



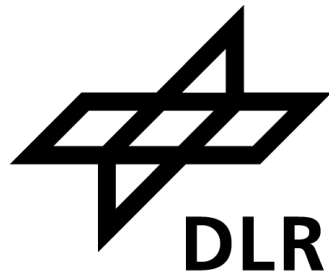
e-shape Pilot 3.2: High photovoltaic penetration at urban scale: Energy Modeling Application - coupling to FlexiGIS

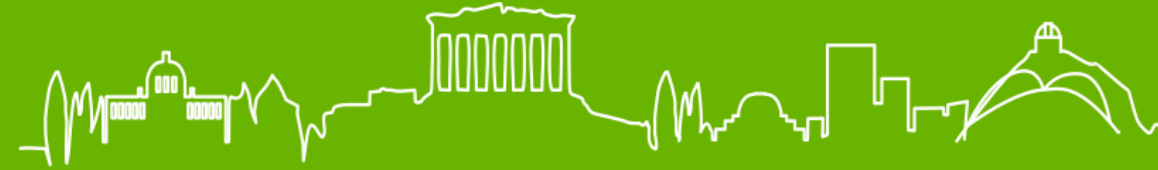
Susanne Weyand, Jethro Betcke, Hauke Bents and Marion Schroedter-Homscheidt

with thanks to DFD, IMF and IHR colleagues

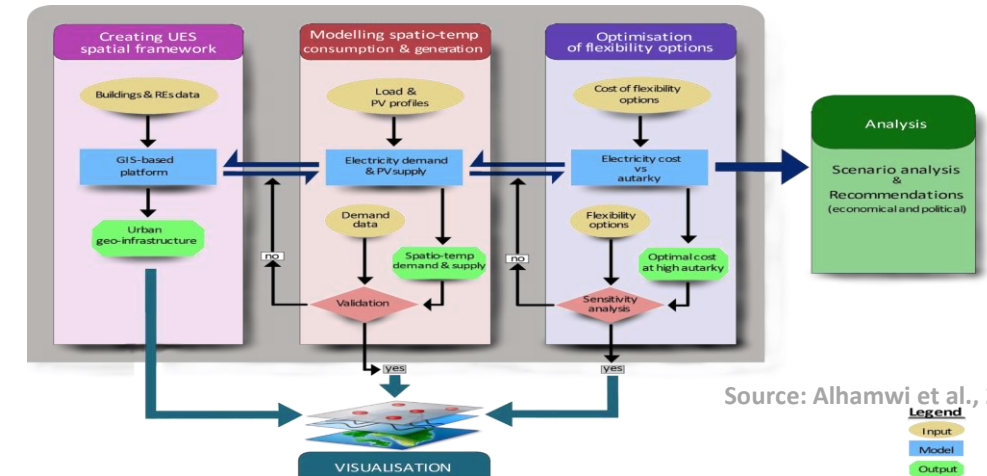
German Aerospace Center (DLR) -

Institute of Networked Energy Systems



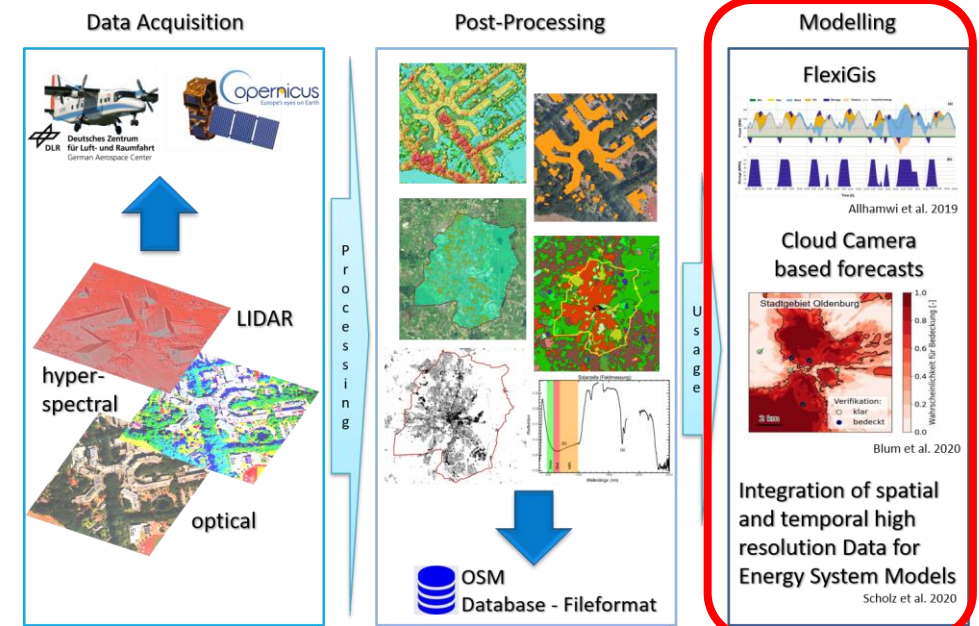


FlexiGIS energy system modelling tool support potential users such as network operators, decision-makers in urban planning, industry, aggregators for solar power trading, citizens, operators and researchers
on PV self-consumption, urban distribution network energy systems models, planning and monitoring tasks, short-term forecast by spatial / temporal variability on power consumption and generation of PV systems



Data implementation (ongoing):

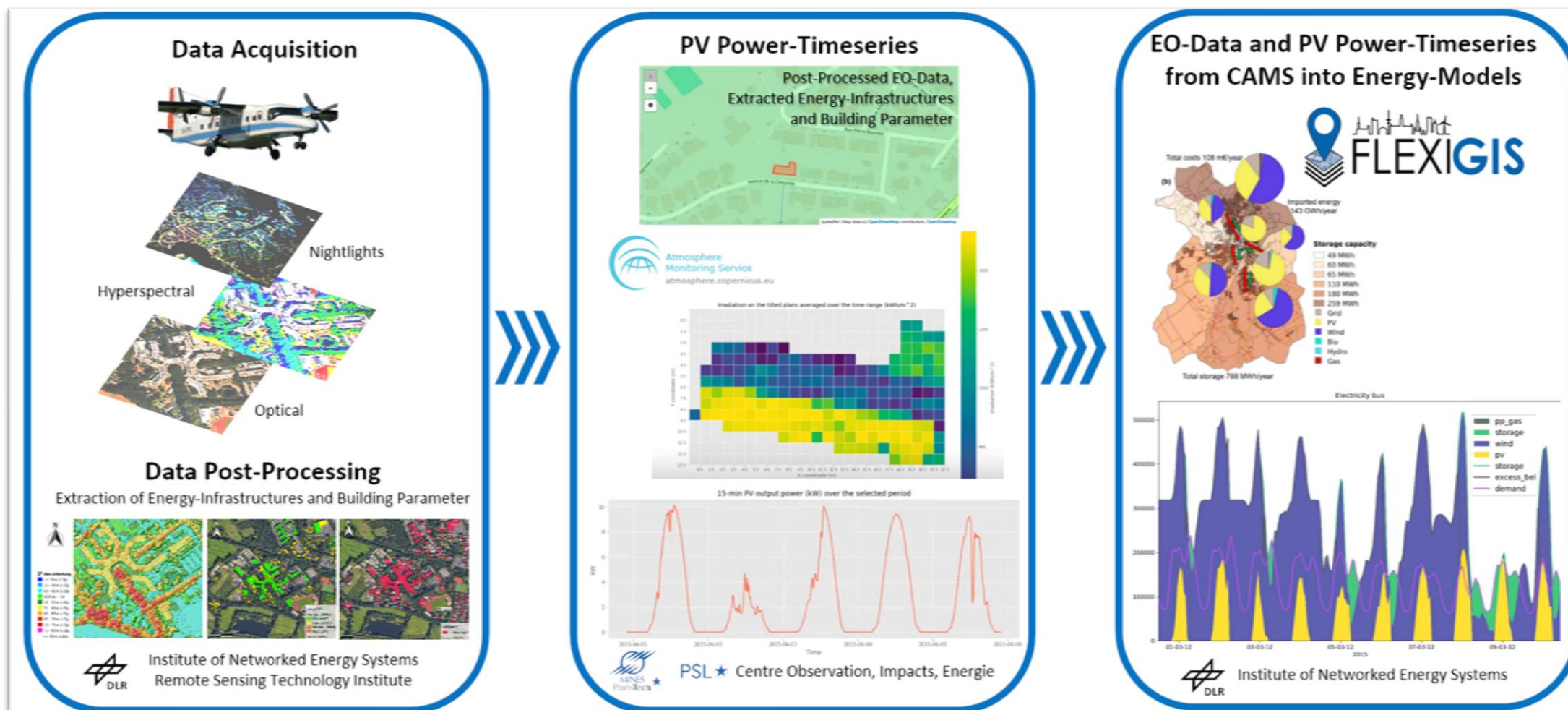
- **CAMS Radiation** Service to retrieve irradiation and temperature data via soda
- Airborne based **Digital Surface Model (DSM)** (20 cm resolution) from DLR optical overflight 2019
- **Building footprints** extracted from DLR optical datasets
- **Corine Land Cover (CLC)** data provided by DLR German Remote Sensing Data Center



Data acquisition and post-processing support from Remote Sensing Technology Institute (IMF) - Department: Photogrammetry and Image Analysis, as well as from Remote Sensing Data Center (DFD) - Department: Land Surface Dynamics



Co-Design DLR and PSL





FlexiGIS plugin with earth observation data connection

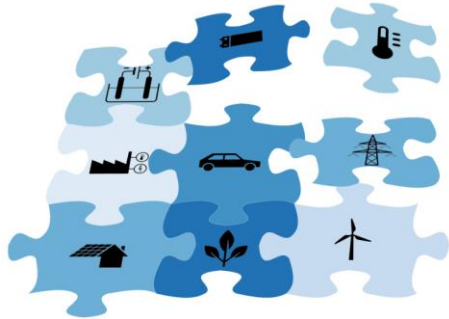
Old
Version
Online
available at:
<https://github.com/FlexiGIS>

New
Version



Old process chain of FlexiGIS (online Version)

open energy modelling framework
(oemof.org)



Use PVlib code via feedin lib



Provide:

- PV location by single system
 - ERA 5 data access
 - PV modeling chain



*PV
power
time
series*



*Used in
FlexiGIS for
scenario and
optimization
studies*



Current process chain of FlexiGIS



Use

- PV location by single system
 - ERA 5 data access
 - PV modeling chain



*PV
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*Used in
FlexiGIS for
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Enhanced inside FlexiGIS with

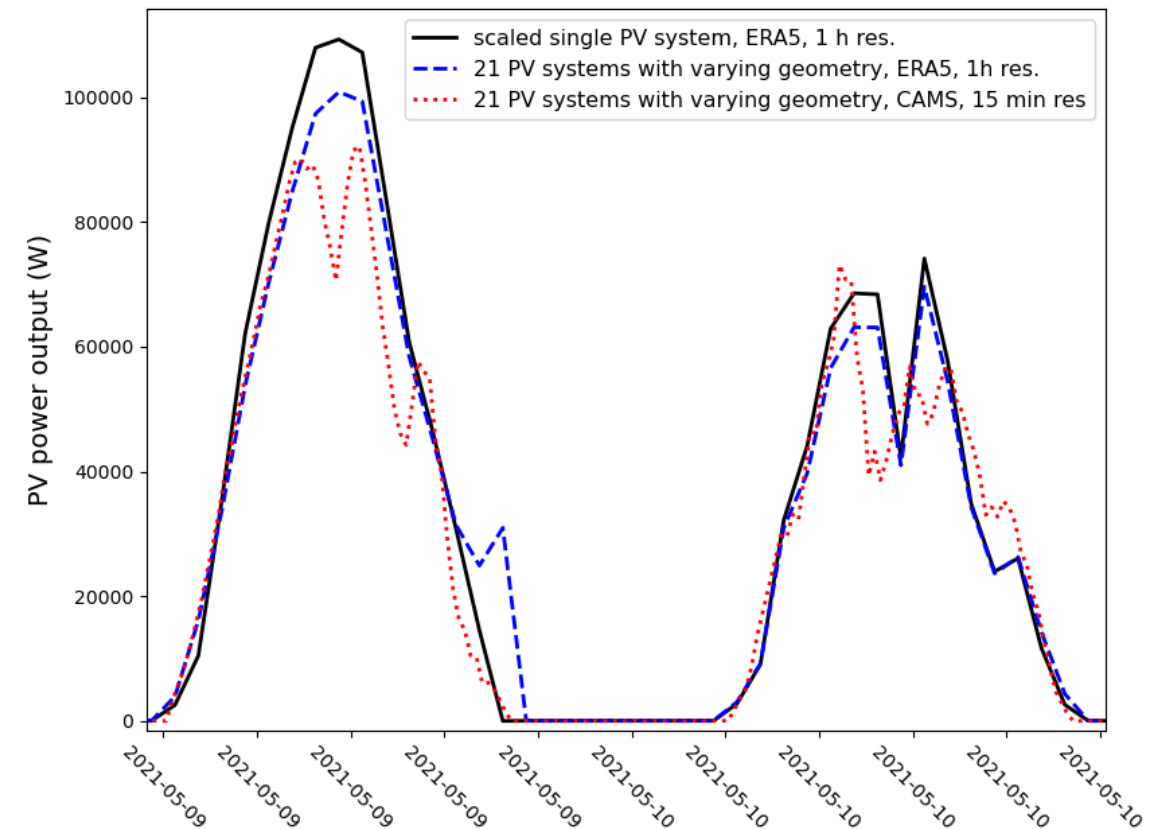
- CAMS Radiation data
as well as
- PV multi location data from
airborne data collection



First results – PV multi locations

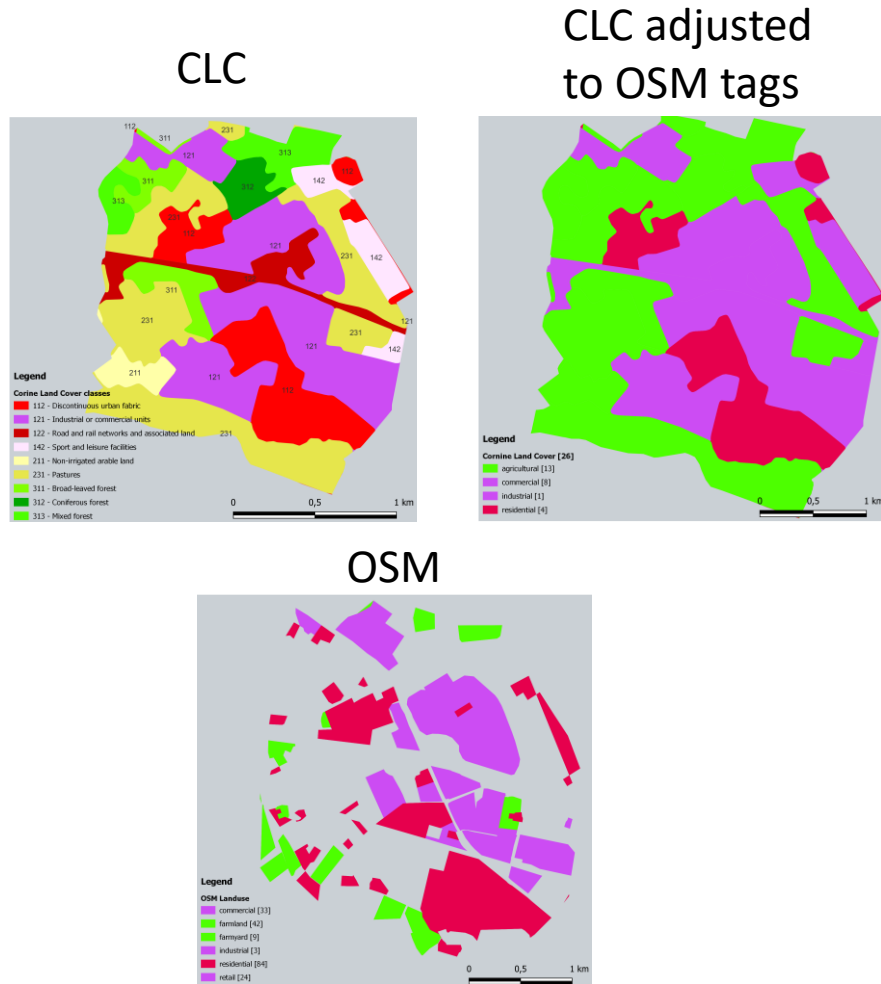


Test data with 21 geometries, technologies and more representative temporal resolution

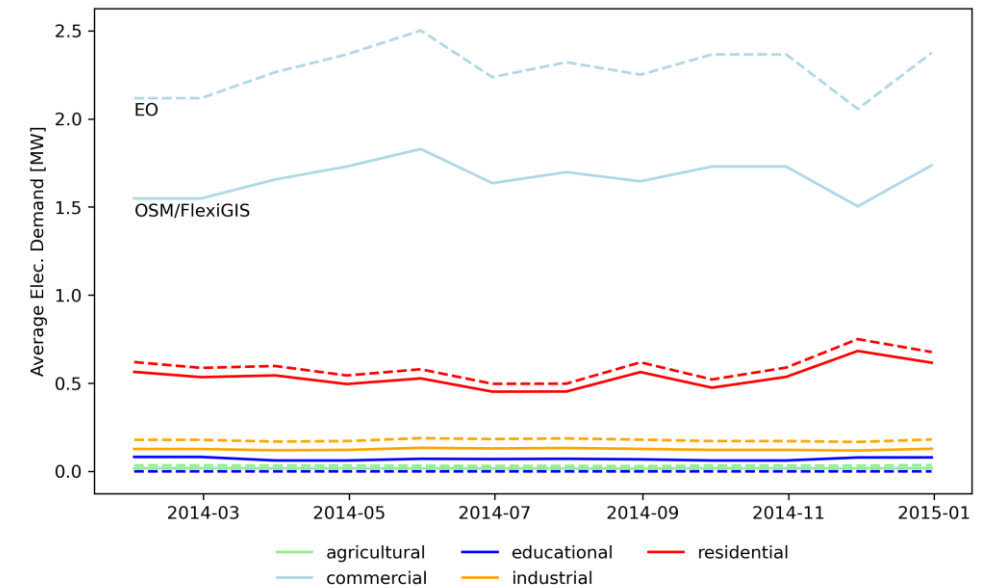




First results – CLC data impact on demand simulation



CLC data (=EO) vs. OSM data used for demand simulation



Data current under quality control



Conclusion

- Intensive co-design with application and library developers initiated.
- Several code adaptations deep inside user code needed.
- Several EO data implemented -> CAMS radiation, Corine Land Cover, building footprints and still ongoing for PV system information.
- Impact by replacement with EO data and combination with OSM data shown.
- Further application and data evaluations ongoing.