How to build a Climate Service

Marcello Petitta
Federica Guerrini
Amigo S.r.l.

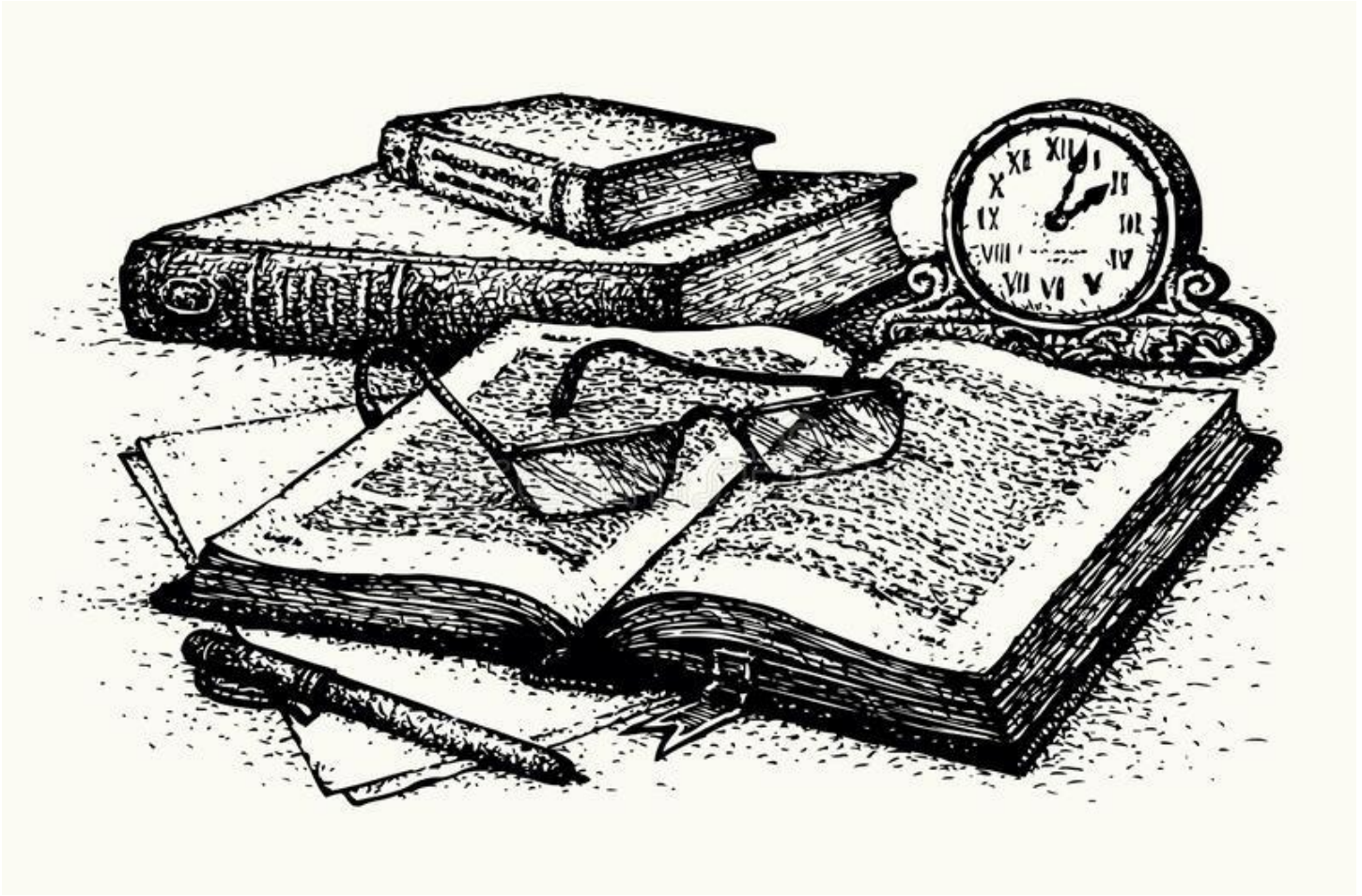
Outline

#1 Climate Service: what is it?

#2 Climate data: the building blocks of Climate Services.

#3 Review of existing climate service

#4 Trends in climate service markets



#1 Climate Service:
what is it?

#2 Climate data: the building blocks of Climate Services.

#3 Review of existing climate service

#4 Trends in climate service markets

Section #1

Climate Service: what is it?

Climate services, some definitions

- Climate services rely on the production and delivery of **relevant, credible** and, of course, **valuable climate information**. There are many definitions of climate services, reflecting the (im)maturity of the field

- A definition of 'service' (Troccoli 2018): A set of actions aimed at **helping its beneficiaries** make the best use of tailored information so as to **improve their 'business'**

- In other words, climate services are meant to solve **real life problems**, by 'translating' the best latest science into practical solutions

Climate services, the features of a service

- Maturity: how long have they been used?
- Tangibility: is it something we can easily relate to?
- Level of Risk: how reliable and/or accurate is the output/product?
- Trustworthiness (or Credibility): how much do we trust the service provider?

Climate services, the features of a service

	Maturity	Tangibility	Level of Risk	Trustworthiness
Financial Service	H	M	M	M
Medical Service	H	H	M	H
Car Service	H	H	L	M
Weather Service	H	M	M	M
Climate Service	L	L	H	M

Qualitative comparison between five different types of service based on the four representative features. The three qualitative levels – H, M and L – stand for High, Medium and Low, respectively. These are associated with colours to indicate the level of 'caution'. So, for instance, a high maturity (e.g. > 30 years) carries a low level of cautioning (green) whereas a high risk carries a high level of cautioning (Troccoli 2018).

Co-Co-Co: a key element in climate services development

CO-CO-CO

Co-design

Co-development

Co-production

Take away messages

- There is a strong opportunity to develop Climate Services to assist infrastructure managers to meet the climate goals
- Climate Services are already assisting several industries to better manage resources by embedding forecasts into their decisions
- The key to successful Climate Services is to keep an ongoing communication with users, via the CO-CO-CO, to overcome the complexity of the information and the level of accuracy of the forecasts

The seven principles of successful climate service development.

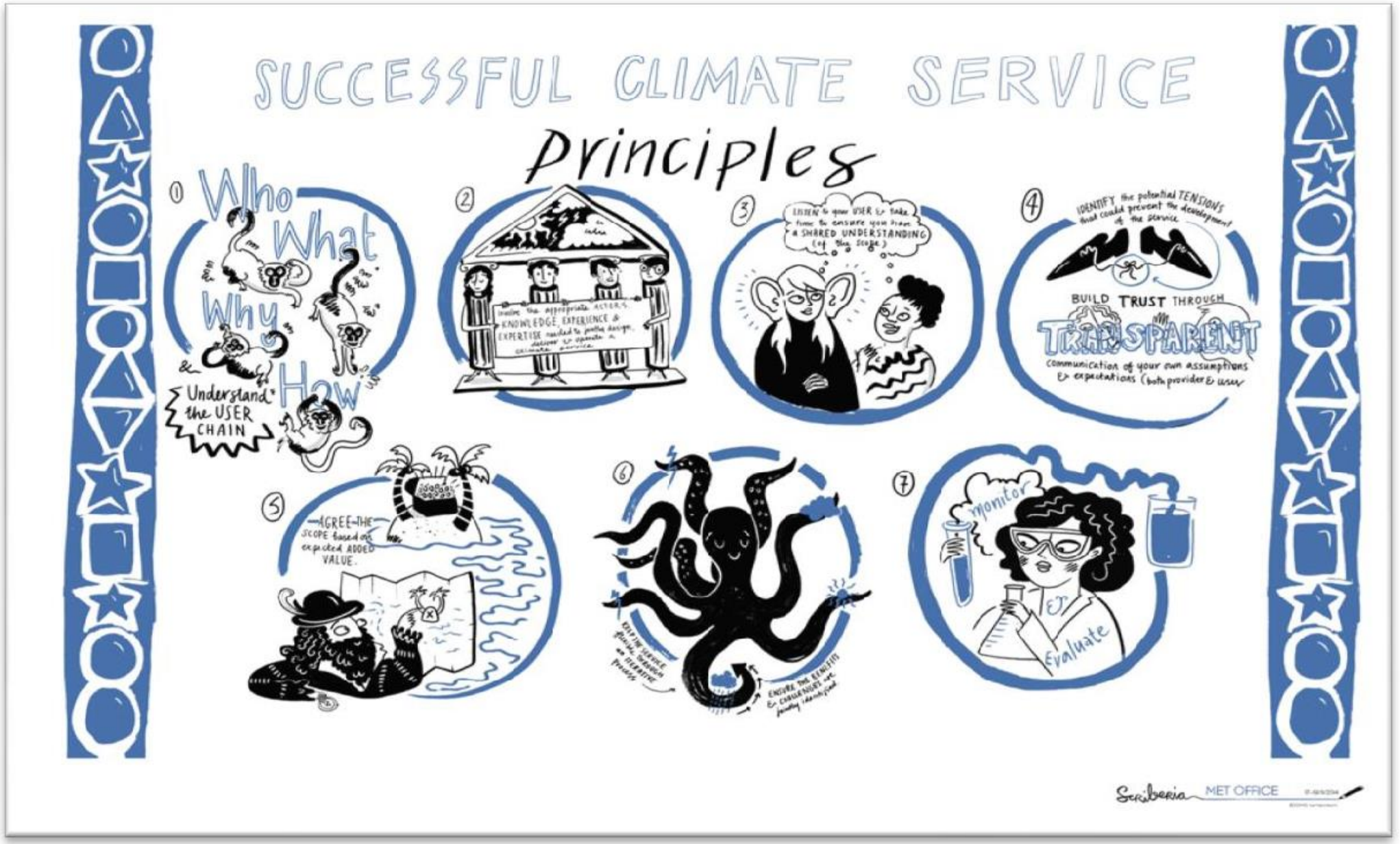
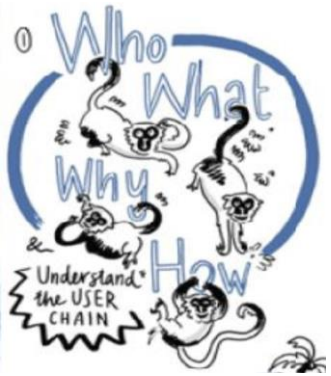


Image courtesy of Scriberia, Euporias EU project



Be mindful of the limits

Who are the possible users of a climate service?
What is the proposed approach?
What are the motivation of each participant?

It takes (at least) two to “service”

Are all the relevant people involved in the discussion?
Does the project initiator have a good understanding of the end-users’ needs?
Do the providers have all the skills needed to deliver the service on time and in full?
What expertise will the users bring to the service development?

Share to be understood

It is essential that the scope is clearly defin at the beginning of the process to ensure there is a common understanding how the scope is evolving throughout the project
What is the scope and what is not?

Be open

Be honest about what is and it is not achievable within the project.
Be open about new ideas that can alter your perception of what is and is not possible.
Spell out all the possible issues (scientific, technical legal, political, commercial, etc.)which could limit the service

Take the journey together

Expect changes in the scope as this is part of the human nature.
Maintaining a highly interactive and flexible work-programme you will be able to account for some of those changes

Scope, deliver, evaluate: iterate

If possible divide the service in small components that can be delivered separately.
Scope each of these, deliver and evaluate them with the users and then, if necessary, re-scope.

Be flexible

The service (should) provide value to the users but it is also important to identify value to the provider.
Make clear what each actor involved is expecting to get out of the service, meaning the journey can be more easily taken together

#1 Climate Service:
what is it?

#2 Climate data: the building blocks of Climate Services.

#3 Review of existing climate service

#4 Trends in climate service markets

Section #2

Climate data:
the building blocks of
Climate Services.

The available data

What data are available?

- Stations data (E-OBS)
- ECMWF Reanalysis
- Short term forecast
- Seasonal Forecast
- CMIP5/6 and regional scenario
- Air quality station (up to 2012)
- Satellite data

- C3S data store
- https://cds.climate.copernicus.eu/#!/home

What data are available?

Copernicus ECMWF Climate Change Service

Login/register

Home Search Datasets Applications Toolbox Support Live

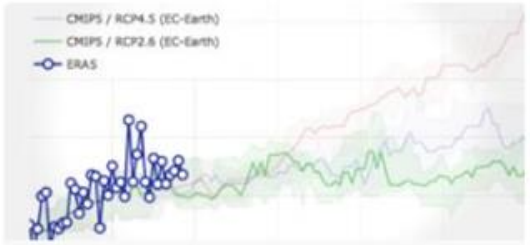
Welcome to the Climate Data Store

Dive into this wealth of information about the Earth's past, present and future climate.

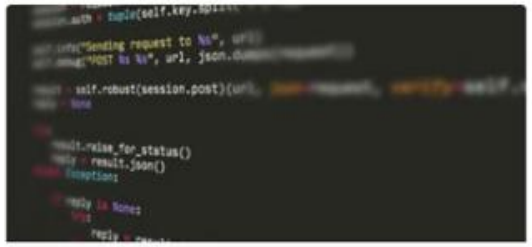
It is freely available and functions as a one-stop shop to explore climate data. Register for free to obtain access to the CDS and its Toolbox.

We are constantly improving the services and adding new datasets. For latest announcements, watch the posts on the C3S forum.

Enter search term(s) | All | Search



Climate Data Store **Toolbox**



Climate Data Store **API**

Access the **ECMWF Support Portal**

#1 Climate Service:

what is it?

#2 Climate data: the building blocks of Climate Services.

#3 Review of existing climate service

#4 Trends in climate service markets

Section #3

Review of existing climate service

Acronym: MArket Research for a Climate Services Observatory

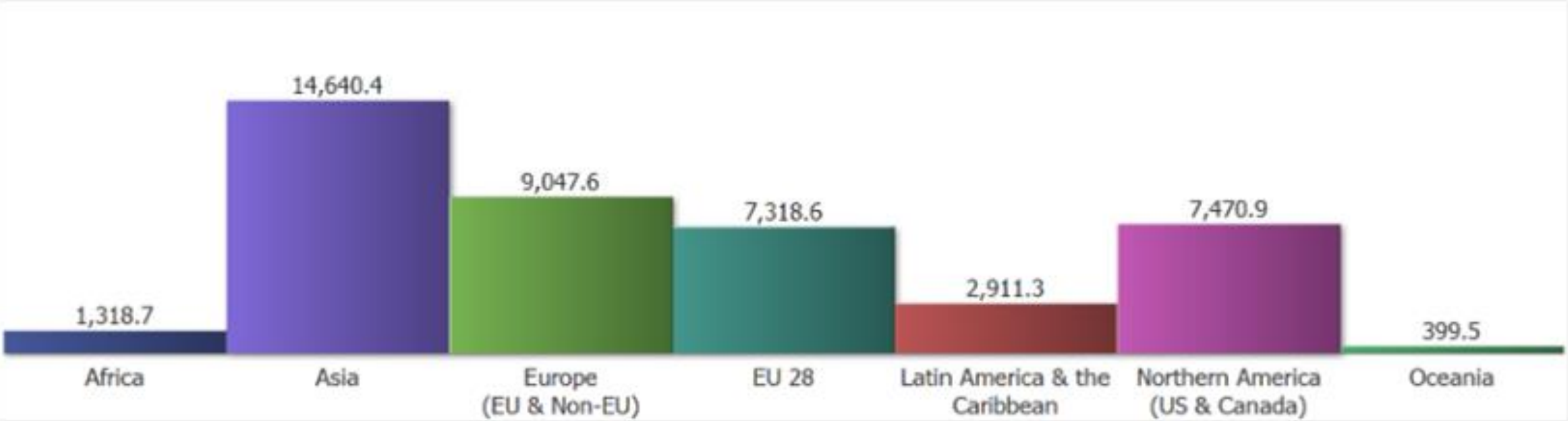
Goals: assess the EU market of climate services; validate and enrich the market assessment with case studies; forecast future user needs and assess market growth until 2030; unveil opportunities and promote market growth.

Period: 2016-2018

Website: https://marco-h2020.eu/

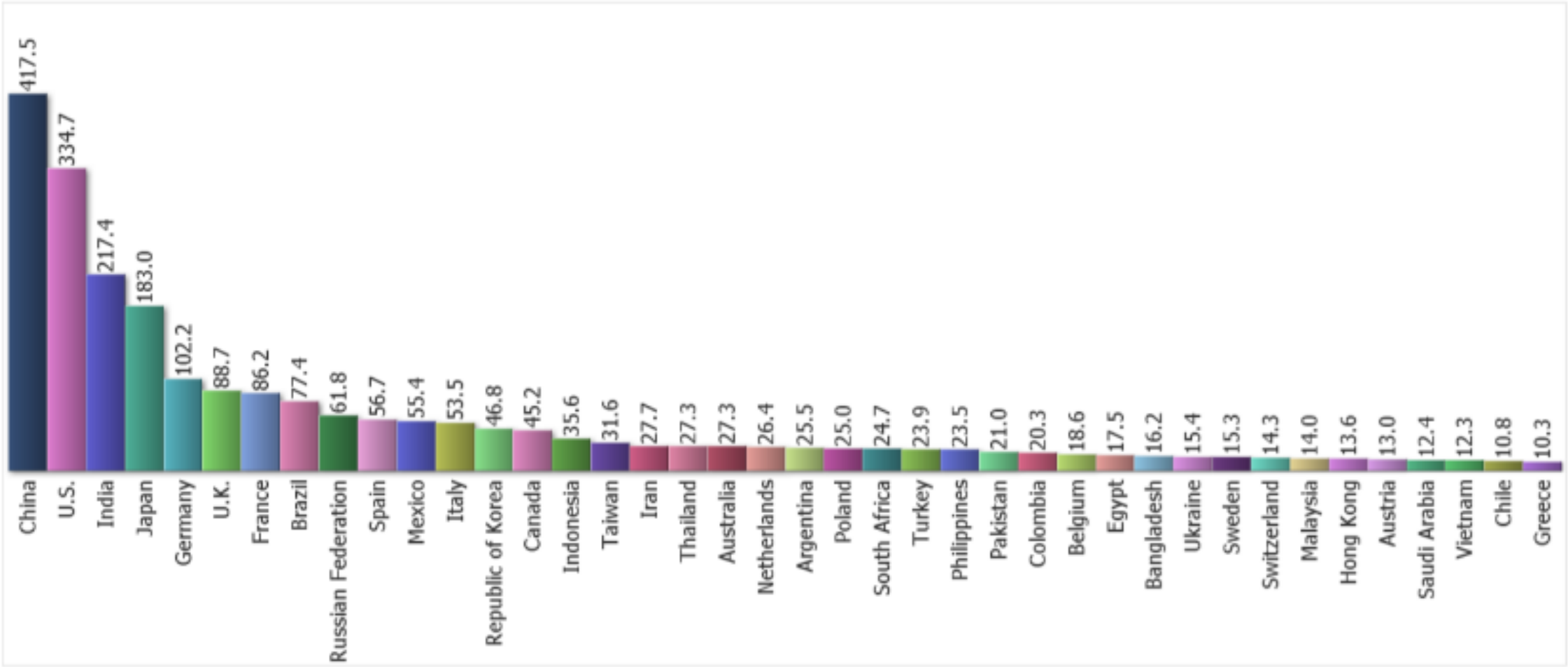
The Climate Service market

Figure 2: Climate Services Sales (€m) by Global Region, 2016/17



The Climate Service market

Figure 5: 2016/17 Top 40 Countries Selling Climate Services (€m) into the Top 36 Countries



SWOT analysis of the EU climate service market

Figure 14: SWOT for the EU Climate Services Market (Against US Competition) In terms of Users

Case study: energy infrastructure

USE OF CLIMATE SERVICES

The current use of climate services is still very limited though the use of weather services for daily planning activities is common.

This may be due to unreliable predictions and a lack of knowledge of what climate services can actually provide.

— CLIMATE NEEDS —

- Seasonal forecasts and decadal projections
- Regular assessment of sector vulnerabilities and realistic profit forecasting
- Greater awareness of the benefits of climate services

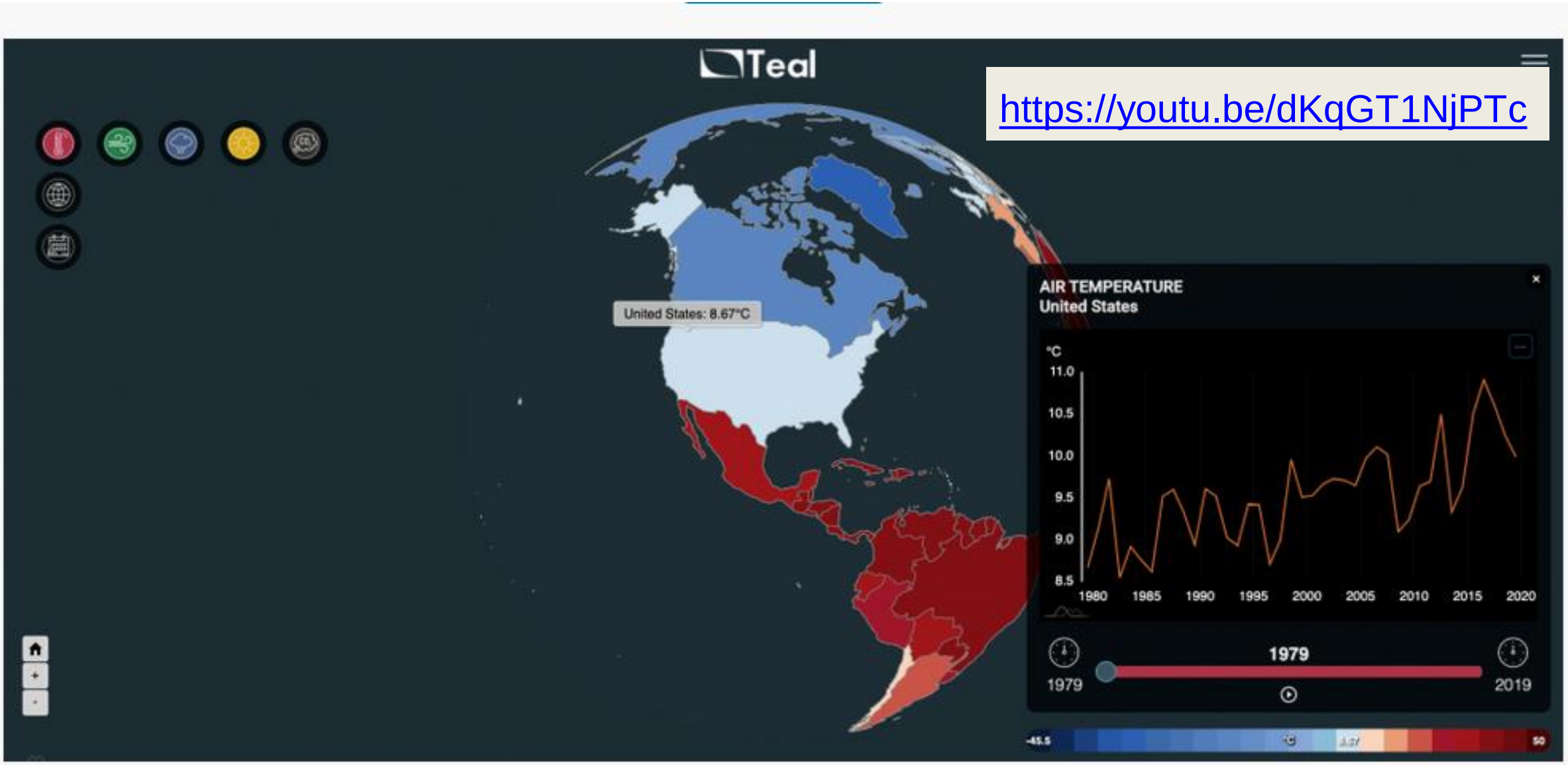
Acronym: The Added Value of Seasonal Climate Forecasting for Integrated Risk Assessment

Goals: Assess the impact on operational planning and portfolio management, such as hedging and asset optimization, thus enabling quantification of the value-add provided by seasonal forecasts which have been calibrated, evaluated and tailored for each specific application thanks to 9 case studies..

Period: 2018-2021

Website: https://www.secli-firm.eu/

TEAL platform

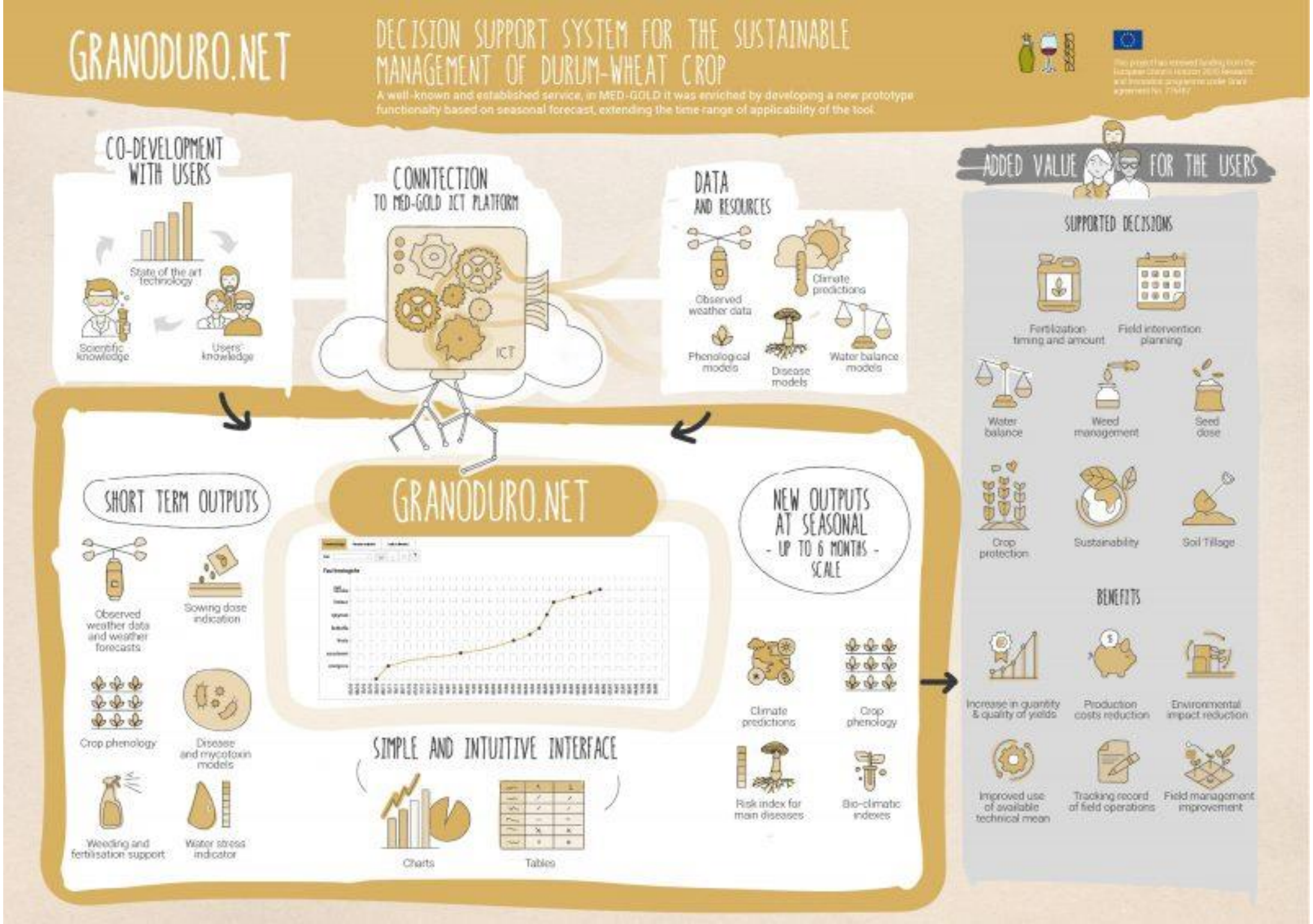


Acronym: Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food system

Goals: Demonstrate the proof-of-concept for climate services in the agriculture sector by developing case studies for three hallmarks of the Mediterranean food system: grapes, olives and durum wheat.

Period: 2017-2022

Website: https://www.med-gold.eu/


GRANODURO.NET
DECISION SUPPORT SYSTEM FOR THE SUSTAINABLE MANAGEMENT OF DURUM-WHEAT CROP
A well-known and established service, in MED-GOLD it was enriched by developing a new prototype functionality based on seasonal forecast, extending the time range of applicability of the tool.
CO-DEVELOPMENT WITH USERS
State of the art technology
Scientific knowledge
Users' knowledge
CONNTECTION TO MED-GOLD ICT PLATFORM
ICT
DATA AND RESOURCES
Observed weather data
Climate predictions
Phenological models
Disease models
Water balance models
ADDED VALUE FOR THE USERS
SUPPORTED DECISIONS
Fertilization timing and amount
Field intervention planning
Water balance
Weed management
Seed dose
Crop protection
Sustainability
Soil Tillage
BENEFITS
Increase in quantity & quality of yields
Production costs reduction
Environmental impact reduction
Improved use of available technical mean
Tracking record of field operations
Field management improvement
SHORT TERM OUTPUTS
Observed weather data and weather forecasts
Sowing dose indication
Crop phenology
Disease and mycotoxin models
Weeding and fertilisation support
Water stress indicator
GRANODURO.NET
NEW OUTPUTS AT SEASONAL - UP TO 6 MONTHS - SCALE
Climate predictions
Crop phenology
Risk index for main diseases
Bio-climatic indexes
SIMPLE AND INTUITIVE INTERFACE
Charts
Tables

Acronym: Sub-seasonal to Seasonal climate forecasting for Energy

Goals: The S2S4E project will create an operational climate service that will enable renewable energy producers and providers, electricity network managers and policy makers to design better-informed strategies at sub-seasonal to seasonal timescales.

Period: 2017-2020

Website: https://s2s4e.eu/


S2S4E Decision Support Tool
Climate Services for Clean Energy
For updated forecasts, click here
Sara
Search location
Check previous forecasts
2020 Jul 30
Forecast window
Aug 01 - Aug 31
1 2 3 4 1 2 3
Next 4 weeks
Next 3 months
Forecast for 2020 Aug 01 — 2020 Aug 31
Forecast issued on 2020 Jul 01
Next forecast available on 2022 Jan 13
v1.6.0
VARIABLES
Select category
Wind energy
Select variable
Wind speed
FILTERS
Skill level
View all
0%
0
100
Probability threshold
50
%
Show extremes
https://www.youtube.com/watch?v=f_j7rNmNonE
LEGEND
Predicted tercile
Above
Normal
Below
Probability range
50% to 100%
34% to 49%
Extremes
Max (p90)
Min (p10)
Installed power (MW)
High
Low
© Mapbox © OpenStreetMap Improve this map

OASIS hub collects many of them

#1 Climate Service:

what is it?

#2 Climate data: the building blocks of Climate Services.

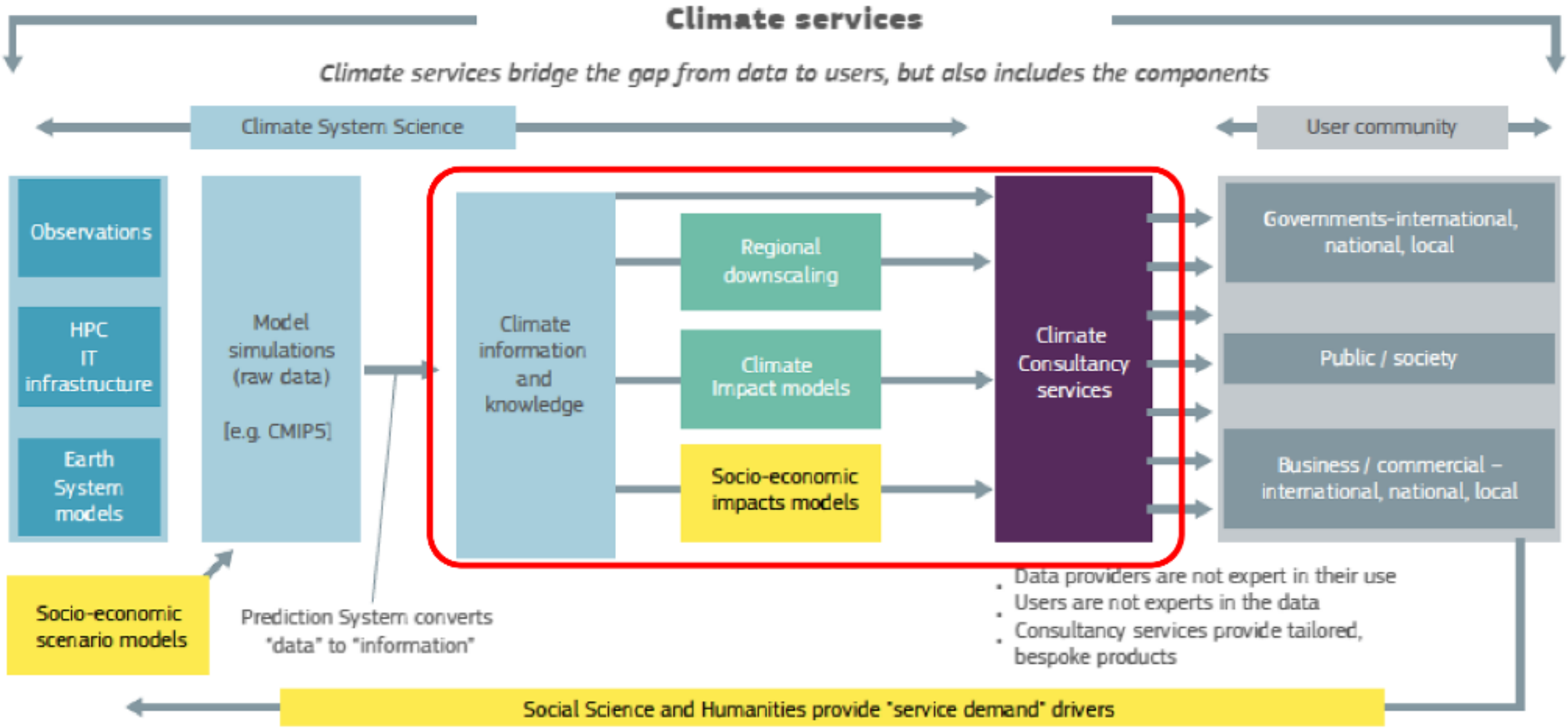
#3 Review of existing climate service

#4 Trends in climate service markets

Section #4

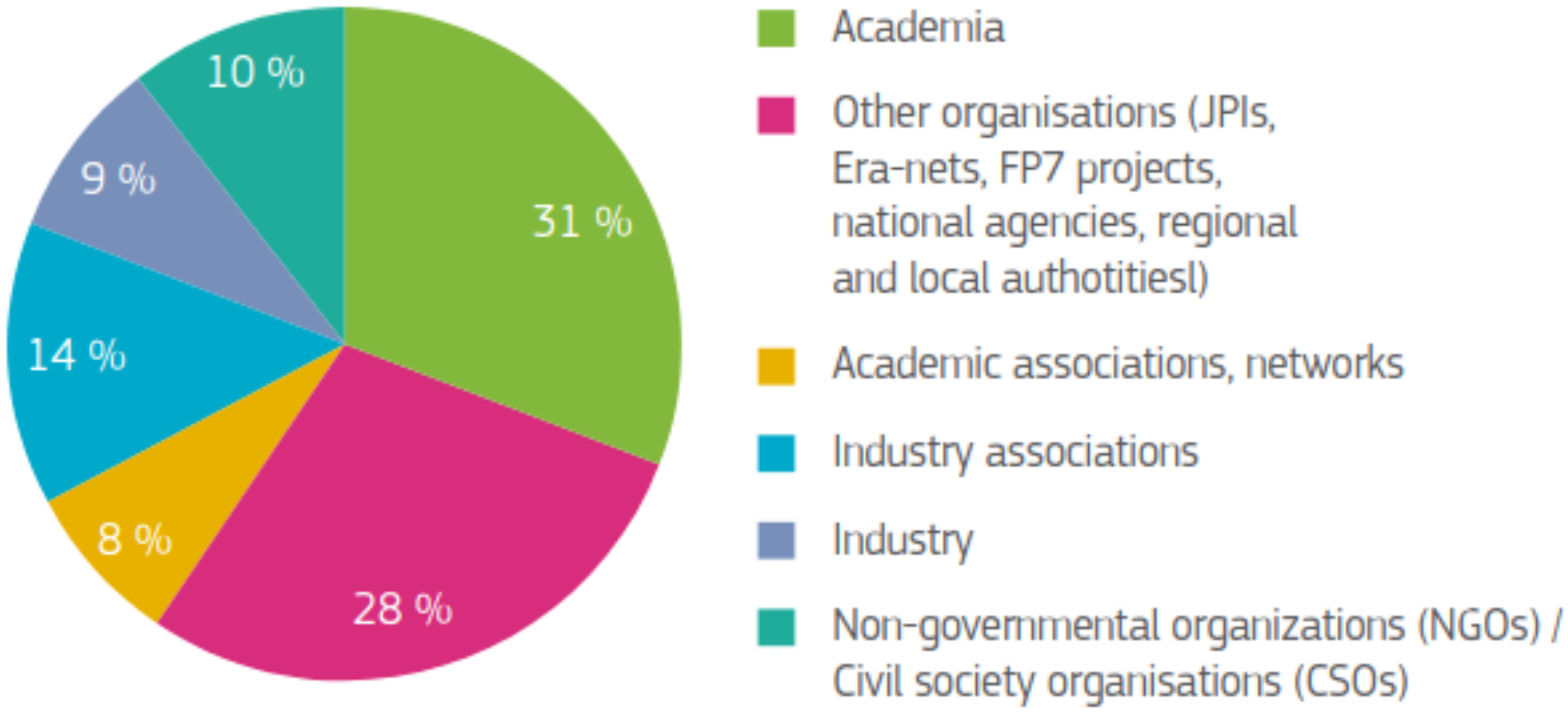
Trends in climate service markets

The climate service value chain



Climate service contributors

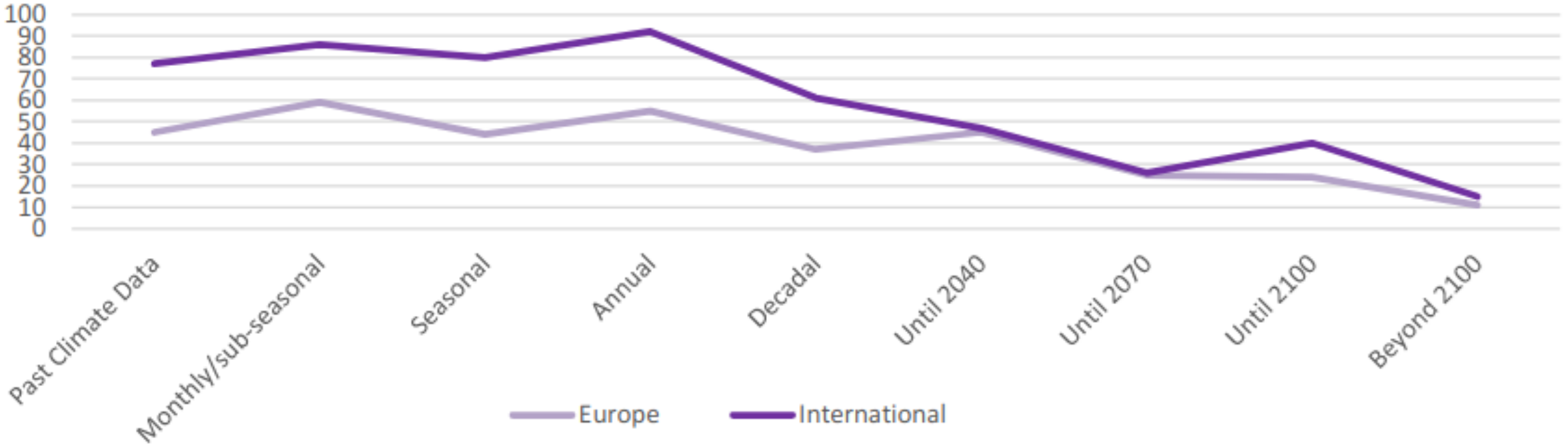
Figure 2. Breakdown of organisational contributors by nature of the organisation



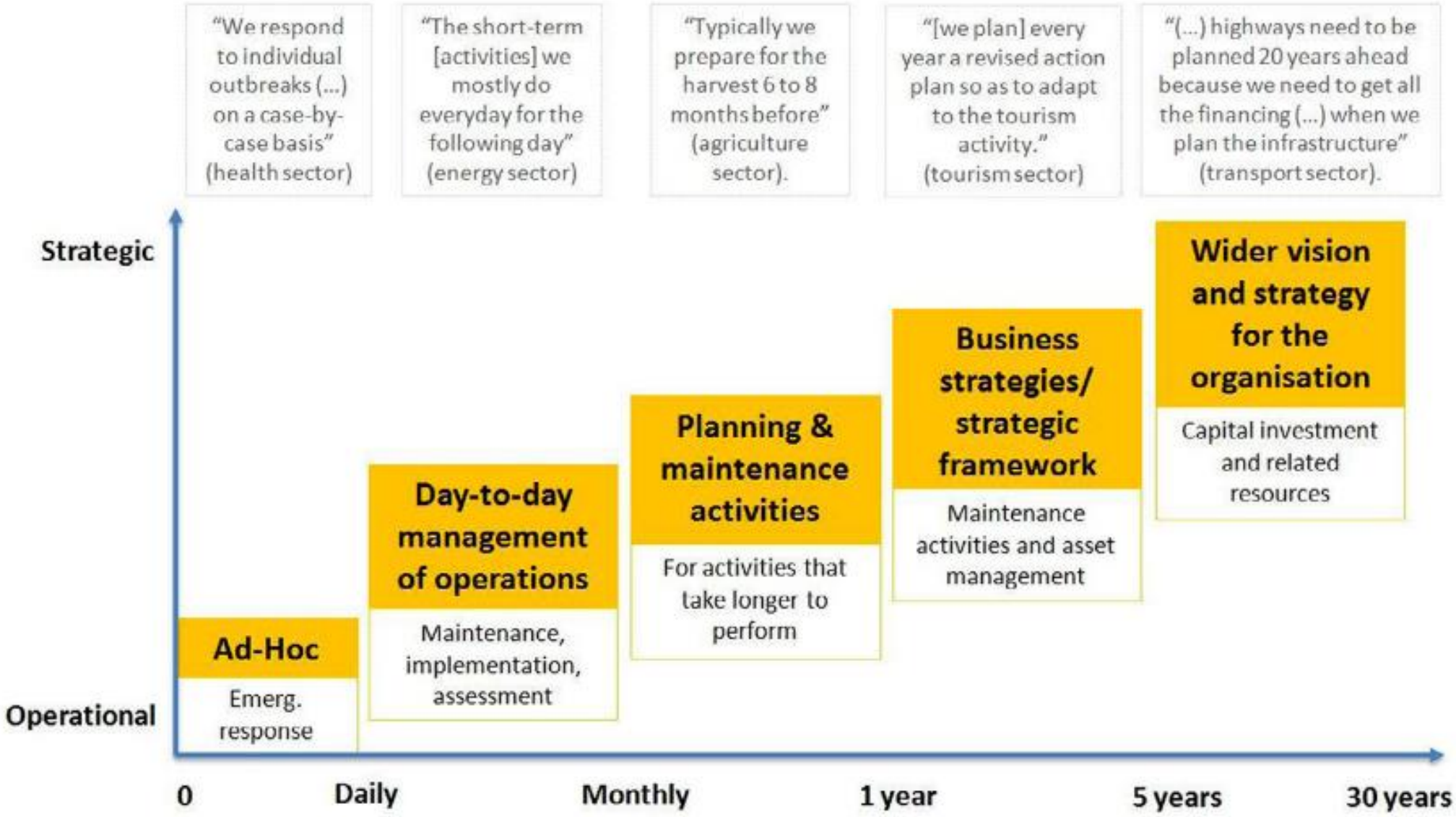
Pros and cons of the different providers

Type of climate services providers/ purveyors	Strengths	Weaknesses	Cultural background
Extension of meteorological services.	Strong infrastructure.	Main focus on physical data, limited socio-economic aspects.	Meteorology/hydrology.
Public climate services centres (not from meteorological services).	Fit for purpose.	Limited business orientations.	Multidisciplinary.
Services offered by a university or a group of universities.	Often include physical and socio-economic competences, research oriented.	Little user knowledge.	Multidisciplinary, academic.
Private business development.	Business orientation, user knowledge.	Dependence on external climate information.	Multidisciplinary, business.
Incorporation of climate information management in business consulting services.	Very good knowledge of users' needs, integration with other consulting needs, cost-orientation.	Limited climate knowledge.	Economic, business, marketing.

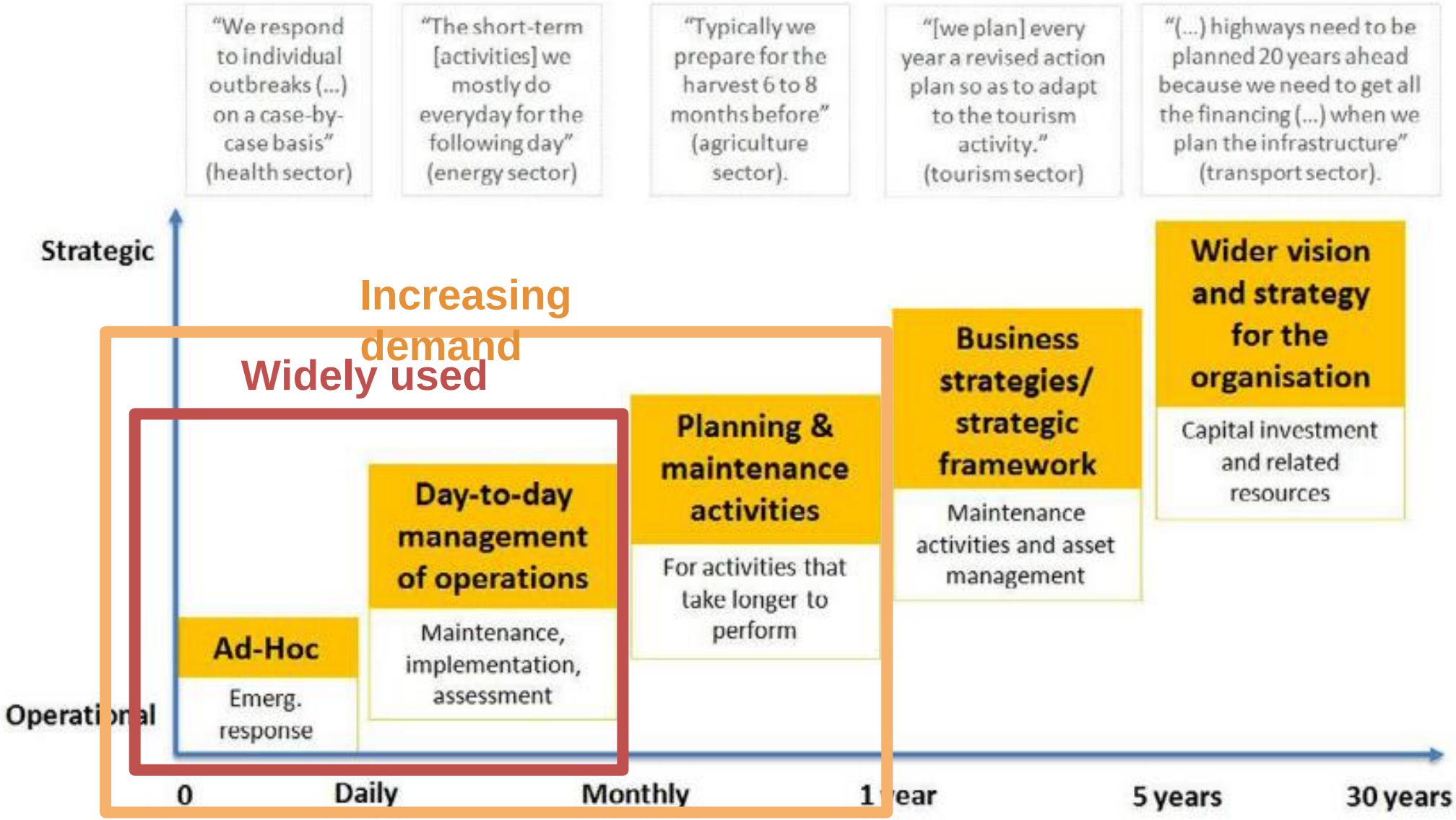
Typical time scale requested by users



Timescale of information and decision



Timescale of information and decision



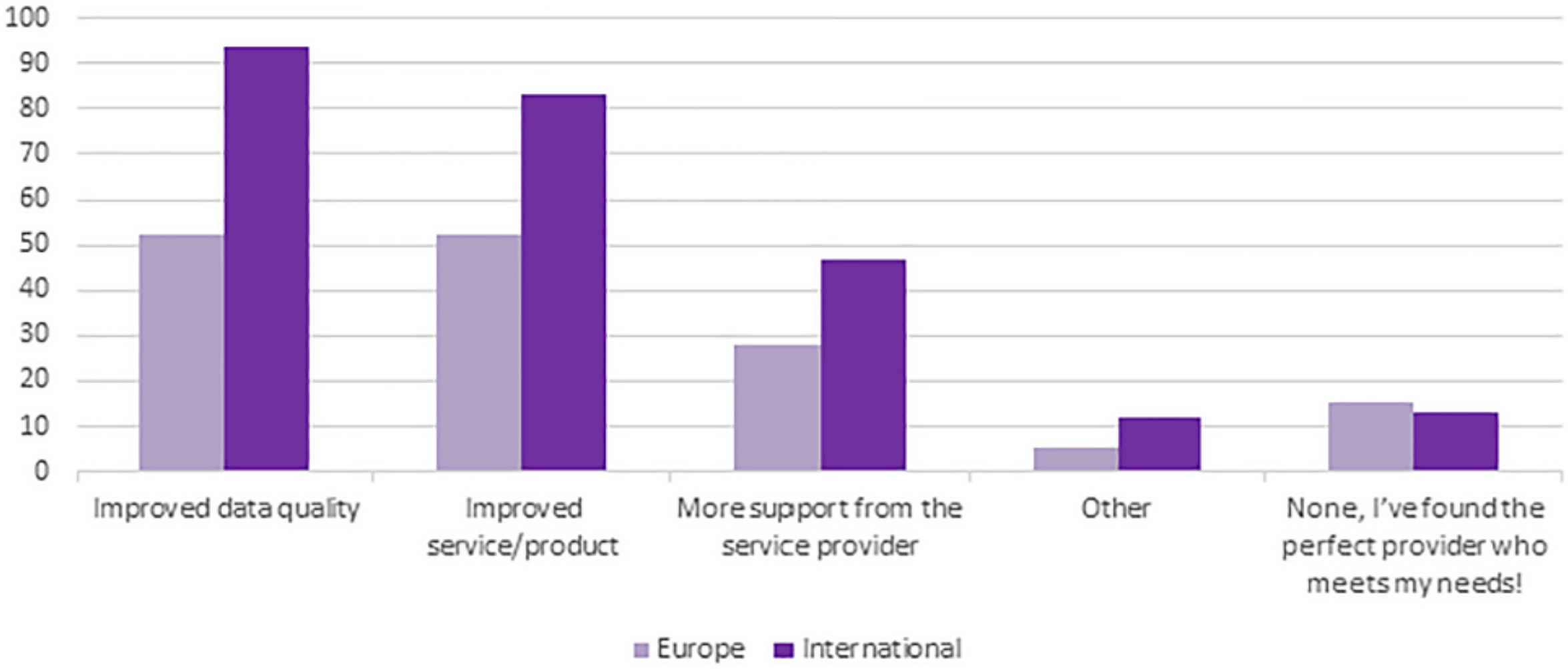
Met users' needs

Types of climate services used		
Education and consultancy	Forecasts	Other
Climate advisory	Weekly and partly seasonal forecast (indicative)	Economic assessment of CC impacts and investment options
Climate change consultancy (environmental consultancies)	Climate scenarios and Climate model outputs	Cost-benefit calculations
Vulnerability assessment	Weather forecasts	Insurance
Academic resources and legal repositories	Daily/hourly forecasts of consumer demand and production of electricity	
	Weekly and daily measured data	
	Publicly available simple hydrological models	
	Snow cover forecast (natural and technical)	
	Skier day forecasts (weather-based)	

Unmet users' needs

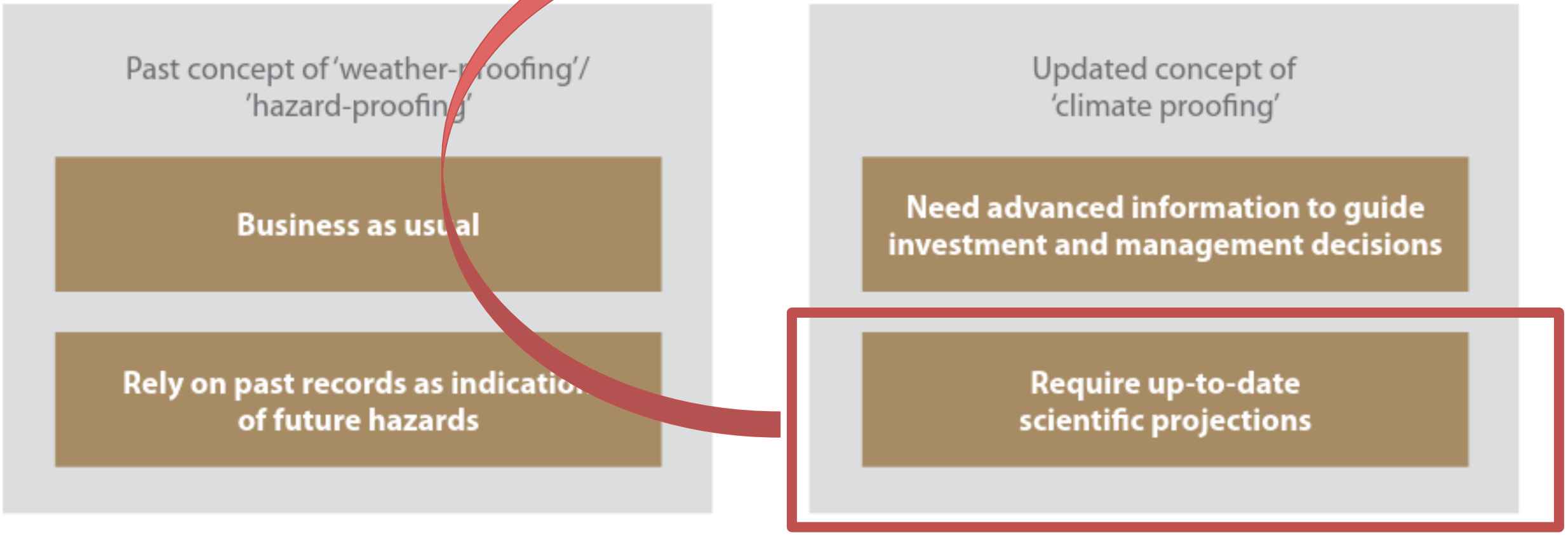
UNMET climate service demand		
Education and consultancy	**High resolution forecasts**	**Other**
Consultancy	Accurate forecasted daily distribution of precipitation for coming months	Climate services already used
Adaptation solutions	Accurate seasonal forecasts for precipitation	Coupling of climate information into existing tools
Applied business oriented services	More precise/detailed seasonal-decadal hydrological models	Coupling of climate information with local information - i.e. sewage system, drainage capacity etc.
Capacity building / professional accreditation	Forecast of type of precipitation during wintertime (rain or snow)	Climate services database / shop-window
Translation of climate change factors to local impact	More precise weekly to seasonal forecasts on snow cover and skier days	Financial modelling
Coupling of weather events and climate change with building performance	More reliable information on wind speed	Chain-analysis to place responsibilities
Climate services tailored to legal sector needs re. legal standards of proof, narrative-style, information resolution	Material performance studies under changing weather conditions	Vulnerability analysis of supply chain
	High-resolution, multi-parameter, multi-scenario climate impact models (sector-specific)	
	Long term forecast of local impact on specific buildings	

What can be improved according to users



Climate service for CI at planning stage

Ad-hoc, reliable, detailed information based on climate scenarios.



Objective:

- To develop an innovative climate service concept that addresses specific climate-related challenges, tailored to meet the needs of a designated target audience.

1. Brainstorming and Ideation Session

- Collaborate with your group to brainstorm ideas for a climate service.
- Identify a specific climate-related challenge to address.
- Determine your target audience: Who will benefit from your service?
- Establish clear objectives: What do you aim to achieve with your service?
- Select potential data sources: Where will you obtain the necessary climate data?
- Explore potential applications: How can your service be used in sectors like agriculture, energy, water resources, or disaster management?

2. Research and Analysis

- Conduct comprehensive research to understand the needs and preferences of your target audience.
- Determine the demand for climate services.
- Evaluate existing climate services and identify any gaps or areas for improvement.
- Use your findings to refine your concept and establish a unique value proposition.

3. Concept Development

- Based on your brainstorming and research, develop a well-defined concept for your climate service.
- Outline the key features and functionalities: What will your service do, and how will it work?
- Highlight the benefits: How does your service provide value to its users?
- Consider the potential impact: What positive change will your service bring about?
- Address feasibility: Is your concept practical and achievable?

4. Pitch Preparation

- Create a persuasive pitch for your climate service concept (10 slides).
- Develop a narrative that clearly explains the problem, your solution, and its benefits.
- Utilize visuals, graphs, and other media to support and enhance your pitch.

Deliverables:

- A pitch deck with visuals and talking points for your final presentation.

Evaluation Criteria:

- Innovation and originality of the climate service idea.
- Relevance and clarity in addressing the chosen climate-related challenge.
- Depth and thoroughness of the research and analysis conducted.
- Quality and practicality of the concept development.
- Effectiveness and persuasiveness of the pitch.