The Added Value of Seasonal Climate Forecasts for Integrated Risk Management Decisions (SECLI-FIRM)

EU H2020 Project (ref. n. 776868)

D5.17: Report on cooperation activities and exploited synergies

[Dissemination level: Public]

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Internal Review Table

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1 Summary

This report documents the organisations of activities and exploited synergies we have conducted during the nearly four-year project. Activities are mainly presented in a table format, defining for each of them when, with who, the type of action, output and outcome. We have also shared links to, and visual evidence of, the activities progressed.

The cooperation activities listed mostly align to Task 5.4 of Work Package 5, Stakeholder engagement, communications and exploitation of results, defined in the workplan:

(The) coordination and exploration of synergies between projects funded under the same or similar call is crucial to share learning, spend resources efficiently and reach the best possible impact. Thus the primary objective of this task is to coordinate and to create synergies with the EU-projects related to Climate Services funded under the same and similar topics.

Activities under this task were expected to include the following types of activities (we have included examples of these in this report):

a. Regular sharing of information on the progress of SECLI-FIRM to related projects (invitation to meetings, participation in the Advisory board, etc.). See **Figure 5** and **Section 3.2**.
b. Joint participation to meetings upon request of the European Commission/Agency to promote the outputs of the projects – examples include our participation in the ECCA conference 2019 in Lisbon where we presented and contributed to a few talks together with other EU climate service projects.
c. Potential alignment of activities (especially dissemination and communication activities i.e. joint policy recommendations) and kick-off/final meetings. See **Figure 1**.
d. For projects addressing similar sectors/ end-users, coordination of activities and exchange of experience related to user-requirements, stakeholder engagement and case-studies could be envisaged. See **Figure 6.**
e. Exchange and consolidation of results when relevant, e.g. concerning barriers and incentives to the use of climate services, policy briefs. See **Figure 7**.

The SECLI-FIRM consortium regularly interacted with other relevant EU projects and other initiatives in the field of climate services and developed mutually beneficial synergies. These include but are not limited to Copernicus Climate Change Service (C3S), Climateurope, projects funded under ERA4CS, JPI Climate and other initiative under the EIT Climate-KIC. There are examples of these interactions within our summary of cooperation activities tables in section 3.

More specifically, during the SECLI-FIRM project we have developed cooperation activities with EU Climate Services projects including CLARA, S2S4E, FOCUS-Africa and MED-GOLD and progressed initiatives, including our 2021 Summer School, working with partners, including the World Meteorological Organization (WMO), C3S and academic institutions including the

University of Reading and the University of Vigo. Our consortium has attended conferences supported by the EU, in person and virtually, including the ECCA in Portugal and the Energy Sustainability Weeks in Brussels.

Stakeholder Workshops and webinars have featured contributors from a wide range of organisations, projects and initiatives, including WMO, UNITAR, WATExR, EU-MACS and SMHI and enabled exploration of synergies across the projects. Our final conference, held across three days in October 2021 also involved other EU projects as panel members as well as attracting individuals from a selection of projects to attend. D5.16, Final Conference Report features a list of participants.

We maintained close links with Climateurope, a project aimed at bringing together EU funded climate services related projects (Climateurope finished in January 2021). We contributed to their Webstivals for example through the creative Bellhouse project (Figure 2). We also contributed to the Climateurope expert group meeting on 11 and 12 February 2019 in Paris. This expert group discussed and prepared recommendations for the Horizon Europe research agenda in the field of Climate/Earth system modelling and climate services.

We have explored the possibility to implement the Devil's Advocate card game, to co-design market ready climate services with some of our users, together with the CLARA project, the developer of the game.

Crucially, the SECLI-FIRM Advisory board has provided valuable links to other projects and industries. This has allowed additional opportunities to exploit synergies such as links to the UK Water Demand Group via Thames Water board members. It has also facilitated further links for the project within their organisations, for instance TenneT involved additional colleagues, in part due to their increased interest in the SECLI-FIRM project's output.

This happened within the consortium too, for example ENEL involved their economist traders for the value add assessment (they were not included in the original plan). They also shared the Teal tool with other divisions, who were subsequently interested in the development of additional functionalities. Alperia also involved their trading team (not included originally as with ENEL) and also shared the Teal tool internally.

2 Project overview

The main objective of The Added Value of Seasonal Climate Forecasts for Integrated Risk Management Decisions (SECLI-FIRM) project (Feb 2018 – October 2021) was to demonstrate how the use of improved climate forecasts, out to several months ahead, could add practical and economic value to decision-making processes and outcomes, primarily in the energy sector, but also in the water sector. Specifically, for the energy sector, SECLI-FIRM has assessed 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. Improvements in management decisions will ultimately lead to an improved supply-demand balance and therefore to a more efficient energy system, particularly with respect to renewable energy, with corresponding benefits for climate change mitigation.

Project partners, collectively referred to as the 'SECLI-FIRM consortium', are:

- University of East Anglia (UEA)
- Enel Global Trading (formerly ENEL Trade S.p.A) (ENEL)
- Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Economico Sostenibile (ENEA)
- Met Office (MO)
- Koninklijk Nederlands Meteorologisch Institut (KNMI)
- World Energy & Meteorology Council (WEMC)
- UL[1] – (formerly AWS Truepower)
- European Academy of Bozen/Bolzano (EURAC)
- Alperia S.p.A
- Météo-France

SECLI-FIRM has worked very closely with a number of external 'committed stakeholders' from the energy and water industries who have actively contributed to the production of the case studies: TenneT, Shell, National Grid, Thames Water and Celsia.

[1] Underwriter Laboratories (UL) acquired AWS Truepower in September 2016. In legal terms, the participant in SECLI-FIRM is still AWS Truepower SLU, founded in February 2007, with address in Barcelona (Spain) and which is an SME according to its revenue and number of employees.

3 Summary of cooperation activities

3.1 Summary table of European Projects

A number of the European projects with which SECLI-FIRM has interacted and shared learning are listed in Table 1. A session on cross-sectoral learning held during the SECLI-FIRM Workshop 5 in May 2021, for example, included presentations on MED-GOLD and WATExR case studies as well as SECLI-FIRM case studies[2]. The session on value add on the third day of the SECLI-FIRM final conference in October 2021 included perspectives from CLIM2POWER, EU-MACS and S2S4E as well as SECLI-FIRM[3]. These are also covered in Table 2 along with more examples of cooperative working with other EU Projects.

Table 1 – Some of the European climate services projects with which SECLI-FIRM has interacted and shared learning

Project Title	Acronym	Website
Climate forecast enabled knowledge services	CLARA	https://www.clara-project.eu
Translating climate data into power plant operational guidance	CLIM2POWER	https://clim2power.com/
EUropean MArket for Climate Services	EU-MACS	https://eu-macs.eu/
MArket Research for a Climate Services Observatory	MARCO	https://marco-h2020.eu/
Climate services for hydrological sectors	IMPREX	https://imprex.eu/
Developing climate services for European agriculture and food systems	MED-GOLD	https://www.med-gold.eu/
Climate services for clean energy	S2S4E	https://s2s4e.eu/
Extreme climate events and water quality	WATExR	https://watexr.eu/

3.2 Summary table of cooperation activities

Table 2 shares examples of a variety of cooperation activities that have taken place over the nearly four-year project period, defining when, with who, the type of action, output and outcome of the activities. We have also included links to the activities progressed in the final column of the Table as well as visual evidence (**Figures 1-8)**.

[2] http://www.secli-firm.eu/events/#1623228980655-54ad6916-5518
[3] http://www.secli-firm.eu/secli-firm-final-conference-2021

Table 2: Summary of cooperation activities, links forged, outputs and outcomes during the SECLI-FIRM Project (in reverse chronological order)

Date	Type of action	External organisation/ sector/link	Output	Outcome and exploited synergy	More information and links
Oct 21	Final Conference Project showcase and interactive workshop	Climate service and industry organisations: FMI LNEG BSC RTE CNR ECMWF Belgium Met Office FOCUS-Africa consortium members	Two panel discussions 1. Advancing the science of seasonal forecasting for climate services 2. The value add of seasonal forecasts and climate services – lessons learnt from SECLI-FIRM and other EU projects and where do we go from here?	**Outcome** Answers to these questions to be compiled and submitted to the EU, to be fed into planning for future projects. Also, responses can be useful for climate service providers to improve their services as per discussions and priorities. **Exploited Synergy** Climate service organisations understand and take away the shared learning discussed, in an effort to provide improved services.	Presentations and recording on SECLI-FIRM website Lessons learned to be presented in the project final report
Sep/Oct 21	Summer School organisation and delivery Mastering the development of a climate service from start to end	Climate service and academic organisations: UEA, WMO, ECMWF, C3S, University of Reading, University of Vigo	Specialist Summer School, 24 hours of classes over 6 days across three weeks for junior researchers, practitioners, planners, entrepreneurs to learn about climate services in the energy and water sectors with real world applications.	**Outcome** Human capital development. Trained practitioners and researchers in the burgeoning climate service industry. Involved over 40 speakers/ presenters/mentors/moderators from across the climate, energy and water sectors. **Exploited synergy** All sectors using climate services will benefit from this investment in human capital, and the rich educational resources available online. Also, a few involved organisations have pledged to run a yearly summer school based on the same format.	Presentations and recording on SECLI-FIRM website

Sep 21	Attendance and participation in EU H2020 Project Stakeholder Workshop	FOCUS-Africa	Joining discussions focused on exploring the stakeholders needs, challenges and capacities in terms of climate services in Tanzania in three sectors including energy.	**Outcome** Knowledge transfer from SECLI-FIRM to this closely related climate service project (FOCUS-Africa)	https://focus-africaproject.eu/2021/07/28/save-the-date-second-focus-africa-stakeholder-workshop-will-hold-14-15-september-2021
Jun 21	SECLI-FIRM Stakeholder Workshop 5 How can climate services enhance your business decisions?	H2020 projects and industry: WATExR MED-GOLD Sogrape	Discussions exploring climate services and decision making for the water and agriculture sectors	**Outcome** An understanding and sharing of learning amongst H2020 projects and industry around how climate services can benefit industrial sectors **Exploited synergy** Reported learning can benefit future H2020 climate projects and industrial sectors	Presentations and recording on SECLI-FIRM website D1.5
May 21	Webinar organisation Climate Education: Understanding the past to empower climate action Including panel discussion	Panellist organisations: UNITAR RMetS Earthday.Org Presenter: C. Zulberti (ENEL Found.) Moderator: A. Minns (UEA)	Webinar delivered and Teal tool promoted.	**Outcome** Teal, the climate visualisation tool developed within the SECLI-FIRM Project, shared with new audiences.	https://www.secli-firm.eu/2021/06/14/climate-education-recording-live/
May 21	Water Demand Group meeting	The Water Demand Group, represent approximately 70% of the UK water industry	Attended by SECLI-FIRM board member Ian Savage from Thames Water	**Outcome** A presentation on the SECLI-FIRM project was enthusiastically received.	https://www.thameswater.co.uk/about-us
May 21	4th C3S General Assembly (GA) and co-hosted with the Italian Copernicus National Forum	C3S	Presentation by I. Cionni et al.: Co-development of climate services for energy sector from C3S data: ENEA's contribution.	**Outcome** Sharing of project output and strengthened links with related community.	https://climate.copernicus.eu/c3s-4th-general-assembly

Feb 21	SECLI-FIRM Webinar 4 Sharing climate services experiences between the SECLI-FIRM project and in the USA	Delivered with S2S4E, Benchmark Labs USA, Prescient Weather USA	Presenting Seasonal forecasts for water sector stress events, the role of machine learning and cloud computing for the USA public sector and forecasts for energy markets	**Outcomes** Experiences shared **Exploited synergy** European and USA experiences shared to mutual benefit.	Presentations and recording on SECLI-FIRM website
Dec 21	Exploration of Devil's Advocate Game	CLARA	Meeting between consortium members from MO, UEA and WEMC to explore potential use of the game with SECLI-FIRM stakeholders	**Outcome** Better understanding of the card game 'to co-design market-ready climate services' and building of cross project relationships	https://www.clara-project.eu/play-the-game
Up to Dec 21	Alberto Troccoli is on the Advisory Board of CLIM2POWER	CLIM2POWER		**Outcome** Shared knowledge between projects and improved coordination of project activities	https://clim2power.com/
Dec 20	Stakeholder Workshop	FOCUS-Africa	Project developing tailored climate services in the Southern African region for four sectors: agriculture and food security, water, energy and infrastructure.	**Outcome** Shared knowledge between projects and improved coordination of project activities	https://focus-africaproject.eu/2021/07/28/save-the-date-second-focus-africa-stakeholder-workshop-will-hold-14-15-september-2021/
Dec 20	Workshop	S2S4E - Climate Forecasting for Energy	Alberto Troccoli was a panel member	**Outcome** Shared lessons learned	https://s2s4e.eu/newsroom/climate-forecasting-for-energy-event

Dec 20	Meeting	EASME	Alberto Troccoli attended meeting Climate Services for a Climate-Resilient Europe	**Outcome** Update on related climate services project for a better alignment of project activities	https://www.technopolis-group.com/new/online-workshop-climate-services-for-a-climate-resilient-europe/
Nov 20	Climateurope Webstival	Over 70 participants from across Climateurope networks Attended by project team: A Troccoli, L. Haughey, K. Nielsen and M. Callegari	SECLI-FIRM collaborated with Climateurope on BellHouse, a playable interactive sound sculpture that 'plays' climate data.	**Outcomes** A dataset from the project Teal tool was played during the Climateurope event	See Figure 1. Also: https://www.youtube.com/watch?v=SPgukW3XkWM
Nov 20	SECLI-FIRM Webinar 3 Climate services for the hydropower sector	Hosted in conjunction with H2020 CLARA project and delivered with GECOsistema	Presenting Runoff seasonal forecasts in Alpine areas, hydro in Colombia and a smart climate hydropower tool	**Outcomes** Lessons learnt from the development of Seasonal forecasts for different scenarios **Exploitation synergy** Similarities and learning between hydropower case studies	Presentations and recording on SECLI-FIRM website See Figure 2
Sep 20	SECLI-FIRM Webinar 2 Explore how EU Projects have developed innovative services for the energy industry	Hosted in collaboration with Climate Europe, and delivered with CLARA, S2S4E and Copernicus C3S, BSC, SMHI, Uni of Cordoba	Presenting project case studies and decision making considerations for the renewable, Hydropower sectors and energy traders	**Outcomes** Each H2020 project has benefited from lessons learnt during the developmental stage of their projects **Exploited synergy** Decision making considerations across industrial sectors and sources of energy	Presentations and recording on SECLI-FIRM website
June 20	5th meeting of Climateurope projects' network		Attended by Alberto Troccoli, UEA	**Outcomes** Update on related climate services project for a better alignment of project activities	https://www.climateurope.eu/

Oct/Nov 19	General Assembly	C3S	Attended by Alberto Troccoli, who gave two presentations including examples from SECLI-FIRM	**Outcomes** Shared project output and strengthened links with related community	https://insitu.copernicus.eu/news/events/c3s-3rd-general-assembly-28-october-1-november-2019-warsaw-poland
Oct 19	WMO/Green Climate Fund Climate Services Workshop, Cape Verde	Alberto Troccoli (UEA) participated		**Outcomes** Shared SECLI-FIRM output and objectives as possible adoption for climate services activities in Cape Verde	https://public.wmo.int/en/events/workshops/climate-rationale-national-workshop-0
Sept 19	SECLI-FIRM Stakeholder Workshop 3	The East of England Energy Group attended (EEEGR) They are a non-profit trade body.	An EEEGR representative joined our third SECLI-FIRM Stakeholder Workshop in Norwich	**Outcomes** Broadened project stakeholder base	http://www.secli-firm.eu/events/#1582123396365-873df412-1361
May 19	EU ECCA conference	EASME with JPI Climate	Project team member Clare Goodess in attendance and presented SECLI-FIRM material Leading and contributions to 'Unfolding the potential of climate services for climate change adaptation	**Outcomes** Shared SECLI-FIRM output and strengthened collaboration with related climate service projects through joint presentations	https://www.ecca2019.eu/ https://www.secli-firm.eu/2019/07/01/secli-firm-ecca2019-icem2019/ http://www.jpi-climate.eu/media/default.aspx/emma/org/10898775/ecca_jpi_climate_climateurope_booth_activities.pdf

Jan 19	2nd SECLI-FIRM stakeholder workshop	CLARA	Presentation on 'Insights and experience from CLARA project' at start of session on the value of seasonal climate forecasts	**Outcomes** Shared perspectives on different approaches for the evaluation of climate services, including the use of decision trees	http://www.secli-firm.eu/events/#1582123396060-713e4681-de59
Jun 18	EU EUSEW18 conference	EUSEW	Project leader Alberto Troccoli attended Energy talk 'How can seasonal climate forecasts help your business?'	**Outcomes** This led to an interview with a journalist working for the online magazine Horizon (www.horizon-magazine.eu) with subsequent article 'Managing energy demand spikes with seasonal forecasts of heatwaves and cold spells' with contribution from sister project S2S4E	https://ec.europa.eu/info/events/eu-sustainable-energy-week-2019-jun-18_en
Throughout project, from start	Regular interactions with the Operational Service for the Energy Sector, led by WEMC and Alberto Troccoli	Copernicus Climate Change Service (C3S)	Improved retrieval and use of seasonal forecasts and reanalysis data from the C3S Climate Data Store	**Outcome** This link ensures that data and knowledge produced by C3S Energy, and C3S more broadly, are used by SECLI-FIRM. Award for predecessor of Teal tool, Edu Demo, in October 2021 C3S Gala Awards	https://climate.copernicus.eu/
Throughout project, from start	ECMWF, North American seasonal forecast providers (e.g. NASA, NOAA)	Cooperation with seasonal forecast model providers	Receipt of direct information about seasonal forecast models and data	**Outcomes** More efficient retrieval and improved use of various seasonal forecast models	

Figure 1: SECLI-FIRM Climateurope collaboration to deliver a free Climate Services for the Energy sector webinar, example of a promotional tweet

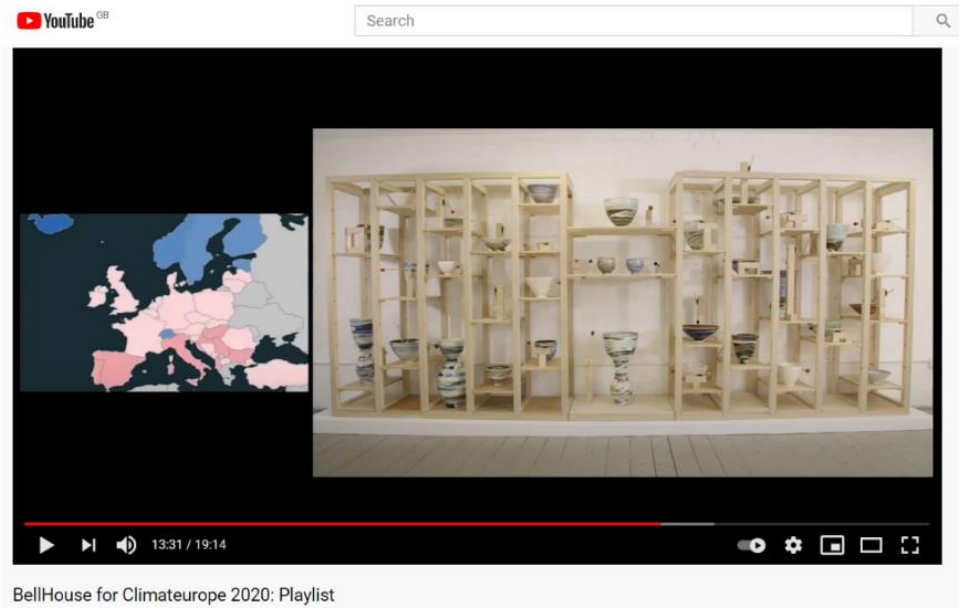

Figure 2: SECLI-FIRM Climateurope collaboration on BellHouse, a playable interactive sound sculpture that 'plays' climate data, part of a Climateurope initiative

Figure 3: Participation of Roberta Boscolo from WMO in SECLI-FIRM Summer School, Sept-Oct 2021. WMO were an official partner of the School.

Figure 4: Participation of Alessia Pietrosanti, our EU Project Officer, from CINEA, at the SECLI-FIRM Summer School, Sept-Oct 2021.

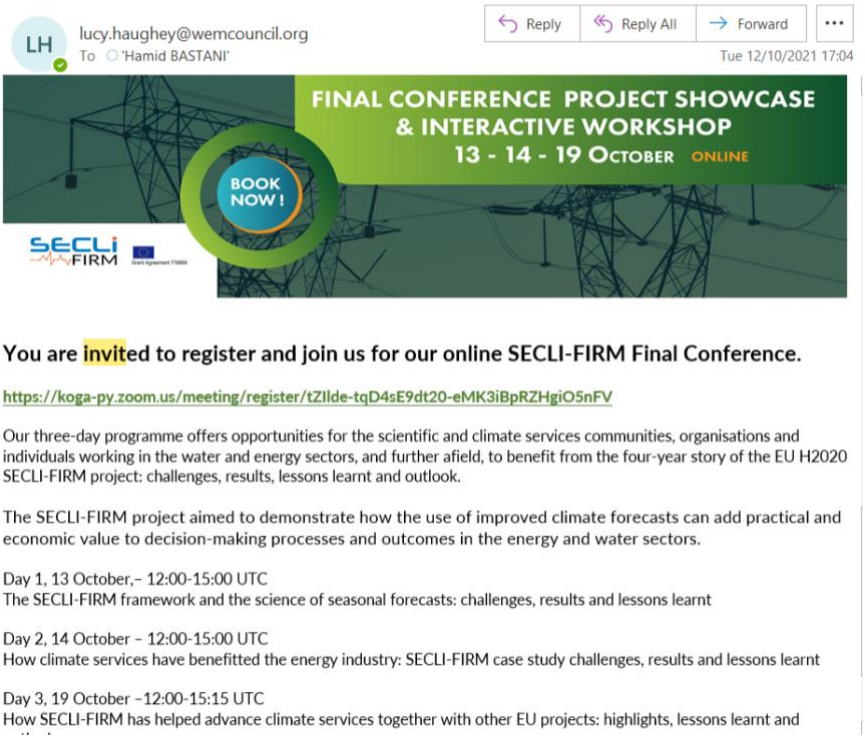

Figure 5: Direct invitation to the FOCUS-Africa consortium to join the SECLI-FIRM Final Conference

Figure 6: MURAL interactive platform snapshot summarising activities and Session Leaders involved in our Stakeholder Workshop 5, including MED-GOLD, SO-GRAPE, WATErX (image shown to give an idea of the richness of input from participants)

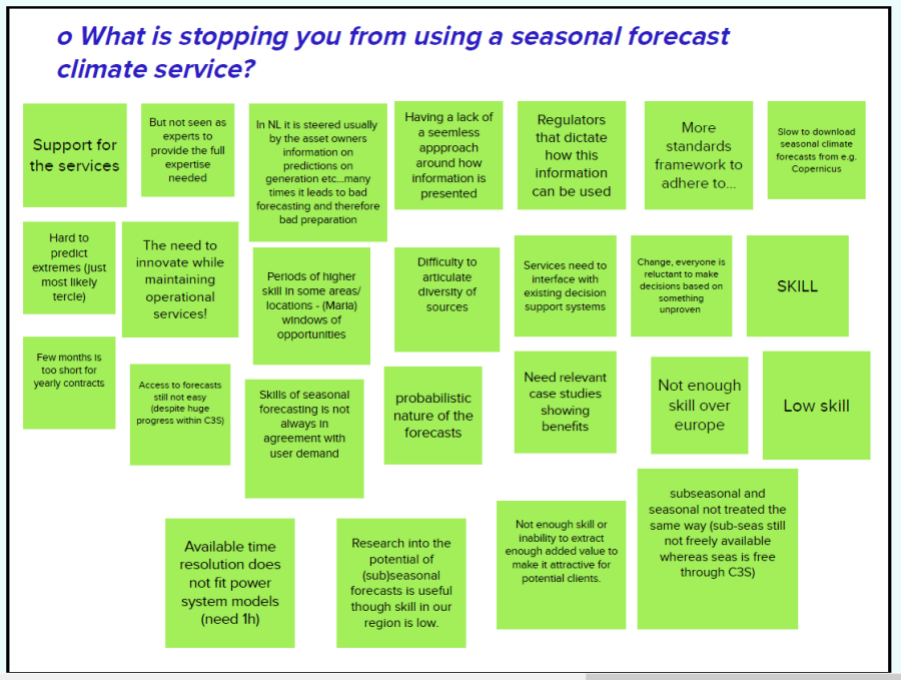

Figure 7: Feedback gathered live during Stakeholder Workshop 5 from attendees on barriers to using a seasonal forecast climate service, May 2021.

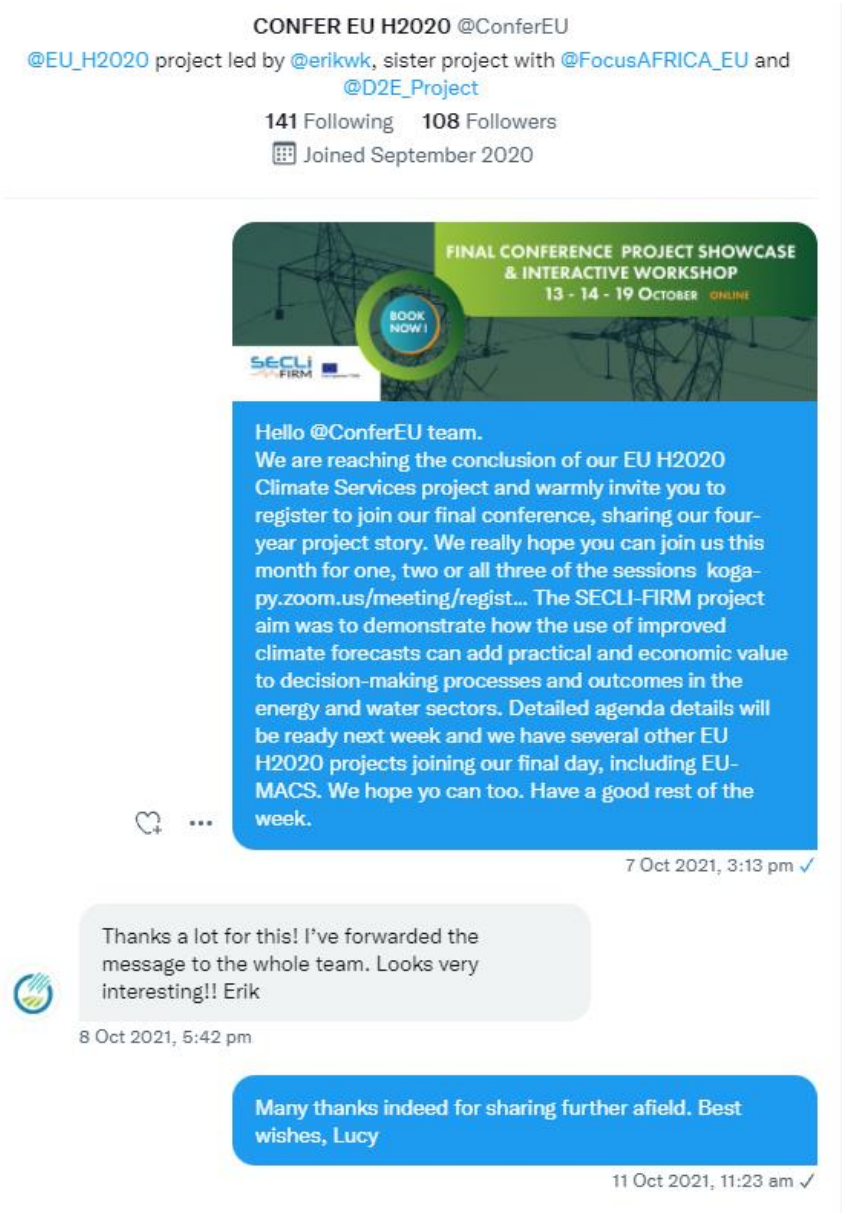

Figure 8: Reaching out to other EU Projects via twitter, this example is to EU project Confer

3.3 Social media

Cooperation activities including the sharing of opportunities and findings on social media, across EU Climate Services projects, has been ongoing throughout the four-year project. The

SECLI-FIRM project has over 40 EU projects within its Twitter following and has regularly engaged with them and benefitted from their promotion of synergies and joint activities with SECLI-FIRM too. Two examples below:

4 Conclusion and next steps

Throughout the project the consortium has worked hard to keep links and seek collaborations with other EU projects. For instance, the interaction with CLARA helped shape the development of one of the SECLI-FIRM critical tools and outputs used to enhance the interaction between scientists and industrial users in our project: the decision trees. Some more recent examples of collaborations include our Summer School and Final Conference.

Overall these related climate service projects have helped SECLI-FIRM to better understand the types of decisions that can be supported by seasonal forecasts and the types of tailored information that are required. This cooperation has delivered reciprocal benefits to the projects involved and provided valuable information for the EU Commission for future similarly themed projects.

The discussions and sessions from all the SECLI-FIRM run events have been recorded so they can continue to inform and contribute to existing and future climate services projects. Some consortium members are also involved in ongoing related EU projects such as FOCUS-Africa (with WEMC and Met Office as partners) and Down2Earth (with UEA as a partner), so the cooperation activities continue into 2022 and beyond.

Alberto Troccoli is also sharing information about the SECLI-FIRM project on 1st November 2021, as part of the EU Pavilion COP activities, in a digital side event. More information: https://ec.europa.eu/clima/news-your-voice/events/cop26-climate-change-conference_en and https://www.cop26eusideevents.eu/programme

5 Appendix: Acronym Table

List of Acronyms (see also list of SECLI-FIRM project partners in Section 2)

Acronym	Expanded version
CLARA	Climate forecast enabled knowledge services
CLIM2POWER	Translating climate data into power plant operational guidance
COP	Conference of the Parties
C3S	Copernicus Climate Change Service
Down2Earth	Translation of climate information in the Horn of Africa Drylands
ECCA	European Climate Change Adaptation Conference
ERA4CS	European Research Area (ERA) for Climate Services (CS)
EU-MACS	EUropean MArket for Climate Services
FOCUS-Africa	Full-value chain Optimised Climate User-centric Services for Southern Africa
IMPREX	Climate services for hydrological sectors
JPI-Climate	Joint Programming Initiative "Connecting Climate Knowledge for Europe"
MARCO	MArket Research for a Climate Services Observatory
MED-GOLD	Developing climate services for European agriculture and food systems
S2S4E	Climate services for clean energy
WATExR	Integration of climate seasonal prediction for water resources management
FMI	Finnish Meteorological Institute
LNEG	Laboratório Nacional de Energia e Geologia
BSC	Barcelona Supercomputing Center
RTE	Réseau de Transport d'Électricité
UNITAR	United Nations Institute for Training and Research
RMetS	Royal Meteorological Society
SMHI	Swedish Meteorological and Hydrological Institute
CNR	Consiglio Nazionale delle Ricerche
ECMWF	European Centre for Medium-Range Weather Forecasts
EASME	Executive Agency for Small and Medium-sized Enterprises
EUSEW	EU Sustainable Energy Week
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
Confer	co-production of Climate Services in East Africa
WMO	World Meteorological Organization

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For more information visit

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