

What are the potentials of renewables, waste and locally available resources?

Where are these potentials located and how can we connect them to energy needs?



Considering simultaneously, integrated and spatialized :

- **Energy needs**
- **Energy resources**
- **Energy technologies**
(*conversion, distribution, storage*)
- **Knowledge of local resources**

They are **not equal!**

Territorial anchoring **VS** «transportable»
«Unlimited» **VS** Exhaustible...

Feasible / profitable projects, thanks to existing
infrastructures and needs

Heating systems



Thermal consumptions



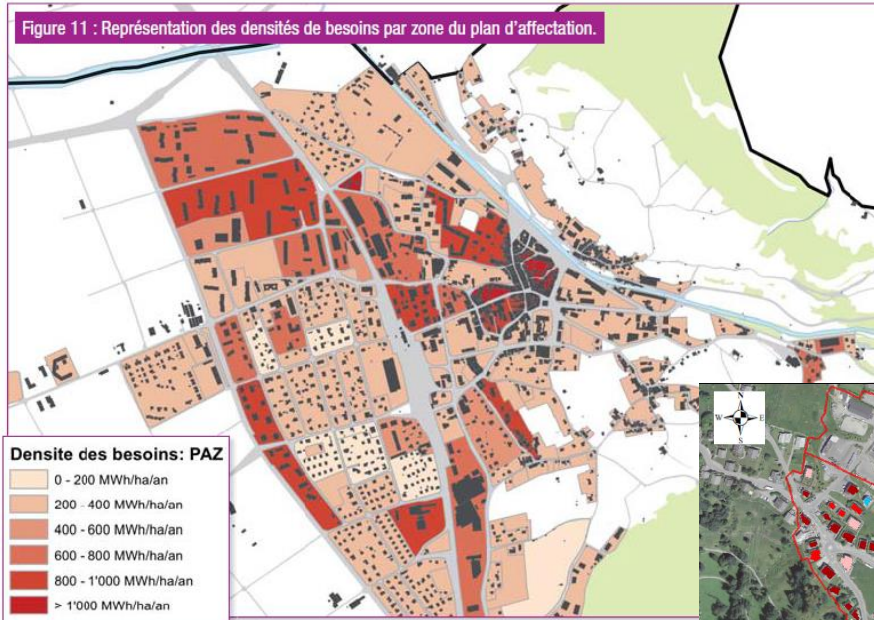
Fake data

Characterizing energy needs

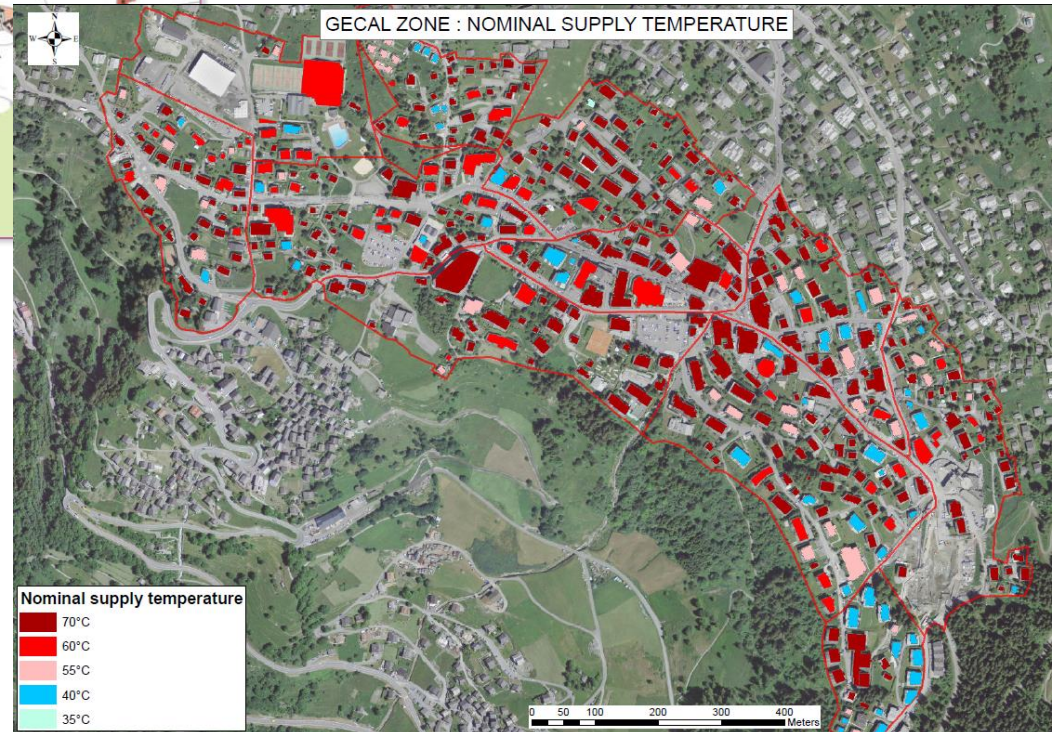
Thermal density & supply temperature

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Figure 11 : Représentation des densités de besoins par zone du plan d'affectation.



54 Géomatique Expert | N° 95 | Novembre-Décembre 2013



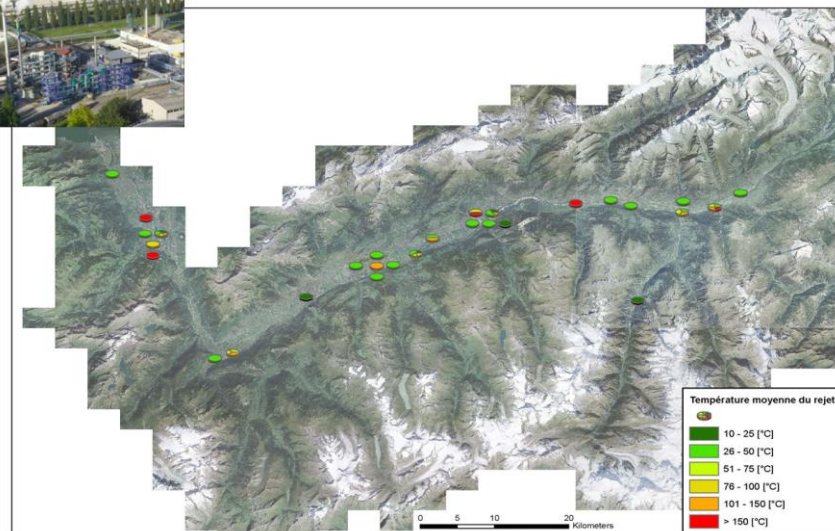
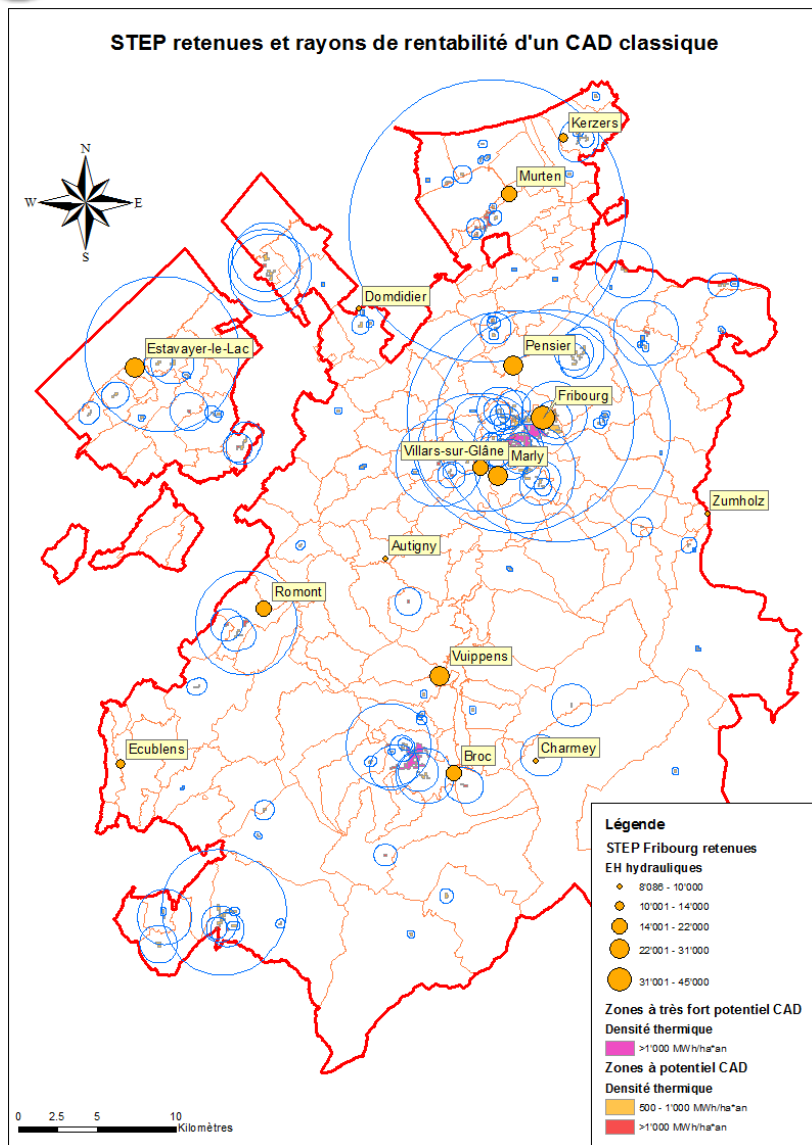


RENEWABLE & NON- RENEWABLE RESOURCES

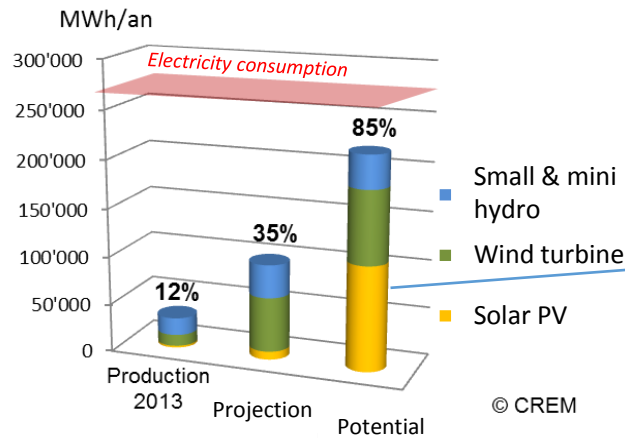
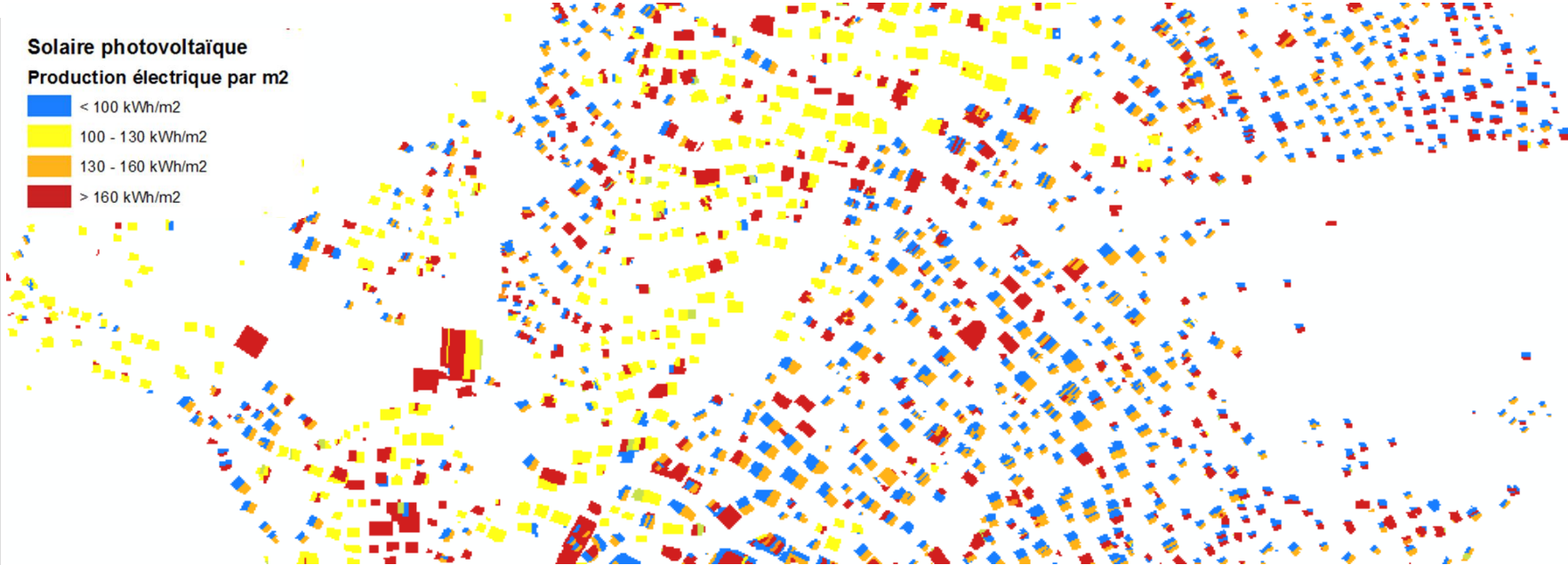




Project : urban energy management

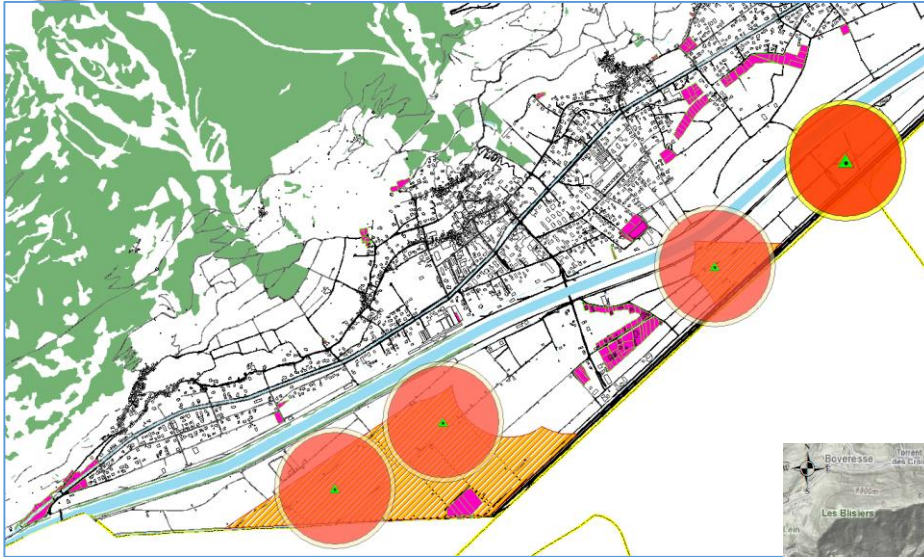


Solaire photovoltaïque Production électrique par m2

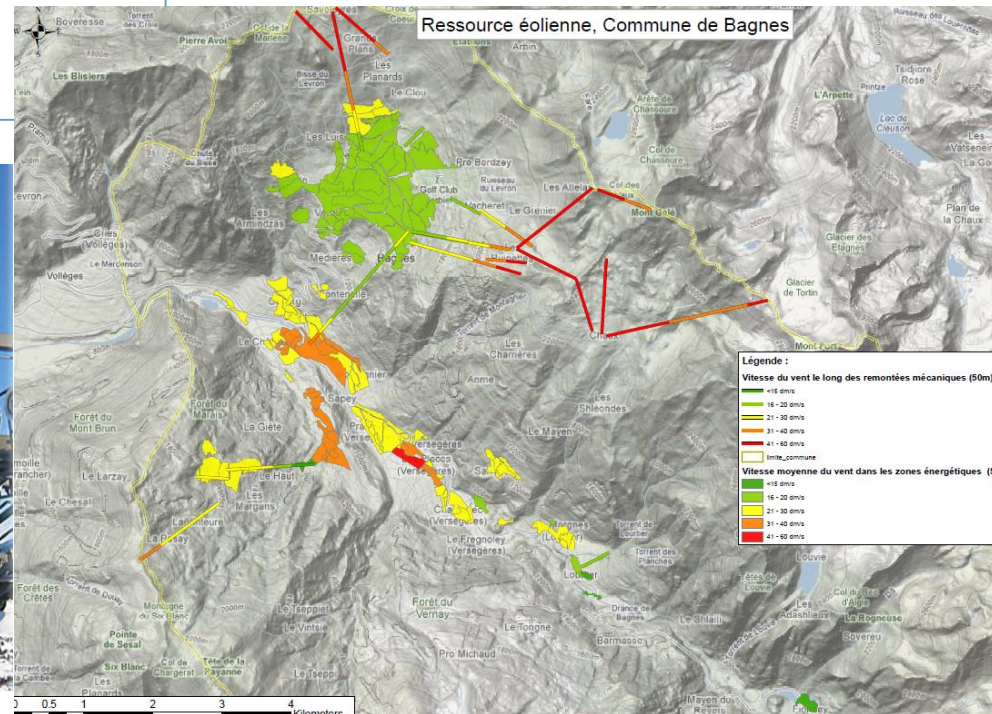


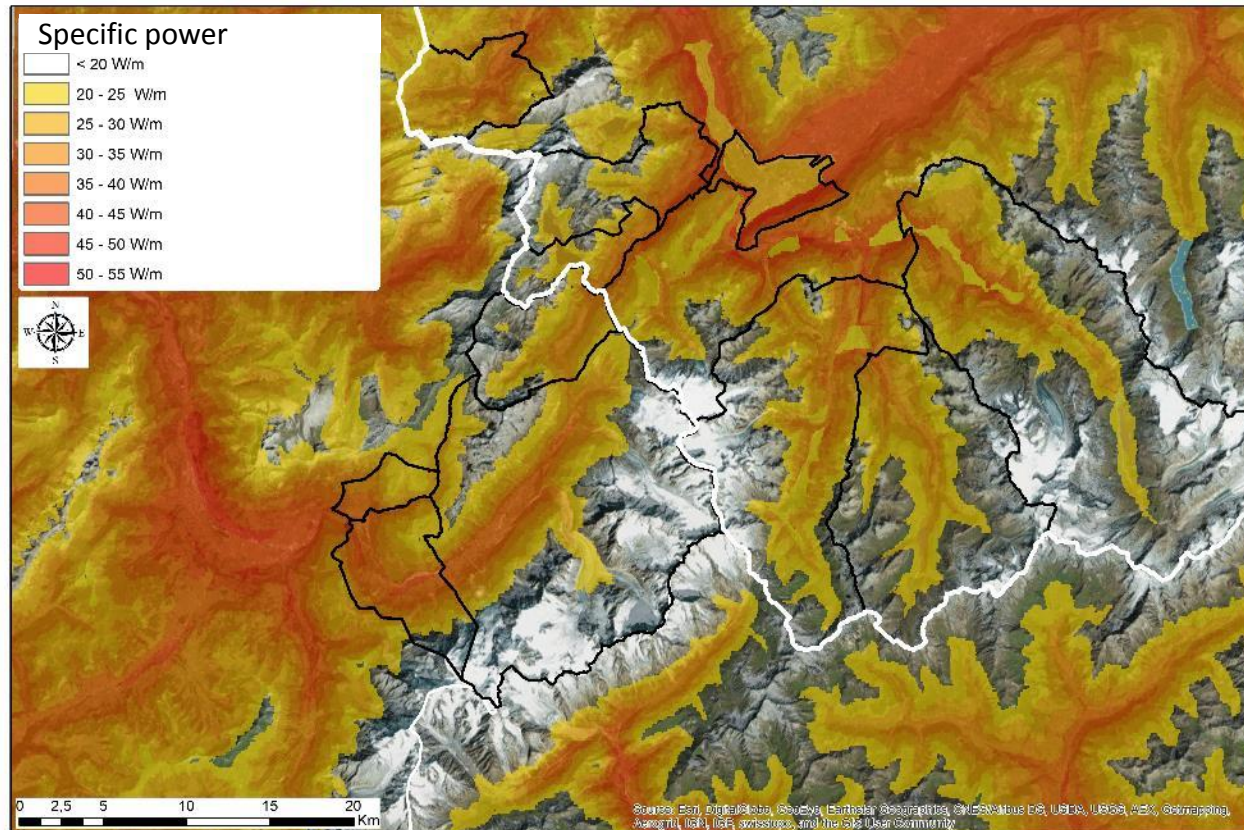
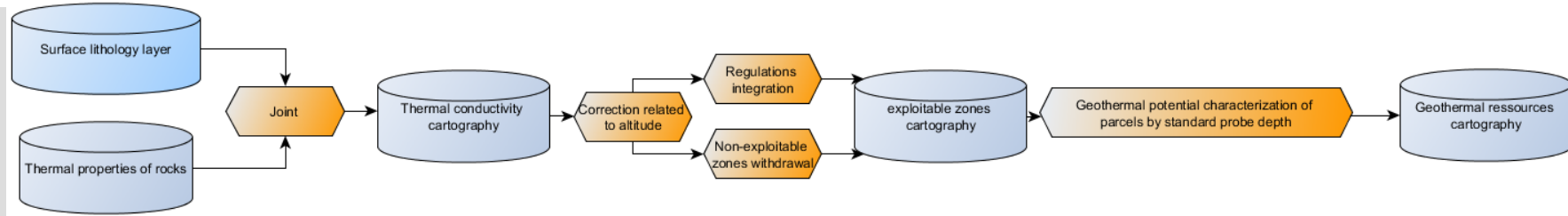
~ 83 Soccer fields of PV plants

~ 4% of best fits buildings roofs



- Existing Wind data base
- Model regulation
- Model technology constrains
- Integrate Infrastructure

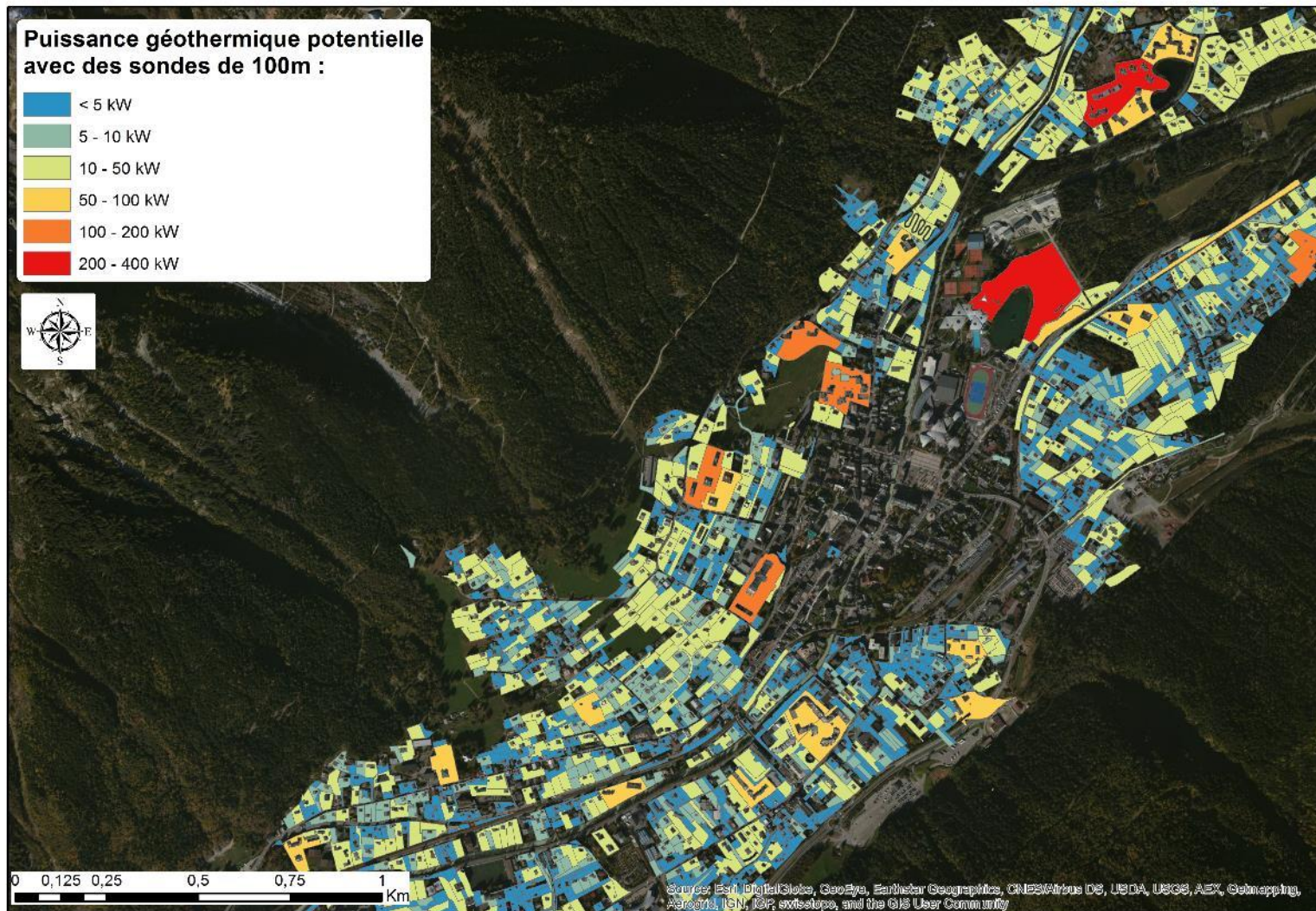




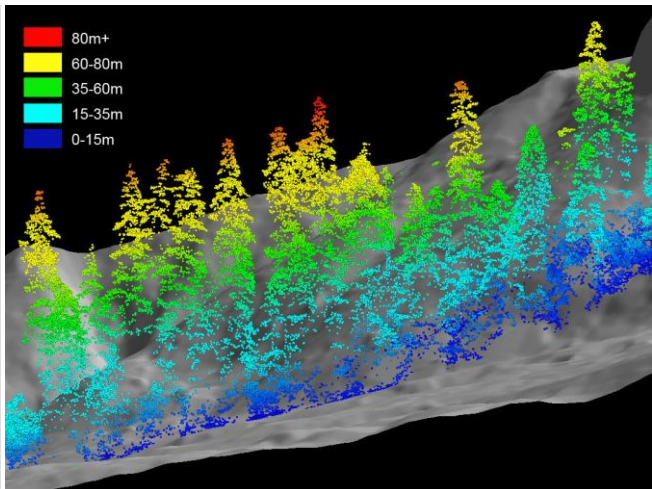
Energy Resources

low enthalpy geothermal resources - results

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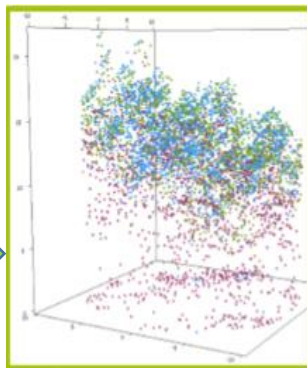
UNIGE



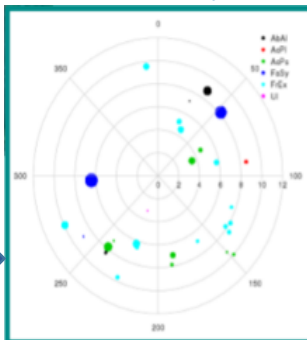
http://oregonstate.edu/terra/wp-content/uploads/2010/10/tall_tree160-LiDAR.jpg



Scatterplot

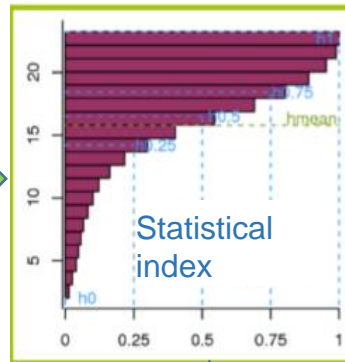


Forest inventory data

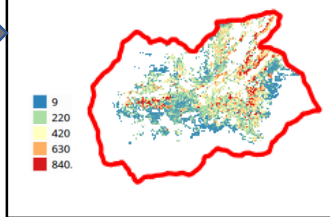


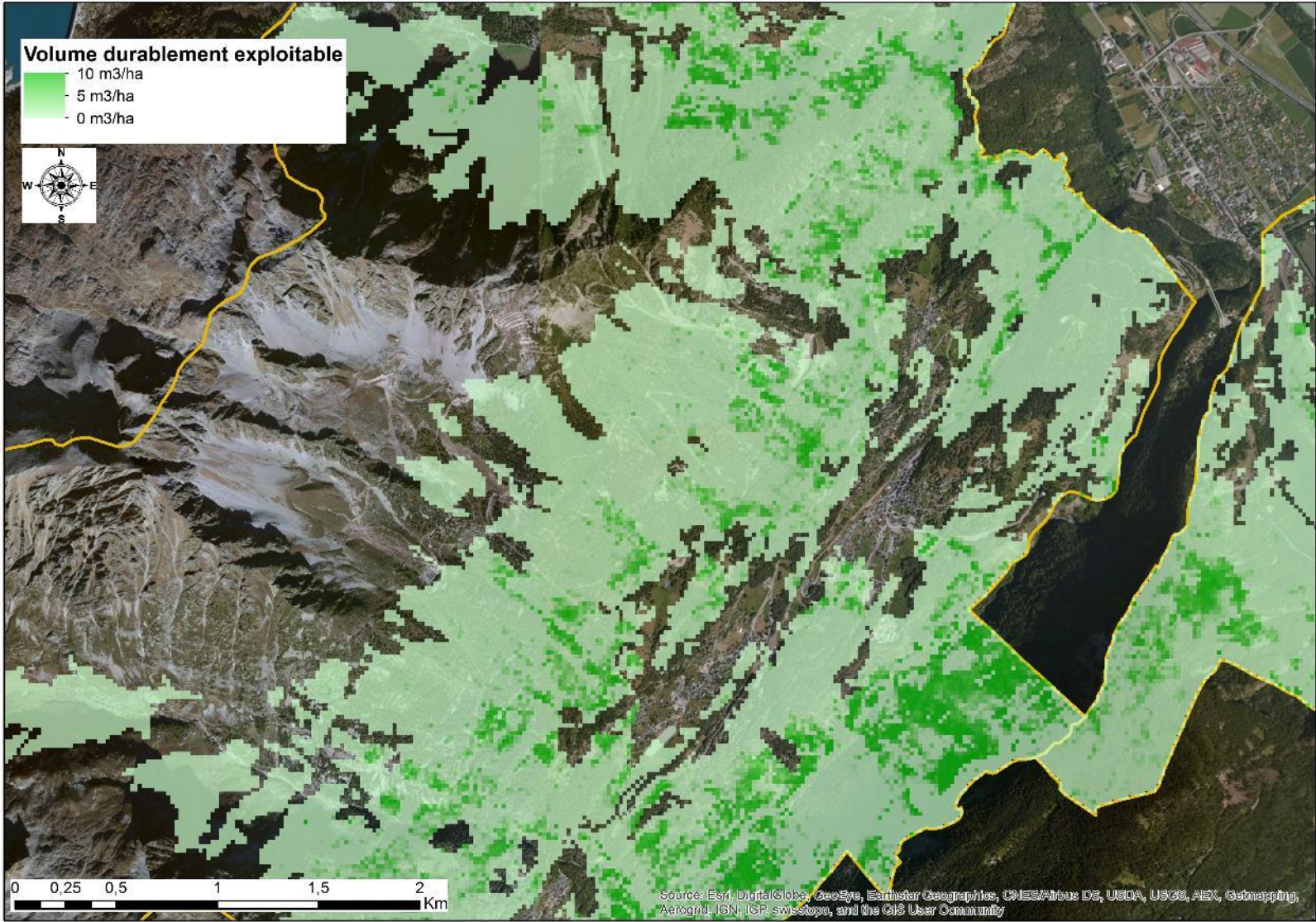
Methodology

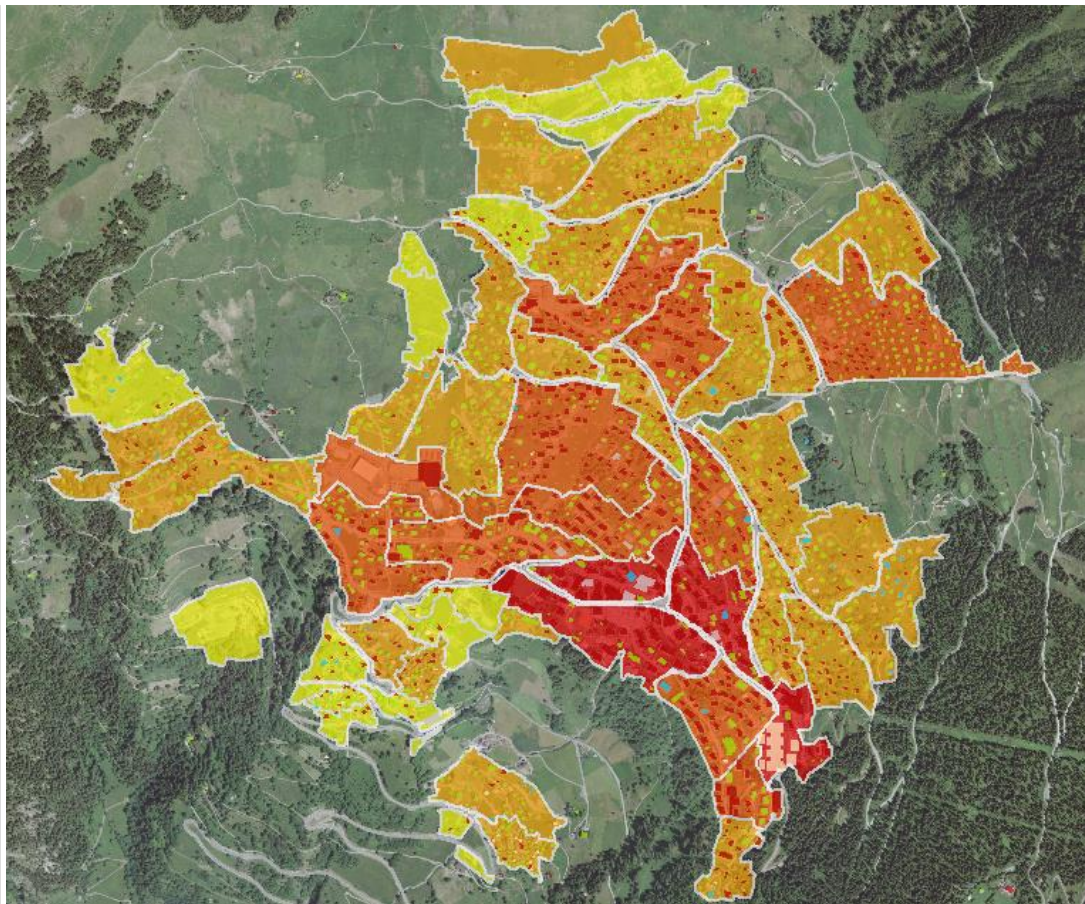
Calibration



Forest resources cartography

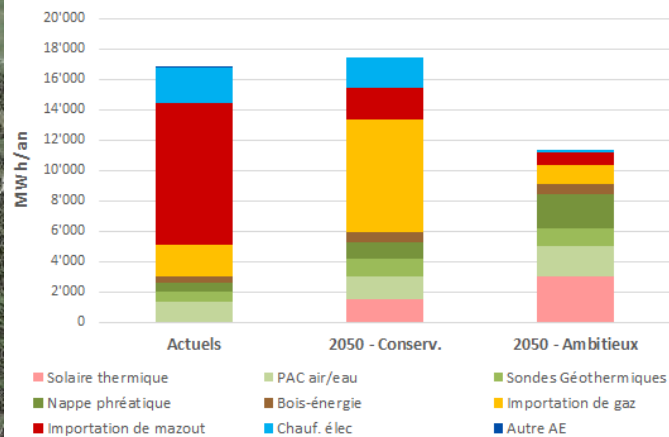






Fake data

Thermal needs supply



Navitas Consilium SA
spin-off 

Next step - 1

Dynamic computation and optimization

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Needs and
Resources
Mapping

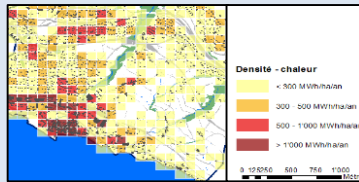
Dynamic
Simulation

Optimization
for Design

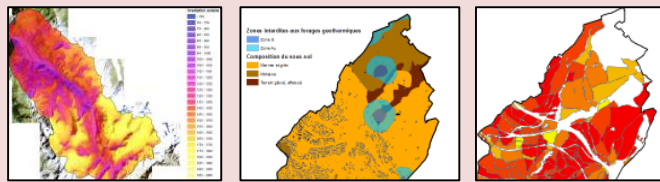
Validation and
Application

PLANETER
PLANNIFICATION ÉNERGÉTIQUE TERRITORIALE

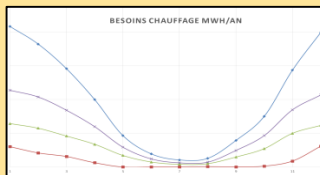
Thermal Needs



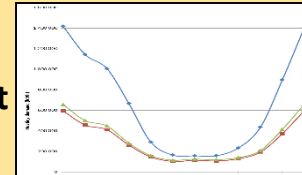
Resources



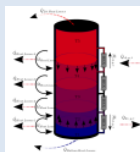
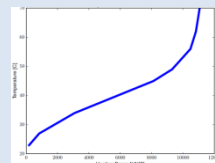
Dynamic Building Simulation, actual & future demand, with hourly results



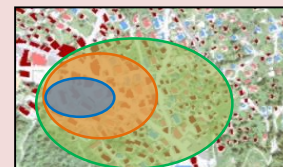
Refurbishment
model



Model Optimization



Spatial-temporal Dimension



BUSINESS MODEL

INVESTMENTS
COSTS

O&M COSTS

FINANCIAL
INDICATORS



EPFL
ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

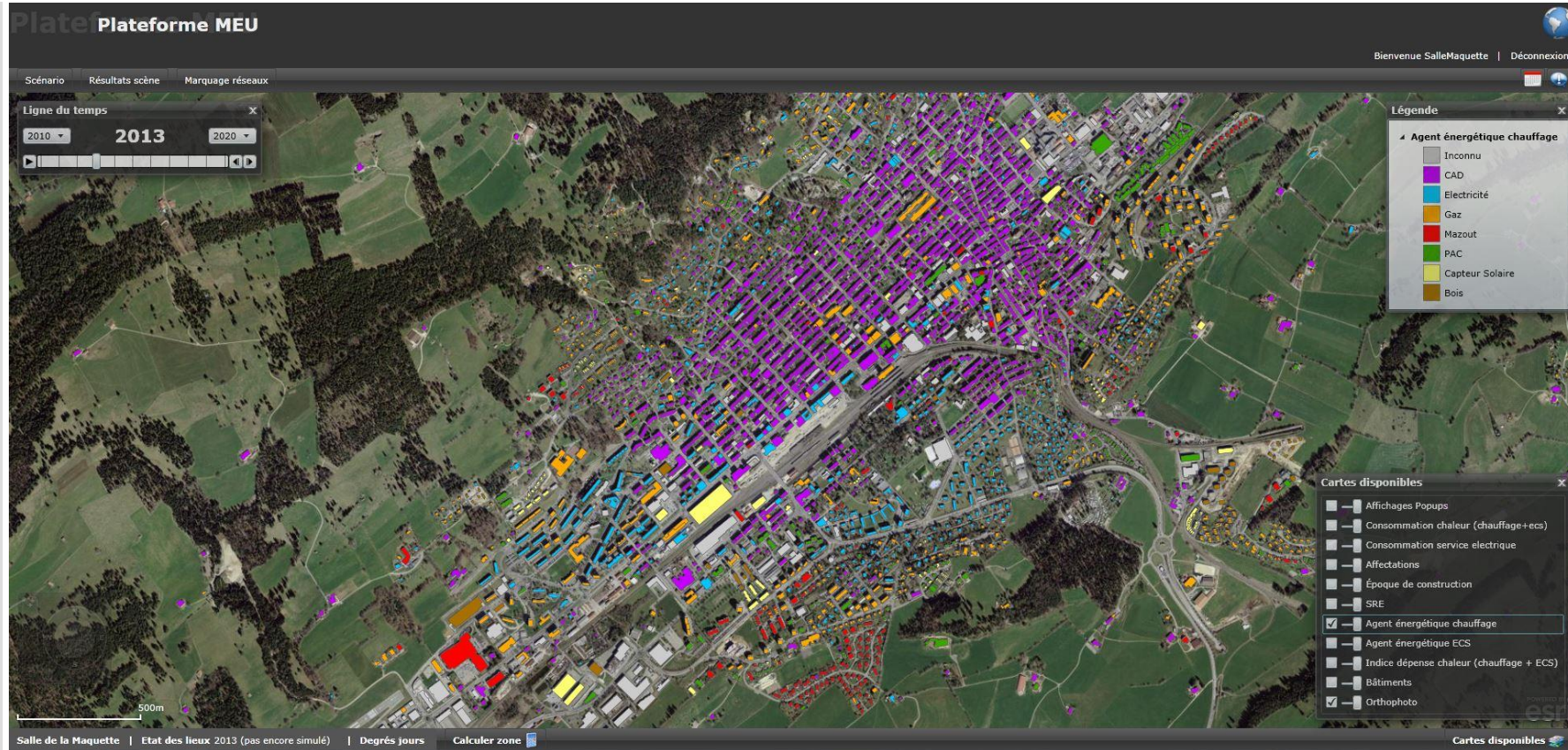
Hes·SO
VALAIS
WALLIS

Rager et al.: "Smart Heat Design: Integration and Optimization of Solar Thermal Energy and other Resources in District Energy System Design using mathematical programming", 3rd International Solar District Heating Conference (SDH), Toulouse, 2015

Next step - 2

Need of performing & practical tools

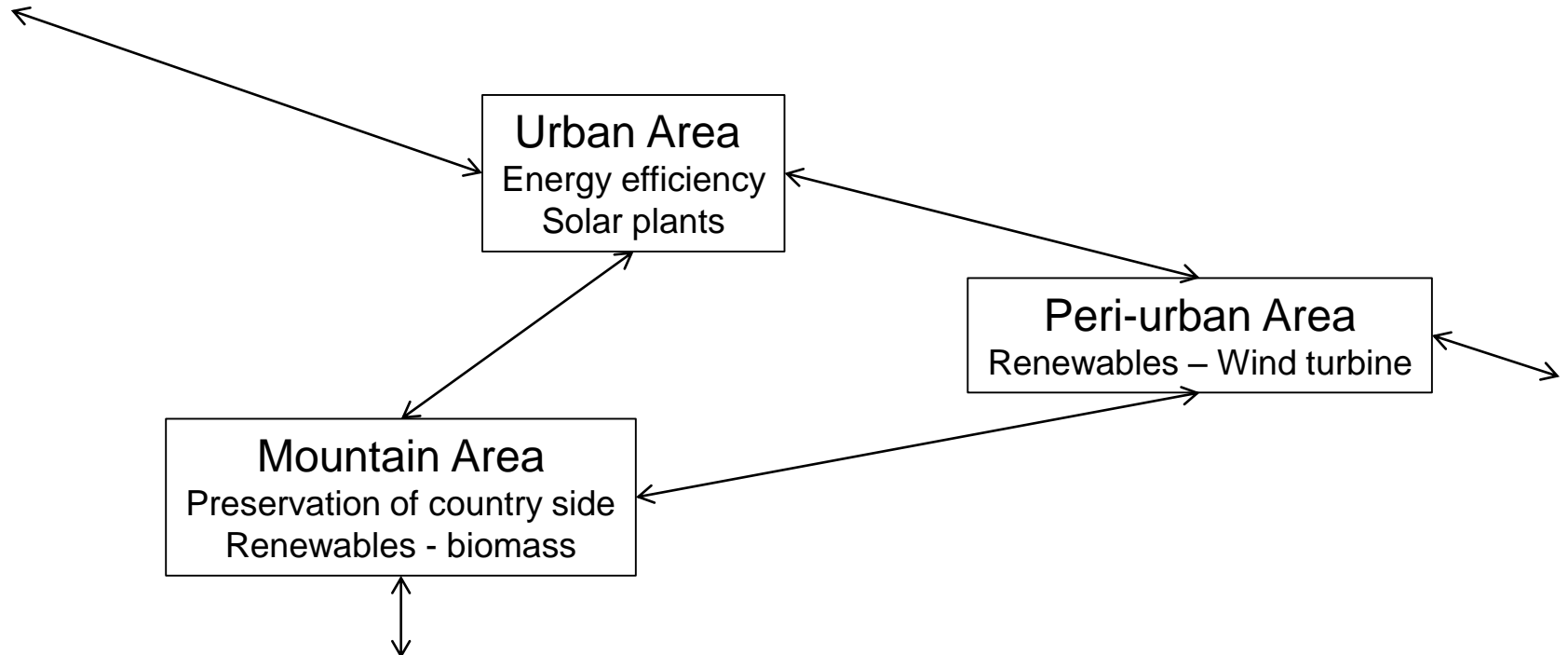
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Capezzalli & Cherix : “MEU – A cartographic-based web-platform for urban energy management and planning”, Esri international user conference, San Diego, 2012

Regions, with specific energy identity, could valorize a their full potential available renewable resources,

and interact amongst themselves through multi-energy networks (storage include), to lead to a smarter energy system, for the whole territory



Territorial Energy Systems

***We are at the
beggining...***

Let's do

- ***research,***
- ***Innovation,***
- ***pioneer projects***

