

# Space for Hydro Energy Sector Snow Water Equivalent and snow cover

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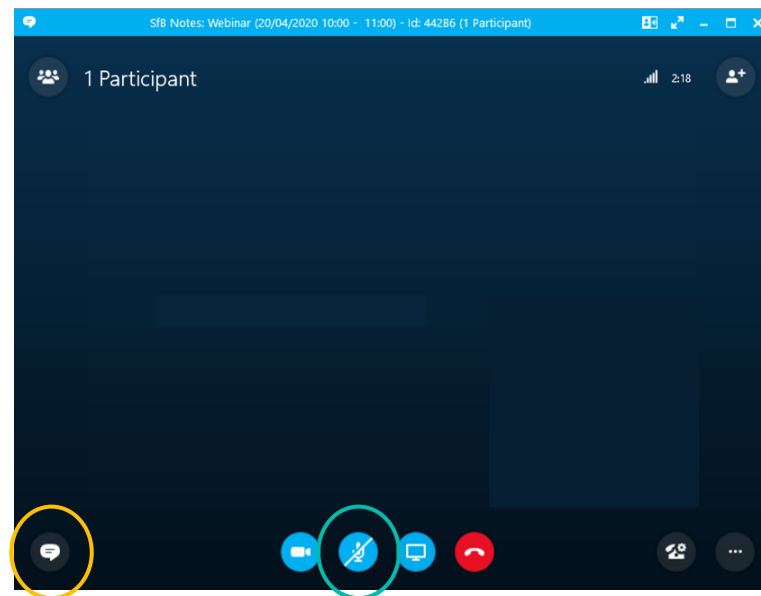
Davide Coppola



## WELCOME TO THE WEBINAR!

### Before we start...

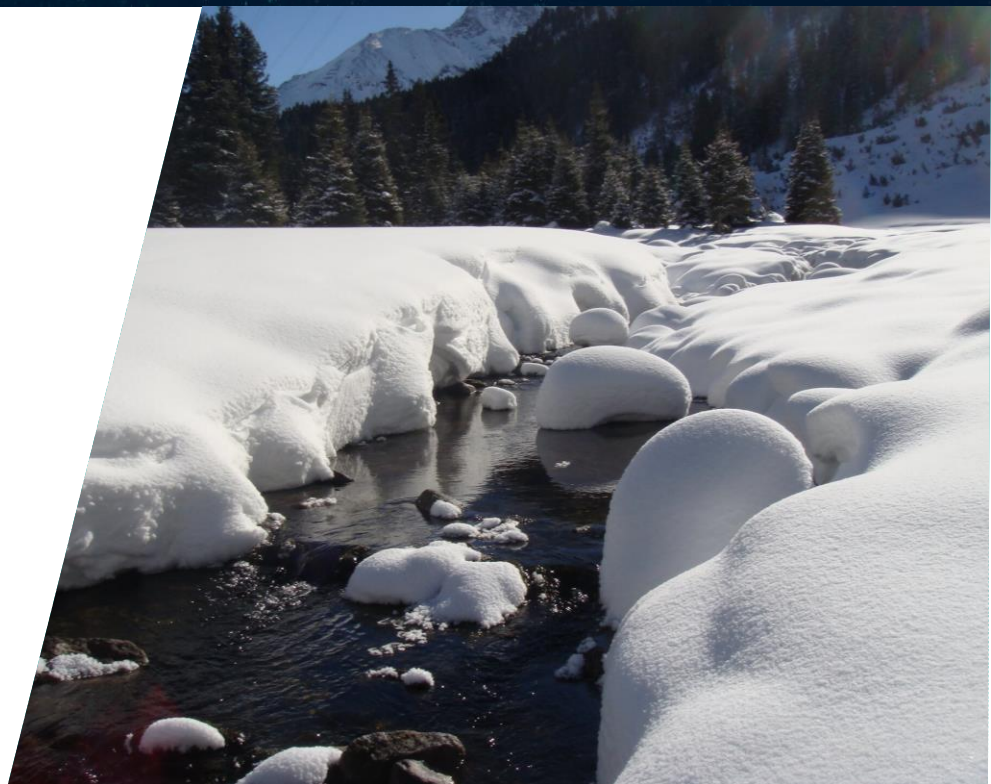
- Due to the number of attendees, please **keep your microphones muted** at all times and switch off the webcam function
- You can use the **conversation function** anytime to submit your questions. They will be addressed during the Q&A at the end of the webinar





## AGENDA

- ESA introduction
- “Space for Hydro Energy Sector: Snow Water Equivalent and snow cover” Announcement of Opportunity
  - Objectives
  - Areas of interest
  - Value of Space
- Guest speakers
  - Marco Favarato – Enel
  - Elvira Musicò – Enel
- Open Questions & Answers session







## THE EUROPEAN SPACE AGENCY

### Purpose of ESA

To provide for and promote, for exclusively peaceful purposes, cooperation among European states in space research and technology and their space applications.

### Facts and figures

- Over 50 years of experience
- 22 Member States
- 8 sites across Europe and a spaceport in French Guiana
- Over 80 satellites designed, tested and operated in flight



space transportation



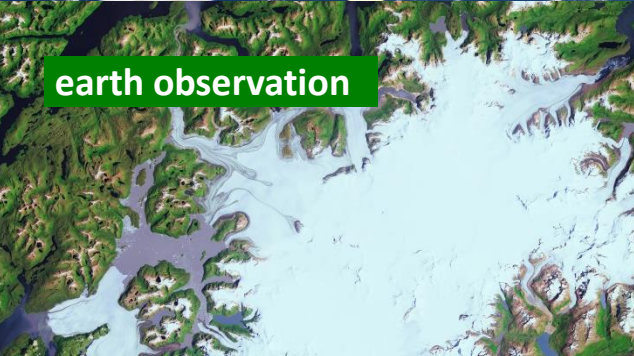
science



human spaceflight



earth observation



telecommunications  
and applications



navigation



exploration



operations



technology







## WHAT ESA OFFERS



Zero-Equity  
Funding  
(€60k-€3M+)



Tailored Project  
Management  
Support



Access to  
Our Network  
& Partners



Use of the  
ESA Brand for  
Credibility





# ESA-ENEL PARTNERSHIP

16 December 2019

## Enel and the European Space Agency together to foster space applications in energy




**Rome, December 16<sup>th</sup>, 2019** – Enel and the European Space Agency (ESA) are cooperating to promote the development of space-applications in support of energy security as well as economic and environmental sustainability. Through this cooperation, in the first half of 2020, Enel and ESA will be launching a joint initiative related to circular economy and aimed at fostering the development of innovative services combining space data and other technology to monitor public lighting, building efficiency and traffic flows, seeking to improve mobility and environmental sustainability in cities.

The cooperation was announced during today's "Space for Innovation Impact" event, promoted by ESA, and held at the premises of ASI, the Italian Space Agency.



Elena Razzano



**SPACE FOR HYDRO ENERGY SECTOR**  
**SNOW WATER EQUIVALENT AND SNOW COVER**  
**Planned ESA's co-funded announcement of opportunity**





## SPACE FOR HYDRO ENERGY SECTOR

ESA Space Solutions is planning on issuing an Announcement of Opportunity for feasibility studies to investigate the **technical feasibility (including a mock-up)** and **economic viability** of space based applications to support nowcasting and forecasting of hydroelectric power generation, and define a roadmap for services implementation and demonstration.

- Announcement of Opportunity planned to be issued on the **30 June 2021**
- ESA will bear up to 50% (up to 80% for SMEs) of the acceptable cost of the activity, up to a max estimated cost of €120,000

<https://business.esa.int/funding/intended-tender/space-for-hydro-energy-sector>



ESA UNCLASSIFIED





## ESA TENDERING PROCESS

The tendering process follows a two steps approach:

- The first step requires the submission of a (light) **Outline Proposal**
- The Tenderers whose Outline Proposal is positively evaluated, will be invited to prepare a **Full Proposal**





## OBJECTIVES

- Demonstrate **technical feasibility** of the proposed services, and establish a **mock-up / prototype**
- Assess the **economic, societal and environmental benefits** of the proposed services
- Define **business plan and models** for service operations
- Define a **roadmap** for services **implementation and demonstration** (potentially through a follow-up ESA co-funded demonstration project)
- Secure support from **users and potential customers** for potential follow-on and commercial stage





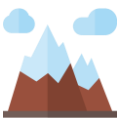
## USE CASES



A tool to produce an estimation of the snow water equivalent and snow cover



A combination of satellite data, weather forecast modelling and in situ data



Geographic coverage and pilot areas selected by the customer.  
It is anticipated that the Enel geographical area will contain the Alpine region.







## VALUE OF SPACE



### Satellite Navigation

*Geo-referencing sensor data  
GNSS-R instrument*



### Satellite Communications

*M2M / IoT communication  
Drone Remote control*



### Earth Observation

*Deriving snow cover area  
Monitoring changes in water resources*





# Space for Hydro Energy Sector - ENEL



Marco Favarato

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Elvira Musicò

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# Enel business

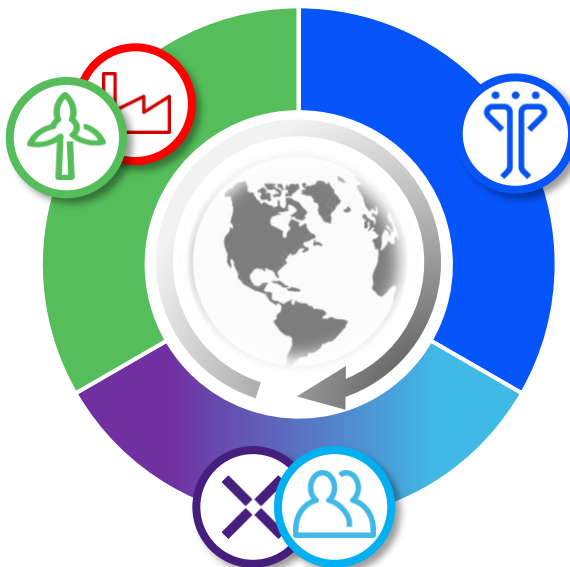


## Global Power Generation

**Accelerates** a sustainable energy transition, increasing **renewables** capacity growth and **decarbonizing** our fleet

## Enel X

**Enables** the energy transition boosting electrification and decarbonization of customers, by providing **innovative services** and **system flexibility**



## Global Infrastructure & Networks

**Guarantees** reliability and quality of service in the energy supply, through **efficient**, **resilient** and **digital** networks

## Global Energy & Commodity Management

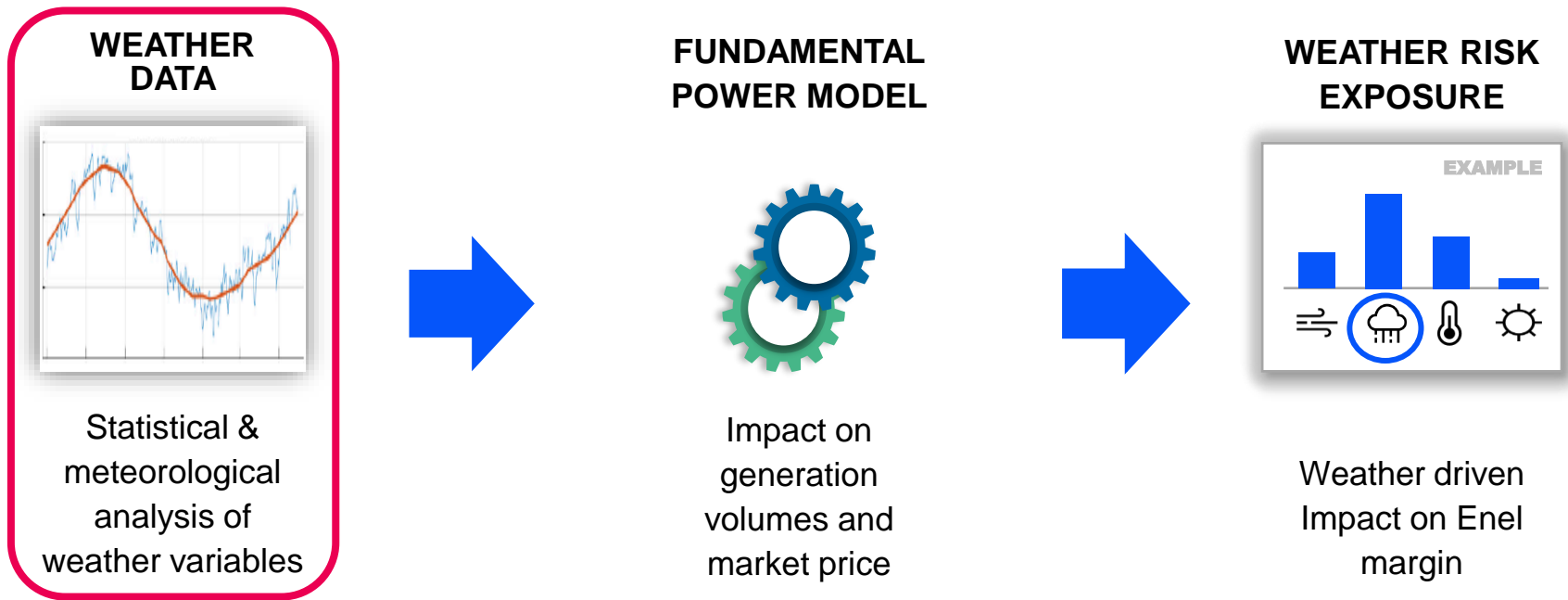
**Optimizes** the Group margin as a single portfolio, finding its **best balance**

## Retail

**Increases** customer value through commodities and “beyond commodities” services also thanks to **customer satisfaction and experience** improvement

# Weather Risk Management

- Risk exposure modelling structure

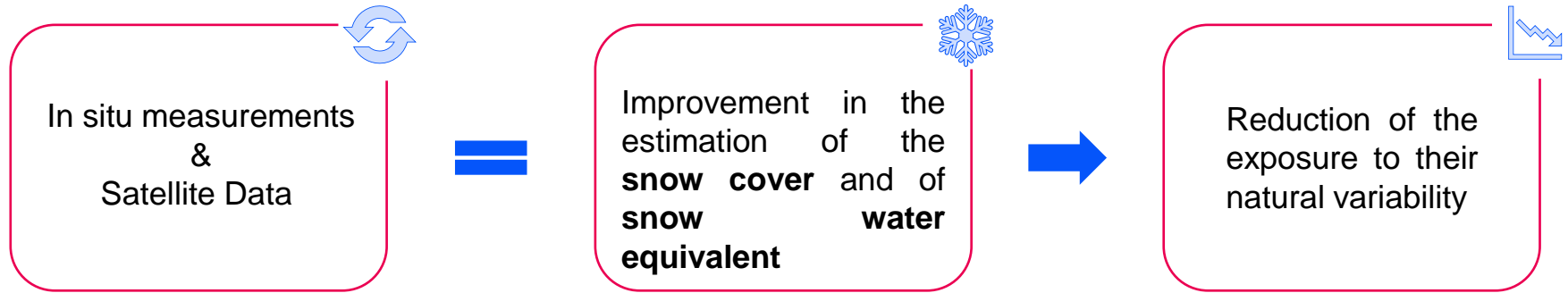


*It is important to know not only the rain, but also the water contained within the snowpack (Snow Water Equivalent)*



# Combining different types of measurement

- Exposure reduction



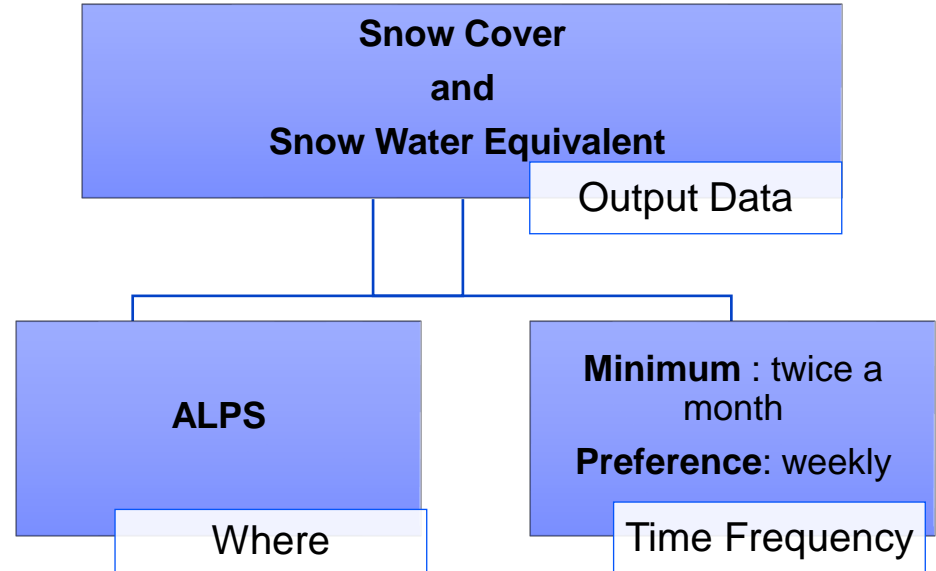
*We are interested in the potential energy stored in the snow/ice*



# Development of a tool



Image Credit: MODIS Land Rapid Response Team, NASA GSFC

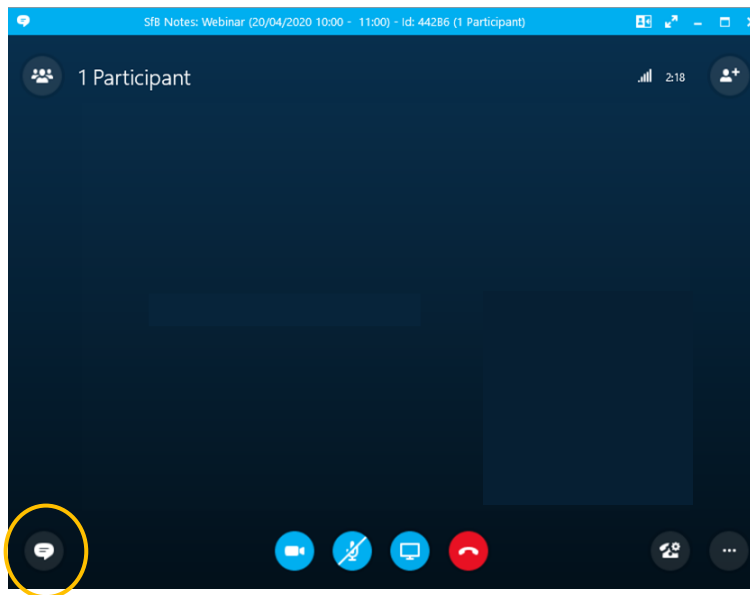




**Thank you**



## OPEN QUESTIONS & ANSWERS SESSION



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THANK YOU!

<https://business.esa.int/>

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