GrEnFIn: Greening Energy Market and Finance

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WP2 - D2.3 - Report on the consultation-Survey's Report

With the support of the Erasmus+ Programme of the European Union

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Statistical Analysis of the Stakeholders Survey

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Project description

The development towards sustainability and resource efficiency of the Energy Sector is fundamental for meeting the EU2030 climate and energy targets and align the EU to the Paris Agreement. To support this process, training professionals in the energy sector as well as creating, supporting and developing a long-lasting network among energy providers, private companies and universities is crucial. In line with the key elements of the Innovation Union and the EU Higher Education Modernisation Agenda, the GrEnFIn Erasmus+/Knowledge Alliance project aims to provide the Energy Sector's stakeholders (energy providers, private companies, research institutes,…) the figure of the Sustainable Energy experts professional, i.e. European high skilled professionals capable to face the changing challenges in the field with an inclusive global logic. Its main expected results are the development of an innovative Joint Master Degree in the Green Energy and Finance targeting young students, but also a Professional Module to train companies' staff and experts already active in the labor market. GrEnFIn educational approach contributes to meet the European Commission High-Level Expert Group on Sustainable Finance's Final Report (January 2018) vision of sustainability and financial stability in Europe that highlights the importance of updating academic and professional curricula to increase financial literacy, and to provide corporate stakeholders with adequate education and training measures in sustainability.

On the one hand, the Joint Degree and the Professional Module will shape "high level professionals" that can blend technical issues on green energy and sustainable finance, quantitative analysis and topics in economic policy and business. The good professionals will be able to handles several issues concerning the green energy market, from production to distribution, as well as the knowledge of "green financial products" to foster a sustainability transformation of the energy sector. To this end, the role of companies in the GrEnFIn Alliance, as key market players, is crucial and structural in order to identify the specific needs and priorities of the job market and, consequently, to define the expected learning outcomes, the key competences and skills of the professional profile to be developed.

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Mapping the energy market

The starting point for this consultation is the mapping of the energy market that has been discussed at the November kick-off meeting in Bologna. The reason for this grounding is clear, i.e. that only a solid assessment of the characteristics of the market allows for a proper survey.

This section aims at classifying the different stakeholders in macro-groups, that will ultimately be the target recipients of the survey. For each stakeholder, the main risks related to the energy transition are briefly discussed.

At the highest level, four categories can be identified:

1. Financials;
2. Energy producers;
3. Industry;
4. Governments & other policymaking entities.

These actors play the different roles that build up the energy sector and they are the natural target for our survey and project.

We can break down each category at a deeper level, in order to identify sub-sectors and the main risks related to the energy transition. This disaggregation is necessary and instrumental for the survey, but the discussion in this report will be done at the macro-category level. Also, please note that the mapping is a starting point and hence it does not aim at being fully comprehensive of actors and related risks.

Financials

Financial companies cover different enabling and supporting roles in the energy sector: they ultimately provide capital, insurance, data, consultancy services, and support a well-sound management of energy companies. Also, the existence of the financial sector allows for better disclosure and, through capital allocation decision, can influence (or obstruct) macro-trends in the energy sector.

Financial actors that play a relevant role in the energy market can be identified in:

- Banks, providing capital either as loans or bonds (investment portfolios are discussed in a separate point). These actors bear risk related to the energy transition on the credit channel, as both existing and new projects are impacted at different levels (regulations, reputation, performance, stranded assets, etc.). These risks are applicable also for green projects, given the

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increasing competition, the constant threat of greenwashing, and unexpected environmental or social harm;

- Development banks, providing capital to private and public actors in developing countries. These actors have a significant role to play in the energy transition, as their policies reverberate through many economies. The main risk for them stems from the very projects they finance;
- Insurers and reinsurers, taking up risk from the energy sector. These actors face risks related to the extremes of the energy transition and climate change itself, being directly impacted by catastrophe risk, climate risk and, ultimately, default risk;
- Institutional investors, directing capital flows. There is a clear debate for these actors, i.e. whether being "green" (or, in general, sustainable), can be a source of alpha or not. Also, huge regulatory risk is not to be underestimated, giving the significant momentum that sustainability-related considerations are gaining within regulators and the investment community;
- Private investors have somewhat less chances to take part in the energy transition, aside from a growing but still limited set of financial products and, ultimately, consumer choices. Also, diversification benefits from sustainable investing have to be balanced against the increased complexity of the financial landscape. Private investors are not a target group of this survey.

What we would expect is for these stakeholders to be highly sensitive to regulation changes and highly interested in a blend of strong quantitative, core financials and sustainability / environmentally related skills. As we will see in the next Section, specific questions in the survey have been targeted at testing these hypotheses.

Energy Producers

Energy Producers ("Producers" from now onward) include extractive and mining companies, electricity companies, as well as related supporting businesses. This macro-category includes the "core" of the energy sector and is clearly the most impacted by the energy transition. Hence it includes stakeholders whose responses are going to be critical for the future development of the project.

We can classify companies according to their activities as:

- Producers of electricity from Renewables, including Solar, Wind, Biomass, etc. These actors are clearly in a more advantaged position when it comes to the transition per se, but issues related to grid integration, volumetric risk and regulatory impact should not be underestimated;
- Producers of electricity from non-renewable sources, including Oil, Gas, Coal. These actors are the most impacted from the transition as their core operations need to change in the future

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if the objectives of the Paris Agreement (here seen as a proxy for the transition) are to be achieved. Multiple risks are loaded on these actors, starting from the issues related to stranded assets and business transition (technical and financial challenges), continuing with regulation and reputational issues, and of course the need to shift to more sustainable production sources and more limited environmental impact (sustainability and environmental sciences);

- Commodity miners, that physically extracts Fossil Fuels and other related raw materials from the ground. They clearly bear the risks associated with the electricity producers as listed above, plus the additional risks related to the mining and extraction sites, including but not limited to environmental impacts, working conditions, decommissioning. Like the corresponding producers, they strongly need to handle the transition by a Sustainable and economically sound perspective.

We expect stakeholders in this group to be more interested in the technical challenges of the transition and its sustainability aspects, as well as the skills necessary to manage companies through strong storms.

Industry

The industrial sector covers the whole range of energy users, excluding household's consumption. The width of this sector and the high number of different business models active within it makes it challenging to perform a full assessment of interactions with the energy sector and risks stemming from the energy transition.

Nevertheless, parts of this sector are and will be highly impacted by the transition, and it is hence important to categorize and assess needs. For the purposes of this survey, we will classify industrial companies based on their energy intensity. Companies in the transportation sector are included within the Industrials category for the purpose of results discussion but are technically different from the other companies in the category.

Hence, we distinguish between:

- Energy intensive industries, which, for either production or raw materials needs, highly depend on fossil fuels and related commodities. Examples can be aluminium, steel, cement, chemicals, etc. Clear risks for them stem from regulation and, indirectly, from the trends on the producers' side. Also, the significant needs from these stakeholders impact decisions across the economy; we hence expect main issues to be related to Sustainability in general, regulation and new technologies;

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- Non-energy intensive industries, which cover the rest of the industrial sector. These companies are probably the least impacted by the energy transition, even if it's important to watch it closely for them as well. We expect these companies to be interested in the same skillset described above, although for slightly different reasons;
- The transport sector is responsible for roughly 20-25% of global carbon emissions and it is hence a huge target of the energy transition. Risks on this sector are numerous: carbon, public awareness, regulation, technology are probably the most important. Again, we would expect the skills relevant for these stakeholders to be the ones listed above.

Overall, we expect stakeholders to be interested in the technological and regulatory challenges of the transition, as well as Sustainability as a whole, but with different focuses (and actual risks) depending on the specific stakeholder group and industry sector.

Governments & other policymaking entities

Finally, Governments and supporting entities in policymaking are crucial players, as they have a strong influence on regulation and economic decisions. These entities include sovereign governments, international bodies, government-linked agencies, universities, research centres, think-tanks, NGOs, and in general all of those organization that rotate around the dimension of "policy".

The exposure for these entities is clearly various. Some are impacted on their funding, or demand for their services, or on their ability to meet customers' demands. It is clearly hard to come up with a comprehensive list.

Nevertheless, we expect these actors to be key players in the transition and hence they constitute a significant stakeholder group for the present survey. We expect the responses from this group to be somewhat different from the ones of others, in light of their unique features.

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Survey methodology, KPIs, data collection tools

Purpose of the survey

The main purpose of this survey is to provide a detailed assessment of the challenges and needs of the energy market in the current transitioning context. In order to do so, two main objectives have been pursued in the design phase:

1. The need to cover the whole market, i.e. obtaining a comprehensive assessment of the current and future situations for producers, consumers (industrial), financers and researchers;
2. The need to gather in-depth information across a broad range of topics, i.e. current and future needs, skills needed for an academic curriculum and for continuous learning.

Structure of the survey

To achieve these objectives, a 10-Sections, 46-Questions questionnaire has been designed by the Project team. The sections assessed are the following:

1. Respondent profile;
2. The energy transition – preparedness and challenges;
3. Employees' profile;
4. Hard skills;
5. Soft, transversal and managerial skills;
6. Global scope;
7. Assessing the gap between real world and Academia;
8. Closing the gap;
9. Professional module;
10. Further comments.

Where Sections 1 and 3 aim at understanding the profile of the consulted stakeholders; Section 2 aims at understanding the challenges that the energy transition has been imposing, and is expected to impose, on stakeholders; Sections 4 and 5 aim at gathering the information needed to develop the academic curriculum; Section 6 aims at understanding the ideal geographical reach of an energy project; Section 7 and 8 aim at understanding the depth of the gap between industry and Academia, its geographical profile, and how to close it; and Section 9 aims at gathering the information needed to develop the professional module.

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A further division by stakeholder macro-category has been implemented, in order to gather information covering the whole energy market. Specific questions in the questionnaire have been tailored to suit 6 different stakeholder groups, in order to achieve higher granularity; for this final report, although, a clearer approach has been chosen, aggregating the industrial sector in a single macro-category and hence having 4 different groups representing the energy sector as a whole.

These groups are the following:

- Energy producers;
- Industrial sector;
- Financial sector;
- Researchers and policy makers.

The questionnaires for each group have the same core set of questions, while a subset of questions is diversified by stakeholder group in order to gain a deeper granularity. Whenever a question has been analysed only for a subset of the whole sample, this is clearly stated in the discussion.

Structure of the survey – details

We will now discuss in details the questions in each section, highlighting the logic behind them and the structure. Where the question was different between stakeholders, the difference and the reasons behind it are discussed.

Section 1

The first set of questions, 1 to 6 or 7, is used to identify the respondent. The information gathered speak to:

1. The specific company activity (for example, for Financials we will distinguish between Banks, Exchanges, Insurers, etc.);
2. The type of organization, either Private, Public or State owned;
3. The size of the organization, either Small (1-49 employees), Medium (50-249) or Large (250+);
4. The home country;
5. The presence of international branches or subsidiaries;
6. The role of the respondent in the organization, either Accounting and finance team, Executive team, Operations and production team, Research and development team, Sales and Marketing. The “Others” option was provided for this question;

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7. For stakeholder categories not necessarily active in the energy market, i.e. Financials and Policymakers, a question regarding the type of involvement in the market was added. The answers to this specific question are not separately analysed in this report.

Section 2

This question set, further divided in two subsets, is used to assess the readiness for the energy transition and the perceived challenges. Section 2a discusses the past and present challenges, section 2b the future ones.

The current and past impact is assessed via the following questions:

8. Whether the company has been impacted by the energy transition, either now, in the past or both;
9. The business areas that have been impacted. This question is differentiated between stakeholder groups in order to assess challenges at a more granular level. For Financials, potential issues are focused on investment, credit, and other internal processes; for Producers and Industrials, on access to finance, investment and maintenance decisions about existing and new plants, implementation of new technologies, regulation; for Policymakers, on funding and demands for services;
10. The balance between challenges and opportunities so far, either skewed towards challenges / opportunities, or poised;
11. Whether a single professional figure able to deal with the challenges was available in the company or not, and if not, whether such a professional was available for hiring in the market;
12. If such figure was not available, which skills were missing and, if it was available, which were the weakest areas. This question is differentiated between stakeholder groups in order to assess needs at a more granular level, and follows the challenges categories highlighted in Question 9 above;
13. Thinking more generally and less in the context of the specific business activity, which skills were missing the most in the available workforce. Listed options includes Engineering, Finance, Economics & Business sciences, Law, Mathematics & Statistics, Physics, Natural & Environmental Sciences. The “Other” option is available to gather suggestions.

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Switching to section 2b, the aim changes and becomes understanding what the future challenges will be. The following questions points in the direction of understanding such challenges, the preparedness by the company, the availability of relevant professionals in the marketplace.

14. The expectations about the low-carbon economy itself. Taking as horizon the year 2030, respondents are asked whether the economy will be either carbon neutral, Paris aligned, significantly greener but not Paris aligned, greener but not significantly, or not greener;
15. Whether the expectations are for more challenges, more drawbacks, or an equal future balance of them;
16. Whether the company has a transition strategy in place, i.e. whether it is ready for the transition, working to get ready, not working to get ready or just not interested or not impacted;
17. The degree of exposure, looking at the issues listed in the Question 9 above, in a scale from 1 to 5. This question is differentiated to assess challenges at a more granular level, following the same scheme of Question 9;
18. The greatest risk by stakeholder category. The responses options here are wider and the aim is to pick the top risk area, while the previous question was more granular. Options speak, for Financials, to Conversion costs, Lack of investment opportunities, Lower demand, Regulation, Reputational risk, New technologies; for Producers, to Stranded assets & Conversion costs, Lack of funding, Lower demand, Regulatory intervention, New technologies & entrants, Phase out of subsidies, Reputational risks; for Industrials (separated in the questionnaires as Energy intensive, Non-energy intensive, Transportation), to Competition, Lack of funding, Lower demand, Conversion costs, Regulation, New technologies, Reputational risks; for Policymakers, to Competition, Demand, Funding, Regulatory intervention, Reputational risk. The option “Others” was provided for all categories;
19. Whether a single professional figure, able to deal with the challenges, is available in the market. If yes, whether widely of scarcely, if not, whether the Academia is preparing such a professional or not;
20. Whether the company is currently looking for a *Sustainable Energy Expert* as described above, and whether was able to find it in the marketplace.

Section 3

This question set assess the background of current employees. There are only two questions on this point, inquiring:

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21. The academic background of people working on energy within the company;
22. The educational level of people working on energy within the company.

Section 4

This question set is the core of the survey and aims at understanding what the most requested hard skills for a Sustainable energy expert are. It is structured on two levels:

23. A first question, constant across all stakeholders group, assess how important different subjects are (for example, Corporate Finance, Statistics or Environmental Science); the aim of this question is to understand which macro-topics should be covered by the curriculum;
24. A second set, composed of 2 or 3 additional questions, is stakeholder-dependent and aims at understanding the specific topics within certain subjects. The questions assessed are as follows, with the relevant reasoning:
    - For Financials, Financial subjects (such as Derivatives, Risk management, etc.), Economics subjects (Econometrics, Environmental economics, etc.), and IT skills (Advanced Excel, Python, MATLAB, etc.) are assessed. The logic is that these stakeholders are best positioned to assess what are the detailed financial and economics skills needed to understand the energy transition, and the IT tools they use are generally less product-specific than in other sectors. Financial and Economics skills are anyhow assessed, although less in details, for other groups;
    - For Producers, Economics and Financial subjects are assessed at a less granular level, to understand what kind of skills is most needed by this kind of players; mainly, what is most important between Corporate finance, Financial markets, Economics, Trading. Engineering subjects, regarding specific Green and Brown generation technology, are also assessed within this stakeholder group, given the fact that they are the ones actually dealing with the generation, and hence best positioned to understand which technologies are going to be more or less useful in the coming transition;
    - For Industrials, Economics and Financial subjects are assessed following the same reasoning of Producers; also, generation technologies and end-user technologies are discussed under the Engineering questions, using the same less granular approach;
    - For Policymakers, Economics and Financials subjects, as well as Engineering subjects, are assessed at the less granular level. Also, IT skills are assessed for this group following the same logic highlighted for Financials.

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Section 5

This question set is dedicated to the assessment of soft, managerial and transversal skills. The aim is twofold: one the one hand, understanding what are the most important soft skills in a curriculum such as the GrEnFIn's one; on the other, understanding what are the best methods to train soft skills, and how much time should be dedicated to them.

Specifically, the following is requested:

25. The importance of given soft, transversal and managerial skills, such as Adaptability, Communication, Creativity, Flexibility, etc.;
26. The amount of time of the academic curriculum that should be dedicated to the training of soft skills, out of a 40 hrs/week;
27. The relevance of specific initiatives for soft skills training, including Specific modules, Seminars, Guest Speeches, Projects. The "Other" option is left available to gather additional suggestions.

Section 6

These two questions are used to assess the geographical focus needed for the curriculum. While it is fundamental to keep a global focus when talking about energy, it is clear that some areas will be more important than others depending on the location, business scope, size, model or other factors. Hence, in this section is asked:

28. To rank world regions (Home country, Europe, Africa and Middles East, Asia Pacific, Latin America, US and Canada, Russia and Central Asia) from the most to least important;
29. To indicate the reach of the business, either Local, Country, Cross border, Continental or Global.

By looking at the two factors jointly, it is possible to identify most important regions and business-based patterns.

Section 7

This question set is dedicated to understanding the gap between Academia and Industry. It is often heard, especially in some countries, that Academia is not able to shape students as they are needed by companies, and in general that it is too theoretical.

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For the genuine success of the GrEnFIn project and curriculum, it is fundamental to keep a perspective of constant collaboration between Academia and industry, hence it is a cornerstone to understand the following:

30. Overall, whether the Academia is able to provide the talents needed by the industry – i.e. if ultimately, in a yes or no question, there is a gap;
31. What technical skills are lacking the most within graduates or are most likely to be below expectations. This question assesses the same subjects as in Question 23;
32. What soft, transversal and managerial skills are lacking the most within graduates or are most likely to be below expectation. This question assesses the same subjects as in Question 25;
33. Whether the gap is ultimately widest for Technical, Soft, Managerial or Transversal skills;
34. The limitations experienced by Academia, i.e. why it is not capable of preparing graduates up to the expectations. Proposed options include Excessive focus on theory, Lack of internships and collaboration with companies, Lack of practical case studies, Lack of good professors, Antiquate methods not fit to the modern world. The "Other" option is provided to gain additional insights;
35. Finally, as an open question, the main difficult encountered when hiring a graduate is requested.

Section 8

After assessing whether a gap is present and where it is most significant, the aim of this questions set is understanding how to close it. Specific initiatives are tested for importance and their feasibility is inquired.

36. Initiatives to close the gap are proposed and requested to be evaluated. Options include Internships, Company lectures, Company trainings & Intensive programmes, Thesis projects. The "Other" option is provided to gain additional suggestions;
37. Questions 38-39-40 discuss internships, understanding whether respondents would be open to host interns, how many, and for how long;
38. Question 41 assesses will to collaborate for lectures or intensive programmes;
39. Question 42 assesses will to participate in thesis projects;
40. Question 43 assesses whether, after a successful internship or thesis project, companies would be interested in hiring the graduate.

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Section 9

This question set discusses the Professional module and aims at understanding what topics and activities would be most important for companies. The following aspects are discussed:

41. What the most important topics for life-long learning are, including Latest geopolitical trends, New financial products, New models, New regulations, New technologies. The "Other" option is provided to gain additional insights;
42. What number of training days would be needed for employees to stay up to date;
43. What delivery method would be best for training, including In-company trainings, Intensive programmes, Weekend learning or Online learning. The "Other" option is provided to gain additional insights.

Section 10

This final section is provided to gather further comments on any part of the survey.

Dissemination methodology and process

The questionnaire was designed as an online tool. One questionnaire for each stakeholder group has been uploaded to the Project platform and shared with users. The platform has been deliberately left open to the public, in order to gather relevant inputs also from stakeholders not directly invited to collaborate.

The main dissemination channel has been the contact network of each partner, hence reached via email or other direct contact channels. Social media have also been used for the dissemination, although this choice makes it difficult to estimate a respondent rate.

KPI for survey evaluation

The success of the survey will be analysed in this report, together with the discussion of results. 4 KPIs (Key Performance Indicators) will be used to assess the performance, i.e.:

- Number of surveys collected and analysed (2.1)
- Number of countries covered by the survey (2.2)
- Distribution of organizations taking part in the survey by macro-category (2.3)
- Response rate of contacted stakeholder (2.4)

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Respondents' profiles

In this Section, we study the Profile of responding organizations. As mentioned in the Introduction, 4 different macro-categories of stakeholders have been targeted by the survey. The aim of the choice for the survey setup was to cover every part of the energy market, i.e. Producers, Consumers (Industrial), Financers and Researchers.

The respondent profile has been detailed at various level:

- Profile (within the macro-category);
- Ownership type;
- Size;
- Home country;
- Internationalization;
- Role of the responding person in the organization.

We will now present the results of the breakdown by respondent profile at the different levels. These will be used in the next sections also to analyse trends in the different responses.

Overall results

Overall, 198 questionnaires have been filled out. We will now show different breakdowns, as mentioned above. Before going forward, we want to highlight how this number speaks to the KPI **2.1**, the number of surveys collected and analysed; and **2.4** the response ratio.

Although absolute numbers alone have little meaning, we believe the reached number of responses is representative and satisfying, also after considering the coverage distribution. Furthermore, the extraordinary international circumstances of the past months have most likely had a significant negative impact on the number of stakeholders able to dedicate the necessary time to the survey.

For this reason, we believe the KPI 2.1 has been **achieved** with satisfactory results.

In addition, it is important to analyse the respondent rate as of KPI 2.4. The project contact database, as gathered by the Project coordinator, contains 461 references.

Of course, this is a lower bound and does not represent the effective number of stakeholders reached. While it is impossible to estimate the exact number of contacts reached, because of reasons related to privacy issues and the survey methodology itself, we can safely position an upper bound of contacted stakeholders at double the number of contacts in the database, i.e. 922 references.

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These bounds, actual and estimated, position the responding rate between 21.50% and 42.95%, which represent a satisfactory rate in the current global context.

For this reason, we believe the KPI 2.4 has been **achieved** with satisfactory results.

Profile

The organization profile variates at deeper levels than just the macro-category. A more granular breakdown, as collected in Section 1 of the survey, is provided in Table 1 below.

Macro category	Detailed category	Number of respondents
Financials	Asset manager	4
Financials	Central bank	2
Financials	Commercial Bank	4
Financials	Consultancy firm	7
Financials	Development bank	1
Financials	Energy Exchange	1
Financials	Full-service brokerage company	1
Financials	Insurance / Reinsurance company	3
Financials	Investment Bank	1
Financials	Other Financials	1
Financials	Pension fund	1
Financials	Private equity or venture capital fund	2
	Total Financials	**28**
Industrials	Automotive	1
Industrials	Construction and real estate	2
Industrials	Electronics	2
Industrials	Food and Beverages	1
Industrials	Logistic	2
Industrials	Other Industrial Manufacturing	6
Industrials	Refining and Petrochemical industry	3
Industrials	Shipping	2
Industrials	Software Development and Maintenance	4
Industrials	Steel, Glass, Aluminium	1
	Total Industrials	**24**

Macro category	Detailed category	Number of respondents
Policymakers	Consultancy firm (non-financial)	21
Policymakers	Energy Service Company	7
Policymakers	Government agency / body	14
Policymakers	NGO	6
Policymakers	Research centre / Think tank	14
Policymakers	University	22
	Total Policymakers	**84**
Producers	Commodities miners;	2
Producers	Electric utilities, mostly non-renewables	30
Producers	Electric utilities, mostly renewables	6
Producers	Electric utilities, non-renewables only;	3
Producers	Electric utilities, renewables only;	3
Producers	Energy agency	1
Producers	Energy distribution	1
Producers	Multiutility	12
Producers	Oil, Gas and Coal Providers;	2
Producers	Other Producers	2
	Total Producers	**62**

Table 1: Profile of respondents

As can be easily seen in the table, the most represented category is the one of the "Policymakers", covering Academia, non-financial consultancies, business support services, government agencies and NGOs; followed by Producers, classified by activity and, where specified, energy mix. Financials and Industrials still have a significant representation, although the numbers are lower given the more indirect participation of most of these stakeholders to the energy market.

This speaks to KPI 2.3, the distribution of respondent across different sectors. The main aim of this KPI is to ensure that the macro-categories are all represented in a meaningful way. Despite the clear skew towards Policymakers and Producers, the numbers for Financials and Industrials are not too low and hence don't compromise the results.

We hence believe that KPI 2.3 has been **achieved** with satisfactory results.

Ownership type

The second characteristic we assess for the whole respondent set is the ownership nature.

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We distinguish between Public, Private and State-Owned companies, as described in Figure 1 below. In the chart, companies labelled as "Others" pertain to categories such as Independent foundations, Central banks, or Non-Governmental organizations.

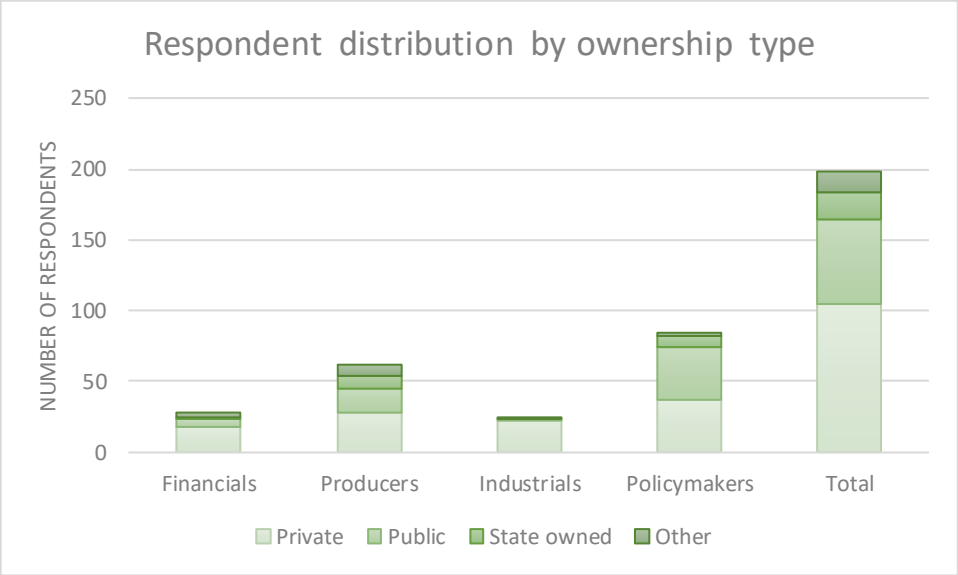

Figure 1: Respondent distribution by ownership

As clearly highlighted in the chart, roughly half of the sample is made of private companies, followed by a significant share of public companies.

Size

The third assessed characteristic is the size of the company, distinguishing between Small companies (1-49 employees), Medium companies (50-249 employees) and Large companies (250+ employees). The breakdown is presented by macro-category and briefly discussed, as above.

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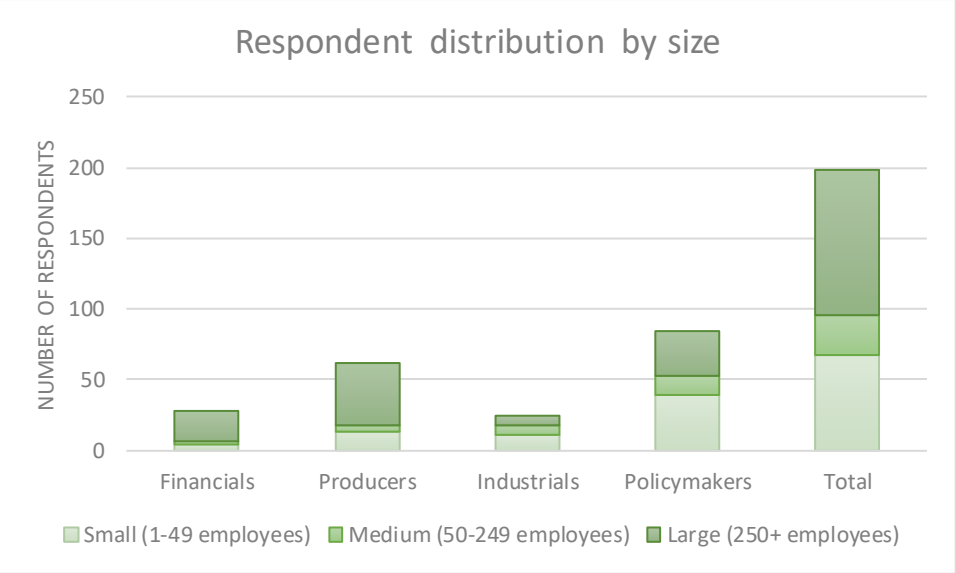

Figure 2: Respondent distribution by size

The major share of the sample is constituted by Large companies, followed by Small ones. Medium size companies constitute a small percentage of the sample and in some macro-categories (for example, Financials or Producers) are almost absent.

Home country and Internalization

In the following discussion we analyse the country distribution of respondents and the degree of internationalization, measured as the number of companies having international subsidiaries or branches.

The exact country distribution will be discussed at the beginning of this Section, but in the rest of the report we will refer to geographical areas in order to provide a more significant overall picture.

The geographic information is also cross-referenced against the dimensions analysed above, i.e. Ownership type and Size, in order to present the full picture for each country.

European countries covered by the survey are visualized in Figure 3 below.

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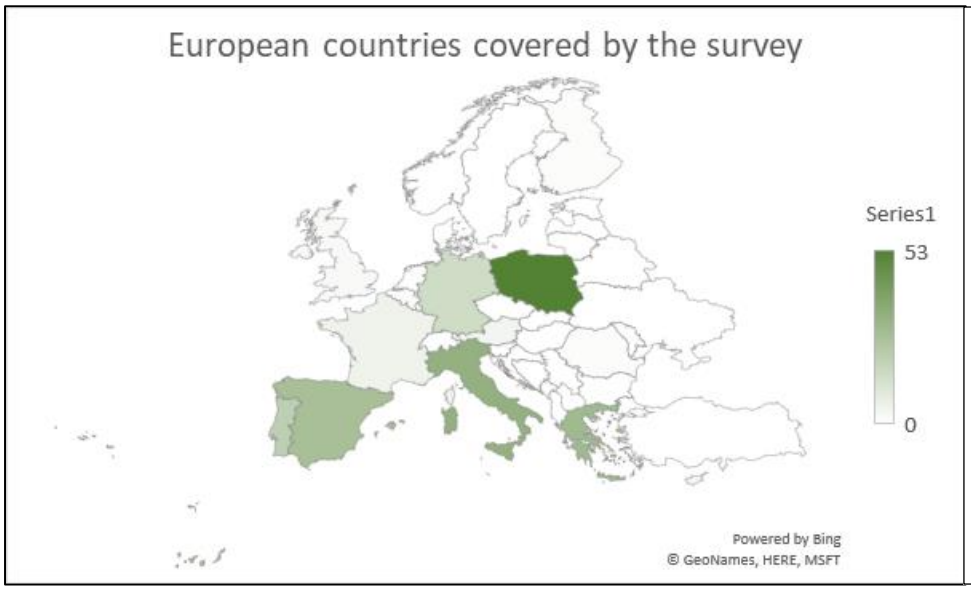

The survey covered the following countries:

1. Austria;
2. Belgium;
3. Canada;
4. Cyprus;
5. Finland;
6. France;
7. Germany;
8. Greece.
9. Italy;
10. Luxembourg;
11. Poland;
12. Portugal;
13. Romania;
14. Spain;
15. UK;
16. US.

Figure 3: Country distribution

As mentioned, countries are grouped by geographical area. The following 5 regions have been identified:

- Central Europe (Austria, Belgium, France, Germany, Luxembourg), 26 respondents;
- Eastern Europe (Poland, Romania), 54 respondents;
- Southern Europe (Cyprus, Greece, Italy, Portugal, Spain), 112 respondents;
- Europe – Others (Finland, UK), 4 respondents;
- Extra Europe (Canada, US), 2 respondents.

The distribution by Region and macro-category is provided in Figure 4 below.

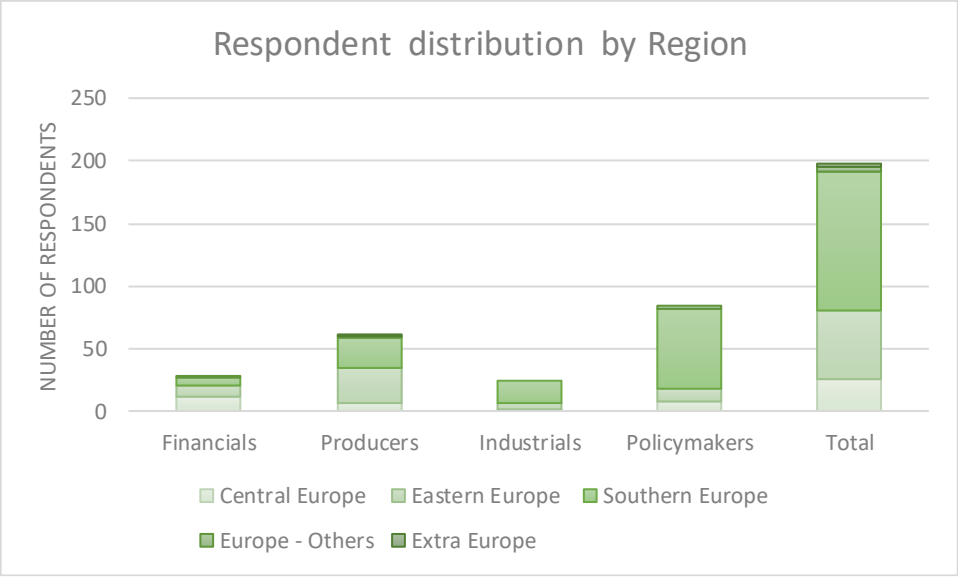

Figure 4: Respondent distribution by Region

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Most of responses come from Southern European countries, as expected given the significant quota of partners from such countries in the project consortium. Despite this imbalance, the share of respondents from other European region is significant enough to include their perspective in the following analysis.

Responses from other European countries and Extra Europe are included, but not deemed significant as standalone.

The distribution by Region, Size and Ownership structure offers interesting insights and is reported in Figure 5 below.

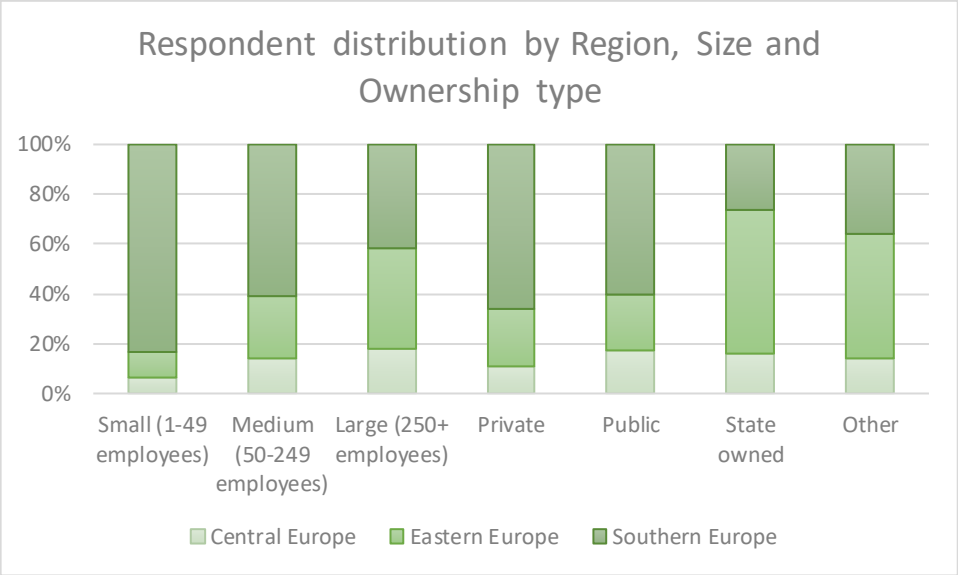

Figure 5: Respondent distribution by Region, Size & Ownership

Reflecting the different economic structures withing the European Union, we see that Small companies are mostly from Southern European countries, while Large companies are more concentrated in Central and Eastern European companies. Also, it is relevant to note the significant share of State owned and "Others" ownership structures in the Eastern European countries.

Finally, the degree of internalization of respondents, based on the presence of foreign subsidiaries or branches, is represented by Region in Figure 6 below.

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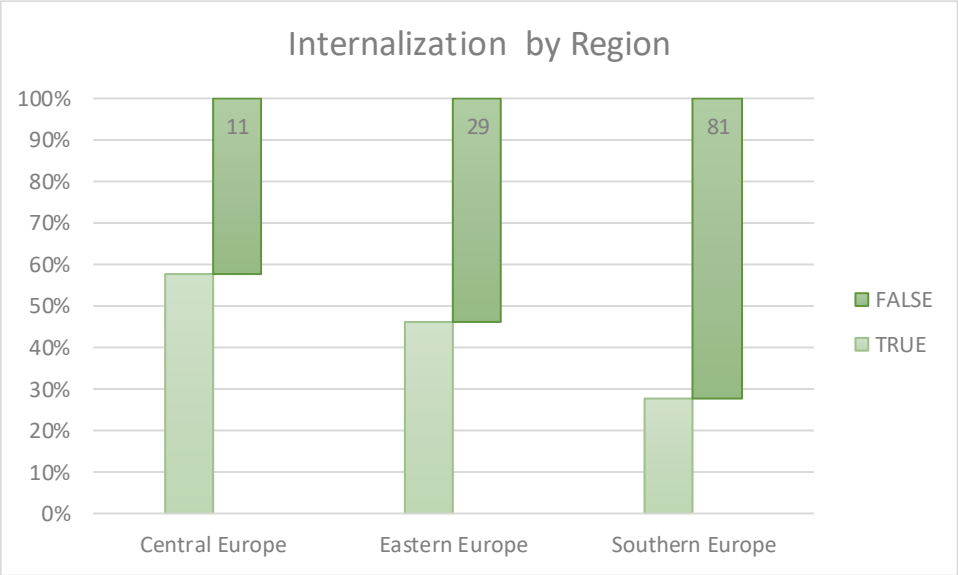

Figure 6: Internationalization

Note how the proportion of companies having / not having subsidiaries or branches is roughly equal for Central and Eastern Europe; while in Southern Europe the proportion of companies lacking international presence is much larger.

The number of countries reached also speaks to KPI 2.2. Despite the lack of extra-European coverage, we see good responding rates across European countries and a satisfying Regional distribution, which allows a meaningful aggregation of results.

For this reason, we believe the KPI 2.2 has been **achieved** with satisfactory results.

Role of responding person

Finally, we discuss the role of the respondent within the organization. Despite similar titles have different meaning across different sectors, we wanted to grasp an understanding of the roles covered by our respondents across their organizations. In Figure 7 below, the category "Others" include Professors, Risk managers, Project managers, Legal, Human resources, Sustainability teams and Equity teams.

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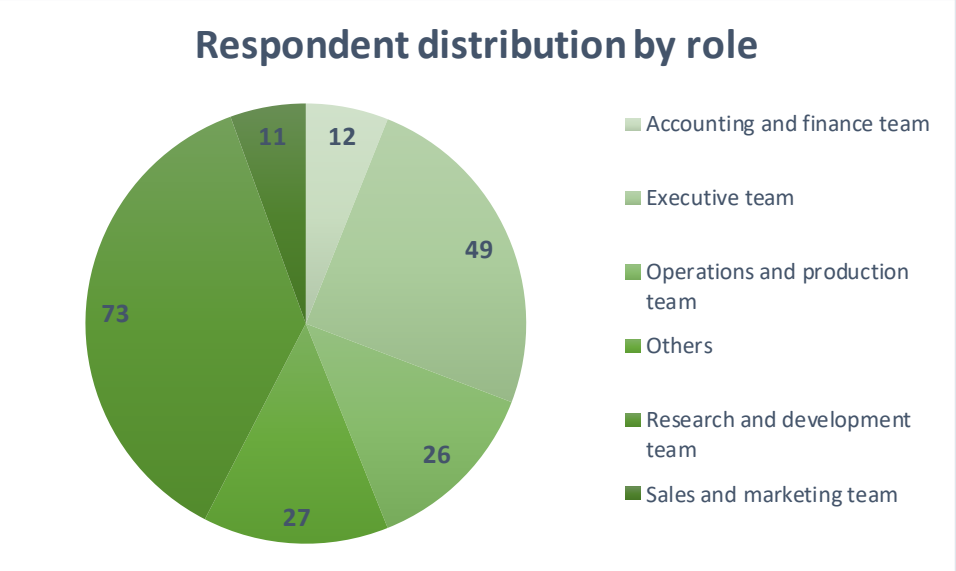

Figure 7: Respondent distribution by role

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The questions in this Section aim at understanding the challenges and opportunities imposed on companies by the energy transition. We try to understand past, present and future issues, in order to see which areas are most important for the Sustainable Energy Expert.

We will first assess current and past challenges, between switching to the future ones.

Current impact and challenges

Three questions are necessary to assess the impact of the energy transition in the past and present:

1. Has the company been already impacted?
2. If yes, in which business areas?
3. Has the company faced more challenges or drawbacks?

Where Questions 1 and 3 are the same across all macro-categories, and question 2 differs by macro-category.

The distribution of impact is shown in Figure 8 below, both overall and by macro-category.

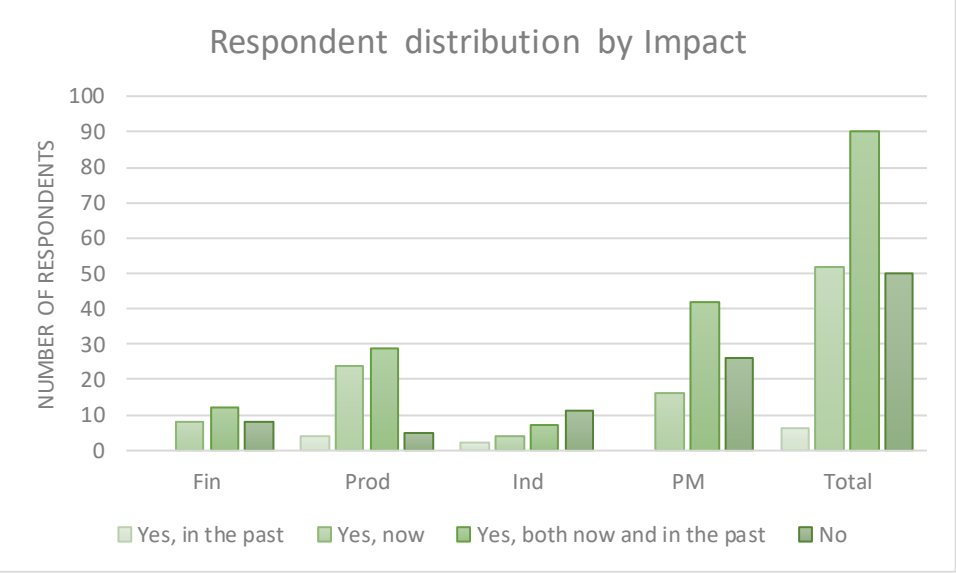

Figure 8: Respondent distribution by Impact

The chart clearly shows that the energy transition is *real* and is *now*. Indeed, a very limited number of companies have left the transition behind them, while the significant number of "no" is coming mostly from Policymakers, where the degree of impact is clearly different and from Industrials, which include non-energy intensive sectors which are of less interest for energy transition impacts and regulations.

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It's also clear that the transition has been ongoing for a while, given the high number of companies that have been impacted in the past and in the present.

Table 2 below presents a breakdown by Region and Macro-category, in order to identify regional trends.

Region	Macro category	Yes, in the past	Yes, now	Yes, both now and in the past	No
Eastern Europe	*Financials*	0	3	3	4
Eastern Europe	*Producers*	2	14	12	0
Eastern Europe	*Industrials*	0	1	3	2
Eastern Europe	*Policymakers*	0	4	1	5
Central Europe	*Financials*	0	2	7	2
Central Europe	*Producers*	1	0	5	0
Central Europe	*Industrials*	0	1	0	0
Central Europe	*Policymakers*	0	0	6	2
Southern Europe	*Financials*	0	2	2	2
Southern Europe	*Producers*	1	9	10	5
Southern Europe	*Industrials*	2	2	4	9
Southern Europe	*Policymakers*	0	11	34	19
Eastern Europe	*Total*	2	22	19	11
Central Europe	*Total*	1	3	18	4
Southern Europe	*Total*	3	24	50	35

Table 2: Impact by Region and Category

The main trend is confirmed by the Regional picture, although the different structure of respondent by macro-category impacts the breakdown.

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We will now analyse the most impacted areas for each category and briefly comment them. Please note that each respondent could select multiple impacted areas; also, please note that single issues are aggregated for discussion.

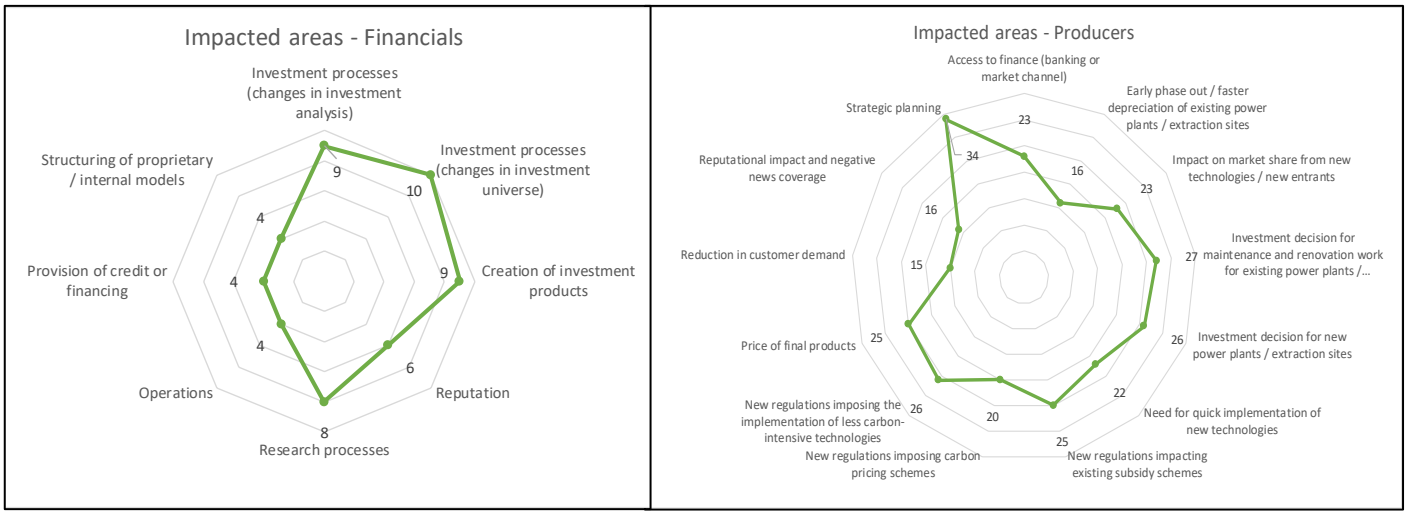
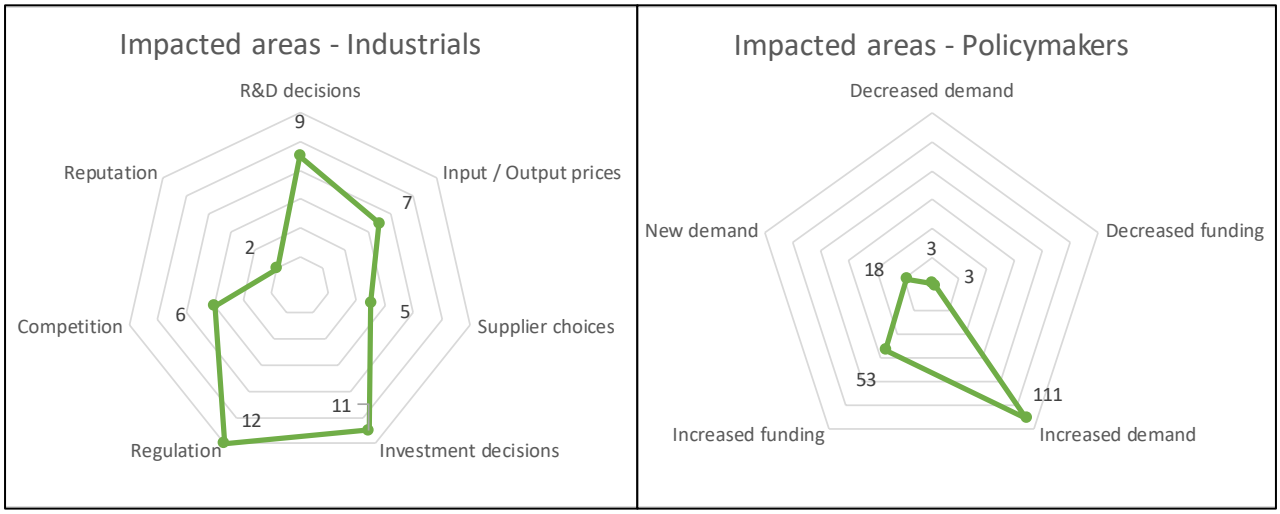


Figure 9: Impacted areas - Financials & Producers

The first two charts we discuss (in Figure 9) are for Financials and Producers. We can clearly see that Financial companies have been mainly impacted in their internal processes, being them related to Investments (mentioned 28 times as impacted) or to Research (8). Operations (4) and Financing (4) seems to be lesser concerns for companies in the sample.

The picture is clearly different for Producers. The biggest impacts have been faced, so far, in the Competitive landscape (85), in Regulation (71) and in Planning (60). This was to be expected given

Figure 10: Impacted areas, Industrials & Policymakers



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the huge volume of technological and regulatory changes that happened on the production side in recent years. Financing (23) and Reputation (16) have been a lesser concern so far, confirming the trend highlighted by Financials, while issues related to Stranded assets (43) have been biting, but less than the main troubles. Please note that the definition of Stranded assets in this report is left deliberately broad and not specified with a given metric.

The pictures are clear as well for Industrials and Policymakers. The former has mainly been impacted with respect to Investment (11) and R&D (9) decisions, as well as by Regulation (12); while effects on Reputation (2) and Competition still lag behind.
The picture for Policymakers is probably the most eloquent of all regarding the growing past and present interest in the energy transition. Basically, no funding (3) or demand (3) decreasing has happened in the studied sample, while increases in demand (111) and funding (53) have surged.

Finally, we want to assess whether, so far, benefits have prevailed over challenges or vice versa. The issue is assessed in Figure 11 below.

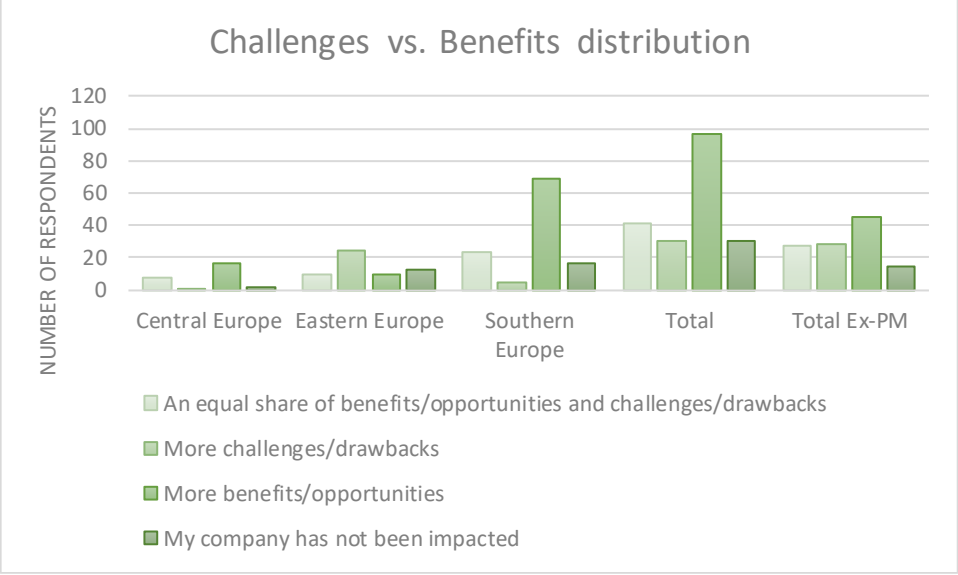

Figure 11: Challenges vs. Benefits

This picture shows clearly that:

1. The energy transition can offer opportunities;
2. The distribution of challenges and opportunities is geographically unequal;
3. Policymakers in general face more benefits than challenges.

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More in details, on Point 1 we can easily see that the "More benefits" bar is overall the most prominent, both with and without considering Policymakers. This shows that, if tackled, the energy transition can offer significant upside opportunities.

Point 2 can be easily assessed looking at the "More challenges" column and comparing Eastern Europe against Central and Southern. It is clear that the different economic structure imposes more hardships on some countries than others, and it should be taken into account by the European legislators and by any professional aiming at supporting the transition.

Point 3 is intuitive, as research and supporting entities can easier shift their focus and benefit by momentum changes. The high presence of PMs in Southern Europe explains the skew for this Region toward the "More benefits" answer.

Sustainable Energy Expert – the current status in the market

The long-term aim of the GrEnFIn project is to introduce a strong curriculum to shape the figure of the Sustainable Energy Expert, i.e. a Professional able to support companies in their transition toward a more sustainable world.

In order to understand what the skills are needed by such an expert, the first questions to ask are the following:

1. Is such profile already available in the market?
2. What are the missing skills in the market?

We first present and comment the chart speaking to Question 1.

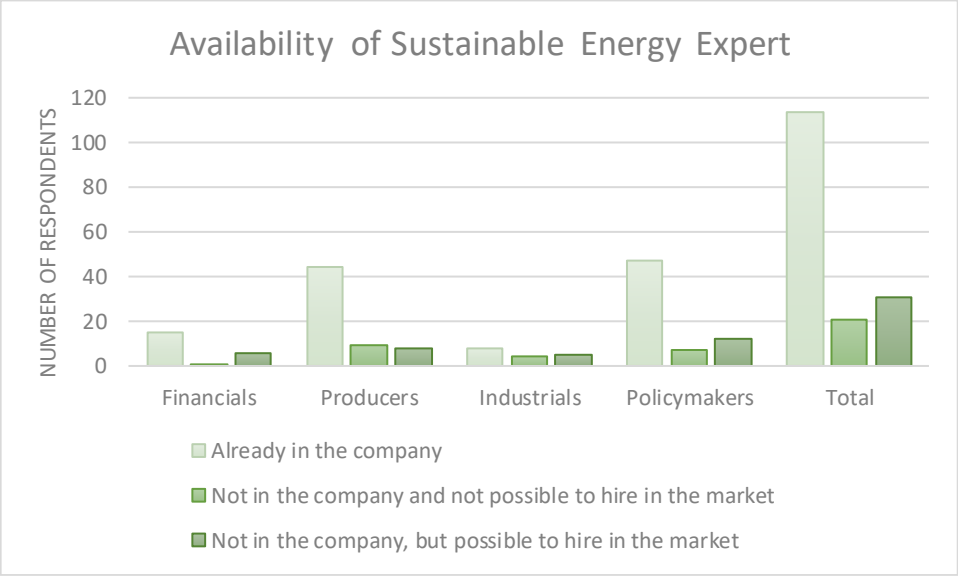

Figure 12: Availability of Sustainable Energy Expert

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As can be seen from the chart in Figure 12 above, most companies have already taken steps in the direction of preparing for the energy transition by hiring specific figures. This, as expected, is highly true within Producers and Policymakers, which have been called earlier to action. Across all categories there are companies that lack the necessary professional figure and there is generally an equal split regarding the feeling about availability of such a figure in the market – if we exclude financials.
We believe this picture shows a good degree of preparedness by companies; nevertheless, we are convinced the figure of the Sustainable Energy Expert as designed by the GrEnFIn project will be a strong candidate both for companies already employing such figures and for companies not currently employing them.

Also, we can see that the replies to Question 2 show relevant weaknesses in the current preparation of existing professional figures. The results are presented in Table 3 below. Please keep in mind that multiple entries were available for this question.
The picture shown in Table 3 below highlights that most respondents feel the need to strengthen both the technical and economical skills in currently available curricula. Engineering is the most lacking skillset, followed by Economics and Finance. Law has a prominent role too, while pure Mathematics and Statistics seem to be more marginal.
Furthermore, it is important to look at the breakdown by Macro-category. It is clear that there is a need to strengthen the technical and economical skills of professionals working in Energy within Financials, while Law and Mathematics / Statistics are less important. For Producers, Law is the weakest area (32), immediately followed by Engineering and Economics / Financials.
Also, interesting suggestions have been proposed in the “Others” category, i.e. the need for multi-disciplinarily of such a Professional figure, and the need to quickly grasp new skills. Further suggestions were received pointing toward a deeper knowledge of AI, Communication skills and, in general, skills related to Humanities.

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Skill	Financials	Producers	Industrials	Policymakers	Total
Economics	17	27	11	51	106
Engineering	15	31	13	51	110
Finance	17	27	11	51	106
Law	7	32	7	28	74
Mathematics	7	13	3	24	47
Natural and Environmental Sciences	11	17	6	27	61
Physics	11	17	6	27	61
Statistics	7	13	3	24	47
Other (describe)					
-Energy markets (general)	0	0	0	9	9
-New skills and Reskilling	0	0	1	0	1
-Multidisciplinary skills	0	0	1	0	1

Table 3: Weak areas for available professional figures

This assessment of weak areas will be taken into account when assessing the results for Hard skills later in the questionnaire.

Future impact and challenges

Future impacts are assessed at different levels across the sample:

- Expectations regarding the level of "greenness" of the Economy (2030 horizon);
- Balance of future challenges / opportunities;
- Perceived readiness for the transition;
- Greatest transition risk by sector;
- Availability in the market of Professional figures able to deal with future challenges;
- Interest in hiring Sustainable Energy Experts to face future challenges.

Where relevant, answers are compared with the ones from previous questions.

The first item we assess are expectations: what will the economy look like in 2030? The main comparison target, on this point, is the Paris Climate agreement. The economy could be either Carbon neutral, in line with the targets, significantly greener but below the target, greener but not significantly, or not greener.

Expectations are summarized by stakeholder group in the chart in Figure 13 below.

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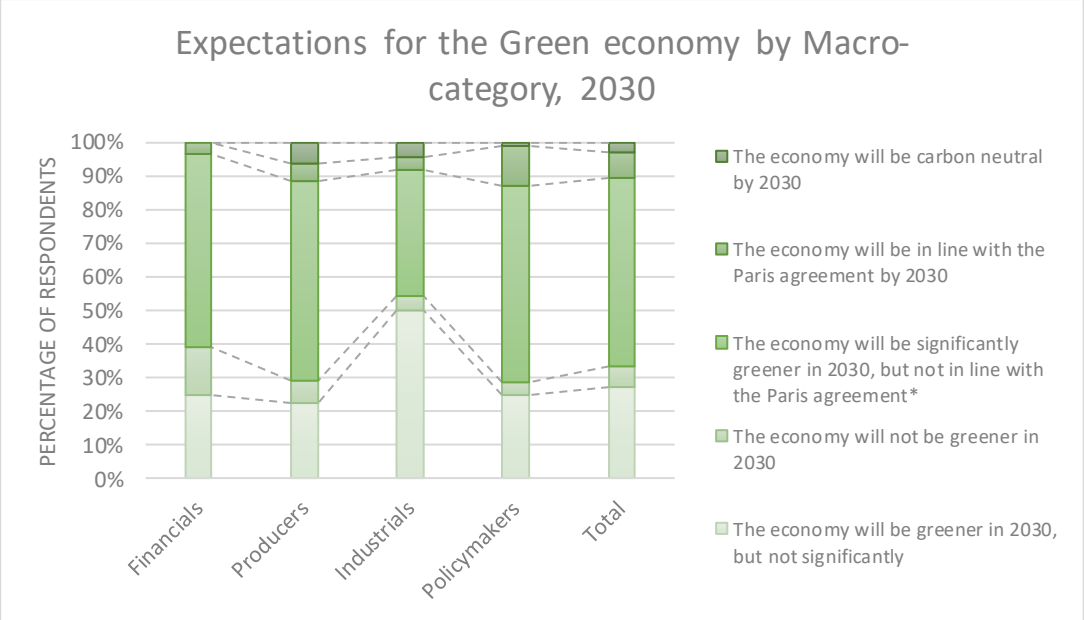

Figure 13: Expectations on the Green economy, 2030

As clearly highlighted in the chart, there is confidence that the economy will be greener in 2030, either somewhat or significantly; but Carbon neutrality and the possibility to meet the Paris target seem to be *way off the table* within the surveyed community. This is of course concerning evidence, even if it highlights even further the necessity to have professional figures able to deal with climate change and the energy transition.

We can now assess the perceived challenges and opportunities from the energy transition in the future, also comparing with what we have seen above related to past and present. The balance is detailed by Region in Table 4 below, comparing also with the previous results.

Impact assessmnet	Central Europe	Eastern Europe	Southern Europe	Total	Total Ex-PM
	Past and present challenges				
An equale share	7	9	23	41	27
More challenges/drawbacks	1	24	4	30	28
More benefits/opportunities	16	9	69	97	45
My company has not been impacted	2	12	16	30	14
	Future challenges				
An equale share	9	14	21	46	31
More challenges/drawbacks	0	26	9	36	31
More benefits/opportunities	17	8	76	104	46
My company will not be impacted	0	6	6	12	6
	Differences (Future - Past&Present)				
An equale share	2	5	-2	5	4
More challenges/drawbacks	-1	2	5	6	3
More benefits/opportunities	1	-1	7	7	1
My company will not be impacted	-2	-6	-10	-18	-8

Table 4: Future challenges

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What's most important to notice in the table is that the share of companies that consider not being impacted drops significantly across all Regions, showing that the energy transition is real, and will become even *more significant* in the foreseeable future. Overall, these impacts translated mostly in Equal shares of benefits and opportunities, or challenges. Again, the economic structure of specific Regions impacts the new situation: Eastern Europe is the only Region that foresees a lower number of companies with more benefits, signalling that companies expect either to gain a fair share of opportunities and challenges, or to be worse off.

The natural questions that immediately follows is: are companies ready, in their opinion, for this massive transition? For this question, we define "readiness" as having a vision or strategy in place to deal with the energy transition. The chart in Figure 15 below speaks to this question.

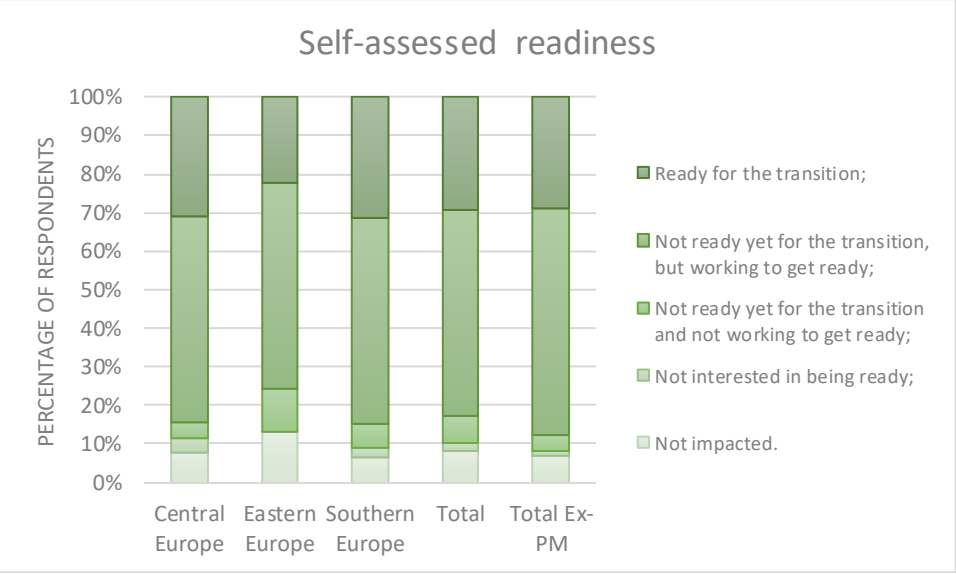

Figure 14: Self-assessed readiness

Clearly, a significant share of companies feels currently ready for the energy transition. Next, most companies feel to be not ready, but already working toward readiness; while only a small fraction of companies is not even working in that direction. Companies not impacted or not interested in being ready compose a minimum fraction of the studied sample.

We now make another step forward and investigate what is the *greatest* risk for each sector. In order to consider the differences in the economic impact of the energy transition across different categories of stakeholders, this question differs by macro-group.

We will now present the results at a macro level and discuss them, following the same order used for past challenges, i.e. Financials, Producers, Industrials, Policymakers.

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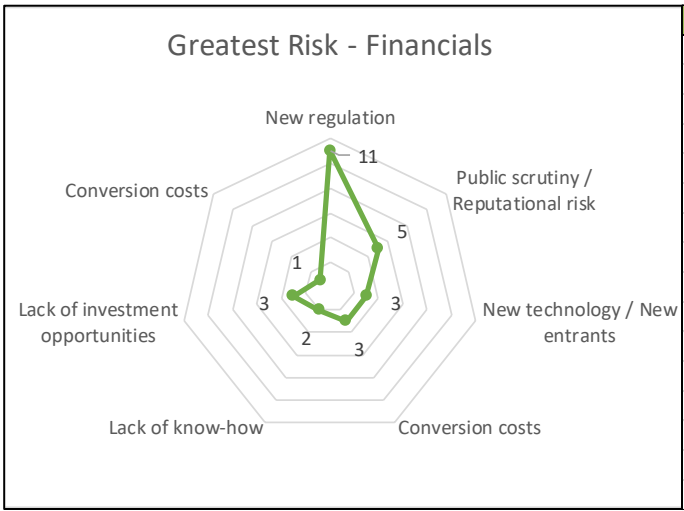
We start with Financials.



Detailed risk	Average Exposure
Reputational risk related to non-green investments	3.12
Need to adapt current product portfolio	3.00
Excess competition in the green finance market	2.92
Reputational risk related to greener behavioural standards	2.92
Need to switch to a greener credit portfolio	2.91
Increased regulatory scrutiny	2.84
Need to change research processes	2.73
Need to switch to a greener investment portfolio	2.72
Need to adapt to a new customer base	2.68
Inability of performing a correct risk pricing and risk management	2.52
Inability of finding green companies/funds/financial products to invest in	2.42
Reduced client demand for non-green financial products	2.40
Inability of finding attracting returns	2.35
Inability of finding green projects to finance	2.28
Inability of competing with non-green benchmarks and/or competitors	2.00
Other	2.00

Figure 15: Major future risks, Financials

The chart and the table speak, at two different levels of granularity, to the same question: what the major risks associated with the Energy transition are. In the chart, we see what respondents answer when presented with *only one* choice; in the table, we see the average answers when respondents are given an array of options and have to value them from highest exposure (5) to lowest exposure (1).
As shown in the chart, Regulation is the most important risk for financial companies; this is confirmed by the trends in the table, where the impact of an increased regulatory scrutiny scores 2.84. Second highest risk in the chart is the impact of Public scrutiny; again, this is confirmed by the table where Reputational risk of non-green investments score 3.12, and reputational risks related to the necessity of being greener score 2.92. Also, the table highlights significant risks stemming from Competition (2.92) and portfolio switch (3.00 for adaptation of product portfolio, 2.91 for greener credit portfolio, 2.72 for greener investment portfolio).

Secondly, we assess the risks for Producers.

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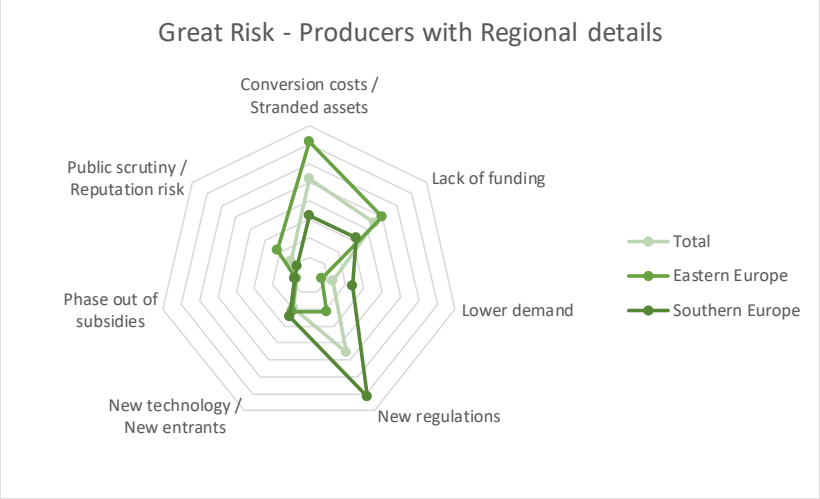

Figure 16: Major future risks, Producers

Detailed Risk	Central Europe	Eastern Europe	Southern Europe	Overall
Access to finance (market or bank channel)	3.17	3.37	2.86	3.18
Extinction of reserves	1.75	2.82	2.00	2.37
Inability of competing with brown competitors	1.67	2.73	2.59	2.48
Inability of competing with greener competitors	2.83	3.16	3.06	3.02
Inability of keeping the pace with new technological development	3.00	3.11	2.83	2.97
Increased regulatory screening	3.25	4.00	3.35	3.67
Need to modernize current brown power plants	1.40	3.13	2.58	2.76
Need to phase out current brown power plants	1.67	3.39	2.74	3.02
Need to switch to a greener energy mix	2.80	3.38	3.56	3.44
Reduced demand from industrial sector	2.80	3.28	3.24	3.19
Reduced demand from private sector	3.17	3.38	3.25	3.26
Reduced price for final products	3.67	3.04	3.10	3.21
Reputational risks related to oil, gas and coal	2.40	3.41	3.28	3.19
Tightening of / inclusion in ETS schemes	2.25	3.75	3.00	3.29

Table 5: Major future risks, Producers

The chart clearly shows the Regional differences between European regions. While New regulations represent the most significant risk for countries in Southern Europe, we see that the main concern for Eastern European countries is related to conversion costs and Stranded Assets, as well as the lack of funding. Again, we adapt a broad definition for stranded assets.

This is no coincidence and it is strictly dependent on the economic structure of the specific countries, highlighting again the importance of the geographical perspective.

Another significant fact stemming from Table 5 is that respondents from Eastern Europe are overall more concerned with the challenges of the energy transitions and only 2 entries go below 3 as average impact. Confirming the picture above, the importance of Regulation is crucial across the board, while issues related to phasing out and modernization of plants, and ETS, are particularly significant in Eastern Europe. Central European players seem to be the least worried with the impacts related to plant

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modernization, competition and extinction of reserves, and the most concerned with price considerations.

We next assess industrials, where we see a clear tendency between the identification of Regulation as greatest risk.

Figure 17: Major future risks, Industrials

Since Industrials were assessed more granularly, with different options for the detailed challenges, it is not possible to present tabular results on this point. What we can say is, nevertheless, that Regulation represents the major risks and stand above all the others. Discussing some of the results obtained from the detailed question, respondents indicated that phasing out of brown technology and corresponding introduction of green technologies are seen as major risks.

Finally, we discuss the risks perceived by Policymakers, as represented in Figure 18 below.
Again, Regulation represents a major issue (17), especially when paired with Public scrutiny (13). Overall, the biggest concern of the Sector seems to be the possibility of Increased competition (26), which delineates good growth expectations; despite this, Lower research funding still represents a concern (19).

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Figure 18: Major future risks, Policymakers

Sustainable Energy Expert – Expectations for the market

In the previous section we have assessed the current status of the market for the professional figure of the Sustainable Energy Expert. We now want to understand what the perspectives are for such a figure, asking two main questions:

1. Are figures able to deal with the future challenges imposed by the Energy transition available in the market?
2. Are companies willing to hire such a professional figure in the future?

The responses to Question 1 are reported in Figure 19 below, by Stakeholder type.

As can be seen, professional figures able to deal with future challenges of the energy transition are currently scarcely available in the market; but if we look closer at the breakdown by Sector, some Producers believe there are enough.

Nonetheless, the overall picture is that this Professional figure is needed and not widely available for hiring in the marketplace. Given the expected increase in the pace of the energy transition, as discussed also above, this is a strong signal for the Academia.

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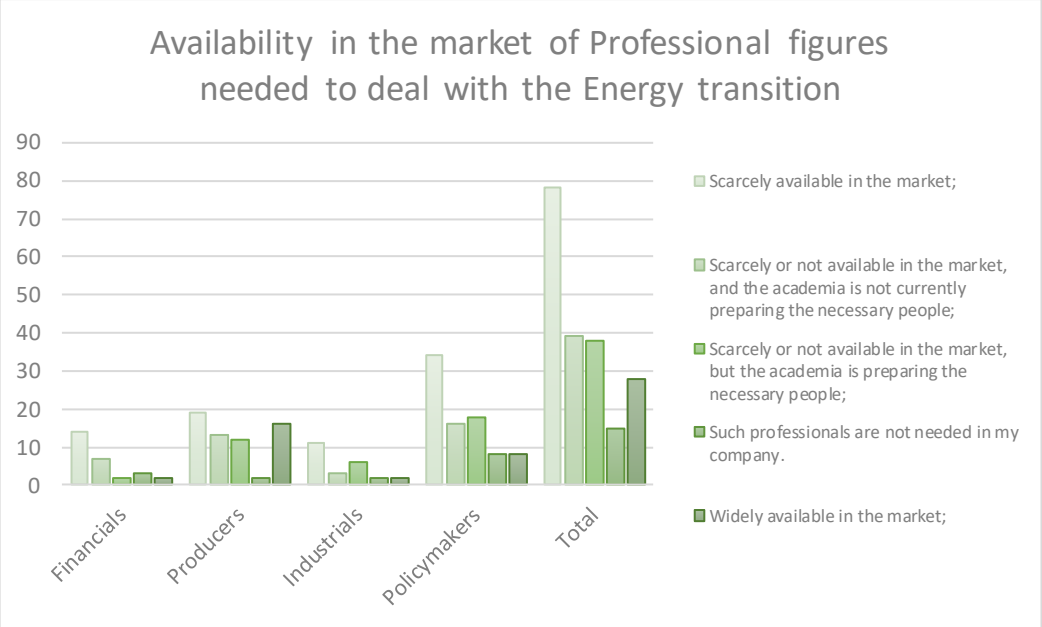

Figure 19: Availability of Sustainable Energy Expert

Turning to Question 2, we can clearly see from Figure 20 below that, although some companies already employs or do not plan to employ a Professional figure such as the one of the Sustainable Energy Expert; there is a strong case for building the curriculum, justified by an actual demand by several companies across all Sectors.

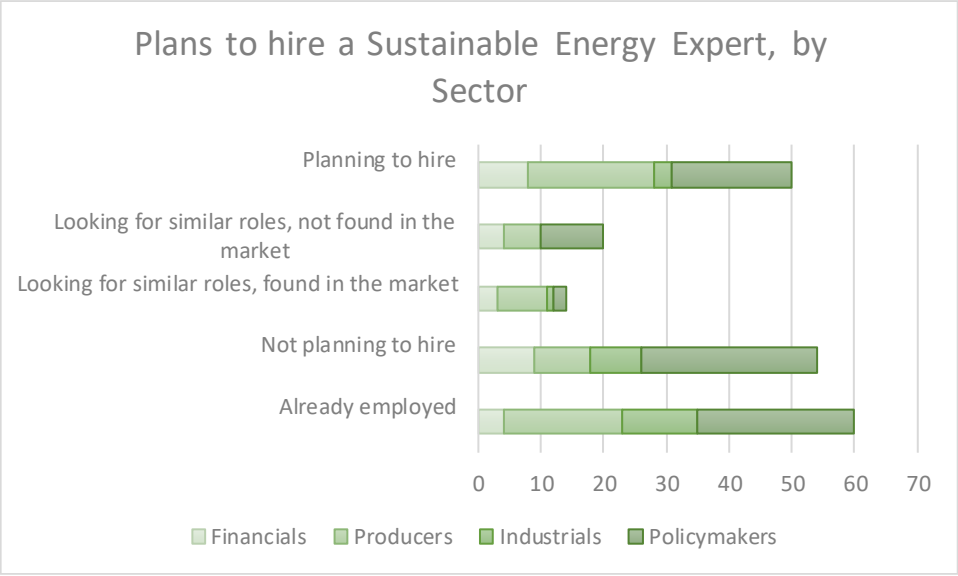

Figure 20: Hiring plans for Sustainable energy experts

Indeed, as the chart clearly show, roughly half of the companies involved in the survey are planning to hire such a Professional. This need is distributed across sectors, showing that there are different career perspectives for such a figure.

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Preparedness and challenges of the energy transition – wrap up

Responses clearly show that the energy transition is real and is now. Few companies are not impacted or have left the transition behind them, mainly in the Industrials and Policymakers categories.

Main challenges faced are different across stakeholders and can be identified as:

- For Financials, Internal processes;
- For Producers, Competition, Regulation, Strategic planning;
- For Industrials, Investments and R&D decisions;
- For Policymakers, Increased demand;

The balance of opportunities and challenges is unequal across regions, although overall it tends toward the more opportunities bucket. Despite companies seem to be generally prepared for current and past challenges, there are significant skill gaps that should not be ignored.

Future expectations point in the direction of a somewhat greener, but not Paris-aligned, economy, together with an increase in challenges related to the energy transition. Companies feel to be ready for the transition, or working to get ready, while the fraction of non-ready companies is negligible in the sample.

Digging into the major risks by category, we found out the following:

- For Financials, number one issue is Regulation. Public scrutiny, Competition and Portfolio risks follow;
- For Producers, number one issue is dependent on the location. In Southern Europe, it's Regulation; in Eastern Europe, it's Stranded assets. There is a clear indication of higher concerns in Eastern Europe overall, while challenges are limited from a Central European's perspective;
- For Industrials, number one issue is Regulation, followed by concerns related to switching from brown to green technologies;
- For Policymakers, number one issue is the Increased competition, highlighting significant growth expectations. Important are also Regulatory and Funding-related concerns.

Finally, it is clearly highlighted by respondents that there is a significant need for the professional figure of the Sustainable Energy Expert. Such figure is scarcely available in the market, but part of hiring plans across the board. We believe this is a strong signal for the Academia and important evidence supporting our development plans for the GrEnFIn curriculum.

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Skills for the GrEnFIn curriculum

In this Section, we are going to assess the results regarding the skills needed in the GrEnFIn curriculum to build the Professional figure of the Sustainable Energy Expert.

This Section is divided in four parts:

1. Current structure of workforce: breakdown by background and level of education;
2. Hard skills;
3. Soft skills;
4. Geographical reach.

In the Hard skills subsection, specific questions have been asked only to a precise Stakeholder group. When this is the case, the assessment on subsample is clearly stated in the text.

Current structure of the workforce

The current structure of the workforce is assessed on two levels: main background of employees working on energy and level of education.

The first point is discussed in Table 6 below. Please note that multiple entries were available for this question.

Background	Overall	Financials	Producers	Industrials	Policymakers
Economics	86	17	32	8	29
Engineering	148	10	55	19	64
Finance	50	18	21	4	7
Humanities	9	0	1	2	6
Law	2	0	0	1	1
Mathematics / Statistics	24	9	9	0	6
Science	36	5	9	2	20
Sustainability	27	4	6	0	17
Techinicians	7	0	6	1	0
My organization does not have employees working on energy	11	2	0	3	6

Table 6: Main background

As can be seen, the most relevant backgrounds are Engineering, Economics and Finance, followed by studies in the Sciences, Sustainability, and Mathematics / Statistics. Technicians are employed by Producers and Industrials, while there is currently a lack of backgrounds in Law or Humanities. This

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can explain the significance of the Regulatory challenge above, given the limited number of employees with a significant law background.

We can also see, overall, what is the average distribution of the workforce by educational level:

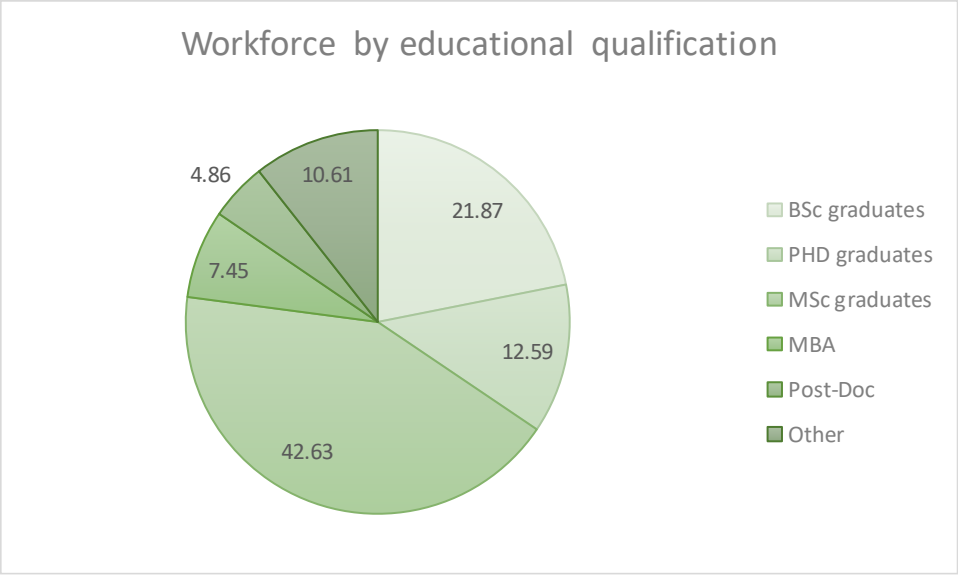

Figure 21: Workforce by qualification

As can be seen, MSC graduates constitutes the main category, followed by BSC. PHDs are still relevant, while MBAs and especially Post-doc are less recurrent qualifications. The Other category, still significant, includes mainly high-school and technically educated professionals.

Hard skills

Sixteen different hard skills have been assessed across the board. All respondents have been asked to evaluate each skill from 1, not relevant, to 5, fundamental. Interesting suggestions have been gathered using the "Other" option, including AI and IoT, but they are not significant enough to be reported on a standalone basis. The results are summarized in Table 7 below, both overall and by macro-category.

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Subject	Overall	Financials	Producers	Industrials	Policymakers
Economics	3.44	3.39	3.68	3.00	3.42
Sustainability (including carbon and GHG)	3.27	3.11	3.29	2.54	3.52
Environmental Science	3.27	3.11	3.39	2.75	3.38
Languages	2.91	3.04	3.05	2.13	2.99
Law	2.86	3.07	3.15	2.29	2.75
Finance (corporate)	2.81	3.36	3.08	2.13	2.63
Finance (financial markets)	2.78	3.43	3.00	2.00	2.63
Mechanics (theoretical and engineering)	2.74	2.25	3.00	2.42	2.80
Programming	2.73	2.36	2.95	1.75	2.96
Statistics	2.68	2.68	2.85	1.71	2.82
Physics (theoretical and engineering)	2.52	2.46	2.69	2.04	2.55
Mathematics	2.44	2.68	2.58	1.71	2.46
Materials (theoretical and engineering)	2.39	2.14	2.56	2.46	2.33
Marketing	2.29	1.82	2.47	2.21	2.35
Chemistry (theoretical and engineering)	2.17	1.96	2.21	2.29	2.18
Political science	1.94	1.79	1.84	1.58	2.18
Others	1.92	1.50	2.00	2.00	2.00

Table 7: Relevance of Hard skills

The overall picture, confirmed by the sector level ones, leans toward capital importance of Economics, Sustainability and Environmental Science. Languages, Law and Finance follow closely, with some variation across groups, while skills such as Programming, Statistics and Mathematics, and more Engineering subjects lag behind. Furthermore, Marketing and Political Science are mostly deemed as not relevant by respondents.

Despite the variation by macro-category, the overall picture leans toward the establishment of a ductile figure, with a strong understanding of Economics, Environmental topics and Law, also able to position him/herself on the international scenario.

Strong quantitative skills are required for the curriculum, as understood from the picture above, but more in an applicative sense, than standalone as purely theoretical exercises.

We will now turn to which skills within the different subject are more important according to stakeholders. Following the order derived from the table above, we will first discuss Economics and Finance skills; then Engineering; and finally, Programming.

Economics and Financial skills have been assessed at two different levels:

- For Financials, we separately assessed the two subjects, going into more details for each topic;
- For the other stakeholder groups, they have been assessed jointly and in less details.

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The justification for such a distinction is the different degree of specialization required by the identified groups. We will first assess the results as obtained from Producers, Industrials and Policymakers, before turning to a more detailed analysis using the answers gathered from Financials.

Subject	Overall	1	2	3	4	5
Cost benefit analysis	3.63	17%	2%	19%	**26%**	**36%**
Economics	3.36	17%	7%	23%	**29%**	**24%**
Risk management	3.27	21%	6%	22%	**28%**	**24%**
Business management	3.22	18%	**12%**	23%	**24%**	**23%**
Financial Markets	2.74	**26%**	**14%**	**29%**	21%	10%
Corporate finance	2.62	**26%**	**19%**	**29%**	16%	9%
Trading	2.60	**35%**	**10%**	**27%**	15%	13%

Table 8: Economic and Financial skills, overall

As highlighted in Table 8 above, the most important skill within the Economic and Financial set is the Cost-Benefit analysis; next follows the Economics set, i.e. macro, micro, international and energy economics. Overall, what is clear from this breakdown is that respondents are mostly in need of experts able to understand the impact of a given project and its fit with the economy. More financial skills, such as Financial Markets and Trading, are seen as less significant.

This is confirmed also by the percentage of respondents giving a 4 or 5 (or, conversely, a 1 or 2) to a given subject. We can clearly see how some more market-oriented skills are seen as important by a thin percentage of stakeholders.

We will now see the more detailed breakdown as obtained by the responses of Financial companies, in order to:

- Assess more granular trends within the needs;
- Identify discrepancies between the needs of the financial world and the rest of the economy.

Table 9 below presents the Average results for both Economic and Financial skills.

Economic Skills		***Financial Skills***	
Subject	**Overall**	**Subject**	**Overall**
Environmental economics	3.46	Risk management	3.64
International finance	2.93	Sustainable investing	3.54
Development economics	2.89	Corporate finance	3.04
International economics	2.86	Equity analysis	2.96
Business management	2.82	Fixed income analysis	2.75
Macroeconomics	2.79	Derivatives	2.75
Econometrics	2.57	Trading	2.43
Microeconomics	2.46		

Table 9: Economics and Financial skills, Financials

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The table confirms what we have seen above and offer interesting insights. Environmental-related subjects, such as Environmental Economics, Development economics and Sustainable investing, are seen as crucial by Financial companies. While business management is seen as less important in this group, we still have a distinct difference between more relevant corporate-related subjects (such as Risk management and Corporate finance), and less relevant market-oriented subjects (such as Derivatives or Trading).

This confirms and strengthens the takeaways from the previous tables regarding the structure of the curriculum and is coherent with the conclusions driven from non-Financials companies.

Engineering skills have been assessed across different Industrials and Producers stakeholders, as well as Policymakers. For reasons related to the significance of results, we discuss here only the responses for Producers and Policymakers. These have been assessed separately for the former, i.e. distinguishing between Green and Brown technologies; and jointly for the latter, i.e. without distinction between the "greenness" of a given technology. This is consistent with the approach followed above for Financial and Economics skills.

Sticking to that approach, we will first discuss the general picture as presented by the results over Policymakers, before turning to the more detailed pictures as described by Producers' replies.

Technology	Total	1	2	3	4	5
Energy networks and smart grids	3.73	10%	10%	17%	**27%**	**37%**
Upstream renewable	3.71	13%	6%	12%	**35%**	**35%**
Downstream	2.80	**24%**	**18%**	**25%**	21%	12%
Carbon capture and storage	2.80	**24%**	**23%**	**21%**	14%	18%
Upstream non-renewable	2.65	**25%**	**19%**	**29%**	20%	7%

Table 10: Engineering skill, Policymakers

As seen from the Policymakers' point of view, the picture on the technology question is pretty clear: Smart grids, Networks and Renewable generation have the lion share; while other technologies, especially Non-renewable ones, lag behind and are deemed less important overall and by a larger share of respondents.

The next table addresses the same problem, i.e. which green/brown technologies are most important to know for a Sustainable Energy Expert, from the point of view of Electricity Producers.

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Green Technologies		*Brown technologies*	
Technology	**Overall**	**Tehcnology**	**Overall**
Electricity storage	3.84	Down-stream technologies	2.10
Networks	3.82	Oil and gas transport	1.94
Smart grids	3.82	Offshore petroleum technologies	1.79
Solar photovoltaic	3.58	Exploration geophysics and Reservoir engineering	1.79
Wind Energy	3.26	Excavation engineering and mining plants	1.71
Biomass and waste to power	3.11	Petroleum technology	1.65
Solar thermal	2.82	Oil and gas contamination	1.65
Carbon capture and storage	2.77	Petroleum and mining geology	1.53
Materials	2.66		
Hydropower and Ocean	2.44		
Geothermal	2.27		
Nuclear fission	1.68		
Nuclear fusion	1.65		

Table 11: Engineering skills, Producers

The trends highlighted in the Policymakers table are fully confirmed. Specifically, we notice that:

- Overall, green wins over brown, as from the premises of our project. This is partly to be expected by the fact that none of the countries involved in the survey is a petrostate, but confirms the premise that Europe is inexorably going in the direction of a green energy sector;
- Within green, Storage, Networks and Smart grids take the lion share;
- Within generation technology, Solar photovoltaic and Wind are seen as most important; Nuclear is considered marginal in the sample;
- Surprisingly, Carbon capture and storage are not considered important by surveyed stakeholders.

Finally, we are interested in assessing Informatic instruments, i.e. Programming languages and software (hence excluding specific topics, such as AI); the aim is to understand which ones should be included explicitly in the program – despite being aware that the cornerstone ability here is adaptation. This question has been assessed for Financials and Policymakers, under the assumption that they represent a significant sample for non-specialized programming languages and software.

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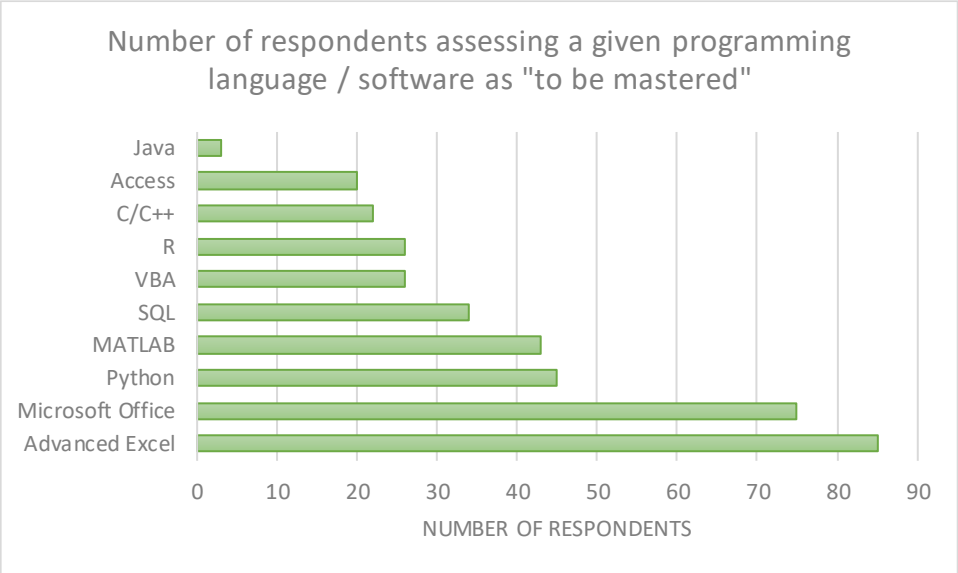

Figure 22: Programming languages and software

As shown in the chart above, Excel is still the most important tool for such a role, together with the whole Office suite. Programming languages such as Python and MATLAB are often seen as important, while R is somewhat less popular. Database tools, such as SQL or Access, especially the former, play a still significant role. It is also important to note that, in the survey, multiple stakeholders have highlighted the relevance of AI and IoT.

Soft skills

Several researchers have pointed in the direction of the importance of Soft skills in order to improve and complete one's professional profile. In this Section, we assess three different questions:

1. What soft skills are needed within the GrEnFIn curriculum;
2. What amount of time should be dedicated to soft skills training;
3. What delivery method is best for soft skills training.

As in the Sections above, responses are assessed in charts and tables to be discussed. Where relevant, further breakdowns are presented. These questions were the same across all respondent macro-categories.

We first assess which soft skills are deemed as useful by respondents. To do so, the survey asked to rank the relevance of the following soft skills on a scale from 1, not relevant, to 5, crucial.

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Skill	Financials	Producers	Industrials	Policymakers	Overall	1	2	3	4	5
Problem-Solving	4.11	4.18	3.92	4.27	4.18	8%	1%	9%	30%	**52%**
Responsibility	3.93	3.89	3.54	4.31	4.03	9%	1%	11%	**37%**	**42%**
Team Working	3.82	3.87	3.58	4.26	3.99	8%	2%	18%	28%	**44%**
Communication	3.86	4.11	3.25	3.96	3.91	10%	1%	15%	**37%**	**37%**
Creativity	3.71	3.90	3.42	3.80	3.77	9%	**4%**	**21%**	33%	33%
Work Ethics	3.89	3.58	3.33	4.00	3.77	**12%**	2%	**21%**	28%	**37%**
Flexibility	3.50	3.89	3.58	3.79	3.75	8%	**4%**	**20%**	**41%**	27%
Adaptability	3.54	3.69	3.38	3.85	3.70	**11%**	**3%**	**21%**	**35%**	30%
Time Management	3.50	3.52	3.21	3.82	3.61	**12%**	**3%**	**25%**	32%	28%
Leadership	3.39	3.50	3.08	3.58	3.47	**10%**	**9%**	**27%**	32%	22%

Table 12: Soft skills relevance

Confirming our expectation and the common thinking, soft skills are deemed as useful across the board. On top of a common understanding of usefulness of such skills, the most important ones are related to Problem-solving, Responsibility and Team Working; while skills such as Leadership and time management lag behind.

The amount of time that should be dedicated to such skills is summarised in the chart below.

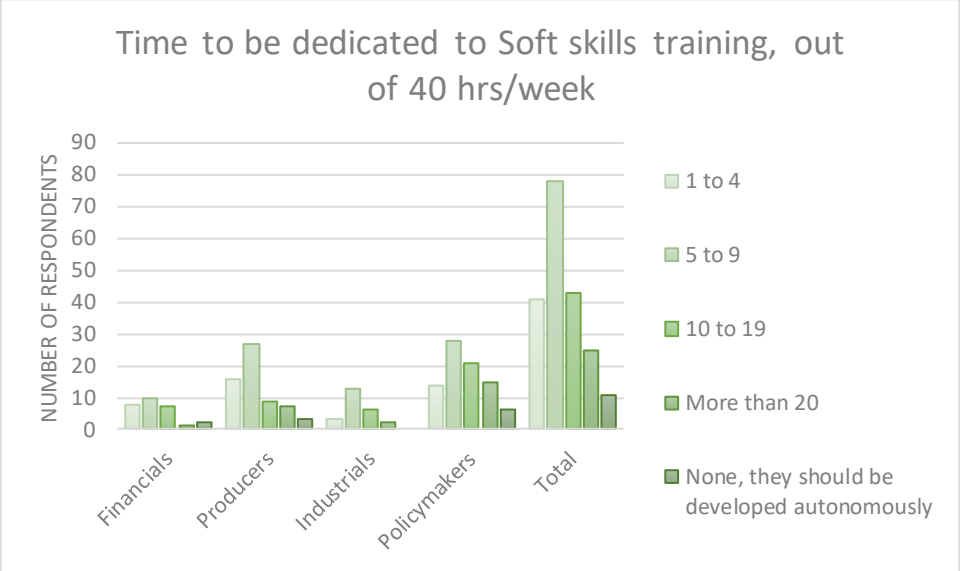

Figure 23: Time for soft skills training

As clearly highlighted by the chart there is significant support, across the board with roughly the same trend, for Soft skills development. The main takeaway of this chart is that a significant part of the curriculum, in the range of 10% to 20% of a 40hrs week equivalent, should be dedicated to Soft skills training.

Finally, we want to better understand which delivery methods are deemed as most effective by companies for Soft skills training. The results are summarized in the table below.

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Activity	Fin	Prod	Ind	PM	Total
Seminars	3.46	3.71	3.71	3.64	3.65
Specific Projects	3.68	3.39	3.79	3.64	3.59
Classes / trainings	3.25	3.31	3.08	3.45	3.33
Guest Speeches	3.00	3.18	3.25	3.42	3.26
Activity	**1**	**2**	**3**	**4**	**5**
Seminars	8%	8%	22%	**37%**	**25%**
Specific Projects	11%	10%	17%	**37%**	**26%**
Classes / trainings	**13%**	**13%**	**26%**	23%	**25%**
Guest Speeches	**13%**	**12%**	**29%**	29%	17%

Table 13: Soft skills training, best delivery method

Overall, only slight preferences toward Seminars and Projects emerge from the Table. Trends are, coherently with what seen before, very similar across the board.

What clearly emerges from the survey and the significant importance given by all stakeholders to Soft Skills is the need to include them in the curriculum, using different instruments in order to train students.

Geographical reach

Before switching to the next Section, we want to understand what needs to be the geographical focus of the curriculum. Although the project centre is Europe, we believe that a truly global perspective is essential for the success of an energy-based curriculum.

We tested this assumption asking respondents to rank geographical areas according to their importance. The assessed ones are the following:

- Home country;
- Africa and Middle East;
- Asia Pacific.
- Europe;
- Latin America;
- Russia and Central Asia;
- US and Canada.

The ranking was requested in a scale from 1, least important, to 7, most important region.

We also want to compare how companies with a different geographical reach assess the importance of different geographical areas.

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Region	Local (city, region)	Country wise	Cross border	Continental	More continents	Global	Total
Africa and Middle East	3.08	2.98	3.48	3.12	3.63	3.83	3.28
Asia Pacific	3.11	3.71	3.42	3.32	2.25	4.22	3.54
Europe	5.33	5.71	5.74	6.12	6.38	5.97	5.77
Home country	6.28	6.42	5.74	5.96	6.25	5.61	6.08
Latin America	2.86	2.97	3.00	2.76	2.38	3.67	3.03
Russia and Central Asia	3.86	3.66	3.45	3.12	3.88	4.08	3.68
US and Canada	4.22	4.16	4.10	4.08	5.00	4.97	4.33

Table 14: Importance of geographical regions

Table 14 above clearly shows that the Home Country and Europe are the most important areas for our respondents. Interestingly, as companies become more global, Europe rises compared to Home Country. The US and Canada area is the third most important, especially between companies covering more continents or being Global in scope. Surprisingly, the Middle East and Africa, despite the huge natural resources, are seen as less important than all other regions except Latin America. Asia Pacific is not seen as important, despite the significant number of developing markets and next frontier markets located in the Region. Finally, Russia and Central Asia are of mid-importance across the board, with a significant decrease of importance when we look at continental companies.

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Bridging the gap between Industry and Academia

The presence of a gap between the needs of the industry and the modus operandi of the Academia is often discussed in the public debate, especially in countries such as Italy. According to several parts of the general public, there is a difference between what the Academia wants to (and can) teach, and what the industry would need to ultimately increase development. This is a debate covering not only universities, but rather the whole educational system.

In order to investigate this issue, we worked with a two-step process:

1. We want to understand what the size of such gap is, if any, and if it variates regionally;
2. We want to understand how this gap can be bridged, in order to implement the most efficient strategies within the GrEnFIn curriculum.

Assessing the gap

The first thing we want to understand is whether there is a gap or not. To do so, we asked whether respondents feel that Academia is able to supply the professionals they need to meet the demands related to the energy market. Results, showing the percentage of companies answering *false* to the question above, i.e. the Academia *not being* able to provide such professionals, by Region, Stakeholder group and Overall, are shown in Table 15 below.

	Central Europe	Eastern Europe	Southern Europe	Overall
Financials	54.5%	70.0%	50.0%	57.1%
Producers	0.0%	67.9%	56.0%	54.8%
Industrials	NA	66.7%	23.5%	33.3%
Policymarkers	62.5%	60.0%	45.3%	50.0%
Overall	42.3%	66.7%	44.6%	50.5%

Table 15: Respondents feeling Academia is not able to provide the needed graduates

As can be seen, there is a perceived gap across a little bit more than half of the sample. Such gap is stronger in Eastern Europe than in other parts of the continent, and it is particularly strong within Financial companies.

The results assessing where such a gap is widest are shown in Figure 24 below. Although when summed up Soft, Transversal and Managerial skills are assessed as showing the widest gap, we can clearly see that Technical skills are seen as the core problem by our respondents.

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What emerges from this picture is a misalignment between the professionals provided by Academia and the needs of some parts of the economy.

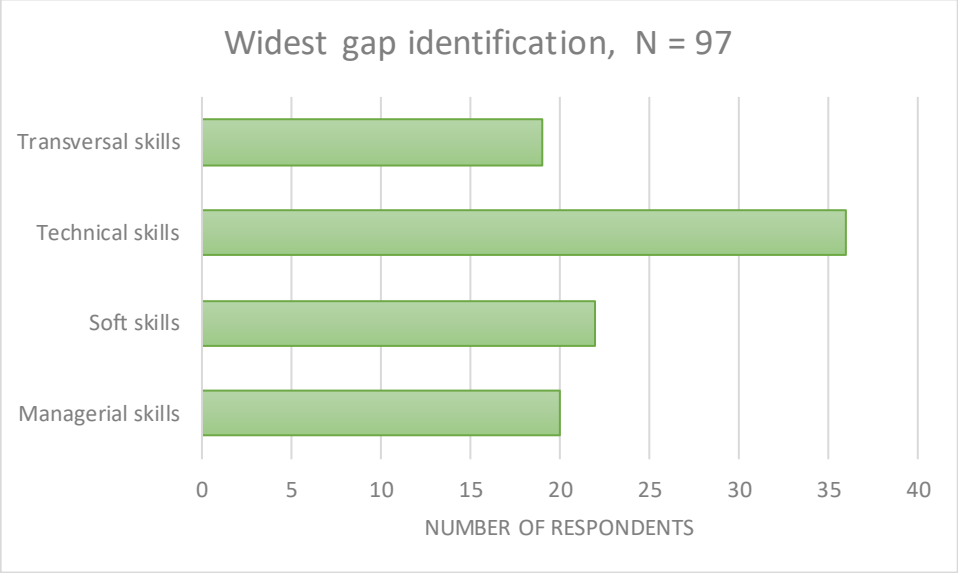

Figure 24: Widest gap

We now try to understand what the perceived weaknesses of Academia are. To do so, we use the full sample of respondents and not just the ones identifying a gap. Also, please note that multiple answers were available for this question.

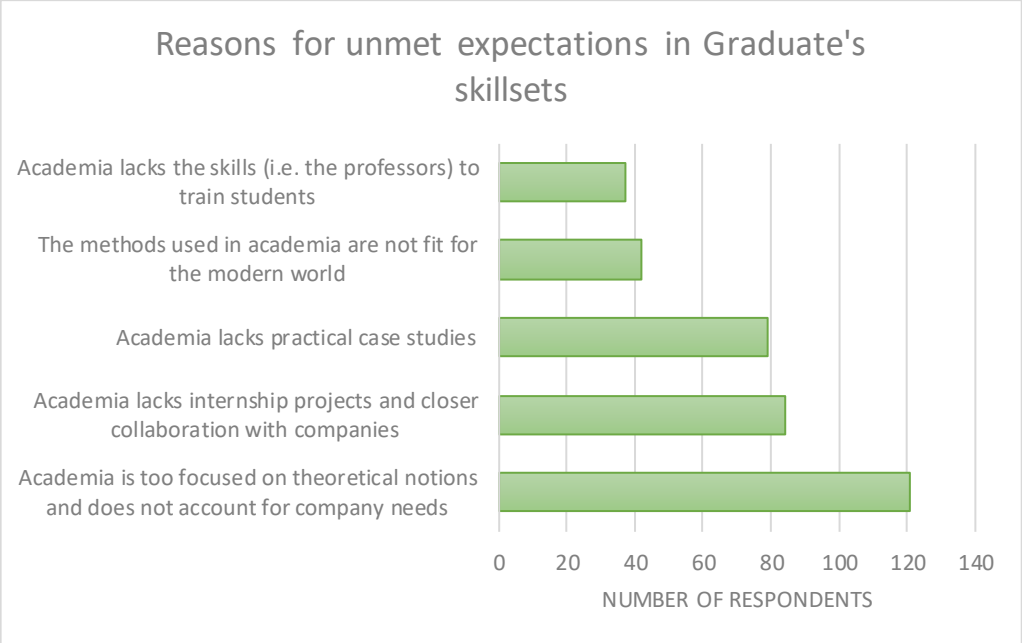

Figure 25: Unmet expectations, reasons

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The specific question asked why the hired graduates did not meet specific expectations. The picture that emerges from the chart is clearly pointing in the direction of an excess theoretical focus by Academia and, in general, in a lack of practical applications tailored to companies' needs.
This is clearly an issue which points at the very core of the gap and should be tackled in effective and innovative ways in the GrEnFIn project.

We now want to assess how deeply expectations are met (or not met) across hard and soft skills. For this purpose, we asked respondents to evaluate whether their expectations were met in specific skills, using a scale from 1, absolutely not met, to 5, fully met. The skills assessed matched the ones we ranked for importance in the previous sections, so it's possible to compare the results of the two tables. We first discuss Hard skills.

Subject	Average	1	2	3	4	5
Political science	1.93	**56%**	11%	22%	9%	3%
Chemistry (theoretical and engineering)	2.16	**52%**	10%	18%	12%	9%
Law	2.29	**38%**	**19%**	24%	11%	7%
Materials (theoretical and engineering)	2.35	**43%**	8%	**28%**	14%	7%
Sustainability (including carbon and GHG)	2.45	**36%**	**18%**	19%	**19%**	8%
Physics (theoretical and engineering)	2.52	**37%**	12%	21%	**20%**	**10%**
Statistics	2.53	33%	**15%**	**25%**	18%	9%
Mathematics	2.53	**36%**	9%	**29%**	**19%**	7%
Finance (corporate)	2.56	33%	**16%**	**25%**	15%	**11%**
Finance (financial markets)	2.57	33%	**14%**	**26%**	18%	**10%**
Mechanics (theoretical and engineering)	2.66	**36%**	7%	23%	**22%**	**12%**
Programming	2.69	29%	**14%**	**26%**	**22%**	9%
Environmental Science	2.80	26%	10%	**33%**	**19%**	**12%**
Languages	2.93	27%	8%	25%	**27%**	**13%**
Economics	2.96	21%	**13%**	**28%**	**25%**	**13%**

Table 16: Meeting expectations

Interesting to notice, despite Political Sciences were assessed as not relevant by respondents, still there is a feeling of a gap in this field. Two of the most important subjects, Law and Sustainability, are largely felt as "not met expectations" and hence should be appropriately assessed within the programme. Other important subjects, such as Economics, Languages and Environmental Sciences, are assessed as generally satisfactory met by stakeholder, and it is hence necessary to build up on the previous work in these Subjects within the curriculum.
The picture is similar for Soft skills, as shown in Table 17 below.

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Subject	Average	1	2	3	4	5
Leadership	2.54	**23%**	**26%**	31%	14%	6%
Time management	2.72	**19%**	**18%**	**41%**	17%	6%
Communication	2.90	15%	**18%**	**36%**	24%	7%
Creativity	2.91	17%	13%	**39%**	23%	8%
Adaptability	3.03	17%	9%	**38%**	**28%**	8%
Flexibility	3.05	15%	**14%**	**35%**	24%	**12%**
Problem-solving	3.05	16%	11%	**37%**	24%	**12%**
Responsibility	3.07	17%	11%	32%	**28%**	**12%**
Work ethic	3.19	**18%**	8%	27%	**32%**	**15%**
Team working	3.21	16%	8%	27%	**37%**	**12%**

Table 17: Meeting expectations, Soft skills

Again, respondents are less satisfied with the skills they see as less important, and overall, more satisfied with the ones they see as more important. This is a positive sign but should not be overestimated and suggestions toward the importance and training of soft skills should be fully taken into account.

The main difficulties encountered when hiring a graduate variate within respondents, but generally point in the direction of lack of practical experience and lack of commitment / willingness to learn; hard skills gap, especially on quant skills, are mentioned in the sample as well.

Closing the gap

We now want to understand how to close the gap between industry and Academia. To do so, we proceed as follows:

1. We assess the importance of a set of initiatives to close the gap, in order to identify the best ones;
2. We assess whether respondents would be open to host interns and under which conditions;
3. We check the collaboration of companies in thesis project, intensive programmes and lectures, hiring of graduates after completion of internships or thesis projects.

We first assess four different initiatives that we believe can be useful, in order to check preferences from respondents:

- Company lectures;
- Company trainings and Intensive programmes;
- Internships;
- Thesis projects.

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The results are summarized in Table 18 below. Interesting suggestion gathered using the "Other" section include Joint curriculums, "Reverse" Intensive programs and Research projects. They are not assessed in the following table.

Initiative	Average	1	2	3	4	5
Company lectures	2.98	**17.7%**	**14.6%**	**31.8%**	23.7%	12.1%
Company trainings / Intensive Programmes	3.63	11.6%	6.6%	16.7%	**37.4%**	**27.8%**
Internships	3.65	14.1%	4.0%	17.7%	**30.8%**	**33.3%**
Thesis projects	3.10	**17.2%**	**9.6%**	**33.8%**	24.7%	14.6%

Table 18: Closing the gap, relevant initiatives

Respondents clearly lean toward Company trainings, Intensive programmes and Internships in order to bridge the gap. This is true both in terms of averages and distribution.

We will now go into more details, assessing first Company lectures, trainings, intensive programmes and thesis projects, before discussing internships.

The positive lean toward collaboration across all stakeholders is clearly highlighted in Table 19 below.

Initiative	Financials	Producers	Industrials	Policymakers	Overall
Both lectures and intensive programmes	36%	47%	25%	46%	**42%**
Only lectures	39%	23%	29%	27%	**28%**
Only Intensive Programmes	4%	11%	13%	5%	**8%**
None	21%	19%	33%	21%	22%
Initiative	**Financials**	**Producers**	**Industrials**	**Policymakers**	**Overall**
Thesis	82%	82%	63%	80%	**79%**

Table 19: Closing the gap, Intensive programmes and lectures

The table shows, in the upper pane, the percentage of respondents prone to giving lectures, intensive programmes, both or none. In the lower pane, the percentage of respondents prone to collaborate in thesis projects. The separation is due to the fact that the initiatives, being somewhat different in nature, were assessed in different questions.

What is important to notice is the positive willingness by companies to be involved in academic activities, which is cornerstone for collaboration within the project.

Finally, we summarize the results for Internships in the table below. We assess different aspects:

- What share of respondents would be open to hosting interns and, within them, what share would hire a successful intern;
- How many interns would be hosted and for how long.

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Table 20 below speaks to the first question. In general, we see there is a significant interest for internships across all respondent categories, with potentially good retention rates after the internship.

	Would hire an intern (N)	Would hire an intern (%)	If yes, would keep after the internship
Financials	23	82%	82%
Producers	53	85%	74%
Industrials	16	67%	58%
Policymakers	63	75%	64%
Overall	155	78%	69%

Table 20: Internships

Please note that the last column is measured as percentage of companies actually open to host interns, i.e. it's measured only on the N listed in the first column. For example, for Financials, we have 23 companies out of 28 (or 82%) that would host interns; out of those 23, 82% would actually keep the intern after the completion.

Finally, we turn to the internship characteristics in Table 21 below. Please note that the totals are different from above since the questions were optional and hence have not been replied by all respondents.

	Number of interns				*Hosting time*			
	1	**2 to 4**	**4 to 8**	**8+**	**1 month**	**3 months**	**6 months**	**More than 6 months**
Financials	7	**9**	2	5	2	10	7	4
Producers	**9**	**23**	5	**15**	6	**16**	**14**	**17**
Industrials	4	8	0	1	2	6	5	1
Policymakers	**25**	**30**	4	3	6	**20**	**29**	7
Overall	**45**	**70**	11	24	16	**52**	**55**	29

Table 21: Internships characteristics

The table clearly show shared preferences across the board for:

1. A limited number of interns, in the range of 1 to 4;
2. A time duration between 3 and 6 months.

Assessing and bridging the gap: summary

To summarize, a detailed assessment of the gap between the graduates provided by the Academia and the ones requested by the Industry highlights that this phenomenon is perceived as relevant by roughly half of the respondents, especially in Eastern Europe, and stronger within Technical skills. The reasons

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for this gap stem mostly from an excessively theoretical focus from Academia and the inability to suit companies' needs.

At hard skills level, the most critically unmet expectations are within Political Sciences, despite being seen as overall not relevant, Law and Sustainability; together with technical skills such as Chemistry or Physics. At the soft skills level, the ones seen as less important in the previous assessment are also considered the least satisfied ones.

To close the gap, Company trainings, Intensive programs and Internships are seen as the most efficient actions across the board. The sample shows a good interest from companies to collaborate in such projects, and in retaining successful graduates after Internships.

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Professional module

The last section of the survey speaks to the Professional module. We are interested in the following three questions:

1. What are the most important areas for life-long learning;
2. How many days per year of training should be delivered;
3. Which would be the best delivery method for life-long learning.

A summary of responses regarding the most important topics is provided in the Table below.

	Financials	Producers	Industrials	Policymakers	Overall
Latest geopolitical trends	**3.89**	3.11	2.88	3.06	3.17
New financial products	3.75	3.18	2.29	2.90	3.04
New mathematical / statistical models	3.25	2.90	2.13	2.75	2.79
New regulations	**4.18**	**4.19**	3.67	3.86	3.98
New technologies (development phase)	**4.00**	**4.24**	3.46	**3.94**	3.98
New technologies (research phase)	3.43	3.69	2.88	3.54	3.49

Table 22: Areas for life-long learning

As can be easily spotted, and confirming the trends highlighted above, New regulations are the biggest concern for stakeholders, together with technologies already in the development phase. Confirming the trend about pure modelling skills, New mathematical and statistical models are seen as least important by stakeholder; also, consider that these are particularly important within financials and much less within other macro-categories. Financial products are interestingly very important for Financials, but much less for other stakeholders including, surprisingly, Industrials. Same reasoning applies to Geopolitical trends, where Financials give much higher importance. Technologies currently under researched complete the picture and are assessed as most important by Producers and Policymakers.

Next, we want to understand how many days of training should be delivered and in which format. In the charts below we can notice two important takeaways.

1. There is a significant demand for training, also for prolonged periods;
2. In person training are, within our sample, considered the best delivery option.

We can discuss Point 1 from the first chart, in Figure 26.

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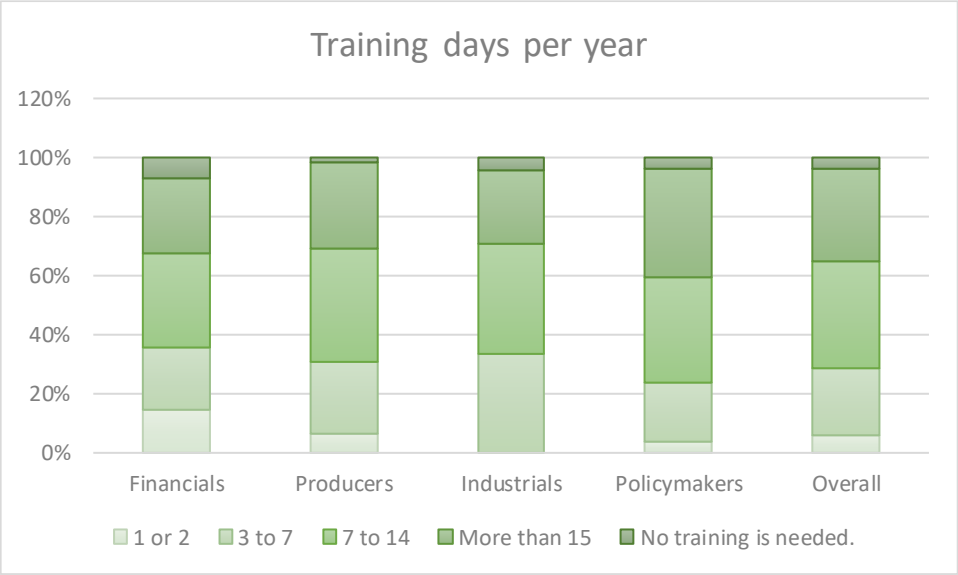

Figure 26: Trainings day per year

Clearly, short options (1-2 days) and No training options are not at all successful within our stakeholders. The preferred option is the 7-14 one, but there is a significant share of respondents declaring that more than two weeks per year would be needed for their employees to stay "on top" for what concerns energy market news.

Finally, the next chart, in Figure 27, speaks to Point 2 above.

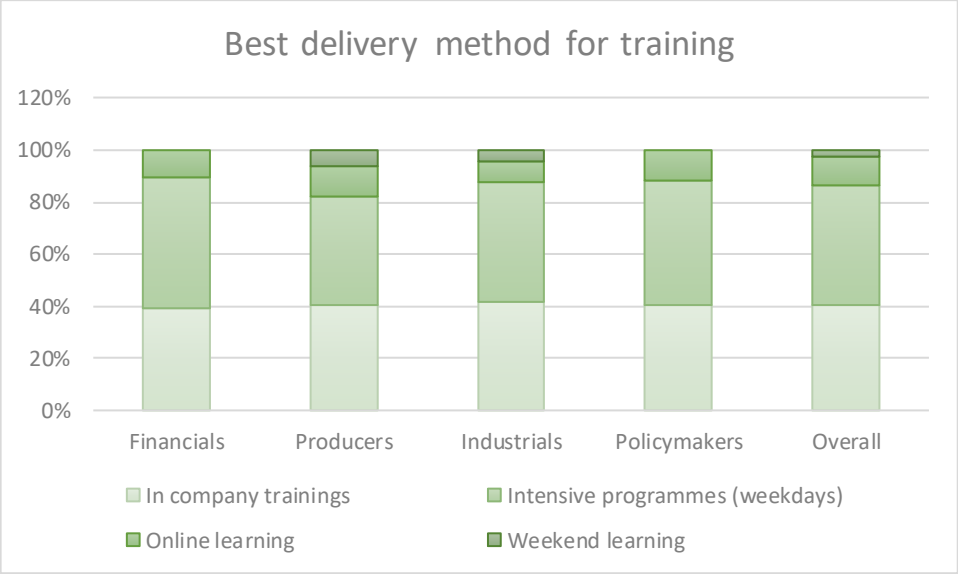

Figure 27: Delivery method for training

The picture is again clear. Weekend learning is ruled out basically across the board and online learning, despite the surge in popularity in recent times, is not well seen. There is hence an almost even split in preference between proper intensive programmes and formal in-company trainings. This finding points

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in the direction of well-structured and tailored programmes, to be delivered during the week in a non-centralized manner.

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Summary and conclusions

We want to use this part for three separate purposes:

1. To wrap-up the most important points for the development of the GrEnFIn curriculum, as they emerged from the survey;
2. To compare such main take-aways with preliminary work on the curriculum that has been conducted in Bologna during the kick-off meeting;
3. To conclude this report pointing to the next steps.

Wrap-up

Overall, 198 questionnaires have been filled out. Given the collected number of contacts, 461, and an upper bound of reached contacts of 922, the response rate is between 21.50 and 42.95% and hence satisfactory.

The respondents' profiles are distributed across macro-categories with a light skew, having received the most answers from Policymakers (84), followed by Producers (62), Financials (28) and Industrials (24).

Other samples characteristics can be summarized as follows:

- Ownership: mostly private companies;
- Size: mostly large companies;
- Countries: Southern, Eastern and Central Europe are the most represented regions in the sample;
- Internationalization: across the sample, roughly half of the respondents have international branches or subsidiaries;
- Respondent's role: heterogeneous distribution.

Responses clearly show that the energy transition is real and is now. Few companies are not impacted or have left the transition behind them, mainly in the Industrials and Policymakers categories.

Main challenges faced are different across stakeholders and can be identified as:

- For Financials, Internal processes;
- For Producers, Competition, Regulation, Strategic planning;
- For Industrials, Investments and R&D decisions;

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- For Policymakers, Increased demand.

The balance of opportunities and challenges is unequal across regions, although it tends toward the more opportunities bucket overall.

Despite companies seem to be generally prepared for current and past challenges, there are significant skill gaps that should not be ignored.

Future expectations point in the direction of a somewhat greener, but not Paris-aligned, economy, together with an increase in challenges related to the energy transition. Companies feel to be ready for the transition, or working to get ready, while the fraction of non-ready companies is negligible in the sample.

Digging into the major risks by category, we found out the following:

- For Financials, number one issue is Regulation. Public scrutiny, Competition and Portfolio risks follow;
- For Producers, number one issue is dependent on the location. In Southern Europe, it's Regulation; in Eastern Europe, it's Stranded assets. There is a clear indication of higher concerns in Eastern Europe overall, while challenges are limited from a Central European's perspective;
- For Industrials, number one issue is Regulation, followed by concerns related to switching from brown to green technologies;
- For Policymakers, number one issue is the Increased competition, highlighting significant growth expectations. Important are also Regulatory and Funding-related concerns.

Finally, it is clearly highlighted by respondents that there is a significant need for the professional figure of the Sustainable Energy Expert. Such figure is scarcely available in the market, but part of hiring plans across the board. We believe this is a strong signal for the Academia and important evidence supporting our development plans for the GrEnFIn curriculum.

The current workforce is mainly coming from an Engineering, Economics or Financial background. Sciences, Sustainability and Mathematics/Statistics follow, while Law and Humanities lag behind. From a qualification perspective, MSC graduates constitute the largest share, while BSC graduates are the second most represented group.

In the overall picture, hard skills in Economics, Sustainability and Environmental Sciences show capital importance. The next bucket by relevance includes Law and Languages, followed by

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Engineering subjects and relevant, more technical, knowledge. Studies in Political Science and Marketing are generally seen as less important for the Energy expert's profile.

Within Economics and Finance, skills related to cost-benefit analysis and Economics are deemed as more important, while market-related skills are seen as less relevant. This is true for non-financial companies and confirmed by the trends within Financials.

Within Engineering skills, the most relevant are the ones related to Energy networks, Smart grids and Renewable generation. This trend is confirmed by the picture for Producers, where the most significant generation technologies are highlighted as Solar PV, Wind and Biomass – while Nuclear and non-renewable power lack interest.

For what concerns programming and IT, Excel still represents the most used tool, followed by programming languages such as MATLAB or Python. Also, the survey has highlighted several suggestions on the need to include AI and IoT in the curriculum.

Soft skills are seen as extremely relevant across the board, with the ones related to Problem-solving, Responsibility and Team working being the most important. In terms of time, respondents see an amount spanning between 10 and 20% of a 40hrs/week constituting the ideal space for soft skills development. Preferred methods for training include Seminars and Specific projects.

For respondents in the sample, the main focus area is seen to be Europe, followed by US and Canada. Latin America, Africa and the Middle East are not seen as central stages in the sample.

A detailed assessment of the gap between the graduates provided by the Academia and the ones requested by the Industry highlights that this phenomenon is perceived as relevant by roughly half of the respondents, especially in Eastern Europe, and stronger within Technical skills. The reasons for this gap stem mostly from an excessively theoretical focus from Academia and the inability to suit companies' needs.

At hard skills level, the most critically unmet expectations are within Political Sciences, despite being seen as overall not relevant, Law and Sustainability; together with technical skills such as Chemistry or Physics. At the soft skills level, the ones seen as less important in the previous assessment are also considered the least satisfied ones.

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The most important topics for life-long learning are New regulations and New technologies in the Development phase, followed by Technologies under development and Geopolitical trends. The preferred delivery methods for such trainings are in-company trainings and Intensive programs, covering multiple weekdays during the year. There is a clear preference for longer training days amounts and a clear case against online and weekend learning.

Link to the draft curriculum

During the kick-off meeting held in Bologna in November, the Academic partners have started a discussion around the possible structure of the future curriculum. This draft was developed in three different tracks:

1. Scientific/Technological;
2. Risk and Finance;
3. Social Welfare – Policy and Economics.

While some of the specific topics included in the tracks have not been explicitly addressed by the survey, we found in the consultation a good support for both the tracks and their content.

The skills seen as most important by consulted stakeholders, i.e. Economics, Sustainability, Environmental Science, Law and Finance, speak well to this structure. It is indeed possible, while keeping Sustainability and Economics as a common denominator, to identify a structure similar to the one imagined at the kick-off meeting.

If we look in details at the tables at pages 25 onward regarding hard skills, we can group the most significant ones, of course keeping as a common denominator a multi-disciplinary perspective, in the following way:

- Group 1: Sustainability (including Carbon and GHG), Environmental Science, Mechanics, Programming;
- Group 2: Finance (Corporate and Market), Statistics;
- Group 3: Economics, Languages, Law.

Going at a deeper level, i.e. taking a closer look at the specific skills within the groups, we can go as follows:

- Group 1: Energy networks, Smart grids and Renewable generation; specifically, suggestions point in the direction of Electricity storage, Networks, Smart grids, Solar photovoltaic, Wind energy, Biomass and Waste to power;

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- Group 2: mostly corporate finance, especially cost-benefit analysis, and Risk management; specifically, suggestions point in the direction of a crucial role of Risk management, Sustainability (and sustainable investing) and Corporate finance – while traditional Equity and Fixed income analysis are not seen as crucial skills in our sample;
- Group 3: requested Economics skills point in the direction of Environmental and Development Economics, followed by International Finance and Economics.

We can hence easily see how the skills highlighted as most important by stakeholders can be grouped in different tracks; we believe this will be the best way to leverage properly the skills of the different stakeholders involved in the project, as well as to meet in the most efficient way the needs of respondents involved in this survey.

The imagined tracks can also be seen as answering the different challenges highlighted by stakeholders in various parts of the survey, specifically: for Group 1, the need to address challenges related to Investment decisions, R&D priorities and Stranded assets; for Group 2, challenges related to Investments decisions and products, Financing and Pricing; for Group 3, challenges related to Regulation and Sustainable development.

On top, important soft skills training as highlighted in the discussion above, together with a close collaboration with companies, will complete the final program set-up.

This structure will make it possible to shape different blends, building overall the professional figure of the Sustainable Energy Expert as solid and ductile, adaptable to multiple geographical and economical settings in a changing world.

Next steps and conclusions

Future steps within the WP2 are focused on a close collaboration with the project partners for the further development of the Academic curriculum and Professional module.

Concluding the current report, we believe it is important to sincerely thank all the stakeholders that have been involved in the project dedicating their time to the survey, despite the extraordinary times. We believe the feedback gathered offers a strong grounding for the relevance of the GrEnFIn project in the current economic context, together with crucial directions on how to develop the Academic curriculum and the Professional module.

The results from the sample also offer important insights in the energy transition, its dynamics, and the expectations around the economy of the future. We understand that the times are challenging, and significant efforts are required to tackle the issues discussed in this report and the new ones that will

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become clear only further down the road. But we strongly believe that the joint efforts of Academia and Industry can play a significant role now as well as in the future, supporting the development of a low carbon world. And we are convinced that, by shaping new, young generations of professionals, the GrEnFIn project will contribute to this collaborative journey toward a more sustainable, and ultimately more just, society.

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WP2 - D2.3 - Report on the consultation-Survey's Report

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