in the Tempa Rossa area. Due to the conflictual nature of the relationship between the energy company and the local community, it should be noted that local people are rather reluctant to be interviewed about their experiences and problems with oil production and processing in their area. Some guests present read several messages rejecting the



invitation to participate in the focus group, triggering a reflection on people's fear of exposing themselves and participating in events like this. During the works, some cars passed at reduced speed to photograph what was happening inside the room that hosted the focus group.

### 3. Findings

According to the scenario, all pilot partners were advised to launch a discussion with specific questions.

#### **3.1. What environmental challenges are prevalent in your region due to the fossil fuel industry? Specifically, which pollutants from this industry are causing the most concern?**

##### 3.1.1. Tarragona (Spain)

The impact of the petrochemical area in Tarragona has been evident across various environmental matrices since its inception. Chemical spills into the Francolí river, groundwater contamination by naphtha, or the release of anti-foaming agents to sea water by different chemical companies are among the ecological crimes under investigation by authorities. Over the past 15 years, the primary concern has always been understanding what kind of toxic pollutants the inhabitants of nearby towns are breathing due to the petrochemical industry. Initially, the focus was on pollutants associated with foul odours, but nowadays, attention has shifted to all pollutants produced in the chemical industry that are emitted into the atmosphere. Volatile organic compounds (VOCs) have been a major concern for citizens, especially benzene, but also 1,3-butadiene, and ethylene oxide. In the past 6 years, the impact of millions of microplastics on Tarragona beaches has also raised concerns among citizen initiatives.

##### 3.1.2. Konin (Poland)

The most relevant environmental issues discussed in the interview are mainly related to environmental monitoring, water retention in the Konin region, impacts



on ecosystems, and problems related to pesticide and chemical water pollution. In addition, there is also a thread related to community involvement in these issues and cooperation with NGOs such as Greenpeace. The session has focused on a discussion of environmental monitoring and civic engagement. The conversation has covered different perspectives and experiences related to the impact of industrial activities on the environment, particularly in the Konin region. Participants express concerns about the ecological consequences of mining and power plant activities, addressing issues such as water temperature, quality, landscape transformation and potential impacts on protected areas.

The discussion highlighted the multi-faceted impact of industrial activities on the local environment and communities. Participants represent diverse viewpoints, emphasizing the need to consider environmental sustainability, community well-being and the role of various stakeholders in decision-making processes. In addition, the conversation depicts the evolving nature of environmental activism, with an emphasis on engaging diverse voices, including younger generations, and fostering constructive, forward-looking discussions to address environmental challenges. A large role is given to the importance of monitoring and evaluating the environmental impact of a project, indicating a shared commitment to ensuring project sustainability and minimizing negative environmental impacts. This emphasis on data-driven decision-making and accountability influences the dialogue, promoting a more informed and collaborative approach to environmental management.

Local mining infrastructure, particularly excavating activities, has had a significant impact on the daily lives and work of residents in the Konin region. The coal mining complex in Wielkopolska and Kujawsko-Pomorskie provinces has affected not only the immediate surroundings, but also the nearby areas. Consequences include the drying up of forests, reduced agricultural productivity and the disappearance of lakes, which has led to a decline in tourism. In addition, coal mining has caused depressions and the loss of natural lakes in the Gniezno Lake District. The impact of these activities was also felt in the form of environmental



changes, such as soil erosion and the need for hydrological projects to manage the region's water resources. What's more, local governments were receiving significant tax revenues from the mining industry, but there was a lack of investment in creating new jobs for the local community. Together, these factors demonstrate the far-reaching effects of coal mining on the daily lives and work of residents in the Konin region. Concerns about the hydrological project mentioned in the interview relate to potential negative impacts on the environment and the availability of water resources. Stakeholders are concerned about the possibility of water shortages and changes in environmental quality in other areas due to the project. They are also concerned about potential impacts on Natura 2000 sites and the flow of the river downstream. The proposed modifications aim to optimize the project to minimize these negative impacts. This reflects the different interests of stakeholders, who are trying to balance the need for the project with environmental and social concerns. Local organizations are particularly involved in these discussions and are advocating changes to the project to address these concerns.

Based on the results of the task conducted during the interview, the biggest concerns and aspects that need to be monitored are: groundwater levels, surface water quality, water temperature and harmful chemical compounds (this applies to lakes that are used for cooling power plants), underwater biodiversity as well as slope stability and landslide risk. Several artificial lakes, known as settling ponds, have been created in the Konin region, with mine-derived contaminants at their bottom. Their exact chemical composition remains unknown to the local community. Most of the interview participants were unable to give specific polluting factors. They mentioned suspended solids, ash resting on the bottom of the lakes and also noise and ground shaking caused by excavators. Only one person indicated the primary pollutants from the lignite combustion process, namely: sulfur dioxide, nitrogen oxides, dust (including pm 10 and pm 2.5), and carbon monoxide. These pollutants are monitored by the company and municipal authorities. The locations designated for the placement of the sensors were negotiated with the local community.



Considering the coverage of these areas under the Just Transition Plan and the companies' obligations to shift away from coal and close all open pits, the biggest concern seems to be the proper conduct of reclamation processes.

### 3.1.3. Basilicata (Italy)

The oil industry in Basilicata is located since 1990 in a water-rich and geologically fragile environment, with limestone rocks and numerous catchment areas, in a highly seismic area with high hydrogeological disruption. The oil wells and associated infrastructure (oil and gas pipeline network, oil waste re-refinery pipeline, and pre-refining oil center) have been built close to the Agri River and within the associated hydrographic network that feeds local spring drinking water reserves and Pertusillo Lake, which serves two regions, Basilicata and Puglia. Horizontal drilling has bypassed even groundwater bodies, so the exploited reservoir in Val d'Agri intersects with a dense and abundant hydrographic network. The abundance of water has over the centuries led to the development of settlements, agriculture and animal husbandry that coexist with oil exploitation.

What is of greatest concern is the spread of pollutants into the atmosphere and that the winds move to inhabited areas, and the pollution of water, both groundwater and surface water, unfortunately already affected by hydrocarbon spills, oil accidents that have mainly brought heavy metal and hydrocarbon pollution. The local community is also concerned that many substances escape control because they are covered by trade secrets and therefore difficult to search for.

Everyone attending the focus group interview agreed on the same answer, even those who work in the sector, oil is not a clean source, similarly to gas which has however been included among green sources by the EU. People are aware of the propaganda and rhetorical devices used in the oil industry to make things friendlier.



### 3.2. Could you provide the name of the fossil fuel company operating in your area? What details can you share about their project and when did they commence operations?

#### 3.2.1. Tarragona (Spain)

The petrochemical sector in Camp de Tarragona (Catalonia, Spain) is the largest in Southern Europe, spanning over 1,200 hectares, including port facilities. Its history dates back to 1971 when the construction of the first refinery was approved. Currently, the complex hosts approximately 30 companies situated in Taragona's North and South industrial parks, with facilities spread across several municipalities. Together, these companies produce 20 million tonnes of various products, predominantly plastics and fuel. Among them, Repsol stands out as the most prominent.

Repsol's petrochemical complex in Tarragona spans over 500 hectares and encompasses four main areas: refining, chemistry (within the Industrial Complex), LPG, and exploration. Through the refining process, Repsol produces a range of petroleum products including LPG, gasoline, kerosene, diesel, fuel oil, and asphalt. Notably, it generates 300 kilograms of butane per minute.

In the chemical area, Repsol manufactures materials such as polyethylene, polypropylene, polyol, glycol, butadiene, and styrene. These products serve as crucial components in the production of everyday items such as shower gel, shampoo, medicines, clothing, cosmetics, perfumes, computers, mobile phones, furniture, cars, mattresses, and more.

#### 3.2.2. Konin (Poland)

The location chosen for the pilot site in Poland is the Konin lignite mining region. Placed in the central part of the country and western part of the Wielkopolska province, the open-pit and power plant complex is one of the largest in Poland. The Konin lignite region in Central Poland is a carbon-industrial complex consisting of several open-pit mines and three coal-fired power plants. Developed around





the city of Konin during the state-driven industrialization period of the 1960s, it was privatized in the late 1990s. Restructuring processes have resulted in growing unemployment, outmigration (the population of the city of Konin decreased by 10% between 2000 and 2015), and a relative stagnation across the region.

PAK Kopalnia Węgla Brunatnego Konin S.A. (KWB Konin) is part of the Zespół Elektrowni Pątnów-Adamów-Konin S.A. Group (ZE PAK) that merges regional companies in the mining and energy sectors. ZE PAK's core business is the mining of lignite coal, the production and distribution of electricity and heat. The company generates energy from conventional sources and by burning biomass. KWB Konin has worked since 1945. The lignite is excavated using the open-pit method. The extracted raw material is used to produce electricity in commercial power plants owned by the ZE PAK Group. In 1999 KWB Konin was transformed into a company fully owned by the state. In 2012, the company became part of the Pątnów-Adamów-Konin Power Plant Complex Capital Group as PAK Kopalnia Węgla Brunatnego Konin S.A.

PAK Kopalnia Węgla Brunatnego Adamów S.A. (KWB Adamów) was a lignite mine established in 1959-1964 in in Turek, a medium-sized city near Konin. In August 2020, the mine's management board decided to close the mine by the end of 2020. The post-mining area is planned to be used for investment in renewable energy sources, including a photovoltaic farm.

The mining area covers several counties and several municipalities. Lignite extracted in mentioned mines (KWB Konin, KWB Adamów), consisting of twelve open pits (Morzystaw, Niestusz, Gostawice, Pątnów, Kazimierz, Józwin, Lubstów, Drzewce, Tomisławice, Adamów, Koźmin, Władysławów) was primarily used to power nearby coal-fired power plants. Although the fossil fuel industry has largely determined the economic development of the city and its surroundings, the excavation works had a major impact on groundwater resources across the region. While local environmental organizations have observed a significant drop in water



levels in the nearby lakes, farmers have protested against the company due to the crop damage caused by insufficient groundwater levels.

Polish lignite utility ZE PAK says it will shut all of its Polish lignite plants by 2030, making it the first fossil fuel company in the country to commit to a coal plant exit in this decade. The company is currently implementing a number of reclamation projects, including water filling of closed pits.

### 3.2.3. Basilicata (Italy)

Basilicata has three major oil and gas fields: Val d'Agri, Tempa Rossa and Val Basento. The first productive drilling started in Val Basento in the late 1950s. The main operating companies are: ENI, Total, Shell, Mitsui, Energean, Gas Plus, Rockhopper. Today the Val d'Agri field is covered by mining agreements until 2029 and which will most likely be renewed after 2029 but it is not known for how long, because the estimate of the field has never been disclosed. Eni is the main player with Shell a minority partner. Tempa Rossa will produce until 2068, Total major operator with Mitsui backing. In Val Basento, on the other hand, production is coming to an end, main operator is ENI. Today's production is about 85 thousand barrel days of oil, more than 3 million cubic meters per day of gas, and more than 200 tons per day of LPG.

The extraction activities were initially presented to local communities as an opportunity for development, modernization and enrichment for the territory and its inhabitants. Much propaganda on the alleged advantages, and little information on the impacts and backwardness of the publicly owned environmental control system. Between 2000 and 2016, before large-scale production began in Tempa Rossa, only the problems came to the fore in the local and national media: judicial investigations into corruption in the contracts for the construction of the Tempa Rossa oil centre, and the services journalists on the pollution of groundwater and the food chain, the problems of coexistence between agriculture and oil. Then came the ordinances banning the use of underground water, which are still pending today.



Today the population is divided between those who earn from oil activity and also accept the negative repercussions, and those who complain of isolation and marginalization, without economic repercussions and without the possibility of criticizing so as not to lose the prospect of having something, or fear of being completely excluded from the social life of the country.

The mining sector is seen as a cursed wealth: it brings a lot to a few, it brings something to many, it brings problems and anxieties to many. Even obvious damage is accepted, it is considered the strongest and most incisive oil company in the state.

Given that the interviewees know the names of both those who extract and the bodies responsible for public controls, they know the general functioning of hydrocarbon extraction and the services they require. 12 out of 13 interviewees wrote that they did not consider public controls independent of the economic needs of the oil sector, therefore showing conviction and not doubt, that the ongoing imperative is to extract, and that any environmental problems, even serious ones, must not stop production.

Most of the participants in the focus group are aware that from the extractions, in addition to the blackmail of employment in a depressed area, also comes the blackmail of royalties, without which the budget of the region and municipalities would not be closed. From the focus group, regret and self-awareness emerged in the fact that despite having been aware for some time of all these flaws in the control system, and aware that oil polluted a lot, there are no local associations in the area that deal exclusively with this, that is, documenting and combating pollution, proof of the state of profound subjugation of the local population, who when they report it, do so only anonymously or by contacting associations outside the area.

Asked whether institutions or oil companies have more power, participants also gave uniform answers, with an imbalance toward a clear assessment, namely that



institutions are at the service of oil companies. Consistent with the rest of responses, the participants in the focus group confirmed that there is no public debate where the negative aspects of oil can be discussed between opposing groups, indeed everyone only speaks well of it and this has quelled further attempts at criticism. Thanks to poor education, widespread poverty, politicians who are only waiting for royalties to implement their projects.

Several local citizens complain about the social divisions brought about by oil, in places where previously politics was a long-term human and friendly relationship, today oil has dug social furrows, unleashing a race for personal well-being. There are no spaces or moments for public discussion between citizens, institutions and companies; in the last 10 years one has been organized in 2024, during which numerous traders and small entrepreneurs have publicly complained about the total lack of respect on the part of the companies towards their needs, even threatening mass relocation and business closures<sup>1</sup>.

When asked about the status of public health and the environment (does the inspection system work?, does it inform or censor detected problems?, is health being overlooked as an aspect?), participants have said that agreed that if the inspection system finds positives does not publish them, public inspectors talk much more with oil companies than with local communities. Sometimes the measuring equipment is donated by the company to the public controller. The health impact of pollution is the great absentee, and it is at a more backward state than public environmental controls. The polluted area health monitoring project, called LUCAS, has yet to actually get off the ground, unlike the impacts it aims to measure, some of which started in the 1980s<sup>2</sup>. Oil royalties were supposed to improve the local health service, which instead is at a standstill, indeed regressing. There is a widespread perception that the health impacts are the most censored, and especially the increase in cancers could be a sentinel factor, in addition to the goat and sheep deaths, and the deformities spotted by some local ranchers.

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<sup>1</sup> <https://www.youtube.com/watch?v=TKYMFPw10ss>

<sup>2</sup> <https://www.regione.basilicata.it/giunta/site/giunta/detail.jspotype=1012&id=3088410&value=regione>



When asked about rating royalty spending, the participants have shown more division. Some say that they could be more and spend better, and in any case they are a tangible compensation to their detriment, and without the municipal royalties, the situation would be even worse. Others say that they are insufficient, impalpable, and foment a blackmail relationship, a sort of fossil drug addiction, where oil becomes the new welfare. How can autonomous controls be carried out if social spending and productivity bonuses for public employees depend on royalties? Blackmail remains a constant for the focus group. Some members underline how a large part of the royalties are spent unproductively: organizing festivals, concerts, frequent road renovations, various festivals, religious events, and for example zero euros for environmental and health checks linked to environmental impacts<sup>3</sup>.

### **3.3. Are there any civil society organizations or citizen science initiatives related to combating environmental impacts from fossil fuel industries present in your locality?**

#### **3.3.1. Tarragona (Spain)**

In the Tarragona area, numerous environmental organizations are actively engaged in addressing the impacts of the petrochemical industry.

RepsolMata was one of the pioneering organizations in the region, initially raising awareness about the environmental impact of petrochemistry. GEPEC-edC is an ecological organization that has a history of denouncing illegal chemical spills in the Francolí river, unsafe transportation of hazardous materials via railways, and toxic emissions into the atmosphere.

Enginyers Sense Fronteres and La Canonja-3 have also been vocal in denouncing environmental abuses and associated health issues related to the industry. Plataforma Cel Net has spearheaded environmental studies on contaminants in

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[https://www.tuttoh24.info/totalenergies-ritornano-i-bus-del-mare-dall8-luglio-al-31-agosto/?fbclid=IwZXh0bgNhZW0CMTEAAR2MMQag2\\_GB3s8HGtJVMpycQ7v--I3GYXCLdnXPMzaCctsbyqk3OrprgOw\\_aem\\_H30uT519PK5g1ZMWI-wo7Q](https://www.tuttoh24.info/totalenergies-ritornano-i-bus-del-mare-dall8-luglio-al-31-agosto/?fbclid=IwZXh0bgNhZW0CMTEAAR2MMQag2_GB3s8HGtJVMpycQ7v--I3GYXCLdnXPMzaCctsbyqk3OrprgOw_aem_H30uT519PK5g1ZMWI-wo7Q)



the Tarragona atmosphere, aiming to regulate those not covered by current legislation.

Good Karma Projects has been actively documenting and investigating the presence of plastic pellets on Tarragona beaches since 2018 through its MEDPELLETS project<sup>4</sup>. Respective websites: RepsolMata<sup>5</sup>, GEPEC-edC<sup>6</sup>, Enginyeria Sense Fronteres<sup>7</sup>, La Canonja 3<sup>8</sup>, Plataforma Cel Net<sup>9</sup>, Good Karma Projects<sup>10</sup>.

Cel Net has been instrumental in promoting independent air quality studies since 2014, collaborating with the LCMA of the UPC and local municipal councils. This led to citizen initiatives such as 'Something smells bad,' 'Do you know what you breathe?' and 'You breathe it too,' aimed at collecting real data on the compounds present in the petrochemical industrial area, educating the public, and advocating for new regulations. These studies revealed high levels of carcinogenic compounds like Benzene, 1-3 Butadiene, Benzo(a)pyrene, and ethylene oxide.

As a result of these efforts, the Catalan Parliament unanimously approved the creation of the Territorial Air Quality Board in 2015. However, challenges remain as many pollutants emitted by the petrochemical industry are not yet regulated. In 2023, another motion addressing air quality in Tarragona was approved, calling for increased monitoring points and the inclusion of 1,3-butadiene analysis. Cel Net's current objective is to advocate for new regulations encompassing carcinogenic pollutants like 1,3-butadiene and ethylene oxide that are currently unregulated.

Although the presence of plastic pellets along the coastline near Tarragona's petrochemical complex has long been acknowledged, a significant increase in

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<sup>4</sup><https://www.programapleamar.es/proyectos/medpellets-estado-y-dinamicas-de-contaminacion-por-pellets-en-el-mediterraneo-occidental>

<sup>5</sup><https://www.ecologistasenaccion.org/2509/repso-mata/>

<sup>6</sup><https://gepec.cat/>

<sup>7</sup><https://esf-cat.org/>

<sup>8</sup><https://esf-cat.org/>

<sup>9</sup><https://www.celnet.cat/>

<sup>10</sup><https://goodkarmaprojects.org/>



pellet arrivals in 2018 prompted Good Karma Projects, in collaboration with Surfrider Foundation Europe, to commence monitoring the beaches of Tarragona. With the petrochemical complex churning out 2 million tons of plastic pellets annually, Good Karma recognized the necessity to pinpoint the source of the pellets washing up on local shores. They partnered with the University of Barcelona to develop a scientific methodology for monitoring.

Their initial findings, presented at the National Congress of the Environment in Madrid, catalyzed political attention to the issue. A project funded by the Biodiversity Foundation enabled the analysis of 1600 plastic pellet samples collected from Mediterranean beaches to determine their polymer composition. Subsequently, in 2023, these findings were presented at the European Parliament<sup>11</sup>.

### 3.3.2. Konin (Poland)

Despite the high awareness of the negative impact of the fossil fuel industry and lignite mining on the environment, interviews show that the Konin area lacks a resilient citizen science and monitoring movement. However, there are four main non-governmental organizations that are engaged (either secondary or primarily) in confronting energy companies with the negative impact of their activities on the environment.

Stowarzyszenie Ekologiczne Eko-Przyjezierze<sup>12</sup> is a local environmental association which main mission is to protect of the environment, save the forests and lakes of the Gniezno lakeside area, promote sustainable development, support and creation of local social and local government initiatives based on pro-ecological activities and to support of social ecological activity of citizens. The main reason for the establishment of the association was the desire to officially legitimize its members' efforts to protect Ostrowskie Lake and the Gniezno Lake District. For several years, they have been struggling with the drastic lowering of

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<sup>11</sup> Websites for citizen science initiatives monitoring the impact of petrochemistry: <https://www.celnet.cat/saps-que-respires.html>, <https://goodkarmaprojects.org/mediterraneamente-plastico-2/?lang=en>, <https://goodkarmaprojects.org/mediterraneamente-plastico-2/interactive-map-of-the-presence-of-plastic-pellets-in-the-environment/?lang=en>

<sup>12</sup> <http://www.przyjezierze.org/>





water levels in lakes located near the Konin Lignite Mine. The association fulfills its objectives, among other things, by: assistance in organizing meetings for environmental protection, organizing meetings on pro-ecological and educational topics in schools and educational centres for children and young people, conducting informational, promotional, educational activities, exchange of information, knowledge and experience between ecological organizations, organizing cyclic bicycle rallies in the area of the Gniezno Lake District associated with the promotion of pro-ecological attitudes and behaviour, acquiring funds to finance pro-environmental projects undertaken by the association, cooperation with Polish and foreign non-governmental organizations of the same or similar pro-ecological character, supporting the knowledge and experience of people with scientific resources in cases when this assistance is needed to achieve the statutory objectives of the association.

The Foundation Rozwój TAK – Odkrywki NIE<sup>13</sup> (Development YES – Open-Pit Mines NO, RT-ON) is a nationwide civil society grassroots movement to prevent plans to build new lignite open-pit mines and supporting the transformation of the Polish economy from the one based on fossil fuels to a resource-efficient and new renewables-based one. Established in 2015, the foundation unites „anti-open-pit mines” associations, local authorities from threatened areas and non-governmental organizations oriented towards the environment. Foundation headquarters are located in the city of Legnica in south-west of Poland. The leaders of the organization have many years of experience working in the local government, business and NGO-s. They organized a successful referendum against an open-cast mine near Legnica and Lubin, as well as written and submitted a numerous petition against the fossil fuel industry. The most important task of the Foundation is to support the activities of the civil society aimed at stopping plans to build new opencast lignite mines in Poland, including assistance to non-governmental organizations, associations, ordinary residents opposing the construction of quarries fighting the negative effects of the operation of existing ones and promoting the development of energy systems based on renewable

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<sup>13</sup> <https://rt-on.pl/en/>





energy sources, energy efficiency and local self-sufficiency. Their goal is to protect and preserve the environment and the natural conditions of human life, improve the health and environmental education of the communities living next to existing or planned open-pit mines. The foundation members try to promote the sustainable development of civil society based on social dialogue and strengthened democracy. The group strive to help those who have suffered as a result of existing mines and natural disasters and to support initiatives to limit the negative effects of mineral exploitation on the environment and on physical and social infrastructure as well as maintaining and cultivating national and local heritage and culture. The foundation also intends to promote universal values of tolerance, equality, freedom of expression, as well as respect for human rights and the civil liberties of ordinary citizens opposing the construction of quarries. The organization is currently heavily involved in a conflict with PGE Polska Grupa Energetyczna S.A. - the largest, state-owned public power company in Poland that manages the massive Turów mine in southwestern Poland, the largest open-pit mine in the country.

Greenpeace is a well-known international non-governmental organization working to protect the environment. In the context of the fossil fuel industry, the Polish branch of Greenpeace is working to end the production of "dirty" energy. Its members oppose big oil companies, seek support for citizen-generated renewable energy and to hold energy sector companies accountable for their negative impact on the environment and people's lives. The organization is also working to end support for the fossil fuel industry by banks and insurers. At this very moment Greenpeace is collecting signatures for a petition demanding urgent action to phase out the burning of fossil fuels in Poland (coal by 2030 and then natural gas by 2035)<sup>14</sup>. Regarding fossil fuels, the organization is demanding a reduction in the permissible limits for chloride and sulfate concentrations (which are responsible for high salinity) in wastewater discharged by mines into rivers, an inspection of water permits issued to mining companies, immediate environmental impact assessments of coal mines, the introduction by mining companies of

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<sup>14</sup> <https://dzialaj.greenpeace.pl/chronmy-klimat>



modern methods for desalinating mine water that is discharged into rivers, and the elimination of the legal chaos in wastewater and water regulations that contributes to the current situation. Although in the early 2000s the organization did not get involved in local attempts to fight the fossil fuel industry, a few years later it publicized the problem and personally participated in protests against the mine. Greenpeace, together with chemical scientists, sampled wastewater discharged by selected Polish coal mines that received one-time license extensions without environmental impact assessments. The researchers measured the basic salinity parameter, i.e. specific electrolytic conductivity at 20 degrees Celsius, in the waters pumped out of the mines (before they entered the rivers), and then forwarded the samples to an accredited laboratory, which determined the chloride and sulfate content. Similar measurements of specific conductivity were made for rivers into which mines discharge water from dewatering. The results turned out to be alarming. Water pumped out of mines and discharged into rivers in the Oder and Vistula basins is concentrated brine. Greenpeace scientists have studied the Oder River practically from its source in the Czech Republic and Poland. In the entire Czech section (about 100 km), the Oder meets the requirements in terms of salinity. In Poland, however, at the level of Upper Silesia, in the area of Kędzierzyn-Koźle (80 km from the Czech-Polish border), the Oder's waters are already out-of-class.

On May 14, a representative of the Ecological Association EKO-UNIA (based in Wrocław) spoke at the opening conference of the "Job after coal" project in Konin. She asked a question about the accessibility of the project's solutions not only for male employees of the mine, but also for their wives – women who are not directly employed in the company, but who also depend on its operation. The association has been implementing environmental and social projects in accordance with the principle of sustainable development since 1994. Its activities are local, national and international in scope. They protect biodiversity and conduct active conservation through various projects aimed at preserving disappearing ecosystems, sustainable development of rural areas, promoting the protection of the natural environment of the Baltic Sea and helping citizens through conducting environmental interventions as well as helping local communities obtain



information and legal advice on investments that threaten the natural environment. EKO-UNIA association supports the citizen's right to co-determine the location of open-pit mines, wind farms, coal and nuclear power plants. They provide environmental education and promote climate protection activities like building renewable energy sources in place of large coal and nuclear power plants. What's more, the association assists in expert reports, opinions and assessments of the environmental impact of investments. In the context of fossil fuels, they supported the execution of the environmental report on the impact of the planned open-pit mine in the Legnica region.

### 3.3.3. Basilicata (Italy)

The COVA Contro is the only association that carries out citizen science actions in Basilicata. The other associations are limited to press releases or posting photos and documents on social profiles, sporadically we share public or legal initiatives. The other existing associations are either composed of very small nuclei of people, no more than 2/3, or are in the form of committees so without even a membership fee or membership card.

The main association active in Basilicata in combating fossil mining, before the birth of Cova Contro in 2013, was OLA - Organizzazione Lucana Ambientalista, active as early as 2006, a historical memory of the first regional mining phase, an organization with more than 10 members, which ran an important informative website, which has now disappeared, organized public events and collected documentation of various kinds. The association closed in 2016, because it was included by the Italian Ministry of the Interior in the report on public order, on a par with subversive and criminal associations<sup>15</sup>.

To date, the active entities that have a website or facebook page are Movimento Tutela Val Basento<sup>16</sup> and Osservatorio Popolare Val d'Agri<sup>17</sup>.

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<sup>15</sup> <https://covacontro.org/non-dimentichiamoci-della-ola-organizzazione-lucana-ambientalista/>

<sup>16</sup> <http://movimentovalbasento.altervista.org/>

<sup>17</sup> [https://www.facebook.com/osservatoriopopolarevaldagri/?locale=it\\_IT](https://www.facebook.com/osservatoriopopolarevaldagri/?locale=it_IT)



Other realities are composed of individual activists or pairs of activists not even formed into associations, or in associations composed of less than 5/10 people who do not even have a website or social page and use the profiles of individual activists to communicate:

- Mediterraneo No Triv<sup>18</sup>
- No Scorie Trisaia<sup>19</sup>
- Ehpa / Liberiamo la Basilicata<sup>20</sup>
- Coordinamento No Triv<sup>21</sup>

When asked about one's perception of the oil issue, general negative opinion emerged, although in some cases there was no lack of self-criticism. That is, oil is more of a problem than a resource but this affair has demonstrated the lack of civic sense on the part of communities that suffer or are sold off, therefore in the face of all the obvious problems and anomalies no movements against extraction have been formed, nor associations that organized citizen science initiatives or bottom-up and participatory controls on site. The only initiatives in this sense have come from outside. From 2015 to today COVA Contro has organized sampling, reconnaissance and detection of pollutants with its own equipment, and in one case the NGO CATF - Clean Air task Force measured the emissions of the local oil center in 2021.

- <https://www.youtube.com/watch?v=nEXjSB5dFcc>
- [https://www.youtube.com/watch?v=QFo7pWthVYg&list=PLjnMKoEU1Y\\_Hv8cFE4J8B8rKQ-dV3KDtO](https://www.youtube.com/watch?v=QFo7pWthVYg&list=PLjnMKoEU1Y_Hv8cFE4J8B8rKQ-dV3KDtO)
- <https://covacontro.org/affioramenti-contaminati-da-metalli-pesanti-a-tempa-rossa/>

### 3.4. Have there been any notable socio-environmental movements related to fossil fuel industries in your region?

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<sup>18</sup> <https://www.facebook.com/profile.php?id=100069433293106>

<sup>19</sup> <https://www.facebook.com/felice.santarcangelo>

<sup>20</sup> <https://www.facebook.com/liberiamolabasilicata> - <https://www.facebook.com/profile.php?id=100064884090308>

<sup>21</sup> <https://www.facebook.com/profile.php?id=100064704698055>



### 3.4.1. Tarragona (Spain)

Over the years, there have been several notable socio-environmental movements and demonstrations against the petrochemical industry in the region, typically involving dozens of people. However, the largest and most prominent demonstration to date occurred on January 15, 2020, in Tarragona. This demonstration was prompted by the tragic accident at the IQOXE company, which resulted in three fatalities. Approximately 3,000 people participated in this demonstration, demanding increased safety measures in the chemical industry.

Additionally, Good Karma Projects has mobilized around 200 people for various sampling campaigns focused on microplastics in Tarragona beaches. These initiatives reflect the growing concern and active engagement of local communities in addressing environmental issues related to the fossil fuel industry. In 2021, more than 700,000 plastic pellets were collected. By 2022, 1,835,000 pellets were collected in just 1.5 hours.

### 3.4.2. Konin (Poland)

According to a representative of the EKO-Przyjezierze environmental association, the group's members have organized dozens of protests against the KWB Konin mine since the association establishment. The first protest, even before the association was founded, was organized in 2004. At that time a group of citizens blocked two national roads. In 2007, the same people organized a protest about low water levels in the Goslawskie, Budzislawskie, Kownackie and Suszewskie lakes. Although one of the association's member asked officials at all levels of local politics and other non-governmental organizations to intervene, he was met with a lack of understanding. *I even wrote to Greenpeace I remember, in respond they told me to inform then some local social organization to help me. They didn't realize what was going on here either he said.* In 2007, the association organized a protest against the construction of an open pit in Tomislawice, which was attended by 5,000 people. According to what an interview participant said, it was the largest environmental protest in Poland at the time:



*And that's when Greenpeace and other organizations showed up, including the current RT-ON Foundation. They came all the way from all over Poland. Everyone heard what a threat open-pit mines are. But that doesn't mean that the Tomislawice open-pit was not created, because it was.*

The EKO-Przyjezierze association also protested repeatedly in Kleczew, in front of the headquarters of KWB Konin, took part in nationwide protests in Warsaw and also several times abroad, including solidarity protests in Germany. The most significant were protests organized in places where more open pits were planned. *Wherever any mine of Poland was to be built - we were there.*

A similar commitment is held by the RT-ON foundation, which has repeatedly organized protests against the construction of new open pits, including in the vicinity of Konin (including in Ościstowo and Kleczew). Photo documentation of the protests can be found on the foundation's website<sup>22</sup>.

Protests by pro-environmental organizations were answered by the miners community, which demonstrated concerns about their employment. The largest counter-protest of miners was organized in Konin around 2010. Hundreds of miners took to the street and protested against the closure of the mine and environmental associations. The slogans they proclaimed referred to the mining character of the region, mining cultural heritage, tradition and work that is the source of livelihood for a large part of the local community.

The last 15 years have also seen a growing bottom-up protest movement, especially targeted at the planned open-pit mines. The leaders of the protest represent environmental organizations together with farmers and tourist operators organized around local lakes, two groups affected by the decreasing level of groundwater. With the help of established environmental NGOs, they started a legal battle with the coal company, using the post-accession EU law on the Natura2000 areas and the environmental impact assessment, and managed to

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<sup>22</sup> <https://rt-on.pl/fundacja/galeria>



significantly limit the pace of extraction. The local public authorities, confronted with the uncertain future of lignite due to a foreseeable exhaustion of the deposits, and increasingly stringent EU climate regulations, have recently decided to join the discussion about the post-carbon future. Over the last years the region hosted the Polish Climate Camp, fostering the emergence of a nation-wide climate movement. Last year, the Territorial Just Transition Plan for Eastern Wielkopolska (Konin) was accepted by the European Commission which means that new funds will be allocated to this region and a wide range of transition projects will be carried out.

### 3.4.3. Basilicata (Italy)

There is a large silent majority in support of fossil fuel, which is why the struggle against fossil fuel has always over the decades been entrusted to individual vanguards, more or less numerous, which in rare cases have led to extensive, demonstrative but episodic street movements. In some cases there have been protests to keep fossil infrastructure open. Unfortunately, these events have no online documentation that can be found. To date actively concerned with the environment in Basilicata, on the civic activism front, fewer than 50 people out of a population of over 500,000 are consistently concerned with it.

Cova Contro is the only association with a constantly updated website, activities on two socials, daily publications of local environmental content. We are the only ones with the economic capacity to organize citizen science actions, with more than 25 sentinels scattered throughout the territory and doing data collection in the field or on the web.

Very active, on the other hand, is the communication machine in support of the fossil supported transversally by everyone: region, municipalities, central government, trade associations ranging from industrialists to farmers/breeders, including the local church. Rarely there are episodic union grievances related to contractual and workplace safety issues, ever on the environment and related health impacts. We also have serious problems with schools: multinational oil



companies constantly enter schools, with programs and projects repeated over time; we are denied dialogue and feedback.

### **3.5. Is there an ongoing citizen science for environmental monitoring initiative related to combating environmental impacts from fossil fuel industries in your area?**

#### **3.5.1. Tarragona (Spain)**

The citizen science initiative for environmental monitoring in our area began in 2009 in response to recurring complaints of bad smells in towns surrounding the petrochemical area. Social movements collaborated with a specialized laboratory (LCA-UPC<sup>23</sup>) to conduct an environmental study of the air. Subsequently, additional air quality studies were funded by local governments to address several key questions:

- a) Identification of the main volatile organic compounds (VOCs) present in Tarragona's air.
- b) Identification of VOCs associated with bad odours.
- c) Determination of petrochemical or chemical companies responsible for pollution.
- d) Identification of toxic VOCs produced by the petrochemical industry not covered by current regulations.

Between 2009 and 2023, multiple studies were conducted, highlighting benzene, 1,3-butadiene, and ethylene oxide as the most significant VOCs requiring continuous monitoring and new regulatory measures.

Due to ongoing concerns about air quality near the petrochemical complex, the municipality of El Morell has installed air sensors specifically designed to detect 1,3-butadiene and monitor episodes of VOC pollution and elevated levels.

Since 2018, Good Karma has been monitoring the beaches in the Levantine-Balearic region to identify plastic pellets and ascertain whether they originate from

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<sup>23</sup> <https://lcma.upc.edu/ca>





the Tarragona petrochemical complex. The MEDPELLETS project, funded with €160,000 from European funds via the PLEAMAR program of the Biodiversity Foundation, aims to establish a knowledge base regarding the current state of plastic pellet pollution along the southern coast of Catalonia and northern Balearic Islands. Additionally, it seeks to gather evidence on the dynamics of this pollution to facilitate the development of more effective countermeasures preventing primary microplastics from reaching the sea. This citizen science project involves active participation from the local surfing community. A web platform for citizen engagement enables users to report the presence of pellets on beaches.

As for the air and soil pollutants or parameters being analysed are as follows:

- Identification of bad odours and their sources
- Analysis of 200 volatile organic compounds (VOCs), with notable pollutants including benzene, 1,3-butadiene, acetic acid, and ethylene oxide following the IQOXE chemical accident in 2020.
- Measurement of PM<sub>10</sub> (particulate matter with a diameter of 10 micrometers or less)
- Assessment of polycyclic aromatic hydrocarbons (PAHs), with significant pollutants including benzo(a)pyrene, benzo(a)anthracene, benzo(b+j)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene.  
(Reference: <https://www.celnet.cat/estudis.html>)
- Analysis of microplastics

Additionally, investigations conducted by the environmental prosecutor's office have addressed cases such as naphtha spills in groundwater and soil, as well as anti-foam spills into seawater.

All the methodologies used for air analysis are validated and published. Specifically, for the detection of 1,3-butadiene, the LCMA-UPC laboratory conducted a comparison between two methods: Radiello® passive samplers and 24-hour active air sampling using multi-sorbent bed tubes. LCMA-UPC demonstrated that Radiello® passive samplers are suitable for establishing



baseline 1,3-butadiene levels, while 24-hour active sampling using multi-sorbent bed tubes is advisable during significant pollution episodes. The method detection limit (MDL) for both sampling methodologies was determined to be 0.2 ng of 1,3-butadiene per sample (Gallego et al., 2018a,b).

When it comes to advantages and disadvantages of these monitoring tools, as well as their cost and accessibility, the interviews revealed that:

#### Advantages:

- Air studies provide detailed data on air quality and the presence of pollutants.
- The analytical equipment used, such as thermal desorption coupled with GC-MSD, is highly accurate and reliable.
- Interactive mapping technology for microplastics offers a clear and accessible visual representation of pollution.
- People potential.

#### Disadvantages:

- Costs: Air studies can be expensive, especially depending on the number of samples to analyse.
- Acquisition and maintenance of analytical equipment, like GC-MSD, can be prohibitively costly.
- Minimal technical knowledge. Expert team to interpret and validate all data.
- Opacity of the industrial procedures. Regarding microplastics, opacity to know the total amounts carried by trailers.
- Developing and maintaining interactive maps of microplastics requires a significant investment.
- Advanced age of most of the activists.
- Demoralization and demotivation of people over time
- Difficulties of take samples in the sea. Difficulties to know the real impact of the petrochemical sewage water to the marine ecosystem.
- Difficulty in the traceability of pollutants.



The cost of air studies varies depending on the number of samples to analyse, with sample analysis ranging between €500 and €700 depending on the number of samples. The price of the analytical equipment required for thermal desorption coupled with GC-MSD is approximately €150,000 to €200,000. As for the interactive microplastics map, its cost is estimated at around €15,000.

None of the mentioned citizen organizations have utilized do-it-yourself (DIY) monitoring tools. However, there have been other initiatives proposing the use of experimental tools such as the PurpleAir map<sup>24</sup>.

Following each study initiated by Cel Net, the findings are disseminated through their website<sup>25</sup>, public exhibitions, and coverage in print and TV media. Additionally, meetings are held with various local and regional governmental bodies to present the results, and regular dialogues are maintained with REPSOL. Utilizing the results of air studies, Cel Net has submitted two proposals to the Catalan Parliament aimed at enhancing the air monitoring system in the vicinity of the petrochemical area.

Educational materials have been developed for distribution in schools, including resources related to the TV documentary "ÉS A L'AIRE," co-produced by Catalan television and featuring Cel Net's involvement<sup>26</sup>. This documentary serves as a unique educational tool to raise awareness about air quality issues in Tarragona.

The success of Cel Net's initiatives in generating actionable data stems from collaborative efforts involving universities, local and regional governments, and engaged citizens.

Concerning air pollution, retrotrajectory systems based on mathematical models were utilised during the initial studies conducted by CelNet to identify the sources

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<sup>24</sup> <https://map.purpleair.com/1/MAQI/a10/p604800/cC0#11/41.1245/1.2319>

<sup>25</sup> <https://www.celnet.cat/estudis.html>

<sup>26</sup> <https://codoeducacio.com/activitats/esalaire/>



of odours affecting towns near the petrochemical area. Additionally, an analysis of volatile organic compounds (VOCs) associated with these odours was undertaken to assess their potential toxicity. This involved recruiting a significant number of volunteers to report instances of bad odours (including intensity, time, and location) and installing active air pump samplers in their homes to collect air samples each time an odour event occurred. However, recruiting enough volunteers posed a challenge for this initiative.

Regarding microplastic pollution, establishing traceability is challenging due to the opaque nature of the production systems employed by various companies.

### 3.5.2. Konin (Poland)

There is lack well-established movement of citizen science and environmental monitoring in the Konin region. If an organization carries out environmental monitoring for its own purposes, it usually do it without the use of advanced or semi-advanced technology or proper tools. Representatives of the EKO-Przyjezierze organization observed the ditches draining water from the power plant to the reservoirs, took a sample and assessed it through visual examination (siltation and water color):

*We don't have, how to say it, the ability to do some kind of chemical test, but it was an immediate signal that something was going on.*

Additionally, members of the organization observed the behavior of animal species, mostly birds, both those that fledged and those for which the conditions were suitable. They visually documented each observation with photos. At the association's request, two expert reports were prepared <https://www.cpn.edu.rs/en/programi/terrifica/> by scientists from Adam Mickiewicz University in Poznan. One concerned fish, amphibians and reptiles, the other heavy metals. Another organization performing similar expert reports was the Polish branch of Greenpeace.



*Since we don't have the money to do this, we outsourced to Greenpeace. I have an agreement signed with them and they helped us.*

In an interview, a participant also mentioned one person who is interested in slope stability and landslide risk:

*In our municipality there is a guy who monitors this. These landslides. I don't know if it's his job duty, but he drives around these landslides probably once every two years and inspects it visually.*

As mentioned, the company that owns the mines is ending mining near Konin and will flood the open pits as part of reclamation. Its planned methods, however, have raised concerns among NGOs, including the RT-ON Foundation and CEE Bankwatch. The giant holes in the ground left behind after the open pits have disrupted water relations in the region. According to these NGOs, poorly executed reclamation could cause new damage. The flooding of the Józwin IIB pit will lead to the creation of the largest lake in Greater Poland, which could affect the Warta River. A representative of CEE Bankwatch is also a member of a committee that monitors the proper spending of EU funds for the transformation in Eastern Greater Poland.

In the context of restoration and improvement of water quality in local lakes, interview participants suggested monitoring underwater changes, including the examination of phytoplankton, zooplankton, ichthyofauna and macrophytes. They also proposed monitoring water levels in household wells. In terms of potential tools, a conductivity meter, aquarium tests and strip tests for measuring water quality were mentioned. When it comes to advantages and disadvantages of these monitoring tools, as well as their cost and accessibility, the interviews showed that the easier to use and more affordable the tool, the more likely it is to be used by citizens.



### 3.5.3. Basilicata (Italy)

The only citizen science initiative well known to the public in Basilicata region is COVA Contro, which has been conducting environmental monitoring from below since 2015. It started by using social, posting photos of obvious environmental anomalies: soils of abnormal color and texture at the mouth of the Cavone River and the Basento River, drinking water checks. People of the initiative would post the photos or videos on social media and ask for funds from followers. The system took off, increasing year by year, they bought a geiger detector and started taking samples to testing laboratories on a monthly basis. They have always had two tracks of work: autonomous research, identifying the matrices or locations to be analyzed based on the data we have based on the total lack of public data on a given area, or responding to emergencies/reports/proposals that come in.

The bulk of COVA Contro activity to date focuses on: oil fields of Tempa Rossa, Val d'Agri, Val Basento, gas wells in Metapontino, Semataf and Ecobas landfills also in Basilicata. Civil and industrial sewage treatment plants, drinking water and spring controls, air quality and emission measurements using electrochemical sensors and Flir thermal imaging camera. The association has also been using some satellite imaging software for 4 years, and only in the area of remote sensing, they respond to reports or requests for support from outside the region and outside Italy.

When it comes to the number of sites, costs and funders, Cova Contro monitor about 100 sites a year, including continuous, spot and emergency monitoring. The average costs of citizen science alone, as of 2022, about 2 thousand euros per month including insurance and legal costs and without salaries but with pure volunteerism.

The organisation analyses pollutants like:

Air:

- Identification of bad odours and their sources
- Analysis of NHMC, H<sub>2</sub>S, NO<sub>2</sub>;



- Remote sensing for methane into the air column - <https://covacontro.org/a-stigliano-aumenta-la-presenza-di-metano-nella-colonna-daria-valori-quintuplicati-tra-il-2018-ed-il-2021/>

Soil:

- Analysis of hydrocarbons and heavy metals;

Water:

- Analysis of hydrocarbons, heavy metals and new contaminants such as DCPA and PFOS in drinking and underground waters;

In the context of detection limits Cova Contro not only do study the legal limits relevant to environmental surveys, but compare them with those of other nations or research organizations. They themselves ask public authorities to regulate some unregulated pollutants, and in some cases question the authorities about the legal limits for some pollutants when they are too high. Before purchasing sensors they inquire about limits and characteristics so that data are expressed in the best possible way, avoiding misunderstandings or legal implications.

When it comes to advantages and disadvantages: Real-time air quality meters cost 1,500 euros each, calibration every two years, electrochemical sensors not recognized by European standards but by American one.

Aerial and underwater drones with costs between 900 and 4000 euros. They are not easy to use and require permits and various insurances. They allow circumventing fences and other obstacles for viewing locations.

Flir thermal camera cost 127000 euros vat included. Requires specific preparation and allows viewing of emissions not visible to the human eye.

Copernicus open source/Envi remote sensing software. Software for satellite image acquisition and interpretation. Requires special training, high-performance computers, large space for data storage. Can identify sources and concentrations of pollutants both in the air column and on the body of water



There are DIYs but COVA Contro has never used them because they are not approved/accredited and therefore not recognizable as results at institutional tables or in legal disputes. Citizens are not against their use - in fact, they believe they can be useful in reducing the cost of analysis, but they must always be used in a way that is linked to approved instruments.

As for the methodology, citizens first study the available bibliography on the subject, documents from both scientific, technical or internal company sources, then institutional and judicial ones if available. They also try to dialogue with direct witnesses, former employees or subject matter experts free from conflicts of interest.

COVA Contro participants first carry out an analysis by exclusion, sketching out censuses on potential polluting sources. Now, with infrared technology, identifying the exact sources is much simpler, at least in the field of VOCs, benzene, methane, etc. In the case of water, soil/= or food contamination, if the source cannot be identified with certainty, residents are not only interested in finding the culprit. Since identifying the source exposes them to legal disputes, it is important for them to protect the citizen and the consumer, and therefore to photograph the environmental or food matrix. Association members are interested in raising the issue and putting pressure on institutions to investigate. Under the Italian legislative system, the source must be identified by public bodies or the judiciary. In some cases COVA Contro points out, but not specifically, the potential perpetrator.

In response to the question about any existing controversy about oil, Focus group participants were consistent with the previous responses, confirming that there is no public debate where the negative aspects of oil can be discussed between opposing groups. Indeed everyone only speaks well of it and this has quelled further attempts at criticism. Thanks to poor education, widespread poverty, politicians who are only waiting for royalties to implement their projects. A sore point is that even in local schools there is no debate on the subject, students only





come into contact with oil companies or those who work for them. There is no *par condicio* even in the public spaces of compulsory schooling. The local Catholic Church and labor unions are also silent on the matter, and are not refusing any sponsorship or contributions from the oil companies.

### 3.6. What valuable lessons have been gleaned from your involvement in any citizen science for environmental monitoring initiatives?

#### 3.6.1. Tarragona (Spain)

It is crucial to achieve changes in industry and governments, and for this, it is essential that citizen scientists collaborate closely with universities and subject matter experts. This entails collaboration among universities, local and regional governments, and citizens.

Also, it is very important to communicate and disseminate the information obtained from the citizen initiatives. Frequently both the authorities and the industry promote changes when they feel challenged.

#### 3.6.2. Konin (Poland)

Participants in the interviews expressed a strong need for water reclamation of post-mining areas. Low groundwater levels and declining water tables in lakes are a concern not only for environmental NGOs, but also for farmers and residents of the region who make their living from tourism. Municipal authorities also see water reclamation as a way to promote the region and a source of income from the tourism sector. The interviewees repeatedly emphasized the fundamental role of dialogue between NGOs, the local community, authorities and energy companies:

*This is the most important thing, to mutually flow of ideas. On the one hand the investor, who benefits from the environment, on the other hand the people, who point out how the mining process affects them. I think it cost us many years of*



*work to develop a good platform for discussion. Today I can say that we have succeeded, because this flow of information and cooperation between the investor and this local community, in my opinion, is correct and is going well, and can be a model for others. [...] All I can say is that years of work, sometimes harsh discussions, have led to a line of agreement and mutual understanding, and a desire to fix the situation as it is now.*

One participant also came up with the idea of setting up observation points, where a resident would come, scan a QR code, take a photo of the water or plants, and upload it to an app so that it would be possible to verify how the environment is returning to its original state.

### 3.6.3. Basilicata (Italy)

According to the participants, in the context of environmental justice it would be more effective to:

- press and not accuse public bodies;
- support the judiciary constantly over time and collaborate with the healthy parts of the institutions and not make the corrupt side of the institutions understand their point of view;
- engage in a dialogue and publicly denounce inefficiencies and corruption only in extreme cases;
- monitor water quality without beforehand announcement and carry it out sporadically, even on new or unexpected substances;
- always evaluate the context before intervening or publishing something, because sometimes environmental problems are reported for settling scores between different political factions in the field;
- create a network of informants, journalists, researchers, members of institutions and politicians/trade unionists to increase its communicative impact;
- take typically local problems out of context because activism is often inhibited by occupational blackmail and clientelism;



- film and record any risky actions to protect yourself legally;
- publicly report threats.

### 3.7. Have there been any discernible changes in the environmental impact of the fossil fuel industry following socio-environmental monitoring initiatives?

#### 3.7.1. Tarragona (Spain)

In the case study of Tarragona, over the past 15 years of citizen science initiatives focusing on air monitoring, several significant achievements have been observed:

- The industry, particularly REPSOL, has installed sensors in their facilities to monitor benzene diffuse leaks.
- The industry has established its own Tarragona Air Quality Group<sup>27</sup> to fund air quality analyses in various towns near the petrochemical area.
- The industry has demonstrated self-regulation, particularly during different monitoring campaigns.
- Two real-time sensors for total VOCs have been installed in two municipal facilities in El Morell. To ensure accessibility, the data from these sensors has been made available on the city council's website<sup>28</sup>.
- Catalan Parliament committed to increase the number of monitoring points around the petrochemical complex, as well as analyse 1,3butadiene.

When it comes to microplastic pollution, social initiatives that arose in 2018 have spurred heightened routine and surprise inspections of manufacturing companies by regulatory bodies. This has resulted in penalties and the initiation of proceedings for malpractice. Furthermore, Catalonia's proposed new waste legislation, currently awaiting approval, includes a groundbreaking section on plastic pellet management. If enacted, this would establish Catalonia as a pioneer in Europe in addressing this issue.

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<sup>27</sup> <https://www.icerda.org/observatori-aire-tarragona/>

<sup>28</sup> <https://elmorell.cat/ajuntament/compromis-amb-el-medi-ambient/>



### 3.7.2. Konin (Poland)

Civic engagement and activism have played a significant role in influencing environmental initiatives and decision-making processes in the Konin area. The interview highlights various instances in which local communities and organizations have been actively involved in promoting environmental issues. For example, there are references to protests organized by environmental activists, involvement in organizations such as Greenpeace, and the involvement of local leaders and young activists in discussions related to climate and environmental action. In addition, efforts to raise awareness of environmental issues, such as educating children about the importance of respecting the environment and the impact of human activity on natural ecosystems, are mentioned. Moreover, the discussion indicates that civic engagement has led to cooperation between local communities, environmental organizations and government authorities to address environmental challenges and promote sustainable development.

### 3.7.3. Basilicata (Italy)

The COVA Contro association's actions, complaints and analysis have led to:

- dozens of public ordinances prohibiting the use of underground drinking water in dozens of municipalities in the region;
- some mayors and public managers consult us for targeted consultancy in contaminated sites and environmental authorisations;
- part of the judiciary and law enforcement seeks our collaboration;
- after COVA Contro complaints, many polluting companies have either improved their procedures or invested in hiding/mitigating the impact;
- in some cases citizens work has forced the opening of environmental characterization proceedings, in one case for a value of over 600 thousand euros;
- COVA Contro reports have blocked coastal nourishment with contaminated sand;
- citizen have triggered judicial proceedings and seizures for numerous types of environmental crimes;



The main local bodies responsible for environmental protection still live in a situation of profound economic crisis and understaffing, as well as a lack of political autonomy. In fact, in some cases COVA Contro representatives replace themselves, while the community follows their advice despite not having legislative power.

### **3.8. What notable achievements or insights have emerged from your experiences and involvement?**

#### **3.8.1. Tarragona (Spain)**

Notable achievements that have emerged from these experiences and involvement include the recognition of the importance of collaboration among citizen scientists, universities, public administration, and companies to address and mitigate the impact of petrochemical industries. Additionally, emphasizing the necessity of engaging with property owners and conducting thorough studies before reporting any data has been identified as crucial. This comprehensive approach enhances the effectiveness of environmental monitoring initiatives and facilitates informed decision-making processes.

#### **3.8.2. Konin (Poland)**

According to the RT-ON Foundation, this, the strategy of biological reclamation of post-mining areas should result from scientific analyses that take into account the specific conditions of the area. Land reclamation should be carried out under the guidance of properly qualified experts in ecology, environmental biology or environmental protection. The experts should cooperate with the local community as well as foresters, farmers and institutions responsible for reclamation. Effects of such collaboration should be regularly monitored in order to adopt preventive actions, such as removal of invasive species. Participants in the session identified the most pressing needs and potential ways to monitor the environment, which are outlined above. It is also important for them to monitor whether water



reclamation in one region will adversely affect groundwater levels in another, neighbouring region<sup>29</sup>.

### 3.8.3. Basilicata (Italy)

COVA Contro association has anticipated the problem of the environmental disaster in Val d'Agri by denouncing years before the judiciary the illicit trafficking of oil waste and the dispersion of hydrocarbons up to Lake Pertusillo. The association denounced these problems alone in 2017, while local politics threatened and delegitimized their representatives. They have become data suppliers for numerous and prestigious scientific publications in various sectors: from environmental metagenomics to economic sociology. The association detect cases of pollution well in advance near gas wells which for decades had not received checks from public authorities.

## 4. Conclusion

All pilot sites differed not only in the type of industry and resource extracted, but also in: the level of civic involvement in environmental initiatives involving environmental monitoring; the type of relationship between residents, representatives and employees of energy companies and the local government; and the intensity and nature of the conflicts that arose between them.

The highest awareness of the negative impact of fossil fuel extraction on the environment and human life was at the Tarragona pilot site. There, project partners from the University of Barcelona identified the highest number of citizen science initiatives and environmental monitoring NGOs. In Basilicata, the most active organization, which is, as it were, the glue of engaged citizens, is COVA Contro. In Poland, on the other hand, despite the relatively high level of awareness of the

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<sup>29</sup> In latest interview a CEE Bankwatch member says that from an ecological point of view, the problem is not the filling of the pits, but the fact that the surrounding reservoirs are losing water because of them. But when the pumps are turned off, the problem begins to solve itself to some extent. <https://next.gazeta.pl/next/7,172392,30943566,chca-zalewac-odkrywke-woda-z-warty-nie-analizowano-wszystkich.html>



environmental impact of lignite mining, there has been no systematic, organized activity that can be described as a citizen science initiative.

However, it's not as if there is no one there committed to observing pollution indicators. Organizations such as the EKO Przyjezierze Association, Development YES - Opencast NO, Greepeace and EKO-Unia represent a large network of citizens worried about the environmental situation and the impact of open pit mines. However, their actions (petitions, protests) do not include the use of such tools, as is the case in the other pilot sites.

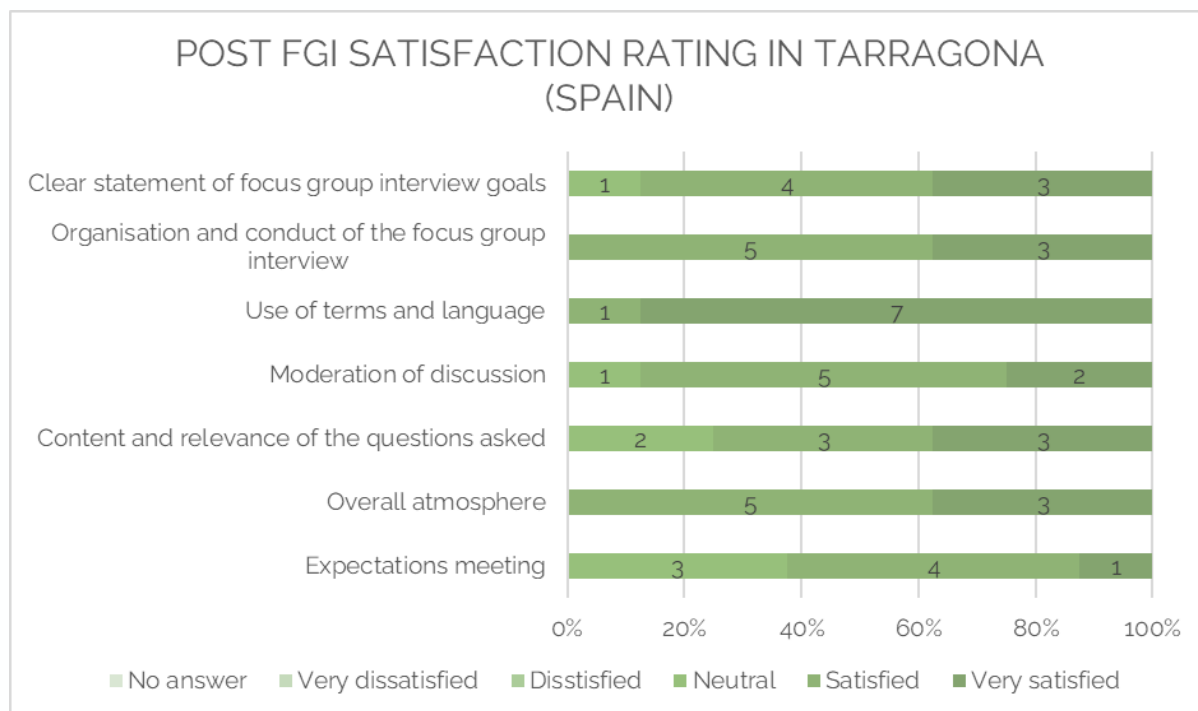
In Italy, on the other hand, the problem of conflict and strong tensions between the local community and the energy company resonates much more than in Spain and Poland. The COVA Contro organization not only monitors the environmental impact of oil extraction, but also engages in legal battles with energy giants. At a pilot site in Poland, which is currently included in the Fair Transformation Plan, mining companies are involved in reclamation activities and have reached a fruitful agreement with environmental organizations. Interviews conducted there showed that the greatest need of local residents is to observe and monitor restoration projects aimed at restoring or giving new meaning to the environment destroyed by the mines.

The interviews showed the project's potential to share knowledge and skills related to citizen science and environmental monitoring among partner countries. They also uncovered the local diversity of the pilot sites, from which the needs of citizens can be identified and the workshop offerings can be adjusted at later stages of the project.



## 5. Satisfaction rating

### 5.1. Tarragona (Spain)



**Chart 1.** Post focus group satisfaction rating conducted in Tarragona. Author: Gorka Muñoa (P2).

62.5% of interview participants positively assessed the meeting's compliance with their expectations (including 12.5% very positively). 37.5% described neutral in this context. 100% of participants were satisfied (of which 37.5% were very satisfied) with the overall atmosphere of the focus group. 75% of participants were satisfied (of which 37.5% were very satisfied) with the content and relevance of the questions asked by the moderator. 25% of the participants described neutral in this question. 87.5% of attendees rated the moderation of the discussion positively (of which 25% very positively). One person was neutral in this aspect. 100% of the participants positively (of which 87.5% very positively) evaluated the choice of words and the comprehensibility of the language used by the moderator. In the same way, also 100% of the participants assessed the conduct and organisation of the interviews (of which 37.5% very positively). 87.5% of the participants were satisfied (of which 37.5% were very satisfied) with the clear statement of goals





presented at the beginning of each meeting. In this regard, one person described themselves as neutral. **None of the attendees were dissatisfied or very dissatisfied with any aspect of the session.**

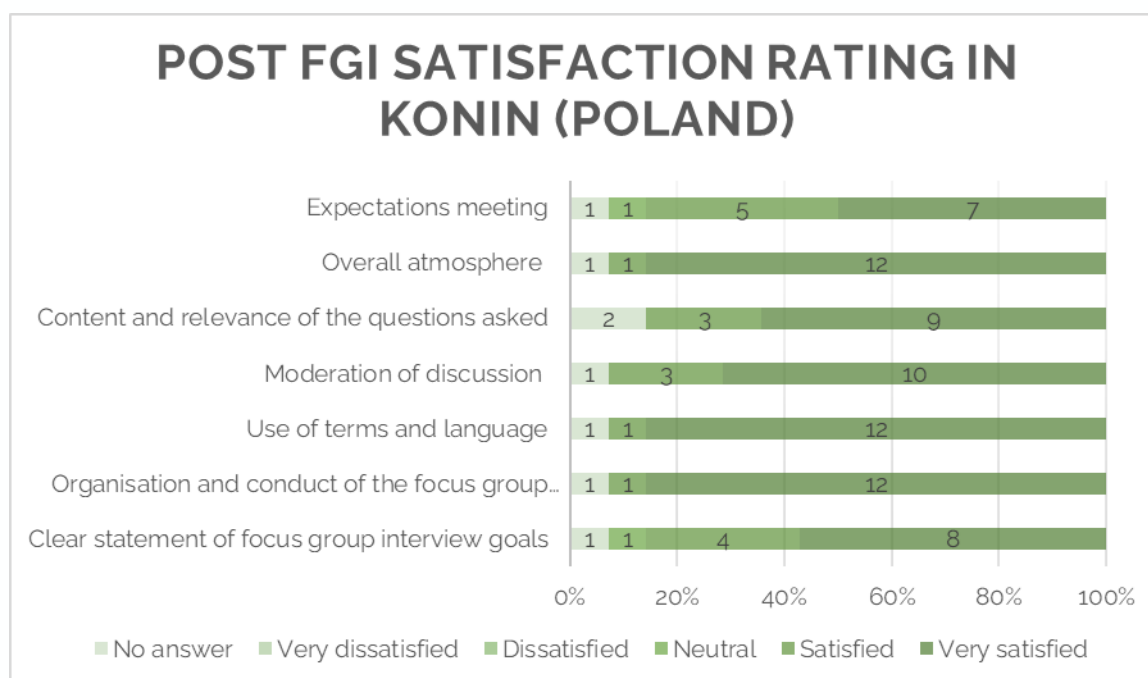
When asked about the new information they gained during the focus group, participants pointed to:

- the interest to find out of more organizations with similar environmental concerns, to be aware of unknown environmental problems from Tarragona related to petrochemical complex, as well as to meet new members of different environmental organizations from the region interested in the same problematic
- the knowledge of microplastics from petrochemistry around Mediterranean coasts.
- gaining new insights into the history of the fight against pollution caused by the petrochemical complex, as well as fresh perspectives on the issue.
- the interest to know new citizen science initiatives in Tarragona.

As missing or insufficient aspects of the session, the focus group participants identified the lacking of experiences in citizen science monitoring specially in the application of DIY sensors in the area. One member commented the concertation of technical issues.

Overall, focus group participants expressed their interest in the existence of an e-booklet of good practices in citizen science related to petrochemical industry. All of them were agree to continue working together on the project and their willingness to participate in the pilot workshop.

## 5.2. Konin (Poland)



**Chart 1.** Post focus group satisfaction rating conducted in Poland. Author: Karolina Dziubata-Smykowska (P4).

85,71% of interview participants positively assessed the meeting's compliance with their expectations (including 58,3% very positively). One person described themselves as neutral in this context. 85,7% of participants were satisfied (of which 92,3% were very satisfied) with the overall atmosphere of the focus group. 85,7% of participants were satisfied (of which 75% were very satisfied) with the content and relevance of the questions asked by the moderator. 92,8% of attendees rated the moderation of the discussion positively (of which 76,9% very positively). 92,8% of the participants positively (of which 92,3% very positively) evaluated the choice of words and the comprehensibility of the language used by the moderator. In the same way, participants assessed the conduct and organisation of the interviews. 85,7% of the participants were satisfied (of which 66,6% were very satisfied) with the clear statement of goals presented at the beginning of each meeting. In this regard, one person described themselves as neutral. Out of fourteen attendees one did not answer any question due to technical problems during the online session. One of the rests did not answer to a question regarding the content and relevance of the questions asked. **None of the attendees were dissatisfied or very dissatisfied with any aspect of the session.**



When asked about the new information they gained during the focus group, participants pointed to:

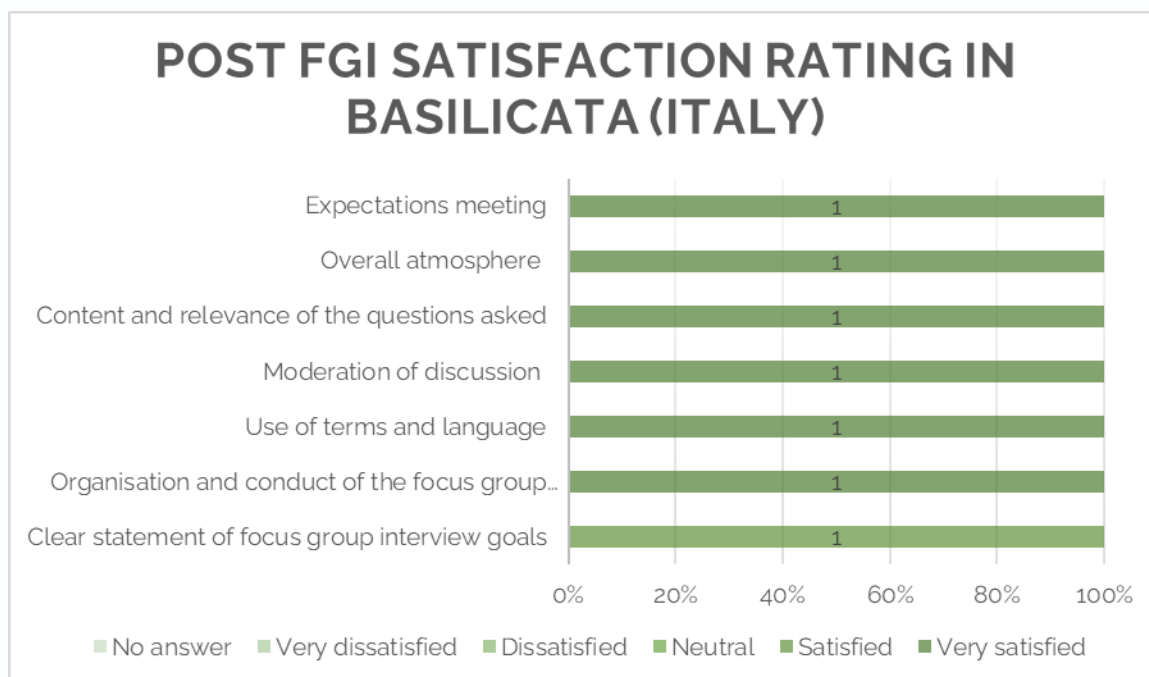
- environmental monitoring methods and tools (including the use of a thermal imaging camera and equipment to measure water levels and quality)
- the aims and objectives of the project, which they found very interesting and necessary
- reclamation of post-mining areas (including the possibility for animals to return to post-mining areas)
- risks of the fossil fuel industry
- examples of the negative impact of lignite mining on the environment (including problems with water levels in lakes)
- expectations of other people
- getting to know interesting people working locally for environmental protection
- information on similar problems in Poland and abroad
- how complicated is the process of implementing a certain topic in practice
- The difference in the understanding of seemingly clear issues among people

As missing or insufficient aspects of the session, the focus group participants identified the lack of presence of young people and more precise information on the tasks of the participants at further stages of the project.

Overall, focus group participants expressed their willingness to continue working together on the project and to participate in the pilot workshops. The attendees were very interested in learning more about the other pilot sites, especially in Basilicata. In fact, they identified information about COVA Contro activities, tools used and monitoring methods as one they would expect to find in a e-booklet of good practices and an e-learning platform.



### 5.3. Basilicata (Italy)



**Chart 1.** Post focus group satisfaction rating conducted in Basilicata. Author: Karolina Dziubata-Smykowska (P4).

A collective survey of the Basilicata interview shows that those who participated were very satisfied with the content, overall atmosphere, relevance of the questions asked, moderation, language and organisation of the session. They were satisfied with the statement of the focus group interview goals. In terms of missing topics that could have been discussed during the interview, Basilicata focus group participants stated that it would have been worthwhile to deepen the discussion about:

- impacts that vary by reference generation;
- the role of crime in the oil supply chain;
- the monetization of the effects, the compensation system and the inequality in justice between victims and multinational corporations;
- how residents see Tempa Rossa in 20 years
- corruption.

The opinions on the degree of satisfaction with the focus group questionnaire in Basilicata were all between satisfied and very satisfied.



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