Exploitation Strategy

D7.1 version 1 of 3

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Main authors	Andreas Skouloudis and David Rickerby (JRC)	
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Short Description	*This strategy aims to explore the potential for further development and implementation of the project deliverables by identifying the ones that can be utilised in generalising legislative efforts in national or regional scale as well as identifying targeted markets and tasks that could be carried out with citizens and innovative Living Labs. The strategy will be updated twice (in month 18 and 36) to integrate project outcomes.*

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Statement of originality:

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Table of Contents

Table of Contents

List of Tables

List of abbreviations

AQ	Air Quality.
DoW	Description of work.
ENoLL	European Network of Living Labs.
EC	European Commission.
ESIC	Exploitation Strategy and Innovation Consultant.
EU	European Union.
FCC	Future Cities Catapult.
FMI	Finnish Meteorological Institute.
GEOSS	Global Earth Observation System of Systems
IAAC	Institute for Advanced Architecture of Catalonia.
IIASA	International Institute for Applied Systems Analysis
IPR	Intellectual Property Rights.
JRC	Joint Research Centre.
OECD	Organisation for European Economic Co-operation.
RTO	Real Time Operating Systems.
SME	Small and Medium Enterprise.
SWFM-QF	Stakeholder Working Group for Facilitating Manufacturing of deliverables with Quantifiable Finances and results.
SWFM-TI	Stakeholder Working Group for Facilitating Manufacturing of deliverables for Technological Innovations with immediate returns.
SWOT	Strengths Weaknesses Opportunities and Threats.
T6	T6 Ecosystems.
TCD	Trinity College Dublin.
TUDO	Technische Universität Dortmund.
UCD	University College Dublin.
UNIBO	Alma Mater Studiorum - Università di Bologna
UH	Hasselt University.
UoS	University of Surrey

WP	Working Package.

1 Executive Summary

Outlines the range of exploitation actions that are scheduled within this project in order to capitalize the knowledge developed and for the advancements of technology utilised, as well as for bringing the value generated to both open market (from the business perspective) and society (from the societal perspective). In particular, this deliverable describes the first exploitation strategy as based on the project activities and products according to the boosting recommendations suggested in the Plan for the Exploitation and Dissemination of Results in Horizon 2020.

The aim of the exploitation campaign is first to generalise the relevant deliverables, to link the lessons learned to regulatory consequences regarding exposure of the population to atmospheric pollution as well as to promote specific deliverables with commercial value in the international industry and furnish expert advice in developing countries. These will be in particular targeted at sites where iSCAPE could influence large climate gains from air pollution mitigation.

The exploitation is based on an innovative scheme that will be reviewed in two more versions of this document during the project so that it incorporates the latest understanding of the project achievements that could be further exploited. In these reviews, the SWOT analysis will be updated together with the Stakeholder Working Groups for the potential use of the project results. The reviews will also identify new associations with other projects having similar aims and learn from the momentum of other projects that have ended but furnished similar deliverables with relevance to this project. Hence, with this campaign iSCAPE is also planning to offer a unique exploitation flagship, adding the significant value of European resources worldwide and in promoting European development through concrete technological achievements.

2 The aims of the project exploitation

One of the main aims of iSCAPE is to translate local experiences in general and shared knowledge for improving the air quality in cities and in alleviating climate change scenarios. New solutions identified within the project will show the main benefits for the sectors of air-pollution control and climate change as well as smart cities as a whole in Europe. Indeed, the technological outputs of the project not only will become beneficial for the advancement of individual partners but will also constitute a positive external benefit for Europe. These outputs are the set of control interventions (passive control systems) linking air-quality and climate change in urban areas. It will also aim to promote improvements attributed to behavioural aspects of urban residents while at the same time considering these residents as active contributors and hopefully project owners rather than passive information providers/listeners. This will allow the proliferation of real-world physical interventions in the urban domain and the study of the dynamics that lead to more resilient, healthy, and sustainable cities. In order to reach this aim and for successfully transferring the project's results, a wide exploitation

campaign in Europe and elsewhere is planned during this project. This is achievable because of the long scientific and technical expertise of participants and on tangible research results that are available from the early stage of iSCAPE.

First, relevant research deliverables will be generalised in order to link the lessons learnt and research outputs with regulatory consequences regarding population exposure as well as human health. Moreover, specific deliverables with commercial value to the international industry will be generalised and furnish expert advice to developing countries at sites where iSCAPE will influence large climate gains from air pollution mitigation. We also aim with broad campaigns to transform iSCAPE into a unique flagship for the sector by promoting European development through concrete technological achievements.

Exploitation of iSCAPE results and developments will be an ongoing activity through the project. The project consortium will establish iSCAPE as a highly visible focal point for research on air pollution in Europe and internationally according to the aims of the call (SC5-04-2015).

The challenges of this call are to find long-term, sustainable solutions in the EU addressing atmospheric pollution in cities where citizens are frequently exposed to high levels of pollutants, exceeding the limit values established by the European directives. It also requests the development of technological options and strategies to fight against air pollution in urban environments and against climate change, ensuring the involvement of the main pollution-generation sectors. It also raises awareness for relevant citizen/societal challenges and promotes their engagement in playing an active role for resolving these issues. We also with this project stimulate the development and application of tools in support of integrated air quality and climate change governance in EU Member States. For regulators we aim to design and implement adequate abatement strategies and practices applicable at various scales.

The iSCAPE project will produce cutting-edge research and scientific and social results will be spread as widely as possible, and will be publicised via the consortium's national and international networks.

In particular, the objective of exploitation is to develop an effective way to exploit the project results within and if possible beyond the life of the project. The iSCAPE strategy will focus on the following objectives:

1. To define a pragmatic procedure to translate the findings into policy actions in order to maximise the impact.
2. To define a framework to exploit the lessons learnt from the innovative use of Passive Control Systems in urban environments in order to deploy similar interventions in other cities in the EU and worldwide to have a positive impact on air quality in cities on a larger scale.
3. To define a framework to exploit the lessons learnt from the innovative use of Living Labs in the field of air quality in order to further exploit the gathered knowledge as part of future EC projects and export the lessons learnt to potential end-users or other beneficiaries.
4. To define business scenarios considering the specificities of each SME in the consortium in terms of commercial positioning and products/services already offered, as well as a suitable value chains for the implementation of applications. These should include an identification of barriers/risks to market deployment and how these could be addressed, showing how

potentially this will benefit the market uptake of the innovative solutions but also benefit the sector as a whole in Europe.

5. To define a legal framework for exploitation by identifying the items that could be exploitable by each partner according to the Consortium Agreement including IPR details and by taking into account the contribution among all partners in each exploitable result.
6. To identify developing areas where the project outcomes will maximise the outcome of interventions and provide expertise in areas with significant impact. This is the reason why in the consortium international Institutions and local authorities are involved, providing benefits that will go beyond written reports and offer coherence for a potential continuation after the end of the project.

The **academic partners** will have a special role in distributing the results of iSCAPE in order to apply the lessons learnt in terms of interventions to improve air quality in urban environments to other cities in EU and worldwide (e.g., the generalisation of the results). ENoLL with contributions from FCCs work in WP2 will ensure that the designed framework for **Living Labs** for air-quality interventions will be available to the Living Lab community at large. The liaison of JRC with European fora will ensure that the findings will be effectively translated into **policy recommendations** for further exploitation in the air-quality directives as well as for the regulatory actions for climate mitigation and monitoring. The SMEs and RTOs will facilitate the dissemination of commercial findings related to sensing units and photocatalytic coatings in order to benefit European industry at large and in general promote technological and non-technological solutions from the project.

The current document has been formulated after several iterations between partners since the project kick-off meeting in Dublin in September 2016, after discussions with the external advisors and verification of several issues with exploitation boosters related to EU project results and deliverables. It serves as an outline of the exploitation strategy and highlights opportunities and possibilities that will be updated throughout the duration of the project, as more deliverables will become available. The iSCAPE exploitation strategy will carry out the following specific actions that are described in detail in the following sections:

- To promote and raise awareness about the project's contents, developments and results in association with the communication and dissemination strategy (deliverable D8.1);
- To cooperate with decision-making bodies and organizations identifying specific channels for exploitation events in Europe and internationally;
- To harmonize the exploitation activities of the partners for a more efficient and effective communication;
- To plan exploitation events together with other relevant initiatives during which will be also examined the possibility to continue after the project lifetime if the last event succeeds to be self-financing. In terms of Living Labs this will depend on the community engagement and how the citizens involved will take ownership of the project aims.
- To get citizens involved and continue their involvement by creating value from the citizens' point of view, so that the input provided from their engagements is directly reflected back to them as a tangible benefit (see more as per deliverable D2.1).

3 The first iteration of Exploitation Strategy

Within the iSCAPE DoW, the exploitation strategy was proposed to be a continuous innovative approach with two unique features. First, the consortium has agreed to implement a complete Work Package (WP) that has ten specific deliverables while at the same time it has proposed to work in harmony and close collaboration with the dissemination and communication package (WP8). The second feature was to propose an exploitation process that will be revised and updated twice during the project execution. Namely, the three versions of the strategy will be communicated at months 6, 18 and 36.

The purpose of the first version is to establish in sections 3.1 the templates of the information that will be needed for exploitation targets, to initiate the identification of the stakeholders and the potential end-product target working groups. It will also establish the criteria and the templates of the information that will be maintained by all partners during the execution phase (in section 3.2). It outlines in section 3.3, individual partner exploitation objectives and in section 3.4 the liaison approach with projects sharing mutual objectives. Finally, in section 4, are presented the exploitation actions to be realised during iSCAPE.

The second version of the strategy will present detailed information about the exploitation that will be followed by each partner in association with the detailed outline of strengths, weaknesses, opportunities and threats for each of the exploitation deliverables that will be released in the second half of the project.

In the final version of the exploitation strategy, will be released the final data from the exploitation classified into research, regulatory and citizen Living Lab areas. Because of the sensitivity of these two versions of the strategy, we will not plan to release these versions as public documents.

3.1 Compliance to H2020 exploitation requirements

Often the terms dissemination and exploitation are used in referring to the same actions. In our project, these are considered to be of great importance and of high value. Concerning exploitation, this is tackled in accordance to H2020 requirements (EC Decision C8265, 2016 and E. Sweeney, 2015). In particular, we have the obligation to address:

- What kind of problem the proposed solution will solve and why this solution will be better than existing ones and in which areas?
- Who will use these results?
- What benefits will be delivered and how much benefit?

However, we should keep in mind that in the Horizon 2020 framework programme the exploitation is more focusing on the impacts on the society and it should according to IPR Help-Desk (IPR, 2015):

- Keep the plan flexible enough and in line with the objectives of the project.
- Define clear objectives and well-planned exploitation strategies.
- Include sufficient quantitative and qualitative indicators as to the planned activities.

- Show the link between the proposed dissemination and exploitation measures.

For these reasons, the exploitation of iSCAPE and developments are considered an ongoing activity throughout the project. The project consortium also aims to identify exploitation benefits for each individual partner as it is explained in section 3.3 with the aim for each partner to become a highly visible focal point for air pollution and climate change mitigation in Europe and internationally.

The following are actions that are going to be followed during iSCAPE exploitation:

- Start early in the project with developing a dissemination strategy. This is ensured by the communication and dissemination strategy developed as part of WP8 (Deliverable 8.1). The dissemination results are planned in such a way that they will open exploitation channels.
- Quantify what are the project SWOTs regarding project exploitation based on the opinion from all partners. In general, it is necessary to set some finite indicators that are common and makes the project plan more quantifiable (see Table 3 and section 3.2).
- Identify the exploitation potential of each individual partner (by harmonising the information in version 2 of this deliverable).
- Quantify the common deliverables of this work package the SWOTs and if necessary promote this deliverable to the appropriate dissemination channel.
- For a partnership to have a successful exploitation commitment, it is also essential to keep in mind and respect the intellectual property rights. In iSCAPE an analysis is planned of the intellectual properties in the deliverables and this will be incorporated in the final version of this deliverable that will be produced in month 18.
- In some H2020 calls, the EU facilitates exploitation by an 'exploitation strategy and innovation consultant (ESIC)'. We will appoint such consultants for boosting the project SMEs and one from the project external advisory board. More information about this can be acquired from help offered by EU for all H2020 projects.
- Exploitation activities will be continued if possible also after the end of the project, if financially self-sufficient. We will examine during the project on how to systematise this process and continue the exploitation (and additional dissemination) of project results as this will maximise the impact of the iSCAPE project results.

3.1.1Knowing the exploitation targets

Many of the more highly industrialized parts of Europe are marked by large, sprawling metropolitan areas with a population of more than one million that increasingly require integrated management of their environment and transport policies (Eurostat, 2015).

National and regional investment plans for technical and non-technical abatement strategies are based on compliance with EU directives as well as with existing WHO recommendations on this subject. However, it is the cities and the urban areas that are called to demonstrate compliance with the standards proposed by the WHO in relation to this (Skouloudis and Rickerby 2016).

The results from iSCAPE aim to furnish tools suitable to local authorities for understanding the implication of climate in the urban background of their cities and a new set of passive controls for

innovative monitoring in curbing the anthropogenic emissions with indirect interventions. As such, our targets are local authorities, citizen groups with specific occupational hazards (e.g. drivers, children in the periphery of heavy trafficked roads etc.) and Living Labs for advancing public attitudes and government policy within different European countries. For example, our exploitation targets are all groups interested to evaluate the importance of preventive measures to step up action to reduce air pollution focusing on three priority areas:

- The need to increase knowledge of pollutant emissions and air quality,
- To improve local abatement strategies or legislative measures and
- To increase knowledge of the effects of air pollution on the environment and human health.

For the effective exploitation of iSCAPE the following main target groups and key actors have been identified as potential end-users to adopt or apply the results of the project, and potentially benefit from the knowledge produced. At first glance, these might appear similar to the groups of experts on which the consortium will communicate the results. However, for exploitation we seek commercial exploitation of the successful technological innovations from this project, to create sustainable Living Labs, as well as offering the iSCAPE solutions for assisting Regulatory decisions:

1. Air-quality and climate change communities in the research sectors and health care (academic and private researchers, public research bodies);
2. Atmospheric pollution monitoring industry and SMEs;
3. Companies active in the AQ sector for hardware or software solutions;
4. Public sector players (such as public administration organizations, municipal authorities (e.g. urban planners), police departments, universities, etc.);
5. Other EU funded projects and initiatives;
6. Living Labs and other citizen Working Groups;
7. National and local policy and decision makers in Europe and worldwide;
8. Other stakeholders active in the various tiers of the World Bank, OECD and GEOSS;
9. Standardization organisation, trust & security experts working with occupational hazards.

In order to ensure a successful and sustainable exploitation of the iSCAPE results, the exploitation plan is implemented at three strategic levels, namely the National and International level, with a primary focus on the EU, and in Developing Regions worldwide where maximisation of intervention will produce tangible results in short but representative deployment periods.

In establishing the exploitation targets, the project partners will use the following final guidelines for establishing additional multiplier channels to raise the visibility of iSCAPE. These efforts will be based on core communication tools distinguishing between push and pull information:

- ***Pull content***: Content that can be accessed and consumed by the users (all target groups). Amongst these will be the web (the project website and the Virtual Living Lab) and social media explaining concepts, developments, myths and realities in easy to understand language for the public at large. Furthermore, for the aforementioned nine categories of communities, the findings from the project itself, but also from other related partners/projects.

- ***Push content***: New dynamic channels offered by Web platforms to disseminate messages (e.g. Twitter, dedicated social groups) on academic and professional sites (like LinkedIn, ResearchGate etc.).

Although these issues are addressed in detail in the Dissemination and Communication strategy of the deliverable D8.1, for specific exploitation solutions the pull and push content will be helpful in reinforcing the penetration in developing countries.

3.1.2Setting the objectives and the measuring indicators

In order to quantify the success and the effectiveness of exploitation, several impact factors will be directly determined from the direct scientific and public communication channels. Some of the data will be extracted from the dissemination and communication actions planned in WP8 or from the simple monitoring of visits to the project website.

The hetero-citations of published scientific literature and the close monitoring of the increase of the SWFM-QF and SWFM-TI after each main dissemination and communication event will be particularly useful for exploitation purposes. The detailed evolution of these indicators will be presented in the third version of this report.

3.2 Common exploitation objectives for all partners

The iSCAPE consortium has already engaged in a number of exploitation activities, the majority of which aimed at promoting the project objectives by means of presentations at related events, and publications in pertinent scientific journals, as well as on-line and paper magazines. The key objectives that should be followed by all partners are:

- Establish and maintain mechanisms for effective exploitation.
- Inform stakeholders, targeted user communities for the working groups SWFM-QF and SWFM-TI (these might have some names in common with stakeholder groups established for communication purposes in WP8) where a two-way interaction will take place with the project development and encourage interactions/ networking.
- Coordinate all levels and types of exploitation of the knowledge produced by the project.
- Ensure that information is shared with appropriate audiences on a timely basis and by the most effective means.
- Channel the project's results to a truly wide international audience, in particular in those areas where the proposed solutions will lead to immediate society impacts (in developing counties or in EU cities with similar climate and atmospheric pollution conditions).

Within iSCAPE, these objectives should be addressed in the ten exploitation deliverables that are part of WP7 and are summarised in the following table. These will involve all partners and will have significant exploitation impact at the later stages of the project. However, because of their importance, the planning of this work will start in earlier months.

Deliverable	Description of the contents

D7.2	Generalisation summary of infrastructural recommendations for urban policy makers. This report will present final recommendations on infrastructural interventions after taking feedback from partners, stakeholders, urban planners, regulator and industrial needs.
D7.3	Input-output link with an atmospheric dispersion model (outdoor concentrations). This will be in the form of a framework linking anthropogenic urban activities to environmental models for providing new insights on how traffic policy measures need to be designed to improve environmental quality.
D7.4	Personal exposure estimate improvement. This will be in the form of a report describing the framework linking emission models to estimate traffic related emissions, dispersion models to estimate concentrations at which people are exposed and exposure and health impact models to estimate the environmental impacts on public health.
D7.5	Translating environmental effects into human health. This will be in the form of a framework to calculate the health impact on the population based on the impact of road traffic on the environment and taking into account the detailed travel information.
D7.6	Identification of episodes linking air-quality with climate change. This will be in the form of a report detailing a series of modules of generalisation for identification of episodes linking air-quality and climate change.
D7.7	Geographical harmonisation and generalisation of the iSCAPE operational domains. This will be in the form of a report defining a framework for a geographical harmonisation and generalisation of the conclusions from the domains of iSCAPE.
D7.8	Sensor monitoring experiences and technological innovations. This will be in the form of guidelines on sensor utilisation for outdoor and indoor monitoring of pollution.
D7.9	Experiences from photocatalytic films in urban domains. This will be in the form of a report on the use of photocatalytic coatings on residential and commercial building facades in urban environments for different climatic conditions.
D7.10	Potentials and prospects for technological integration with other EU funded platforms. This report will outline synergies with other EU funded platforms in order to maximise the exploitation of the iSCAPE's technological outcomes.
D7.11	Living Labs for air quality knowledge and policy package. This deliverable 1) creates a compilation of the current knowledge related to Living Labs in the form

	of publications/guidebooks and policy papers, and 2) reports on activities performed to transfer this knowledge (webinars, workshops, etc.), participating in World Bank relevant events (in WP8); see Eskelinen et al, 2015.

Table 1; Description of common deliverables of WP7 for the exploitation of iSCAPE

In promoting these deliverables (for e.g. at the municipality or regional scale), the following are recommendations with ***added value*** and could lead to further project benefits:

- Present the results of the project to other public administrations and regulatory authorities (especially by exploiting the links established from the Living Labs).
- Learn about the features needed to extend iSCAPE to smaller scales (e.g. as in street canyons or zones where passive control interventions are implemented).
- Extend the approach to other countries (EU and worldwide if possible).
- Integration of the same policy area across different levels for the geographic generalisation of the results to be applicable to other areas.
- Extension to other policy domains (directives for health or industrial emissions).
- Establish a list of potential end-users from all the aforementioned steps (from month 18 onwards).

The common exploitation deliverables for iSCAPE should also apportion the exploitable knowledge, identify the generated products or services and determine the most suitable areas of application. Table 2 shows the first version of early knowledge and products that are worth exploiting according to the DoW. The rows of this table have been based on the objectives of the iSCAPE project.

Possible Exploitable Knowledge		Possible Exploitable Products or	Sectors of Application	Owner & Other Partners
1	**Potential of Passive Control Systems in Urban areas**	Low boundary walls, trees and hedgerows, green walls & roofs, photocatalytic coatings, green urban spaces and road optimization.	Urban planning and Municipal regulatory authorities	UCD, UoS, TUDO
2	**Air pollution and climate interactions current and future prospective**	Impact and effectiveness of emission abatement and policy intervention measures under business as usual scenarios.	Regulatory authorities	UNIBO, FMI, TCD

3	**Sensor components**	Deployment of sensor arrays in local "hot-spots" where photocatalytic coatings are sprayed.	General Air quality monitoring “in-situ” in one North and one South European city.	IAAC, UNIBO, UoS, FMI
4	**Integrated modelling work**	Analyse policy effects of urban pollution on the exposure of specific vulnerable population groups - children and elderly.	Target Cities (Bologna, Bottrop, Dublin, Guildford, Hasselt, Vantaa)	UNIBO, FMI, UH
5	**Downscaling and socio-economic integration**	Possible future states of a dynamical system and the integration of socio-economic changes.	Generalisation of interventions from regional climate to local urban scale.	FMI all partners and city representatives.
6	**Living Labs**	Collective transport means mobility-on-demand systems and real-time traveler information exploiting smart cities technologies	Social Simulation, Opinion Mining	ENoLL, FCC
7	**Methodology for extending the Living Lab decisions to other fields.**	Citizen’s participatory approach.	Strategic Environmental Assessment, Urban planning, public participation processes.	ENoLL, FCC all partners and other projects in the cluster.

Table 2; Summary of common exploitable deliverable identifiers iSCAPE partners during the first phase of the project.

For all common deliverables of Table 1, a SWOT analysis concerning their exploitation potential was carried out. The following table summarises the indicators of Strengths, Weaknesses, Opportunities and Threats that so far are already considered to be common for the iSCAPE project. The examination of Table 3 will allow the identification of elements that are specific to this deliverable. If this table does not have all the deliverable features then it should be amended with suitable SWOT items. In this way, Table 3 will be also updated during the next versions of this deliverable and will become an instrument for a quick identification of exploitation values of this project.

Strengths	Weaknesses
Addresses a wide audience, since climate and urban pollution concerns citizens and every municipality and governments. Easy to adopt monitoring from users without a technical background. Abatement solutions efficient in areas regardless of the geographical origin. Multiple data types, data modalities (e.g. spatial, temporal, statistical). Capability to access and combine existing (i.e. data visualisation, analytics and data mining) components. Particular focus on a unified approach to linked meta-data. Dynamic visualisation possibilities. Complete set of assessments to mitigation scenarios. Open license technologies.	The transformation of some data types still needs to be improved. Expert knowledge is needed in order to perform advanced analytics (establishing the link between climate change and urban pollution). The lack of wide adoption of the open, linked data concepts from public sector information providers. In order for the sensor monitoring to become a market-ready product platform, extra effort will be required. Identify abatement solutions from urban planning, public policy, urban and environmental sociology that are dependent on the geographical location of the urban domain.
Opportunities	**Threats**
Technological flexibility and openness to adaptation. Citizens are eager to find out how polluted is their local environment. Government, administrative and municipal officers want to reassure citizens in terms of creating public awareness. Regulators want to know which solutions receive greater priority from the citizens' perspective. Worldwide awareness raised regarding integrated datasets, visualisation and comparative analysis tools, from citizen engagement and user groups fostering transparency. Possibility to include new and complementary passive controls for AQ. Integration with related government, municipal and administrative services.	Existing (partial) competition may develop in the future. Introduction of new guidelines, laws and certifications regarding urban planning, privacy of citizens and public fiscal data. Bureaucratic resistance and/or absence of political will by public sector organisations to use the proposed solution. Difficult to find use-cases and data sets that are in formats easy to process. For example, it is common that fiscal data sets are published in complex pdf format and are not openly accessible to non-experts. Significant verification of any sensor technology involved in the project The quality of generalisation might be uncertain from public endpoints. Identify potential conflicts or overlaps of IPRs.

Table 3; List of common SWOT features that could be utilised for the exploitation usefulness of iSCAPE products (updated after the submission of the first deliverables)

3.3 Individual exploitation plans

In addition to the common exploitation, deliverables that will be defined during WP7, the second and the third version of the exploitation strategy will incorporate the opinion and the specific exploitation actions that are considered most appropriate for each individual partner. These opinions will be furnished between month 6 and month 18 from bilateral discussions with each partner. These discussions will be organised on a voluntary basis with the partners that are willing to share their views on exploitation.

The information that will be requested are already harmonised based on the requirements for H2020 projects (EC Decision C8265, 2016) and will include the evaluation of the main market issues and channels to exploit the deliverables to the markets will be considered.

Market analysis and the **identification of competitors** are two of the most important activities that need to be successfully completed by month 18. It is distinct from the perspectives of each partner and critical for the assessment of the extent to which the iSCAPE results can be commercialised. For the market positioning the functional attributes of the solution will be compared to existing solutions (to the extent that these exist) and to the decision making processes in a subset of EU member states and at various levels. Contacts with the working group of stakeholders (SWFM-QF and SWFM-TI) previously mentioned will be utilised to facilitate this process.

It is worth listing potential areas where special efforts could be made in the development of certain deliverables for facilitating further exploitation benefits. These efforts should be categorised under the following themes:

- Geographical applicability in different urban domains or at different “hot-spot” (street canyon) areas within each urban domain – it will be useful to identify what data needs are required and if there are processes that could be automated with a harmonised methodology.
- Temporal applicability. Whether the conclusions of obtained results allow the generalisation over longer periods or are there any technical difficulties that will restrict the process adopted in iSCAPE.
- Population generalisation – are the citizen groups representative enough and how the conclusion reached from each population group is expected to have additive characteristics in emission reduction and not introduce auto-cancelling effects?
- How the non-technical abatement control measures will be accepted by the various end users from Living Labs to regulatory authorities based on current deployment applications?
- Are there any areas of technological solutions that could be implemented in the next months for reducing the monitoring limitations and what would be the appropriate vehicle on which to base such solutions (satellites or in-situ measurements)?
- What are the specifications that will be necessary for potential clients so that further funding will be successful?

Finally, it will be beneficial for each product or service that will be considered worth exploiting to describe an **indicative business plan.** The aim will be to produce a clear vision of the use that will be made of the various results and their commercialisation. Issues that are likely to arise include, among others:

- Competitor and alternatives analysis;
- Market size and likely willingness to purchase;
- Potential Routes to market;
- Legal structure and IPRs for future development and exploitation;
- Proposal for a business model, sharing of development/support costs and revenues, synergistic benefits to participants.

In order to help the partners in identifying suitable activities the remaining two sections of this chapter will present common exploitation solutions adapted specifically for two main categories of partners. These solutions could be suitable for academic partners and for SMEs and Citizen's Organisations. The lists are not exhaustive and more detailed information is expected to emerge during the bilateral exploitation meetings with partners.

3.3.1 Exploitation for Academic Institutions

Academic institutions, in theory, might expect to have limited opportunities for the exploitation of project results. Nevertheless, they play an important role for further research on the basis of successful deployments. These options are more than suitable for expanding the list of potential end users with a clear net benefit for the overall exploitation of the project. These actions could be:

A platform for further research - Although the results of the iSCAPE project will include an operational system specifically focused on the interaction of climate and health in urban areas, there will be many possible improvements and extensions. These potential extensions could be identified during the implementation and a methodology for extending the iSCAPE approach and its components in a number of ways will be worth developing. In particular, several partners are very interested in extending the approach to higher and lower levels by generalizing and applying it to other regions and extending it to business models. Others are interested to assess for regulatory authorities what would be the true natural background of atmospheric pollution beyond which it will be impossible to achieve lower annual mean values etc. The tools for understanding discussions from Living Labs forums will also be reused, generalized and extended for other research areas. Areas that are worth exploring with further research will emerge during the second half of the project and will be incorporated in the final revision of this deliverable.

Other research - iSCAPE has opened a number of research avenues that are worth investigating for environmental monitoring and for testing the effectiveness of passive control systems. The most attractive of these concerns the interaction between decision support and optimization techniques and a simulator of a complex system. In iSCAPE a specific integration and interaction mechanism will be adopted between the climate and urban models and the social simulator (namely an iterative procedure converging to an optimal and feasible solution). However, many other such interaction mechanisms are possible. In addition, iSCAPE can open up an interesting research

direction, i.e. putting decision making at the forefront of complex systems. In general, regional plans should be such that they are achievable by the nationally driven incentives. However, modern urban domains have complex specificities and several local authorities require, in addition to national abatement incentives, to assess the impact of local industries and additional emission reductions from passive interventions. Similarly, there are a number of other policy areas where decisions that are taken effect or are affected by complex systems. Consider, for example, decision making for influencing and improving vehicular traffic, and decision making for planning wildlife corridors for preserving biodiversity. Several partners could further investigate such research directions, by possibly applying for regional or national funds.

National activities in cooperation with other public bodies - As previously mentioned, one of the possible future applications of the iSCAPE system is to apply it to other cities or regions (i.e. at the same level as the pilot system) and at lower and higher scales in particular, for working at regional, municipality and provincial levels. The experience by working with partners from other countries will possibly help in establishing connections with public bodies in other regions.

Research synergies with other universities and research centers - The university teams that are already known in one area will have the opportunity to exercise the combinatorial links with other universities, companies and research centers in the field to amplify their operational potential. The project will support the opening of other collaborations - for example, with computational social scientists, researchers working in opinion and data mining, as well as contacts with industries operating in the industrial monitoring areas.

Improved academic programs - the university groups could create Masters and PhD courses on suitable subjects emerging from the experience of iSCAPE. These courses could include elements that cover decision making and optimization. The concepts of the regulatory policy of the project could be also incorporated in these courses to teach students about the importance of decision support systems for policy making, in order to attract students and researchers to join the research groups of the respective partners.

3.3.2 Exploitation for SMEs and Organisations for Citizens

SME and citizens' institutions, in theory, can be expected to have opportunities for deliverable exploitations. The domain of their operations is wider than that of the academic institutions; however, their intervention is greater where there are tangible deliverables. The following are exploitation ideas based on the deliverables identified in Table 2.

Adoption of the developed tools - The exploitation plan for the common deliverables includes: the adoption of a generalisation summary of infrastructural recommendations; the report translating environmental effects into human health; identification of episodes linking air-quality with climate change; the geographical harmonisation and generalisation of the iSCAPE operational domains; potential and prospects for technological integration with other EU funded platforms; and the compilation of the current knowledge related to Living Labs in the form of handbooks and policy papers. A collection of proposed solutions for emission control based on technological and non-

technological interventions could easily become a marketable product for many regional and local authorities worldwide.

Possibilities for further research and collaborations – Beside the current approach the iSCAPE concept could be extended to address different types of climate and atmospheric pollution in areas such as those with intensive agriculture, or affected by adverse atmospheric circulation conditions. The methodology could be used at different scales, like the national scale, or the municipal level. For these reasons, it is expected that this could lead to promotion of the SME deliverables in collaboration with public bodies. As a by-product, these public bodies would get awareness of the existence of computational capabilities and optimisation tools, and this could further foster their use of these deliverables for other (possibly, completely different) purposes.

Licensing of Products - It is planned to release the semiconductor monitoring platforms and the technological related products as open-source software, so that a community of users can improve them. This is more attractive since the application is implemented on top of open source modules. In addition, with regard to the project hardware and sensor platforms, aside from the open source licensing, the technological contributors in this project have plans to sell the hardware as part of the Smart Citizen sensors and further commercialize their work.

Consultancy for optimised Passive Controls - During the various phases of iSCAPE, solutions for passive interventions will be released in several steps during the project. The generalisation of deliverables could lead to a range of solutions that could be optimised. Potentially, after the end of the project, the development of optimised tools could lead to further software development. The industrial partners and the presence of local authorities in the iSCAPE consortium will be of significant value in offering the continuation of this work in other regions.

Publications - Industrial partners and institutions also have plans to exploit the results through the press or other publications. These could target popular non-scientific media in order to attract the attention of the general public, as well as specialised incubator journals and international marketing of new technological developments. In this context, it will be useful to identify annual and biannual events that would be of interest to them for systematic participation.

4 Liaison with other projects/initiatives

Although most of the iSCAPE framework is newly designed and based on emerging technological innovations, the partners can capitalize on the mature existing applications being used in existing projects and other worldwide initiatives. Furthermore, many partners have already identified key European Research projects that could be extended, thus ensuring that iSCAPE will be built upon (and leverage) existing technologies and encourage strong liaisons amongst the recognised projects.

The following are among the key European Research projects: AIRSCIENCE (Irish EPA), C-LIEGE, Climate-Proof City, DATA SIM, EO2HEAVEN, ESPON Climate, Greening Transport (Irish

EPA), RECAST, Making Sense (H2020 LEIT ICT), TESS, CLAiR-City, CITI-SENSE and several others.

The aforementioned are projects that have been identified as having synergies in the first nine months of the project and have already expressed an interest in liaison for a common exploitation event. Certainly, this list will be enriched in future with more projects suitable for exploiting citizens' participation and the Living Labs experiences.

At the same time, iSCAPE has already participated (and will continue to do so) in many policy and networking events organized by different forums of industrialists and regulators. The management team is also closely linked with the other two system projects funded by the Research and Innovation Action call H2020-SC5-04-2015 aiming at "Improving the air quality and reducing the carbon footprint of European cities". The partners had the chance to meet several participants of relevant projects from the 5th Framework programme onwards and we are aiming to consolidate our horizontal interactions by organising two exploitation events in Brussels (in the end of the first year and during month 30) while at the same time participating in general H2020 exploitation events with projects with iSCAPE synergies.

5 Final Recommendations for the first iteration

The goal of this exploitation strategy is to offer the best possible path to take forward the local iSCAPE results in the form of:

a) A general evaluation of the effectiveness of policy;
b) Recommendations to local urban decision-makers for mitigating of atmospheric pollution;
c) Promoting collaboration with other European projects in creating advanced technological improvements with significant spin-offs.
d) Adding value to European businesses and innovation institutions by promoting specific project modules in the international market, and
e) Identifying European and worldwide developing regions where the project outcomes will maximise the outcome of interventions and provide expertise in areas with significant impact.

The current document was concluded after a successful discussion between various partners associated with management of the exploitation working package, after consulting the exploitation requirements for all H2020 projects (EC Decision C8265, 2016) and after reviewing for four weeks the deliverables that were produced during the first six months of iSCAPE. It serves as a basis for the second and third versions of exploitation and defining future opportunities and possibilities for increasing the impact of the expected deliverables of iSCAPE. It also harmonises the actions needed for promoting and raising awareness among the partners by looking into the deliverables strengths, weaknesses, opportunities and threats that might limit the future commercialisation of the outcomes after the project lifetime.

The strategy will be implemented by the following actions:

- A set of ten generalised deliverables mentioned at Table 1
- A harmonised common SWOT analysis for the exploitation deliverables.
- Two international exploitation events outside the European Union.
- Continuous exploitation coaching for individual partners.
- Liaison with other projects and European regulatory initiatives
- Two exploitation events in Brussels and
- A long-term exploitation exhibition suitable for the general public.

The success of such a strategy is strongly based on an “inclusive approach” as has been clearly stated in many sections of the iSCAPE proposal and in the DoW. This comprises stakeholders, Living Labs, authorities, industries working in the sector of atmospheric pollution and climate change and international organisations operating in developing countries that take part in the iSCAPE activities. It is worth mentioning that iSCAPE right from the beginning has focused on the utilisation of the knowledge from Living Labs in the specific area of urban atmospheric pollution and its relationship on climate.

Finally, in order to maximize exploitation benefits, partners will be informed about spin-off events (2020 information days for ICT and ERC). They will be also encouraged to interact with industry in order to explore the preliminary requirements (ECSEL Joint Undertaking, ARTEMIS Industry Association and all similar initiatives that form part of H2020 technological innovations); and interact with regulatory authorities that represent the end-users for utilising key deliverables as they become available during the coming months (EU Cities forums etc.).

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