



DOWNSTREAM GATEWAY
Space for Earth

Earth Observation contributions to the Clean and Renewable Energy Sector

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2. Ocean Energy
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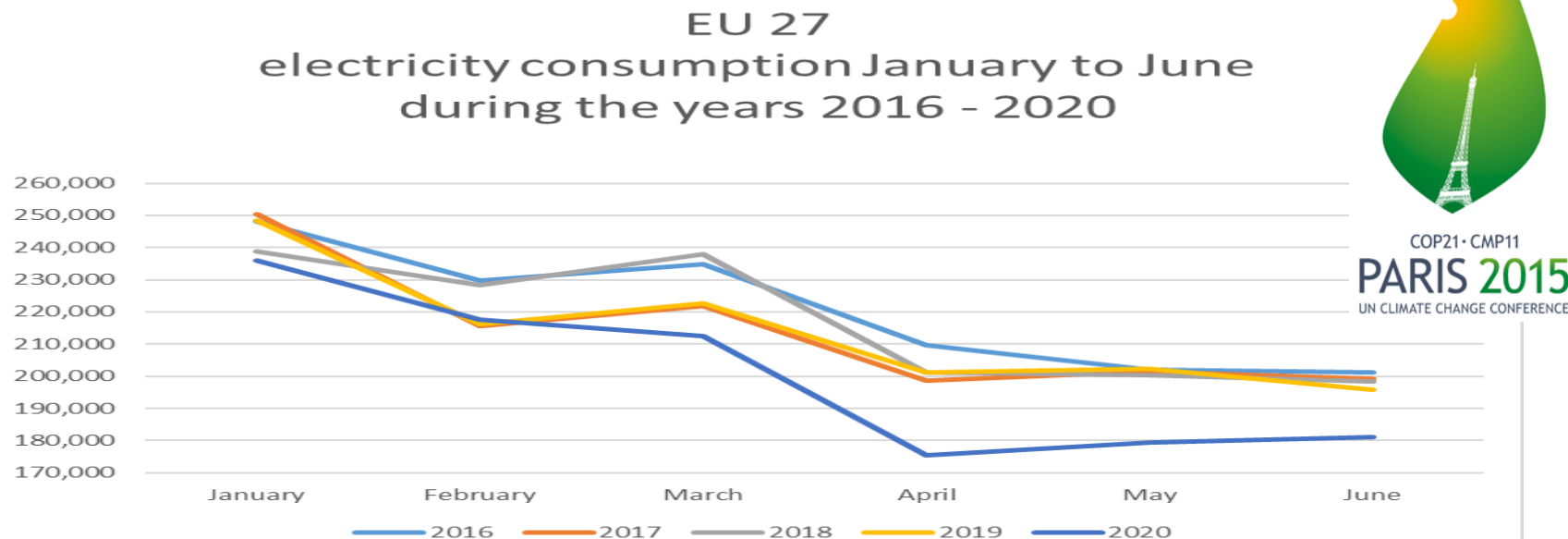


Introduction: the Energy landscape and the EU Green Deal

Energy Production, Transmission, Consumption

European Union strategies pursue:

- Energy security & efficiency
- Integrated energy market
- Decarbonisation of the economy (GHG reduction)
- Significant increase renewables share in EU energy mix
- Increase of energy efficiency



ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL

BEFORE COVID-19

EFFORTS NEED **SCALING UP**
ON SUSTAINABLE ENERGY



789 MILLION
PEOPLE LACK
ELECTRICITY
(2018)

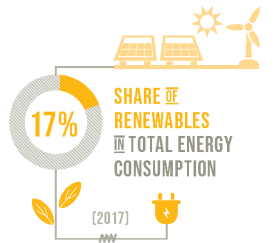
COVID-19 IMPLICATIONS

AFFORDABLE AND RELIABLE ENERGY
IS CRITICAL FOR HEALTH FACILITIES



1 IN 4 NOT ELECTRIFIED
IN SOME DEVELOPING COUNTRIES (2018)

STEPPED-UP EFFORTS
IN RENEWABLE ENERGY
ARE NEEDED



ENERGY EFFICIENCY
IMPROVEMENT RATE
FALLS SHORT OF
— 3% TARGET —



FINANCIAL FLOWS TO DEVELOPING COUNTRIES
FOR RENEWABLE ENERGY ARE **INCREASING**

\$21.4
BILLION
(2017)



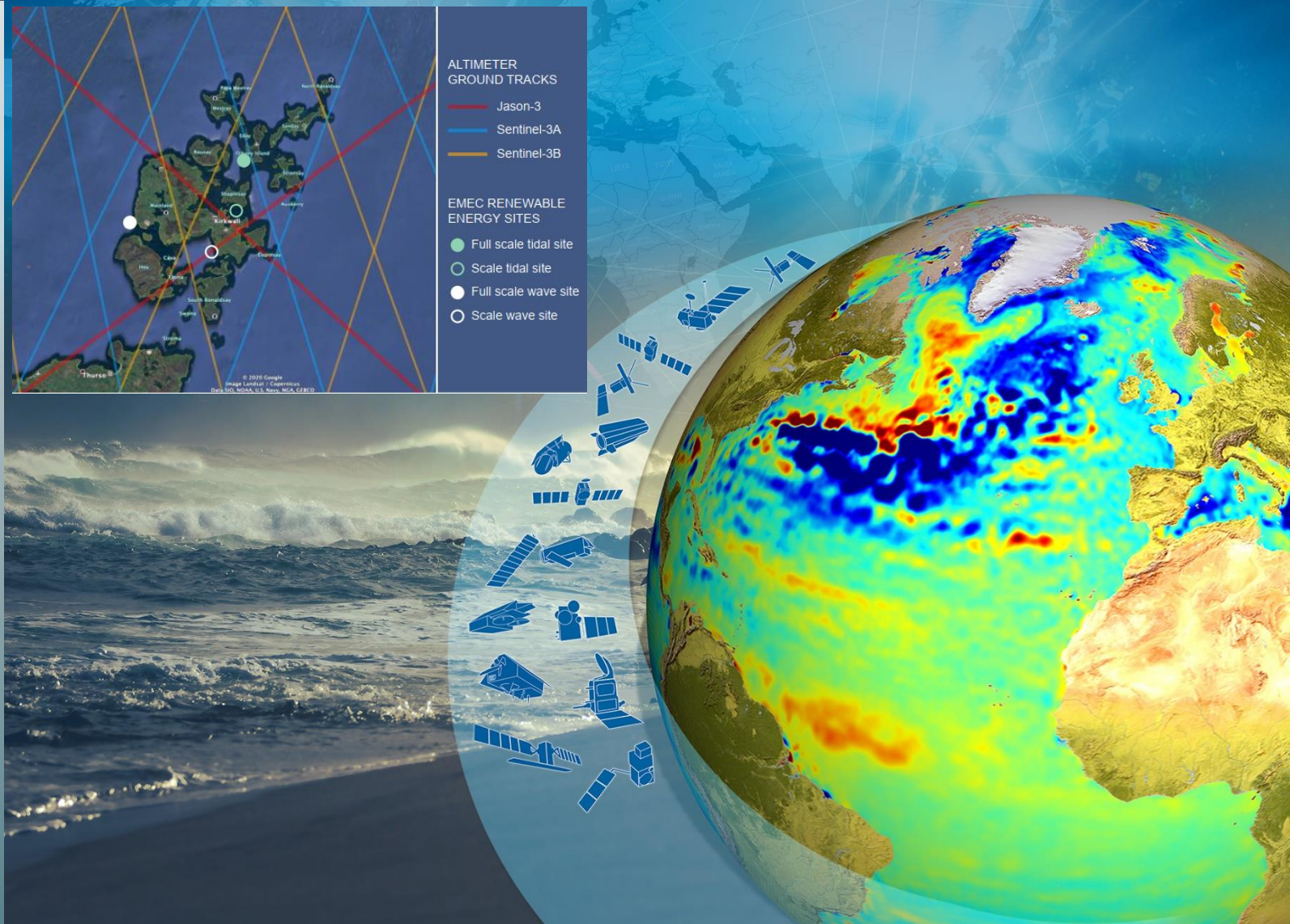
BUT ONLY 12% GOES TO
LDCs

Ocean Energy



Develop and demonstrate a service in partnership with

- EMEC's client base
- Metocean team
- Scale this to a service that can address needs throughout the Atlantic region and beyond
- Actual use cases focused on **waves, tides and currents**



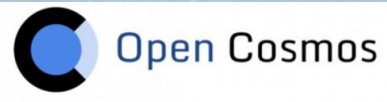


EO based services to **support management and operation** of off-shore wind farms:

- Dashboard for wind farm design and operations (weather windows)
- Assessment of wind resource for energy production
- Assessment and minimization of Wind Turbine Wake Effect
- Assessment of Rain Erosion of Wind Turbine Blades



Mission and Agile Nanosatellite for Terrestrial Imagery Services

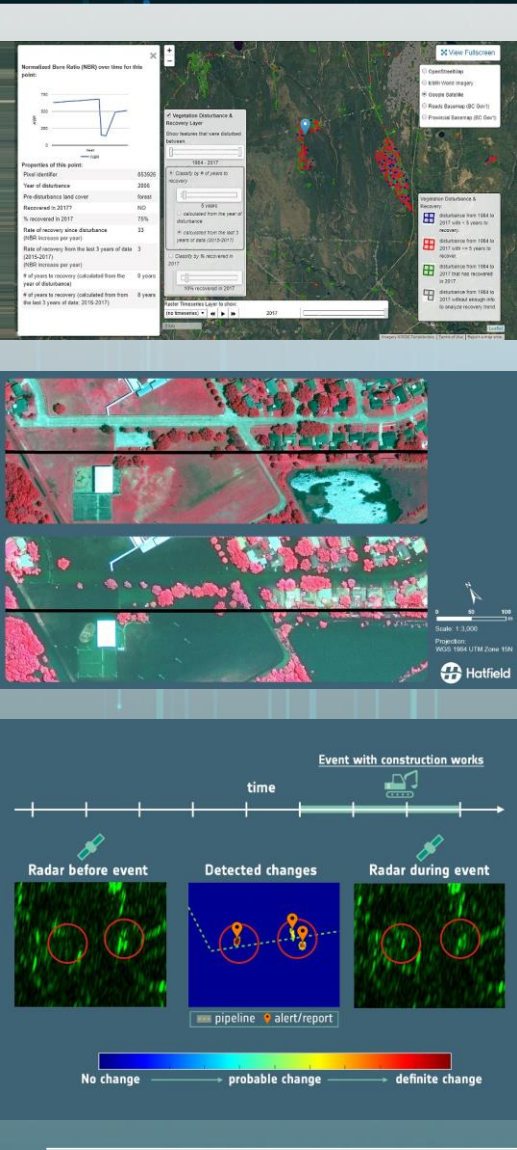


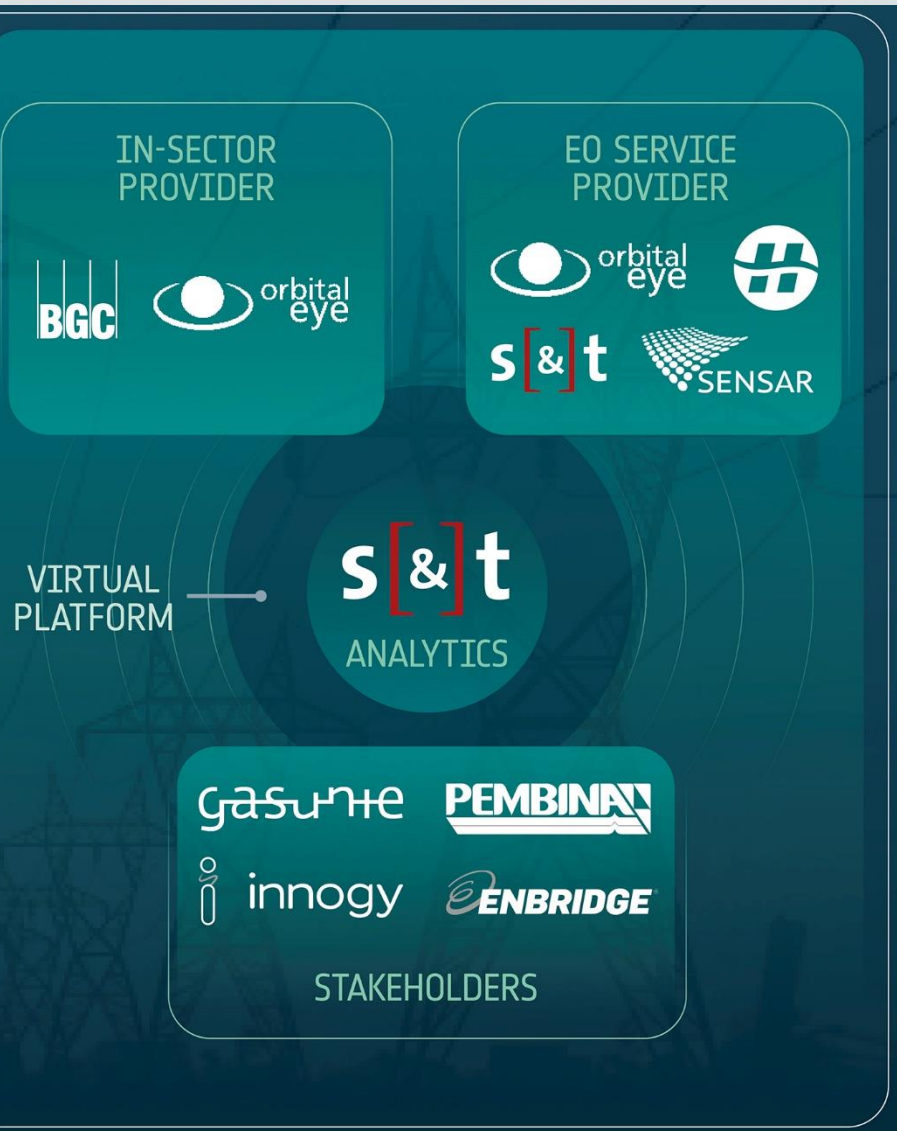
- MANTIS is a demonstration mission to jointly develop, build, launch and operate an innovative nanosatellite platform, flying a high resolution Earth observation camera.
- The activity, funded under the UK Space Agency contribution to the ESA InCubed programme, brings together the expertise of three space companies.

NEO monitors solar panels throughout the Netherlands using deep learning methods.



Energy Corridors and Maritime Spatial Planning





- Co-design with users by creating an atmosphere of mutual understanding of needs, challenges and opportunities
- Actively involving key users and stakeholders in a timely manner, providing opportunities to review the VP development
- New applications and services making use of EO data combined with in-situ data, to support energy critical infrastructures

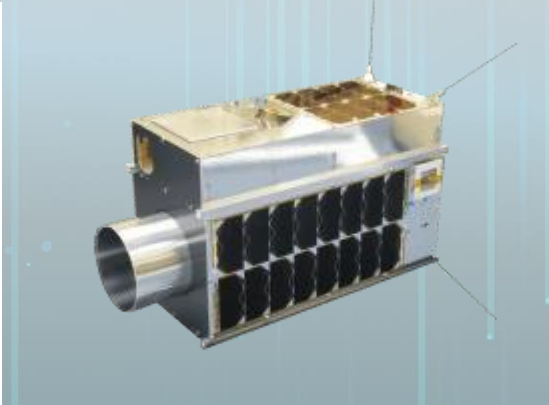
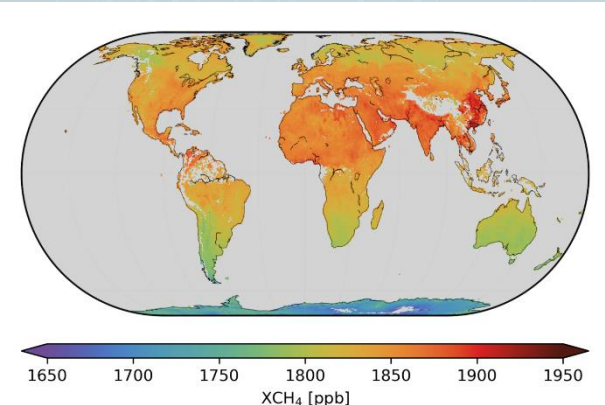
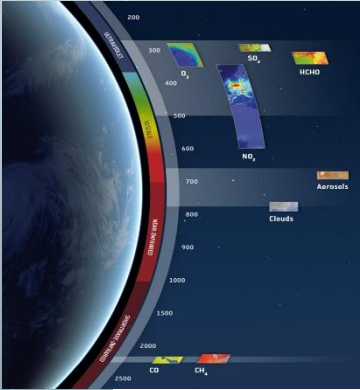


Energy Operations & Maintenance: GHG Emissions

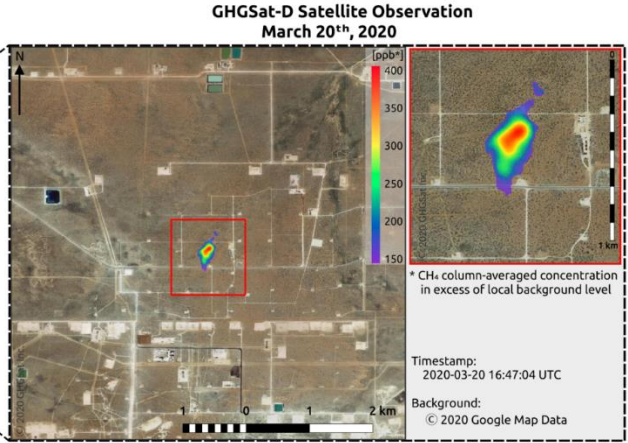
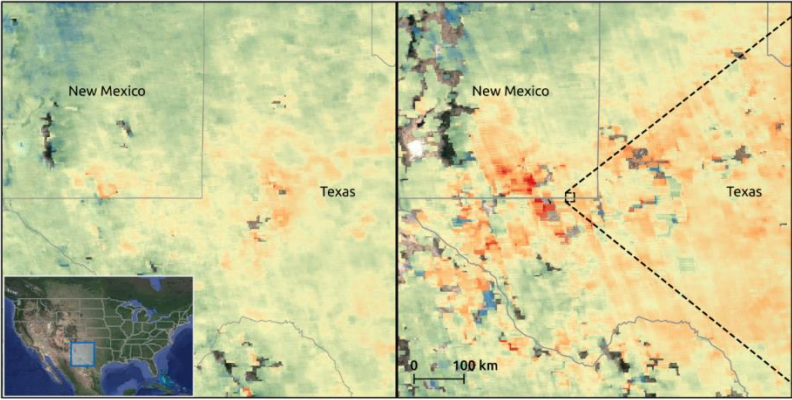
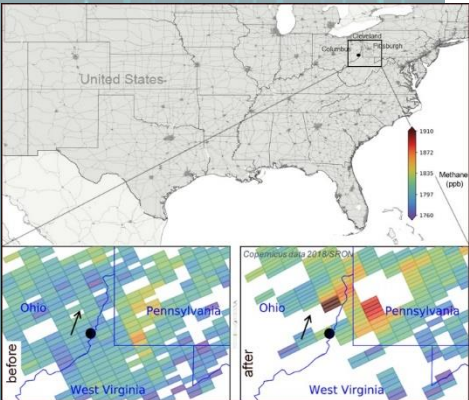


Methane
Emission
Detection from
Satellite
Measurements

NPL & GHGSat



Monthly averages derived from TROPOMI



1. ESA and Space actors joining efforts towards EU Green Deal goals & UNAgenda2030
2. EO applications and services support the efficient production of Renewable Energy (Ocean, Wind, Solar, Geothermal)
3. Energy transmission critical infrastructures (electrical transmission lines and gas pipelines) monitoring from Space
4. Innovative co-design with Energy sector Users and Stakeholders (EO and in-situ data)

