

NEXTGEOSS

Contributing to the Vision of GEO

GEO-VENER **GEO Vision for ENERgy**

NextGEOSS perspectives

Lionel Menard – ARMINES – MINES ParisTech

First NextGEOSS Summit
22ND JUNE, FINNISH METEOROLOGICAL
INSTITUTE – HELSINKI, FINLAND



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730329

Outline

- GEO-VENER – Introduction
- GEO-VENER contribution: Webservice-energy.org
- Selected Use Cases - Advantages – Limits
- NextGEOSS Energy Business Pilots Opportunities
- GEO-VENER community messages

GEO-VENER

GEO Initiative supporting the “Energy and Mineral Resources Management” Societal Benefit Area (SBA)

- Support the development of Earth observation **products and services** for energy management;
- Consider information to **support end-to-end energy production systems** (including planning, generation, transmission, distribution);
- Promote collaboration between **users and providers** of Earth observation and information;
- Encourage the use of Earth observation and information for renewable energy **policy planning** in developing and developed countries.
- **Contributors**
- *Members:* Denmark, **France**, Germany, USA.
- <https://www.earthobservations.org/activity.php?id=121#>

- Support of the EU H2020 programme through the ConnectinGEO and the ERA Planet, ERA NET Plus NEWA and **NextGEOSS** projects;
- Support of **Copernicus** Atmosphere Monitoring Service (**CAMS**) to Solar radiation service;
- Support of **Copernicus** Climate Change Service (**C3S**) to ECEM project;
- In-kind contribution of France (MINES ParisTech) of the Spatial Data Infrastructure **webservice-energy.org**;

Content Management System – Applications Gallery

Drupal

Energy Community Catalog Metadata (CSW – GEOSS Data CORE)

Energy Community Catalog Metadata (CSW – GEOSS Data CORE)

Application Servers – Web Services (WMS, WFS, WCS, SOS, WPS)

Application Servers – Web Services (WMS, WFS, WCS, SOS, WPS)

52n THREDDS PyWPS intecs the Brainware company

EO Data Storage – 70T

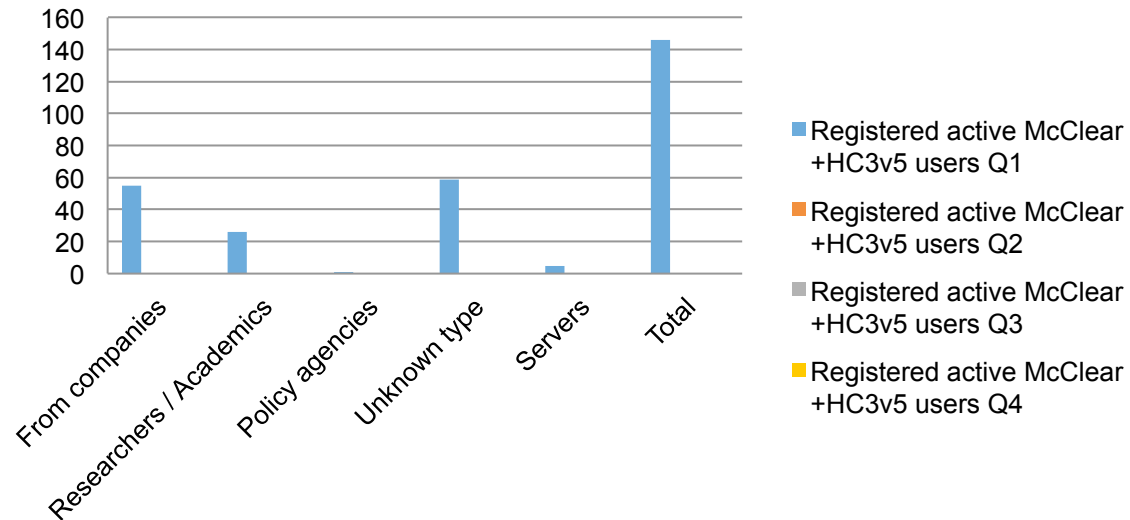
PostGIS Spatial PostgreSQL MySQL PostgreSQL

CAMS Radiation Service - Usage

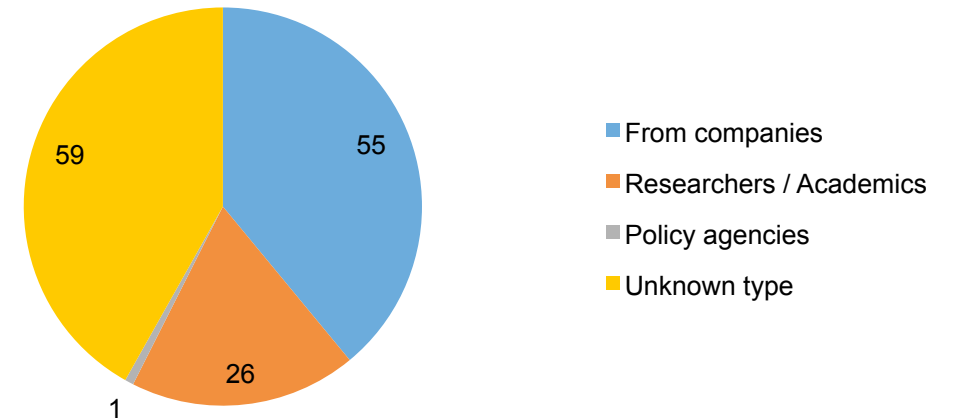
Registered active McClear+HC3v5 users

Quarter	Q1	Q2	Q3	Q4
From companies	55	0	0	0
Researchers / Academics	26	0	0	0
Policy agencies	1	0	0	0
Unknown type	59	0	0	0
Servers	5			
Total	146	0	0	0

Registered active McClear+HC3v5 users per quarter in 2017



Registered active McClear+HC3v5 users quarter #1

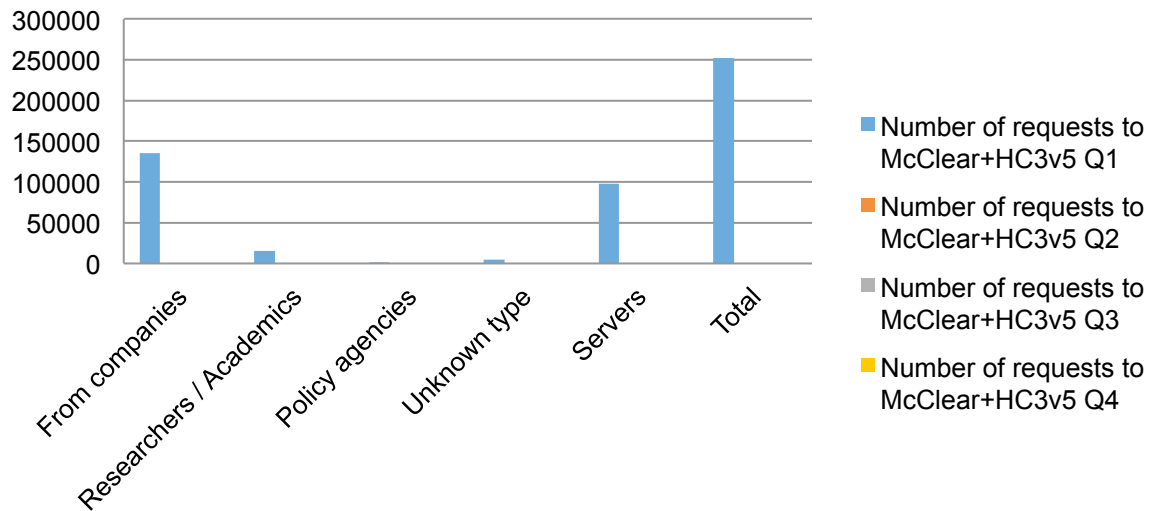


CAMS Radiation Service - Usage

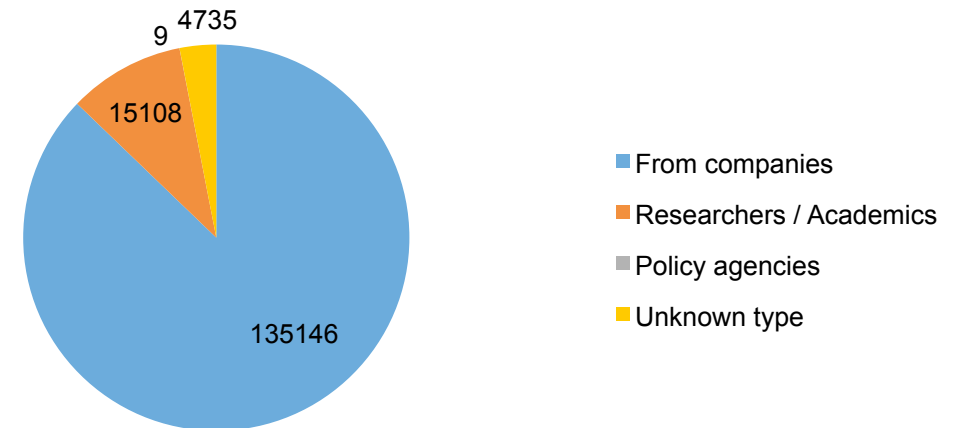
Number of requests to McClear+HC3v5

Quarter	Q1	Q2	Q3	Q4
From companies	135146	0	0	0
Researchers / Academics	15108	0	0	0
Policy agencies	9	0	0	0
Unknown type	4735	0	0	0
Servers	97510	0	0	0
Total	252508	0	0	0

Number of requests to McClear+HC3v5 per quarter in 2017



Number of requests to McClear+HC3v5 quarter #1



SDI - Support to key projects

SMEs
InSunWeTrust

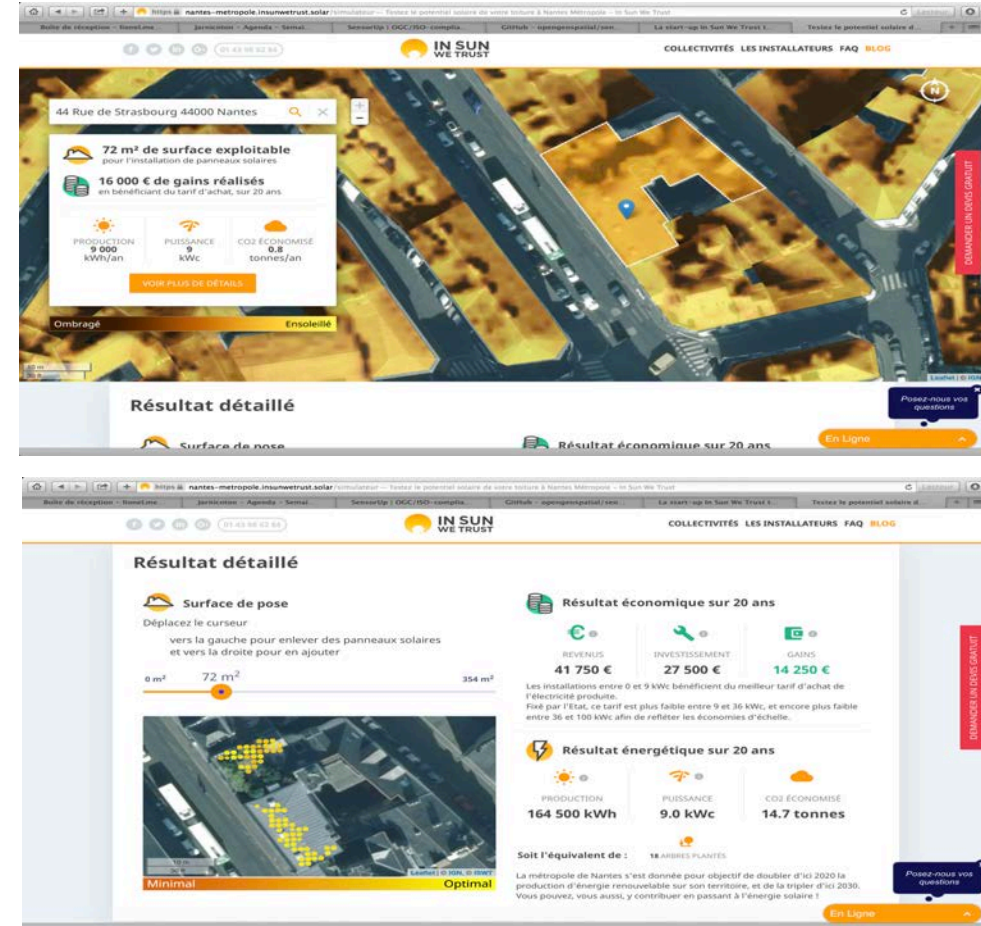
Host **WPS** for an on-the-fly computation for high-resolution sun-roof business potential assessment

Advantages

- Based on Open Standards (OGC)
- Solar resource and solar rooftop potential
- Map display of potential and economic analysis
- Nice and intuitive GUI

Limits

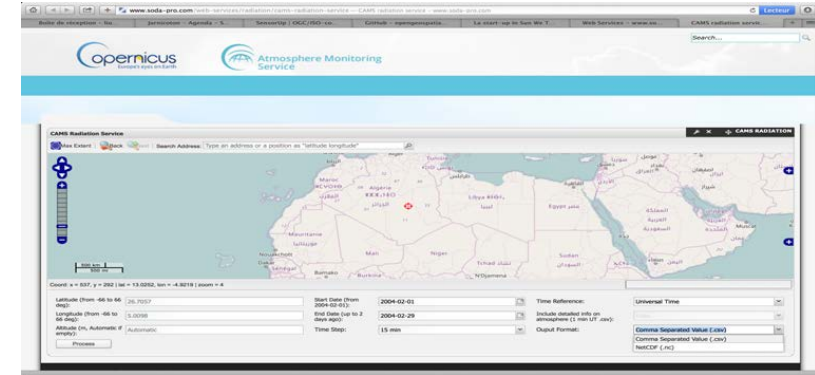
- Pre-computed historical radiation layer (Monthly mean over 12 years- 12 values)
- Computation time for pre-computed layers (400 s is required for a zone of 100 m x 100 m)



Scope of the pilots

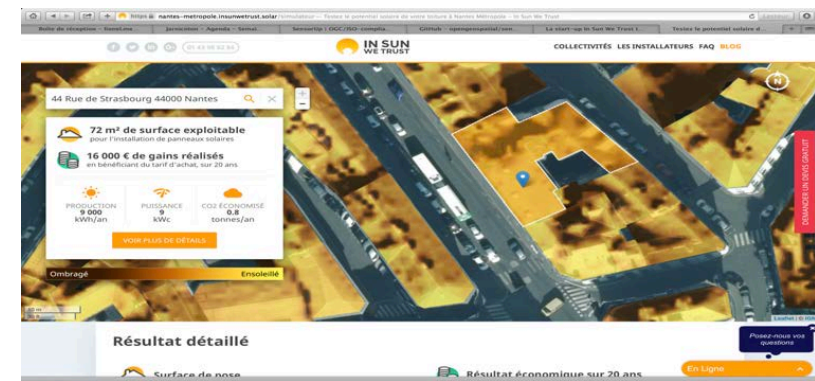
#1: Constructing gridded data for grid operators

- Target user: EDF R&D (National grid operator)
- Process Copernicus Atmosphere Monitoring Service (CAMS) services to provide **time series of gridded data**



#2: High resolution solar mapping at urban scale

- Target user: InSunWeTrust SME
- #1 plus 10 cm resolution Digital Surface Model and 30 m Digital Terrain Model to provide **real time rendering of geo-localized patches of time series of global tilted irradiation including local horizon**



Challenge and Opportunity: **New cloud based architecture !**

*“Combine Earth data sources, validate new ways to process them
Integrate compute-intensive workflows on a high-performing Cloud platform”*

#1 : NextGEOSS **cloud based solution to reduce computation time**. Currently 15 s per one single point. **Need to address** 1000 km x 1000 km area of 10 km grid cells (**10 000 cells at the same time**)

#2 : NextGEOSS **cloud based solution to reduce computation time** to access to a **real-time rendering** of local solar mapping for an urban area of interest. Currently, 400 s is required for a zone of 100 m x 100 m

KPI

1. Number of added functionalities
- 2. Application run time**
3. Number of implemented RS products

Messages from the **GEO-VENER** initiative

- GEOSS/GCI should be the place to find relevant **information and services regarding my daily work**, i.e. structured for my community
- Need to identify **Renewable Energy Essential Variables**, the way to access it, the **applications and the tools** to consume them
- Preference of **Data Core** sets of information, well documented, interoperable, **Open-access** (if possible) and possibly **quality checked**
- If toolboxes can be available to **pre-process or process data** that will be of interest instead of having to reinvent the wheel at any time.
- Also of interest will be a place to **exchange** practices, documentation and experience **with end-users**.



Lionel MENARD

lionel.menard@mines-paristech.fr

