



**MARCO**

*Research and Innovation Action (RIA)*

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**Final report by Expert Committee, recommendations for the future**

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## Summary

This document is the Final report. Last deliverables from different work packages (notably WP2 and WP6) were due for December 31st 2018 and were only made available as drafts to the AEC members at the end of December. Due to short notice and time available for review just one member provided extensive feedback and another provided general comments. In January 2019 a second round of feedback was asked but only on one deliverable that was considered as central to the project (D2.7 Recommendations). Following this AEC review and upon agreement with the EC project officer, a revised version of the D2.7 report is to be submitted to the EC, in order to best address the comments while considering the tight timing before the closing project deadline. Additional comments (on other deliverables) are mainly indicative but will also provide contextual inputs to the joint deliverable D7.5, that is still being finalised in January 2019, together with the EU-MACS consortium, as well as any follow-up activities towards a market observatory for climate services. It is important to bear in mind that the feedback provided in this report is based on the contribution of a small subset of the AEC members and should not be considered a consensus document of the full AEC committee. The feedback from the contributing AEC members is presented in the next section. The feedback on four deliverables (D2.5, D2.7, D3.5, D6.5) is presented in four corresponding subsections. The complete set of comments is presented in the corresponding Appendices 2 to 5. Section 3 presents the overall conclusion.

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## Approval

Date	By
2019-02-01 00:24:09	Dr. Thanh-Tam LE (CKIC)
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## 1 Background

The Advisory Expert Committee (AEC) has an advisory function to allow the MARCO project to benefit from expert opinions on key points along the project.

The Advisory Expert Committee mandate (see D1.1 Project Quality Plan) is to provide the MARCO consortium with advice and recommendations, based on the individual expertise of its members. This advice is based on experts' privileged access to project documentation and information, including inter alia: methodologies; draft deliverables and reports; case-by-case solicitations and questions from the consortium. The advice takes the form of exchanges in meetings, written recommendations and synthesis reports.

The Advisory Expert Committee consists of seven renowned experts in the field, who demonstrate excellent knowledge of the market mechanisms for climate services (see Appendix 1). The committee is animated by a Chair and a Vice-Chair. Apart from the Chair (from the CKIC), the experts do not have direct links with the consortium. They are selected from a range of countries. The Chair shall act as point of contact between the AEC and the consortium. The appointment as an AEC member involves: Signing a confidentiality agreement; Participating at three AEC meetings; Contributing to the recommendations of the AEC; Being invited to attend the Stakeholder Workshops (see also D1.1 Project Quality Plan).

The AEC contributes to the project with three deliverables:

- Deliverable 1.4 *First intermediate report* (January 2017) at the beginning of the project based on the analysis of the proposed methodology.
- Deliverable 1.5 *Second intermediate report* (December 2017) contributes to the mid-project review with feedback based on the preliminary results.
- Deliverable 1.6 *Final report* (January 2019, after extension) at the end of the project provides feedback on the final results and recommendations for the future.

This document is the Final report. Last deliverables from different work packages (notably WP2 and WP6) were due for December 31<sup>st</sup> 2018 and were only made available as drafts to the AEC members at the end of December. Due to short notice and time available for review just one member provided extensive feedback and another provided general comments. In January 2019 a second round of feedback was asked but only on one deliverable that was considered as central to the project (D2.7 Recommendations). Following this AEC review and upon agreement with the EC project officer, a revised version of the D2.7 report is to be submitted to the EC, in order to best address the comments while considering the tight timing before the closing project deadline. Additional comments (on other deliverables) are mainly indicative but will also provide contextual inputs to the joint deliverable D7.5, that is still being finalised in January 2019, together with the EU-MACS consortium, as well as any follow-up activities towards a market observatory for climate services.

It is important to bare in mind that **the feedback provided in this report is based on the contribution of a small subset of the AEC members and should not be considered a consensus document of the full AEC committee.**

The feedback from the contributing AEC members is presented in the next section. The feedback on four deliverables (D2.5, D2.7, D3.5, D6.5) is presented in four corresponding subsections. The complete set of comments is presented in the corresponding Appendixes 2 to 5. Section 3 presents the overall conclusion.

## 2 Feedback of the Advisory Expert Committee

The AEC's comments on available project deliverables (sections below and Appendixes 2-5) can be put in the into two types:

- General comments
- Specific remarks on the deliverable text



Only deliverable D.7 “Recommendations” (section 2.2) received general comments from 3 AEC members including the Chair. The other 3 received specific remarks only from 2 members including the Chair. The subsections below give a general overview.

## **2.1 Deliverable 2.5 “Demand-Supply Gap Analysis”**

There were no general remarks for this deliverable. Comments and request for clarifications are listed in Appendix 2. Major comments are summarized below.

Some questions were raised on the identified shortage of CS types “Modelling” and “Operation” as being a real market shortage. It seems that they concern a small number of providers with no necessary space to increase the supply.

On the Key messages and Gaps there were some request for clarifications but only two raised some questions, both about the CS providers:

- Key message 3: “On average, CS providers supply 2.7 different CS types ». Further consideration of this message is needed to identify the novel message to confirm our knowledge of what providers are supplying and why.
- Key message 4: « private institutions are more likely to address the heavy industry ». Needs to be better articulated with the nature of these gaps as they are not gaps between users, gaps where CS are not being used.

It should be noted that some AEC members view the market numbers given in this report as in general in this project with scepticism, building on what was already introduced in D1.5.

## **2.2 Deliverable 2.7 “Recommendations”**

There were some general remarks for this deliverable. Comments and request for clarifications are listed in Appendix 3. Major remarks are summarized below.

There is still some scepticism about the transactional market numbers that tend to give a larger market than what is actually perceived by AEC several AEC members (also raised in the Second Intermediary report). More transparency is requested from one member that believes it makes the case for a Market Observatory even stronger.

There is the view that the Observatory should focus on market evaluation. Other activities are considered as worthwhile but also attempted by others (unlike the evaluation) and thus a distraction from what is already a big core challenge of valuing the climate service market.

There also is a need to better recognise existing initiatives for which there are potential overlapping that should be considered when defining the way forward – where is the real gap and the potential for added value in terms of the vision. Some recommendations are at risk of generating duplication with existing climate services activities, should these recommendations generate new H2020 funded activities. Activities like Copernicus Climate Change Service (CS3) should be more explicitly acknowledged and do not only support the case of the data hub (C3S contributes to 1 but also e.g. to 3. 4. 6. or 7).

Other recommendations such as 4.1.3 (seasonal to decadal) and 4.5.1 (showcases) should acknowledge the current or future activities planned. For example proof-of-concept projects that have been funded over the past few years by C3S but also at national level, so it is not clear what is new. On the other hand, recommendations like 4.2.1, 4.2.3, 4.5.2, towards regional and tailored (incl. language) aspects, especially for central Europe, are appreciated since it is probably where a niche is untapped.

At a more strategic level, a clearer understanding of the vision and related objectives and goals is needed. In this context, it is somehow difficult to understand if there was recognition of the current state-of-play in the areas/elements suggested in the document and what the focus and therefore the added value of what is being suggested would be.



### **2.3 Deliverable 3.5 “SWOT Analysis of EU Supply”**

There were no general remarks for this deliverable. Comments and request for clarifications are listed in Appendix 4. Major comments are summarized below.

The previous remark about what seems to be overestimated market numbers is still relevant in this report, this time with a UK focus. More cross validation of market numbers is suggested for the Observatory to go forward.

No other major comments. Some remarks point to clarifications and other initiatives that should be looked at.

### **2.4 Deliverable 6.5 “Foresight”**

There were no general remarks for this deliverable. Comments and request for clarifications are listed in Appendix 4. Major comments are summarized below.

Although there is a lot of material about the energy sector, the link and relation with climate services is not made clear. For example there is an interesting focus on energy mix but no focus on the implications for climate services.

Same for the finance sector. Need to clearly identify the source or basis for the relationship between financial flows and the climate service market.

## **3 Conclusion**

As noted in the introduction, only a subset of members had managed to provide feedback on the last set of MARCO deliverables focusing essentially on Deliverable 2.7 “Recommendations”. AEC members contributed mostly to the First and Second Intermediary Reports and have recognized the huge effort and high quality work produced by the project partners.

Based on the examined deliverables during the project and this last phase, the AEC considers that the continuation of the project through **the launch of a Climate Services Observatory is and important initiative that will contribute to accelerate the CS market.**

In that respect, the AEC has 3 major recommendations:

- The observatory should focus essentially on Market evaluation (commercial services) and possibly evaluate the contribution of non-commercial services from the public sector (methodology to be defined). The state of interplay between commercial and free climate services should be monitored.
- The Observatory should improve the crosschecking process of market evaluation as to identify possible misattribution to weather and or mitigation services and avoid overestimations. In a broader perspective, the roles of services in supporting adaptation, mitigation, DRR and the implementation of the SDGs should be included.
- Before considering other activities the Observatory has to justify that it avoids duplication or overlap with existing and upcoming initiatives. Engagement with, and integration of learnings from other activities, that could even join the Observatory, is also recommended.



## Appendix 1 - Advisory Expert Committee Members

**1/ Chair: Harilaos Loukos is an entrepreneur with a climate research background.** He co-founded a weather service company, raised two rounds of venture capital funds, grew the company and conducted a merger with a leading provider on the French market. During this 10 year experience he developed innovative weather services for corporate customers in the consumer packaged goods and energy sectors in the field of business analytics, predictive modeling, big data and cloud applications. He recently launched a new company (theclimatedatafactory.com) in the field of climate services that will disseminate climate model data. He was also Co-Chair of the Adaption Services Platform of the Climate-KIC.

**2/ Vice-Chair: Prof. Ralf Toumi is head of the Space and Atmospheric Physics Group at Imperial College, UK.** He was co-chair of Adaptation Services in the Climate KIC and sat on the expert group of the EC "European Research and innovation Roadmap for climate services". He is part of the H2020 Climate Services Supporting Action (ClimatEurope) and sits on the external advisory board of ERA-NET Co-fund Action European Research Area for Climate Services.

**3/ Glen Anderson is a Senior Climate Change and Development Economist with Abt Associates. He served as Lead Editor and Contributor to the World Meteorological Organization, Valuing Weather and Climate:** Economic Assessment of Meteorological and Hydrological Services, published in 2015. He has trained more than 50 Met Services in the design of climate services socio-economic valuation studies and conducts socio-economic assessments of existing and new climate services programs. Since 2012, he has served on the Advisory Panel for the Research Applications Laboratory at the National Center for Atmospheric Research and has served on the Editorial Board of Climate Services since 2015. He received his PhD in Agricultural Economics from the University of Wisconsin-Madison in 1981.

**4/ Dr Monica Baer worked for the Institute of Meteorology and Climate Research / Karlsruhe Institute of Technology (KIT) until 1990.** From 1991-2015 she worked for the world's leading chemical company BASF SE. From 2003 Dr Monika Baer was Vice President of the department 'Environment and Permits Air/Noise'. Her areas of activity were emission and emission control, reporting of emissions trading, climate change and development of adaptation strategies. She retired in spring 2015.

**5/ Roger Street has been working with climate services, including through engaging with providers and users of such services, since 1989.** This has included facilitating dialogues to understand climate services and their uses and the development of web-based climate service platforms in the UK, Canada and China. He is a member of the JPI Climate, including its Management Committee in which he has focused on the research for climate services, but also is part of the team leading the updating of the JPI-Climate Strategic Research Agenda and associated implementation plan. He was a member and the rapporteur of the ad hoc group pulled together by DG Research and Innovation to develop 'A European Research and Innovation Roadmap for Climate Services and has continued to support the DG Research and Innovation as a member of the Climate Services Roadmap Implementation Working Group.

**6/ Matthias Themessl is head of the Service Centre of the climate change centre Austria (CCCA)** with emphasis on interfacing and facilitating knowledge exchange between science and end-user such as decision makers and the society in general. He holds a master degree in environmental system sciences with emphasis on physical geography and a PhD in geophysics with focus on regional climate modelling using statistical models. He worked in various national as well as international projects on climate modelling and climate impacts assessments. He is author of peer reviewed scientific journal articles as well as book chapters and functions as reviewer for high quality peer review scientific journals and (inter)national funding programmes himself. Furthermore, he is the Austrian



representative in module 2 “Researching Climate Service Development and Deployment” of the joint programming initiative “Climate”.

**7/ Jean-Noël Thepaut has recently been appointed as Head of the Copernicus Climate Change Service** ([climate.copernicus.eu](http://climate.copernicus.eu)), a Service operated by ECMWF on behalf of the EU. He has been the Head Data Division, and Deputy Director of the Research Department at ECMWF for many years. His group was in charge of the development of world-class data assimilation algorithms for NWP, the exploitation of satellite observations from operational and research EO platforms, and the development and production of state-of-the-art climate reanalyses. Jean-Noël is “ingénieur de la météorologie” from Météo-France. He received his PhD from PARIS-VI University in 1992, in the field of atmospheric data assimilation. He was involved in the early development of the 3D and 4D-Var system at ECMWF and Météo-France, for which he developed an incremental formulation that is now used operationally worldwide. He devoted part of his career in the exploitation of a wide variety of satellite data in Numerical Weather Prediction. He has served on a number of Committees, including the EUMETSAT Mission Expert Team for Meteosat Third Generation and EPS Second Generation, the NASA Global Modelling and assimilation Office Advisory Board, and the ESA Scientific Advisory Committee (ESAC). Jean-Noël is currently co-chair of the joint WCRP-JSC/CAS Working Group on Numerical Experimentation.



## Appendix 2 – D2.5 “Demand-Supply Gap Analysis”

### Specific remarks

#### 1 Executive Summary

Last paragraph: It is not clear what is meant by being the most rich analysis? These two sentences need to be stronger and clearer. For example: ‘The results of this comparison are summarised in 25 statements or insights in the concluding chapter (Chapter 7) of this deliverable. These insights draw on the analyses undertaken to provide key messages on the current and future states of the CS market (17), identified market trends (2) and identified market gaps (6).

#### 2 Introduction

Figure 1: It would have been more useful to have arrows directed from the User community to the red box - consistent with the evolving understanding of the CS as seen within the Roadmap.

#### 2.2 Aim of D2.5

To what extent is international and domestic policies considered? “Exactly”? This may be more than MARCO can do or even should be doing. I would suggest deleting the word ‘exactly’.

#### 3.1 Gap analysis

Once such a gap has been identified, that information can be used to identify strategies and plans to facilitate such a company reaching its potential.

“..these categories” Not clear as to categories of what? Gaps? By “complexity” do you mean robustness? or something different?

Table 1: Not clear as to what the different arrows are referring?

#### 3.2 Previous analyses considered during the gap analysis

Last sentence: not clear what this statement is actually adding?

#### 3.3 Limitations

Does this assume that all CS are within country transactions?

Not clear what is meant by compare the results ‘on’ CS providers and CS users?

#### 4 Current state of the climate services market in the EU28

Not clear what is meant by ‘situation’ in each of the following cases?

Provide sufficient evidence to support the identification of the overall...? The use of the term complexity in this sense appears confusing.

#### 4.1.3 Which CS types do CS providers offer?

Last paragraph (“Thirdly”). None of the above paragraph should be surprising considering the legitimate roles seen for public good services relative to those seen for the private sector

Key message 3: Suggest this key message needs further consideration. Which are the novel/insightful messages from this consideration of CS providers? or at least those that reconfirm our understanding of the CSs the different CS providers are supplying and why?

#### 4.1.4 What are the covered sectors of CS providers?

What are the covered sectors of CS providers?



**CS providers – Key Message 4:**

Need to more clearly articulate what the nature of these gaps as they are not gaps between users - gaps where CS are not being used?

**4.2.1 Where are CS users located?**

Figure 8: Would be useful to identify some measure of the distribution of the survey?

It would also be useful to consider from what sources CS are being sought - in country or more broadly?

I am troubled by the term publication as a service. I presume that this does not include peer-reviewed publication which should be classified as research output and thus a public (albeit not always free) service. I think the attention should be on the commercial interactions.

I am not convinced by universities acting as both major seller and user. This looks like recycling of flows, particular with the publication as a legitimate service.

**4.2.2 Who are CS users?**

Using 'worldwide' could be misinterpreted. Is this suggesting based on an international sample broader than the EU28 ?

**4.2.3 Which CS types do CS users purchase?**

*"measurements are purchased the least"* Could this be related to the fact that Measurements are available from public good services?

« 88% of the governmental organizations purchase this specific CS type ». To what extent is this do to policy requirements or other drivers?

**CS users – Key Message 3:**

To what extent do they use Measurements?

To what extent are they selling these on - purveyors?

**4.2.5 What are the sectors CS users purchase CS for?**

Does this suggest that they are consultants and also operating as purveyors?

What is meant by 'priority' sectors? May not be a useful term.

Figure 15 : Need to be consistent - is it sectors or industries?

**4.4 Gaps between current CS supply and CS demand**

Not clear as to how this is a snapshot, rather than the first partial view?

Unclear as to what is meant by 'complexity'?

**4.4.1 What are the gaps at the country scale?**

Is there an assumption here that CS are accessed by within country users only?

Fourth paragraph. Critical consideration? Is there any evidence?

Is it assuming that the nation providers and users analyses are only referring to in-country activities?

Low numbers in eastern countries. Can these lower numbers be further explored by considering the drivers and their relative importance?

**4.4.2 What are the gaps at the product scale?**

*Unmet demand & shortage of available CS types:* Are these not the types of products that the needs of users can be met by a small number of providers? Is a balance needed? Economically viable?



The major assumption (“*who do exactly the same*”) - may not be true in a market sense. It is this understanding of within product difference and preference that requires further exploration.

« *a surplus of supply exists* » The key message here is that providers will need to demonstrate added (competitive) value of their products over those of other providers.

Table 5: Need to rethink this argument as to shortage and surplus? For example, to what extent is this identifying the level of competition that exists and the nature of the demand for the different product types?

**4.4.3 What are the gaps at the sectoral scale?**

To what extent is an equilibrium desirable when the need is to grow the market?

Table 6: In the market sense, do these represent real shortages and surpluses? The sales numbers do not appear to support these labels.

**Current CS demand & supply – Gap 3:**

With respect to the latter two sentences of this box, what does the message being presented actually mean? Is the identified surplus or deficit real? To what extent is the identified surplus or deficit something that should be avoided or filled as suggested in the Section 5? Interpret these in the context of the desire to grow the CS market.

**5 Future state of the climate services market in the EU28**

To what extent will these also be determined by other drivers - policy, standards, expectations.?

**5.1.2 What are the growth rates of CS sales values per CS type?**

As questioned above, is this a real ‘market’ shortage? Are these services that are being (should be) provided by a small number of providers? Is there a market (or competitive) advantage to increasing the supply?

Shortage of CS types Modelling and Operations: As questioned above, is this a real ‘market’ shortage? Are these services that are being (should be) provided by a small number of providers? Is there a market (or competitive) advantage to increasing the supply?

**5.2 Analysis of climate change impacts, vulnerabilities and risks**

Not clear that these are ‘gaps’? They appear to be ‘difference’ between climate vulnerability.

*Adaptive capacity.* Adaptive capacity is not the same as adaptation potential. Two highlighted statements above are adaptation potential and adaptive capacity, respectively.

Figure 25. It is worth noting that ‘winners’ will still need to adapt to take advantage of the positive changes and for this they will need climate services.

Need to clarify this sentence ‘high sensitivity when other sectors change’? This and the following sentence appear to be trying to make the point about the systematic nature of the impacts.

Last paragraph. This suggests not only an increasing demand for climate services in the future, but also the need for the supply to evolve. It suggests that there will continue to be manifold benefits of offering different types of services, but these will need to evolve to consider the broader dimensions of risk and adaptation assessments required.



**Future CS market growth – Trend 1:**

To some degree is this related to the non-country specific supply of CSs? This may likely be more the case in the future as CSs are provided by larger entities, including C3S and users will access CSs in and outside country

**6 Gaps between the current and future state of the climate services**

This provides insights in the role of the identified gaps, differences and trends could impact on the growth of the CS market.

In what sense are these questions addressed? To provide insights as suggested in the above comment?

**6.1 What are the gaps at the country scale?**

These providers could be at the national or international level. The analysis suggests that there currently is a surplus.



## Appendix 3 – D2.7 “Recommendations”

### General comments

There is some scepticism about the transactional market numbers that tend to give a larger market than that is actually perceived by AEC several AEC members. More transparency is requested from one member that believes it makes the case for a Market Observatory even stronger.

There is the view that the Observatory should focus on market evaluation. All the other activities (Hybrid) are considered as worthwhile but also attempted by others (unlike the valuation) and thus a distraction from what is already a big core challenge of valuing the climate service market.

There is a need to recognise existing initiatives for which there are potential overlapping or mutually interested elements that should be considered when defining a way forward – where is the real gap and the potential for added value in terms of the vision. Some recommendations are at risk of generating additional duplication to existing climate services activities, should these recommendations generate new H2020 funded activities. Activities like Copernicus Climate Change Service (CS3) should be acknowledge more and do not support the case of the data hub (C3S contributes to 1 but also 3. 4. 6. And 7. ...).

Other recommendations such as 4.1.3 (seasonal to decadal) and 4.5.1 (showcases) should acknowledge the current or future activities planned. Figure 9 is very close to some of the proof-of-concept projects that have been funded over the past few years by C3S but also at national level, so it is not clear what is new here. On the other hand, recommendations like 4.2.1, 4.2.3, 4.5.2, towards regional and tailored (incl. language) aspects, especially for central Europe, are appreciated since it is probably where the niche is untapped.

At a more strategic level, a clearer understanding of the vision and related objectives and goals is needed. In this context, it is difficult to understand if there was recognition of the current state-of-play in the areas / elements suggested in the document and what would be the focus and therefore added value of what is being suggested.

### Specific remarks

#### 2 Market Support Needs for Climate Services in the EU

There is a need for a well-articulated overall vision, as well as objective(s) and goal(s) for such a ‘platform’. This includes a rationale for such a platform that links the current situation with the overall vision, objectives and goals.

Figure 1 Market supply: Need to understand how this is added value to other such sources - the key point here is what level of referencing and at what scale - global, regional, etc.

(3) Stimulating the market, matchmaking: building trust and demonstrating neutrality in matchmaking

(5) Consulting Services: Difference between this and #3 - same comments regarding trust and neutrality.

(7) Standardisation of climate services: Need to go beyond this to work with providers, purveyors and users to develop and disseminate standards.

(9) Resilience monitoring and forecasting: Links to #2



(10) Networking: Critical to be able to demonstrate added value of such a network

(12) Helpdesk : need to understand differences between this and #3 and #5

(14) Policy recommendations: No immediately evident as to what this is trying to do and if what is suggested would be an appropriate role - policy measures to support climate service development and their uses may be more appropriate

*Monitoring and ensuring climate service quality and relevance would give end-users from the demand side the confidence to procure services, as well as reassure lawmakers that services are capable of helping society to meet tougher climate adaptation protocols. This is a challenging ask and would need further clarification as to the role of the platform in quality and relevance assurance.*

### 3.2 Providers Database

Need to be clear that these are providers that self-identified including the limitations that were identified in D3.2

## 4 Recommendations

### 4.1 Identifying market opportunities

How does this link to / build on initiatives within JPI Climate, ClimatEurope, etc.?

Is there a reference that supports this statement (*“because the impacts of climate change are not yet too serious »*)? How does the situation in these parts of Europe different than others where CS are stronger?

Not clear as to what Table 4 *market growth rates* is showing?

#### 4.1.2 Recommendation 2: Support market development in new priority sectors

Examples of such measures should be included.

Table 3: Not sure why these are Provider sectors and what that means?

#### 4.1.3 Recommendation 3: Link public and private providers to develop more advanced climate service

No specific recommendations can be derived in what context?

What is meant by ‘proper space’ of climate services?

*« Without the availability of these basic services, however, the development of tailored and advanced climate services would hardly be possible. »* This needs to be further developed. Clarify the advantages of this link, but also identify other advantages of an active link between public and private providers

Advanced / sophisticated CS that are relevant, usable, credible and legitimate from the users perspective - advanced /sophisticated are not an essential requirement

#### 4.2.1 Recommendation 1: Increase visibility of climate service providers on a “market place”

The critical aspect here is how what available is relevant and legitimate in the context of users’ needs - as suggested in the following text.

#### 4.2.2 Recommendation 2: Improve and mainstream the taxonomy and/or the classification of climate services

Should not the goal be to identify and undertake a mapping that providers, purveyors and users would find useful, including an appropriate granularity?



**4.2.3 Recommendation 3: Develop a user-friendly tool to enable the selection of appropriate climate services**

A non-trivial requirement considering that there are multiple competitive suppliers that should be all supported - unbiased tool. This would be something along the Amazon website tool?

**4.3.1 Recommendation 1: Develop more creative and diversified business models for specific**

Business models that enable a strong collaborative link between public and private CS providers is critical to market growth. Business models consistent with PPP as suggested in Recommendation 3.

**4.3.2 Recommendation 2: Develop specific instruments oriented towards SMEs and early-stage developments**

Need to clarify what is meant by 'instruments'. Are these CSs to support mitigation and adaptation measures as suggested below?

**4.4.2 Recommendation 2: Strengthen and harmonise climate resilience legal frameworks;**

Not convinced that this would be sufficient? Considering the use of CS in meeting the requirements of the Paris Agreement, Sendai Framework and UN Agenda 2030 SDGs is what is really needed (at least from the perspective of many users).

I would suggest that what is really required is for better engagement of the multilateral development banks. Looking at the scope of the requirements (see efforts by the EBRD for example), this should not be done as simply monitoring, but more engaging and sharing of information as to current and future directions

**4.5.1 Recommendation 1: Showcase success stories**

Is it just the quality or also the demonstrated added value?

Or that they can work with providers/purveyors to develop what is needed?

In this context rather than the cost of inaction would it not be the cost of not using or using inappropriate CS?

**4.5.2 Recommendation 2: Raise awareness of specific sectoral or regional climate-related risks and opportunities.**

Would it not make more sense to not take on the tasks of many other initiatives, but rather to raise awareness of the roles of CS in addressing specific sectoral or regional climate-related risks and opportunities?

**5 Recommendations for Stakeholders**

To what extent are policy-makers also climate service users?

What is meant by main? Are there others or are these key/critical or something else?

**5.1.2 Recommendation 2: Practice transparency in use of climate-related data and in assumptions.**

Also demonstrate the utility of uncertainty in the context enhancing the robustness of decisions made.

**5.2.1 Recommendation 1: Foster the co-design of climate services**

I would strongly suggest that they are even more critical in ensuring supply meets demand

**5.2.2 Recommendation 2: Explore new market niches following projections of future demand for products and services based on various climate change scenarios.**

Suggest that limiting this to just 'climate change scenarios' and 'new forecasts' is not meeting the requirements of the challenges. These should be new developments that can support the development of CSs



**5.3.1 Recommendation 1: Engage in an intuitive marketplace that enables users to easily access providers that are capable of meeting their requirements.**

*climate mitigation or adaptation* : Prefer 'climate action', especially in the context of CSs meeting the post-2015 requirements.

**5.3.2 Recommendation 2: Take part in training modules which demonstrate the added value of applying climate information**

Would there be some advantages to having this training undertaken in collaboration with sector-based or regional professional bodies or organisations?

Recognise that there already exist web-based platforms operating at the sector or national /transnational levels that offer climate services. What should be the relationships of the proposed community with these platforms/communities?

**6 Prospects for a Market Observatory / Support Platform for Climate Services in the EU**

Figure 10: This figure further raises the issues of added value beyond that already available and how such a market-support platform for CSs would work /engage with the existing web-based platforms that already existing nationally and transnationally within Europe and have remits that at least overlap with and/or could add value to some of those proposed here?

**6.3 Community Platform**

Is not, as I believe was suggested earlier, a key component of such a community the purveyors? Some would argue that they may be at least as just as important as the research and academic communities. Others might note that the availability of the research and academic communities for continuous engagement may be more limited than that of the users'.

A critical element for such an initiative is foresight information. Foresight as to potential developments from research and as to changes in the requirements of users.

**6.3.2 Main Challenges**

There exists some experience in doing this - national and transnational web-based platforms that exist in many parts of Europe (and elsewhere) - these do not have all the answers but are working together to deliver.



## Appendix 4 – D3.5 “SWOT analysis of EU supply”

### Specific remarks

#### 1 Executive Summary

Is this looking at competition just from the perspective of the global market or also at regional segments, including targeted regions, Africa, Latin America, etc.?

Also interesting that Europe (including EC and member states) are investing in enhancing capacity in these countries to use, but also to deliver CS.

Last paragraph on page 4. This latter sentence is appears to be an example of the potential opportunities and should be presented as such - ‘For example, US providers and purveyors...’.

#### 2 Introduction

It would be useful to clarify which data? or at least point to where this data is discussed?

Is there not also the possibility that one reason for investing will include the projected economic opportunities.

Is there consideration of the significant investments by many countries in enhancing the capacity, including in emerging and developing economies to use and to develop and deliver CS within these indicators?

#### 3 Methodology

« *urbanisation are also assessed, using city-level GDP per capita (PPP)* ». Rationale for this as compared to national level information?

Also likely misses the Pacific Islands which have a growing capacity and are being targeted by both Japan and Australia.

« *US climate services market* ». Is this really looking at the global climate service market as seen from a US perspective (i.e. not the climate service market within the US)?

#### 4 Landscape Assessment of Potential Competition

Table 1. An interesting marker for future considerations is the level of investment in climate science and capacity building domestically and by the international community.

#### 4.2 Economic Activity and Urbanisation

Rationale for including cities? Who are their counterparts?

#### 5 Assessment of Global Transactional Competitive Data

A lot of scepticism about those numbers. Not much evidence. There should be verification of e.g. what are the largest transactions in this database. Can they be verified independently? e.g the UK is listed as 1Billion Euro (Table 9). A number I fail to believe or understand until I see examples (public data ?) what is included here. The rest of the report just shows me flows of numbers I don't trust in the first place. Reading the rest of the report and examples given I suspect somehow the differentiation between weather/climate/mitigation has not been not made. The numbers are important but I am disappointed to not believe them.

#### 5.1 Climate Services Sales (€m) Analysis

Figure 3. Is there a reason that Europe is not included? Is Figure 3 for sub-regions outside of Europe?



Table 9. Wondering about the benefit of considering CS sales per capita? Would be useful to provide rationale for considering this an effective measure of the relative market?

## **5.2 Climate Services Import and Export Analysis**

Is there any evidence of what comprises the exported climate services?

## **5.4 Analysis of the Global Transactional Competitive Data**

Is this the only goal for the EU? Would there be something to be said about EU member states positioning themselves to capture a larger share of the growing and emerging CS market

### **6.1.1 Legislation and Policy**

It is also worth noting the very sizeable research budgets at the national level within EU countries.

Also interesting to note the considerable adaptation efforts that European cities are undertaking (e.g., Rockefeller cities and a number of other programmes and projects within which these cities are taking action

Case study EU. Might also be interesting to look at The Netherlands and stress testing, but also <https://www.government.nl/latest/news/2018/11/20/netherlands-to-invest-600-million-in-climate-adaptation>

Case study west Africa: Could potentially note efforts in Africa and Latin America within the JPI Climate SINCERE initiative?

« reliable » last paragraph page 44. Not clear in what sense these are 'reliable'?

### **6.1.4 Codes and Standards**

Also this demand is recognised with the European research and innovation Roadmap for Climate Service

Figure 10. Potential role for efforts within CEN? To what extent is the high-level of EC and member state national funding for related research (and innovation) also a strength?

Another factor is that the value of climate services has not been appropriately (meaningfully) demonstrated - relevance, usability, legitimacy and credibility.

#### **6.2.1 Risk Awareness**

Having value and potential users being aware of that value and of the added value are not necessarily the same.

Figure 14. Increasing investments by EC and National funding agencies in seasonal and decadal prediction related research and innovation

## **6.3 Suppliers**

Not all suppliers do both. The community of CS suppliers must find an appropriate balance...

## **6.4 Inputs**

First paragraph. Agree with this sentence, but do have evidence that supports this?

Are there figures as to what European national governments are spending on related R&I?



Figure 17: It could have been clearer that exploring the dynamics between the different perspectives in terms of efforts needed to increase the European share of the developing CS market is discussed within the Conclusions.

### **7 Conclusion**

End of second paragraph. These latter two sentences are focusing on the supply side whereas there are a number of user-related issues that could have been addressed - capacity, willingness to engage, using their organisational/institutional strengths to more effectively engage and influence CS development.



## Appendix 5 – D6.5 “Foresight 2030”

### Specific remarks

#### 2 Cross-cutting conclusions

First two bullet points on page 7. Repeated, but remains unclear as to what is actually meant by the first sentence?

« *These challenges have hampered the penetration of climate adaptation services in Europe* ». Need to reflect on these as barriers to the penetration and be consistent with those identified in the other deliverables.

Energy: The existing fossil fuel infrastructure will not disappear soon, and accounts for most of the energy to 2030 at least and needs to be resilient too. Particularly outside of Europe.

#### 3 The energy sector

*1C°/19% production*. Not clear where this comes from - reference?

Figure 3. Some of the results are not visible in this figure and may need to rethink the scale or consider expanding the scale in the lower values.

There is a lot of stuff on energy but not enough material on relationship with climate service

##### 3.3.2 Power Sector Investments

First paragraph. Is there evidence to support this statement?

##### 3.4 Cross Cutting Conclusions on the Climate Service Market Forecast

First paragraph. Awkward and unclear as what was introduced and where. Is there a reference or any basis for this assumption - having this is critical to the following argument.

What is the willingness or acceptance of the value of CS by the energy sector?

Page 26. Strengthening the link between energy and climate services requirements would significantly improve the results here.

Lasts sentence page 27. This is still focussing on the energy mix. Would be more useful to focus on the implications for climate services based on a well founded and evidenced assumption.

#### 4 Forecast of International Climate Finance

First paragraph. Need to clarify as to the scope and nature of the CS/adaptation dependence.

Will need to clearly identify the source or basis for the relationship between these financial flows and the climate service market.

##### 4.1 Climate finance by the MDB's

Does this publication further develop this link? Provide more evidence.

« *climate services potentially could play a large role in ensuring future efficient climate finance* ». It is not clear from the information presented within this report how and to the extent to which this statement logically follows? More is need (e.g., link to stress testing that many of the MDBs are considering. This stress testing requires the use of CSs).



#### **4.3 Activity forecasts**

Need to better rationalise the statement that they represent a large CS demand.

« No SDG finances will be climate related ». Based on what assumptions? There is SDG 13?

#### **4.3.4 Climate adaptation forecast based on policy scenarios**

financial flows? Those needed to meet the identified needs?

#### **4.3.5 Regional forecast of adaptation finance gap**

The approach where? In the WB report or this report?

#### **4.4 Cross Cutting Conclusions on the Climate Service Market Forecast**

First paragraph, « *CS will be an important ..* ». Further information on this assumption is needed.

End of Third paragraph, « *potential alternative trends* ». Need to expand on this as it does not obviously fall out from the discussions in this report.

« assumption that increasing climate change risks and policies will increase the demand for climate services ». This assumption appears to me more evidenced. It could still be better evidenced (based on that provided above).

#### **7 Urban development and population vulnerabilities**

no information is given for flooding?

#### **10 Maturity of local adaptation plans**

*First sentence. This statement needs to be clarified - currently too complicated.*

*What is meant by 'their political measures'?*

#### **11 Forecasting climate adaptation services in cities**

« *all steps requires the same climate service support* ». Is there evidence that supports this assumption?