GEO Vision for Energy (GEO-VENER) and potential links with UNDRR and the Sendai Framework

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GEO-VENER Goals for 2019-2022

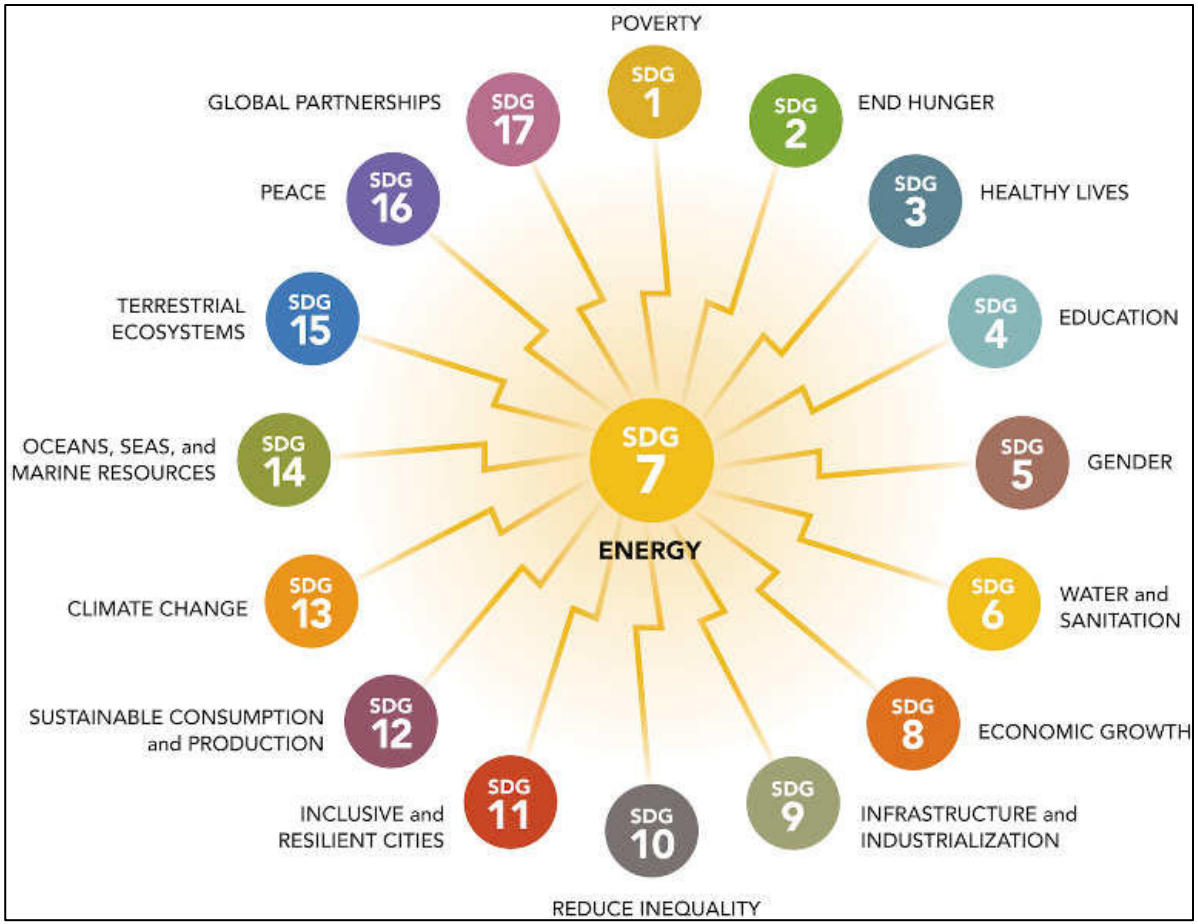
- Support the development of Earth observation products and services for energy management;
- Consider information to support end-to-end energy production systems (including planning, generation, transmission, distribution, and integrated operations);
- Promote collaboration between users and providers of Earth observation and information;
- Encourage the use of Earth observation and information for informed renewable energy policy planning in developing and developed countries.

GEO-VENER Planned Activities for 2019-2022

- Solidify means of stakeholder engagement, governance, and funding (NASA, H2020, Copernicus Programme, …)
- Renewable energy variables for meeting stakeholder requirements
- Gap analyses for renewable energy and EO needs
- Development of in-situ meta network for renewable energy
- Share information via webservice-energy.org
- Connect GEO-VENER to other GEO work groups and Regional GEO (AmeriGEO, AfriGEO, AOGEO, EuroGEO)

Energy and the Sendai Framework

"The Sendai Framework calls for sustainable use and management of ecosystems and integrated environmental and natural resource management approaches that incorporate disaster risk reduction. Trans-boundary cooperation on ecosystem-based approaches to shared natural resources builds resilience and can reduce disaster risk, while contributing to achieving the Sustainable Development Goal of affordable and clean energy."



Source: Prinsloo 2018

NASA Funding: Capacity Building for the Utilization of Earth Observations among Utility Providers

BATTELLE

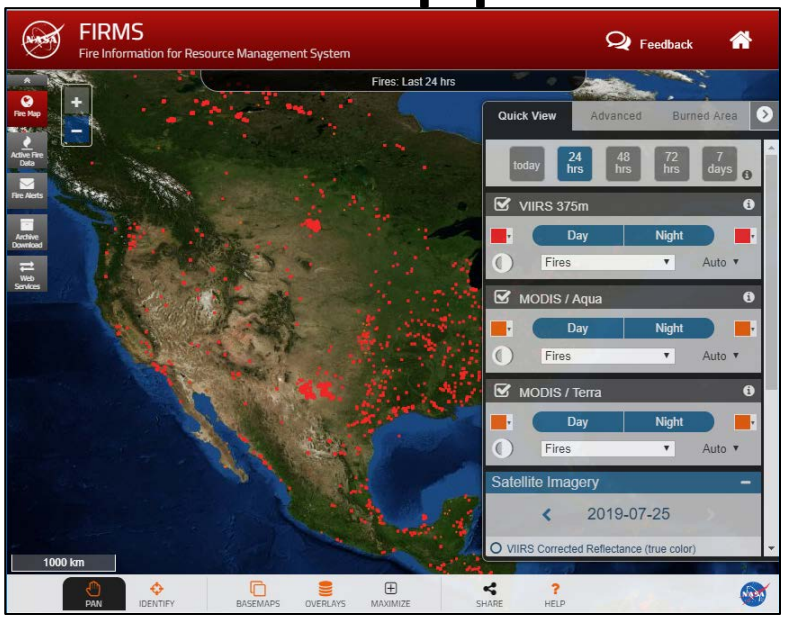
GEO GROUP ON EARTH OBSERVATIONS

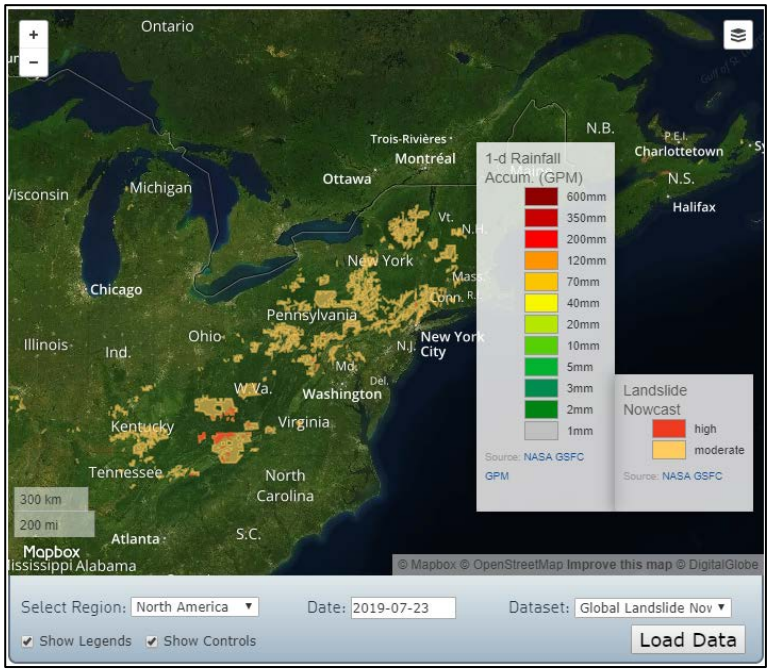
- Project Team: Natasha Sadoff, PI (Battelle), Tanya Maslak (Battelle), Amy Leibrand (Battelle), and Paul Stackhouse (NASA Langley)
  - Also working closely with DOE, NOAA to leverage networks, expertise, and related activities
- Period of Performance: March 2018 – March 2021
- Objective: Use a capacity building approach to identify means of improving the ability of electric utilities to utilize Earth observation data, including NASA data, in pursuit of the GEO Vision for Energy and their goal of increasing the Earth observation (EO) user base.

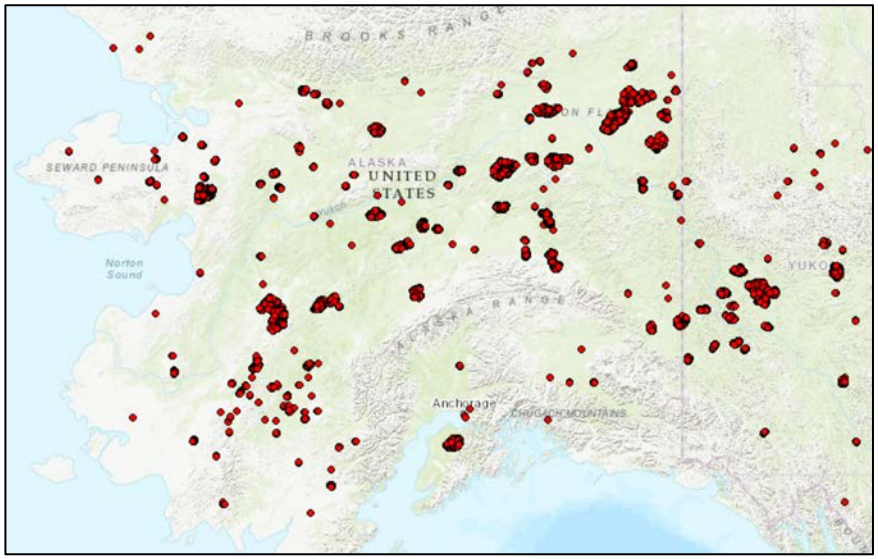
NASA EOs can help the energy sector reduce risk and be more resilient to climate and extreme weather changes

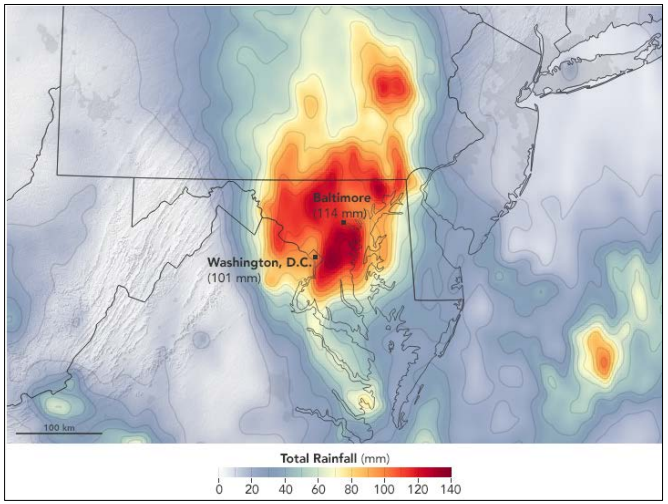
Vulnerabilities to Climatic Conditions	Possible EO Resource	Existing EO Tools and Portals
Decreasing/changing water availability, flooding (affecting hydropower, geothermal, sub-stations)	• Lake/reservoir/ocean height from Jason-2 • Near-surface water and sea surface temperature from Terra/Aqua/MODIS • Groundwater storage from GRACE • Precipitation from GPM • Soil moisture from SMAP	• GES DISC with GIOVANNI • PODAAC • LANCE (near-real time) • Worldview • USGS/NASA LP DAAC
Wildfires (damage to transmission lines)	• NDVI from VIIRS and MODIS • Land Cover from Aqua/MODIS • Active Fires from Terra/MODIS • Active fires from Landsat	• GES DISC with GIOVANNI • LANCE • USGS/NASA LP DAAC • USDA/NASA Active Fire Mapping Program
Sea level rise and storm surge (impacts to inland power plants)	• Lake/reservoir/ocean height from Jason-2 • Scatterometer Winds from RapidScat • Global precipitation from GPM	• Weather and seasonal forecasts through GMAO • GES DISC with GIOVANNI • PO DAAC • ESurge ESA Training Modules • NOAA SLOSH forecasts
Increasing Temperatures and Heat Waves (increasing demand)	• LST from Terra ASTER, Terra/Aqua/MODIS, Aqua AIRS, Suomi NPP VIIRS • Thermal infrared irradiance • Soil moisture from SMAP	• EOSDIS EarthData • GIOVANNI • USGS/NASA LP DAAC • Weather and seasonal forecasts through GMAO • CERES
Extreme storms or hurricanes (disrupted generation, transmission, distribution)	• LST from Terra ASTER, Terra/Aqua/MODIS, Aqua AIRS, Suomi NPP VIIRS • Scatterometer Winds from RapidScat • Global precipitation from GPM	• Prediction of World Energy Resource (POWER) Project • PO DAAC • NASA Worldview • LANCE • Weather and seasonal forecasts through GMAO • SPORT

FIRMS and the Precipitation and Applications Viewer









Managing the Risks of Energy – Water – Food Nexus

To make energy infrastructure more resilient, policymakers, businesses and governments should carefully analyse the conditions needed to ensure investor and public confidence in projects.

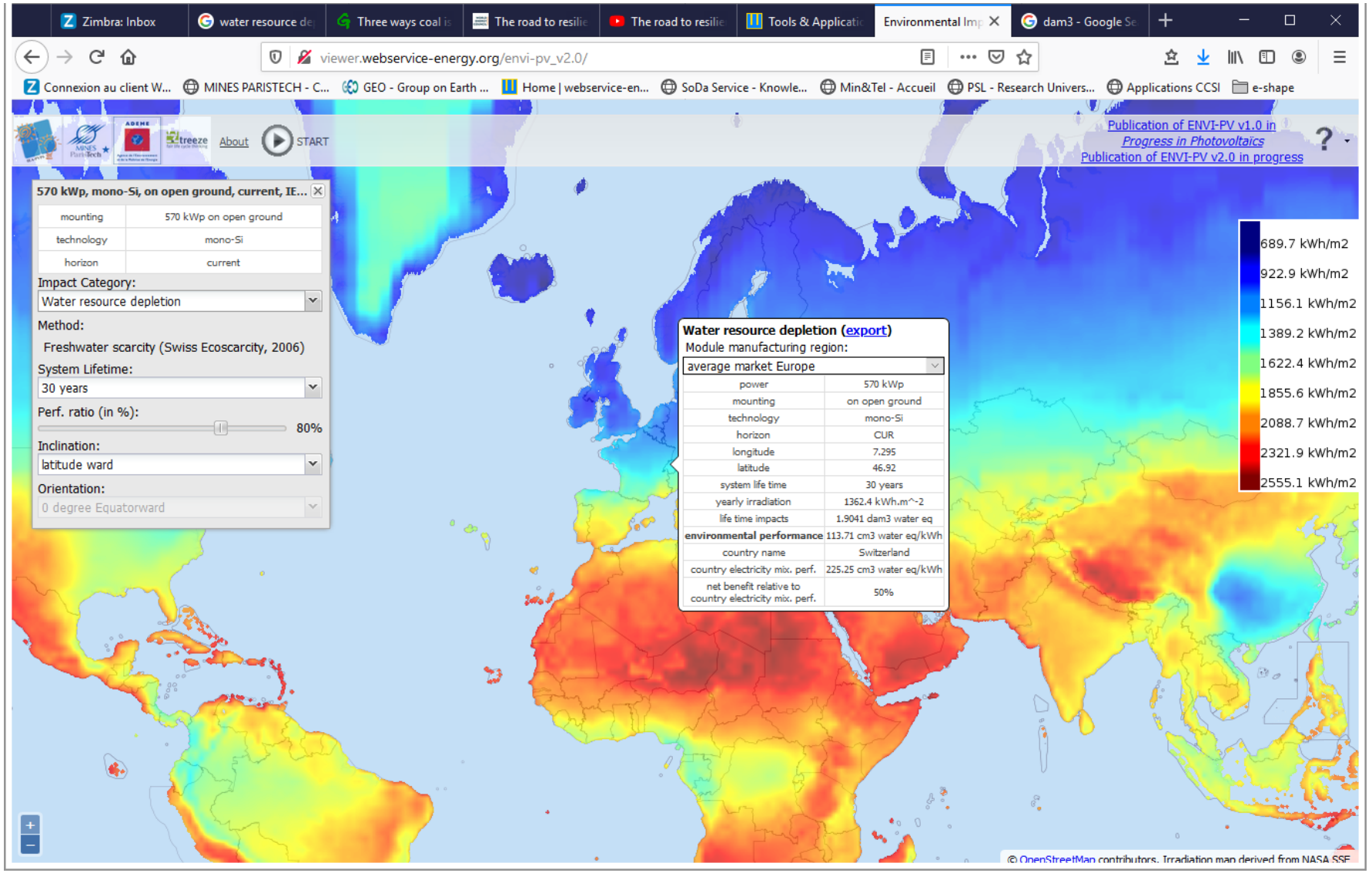
First recommendation of the **World Energy Council (2016)**

Project developers need to be able to **better understand the water footprint of energy technology choices** being considered in order to mitigate the risks of potential stranded assets.

Energy Type	Water Consumption (m^3/kWh)
Coal	0.24-4.16
Solar	0.004-0.3
Wind	0.001-0.004

From https://www.greenpeace.org/international/story/21524/3-ways-coal-is-depleting-the-worlds-water-resources/

Evaluation of water resources depletion using EO



Evaluation of water resources depletion using EO