Deliverable Report

Report on Final Conference

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

EU H2020 Project (ref. n. 776868)

D5.16: Report on Final Conference

[Dissemination level: Public]

Version Table

Name/Party	Description	Date
KOGA	Draft 1	26/10/2021
KOGA	Draft 2	27/10/2021
L Haughey (WEMC)/ Lesley Penny (UEA)	Draft 3	28/10/2021
A Troccoli	Final version, revised and ready for submission	31/10/2021

Internal Review Table

Name/Party	Description	Date
L Haughey	WEMC	26/10/2021
L Haughey	WEMC	27/10/2021
Lesley Penny	UEA	28/10/2021
Alberto Troccoli	UEA	29/10/2021
Clare Goodess	UEA	31/10/2021

Contributors (Consortium Party/Person)

UEA	Alberto Troccoli, Lesley Penny
WEMC	Lucy Haughey, Elena Bertocco, Janice Ogonji
KOGA	Fabian Gruber

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Table of Contents

1 Summary

This deliverable report describes the main aspects of the SECLI-FIRM Final Conference, a three day event to showcase the output of the project, to present lessons learnt and to discuss their implications for future developments of climate services, also with the input of SECLI-FIRM Advisory Board members and in collaboration with other climate services EU projects. An organising committee was established and involved many members from across the 10-partner organisations of the consortium. The committee met fortnightly in the six weeks leading up to delivery of the event.

The Programme offered opportunities for the scientific and climate services communities, organisations and individuals working in the water and energy sectors, and further afield, to benefit from the nearly four-year story of the EU H2020 SECLI-FIRM project: focusing on the challenges, results, lessons learnt and outlook. One of the aims was also to share 'what didn't work' within the project as well as our many successes. To draw more general and robust conclusions we also involved other EU projects and external experts in two of our sessions (panel discussion and value add session, see Day 3 programme). Overall with the final conference we aimed to ensure our knowledge was shared and synergies identified.

Day 1, 13 October – 12:00-15:00 UTC

This session was centred on the SECLI-FIRM framework and the science of seasonal forecasts: challenges, results and lessons learnt.

Day 2, 14 October – 12:00-15:00 UTC

This day's objectives were centred on understanding how climate services have benefitted the energy industry, featuring SECLI-FIRM case study challenges, results and lessons learnt.

Day 3, 19 October –12:00-15:15 UTC

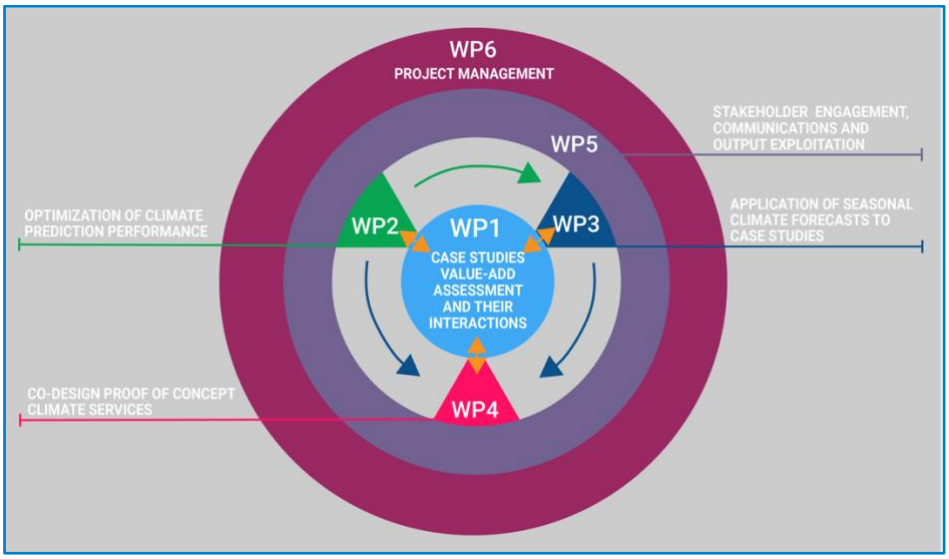
This day's objectives were communicating how SECLI-FIRM has helped advance climate services together with other EU projects, featuring the highlights, lessons learnt and outlook.

The events were delivered working with the external event product company KOGA and used the Zoom Platform as well as livestreaming each day via the YouTube and Facebook channels of consortium partners World Energy & Meteorology Council (WEMC).

2 Project overview

The Added Value of Seasonal Climate Forecasting for Integrated Risk Assessment (SECLI-FIRM) EU H2020 project ran for 45 months from February 2018 to October 2021. The project aimed to demonstrate how the use of improved climate forecasts, out to several months ahead, can add practical and economic value to decision-making processes and outcomes in both the energy and water sectors.

SECLI-FIRM was organised around six Work Packages (WP) per the following diagram which provides WP overview descriptions as well as the inter-relationships amongst them:



Project partners, collectively referred to as the 'SECLI-FIRM consortium' throughout this document, 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 The Final Conference

3.1 Registration and attendance

Name: SECLI-FIRM Final Conference

Total duration of the Conference hours: 6.5 hours

Day 1 - Oct 13, 2021	Day 2 - Oct 14, 2021	Day 3 - Oct 19, 2021
Registrations: 139	Registrations: 131	Registrations: 148
Participants: 76	Participants: 60	Participants: 61
Speakers and panellists: 7	Speakers and panellists: 10	Speakers and panellists: 18
Duration: 3 h	Duration: 3:10 h	Duration: 3:20 h
Streaming: https://www.youtube.com/watch?v=B1Cp6s3JUzY	Streaming: https://www.youtube.com/watch?v=ykXB0yw-PnY	Streaming: https://www.youtube.com/watch?v=fKtDOw0LMyU
Streaming total views as October 27th: 49 views	Streaming total views as October 27th: 35 views	Streaming total views as October 27th: 31 views

Those who registered but didn't attend will be emailed a link to the resources once uploaded on the SECLI-FIRM project website.

3.2 Conference Programme

The programmes across the three days was varied and involved speakers from the SECLI-FIRM consortium as well as several other EU projects with a focus on Climate Services. Specifically, the first two days were devoted to the showcasing of the SECLI-FIRM output.

Day 1 focused on the stakeholder engagement and value assessment framework (therefore including a discussion of co-design, co-development and co-evaluation – co-production) as well as on the multi-faceted science of seasonal climate forecasting tailored to the SECLI-FIRM case studies.

Day 2 elaborated on a few case studies to allow for a more in depth discussion of the selected case studies rather than providing little more than an overview of all case studies. To make the session more expressive and informative the case study presentations were structured around a storyline that highlighted the main development path followed during the project. For case study 6 and 7, it was shown how these paths were different but converged at several key intersections along the journey.

Following an instructive welcome address by EU project adviser Alessia Pietrosanti for SECLI-FIRM, the workshop on Day 3 provided further highlights about the SECLI-FIRM project as with the sharing of personal experiences in the contexts of the project's journey into the discovery and application of climate services for energy and water sectors. The spotlight was then on two of the trial climate services developed in the project, together with a brief overview of all trial services developed for each case study (this also complemented the presentations on Day 2). The second part of Day 3 was then dedicated to two important discussions: a panel on advancing the science of seasonal forecasting for climate services and a series of focused presentations on lessons learnt from SECLI-FIRM and other EU projects (S2S4E, CLIM2POWER and EU-MACS) around the value add of seasonal forecasts and climate services, and next steps.

The day wrapped up with a presentation on the three main exploitable outputs of the project and what has been done to ensure their successful exploitation, also as the foundation for a strong legacy, of SECLI-FIRM.

Full details and links to each presentation are provided in the following tables.

3.2.1 Day 1, 13 October – 12:00-15:00 UTC

The SECLI-FIRM framework and the science of seasonal forecasts: challenges, results and lessons learnt

Time	Program	Speaker	Presentation link
12:05	Welcome and Introduction	Alberto Troccoli (UEA)	PRESENTATION
12:25	Co-design, co-development and co-evaluation: the value of seasonal forecasts	Clare Goodess (UEA)	PRESENTATION
12:55	Introduction to scientific seasonal forecast, challenges tackled by SECLI-FIRM	Jose Vidal (UL)	PRESENTATION
13:00	The added value of statistical seasonal forecasts	Folmer Krikken (KNMI)	PRESENTATION
13:20	Extremes Assessment	Marcello Petitta (ENEA)	PRESENTATION
13:40	BREAK		
14:00	Weather Regimes/ Downscaling	Christian Viel (Météo France)	PRESENTATION
14:20	Weather Regimes	Philip Bett (Met Office)	PRESENTATION
14:40	Key Scientific Lessons Learnt including how challenges were resolved/tackled	Jose Vidal (UL)	PRESENTATION

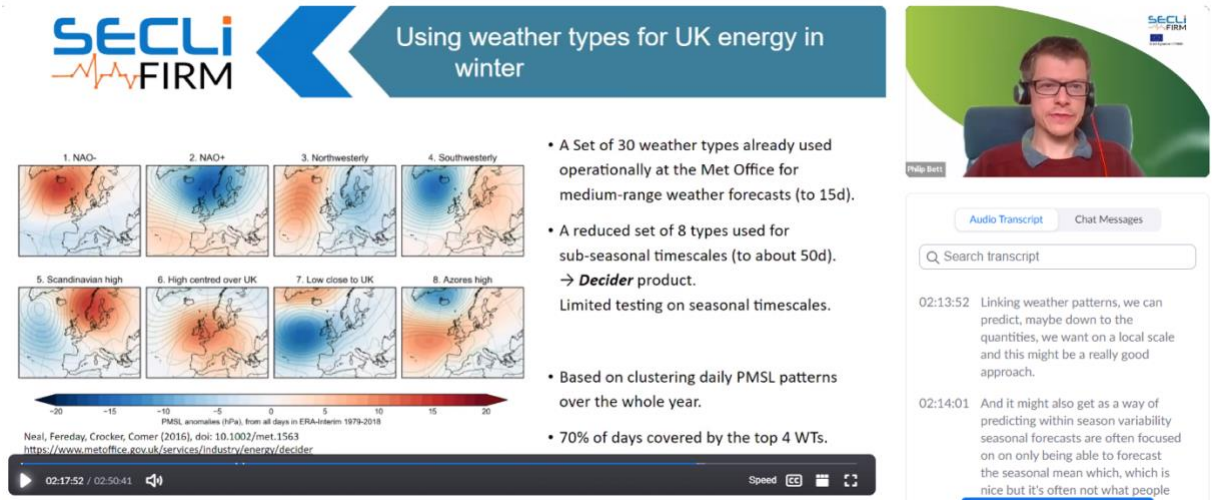


Figure 1: Snapshot from a presentation on Day 1 – Phil Bett talking about weather regimes

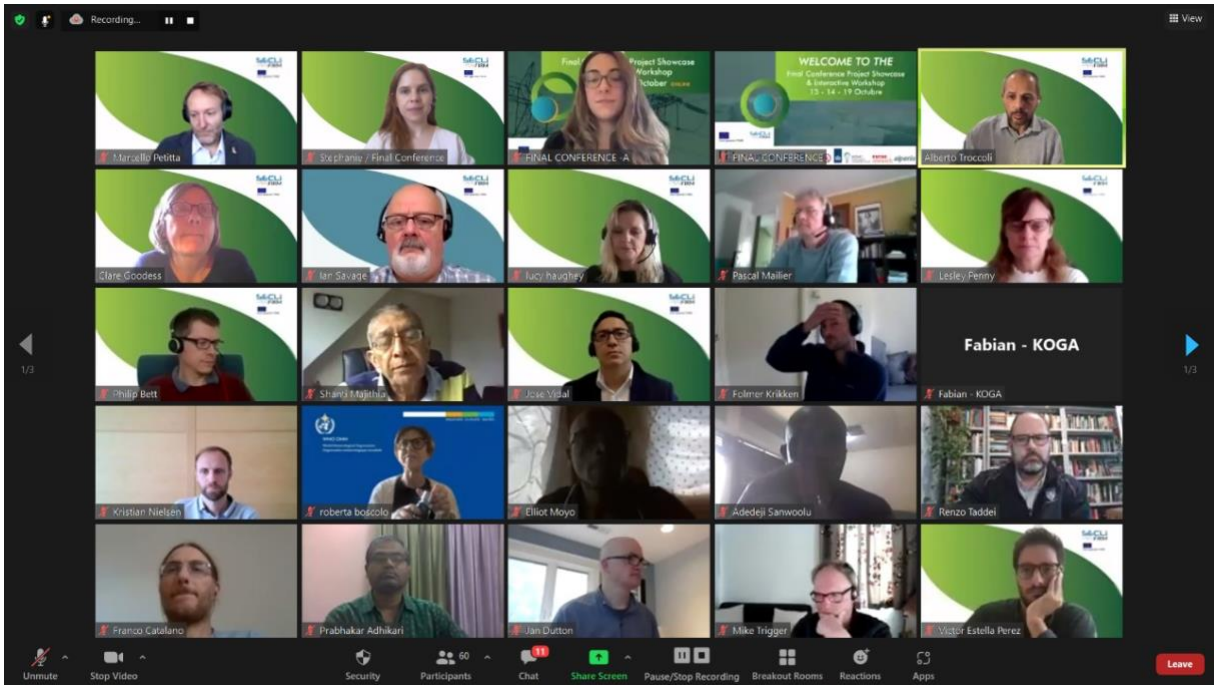


Figure 2: Group Photo Day 1

3.2.2 Day 2, 14 October – 12:00-15:00 UTC

How climate services have benefitted the energy industry: SECLI-FIRM case study challenges, results and lessons learnt

Time	Program	Speaker	Presentation link
12:05	Introduction to case studies	Alberto Troccoli (UEA)	
Case Study: Dry winters in northern Italy and energy generation			
12:10	CS Setting Scene part 1	Marco Formenton (ENEL)	PRESENTATION
12:25	Results in terms of Value add - Part 1		
12:40	CS Setting Scene part 2	Valentina Cavedon (Alperia)	PRESENTATION
12:50	Science/Key Findings	Matia Callegari (EURAC) Alice Crespi (EURAC)	PRESENTATION
13:05	Results in terms of Value add - Part 2	Valentina Cavedon (Alperia)	PRESENTATION
13:10	Trial Climate Service and Summary	Marco Formenton (ENEL)	PRESENTATION
13:20	BREAK		
Case Studies: North Sea wind and wave impact on maintenance planning and logistics Energy logistics: wind and wave conditions - General presentation-welcome			
13:35	CS Setting Scene	Ed Steele (Met Office) Jon Upton (Shell) Bojana Mihic (TenneT) Folmer Krikken (KNMI) Gertie Geertsema (KNMI)	PRESENTATION
14:00	Cs Science / Key Findings		
14:30	Cs Results in terms of Value add		
14:40	Cs Trial Climate Service		
14:50	Discussion and Wrap Up	Alberto Troccoli (UEA)	

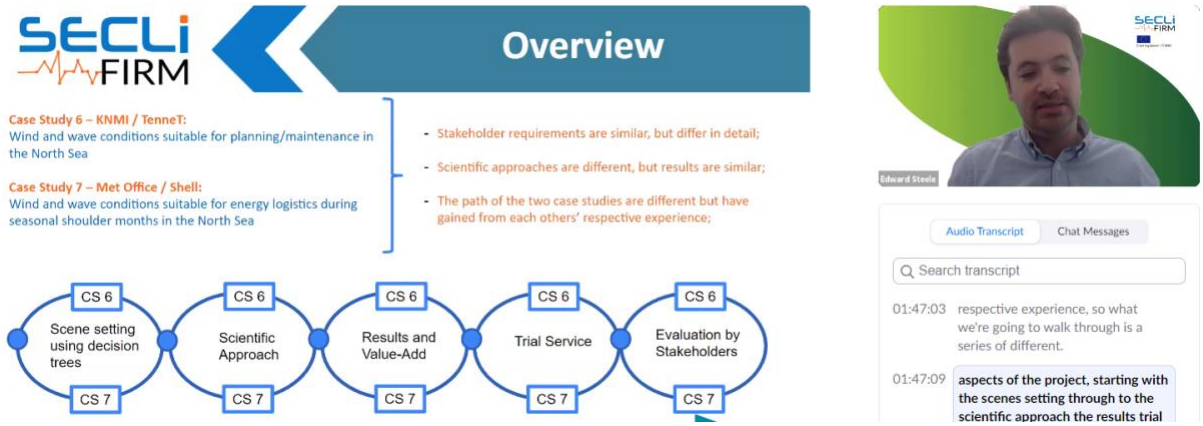


Figure 3: Snapshot from a presentation on Day 2 – Ed Steele presenting case study overview

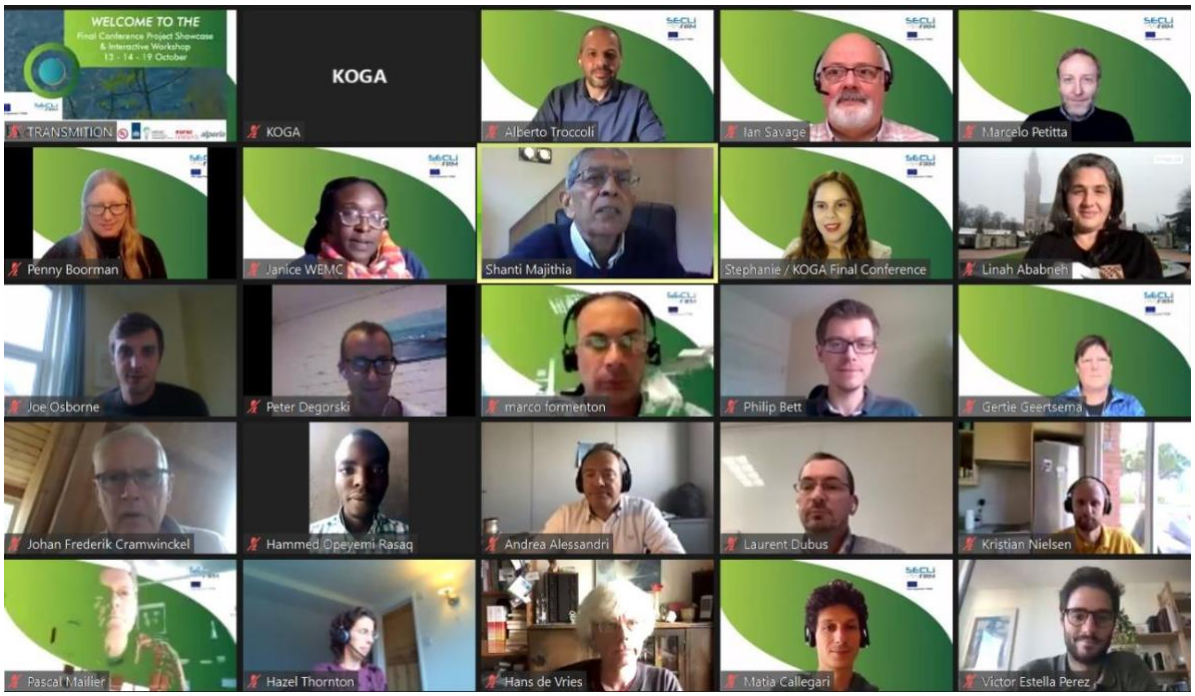


Figure 4: Group Photo Day 2

3.2.3 Day 3, 19 October –12:00-15:15 UTC

How SECLI-FIRM has helped advance climate services together with other EU projects: highlights, lessons learnt and outlook

Time	Program	Speaker	Presentation link
12:05	Introduction	Alberto Troccoli (UEA)	
12:10	Welcome Address and introduction: The journey of the project through EU eyes	Alessia Pietrosanti (CINEA)	PRESENTATION
12:20	Sharing personal experiences: The importance of climate services for energy and water sectors.	Ian Savage (Thames Water) Marco Formenton (ENEL) Marcello Petitta (ENEA) Hazel Thornton (Met Office)	See recording via link in the Table in section 3.1
	SECLI-FIRM trail climate services		
12:50	Overview	Joe Osborne (Met Office)	PRESENTATION
	SECLI-FIRM trail climate services: Teasers		
12:55	TEAL Tool: CSs 1-5	Penny Boorman (WEMC)	PRESENTATION
13:05	Water Management, Trial Climate Services (CS9)	Ian Savage (Thames Water)	PRESENTATION
13:15	Trail climate services: Closing remarks	Joe Osborne (Met Office)	
13:20	BREAK		
13:35	Panel discussion Advancing the science of seasonal forecasting for climate services Chair: Alberto Troccoli	Laurent Dubus (RTE) Anca Brookshaw (ECMWF/ Advisory Board) Pascal Mailer (Belgian Met Service/Advisory Board) Andrea Alessandri (CNR/ Advisory Board) Marco Formenton (ENEL)	See recording via link in the Table in section 3.1 and transcript in Appendix
14:10	The value add of seasonal forecasts and climate services – lessons learnt and where do we go from here Chair: Shanti Majithia (ex-National Grid)	Clare Goodess (UEA) Joe Osborne (Met Office) Albert Soret (BSC/S2S4E) Sofia Simões (LNEG/ CLIM2POWER) Adrian Perrels (FMI/EU-MACS)	PRESENTATION
14:55	Exploitation of SECLI-FIRM output	Alberto Troccoli (UEA)	PRESENTATION
15:10	**Wrap up and Farewell**		

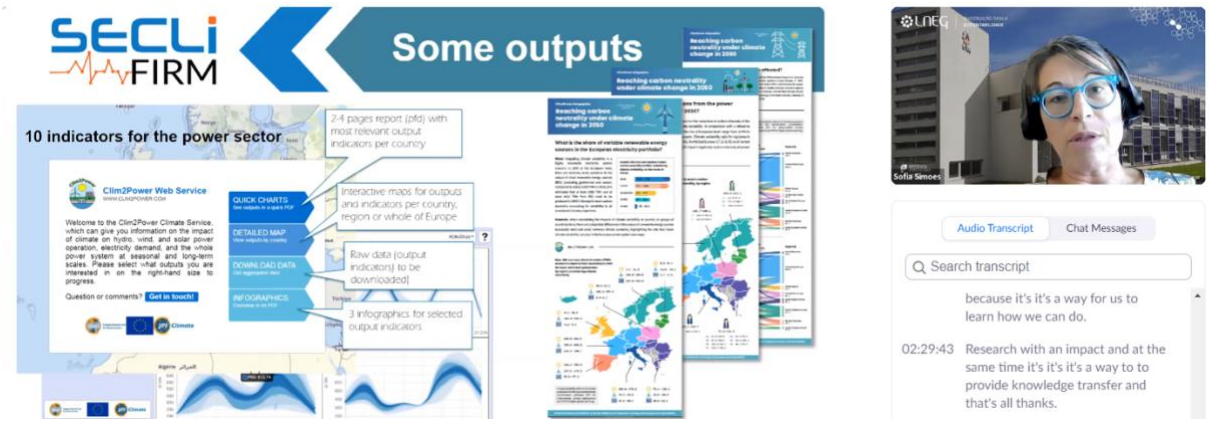


Figure 5: Snapshot from a presentation on Day 3 – Sofia Simões presenting CLIM2POWER output

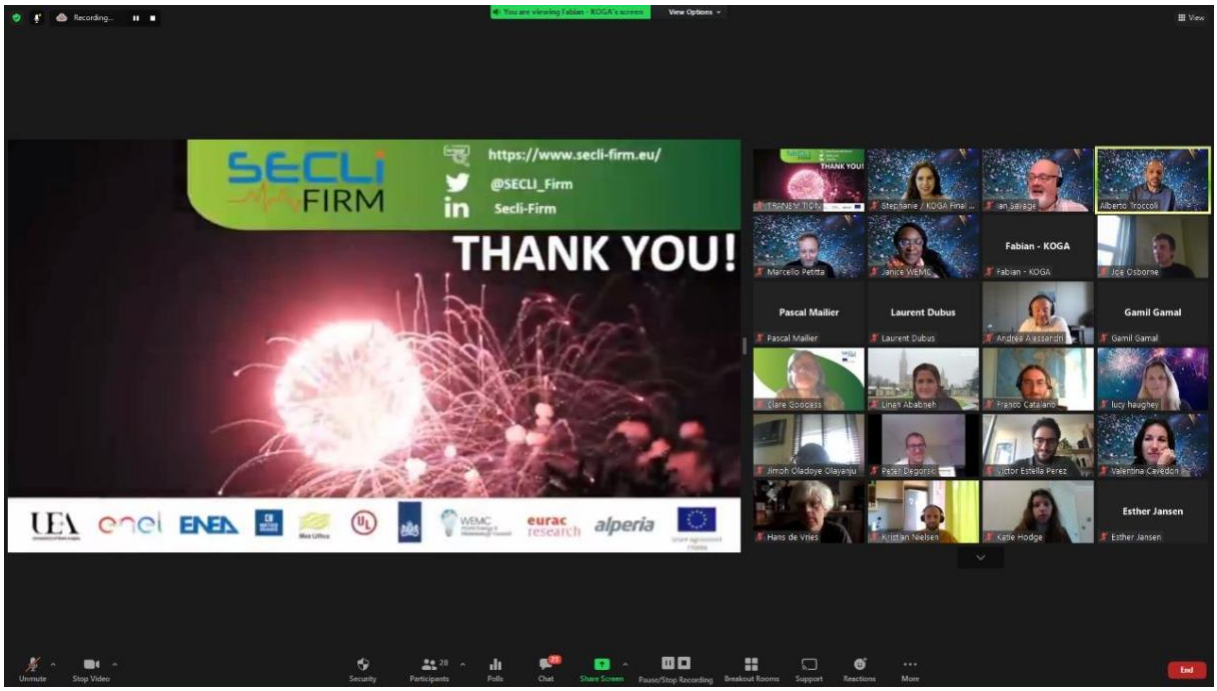


Figure 6: Final Group Photo at the end of Day 3

3.3 Communications

Along with the SECLI-FIRM Advisory Board, which includes industry experts and stakeholders, the three-day final conference was promoted to the scientific and climate services communities, organisations and individuals working in the water and energy sectors and further afield. Subscribers to our project newsletters were targeted and consortium members and presenters encouraged to share our promotions on social media channels. We have 360 followers of the SECLI-FIRM Twitter account. Direct invitations were shared with the FOCUS-Africa consortium, 90+ individuals, and H2020 projects were direct messaged in twitter to raise awareness. The IISD's Community Lists, hosted by Google Groups, were also used to promote the conference to energy, climate and water sector audiences.

Topic	SECLI-FIRM Final Conference - Project Showcase and Interactive Workshop
Description	A three-day programme offering opportunities for the scientific and climate services communities, organisations and individuals working in the water and energy sectors, and further afield, to benefit from the four-year story of the EU H2020 SECLI-FIRM project: challenges, results, lessons learnt and outlook. Day 1, 13 October,– 12:00-15:00 UTC The SECLI-FIRM framework and the science of seasonal forecasts: challenges, results and lessons learnt Day 2, 14 October – 12:00-15:00 UTC How climate services have benefitted the energy industry: SECLI-FIRM case study challenges, results and lessons learnt Day 3, 19 October –12:00-15:15 UTC How SECLI-FIRM has helped advance climate services together with other EU projects: highlights, lessons learnt and outlook

Figure 7 – Final Conference three-day summary on registration page

The emphasis, particularly on Day 3, was the involvement of external speakers from across EU Projects related to Climate Services, whose networks would have also benefited from attendance to the conference. Social media posts particularly through retweets were shared to their audiences (Figure 8).

Figure 8 – Example of retweet from accounts of S2S4E to promote the presence of one of our guest speakers, the coordinator of the S2S4E project, acting as multipliers of the opportunity to participate at the SECLI-FIRM Final Conference

Our project newsletter subscriber numbers have almost doubled since September 2020, due to the series of free project webinars as well as sign-ups collected from our recent Summer School applicants. Through this channel we were able to reach over 539 potential participants from across our target industries, from the climate services and scientific communities and academia for our Final Conference. We produced three email campaigns, one promoting all three days and then two more, with first, a focus on the Day 1 scientific programme and then a campaign promoting Day 3 opportunities. Each achieved high click through and open rates (Figure 9).

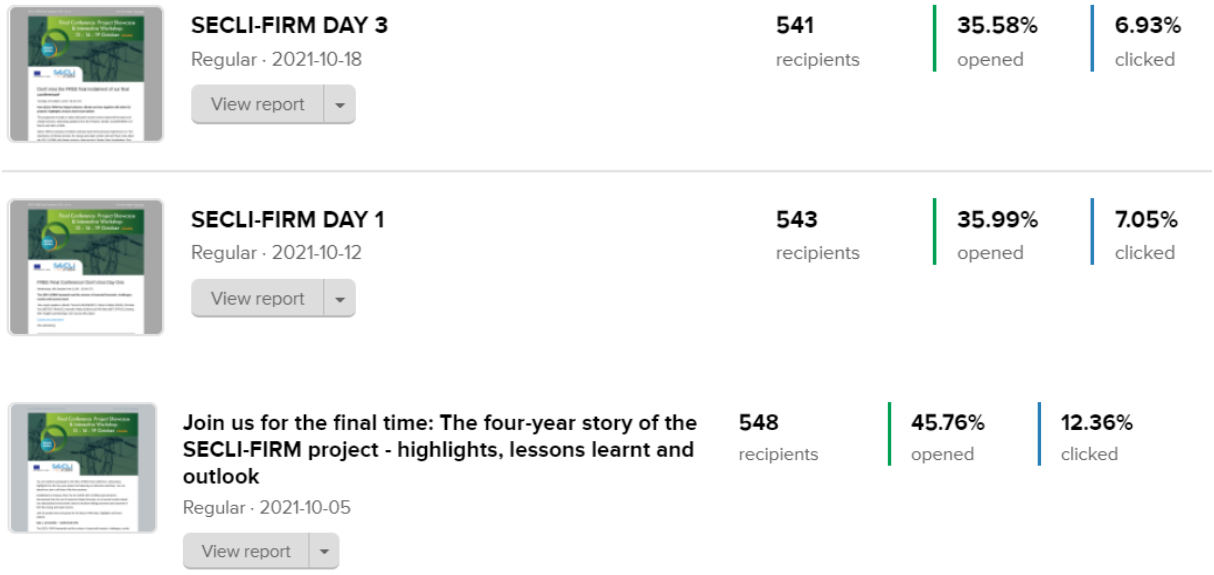


Figure 9 – Analytics from email campaign promoting the Final Conference and sent to all SECLI-FIRM newsletter subscribers

We also promoted the Workshop on the UEA Environmental bulletin that goes to staff and students, particularly as the conference featured UEA Presenters.

All communications were SECLI-FIRM branded, in line with the project brand guidelines and designed for multi-channel distribution. Examples of the visual communications produced for the Final Conference are shown below, including visuals used on social media and a Zoom background for our speakers on the day.

We also used YouTube and Facebook WEMC platforms to livestream the events each day. We waited to promote this only on the day of each session (Figure 14) as we were keen to get participants registered for the Zoom sessions in the first place, where possible. This is because adding the livestream option would have potentially reduced the attendance numbers on Zoom. Either way, we have noticed a few tens of views on YouTube in the days following the event of people who either missed the event or watched it again.

Figure 10 – Final Conference Day 1: Online visual promotional material

Figure 11 – WEMC Facebook page, a Consortium partner, was used to promote the Final Conference and to host live streams of each day

Figure 12 – LinkedIn promotion to our SECLI-FIRM project followers 160 followers

Figure 13 – Zoom background designed for and used by SECLI-FIRM presenters during the Final Conference

Figure 14 – Example of on the day social media promotion of livestreaming of the Final Conference

In addition, KOGA provided a communication plan designed as a road map to convey to the target audience for the workshop and to share key messages about its content, how to access it and possible outcomes on different social media, including format requirements, key message for art works, key messages and access links (Figure 15).

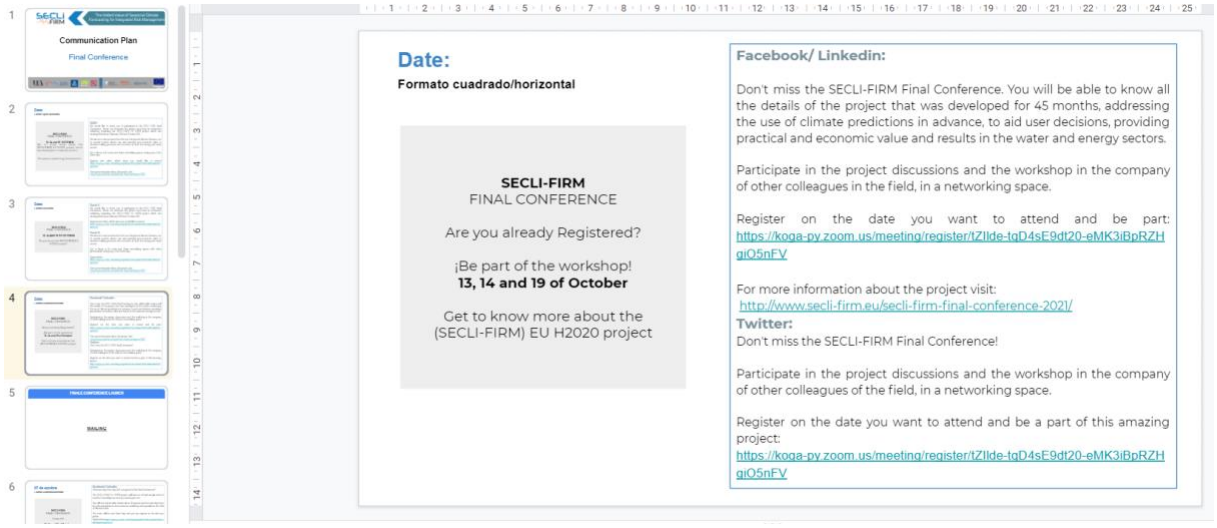


Figure 15 – Communication plan for social media

Communication plan link: http://www.wemcouncil.org/Projects/SECLI-FIRM/SECLI-FIRM_FinalConference_Communication_Plan_Oct2021.pdf

3.4 Additional Promotional Materials

In addition to the communications efforts, KOGA also produced a proposal for an email campaign for Stakeholders and other interested parties, the visuals to programme the livestreaming on the WEMC YouTube channel (Figure 16) and an animation loop for the conference (Figure 17).

Figure 16 – Programmed Live Streaming

Figure 17 – Final conference general animation (click to download)

4 Next Steps

All resources and bite-size videos of the Final Conference sessions will be edited and shared via our project website. The videos will include subtitles to ensure they are as accessible as possible. A summary video of the three-days, of about 1:30m in duration, is also being produced to share the highlights of the Final Conference. Moreover, the recommendations that emerged from the panel discussion (see Appendix 2) will be shared with relevant EU officers to assist them with the shaping of future climate services call for proposals.

The final day of the conference enabled also a celebratory moment for the Consortium Team (see Figure 6) with an opportunity for thanks to be given to members of the Consortium, including the project manager, and to the organisers of the Conference.

Appendix 1 – Final Conference Participants

Participants Day 1

List of People who attended the First Day of the Conference:

Participants Day 1			
Lamine Boulkelia	Ed Steele	Fatkhuroyan	Ronan McAdam
Marta Vinocur	Eduardo Penabad Ramos	Nur Azizah Affandy	Godfrey Juma
Alberto Troccoli	Janice Ogonji	Afsane Moeeni	Lucy Mtilatila
Jose Vidal	Jon Upton	Karen Stocker	Krisna BUCHA
Pascal Mailier	Katie Hodge	Andrea Alessandri	Vimal Mungul
Esther Verena Jansen	Lucy Haughey	Antonio Maria Nicolosi	Arlindo Meque
Renzo Taddei	Mathias Venning	Francesco Ciliberti	Folmer Krikken
Adaman YODA	Mike Trigger	Franco Catalano	Gertie Geertsema
Zvonimir Škarić	nicolas fournier	Marcello Petitta	Johan Frederik Cramwinckel
Kristian Nielsen	Philip Bett	M'koumfida Bagbohouna	Kabengela Hubert
Gamil Gamal	Shanti Majithia	Matia Callegari	Mduduzi Sunshine Gamedze
Bastien Cozian	Elvis Zornic	Andrea Ferreira	Pierre Honore KAMSU TAMO
Christian Viel	Gan Zhang	Cesar Herrera	Adedeji Sanwoolu
Paola Marson	Jan Dutton	Asmerom Beraki	Ajibola Zannu
Ana Marques Leandro	Roberta Boscolo	Elliot Moyo	Hammed Opeyemi Rasaq
Prabhakar Adhikari	Tumaini Laban	Tlakale Mogebisa	Marcello Petitta
Hazel Thornton	Sarah Osima	Victor Estella Perez	Anca Brookshaw
Beatriz Contreras	Penny Boorman	Lesley Penny	Hannah Brown
Clare Goodess	Steve Dorling	Nathalie Doucy	Ian Savage

Table 1: Participants' list Day 1

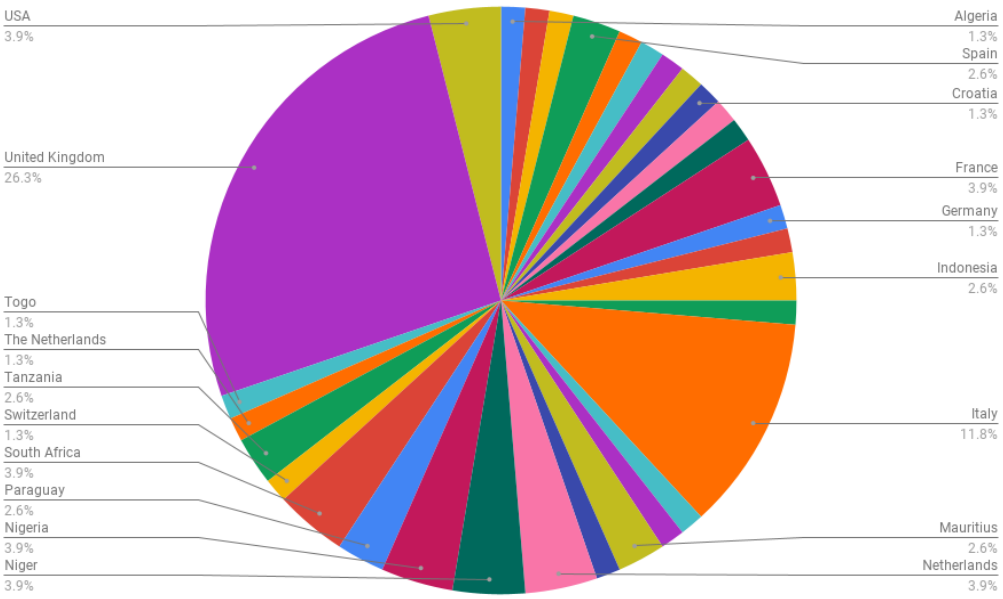


Chart 1: Day 1 - Participants' countries

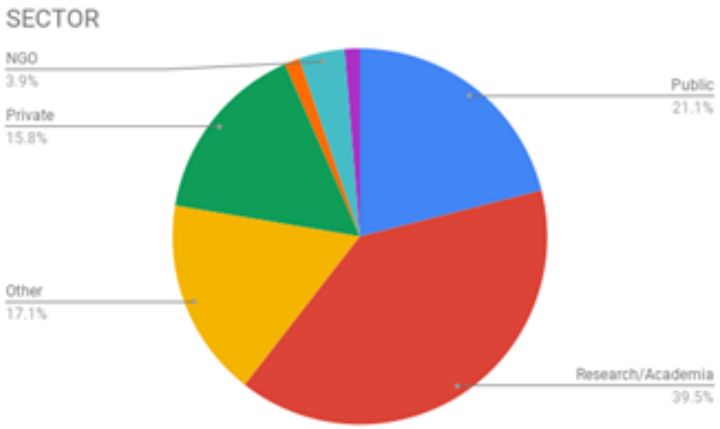


Chart 2: Day 1 - Participants' sectors

Over half of the participants of Day 1 came from only two sectors: Research/Academia and Public Sector. The Research/Academia was the major one, with a total of 39,5%, which is followed by a strong 21,1% from the Public Sector. As can also be discovered by looking at the next two days, NGOs had a stronger presence towards the last two days of the conference.

Participants Day 2

List of People who attended the second Day of the Conference:

Participants Day 2			
Mattia Callegari	Pascal Mailier	Fatkhuroyan Fatkhuroyan	Janice Ogonji
Kabengela Hubert	Victor Estella Perez	Peter Degorski	KOGA (Agathe Dauvergne)
Cesar Herrera	Gertie Geertsema	Fatkhuroyan	Marco Formenton
Nicola Stewart	Christian Viel	Morteza Pakdaman	Godfrey Juma
Kristine Skarsvåg	Jose Vidal	Ed Steele	Hannah Brown
Alberto Troccoli	Shanti Majithia	Adedeji Sanwoolu	Ronan McAdam
Vero Ibarra	Pierre Honore KAMSU TAMO	Sarah Osima	Alice Crespi
Koga (Vero Ibarra)	Anca Brookshaw	Arlindo Meque	Stephanie Dragotto
Folmer Krikken	Kristine Skarsvåg	Chukwuemeka Diji	Kristian Nielsen
Esther Jansen	Andrea Alessandri	Gan Zhang	Katie Hodge
Lucy Haughey	Franco Catalano	Elvis Zornic	Clare Goodess
Lesley Penny	Tlakale Mogebisa	Agathe Dauvergne	Hammed Opeyemi Rasaq
Valentina Cavedon	Eduardo Penabad Ramos	Ana Marques Leandro	Aniruddha Ganguly
Mduduzi Sunshine Gamedze	Jan Dutton	Oluwanifemi Esan	Steve Dorling
Zvonimir Škarić	Jimoh Oladoye Olayanju	Edward Steele	Nicolas Fournier
Ajibola Zannu	Antonio Maria Nicolosi	Mathias Venning	Jon Upton

Table 2: Participants' list Day 2

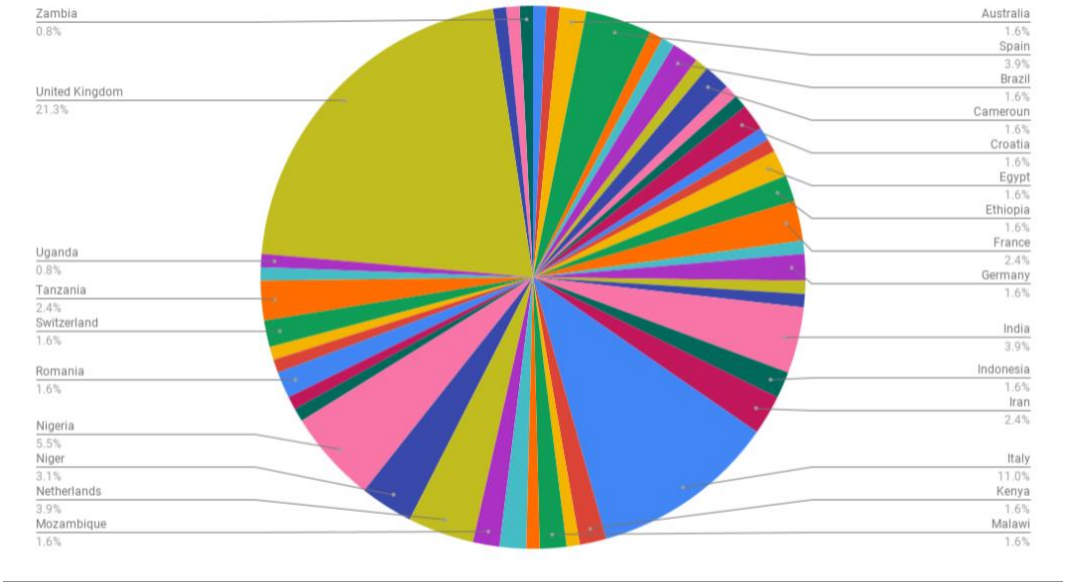


Chart 3: Day 2 - Participants' countries

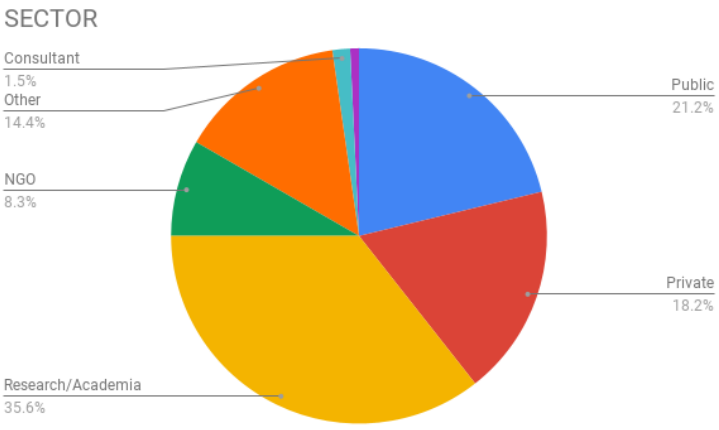


Chart 4: Day 2 - Participants' sectors

Participation on day 2 was more equally distributed amongst the Public and Private Sector, being at 21,2% and 18,2% each. Research/Academia is still the number one sector represented with a lead at 35,6%.

Participants Day 3

List of People who attended the third Day of the Conference:

Participants Day 3			
Elvis Zornic	Penny Boorman	Matia Callegari	Hans de Vries
Lamine Boulkelia	Victor Estella Perez	Anca Brookshaw	Alessia Pietrosanti
Fabian - KOGA (KOGA)	Hammed Opeyemi Rasaq	Pascal Mailier	Abiodun Adedewe
Cesar Herrera	Jannes van Ingen	Andrea Alessandri	Dr. Adama Gassama-Jallow
Jose Vidal	Gertie Geertsema	Sofia Simoes	Marcelo Petitta
Esther Jansen	Franco Catalano	Hannah Brown	Zvonimir Škarić
Stephanie Dragotto / KOGA Final Conference (KOGA)	Katie Hodge	Pierre Honore KAMSU TAMO	Johan Frederik Cramwinckel
Andrea - KOGA (KOGA)	Antonio Maria Nicolosi	Ronan McAdam	Marcello Petitta
Jimoh Oladoye Olayanju	Joe Osborne	Peter Degorski	Valentina Cavedon
Janice Ogonji	Ibrahim SIDIBE	Marco Formenton	linah ababneh
Lucy Haughey	Ana Marques Leandro	Nur Azizah Affandy	Shanti Majithia
Janice WEMC	Eduardo Penabad Ramos	Dosse SOSSOUGA	Kristian Nielsen
Ian Savage	Gamil Gamal	Albert Soret	Clare Goodess
Hazel Thornton	Leo Kiernan	Laurent Dubus	Jon Upton
Alberto Troccoli	Ajibola Zannu	Kabengela Hubert	Tlakale Mogebisa
Alessandro Dell'aquila	Stephanie / KOGA	Philip Bett	Adriaan Perrels
Noel Banda	Gan Zhang		

Table 3 – Participants' list Day 3

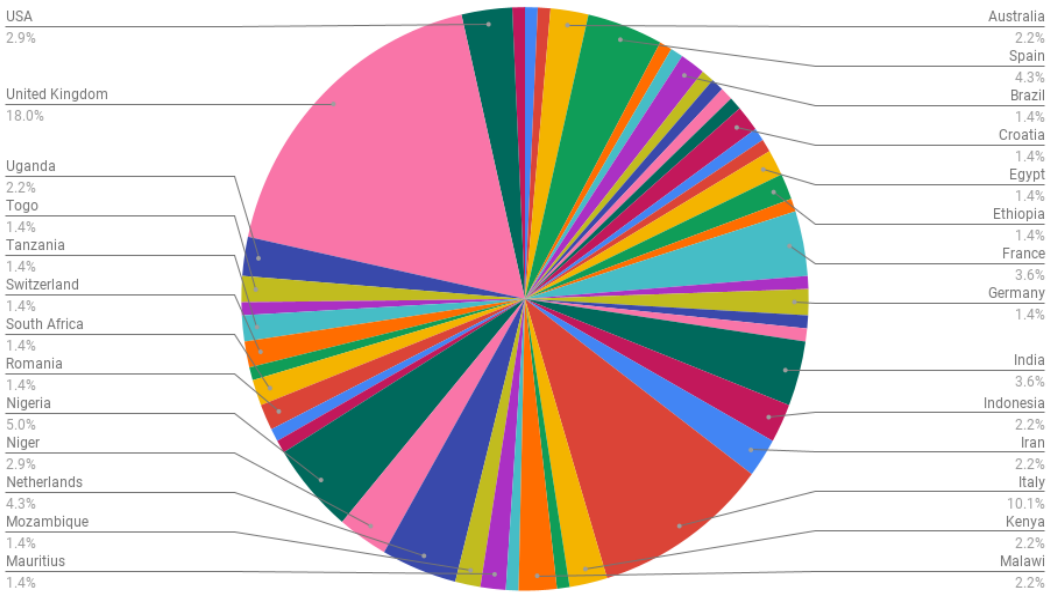


Chart 5: Day 3 - Participants' countries

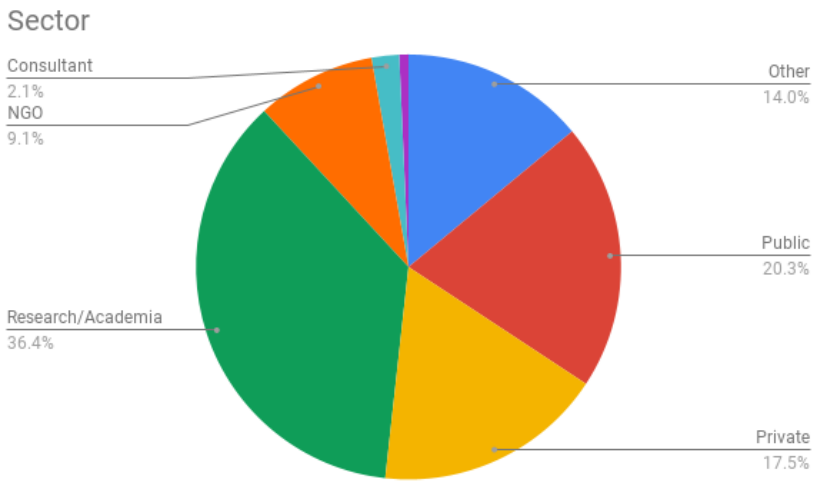


Chart 6: Day 3 - Participants' sectors

The most stable sector seems to be the Public one, which along all three days, made up about 20% of our participants. The Research/Academia Sector made up a little over ⅓ of all participants, with a low of 35% (day 2) and the highest percentage of all with 39% (day 1). We can also notice that this last day attracted more Consultants than the first two.

Appendix 2 – Panel Discussion: Advancing the science of seasonal forecasting for climate service

Panel session held on Day 3 of the SECLI-FIRM Final Conference[2]

Tuesday, 19 October 2021, 13:35-14:10

Facilitator: Alberto Troccoli

Panellists:

- Anca Brookshaw (head of Seasonal Forecast at C3S, ECMWF, also AB member)
- Pascal Mailier (Senior Scientist, Belgian Royal Met Service, also AB member)
- Andrea Alessandri (Senior Researcher, CNR, also AB member)
- Marco Formenton (Senior Meteorologist, ENEL)
- Laurent Dubus (Lead Scientist on Weather and Climate, RTE)

Summary of Panel Discussion

Each panellist was asked to address the same two questions.

Questions 1: What can forecast producers do to help climate service providers and users?

Anca Brookshaw

- The science still needs to deliver more
- We need to improve the physical models; this improvement can come by running models at a higher resolution; we can see for instance that important physical processes are not simulated sufficiently well
- Running larger ensembles could compensate for some of the limitations and inadequacies of the current models
- Larger ensembles also provide a larger data sample to perform better post-processing, such as correcting for output errors
- Scientists could and should improve the modelling of the impacts on a phenomenological basis
- There is still a big gap in impact modelling regarding trying to devise transfer functions between meteorologists and impacts which capitalise on info which can be delivered by long range predictions

[2] See recording via link in the Table in section 3.1

Andrea Alessandri

- It's very important for seasonal forecast providers to talk with users and to learn about their needs
- Teach users what they can better ask from seasonal predictions
- Use of impact models – to reinforce what Anca said, these are very important as they consider what users' needs are and what seasonal forecasters can provide
- The use of impact models provides a set of people (the impact modellers) with skills which can help mediate between seasonal forecaster and users

Pascal Mailier

- What SECLI-FIRM has demonstrated is the relevance for radical change in the articulation of knowledge from simplifying thinking to connecting thinking
- SECLI-FIRM has nicely tackled the complexity in the relationship between producer and user
- This means that producers need a kind of double movement:
    - Physical first - Producers need to get out of their silos and get closer to users
    - Psychological second – Producers need to understand the needs and requirements of users
- We're shaped in our capacities and limitations by the processes we create, so appropriate feedback mechanisms along the supply chain are crucial
- We need to include training in various academic programs, not just under environmental sciences, but also e.g. engineering, to prepare expert 'translators', people who understand and speak the language of both forecasters and users

Marco Formenton

- From the point of view of users, the first is to improve the knowledge and ability to deal with complex products such as seasonal forecast
- Make it easy to access to the seasonal forecasts e.g. Copernicus data, but sometimes you still need to use Python scripts, so you need some knowledge
- The data needs to be available for someone with little knowledge and experience where in a few clicks they can assess the data, make correlations between teleconnection indices etc.

Laurent Dubus

- Climate service providers still need to teach users but also need to learn from users
- Gaps that exist are from the fact that the way users use data is not understood by producers/providers e.g. in the energy sector, when we want to use seasonal outlooks, these need to have the same temporal resolution as those used by the energy models for energy markets, which typically is 1 hour. And while these data (at 1 hour resolution)

are not available from the producers, as considered scientifically useless, in practice there should be an effort to produce these data.

- There can be bias because of misunderstanding
- SECLI-FIRM has done a great job in considerably improving these provider-user interactions via the case studies, but we still need to do more work to bridge the gap between producers, providers and users.
- It is also important to reduce, and eventually remove, the separation amongst time scales (like from medium-range, to sub-seasonal, to seasonal forecasts) because from the user perspective such separation is not helpful

Alberto Troccoli

- On this last point, in SECLI-FIRM we started talking about seasonal forecasts and then we found out that actually what users were looking for in some cases was a shorter range, and so we stepped back a bit because there is no point in pushing the boundaries, and insist on using seasonal forecasts, when you lose attention of the users; it is critical to take the users with you

Question 2: Where should the seasonal forecasting modelling community put its future efforts – where to prioritise?

Alberto Troccoli: In other words, if you had to write a proposal or even start a project tomorrow, what should we work on in terms of improving a seasonal forecasting model?

Pascal Mailier

- We need to be working on methods that will squeeze all the juice from the forecast, reminding ourselves that even if there is limited skill in mid latitudes in seasonal forecasts, the same sometimes happens for shorter range forecasts; and so we have to learn to live with that
- Having said that, one possible direction of research for further development, is to look at refining methods in order to identify windows of opportunity
- SECLI-FIRM has researched the connections and combinations of statistical and dynamical models, maybe we can do work to further tease out some information on predictability in some situations.
- We could also work more on methods to identify trends and connections between successive climate forecast.

Laurent Dubus:

- In addition to improving the performance in the model, we should really go a step forward, especially in the quantification of the model performance

- So, from the meteorological and climate point of view, we use scores like deterministic scores or Brier skill score but in practice, if you want to demonstrate the performance of the model for specific applications, we need to evaluate the performance of the models from a user's perspective and compare with their own current practice (whatever that is)
- This is crucial because the translation of the climate information into business information is not symmetrical. For instance, winter forecasts are more critical and so we do not need the same quality of forecasts for all seasons.

Alberto Troccoli: This is basically the approach we adopted with SECLI-FIRM and the case studies whereby we compared the use of seasonal forecasts to the users' baseline, who would typically be using climatology

Anca Brookshaw

- It is important to remark that seasonal forecasts are typically produced by extending models used for adjacent areas such as weather forecasts or climate projections, so there is no specific seasonal forecast model development
- Where efforts should be now, is in extracting the information we have from our models
- It is also important to see what has been achieved; SECLI-FIRM has done several things well:
    - Approaching the problem from the user perspective
    - Starting from the user perspective in the case studies has helped bring in seasonal forecasts by also extending the timescales from medium-range
    - Tailoring the outputs to the user question and engagement for climate service
- Skill doesn't mean much in the real world. The forecast is either usable or not.
- Need to improve metrics so can answer questions regarding specific events
- Reliability of models is important
- It is crucial to provide tools to use data – technicality of using data is immense and therefore we really need to simplify how data are accessed, evaluated, provided and visualised; this includes the assessment of the best multi-model combination

Andrea Alessandri

- What modelling communities could do to avoid after initialisation model drift is to:
    - use latest observation data, including the latest generation from e.g. satellite, to avoid having the problem that model errors overcome the signal from the initial conditions too quickly
    - need better parametrization of land surface processes to improve prediction over land, given these are the areas we are mostly concerned about in terms of usable predictions

Marco Formenton:

- End users spend a great deal of effort on the post processing, so there is a strong need for simplified approaches to access, visualise and evaluate data
- Need more effort on education so users understand better what they can expect from this technology
- A lot more effort should be devoted to improving the science, the physics of the models
- Improve initial data and observation data
- There should be a stronger message from users to raise these points to the scientific community and funding agencies

Anca Brookshaw:

I would like to make a recommendation to funding agencies:

- The crystallization of the focus of the research funding and the services funding ought to be better than what is done at present; there needs to be complementarity between producers, providers and users, we need to work together rather than everybody asks from their own perspective; this is for instance why we don't get enough focus on the work on developing models, on improving initialization methods, etc.
- In other words, the research agenda is not sufficiently well focused, this is why it is critical to make a strong recommendation to advance the science, and increase the focus on developing the forecast technology and the methodology of how to use it.

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

For more information visit

www.secli-firm.eu

or contact the SECLI-FIRM team at

info@secli-firm.eu

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