XPRESS

Facilitating green
public procurement
in the energy sector

Deliverable 1.2

Deliverable 1.2

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XPRESS strategy

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INTRODUCTION

Recent studies (Ghisetti[1], 2017 and Mowery et al[2], 2010) show that the uptake of *climate-friendly technologies* (namely **EI**) may be influenced by public policies. This is because the transition to more sustainable production requires the invention, adoption and diffusion of radical and, consequently, highly risky innovations, and huge funds for investment, which are unlikely to be raised exclusively by the private sector on its own. As innovative SMEs pave the way for the break-through of early-stage environmental technologies, they produce positive externalities and add value for the society as a whole. For both reasons environmentally innovative SMEs require and are eligible to receive public support in their early-stage deployment. *Green Public Procurement* (**GPP**) reduces the investment risks inherent in radical innovations with uncertain markets and demand. Subsequently, as GPP creates niches for the emergence of early-stage environmental technologies, it can be a valuable instrument to encourage early adoption of these technologies and to allow their easier diffusion.

As recently suggested by the OECD[3], GPP policies have a natural appeal, as they combine increased concern about environmental quality with a not-unreasonable belief that governments ought to lead the way by improving their own purchasing habits (Marron, 2003). Examples for GPP are purchasing vehicles powered by low-emission renewable fuels and, and electricity from renewable energy sources such as solar and wind.

At the end of 2017, the European Commission[4], as part of an action plan[5] aiming at making public procurement more efficient and professional, launched a consultation[6] on a draft guidance[7] on innovation through public procurement.

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[1] Demand-pull and environmental innovations: Estimating the effects of innovative public procurement, Technological Forecasting and Social Change, Volume 125, December 2017, Pages 178-187 https://doi.org/10.1016/j.techfore.2017.07.020

[2] Technology policy and global warming: Why new policy models are needed, Research Policy, Volume 39, Issue 8, October 2010, Pages 1011-1023

[3] The Role of Public Procurement in Low-carbon Innovation, OECD Report 2016 (https://www.oecd.org/sd-roundtable/papersandpublications/The%20Role%20of%20Public%20Procurement%20in%20Low-carbon%20Innovation.pdf). Edler and Georghiou (2007) emphasize the role of Public Procurement for innovation in general.

[4] http://www.housingeurope.eu/resource-1043/eu-wants-to-make-public-procurement-more-innovative

[5] http://ec.europa.eu/growth/content/increasing-impact-public-investment-through-efficient-and-professional-procurement-0_en

[6] http://ec.europa.eu/growth/content/targeted-consultation-draft-guidance-public-procurement-innovation_en

[7] http://ec.europa.eu/docsroom/documents/25724

The main messages coming from this survey were:

- If public procurers screen the market for solutions that are already available or under development, they may find that suitable innovative solutions already exist, or that they can be easily created by adapting or combining the existing ones, or that the market may be able to develop an innovative solution in a satisfactorily short time.
- With appropriate market consultation, public procurers can gain the necessary knowledge of the existing solutions, parameters, properties and measurable indicators.
- The European Commission action plan therefore recommends establishing a platform where public procurers and economic operators could share, comment and evaluate their experience with the functional technical specifications and award criteria.
- While until recently SMEs were often deterred from participating in public procurement procedures by the bureaucratic overhead, the new EU rules allow for a detailed standardised self-declaration by tenderers that they fulfil all administrative requirements.

According to the consultation[8] promoted by the EU Commission in order to support and facilitate Innovative Public Procurement (**IPP**), while SMEs can access EU funding (COSME[9]) to support their innovative projects, in some sectors they strongly rely on public procurers for uptake of their innovative solutions, while the procurers may need to build upon the innovation potential of these same companies in a synergetic fashion.Those findings show the need of further interventions in the area of *Green Public Procurements* (**GPPs**).

However, at present firms willing to invest in RES face financial constraints as banks and other financial sector firms hesitate to supply funds for investing in RES. Uncertainty about the probability of survival of innovative SMEs and the likelihood of continuing supply service from these firms can be a crucial obstacle to firms' investment.

According to a recent OECD report[10], from an economic perspective, the design of public procurement to promote green, sustainable or low-carbon innovation can be justified on three grounds:

[8] http://ec.europa.eu/growth/content/targeted-consultation-draft-guidance-public-procurement-innovation_en
[9] https://ec.europa.eu/easme/en/cosme-0
[10] The role of Public Procurement in low carbon innovation (2016).

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i. *Structural inefficiencies in government purchasing*, e.g. a focus on upfront acquisition cost when the inclusion of operating and disposal costs could lead to a more environmentally-conscious choice. More specifically, according to COM(2017) 572 55% of procurement procedures still apply exclusively the lowest price as award criterion even if the new criterion for assigning tenders is the new defined Most Economically Advantageous Tender (***MEAT***) principle.

ii. *An environmental market failure*, e.g. the absence of a price on CO2 emissions due to political constraints, while a government may choose to include a CO2 price to guide its own decisions;

iii. *Insufficient support for innovation* in light of positive externalities related to the demonstration and adoption of new technologies, learning and network externalities, etc. (Marron[11], 2003).

In summary, public procurement is a well-established government tool to correct market failure and to ease financial constraints caused by innovation risk and information asymmetries, but it is also subject to close public scrutiny wanting to ensure integrity and the best value for taxpayers' money. A recent OECD survey shows that public procurement in most OECD countries is changing from a plainly supporting tool to an instrument of incentivizing strategic innovation that helps to achieve sustainable development goals. The crucial question is therefore, whether and how governments can use the tool of public procurements to initiate and promote effective and efficient innovations capable of accomplishing the low-carbon transition.

The XPRESS project will provide solutions to overcome barriers to a broad deployment of innovative RES technologies along two dimensions:

1. using *smart GPPs* to create the new market and to strengthen the performance of RES innovators. *Smart GPPs* requires committing to the MEAT principle for achieving environmentally-conscious choices and taking into account the positive externalities of RES promotion.

[11] Greener Public Purchasing as an Environmental Policy Instrument (2003).

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2. developing *innovative financing tools* and sharing best practices in order to support innovative SMEs so that they are able to cost-effectively uptake innovative RES technologies along their complete value chain.

The XPRESS project will contribute to the promotion of GPPs and to the progressive elimination of barriers to investments in renewables. The project will benefit from the actions undertaken by the EU to foster Clean Energy for European countries and via funding programmes designed to help businesses, regions, and countries successfully implementing RES projects such as the European Structural and Investment Funds (**ESIF**) and the European Fund for Strategic Investments (**EFSI**).

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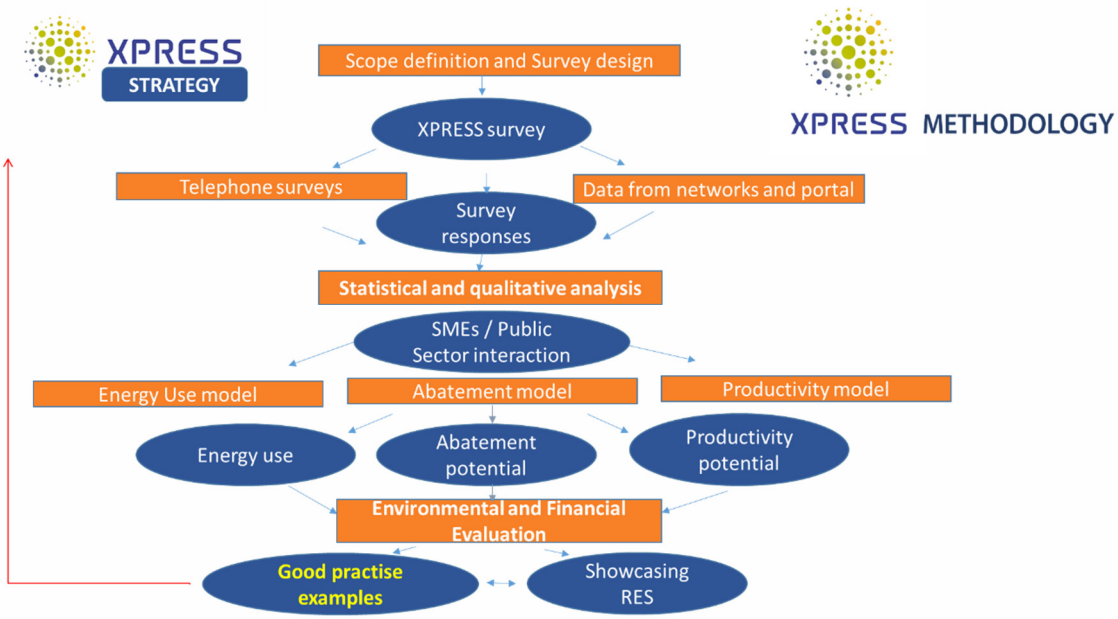

Figure 1 – XPRESS Methodology

More specifically, the ***XPRESS*** consortium aims to pursue the following goals in the three year project:

1. ***Analysing the financial constraints affecting RES innovations*** (Ghisetti 2017 and Ghisetti et al. 2015): the *perception of financial barriers* (rather than the actual barriers) is a deterrent for unlocking the benefits of the eco-innovative capacity of EU firms for the firm itself and the society as a whole. As the lack of proper regulations stimulating RES through the provision of incentives and tax credits does not seem to affect firms' propensity to eco-innovate, financial constraints affect most severely those firms with large capacity to innovate and a

high stock of eco-innovative projects since those firms need particularly large funds to implement their numerous projects (see Hottenrott and Peters 2012[12] and Schäfer, Stephan and Mosquera 2017 for the close link between innovative capacity and financial constraints). Although future increases in energy prices and more restrictive carbon regulations will increase the profitability of investments in RES facilities and, thus, ease financial constraints, currently the financial sector still hesitates to invest in RES facilities. Mobilization of private funds to foster RES facilities remains low. Little is known about the chances to ease financial constraints and to generate large investment volumes by expanding and improving GPP strategies (Mazzucato and Semieniuk 2017). However, it is obvious that obstacles for achieving a higher attractiveness of investments in RES facilities for firms, financial institutions and investors are manifold. First of all, there are no easily available statistical data on the actual energy and costs savings achievable both in physical and monetary terms. Credit risk is difficult to assess given the data gaps on funding of eco-innovations, particularly data on debt service, on arrears and defaults are missing. At the same time, the banking business is undergoing a profound transformation due to digitalization. New competences and expertise are required to meet a changing demand and new regulations. Currently banks are often unable to pool and securitize their, possibly small, loans for investment in RES facilities, and issue, for example, green bonds covered by the pool's assets. Borrowing conditions for small investment volumes in RES are often less favourable than borrowing conditions for large investment volumes. In addition, firms have severe information deficits when it comes to the question of how to mitigate their innovative risk and what financing tools are suitable and available. Finally, there is a lack of robust statistical evidence about the importance of both investment in RES and related financial tools, such as "smart loans" or "Green bonds", for firms and investors. These barriers are particularly severe for Small and Medium Enterprises (SMEs) and for younger firms who, given the nature and size of their business, struggle more than other companies in getting funds for the scope.[13] GPP is likely to play a crucial role in developing lead markets for RES facilities and, thus, in mitigating the various funding risks for financial institutions. Lower funding risks would relax financial

[12] The Review of Economics and Statistics, 2012, vol. 94, issue 4, 1126-1142

[13] Lopez de Silanes, McCahery, Schoenmaker and Stanišić (2015), Banerjee (2014) among others analyse the specific funding constraints for SMEs. Baum, Schäfer and Talavera (2011) assess what role national financial systems play for easing firms' financial constraints.

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constraints. There is some evidence that IPP is even more cost-effective than traditional Research and Development (R&D) subsidies[14] as it increases the rate of adoption of innovative technologies and stimulates the demand for RES while mitigating the funding risk for financial institutions (Guerzoni and Raiteri 2015). However, a more detailed evaluation involving case studies and multivariate econometric analysis is necessary in order to understand how IPP affects financial constraints of RES-innovators and success of innovative solutions.

2. ***Analysing the barriers and challenges to innovative green tenders (GPPs) for the public sector*** (OECD): as suggested by the Guidebooks on support to SME policy from structural funds, the main barriers faced by the Public Sector when considering whether to invest in innovative solutions are:
    a. *Lack of knowledge and expertise*;
    b. *Wrong priorities* with a focus on short-term costs providing no incentives for taking on the additional risks (and initial costs) of purchasing innovative solutions;
    c. *Mismatch with public policies and strategies* insofar as procurement is treated as a purely administrative, legal or financial task without reference to public policy objectives such as improving health, environment and energy;
    d. *Lack of capability in public organisations to identify innovative solutions*;
    e. *Fragmentation of demand/lack of critical mass* due to the dispersed nature of procurement action across borders and administrative boundaries.
3. ***Supporting Public Authorities in minimizing any financial and regulatory constraints*** in their support for investments in RES;
4. ***Providing financial evaluation of barriers faced by SMEs*** who want to collaborate with the public sector on RES innovations: according to the Innobarometer survey[15], since 2009, only 7% of the companies have sold innovative solutions to the Public Sector;

[14] Lööf, Perez and Baum 2018 and Cecere, Corrocher and Mancusi 2016 investigate the impact of traditional R&D subsidies on eco-innovations.

[15] Source: Guidebook on support to SME policy from structural funds.

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5. ***Providing informed advice on SME friendly procedures*** to facilitate their involvement in GPPs: according to the Guidance on Public Procurement of Innovation, SMEs and start-ups are often deterred from participating in public procurement procedures by the bureaucratic overhead. Depending on the country and authority they are asked in various ways about exclusion and selection criteria. Often they need to provide administrative certificates evidencing legal standing, economic and financial capacity, etc., which they have to submit along with their offer.

   The *new EU directives*[16] provide for a detailed standardised self-declaration by tenderers that they fulfil all administrative requirements. According to the Guidebook on support to SME policy from structural funds, the new directives will encourage companies to develop their capacity for innovation, while maintaining the basic requirements of competition, transparency and equal treatment. The Member States had to transpose them into national law, at the latest by April 2016. Since direct beneficiaries of IPP actions are always public bodies, IPP actions can indirectly help innovative SMEs by giving them an opportunity to find a lead customer and bring their innovations faster to the market and obtain faster return on investments. But this new regulatory setting needs to be properly explored in practise in order to understand in full its impact on the economy.
6. ***Learning from current initiatives*** in the US and some EU countries (i.e. for example the Small Business Innovation Research (SBIR) in the US and the Small Business initiative in UK);
7. ***Supporting and augmenting existing web-pages[17] and toolkits***.
8. ***Analysing the environmental impact of RES innovations carried out by GPPs***: many business associations and industry companies already use the life-cycle approach to improve the sustainability of their products and processes and to measure in a scientific way the achieved goals. For this reason, the LCA applications have been increasingly used by industry also as design tool to drive the choices of business development, to improve competitiveness and in communication with governmental bodies. In the last ten years, the LCA analysis is progressively more integrated with the socio-economic issues, so that the LCA is coupled with *LCC-Life Cycle Cost* and *SLCA-Social Life Cycle Assessment*, to get a comprehensive sustainability analysis. The public sector equally makes use of *life-cycle*

[16] Directives 2014/24/EU and Directive 2014/25/EU.

[17] Procurement Innovation Platform, Procurement Forum, European Assistance for Innovation Procurement Toolkit, Tenders Electronic Daily, GPP 2020 .

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thinking (LCT) in stakeholder consultations and in policy implementation. This ensures that the big picture is taken into account in policy-orientated environmental assessments, considering upstream and downstream trade-offs. LCA is a good tool for this and contributes to efficient product policy by providing additional valuable information on environmental performance of goods and services. LCA can contribute to the analysis of the environmental performance of production and consumption patterns on various levels. To evaluate the sustainability profile of RES investments, the environmental, economic and social aspects will be analysed from a life-cycle perspective for all the stages from design, to construction, use, maintenance and final disposal.

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1. Data collection and organisation

The input data for the XPRESS analysis will combine secondary source with primary source data.

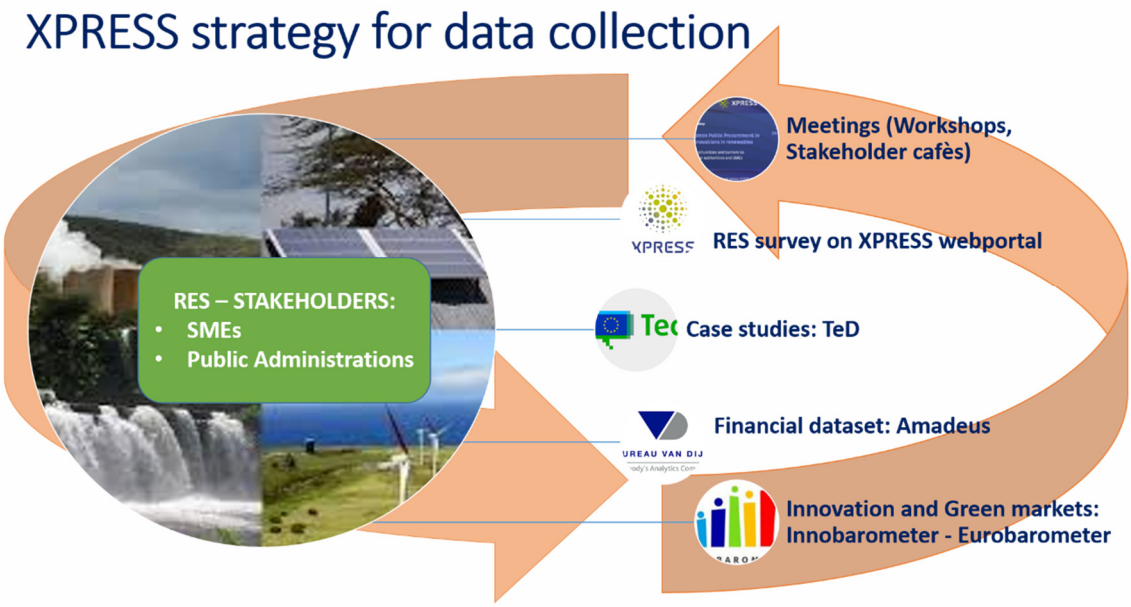

Figure 2 – XPRESS strategy for data collection

1.1 Secondary source data

1. Flash 415 Innobarometer, 2015 – "The innovation trends at EU enterprises"
2. Flash 456 Eurobarometer, 2017 - "SMEs, resource efficiency and green markets"
3. Amadeus dataset from Bureau Van Dijk
4. TED (Tenders Electronic Daily): Supplement to the Official Journal of the EU
5. EUROSTAT dataset on LCA

1.1.1. Flash 415 Innobarometer, 2015 – "The innovation trends at EU enterprises"

The Innobarometer-Eurobarometer surveys18 are conducted on behalf of the European Commission and the responsible Directorate-General(s), particular modules are commissioned

[18] https://data.europa.eu/euodp/data/dataset/S2054_415_ENG and https://data.europa.eu/euodp/data/dataset/S2151_456_ENG

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by the European Parliament. The survey results are regularly published in official reports by the European Commission or rather by the European Parliament.

The primary data on microdata level and the related documentation are placed at the disposal of the scientific community for research and training since the 1970s. They are curated at the GESIS19 data archive department (formerly Central Archive for Empirical Social Research) and at the Interuniversity Consortium for Political and Social Research (ICPSR). They are made available in the long term and worldwide for re-use in statistical analysis, i.a. in the context of the European social science data archive network (CESSDA).

This Flash Eurobarometer survey is aimed at capturing the main trends of EU business as far as innovation related activities are concerned. Carried out in the 28 Member States, as well as in Switzerland and the United States, it was designed to collect information on the profiles of innovative companies, to explore barriers to commercialisation, as well as identify the areas where public funding could best support innovation.

The survey covered the following areas:

- Profiles of companies that develop innovations, including the most common areas where innovations have occurred since January 2012;
- The impact of innovations on turnover, and the proportion of turnover invested in innovation activities;
- Barriers to commercialisation of both innovative and non-innovative goods and services;
- Preferred types of public support for the commercialisation of goods or services;
- The role of design, and the use of advanced manufacturing technologies;
- Involvement in public procurement and the role innovation plays in this process.

The following definition of 'innovation' was employed in the questionnaire: "Innovation occurs when a company introduces a new or significantly improved good, service, process, marketing strategy or organisational method.

The innovation can be developed by the company itself or has been originally developed by other companies or organisations".

[19] https://www.gesis.org/eurobarometer-data-service/home

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Useful variables:

- Profile of the companies introducing innovations
- Use of sustainable Technologies
- Market potential/increased competitivity from introducing innovations
- Barriers to commercialization of innovations
- Participation to Public Procurement

Like most surveys, the identity of the respondents is confidential. What we get from the GESIS surveys is an indication of the prevalence of green innovation in the individual countries and how those in each country view the obstacles, challenges, and policies that would improve their performance in that regard. We expect that some countries' firms and public agencies will be more receptive than others and this aspect should result in a greater number of TED entries in those countries.

Below we present a selection of the questions that will be used to carry out the XPRESS analysis. For each questions, we provide the answers collected from the SMEs belonging to the XPRESS partner countries.

Q2 Has your company introduced any of the following types of innovation since January 2012?

Introduced any of the following types of innovation since Jan 2012?			
Country	At least one innovation	No innovation at all	Total
BE	75,4	24,6	100
DE	75,9	24,1	100
DK	82	18	100
ES	72,5	27,5	100
GB	77,1	22,9	100
IT	77,1	22,9	100
PT	79	21	100
SE	66,1	33,9	100
SK	71,3	28,7	100

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Q2_1 New or significantly improved goods

New or significantly improved goods			
Country	Yes	No	Total
BE	43,5	56,5	100
DE	40,3	59,7	100
DK	49,6	50,4	100
ES	37,8	62,2	100
GB	48,5	51,5	100
IT	54	46	100
PT	57,8	42,2	100
SE	34,8	65,2	100
SK	40,9	59,1	100

Q2_2 New or significantly improved services

New or significantly improved services			
Country	Yes	No	Total
BE	38,8	61,2	100
DE	40	60	100
DK	47,6	52,4	100
ES	43,5	56,5	100
GB	53,8	46,2	100
IT	47,6	52,4	100
PT	56,7	43,3	100
SE	37,6	62,4	100
SK	48,3	51,7	100

Q2_3 New or significantly improved processes

New or significantly improved processes			
Country	Yes	No	Total
BE	40,7	59,3	100
DE	35,2	64,8	100
DK	50,8	49,2	100
ES	36,2	63,8	100
GB	41,6	58,4	100
IT	40,7	59,3	100
PT	55,7	44,3	100
SE	33,5	66,5	100
SK	35,3	64,7	100

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Q2_4 New or significantly improved marketing strategies

New or significantly improved marketing strategies			
Country	Yes	No	Total
BE	37	63	100
DE	31,9	68,1	100
DK	42,2	57,8	100
ES	33,6	66,4	100
GB	48,7	51,3	100
IT	45,4	54,6	100
PT	47,4	52,6	100
SE	31,5	68,5	100
SK	28,1	71,9	100

Q2_5 New or significantly improved organisational methods

New or significantly improved organisational methods			
Country	Yes	No	Total
BE	51,7	48,3	100
DE	38,7	61,3	100
DK	41,3	58,7	100
ES	45,6	54,4	100
GB	46,3	53,7	100
IT	51,5	48,5	100
PT	62,9	37,1	100
SE	29,9	70,1	100
SK	34,3	65,7	100

Q4 Since January 2012, what percentage of its total turnover has your company invested in the following areas?

Q4_1 Training

% of turnover: Training					
Country	0	Less than 1%	1 - 5 %	More than 5%	Total
BE	20,3	24,1	43,9	11,8	100
DE	18,9	22,9	45,4	12,8	100
DK	26,2	30,9	32,7	10,2	100
ES	19,6	21,7	44,5	14,2	100
GB	22,6	18,6	40,7	18,1	100
IT	28,3	18,8	38,7	14,2	100
PT	23,6	14,2	42,6	19,7	100
SE	23,4	24	43,7	9	100
SK	25,2	24,3	36,2	14,4	100

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Q4_2 Software development

% of turnover: Software development					
Country	0	Less than 1%	1 - 5 %	More than 5%	Total
BE	42,2	15,2	29,7	12,9	100
DE	55,7	11,9	22,5	9,9	100
DK	48,4	19,3	21,6	10,7	100
ES	48,8	14,5	27	9,8	100
GB	51,8	14,4	22,8	11	100
IT	37,5	17,5	36,1	8,9	100
PT	47,7	11,1	29,2	12	100
SE	57,6	13,8	20,5	8,1	100
SK	65,2	8	15,3	11,4	100

Q 4_3 Company reputation and branding including web design

% of turnover: Company reputation and branding including web design					
Country	0	Less than 1%	1 - 5 %	More than 5%	Total
BE	27,2	25,2	35,6	11,9	100
DE	32,1	25,2	33,9	8,9	100
DK	28,5	29,9	29,9	11,6	100
ES	33,7	18,8	33,5	14	100
GB	21,9	16,7	41,8	19,7	100
IT	47,9	13,7	29,1	9,2	100
PT	50,6	13,4	23,9	12,1	100
SE	33,5	20	35,7	10,8	100
SK	30,8	18,2	34,4	16,6	100

Q4_4 Research and development (R&D)

% of turnover: Research and development (R&D)					
Country	0	Less than 1%	1 - 5 %	More than 5%	Total
BE	54,5	12,6	23,1	9,8	100
DE	71,5	7	12,8	8,8	100
DK	55,3	15,5	17,4	11,8	100
ES	68,9	7,3	17,5	6,4	100
GB	47,6	15,4	20,8	16,2	100
IT	50	13,1	27	9,9	100
PT	66,8	6,8	18,4	8	100
SE	63	11,3	17,4	8,3	100
SK	74,2	5,6	10,1	10,1	100

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Q4_5 Design of products and services

% of turnover: Design of products and services					
Country	0	Less than 1%	1 - 5 %	More than 5%	Total
BE	44	13,9	28,8	13,3	100
DE	55,1	13,8	22,4	8,6	100
DK	38,9	22,5	21	17,6	100
ES	52,2	14,3	24,7	8,8	100
GB	40,9	13,6	29,6	15,9	100
IT	44	11,5	29	15,5	100
PT	46	6,9	27,3	19,9	100
SE	42	10,5	32,1	15,4	100
SK	51	10,4	24,9	13,6	100

Q4_6 Organisation or business process improvements

% of turnover: Organisation or business process improvements					
Country	0	Less than 1%	1 - 5 %	More than 5%	Total
BE	29,6	19,6	33,9	16,9	100
DE	36,2	19	36	8,7	100
DK	38,5	22,1	28,7	10,7	100
ES	32,3	14,9	38,2	14,6	100
GB	37,2	18,8	31,7	12,3	100
IT	33,5	15	39,8	11,7	100
PT	30,2	11,8	37,4	20,6	100
SE	38,2	13,7	33,6	14,6	100
SK	41,6	15,3	28,1	14,9	100

Q4_7 Acquisition of machines equipment software or licenses

% of turnover: Acquisition of machines equipment software or licenses					
Country	0	Less than 1%	1 - 5 %	More than 5%	Total
BE	18,8	12,9	39,1	29,2	100
DE	12,7	12	36,7	38,7	100
DK	16,6	20,5	37,8	25,1	100
ES	23,9	12,9	38,8	24,4	100
GB	22,3	14,2	39,8	23,8	100
IT	26,8	15,5	40,9	16,7	100
PT	18,3	11,2	40,4	30,1	100
SE	14,9	13,2	40,8	31,1	100
SK	21,8	12	31,6	34,5	100

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Q5A Thinking about the commercialisation of your company's innovative goods or services since January 2012, have any of the following been a major problem, a minor problem or not a problem at all?

Q5A_1 Lack of human resources

% of turnover: Lack of human resources					
Country	A major problem	A minor problem	Not a problem at all	DK/NA (DO NOT READ OUT)	Total
BE	24,6	33,6	41,4	0,4	100
DE	20,9	31,9	47,3	0	100
DK	10	27,1	62,3	0,6	100
ES	7,6	30,9	61,5	0	100
GB	11,2	33,7	52,6	2,6	100
IT	13,6	23,8	62,2	0,3	100
PT	32,4	20,4	46,8	0,3	100
SE	18,2	32,9	48,1	0,8	100
SK	24,7	25,8	48,5	1	100

Q5A_2 Lack of financial resources

% of turnover: Lack of financial resources					
Country	A major problem	A minor problem	Not a problem at all	DK/NA (DO NOT READ OUT)	Total
BE	17,9	24,3	57,1	0,7	100
DE	12,8	26	59,7	1,5	100
DK	11,9	27,4	60	0,6	100
ES	27,5	27,5	43,5	1,5	100
GB	13,8	30,1	53,8	2,2	100
IT	45,6	21,8	32,3	0,3	100
PT	50,5	22,8	26,4	0,3	100
SE	17,8	28,3	53,1	0,8	100
SK	26,8	37,1	35,1	1	100

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Q5A_3 Finding or using new technologies

% of turnover: Finding or using new technologies					
Country	A major problem	A minor problem	Not a problem at all	DK/NA (DO NOT READ OUT)	Total
BE	9,7	33,6	54,5	2,2	100
DE	4,8	23,1	69,2	2,9	100
DK	1,9	27,4	69,7	1	100
ES	4,6	27,9	67,2	0,4	100
GB	2,9	25,6	69,6	1,9	100
IT	15,3	21,1	63,3	0,3	100
PT	34,5	19,2	45,6	0,6	100
SE	1,9	30,6	67,1	0,4	100
SK	5,8	30,9	59,5	3,8	100

Q5A_4 Cost or complexity of meeting regulations or standards

% of turnover: Cost or complexity of meeting regulations or standards					
Country	A major problem	A minor problem	Not a problem at all	DK/NA (DO NOT READ OUT)	Total
BE	22,8	30,6	45,9	0,7	100
DE	21,6	33,7	42,9	1,8	100
DK	11	28,7	58,1	2,3	100
ES	15,6	38,9	45	0,4	100
GB	8	36,2	51,6	4,2	100
IT	29,9	29,6	38,8	1,7	100
PT	47,1	18	32,4	2,4	100
SE	15,5	30,6	52,7	1,2	100
SK	33,3	32,3	33	1,4	100

Q5A_5 Difficulties in maintaining intellectual property rights

% of turnover: Difficulties in maintaining intellectual property rights					
Country	A major problem	A minor problem	Not a problem at all	DK/NA (DO NOT READ OUT)	Total
BE	7,1	14,9	73,5	4,5	100
DE	7,3	16,1	73,6	2,9	100
DK	1,9	8,1	80,6	9,4	100
ES	2,7	13	79,8	4,6	100
GB	1,6	17,6	71,5	9,3	100
IT	9,2	14,3	73,5	3,1	100
PT	19,2	15,3	62,2	3,3	100
SE	6,2	15,9	71,7	6,2	100
SK	9,6	17,9	67,7	4,8	100

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Q5A_6 Administrative or legal issues

% of turnover: Administrative or legal issues					
Country	A major problem	A minor problem	Not a problem at all	DK/NA (DO NOT READ OUT)	Total
BE	14,9	33,2	50	1,9	100
DE	10,3	35,2	53,5	1,1	100
DK	8,1	26,1	64,8	1	100
ES	9,2	33,2	57,3	0,4	100
GB	4,2	28,2	64,4	3,2	100
IT	22,8	25,9	49,7	1,7	100
PT	33,3	18,9	47,4	0,3	100
SE	3,9	30,2	65,1	0,8	100
SK	25,1	33	40,2	1,7	100

Q5A_7 Lack of marketing expertise

% of turnover: Lack of marketing expertise					
Country	A major problem	A minor problem	Not a problem at all	DK/NA (DO NOT READ OUT)	Total
BE	11,2	30,6	57,5	0,7	100
DE	2,9	24,2	72,2	0,7	100
DK	6,5	24,5	67,7	1,3	100
ES	5,7	31,7	62,6	0	100
GB	9,3	28,8	59,9	1,9	100
IT	10,5	25,2	63,3	1	100
PT	23,7	24,9	50,5	0,9	100
SE	5,8	24,4	69,4	0,4	100
SK	7,6	37,8	50,9	3,8	100

Q5A_8 Market dominated by established competitors

% of turnover: Market dominated by established competitors					
Country	A major problem	A minor problem	Not a problem at all	DK/NA (DO NOT READ OUT)	Total
BE	30,6	35,4	32,8	1,1	100
DE	16,8	37	45,1	1,1	100
DK	16,8	37,4	44,5	1,3	100
ES	27,9	41,2	30,9	0	100
GB	14,7	38,8	44,9	1,6	100
IT	35,4	32,7	32	0	100
PT	43,2	25,8	29,4	1,5	100
SE	20,2	38,4	41,1	0,4	100
SK	30,2	32	34	3,8	100

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Q5A_9 Low demand for your innovative goods or services

% of turnover: Low demand for your innovative goods or services					
Country	A major problem	A minor problem	Not a problem at all	DK/NA (DO NOT READ OUT)	Total
BE	7,8	24,6	64,9	2,6	100
DE	7,7	26,7	63,7	1,8	100
DK	8,1	23,5	64,2	4,2	100
ES	16,4	32,8	49,2	1,5	100
GB	6,4	23,4	67,3	2,9	100
IT	19,7	27,9	51,4	1	100
PT	35,4	18,9	43,8	1,8	100
SE	5,8	31,4	62	0,8	100
SK	14,1	37,8	44,7	3,4	100

Q5A_10 Weak distribution channels

% of turnover: Weak distribution channels					
Country	A major problem	A minor problem	Not a problem at all	DK/NA (DO NOT READ OUT)	Total
BE	7,1	21,6	66,8	4,5	100
DE	8,1	28,9	62,3	0,7	100
DK	1,9	14,2	81,6	2,3	100
ES	5,3	25,2	65,6	3,8	100
GB	3,2	17,9	71,8	7,1	100
IT	17,7	22,1	57,8	2,4	100
PT	26,1	19,2	50,8	3,9	100
SE	6,2	24	67,8	1,9	100
SK	9,3	26,5	61,5	2,7	100

Q6A Thinking about possible public support for commercialisation of your innovative goods or services, which of the following two types of intervention would have the most positive impact on your company? Support for: (MAX. 2 ANSWERS)

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1) Meeting regulations or standards;

% of turnover: Q6A Thinking about possible public support for commercialisation			
Country	Not mentioned	Meeting regulations or standards	Total
BE	79,1	20,9	100
DE	75,5	24,5	100
DK	81,6	18,4	100
ES	78,6	21,4	100
GB	77,6	22,4	100
IT	85,4	14,6	100
PT	79,9	20,1	100
SE	86	14	100
SK	81,8	18,2	100

2) Accessing or reinforcing online selling;

% of turnover: Q6A Thinking about possible public support for commercialisation			
Country	Not mentioned	Accessing or reinforcing online selling	Total
BE	83,2	16,8	100
DE	86,4	13,6	100
DK	88,7	11,3	100
ES	77,9	22,1	100
GB	75	25	100
IT	70,4	29,6	100
PT	80,2	19,8	100
SE	84,9	15,1	100
SK	85,6	14,4	100

3) Participating in conferences, trade fairs, exhibitions;

% of turnover: Q6A Thinking about possible public support for commercialisation			
Country	Not mentioned	Participating in conferences, trade fairs, exhibitions	Total
BE	76,9	23,1	100
DE	75,5	24,5	100
DK	82,6	17,4	100
ES	80,5	19,5	100
GB	67,9	32,1	100
IT	83,3	16,7	100
PT	73,9	26,1	100
SE	75,2	24,8	100
SK	74,6	25,4	100

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4) Training staff in how to promote and market innovative goods or services;

% of turnover: Q6A Thinking about possible public support for commercialisation			
Country	Not mentioned	Training staff in how to promote ... innovative goods or services	Total
BE	66,4	33,6	100
DE	77,7	22,3	100
DK	75,5	24,5	100
ES	65,6	34,4	100
GB	63,5	36,5	100
IT	69,7	30,3	100
PT	59,5	40,5	100
SE	70,9	29,1	100
SK	74,9	25,1	100

5) Applying for, managing or protecting intellectual property rights;

% of turnover: Q6A Thinking about possible public support for commercialisation			
Country	Not mentioned	Applying for, managing or protecting intellectual property rights	Total
BE	92,2	7,8	100
DE	91,9	8,1	100
DK	94,8	5,2	100
ES	94,7	5,3	100
GB	93,6	6,4	100
IT	94,9	5,1	100
PT	96,7	3,3	100
SE	93,8	6,2	100
SK	91,8	8,2	100

6) Market-testing a product or service before launch;

% of turnover: Q6A Thinking about possible public support for commercialisation			
Country	Not mentioned	Market-testing a product or service before launch	Total
BE	89,6	10,4	100
DE	91,6	8,4	100
DK	91,9	8,1	100
ES	87,4	12,6	100
GB	88,8	11,2	100
IT	92,2	7,8	100
PT	88,6	11,4	100
SE	80,2	19,8	100
SK	91,8	8,2	100

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7) Accessing or reinforcing your presence in export markets

% of turnover: Q6A Thinking about possible public support for commercialisation			
Country	Not mentioned	Accessing or reinforcing your presence in export markets	Total
BE	78,7	21,3	100
DE	84,6	15,4	100
DK	81	19	100
ES	64,1	35,9	100
GB	86,5	13,5	100
IT	75,2	24,8	100
PT	73	27	100
SE	83,3	16,7	100
SK	84,9	15,1	100

Q7 Approximately what percentage of your company's turnover in 2014 was invested in innovation activities?

0%; Less than 1%; Between 1 and 5%; Between 6 and 10%; Between 11 and 15%; 16% or more; Don't know

Percentage of your company's turnover in 2014 was invested in innovation activities								
Country	0%	Less than 1%	Between 1 and 5%	Between 6 and 10%	Between 11 and 15%	16% or more	DK/NA (DO NOT READ OUT)	Total
BE	15,4	19,7	42,6	9,7	3,4	3,7	5,4	100
DE	13,9	22,7	41,1	10,5	1,7	3,7	6,5	100
DK	13	24,9	36,8	8,5	2,9	5	9	100
ES	21,3	20,4	42,6	7,4	2,5	2,8	3,1	100
GB	14,6	21,3	31,2	10,1	3,7	4,8	14,3	100
IT	14,4	20,8	42,8	10,6	2,3	2,6	6,5	100
PT	24,7	15,7	34,1	11,4	2,7	4,6	6,8	100
SE	20	20,6	38,7	11,6	0,6	5,8	2,6	100
SK	9,7	15,7	36,9	13,3	5,4	13,3	5,7	100

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Q8 Do you plan to increase, reduce or keep unchanged the percentage of investment dedicated to innovation in the next 12 months?

Increase; Keep the percentage unchanged; Reduce; You do not plan to invest in innovation in the next 12 months; Don't know

Do you plan to increase, reduce or keep unchanged the percentage of investment dedicated to innovation in the next 12 months?					
Country	Increase	Reduce	Keep the percentage unchanged	You do not plan to invest in innovation in the next 12 months	Total
BE	28,3	5,1	53,4	9,7	100
DE	19	3,4	63,7	9,1	100
DK	22,2	3,7	65,6	3,4	100
ES	24,7	1,2	49,7	21	100
GB	31,7	2,5	50,6	6,2	100
IT	33,7	3,2	45,7	9,4	100
PT	31,4	3,3	46,6	14,4	100
SE	27,7	3,2	59	7,7	100
SK	26,9	4,8	56,5	6	100

Q12 Since January 2012 has your company…? (MULTIPLE ANSWERS POSSIBLE):

1) Won at least one public procurement contract;

% of turnover: Q12 Since January 2012 has your company...?			
Country	Not mentioned	Won at least one public procurement contract	Total
BE	67,5	32,5	100
DE	73,3	26,7	100
DK	74,6	25,4	100
ES	80,3	19,7	100
GB	78,8	21,2	100
IT	73,3	26,7	100
PT	79,9	20,1	100
SE	71,6	28,4	100
SK	78,7	21,3	100

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2) Submitted at least one tender for a public procurement contract and the outcome is unknown;

% of turnover: Q12 Since January 2012 has your company...?			
Country	Not mentioned	Submitted at least one tender for a public ... contract and outcome is unknown	Total
BE	78,9	21,1	100
DE	89,2	10,8	100
DK	91,3	8,7	100
ES	96,2	3,8	100
GB	83,8	16,2	100
IT	89,1	10,9	100
PT	93,8	6,2	100
SE	86,6	13,4	100
SK	91,8	8,2	100

3) Submitted at least one tender for a public procurement contract without success;

% of turnover: Q12 Since January 2012 has your company...?			
Country	Not mentioned	Submitted at least one tender for a public procurement contract without success	Total
BE	73,3	26,7	100
DE	79,1	20,9	100
DK	76,8	23,2	100
ES	90,2	9,8	100
GB	82,7	17,3	100
IT	78,5	21,5	100
PT	88,9	11,1	100
SE	80,6	19,4	100
SK	83,4	16,6	100

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4) Investigated opportunities to bid on one or more public procurement contracts, but have never submitted a tender;

% of turnover: Q12 Since January 2012 has your company...?			
Country	Not mentioned	Investigated opportunities to bid ... but have never submitted a tender	Total
BE	94,4	5,6	100
DE	96,3	3,7	100
DK	93,5	6,5	100
ES	96,2	3,8	100
GB	94,2	5,8	100
IT	95,5	4,5	100
PT	96,4	3,6	100
SE	93,6	6,4	100
SK	94,2	5,8	100

5) Has never submitted a tender nor investigated opportunities to bid on a public procurement contract;

% of turnover: Q12 Since January 2012 has your company...?			
Country	Not mentioned	Has never submitted a tender nor investigated opportunities ...	Total
BE	53	47	100
DE	47,3	52,7	100
DK	45,1	54,9	100
ES	31,5	68,5	100
GB	50	50	100
IT	44,1	55,9	100
PT	36,2	63,8	100
SE	44,8	55,2	100
SK	51,5	48,5	100

6) Don't know

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1.1.2. Flash 456 Eurobarometer, 2017 - "SMEs, resource efficiency and green markets"

The Green Action Plan for SMEs[20], adopted in July 2014, aims to help SMEs take advantage of the opportunities provided by the green economy, and details how the Commission will work in partnership with Member States and regions to help SMEs turn environmental challenges into opportunities.

Topics covered include:

- Current and planned resource efficiency actions, and the reasons for taking them
- Barriers when implementing resource efficiency actions
- The role and impact of policy in supporting green business initiatives
- The current state of the green market

Below we present a selection of the questions that will be used to carry out the XPRESS analysis. For each questions, we provide the answers collected from the SMEs belonging to the XPRESS partner countries.

Q9 Does your company offer green products or services?

Does your company offer green products or services?				
Country	Yes	No but you are planning to do so in the next 2 years	No and you are not planning to do so	Total
BE	30,2	9,7	54,5	100
DE	33,5	5	58,2	100
DK	32,5	4,5	59,3	100
ES	29,8	9,4	57,1	100
GB	25,8	8,6	56,4	100
IT	17,2	4,5	74,8	100
NO	44,7	6,5	45,1	100
PT	32	12,8	43,3	100
SE	46,7	5,2	43,4	100
SK	32,4	6	56,7	100

[20] https://ec.europa.eu/growth/smes/business-friendly-environment/green-action-plan/

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Q10. How much did these green products or services represent in your annual turnover of the latest available fiscal year?

Up to 5% ; 6-10% ; 11-30% ; 31-50% ; 51-75% ; More than 75%

% green products and services in turnover							
Country	Up to 5%	6-10%	11-30%	31-50%	51-75%	More than 75%	Total
BE	34,3	20	14,3	7,1	4,3	8,6	100
DE	27,7	7,7	18,1	7,7	9	16,1	100
DK	26,3	16,4	17,1	7,9	5,9	17,8	100
ES	36	14,4	12,9	5	3,6	15,8	100
GB	35	5,8	10	7,5	5	14,2	100
IT	31,3	13,8	13,8	3,8	6,3	15	100
NO	30,5	13	16	4,6	7,6	18,3	100
PT	41,2	13,1	7,2	6,5	2,6	14,4	100
SE	27,2	17,1	15,7	6,5	7,8	15,2	100
SK	31,1	11,9	9,3	7,9	7,9	17,9	100

Q11 For how long has your company been selling green products or services?

For how long has your company been selling green products or services?				
Country	Less than one year	Between 1 and 3 years	More than 3 years	Total
BE	8,6	17,1	72,9	100
DE	2,6	14,2	80,6	100
DK	5,9	13,8	79,6	100
ES	9,4	22,3	66,9	100
GB	6,7	19,2	72,5	100
IT	3,8	16,3	77,5	100
NO	8,4	16	74,8	100
PT	3,9	24,8	68	100
SE	3,7	21,7	73,3	100
SK	0,7	16,6	78,8	100

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Q13 What type of support does your company rely on for the production of its green products or services? (MULTIPLE ANSWERS POSSIBLE) (% - EU)

1) Its own financial resources

Q13 Resources as support for green products and services				
Country	Not mentioned	Its own financial resources	Inap. (Not 1 in q9)	Total
BE	8,4	21,8	69,8	100
DE	9,1	24,5	66,5	100
DK	20,8	11,8	67,5	100
ES	14,2	15,7	70,2	100
GB	11,2	14,6	74,2	100
IT	8,4	8,8	82,8	100
PT	11,7	20,3	68	100
SE	27,5	19,1	53,3	100
SK	11,4	21	67,6	100

2) Its own technical expertise

Country	Not mentioned	Its own technical expertise	Inap. (Not 1 in q9)	Total
BE	10,8	19,4	69,8	100
DE	9,1	24,5	66,5	100
DK	11,1	21,4	67,5	100
ES	15	14,8	70,2	100
GB	9,2	16,5	74,2	100
IT	6,9	10,3	82,8	100
PT	13,4	18,6	68	100
SE	20,9	25,8	53,3	100
SK	16,3	16,1	67,6	100

3) External support

Country	Not mentioned	External support	Inap. (Not 1 in q9)	Total
BE	18,8	11,4	69,8	100
DE	19,9	13,6	66,5	100
DK	23,8	8,8	67,5	100
ES	22,5	7,3	70,2	100
GB	15,7	10,1	74,2	100
IT	12,7	4,5	82,8	100
PT	29,3	2,7	68	100
SE	35,3	11,4	53,3	100
SK	27,7	4,7	67,6	100

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DX1 Which type of external support does your company get for the production of its green products or services?

1. Public funding such as grants, guarantees or loans;

DX1 Which type of external support does your company get for the production of green products or services?			
Country	Not mentioned	Public funding such as grants, guarantees or loans	Total
BE	84,9	15,1	100
DE	73	27	100
DK	90,2	9,8	100
ES	91,2	8,8	100
GB	89,4	10,6	100
IT	95,2	4,8	100
PT	69,2	30,8	100
SE	88,7	11,3	100
SK	77,3	22,7	100

2. Private funding (e.g. from a bank, investment company or venture capital fund);

Country	Not mentioned	Private funding from a bank, investment company or venture capital fund	Total
BE	77,4	22,6	100
DE	69,8	30,2	100
DK	87,8	12,2	100
ES	73,5	26,5	100
GB	87,2	12,8	100
IT	76,2	23,8	100
PT	69,2	30,8	100
SE	88,7	11,3	100
SK	81,8	18,2	100

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3. Private funding from friends or relatives;

Country	Not mentioned	Private funding from friends or relatives	Total
BE	90,6	9,4	100
DE	98,4	1,6	100
DK	100	0	100
ES	94,1	5,9	100
GB	93,6	6,4	100
IT	90,5	9,5	100
PT	92,3	7,7	100
SE	98,1	1,9	100
SK	86,4	13,6	100

4. Advice or other non-financial assistance from public administration;

Country	Not mentioned	Advice or other non-financial assistance from public administration	Total
BE	75,5	24,5	100
DE	74,6	25,4	100
DK	80,5	19,5	100
ES	97,1	2,9	100
GB	78,7	21,3	100
IT	81	19	100
PT	69,2	30,8	100
SE	88,7	11,3	100
SK	95,5	4,5	100

5. Advice or other non-financial assistance from private consulting and audit companies;

Country	Not mentioned	Advice or other non-financial assistance from private consulting and audit companies	Total
BE	60,4	39,6	100
DE	76,2	23,8	100
DK	56,1	43,9	100
ES	47,1	52,9	100
GB	76,6	23,4	100
IT	71,4	28,6	100
PT	53,8	46,2	100
SE	67,9	32,1	100
SK	86,4	13,6	100

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6. Advice or other non-financial assistance from business associations;

Country	Not mentioned	Advice or other non-financial assistance from business associations	Total
BE	60,4	39,6	100
DE	60,3	39,7	100
DK	46,3	53,7	100
ES	67,6	32,4	100
GB	57,4	42,6	100
IT	90,5	9,5	100
PT	53,8	46,2	100
SE	77,4	22,6	100
SK	90,9	9,1	100

DX2 How satisfied or dissatisfied are you with the level of public support for your green products or services? (% - EU)

Satisfation on public support for green products and services					
Country	Very satisfied	Fairly satisfied	Fairly dissatisfied	Very dissatisfied	Total
BE	5,6	66,7	16,7	5,6	100
DE	16	56	20	4	100
DK	0	50	20	0	100
ES	0	50	50	0	100
GB	0	71,4	14,3	7,1	100
IT	0	75	25	0	100
NO	0	77,8	0	0	100
PT	0	66,7	16,7	0	100
SE	0	55,6	33,3	11,1	100
SK	0	40	60	0	100

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DX3 What type of support would help you the most to expand your range of green products or services ?

(MAX. 2 ANSWERS POSSIBLE) (% - EU)

1. Financial incentives for developing products, services or new production processes

DX3 What type of support would help you the most to expand your range of green products?			
Country	Not mentioned	Financial incentives for developing products, services or new production processes	Total
BE	65	35	100
DE	53,5	46,5	100
DK	59,9	40,1	100
ES	56,1	43,9	100
GB	62,5	37,5	100
IT	40	60	100
PT	51	49	100
SE	65	35	100
SK	57,6	42,4	100

2. Assistance with identifying potential markets or customers

Country	Not mentioned	Assistance with identifying potential markets or customers	Total
BE	73,6	26,4	100
DE	63,2	36,8	100
DK	63,2	36,8	100
ES	58,3	41,7	100
GB	70	30	100
IT	72,5	27,5	100
PT	68,6	31,4	100
SE	72,8	27,2	100
SK	76,8	23,2	100

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3. Technical support and consultancy for the development of products, services and production processes

Country	Not mentioned	Technical support and consultancy for the development of products, services and production processes	Total
BE	73,6	26,4	100
DE	73,5	26,5	100
DK	69,1	30,9	100
ES	72,7	27,3	100
GB	72,5	27,5	100
IT	90	10	100
PT	61,4	38,6	100
SE	63,6	36,4	100
SK	84,8	15,2	100

4. Consultancy services for marketing or distribution

Country	Not mentioned	Consultancy services for marketing or distribution	Total
BE	72,9	27,1	100
DE	65,2	34,8	100
DK	78,9	21,1	100
ES	84,9	15,1	100
GB	84,2	15,8	100
IT	83,8	16,3	100
PT	80,4	19,6	100
SE	83,4	16,6	100
SK	88,1	11,9	100

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DX4. What type of support would help you the most to launch your range of green products or services?

1. Financial incentives for developing products, services or new production processes;

DX4 What type of support would help you the most to launch your range of green products or services?			
Country	Not mentioned	Financial incentives for developing products, services or new production processes	Total
BE	73,8	26,2	100
DE	74,7	25,3	100
DK	76,8	23,2	100
ES	71	29	100
GB	71,6	28,4	100
IT	77,5	22,5	100
PT	69,8	30,2	100
SE	73,9	26,1	100
SK	73,3	26,7	100

2. Assistance with identifying potential markets or customers;

Country	Not mentioned	Assistance with identifying potential markets or customers	Total
BE	81,5	18,5	100
DE	76,7	23,3	100
DK	86,2	13,8	100
ES	70	30	100
GB	82,5	17,5	100
IT	90	10	100
PT	78,4	21,6	100
SE	82,3	17,7	100
SK	84,2	15,8	100

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3. Technical support and consultancy for the development of products, services and production processes;

Country	Not mentioned	Technical support and consultancy for the development of products, services and production processes	Total
BE	76,5	23,5	100
DE	84,2	15,8	100
DK	82,2	17,8	100
ES	72,6	27,4	100
GB	85,5	14,5	100
IT	89,7	10,3	100
PT	72,4	27,6	100
SE	74,8	25,2	100
SK	86,6	13,4	100

4. Consultancy services for marketing or distribution;

Country	Not mentioned	Consultancy services for marketing or distribution	Total
BE	85,6	14,4	100
DE	86	14	100
DK	91,9	8,1	100
ES	87,1	12,9	100
GB	91,4	8,6	100
IT	93,5	6,5	100
PT	85,8	14,2	100
SE	87,2	12,8	100
SK	88,7	11,3	100

1.1.3. The Amadeus dataset

The Amadeus dataset from Bureau Van Dijk[21] contains financial data (balance sheet data, profit and loss statement data, key financial ratios[22]) firm size variables, ratings, stock prices, ownership,

[21] https://www.bvdinfo.com/en-gb/our-products/data/international/amadeus

[22] Balance Sheet: Assets, Liabilities, Equity and Memo lines (number of employees, export revenue). Assets: Tangible, Intangible. Liabilities: Long Term Debt, Current Liabilities (Bank Loans, Creditors). Shareholder Funds: Capital/Equity, Profit and Loss Account: Sales, EBIT, EBITDA and Memo lines (materials, cost of employees, R&D).

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and subsidiaries information for approximately 19 million public and private companies in 34 European countries. The database is ***commercial***. Therefore, we can only publish results but not the dataset itself.

We intend to merge the TED dataset with the Amadeus dataset on the basis of the names of the winners of the Green Public Procurement contracts (from the TED dataset). Using the combined dataset, we will perform a detailed financial analysis on firms which have been awarded public procurement contracts. The financial analysis can be based on key financial ratios calculated from the available quantitative financial information from both data sets. Financial information for companies within the Amadeus dataset is retained for a rolling period of 8 years. This length of observation period allows to build a panel data set structure with yearly firm micro data. An analysis of the TED's award winning firms before-and-after-the-year of winning the contract would be possible. In addition, we have managed to divide the TED data into three priority classes depending on the RES innovating content of their contract. Because of that, with the merging of Amadeus and TED it would also be possible to do a detailed financial analysis and comparison of different types of contract winning firms.

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1.1.4. TED (Tenders Electronic Daily): Supplement to the Official Journal of the EU

TED (Tenders Electronic Daily) is the 'online version of the 'Supplement to the Official Journal' of the EU, dedicated to European public procurement'[23]. It contains valuable information, such as the type of the procurement procedure used, name, and address of the public purchaser, the value of the procurement, the qualification and award criteria, name, address of the awarded suppliers and whether the supplier is an SME.

From the website containing all European Public Procurement contracts, we selected all the contract award notices with the following CPV codes[24] that identify uniquely each contract (72 codes out of the possible 9,454 for Public Procurement contracts in all fields). At the same time,

[23] https://ted.europa.eu/TED/misc/aboutTed.do

[24] The CPV establishes a single classification system for public procurement aimed at standardising the references used by contracting authorities and entities to describe the subject of procurement contracts.

we created a new variable called Priority in order to rank the contracts on the basis of the topic (more or less relevant for our project):

CODE SELECTION	SHORT CODE SELECTION		Priority (1 = High, 2 = Medium, 3 = Low)
31121300-3	31121300	Wind-energy generators	1
31121310-6	31121310	Windmills	3
31121320-9	31121320	Wind turbines	1
31121330-2	31121330	Wind turbine generators	1
31121331-9	31121331	Turbine rotors	2
31121340-5	31121340	Wind farm	1
38126400-8	38126400	Wind surface observing apparatus	3
45251160-0	45251160	Wind-power installation works	1
09300000-2	9300000	Electricity, heating, solar and nuclear energy	1
09330000-1	9330000	Solar energy	1
09331000-8	9331000	Solar panels	1
09331100-9	9331100	Solar collectors for heat production	1
09331200-0	9331200	Solar photovoltaic modules	1
09332000-5	9332000	Solar installation	1
31712347-4	31712347	Power or solar diodes	2
38126200-6	38126200	Solar radiation surface observing apparatus	3
45261215-4	45261215	Solar panel roof-covering work	1
31712331-9	31712331	Photovoltaic cells	1
45251120-8	45251120	Hydro-electric plant construction work	1
45251140-4	45251140	Thermal power plant construction work	3
45251141-1	45251141	Geothermal power station construction work	1
45248000-7	45248000	Construction work for hydro-mechanical structures	3
42511110-5	42511110	Heat pumps	1
42530000-0	42530000	Parts of refrigerating and freezing equipment and heat pumps	1
42533000-1	42533000	Parts of heat pumps	1
09134230-8	9134230	Biodiesel	1
09134231-5	9134231	Biodiesel (B20)	1
09134232-2	9134232	Biodiesel (B100)	1
31124000-1	31124000	Steam-turbine generator and related apparatus	2

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CODE SELECTION	SHORT CODE SELECTION		Priority (1 = High, 2 = Medium, 3 = Low)
42112100-8	42112100	Steam turbines	3
42112200-9	42112200	Hydraulic turbines	3
42113100-5	42113100	Parts of steam turbines	3
51130000-2	51130000	Installation services of steam generators, turbines, compressors and burners	3
42113200-6	42113200	Parts of hydraulic turbines	3
42112210-2	42112210	Water wheels	3
42113400-8	42113400	Parts of water wheels	3
42121000-3	42121000	Hydraulic or pneumatic power engines and motors	2
42121100-4	42121100	Hydraulic or pneumatic cylinders	2
42121200-5	42121200	Hydraulic power engines	2
42121400-7	42121400	Hydraulic power motors	2
42122210-5	42122210	Hydraulic power packs	2
42124150-0	42124150	Parts of hydraulic power engines or motors	2
42124221-9	42124221	Parts of hydraulic power packs	2
09111400-4	9111400	Wood fuels	1
03416000-9	3416000	Wood waste	1
03413000-8	3413000	Fuel wood	1
24327200-4	24327200	Wood charcoal	3
45251142-8	45251142	Wood-fired power station construction work	1
34144900-7	34144900	Electric vehicles	1
34144910-0	34144910	Electric buses	1
51111000-3	51111000	Installation services of electric motors, generators and transformers	2
51111100-4	51111100	Installation services of electric motors	2
31100000-7	31100000	Electric motors, generators and transformers	2
31110000-0	31110000	Electric motors	2
31160000-5	31160000	Parts of electric motors, generators and transformers	2
31161000-2	31161000	Parts for electrical motors and generators	2
50532100-4	50532100	Repair and maintenance services of electric motors	2
71314000-2	71314000	Energy and related services	2
65400000-7	65400000	Other sources of energy supplies and distribution	2

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CODE SELECTION	SHORT CODE SELECTION		Priority (1 = High, 2 = Medium, 3 = Low)
09000000-3	9000000	Petroleum products, fuel, electricity and other sources of energy	2
09310000-5	9310000	Electricity	2
31200000-8	31200000	Electricity distribution and control apparatus	2
31682000-0	31682000	Electricity supplies	2
24111600-1	24111600	Hydrogen	2
09323000-9	9323000	District heating	2
42515000-9	42515000	District heating boiler	3
45251250-8	45251250	District-heating plant construction work	3
45232140-5	45232140	District-heating mains construction work	3
42320000-5	42320000	Waste incinerators	2
45252300-1	45252300	Refuse-incineration plant construction work	3
51135110-1	51135110	Installation services of waste incinerators	2
90513300-9	90513300	Refuse incineration services	3

1) **TED_NOTICE_URL**: it allows you to recover all the details of the contracts

2) **ISO COUNTRY_CODE** which tells you the country of the contract

3) **CAE_TYPE**: tells you the type of contracting authority.

- 1 “Ministry or any other national or federal authority, including their regional of local subdivisions”
- 3 “Regional or local authority”
- 4 “Water, energy, transport and telecommunications sectors”
- 5 "European Union institution/agency"
- 5A "other international organisation"
- 6 "Body governed by public law"
- 8 "Other"
- N "National or federal Agency / Office"
- R "Regional or local Agency / Office"
- Z “Not specified

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Public_Authority											
Country	1	3	4	5	5A	6	8	N	R	Z	Total
BE	3,7	17,6	14,9	4,1	0	9,8	35,5	0,4	6,2	7,9	100
DE	1,6	51,2	10,8	0,1	0	22,1	13,6	0,1	0,3	0,2	100
DK	3,5	9	64,7	0	0	14,9	5,9	0	1,2	0,8	100
ES	8,8	47,9	13,8	0,8	0	7,5	15,7	0,1	5,2	0,2	100
IT	1,8	10,6	56,3	3,9	0	13	9,2	0	3,5	1,8	100
NO	6,1	26,4	38	0	0,6	4,9	7,4	6,7	8,6	1,2	100
PT	1	25,5	11,6	0,5	0	37,6	15,1	0,2	7,4	1	100
SE	3,9	54,4	20,6	0	0	0	8,5	4,1	8,2	0,3	100
SK	8,9	19,3	18,7	0	0	29,5	21,3	0,3	2	0	100
UK	3,6	25,6	7,1	0	0	35,2	26,6	1,3	0,2	0,2	100

4) **TYPE_OF_CONTRACT** (Work, Supplies or Services)

5) **B_CONTRACTOR_SME** tells you whether the contractor is a SME.

SME			
Country	0	1	Total
BE	96,3	3,7	100
DE	84,5	15,5	100
DK	90,6	9,4	100
ES	96,1	3,9	100
IT	90,1	9,9	100
NO	80,4	19,6	100
PT	96	4	100
SE	73,2	26,8	100
SK	80	20	100
UK	87,1	12,9	100

TED (following the Official Journal of the EU 2017/2365) requires the publication of contracts by local authorities above a value of 221,000 Euros.

Usually other Public Procurement contracts are published on other local webpages (for example for UK it is https://www.contractsfinder.service.gov.uk/Search).
Initially we will focus on the contracts from TED and then we will move to the additional contracts (we will discuss the details later on).

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The XPRESS analysis will focus on contracts dated from 2015 onwards: this is because the reporting of PP contracts involving SMEs became compulsory only after the publication of the EU PP Directives 2014/24/EU and 2014/25/EU.

Priority				
Country	High	Medium	Low	Total
BE	15,8	84,2	0	100
DE	14,4	79,2	6,4	100
DK	33,3	33,3	33,3	100
ES	26,1	66,7	7,2	100
IT	35,7	46,4	17,9	100
NO	43,8	53,1	3,1	100
PT	18,8	81,3	0	100
SE	31,7	56,7	11,5	100
SK	0	98,4	1,6	100
UK	34,7	64,7	0,6	100

A selection of GPP contract award notices will be shortly uploaded in a dedicated section of the ***XPRESS Portal*** together with GPP contracts that are still open with the purpose of creating a direct virtual meeting place between local authorities interested in investing in RES technologies and innovative SMEs.

Some of the contract award notices state the aim of the call, which are closely related to the topic of the XPRESS project. For example, one of the tender notice states that the aim of the procurement is to improve efficiency and reduce fuel consumption[25], another tender notice addresses that the aim is to help implement an Energy and Climate management plan for the municipality[26]. We will also assess the level of innovativeness of the purchased product or service by investigating the content of the tender notice. For example, one of the calls asks a car dealer to supply electric cars, this can be treated as a low level of innovativeness of the called product/service, since it is neither new to the world nor the public sector.

[25] https://ted.europa.eu/udl?uri=TED:NOTICE:227041-2018:TEXT:EN:HTML
[26] https://ted.europa.eu/udl?uri=TED:NOTICE:140954-2017:TEXT:EN:HTML

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However, there is still some information we need to seek by contacting and interviewing both the public purchasers and the suppliers in order to perform the economic and financial analysis for the project. Information will be collected from the ***public purchaser side*** regarding:

1. the barriers for the procurement of RES product and service
2. their perception of green public procurement
3. their motivation to procure RES product or service.

From the ***supplier side***, focusing on SMEs, we will gather information regarding

1. the innovativeness of the suppliers
2. their level of participation in public procurements
3. their perceived barriers during the public procurement process

We will assess whether larger suppliers team up with SME suppliers when developing bids for Public Procurement contracts. At the same time, we will also explore whether TED could provide additional documents about any pre-tender activities related to the purchase, such as requests for information and invitation to supplier conferences.

1.1.5. Life-cycle assessment (LCA) Data

The analysis of statistical data acquired by European Agencies can be useful to better quantify and compare the usage of renewable energy sources in varius Countries, to acquire data on GHG emissions and on the national energy mixes. The energy mix is a group of different primary energy sources from which secondary energy (electricity) for direct use is produced. The 2030 ***climate and energy framework***[27] was adopted by the European Council in October 2014. The targets for renewables and energy efficiency were revised upwards in 2018. This framework includes EU-wide targets and policy objectives for the period from 2021 to 2030. Key targets for 2030 are:

- At least 40% cuts in greenhouse gas emissions (from 1990 levels)
- At least 32% share for renewable energy
- At least 32.5% improvement in energy efficiency.

[27] https://ec.europa.eu/clima/policies/strategies/2030_en

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Eurostat

According to Eurostat, renewable energy sources across the EU, mainly wind power and solar power, expanded more in some countries; for example, in Austria (72.2 %), Sweden (65.9 %), Denmark (60.4 %) and Portugal (54.2 %), more than half of all the electricity consumed was generated from renewable energy sources[28].

It is also worth noting that among the EU Member States in 2017, Sweden (54.5%), Denmark (35.8 %) and Austria (32.6 %) had the highest share of energy from renewable sources in gross final consumption of energy. Lower proportions of renewables were instead registered in Luxembourg (6.4 %), the Netherlands (6.6 %), Malta (7.2 %), Belgium (9.1 %), Cyprus (9.9 %) and the United Kingdom (10.2 %)[29]

EU Open Data Portal

The EU Open Data Portal publishes data on the diffusion of RES Technologies and the greenhouse gas emissions that can be acquired and adopted in the XPRESS project as reference data.

Firstly, the "***energy statistical datasheet***" is published every two years starting from 1990 and shows the energy consumptions of each Member State, organised by type of use and by economic sectors. Alongside the energy consumption information, data on the quantities of CO2 and of greenhouse gases (GHG) emitted by each Country are also provided in several reference sectors[30]

Furthermore, the composition of the energy mix for each European Country is available on the EU Open Data Portal. This information is collected and organized within the ***European Platform on Life Cycle Assessment (ELCD) database***[31] and the ***Life Cycle Data Network (LCDN) database***[32]

[28] https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_ind_ren&lang=en

[29] https://ec.europa.eu/eurostat/documents/3217494/10165279/KS-DK-19-001-EN-N.pdf/76651a29-b817-eed4-f9f2-92bf692e1ed9

[30] https://data.europa.eu/euodp/it/data/dataset/information-on-energy-markets-in-eu-countries-with-national-energy-profiles

[31] https://eplca.jrc.ec.europa.eu/ELCD3/ discountinued in 2018.

[32] https://eplca.jrc.ec.europa.eu/LCDN/

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which can be analysed via dedicated LCA modeling softwaressuch as SIMA Pro[33], in order to obtain specific environmental profiles of several energy mixes.[34]

European Environment Agency

The European Environment Agency publishes the "***GHG Projections***". This document reports the forecasts about the quantities of GHG annually emitted by each Member State, considering the 2015-2035 time frame[35].

Analysing statistical evidence from european datasets and conducting a deep and systematic collection of primary and secondary source data, will allow us to support sound decision making while investigating the main reasons behind different levels of electricity generation from renewable sources and final consumption of energy from renewable sources.

2.1 Primary source data

1. Outputs from co-creation workshops
2. Outputs from case studies
3. Outputs from RESS survey on the XPRESS Portal

2.1.1 Outputs from co-creation workshops

The XPRESS consortium has been organising 10 policy co-creation workshops (1 per partner country) with innovative SMEs and local authorities with the main goal to discuss existing multilevel governance strategies, policies and planning tools and operational, financial and organizational measures for energy, transport, mobility and land-use planning at community and city level in relation to the innovative concept of XPRESS integrated strategy for RES investment fostering. These meetings are shaping the way (XPRESS Strategy) XPRESS elaborates the RESS (RES Survey). Local authorities have been offered the opportunity to start a direct dialogue with innovative SMEs who will be able to collaborate with them in implementing green innovations. These innovative SMEs who are potentially interested in developing some of the innovative green solutions by taking part in GPPs, have been invited to participate more actively in the project,

[33] https://simapro.com/
[34] https://data.europa.eu/euodp/it/data/dataset/jrc-eplca-ce82b33c-ea98-4ba2-b7cd-1838deff792d
[35] https://www.eea.europa.eu/data-and-maps/data/greenhouse-gas-emission-projections-for-4/greenhouse-gas-emission-projections-in/ghg_projections_v4_xlsx

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providing their insights on innovative solutions. Innovative SMEs will benefit from XPRESS by analyzing their projects and suggesting innovative/suitable financial models and giving assistance to their projects. XPRESS will benefit by having the chance to understand the developers 'perspective, which is a valuable input for the overall Project in order to develop - based on those innovative RES solutions - suitable standard documents and procedures such as contracts or agreements. The main result of the co-creation workshops will be the first draft of the RES Survey (RESS).

Here is an example of the main questionnaire that has been presented to the workshop participants:

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Question 1

Involvement of your institution in Green Public Procurement:

- ○ Has been involved in the last 5 years
- ○ Plans to be involved in the next 5 years
- ○ Hasn't been involved in the past nor plans to be involved

Question 2

What are the main obstacles to either investment or implementation of technologies in renewable energy sources?

You may choose multiple options.

- [ ] Lack of information about green technologies
- [ ] Lack of skilled labour
- [ ] Legal restrictions /administrative procedures
- [ ] Industry standards/norms

What are the main obstacles to either investment or implementation of technologies in renewable energy sources?

You may choose multiple options.

- [ ] Financial risk
- [ ] Innovation costs
- [ ] Size of the contracts (too big or too small)
- [ ] Dominant Market positions of incumbent firms

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Question 3

The answers from this short questionnaire have been analysed by the group facilitators leading to two main discussion groups:

1. How to boost innovations in RES through GPP
2. How to support policy makers in boosting the RES market through GPP

These main themes have been presented to the workshop participants and their feedback has been collected and elaborated.

2.1.2 Outputs from case studies

The XPRESS case studies will deliver a comprehensive and in-depth analysis of a minimum of 20 cases (at least 2 in each of the 10 countries) to investigate how leading municipalities/regions are using innovative (dialogue based) public procurement to achieve RES (related) objectives and to what extent they succeed in involving SMEs. The purpose of this analysis is:

(1) to demonstrate the current public procurement practices

(2) to study the public procurement process in detail

(3) to identify the level of SME engagement in public procurement

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(4) to provide suggestions and recommendations for a better understanding of the factors driving the engagement of SMEs in public procurement from the perspectives of both the public authorities and SMEs.

The main research questions which will be addressed in the case studies are:

(1) how municipalities/regions are applying innovative green public procurement to achieve RES related objectives

(2) to what extent and in what way SME are engaged in green public procurement

(3) critical success factors and barriers perceived by local authorities and SMEs regarding the involvement of these enterprises in public procurement.

The collected data can serve the XPRESS objectives by mapping current practices of green public procurement in different municipalities/regions and identifying the driving factors that promote or prevent SME engagement in green public procurement. These insights can strengthen the (conceptual) foundation of the project while stimulating RES uptake through SME friendly GPPs.

The unit of analysis in the various cases will be a specific purchase involving RES and the interaction between public purchasers and SMEs as suppliers. The study will map the planning and preparation of the purchase, any pre-tender activities and the tender process. Both ongoing and completed purchases via Public Procurement will be considered. The case study will primarily rely on interviews with representatives from the public purchasers, selected suppliers, other relevant third parties, observations and existing literature review (Yin, 2014)[36].

[36] Yin, R.K. (2014) *Case study research. Design and Methods*. 5th edition, Sage.

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2.1.3 Outputs from RESS survey on the XPRESS Portal

The RESS will be designed following the existing literature (using a selection of the *Innobarometer-Eurobarometer questions* as a baseline) and tailored to assess the current collaboration between SMEs and local authorities in order to implement innovations in RES. The web interface will target companies that are directly connected to the XPRESS network via INSME (International Network for Small and Medium Sized Enterprises), the European Builders Confederation (whose secretary is on the XPRESS Specialist Advisory Board), EURADA and the Slovak Craft Industry Federation and local authorities connected with Climate Alliance (Italy and Europe) and European Green Cities.

More specifically, this survey will measure the occurrence and relevance of *barriers against innovation in RES* from the point of view of:

- *local authorities* who plan to buy innovative green solutions via *GPPs*
- *innovative SMEs* who plan to sell their green solutions to the local authorities via *GPPs* .

Executing a national survey among both public purchasers and (SME) suppliers, mapping their respective experiences with and views on RES and the potential of GPP for stimulating RES uptake: for each country the RESS will be extended with a national survey addressing a wider set of suppliers and also specific country characteristics in terms of regulations and energy prices among other variables.

The survey will include innovative SMEs but also companies from the country's larger population of SMEs as comparative group. The comparative group will resemble the innovative SMEs in pre-selected key company indicators but be distinct in terms of RES innovative capacity.

Existing drivers and barriers in the RES sector shall be mapped, systematized and described in the context of their appearance in the European RES sector.

The variety of the occurrence and relevance in different European Regions as well as in different business sectors will be described. This will help to specifically plan the focus groups and workshops.

The final version of RESS will be then uploaded on the XPRESS portal.

The XPRESS project portal will constantly be updated with information of the project's ongoing activities and results. The portal will be permanently linked to and publicised on other relevant websites and the arrangement will be reciprocal to ensure maximum exposure.

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The following will be the main features of the XPRESS Portal:

i. ***Online RESS***: Users inputs will be collected in a dedicated database of the portal as additional information to feed the financial and environmental analyses.

Users will be encouraged to fill in the online form as XPRESS will:

- Add them as XPRESS Collaborators in the Home page footer of the portal. The logo of their organisation will be hyperlinked to the respective corporate website
- Invite them as keynote speaker at XPRESS co-creation workshops and XPRESS cafés
- Run promotional social media campaigns (ads) and follower and/or like campaigns.

ii. ***XPRESS matchmaking point tool***: the XPRESS portal will include an innovative section where two parties will be able to meet:

- SMEs producing innovative green solutions
- Local governments wanting to implement innovative green solutions via GPPs.

The section will build the bridge between SMEs and LAs to facilitate green public procurement process and obtain successful results, in this sense it will be provided with tenders' "portal" searching improvements to facilitate the matching of "who offers innovation" and "who searches for innovation" (i.e. search by "SME/ LocGov/ Country/ Investor/ Innovation provider/ Innovation seeker").

iii. ***XPRESS financial and environmental repository***: this public section of the portal will showcase all XPRESS outputs such as webinars, reports from focus groups and workshop sessions, case studies, best practices and deliverables. All contents will be organised into two main categories (portal sections titled): *Environmental observatory* and *Financial observatory*. These observatories will have a common area for cases where both financial and environmental benefits have been found. Special relevance will be given to these cases by banners and widgets. All contents / outputs will be uploaded with keywords or tags to facilitate navigability and availability of information. The section will be augmented even with external relevant contents such as examples of financing mechanisms and savings for Sustainable Energy Projects to the SMEs and local government representatives who are registered on the platform, building upon the

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Enerinvest project (currently applied to the Spanish market only) on which CIRCE is currently working.

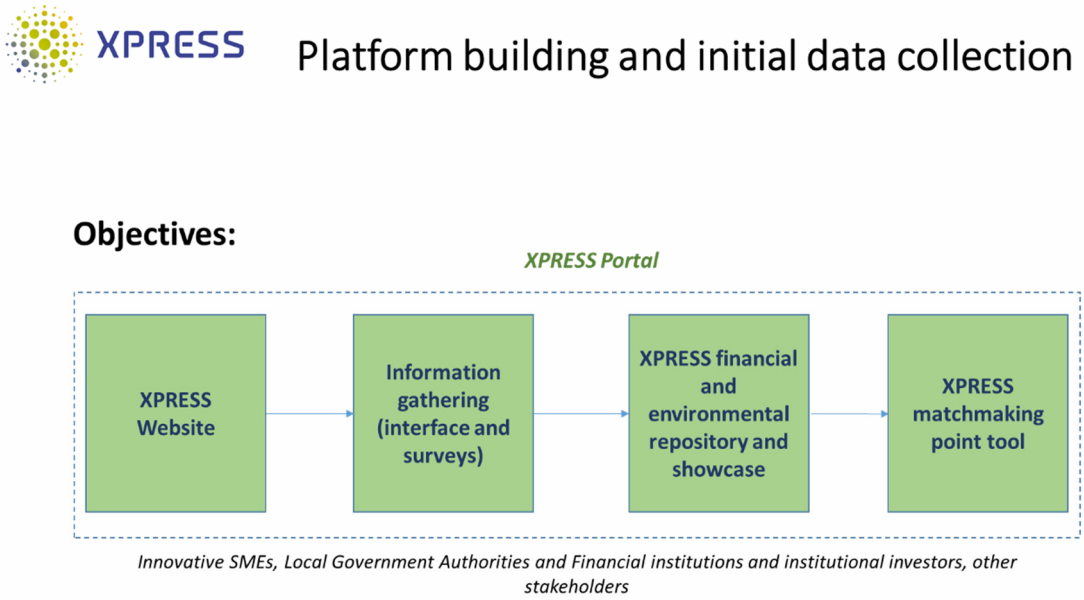

Figure 3 – Platform building and initial data collection

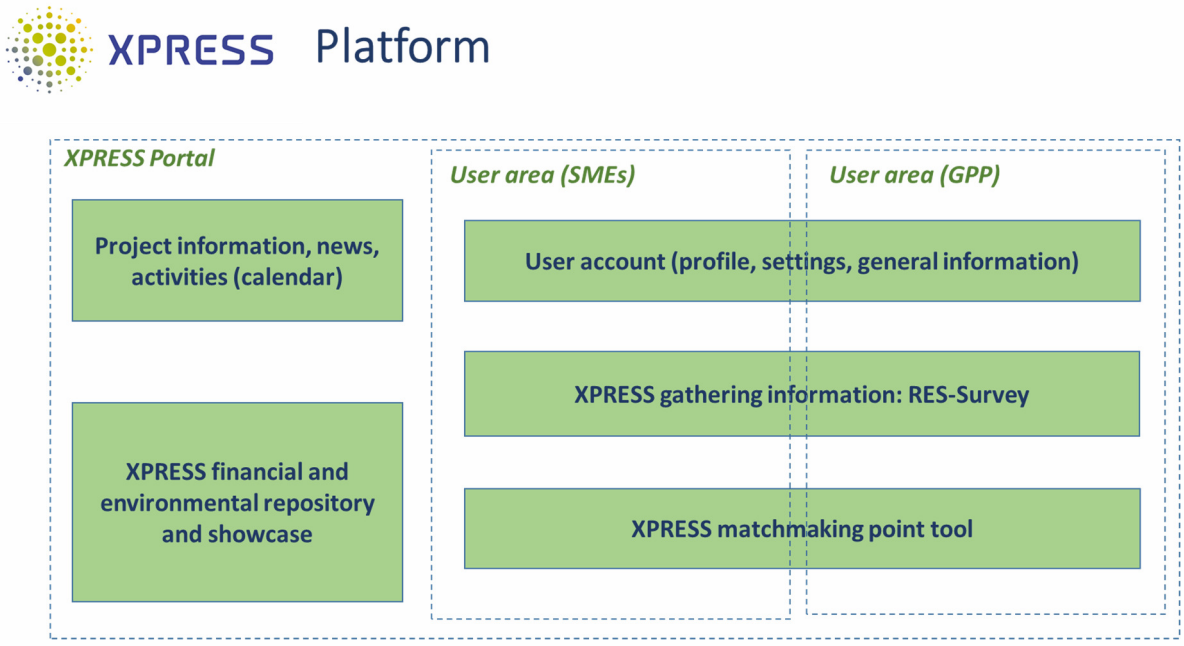

Figure 4 – XPRESS Platform

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APRE Agenzia per la Promozione della Ricerca Europea

eambiente

University of York

elementenergy

DIW BERLIN

NTNU Norwegian University of Science and Technology

ovgroup® green economy industry

Linnæus University

LOBA® CUSTOMER EXPERIENCE DESIGN

INSME LOCAL STRENGTH - GLOBAL REACH International Network for SMEs

circe RESEARCH CENTRE FOR ENERGY RESOURCES AND CONSUMPTION

European Green Cities

Alleanza per il Clima Italia onlus

Climate Alliance

SLOVENSKÝ ŽIVNOSTENSKÝ ZVÄZ

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XPRESS