

Digital approach for spatial energy planning

–

Example of good practice in Switzerland

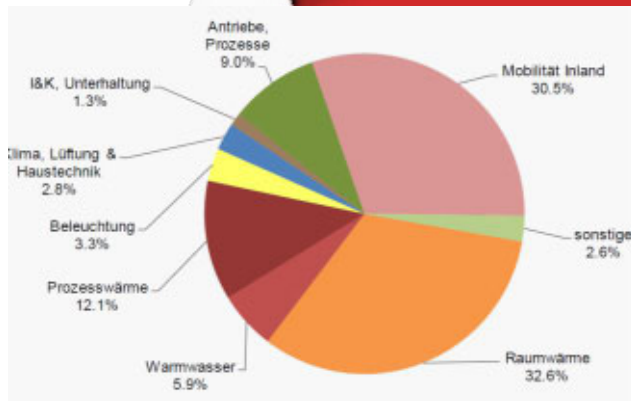
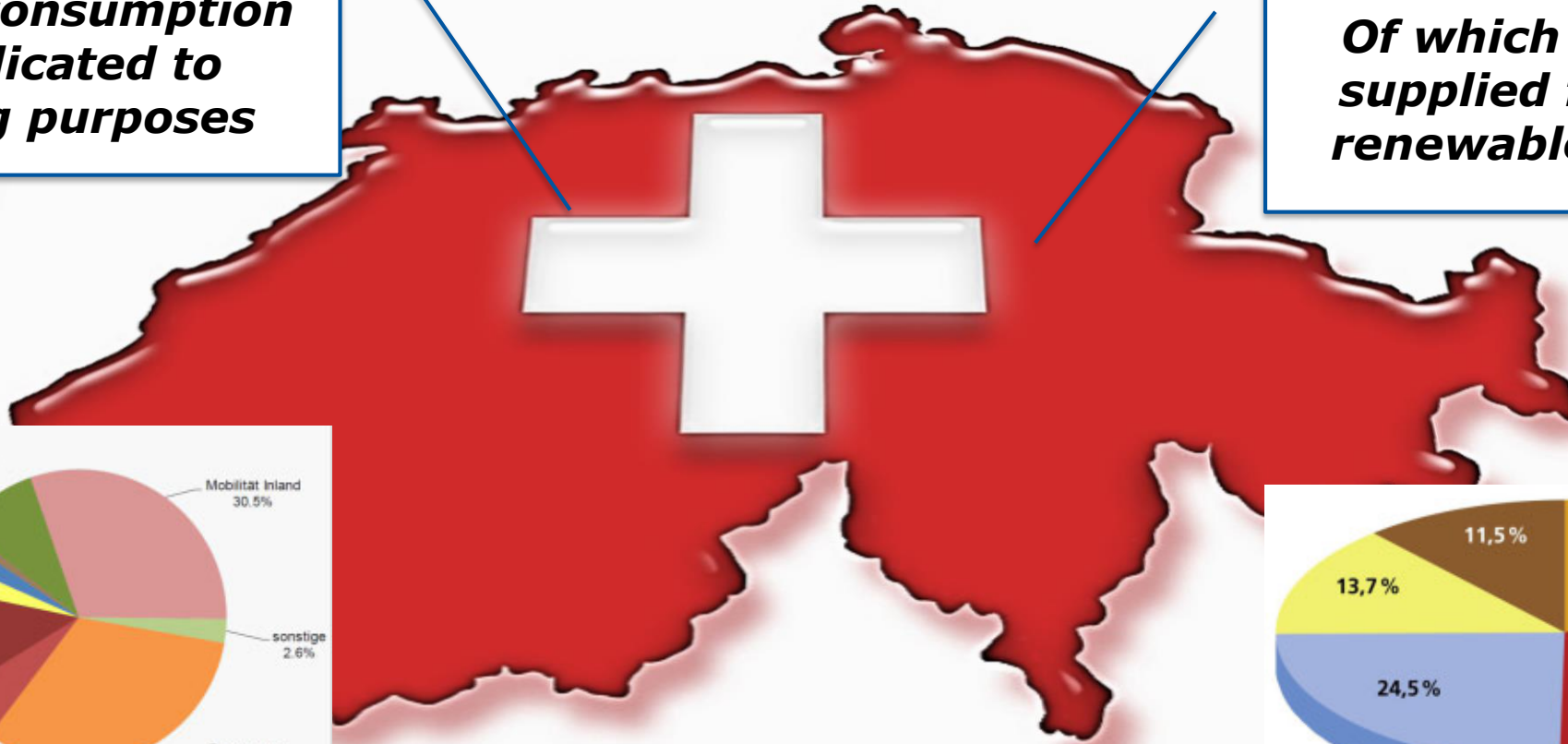
ISEC 2018, Graz

Gabriel Ruiz, 4th October 2018

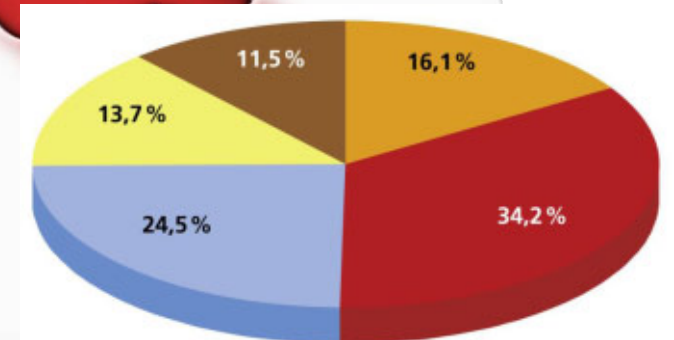
Spatial Energy Planning – Why?

~50% of the total energy consumption is dedicated to heating purposes

Of which ~66% is supplied from non renewable sources

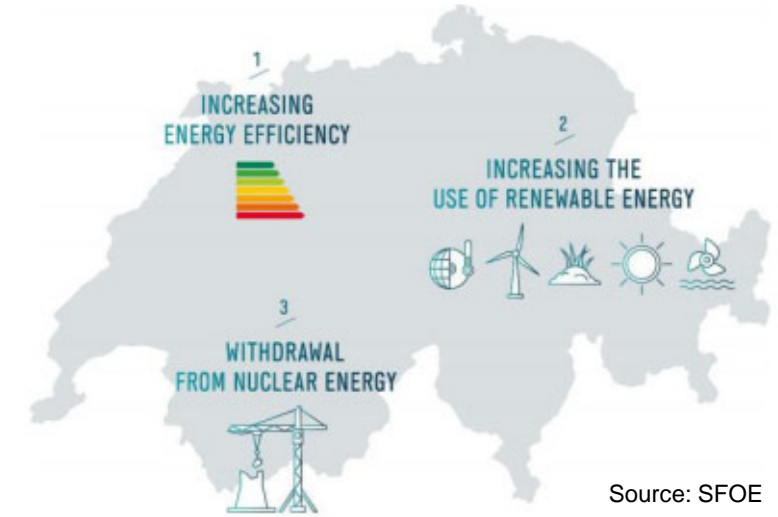
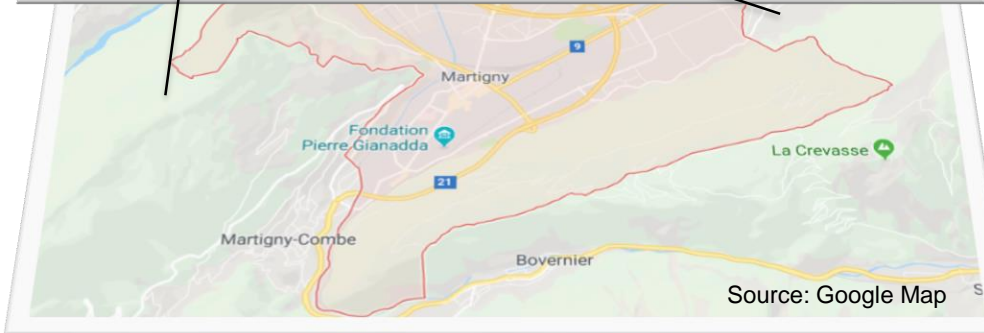
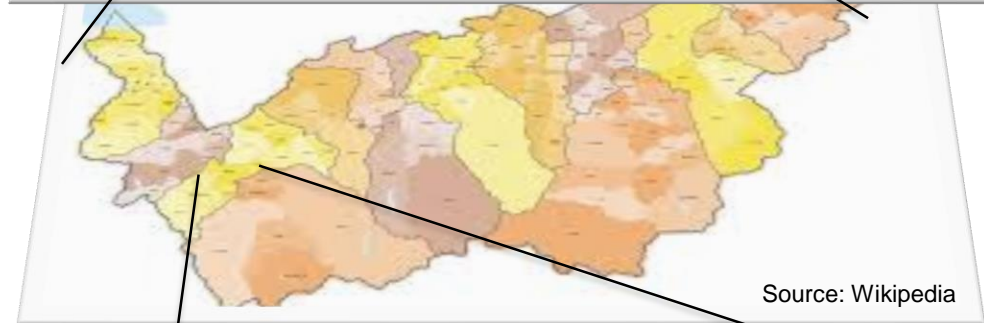
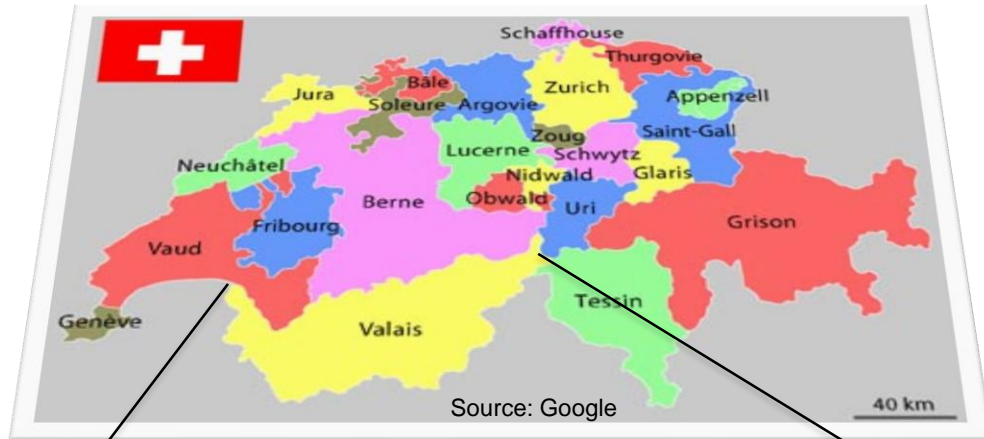


Prozentuale Anteile der ausgewählten Verwendungszwecke am inländischen Endenergieverbrauch (SFOE 2016)



Aufteilung des Endverbrauchs nach Energieträgern (SFOE 2016)

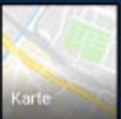
Spatial Energy Planning – Why?



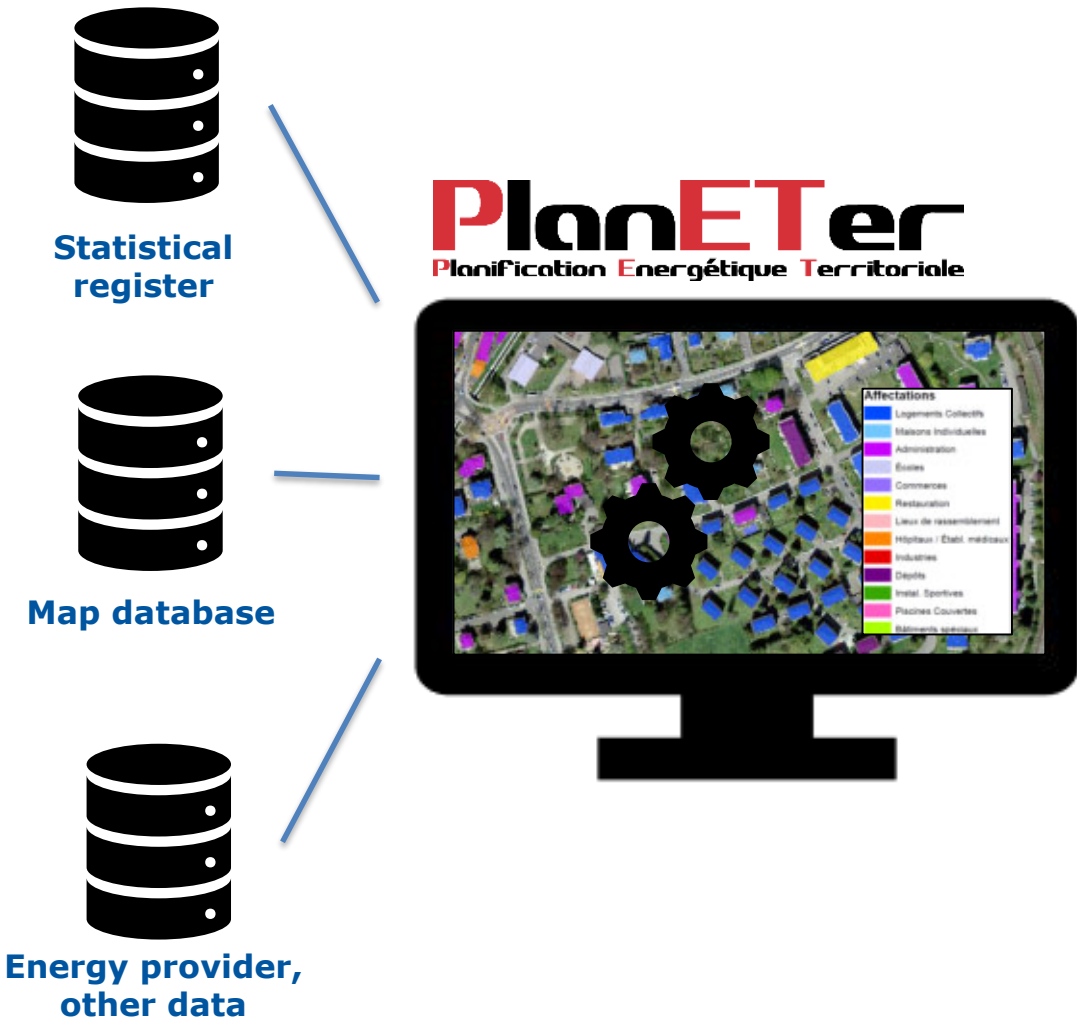
Source: Convention des Maires

Spatial Energy Planning – How?

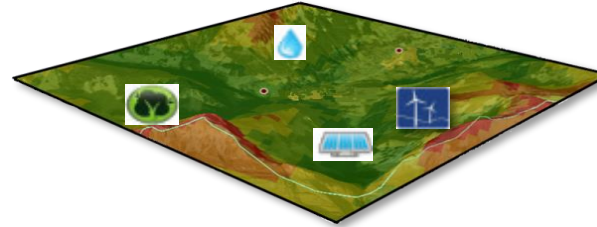
Need/requirement to plan the energy supply and related infrastructures by using the local energy sources



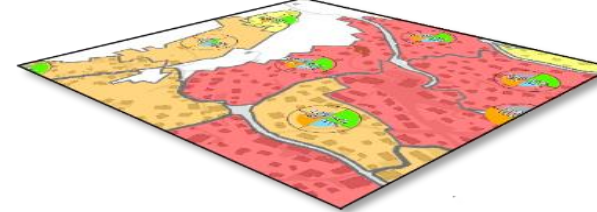
The PlanETer approach: diagnosis



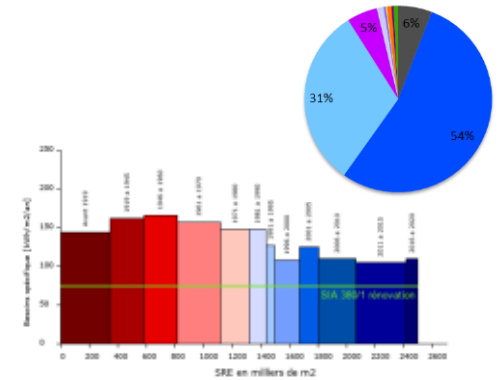
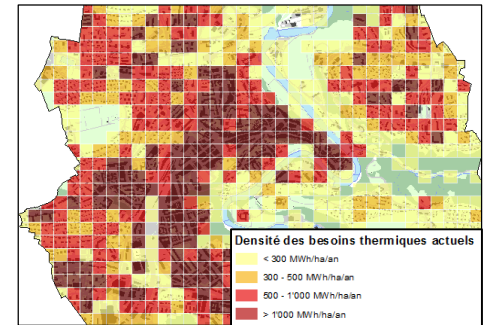
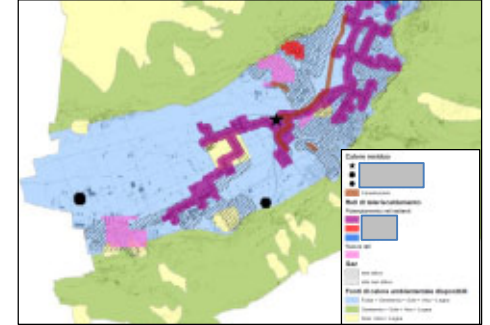
Resources



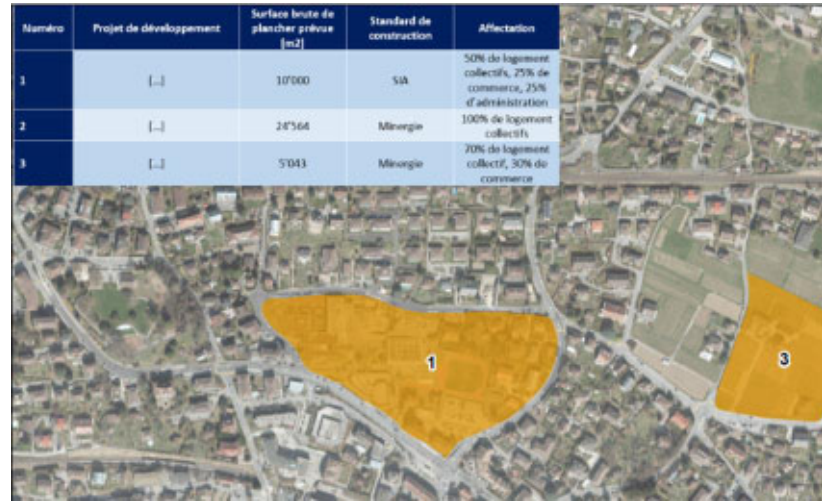
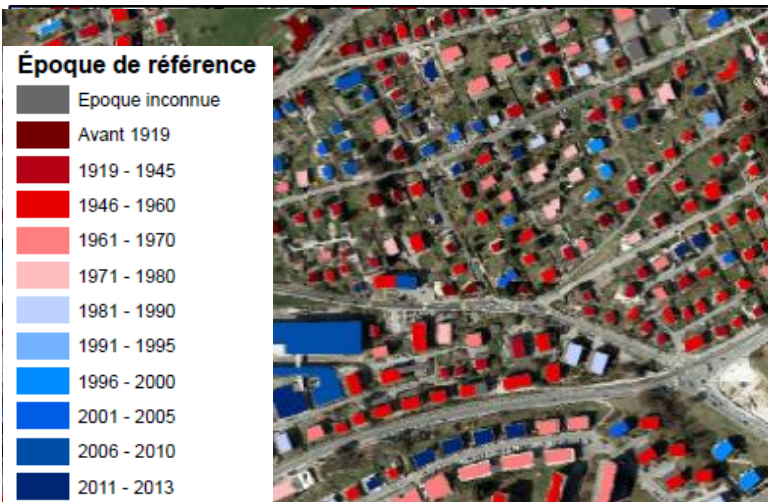
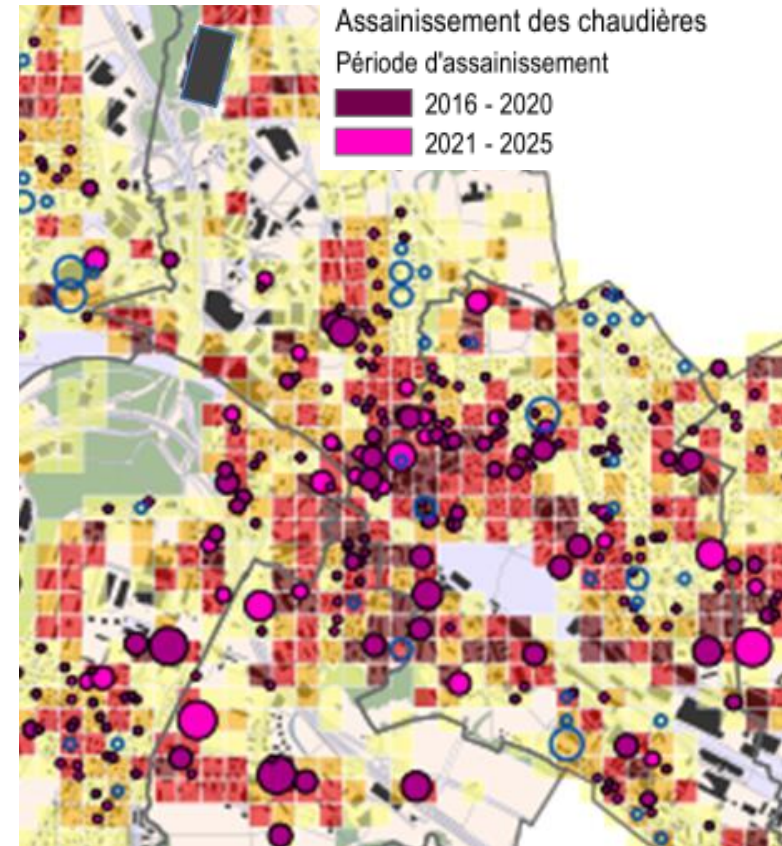
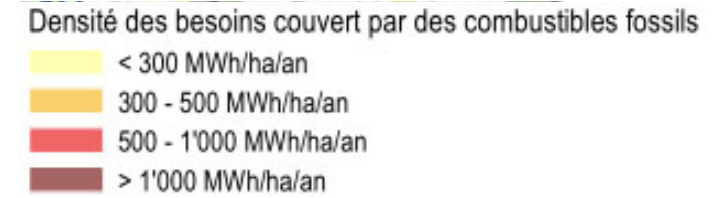
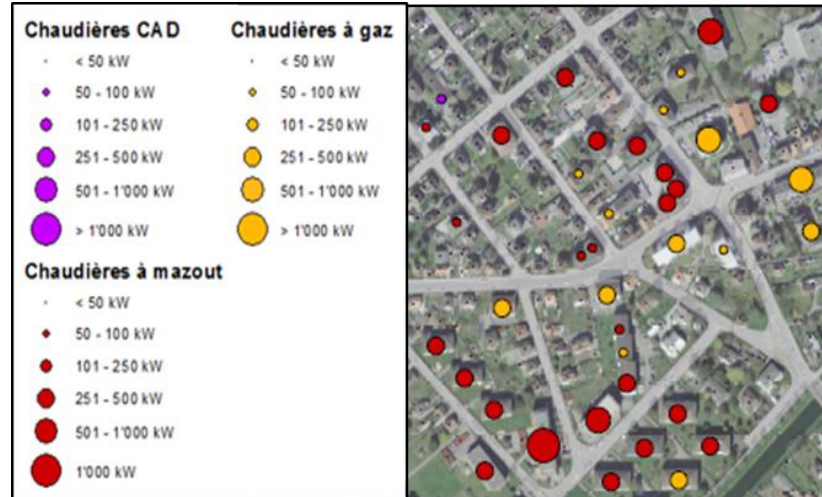
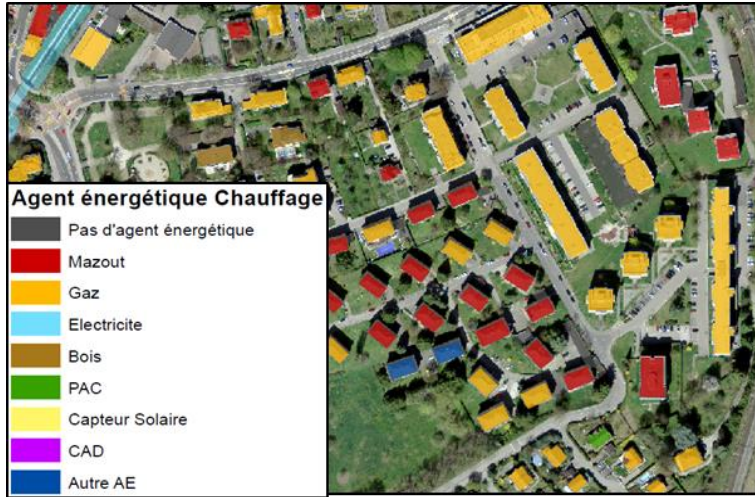
Demand (actual and future)



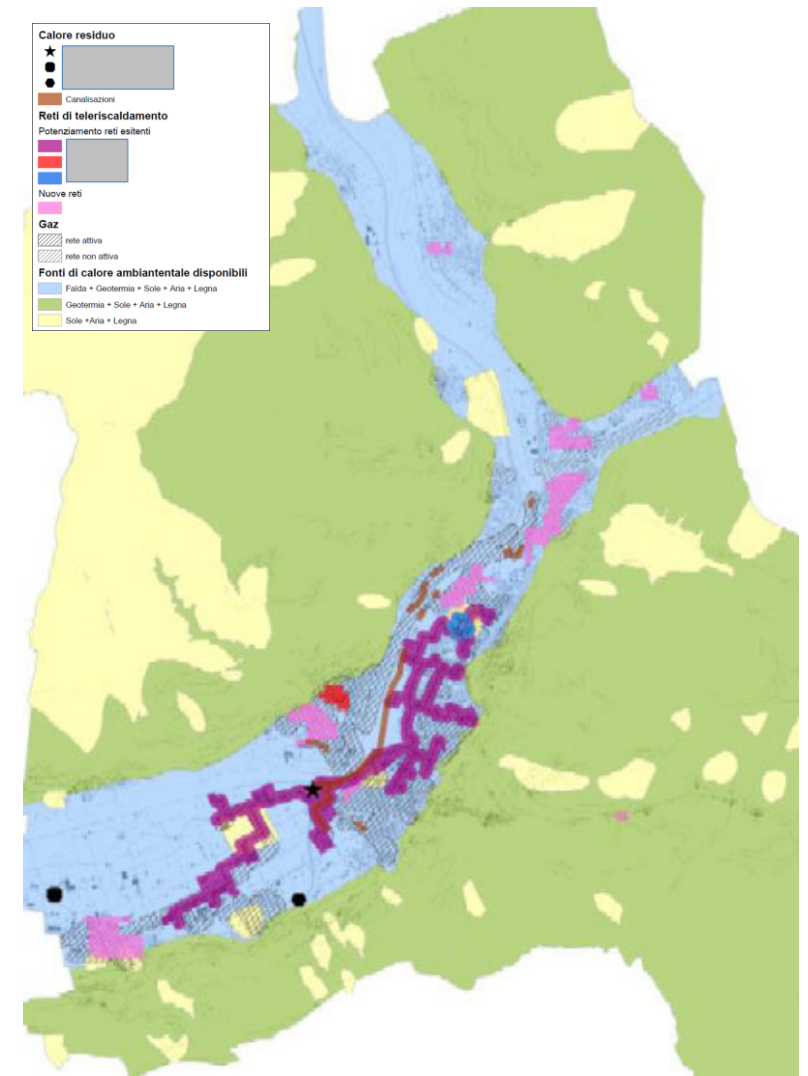
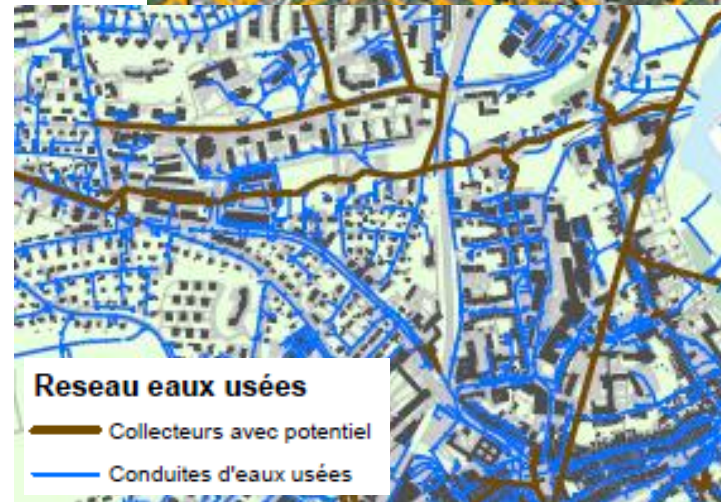
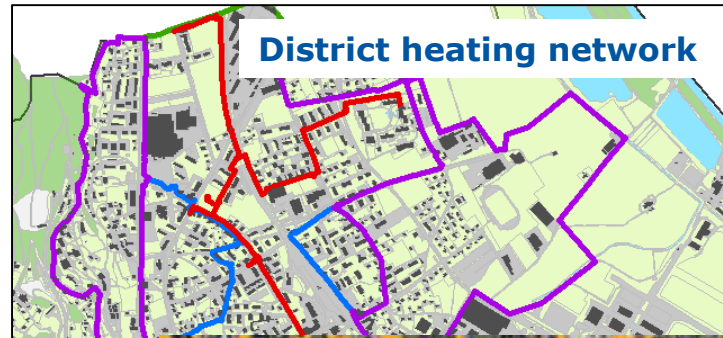
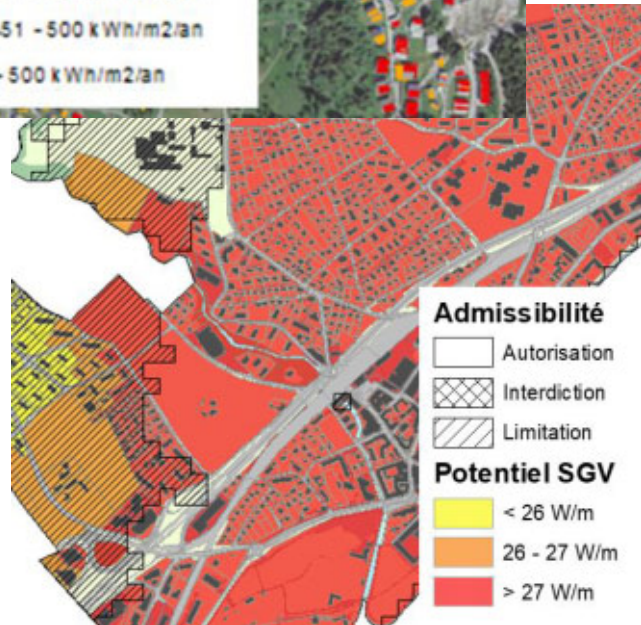
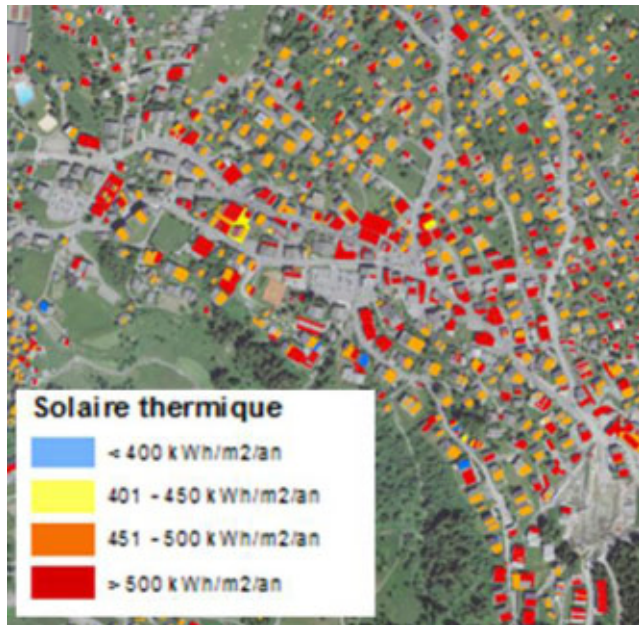
Territory



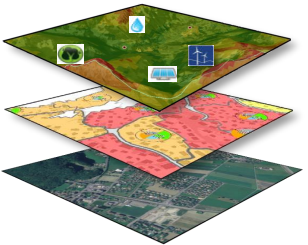
The PlanETer approach: energy demand



The PlanETer approach: energy resources



The PlanETer approach : scenarios



Diagnosis

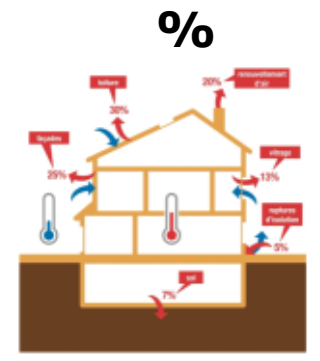
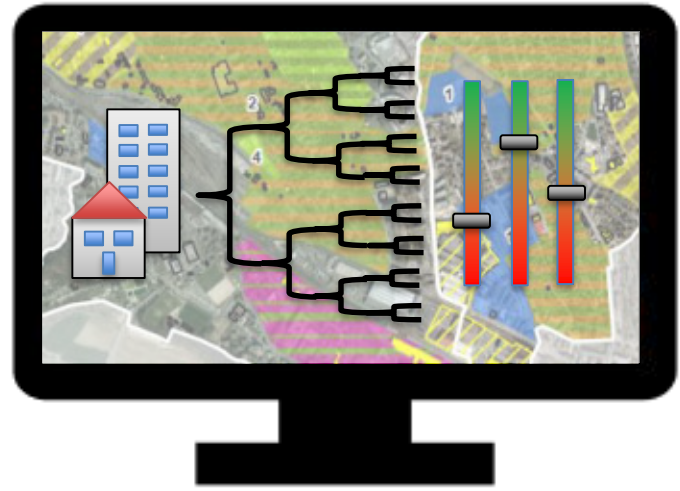


Actors

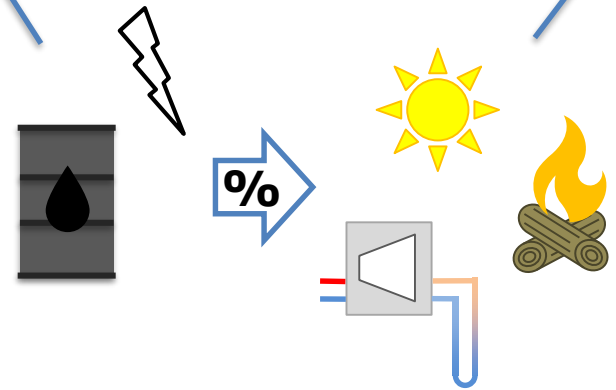


Goals

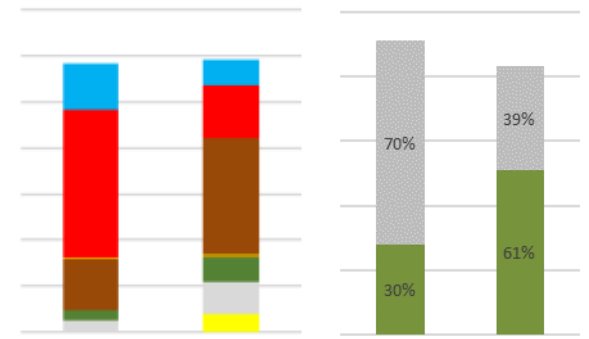
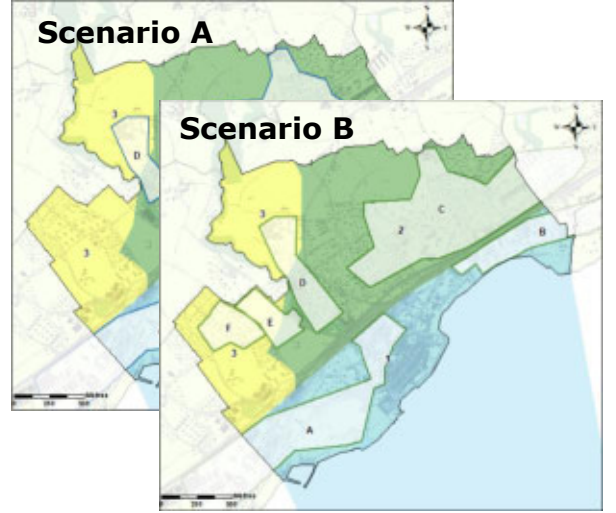
PlanETer
Planification Energétique Territoriale



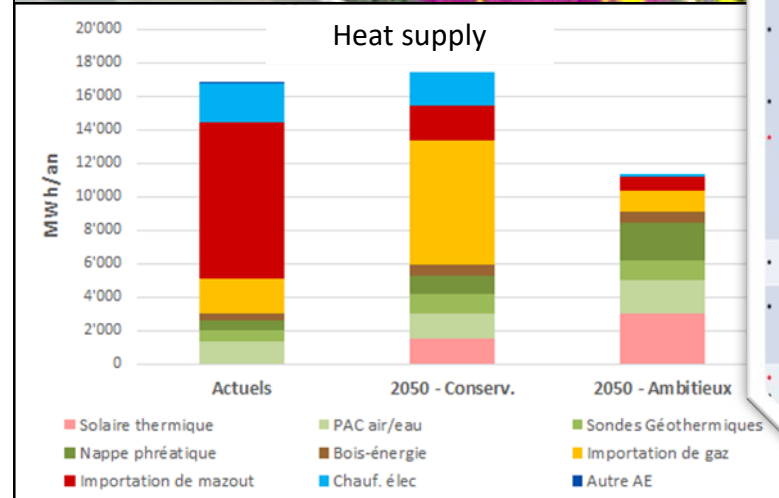
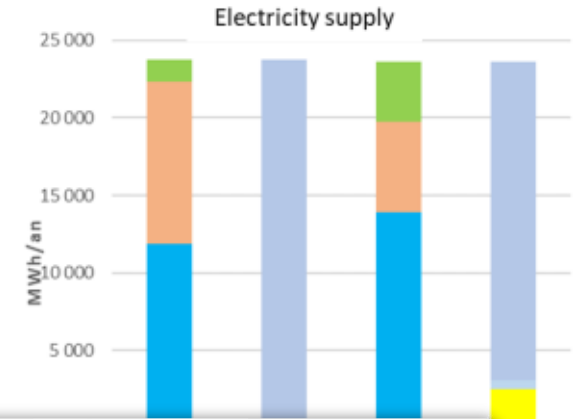
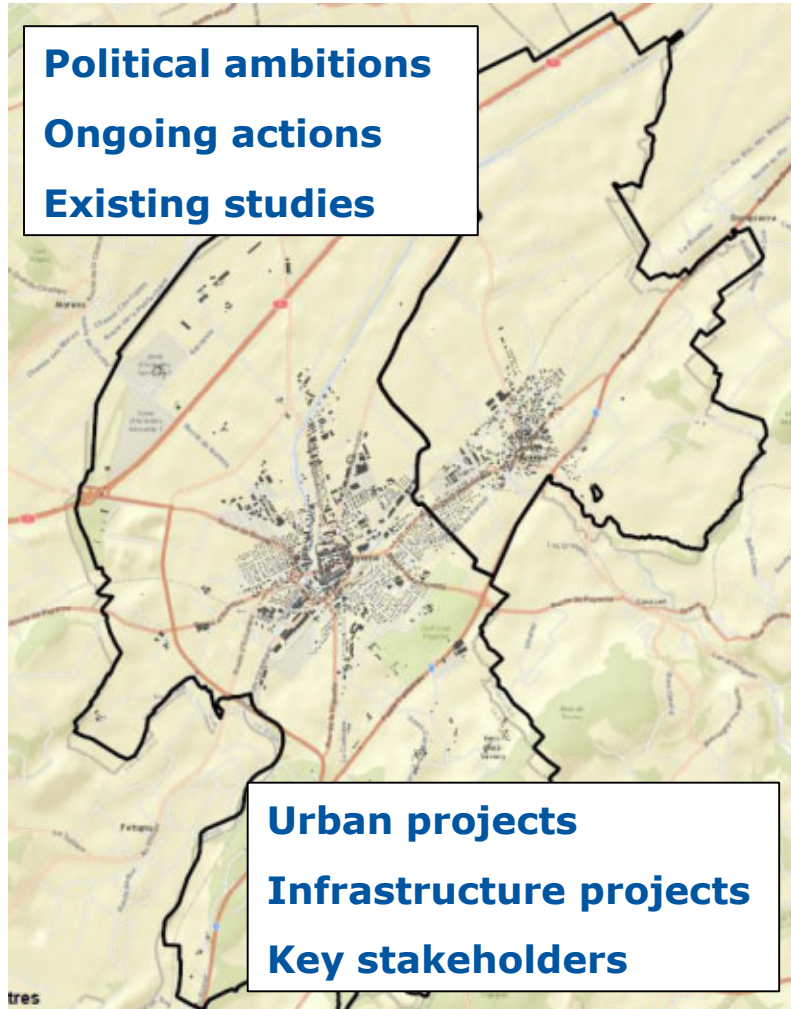
Refurbishment



Substitution



The PlanETer approach : building an energy strategy



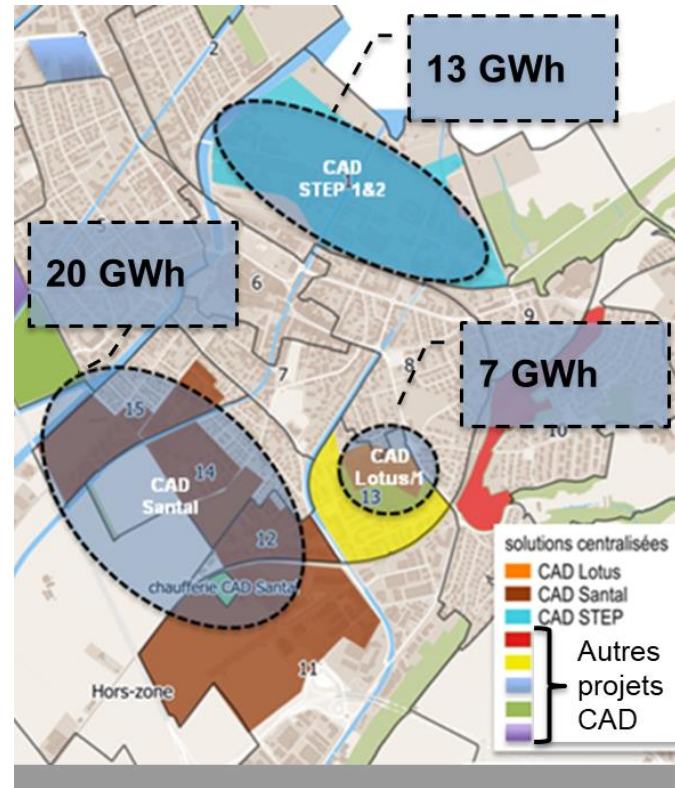
Mesures			
1 - Parc bâti et rénov.	2 - Réseaux CAD	3 - Install. individuelles	4 - Efficience électrique
<ul style="list-style-type: none"> Planifier la rénovation des bâtiments publics Favoriser les audits énergétiques avec estimation du coût des travaux et rentabilité Cibler les bâtiments prioritaires à une réno. Entrer dans le comité de gestion des quartiers (via parcelles de dépendance) pour influencer les conventions d'équipement et d'aménagement 	<ul style="list-style-type: none"> Etudier la faisabilité des projets identifiés et leurs modes de financement Motiver les bâtiments à un raccordement dans les zones recommandées Cibler les bâtiments selon le délai d'assainissement de leur chaudière Motiver la rénovation du bâtiment pour libérer de l'énergie au profit d'autres raccordements 	<ul style="list-style-type: none"> Motiver les bâtiments à un changement de système énergétique selon la stratégie retenue Cibler les bâtiments concernés selon le délai d'assainissement de leur chaudière Favoriser les études (devis) pour un changement de système énergétique 	<ul style="list-style-type: none"> Installer des panneaux solaires PV sur les bâtiments désignés comme prioritaires Assainir l'éclairage des locaux communs Motiver l'achat de courant produit avec une part plus importante de renouvelable (cas de Renens)
<ul style="list-style-type: none"> Favoriser l'association de la rénovation et du changement de leur système de chauffage Aider financièrement les actions de rénovation 	<ul style="list-style-type: none"> Aider financièrement le raccordement au CAD 	<ul style="list-style-type: none"> Aider financièrement la substitution des systèmes de chauffage utilisant des énergies fossiles 	<ul style="list-style-type: none"> Favoriser l'association de solaire PV avec l'implantation de PAC Aider financièrement les installations solaires PV
<ul style="list-style-type: none"> Informez des programmes de subventionnement Réaliser des campagnes de sensibilisation 			
<ul style="list-style-type: none"> Offrir des conseils personnalisés sur les besoins de la 	<ul style="list-style-type: none"> Communiquer sur la stratégie énergétique retenue (recommandation pour chaque bâtiment en fonction de sa situation géographique) 	<ul style="list-style-type: none"> Communiquer sur les potentiels d'énergie solaire à disposition 	

What's next?

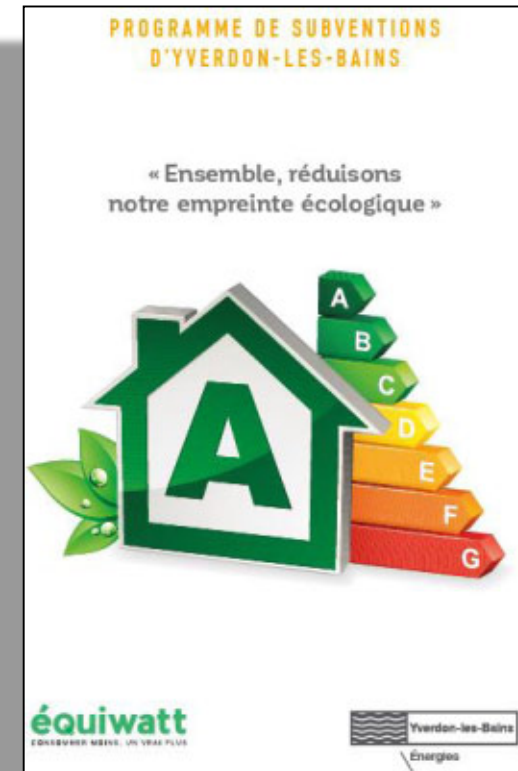
Adapt local regulations



Launch projects



Build a subsidy program



Analyse, monitor & adapt



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GRIDS energyCity



>>> LIVE DEMO



Gebiet: Adlikon - Gemeinde Regensdorf

DASHBOARD



RENEWABLES ↻

73%

Prozentualer Anteil erneuerbarer Energien



E-MOBILITY ↻

22

139 insgesamt

neue Ladesäulenvorschläge in deinem Gebiet



CO2 BALANCE ↻

14.1

t CO₂/Kopf

- Sektor 1
- Sektor 2
- Sektor 3
- Sektor 4
- Alle Sektoren

BUILDINGS ↻

18.1 K Einwohner



23.4 K Gebäude



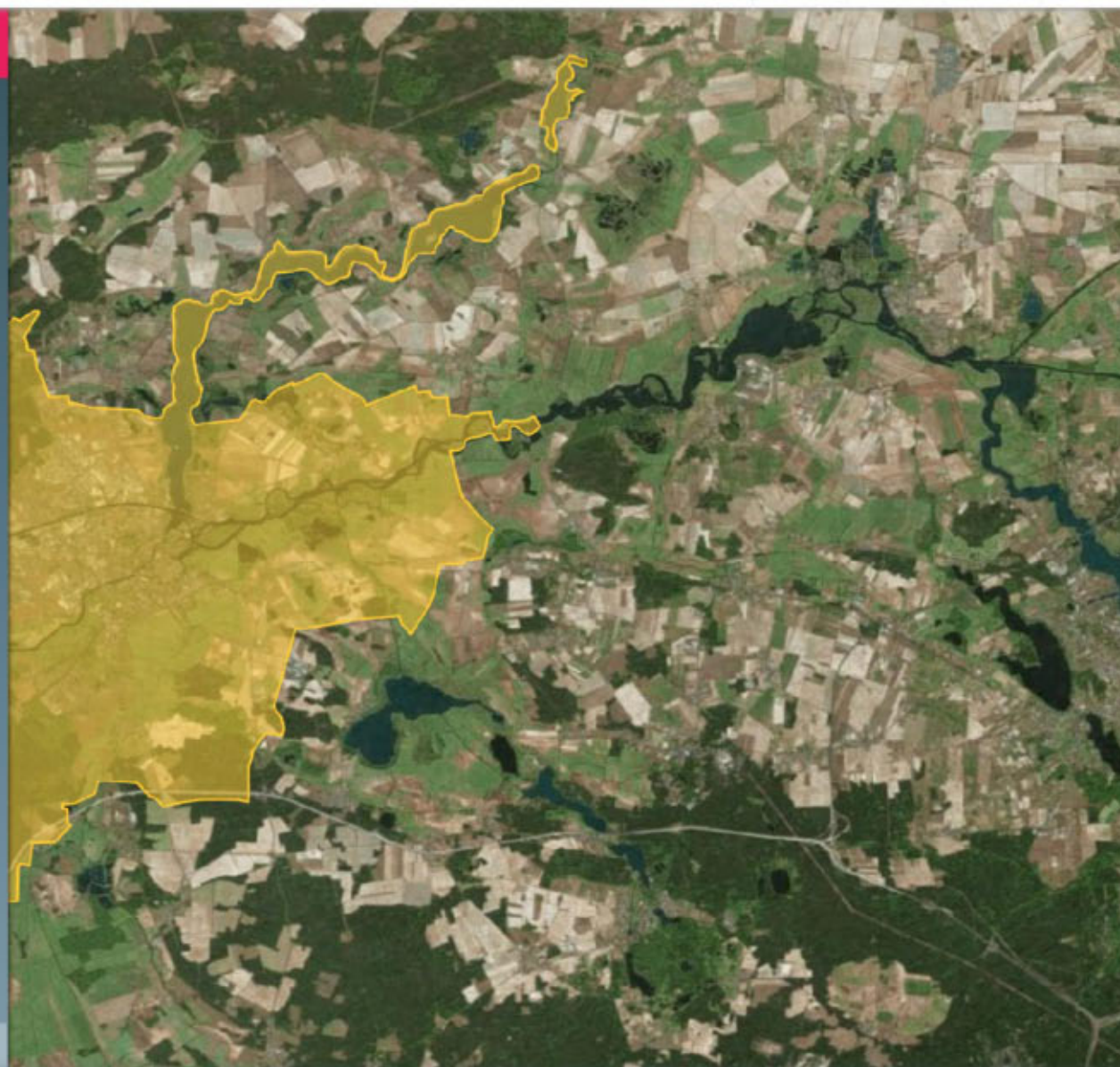
233 M m² Fläche

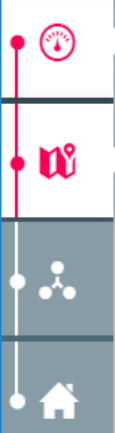


PUBLIC LIGHTING ↻

2.473

Lampen gesamt





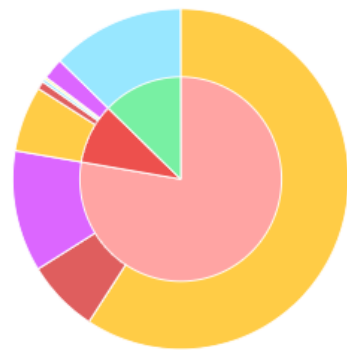
Primary energy consumption
12,809 MWh/a

Final energy consumption
11,840 MWh/a

Heated living space
69,644 m²

CO₂ Emission
2,255.3 t CO₂eq

Local energy mix



Outer circle
Consumption by energy carrier
Inner circle
Consumption by energy service

Energy reference area
501.7 m² | 10 ha

Heat consumption
62.86 MWh/a | 50 GWh/a

Heating energy carrier

- Unknown
- non-existend
- Air
- Geothermal probe
- Geothermal coil pipe
- Water
- Gas
- Fuel oil
- Wood
- Logs
- Wood pellets
- Wood chips
- Thermal withdrawals
- Electricity



Legende

- Buildings > Main category type**
- Unknown
 - Multi family house
 - Single family house
 - Administration
 - School
 - Stores
 - Catering
 - Meeting places
 - Medical institutions
 - Industry
 - Deposit
 - Sports facility
 - Swimming pools
 - Special

Multiselection

Rotation



Enter a search term...

1800 Vevey
Building ID 840546

2015

- KPI
- Detail Information**
- Energy Conversion technologies
- Needs & consumption
- Indicators



General features

Facade

Windows

Roof

Basement

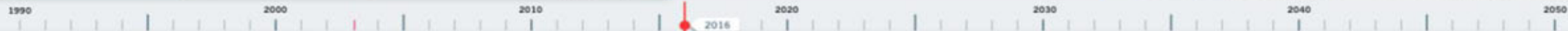
Heat / Cooling

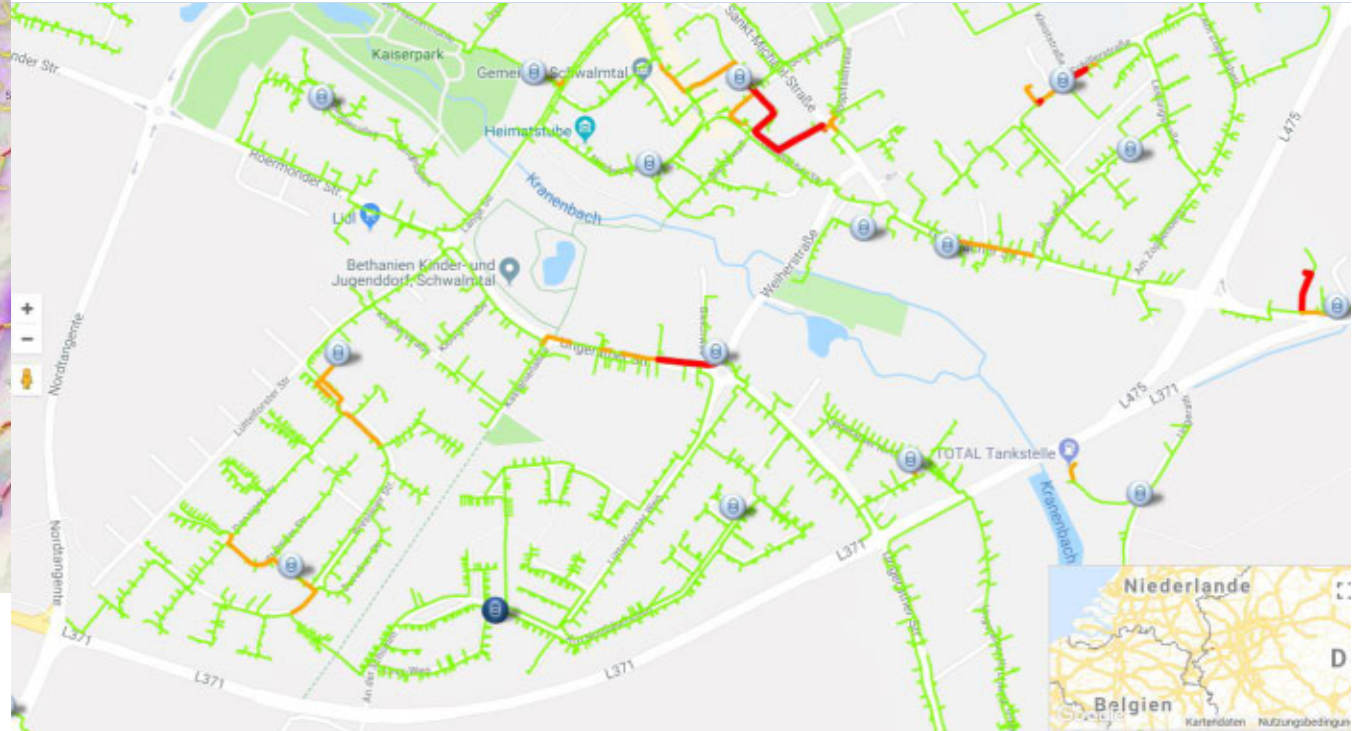
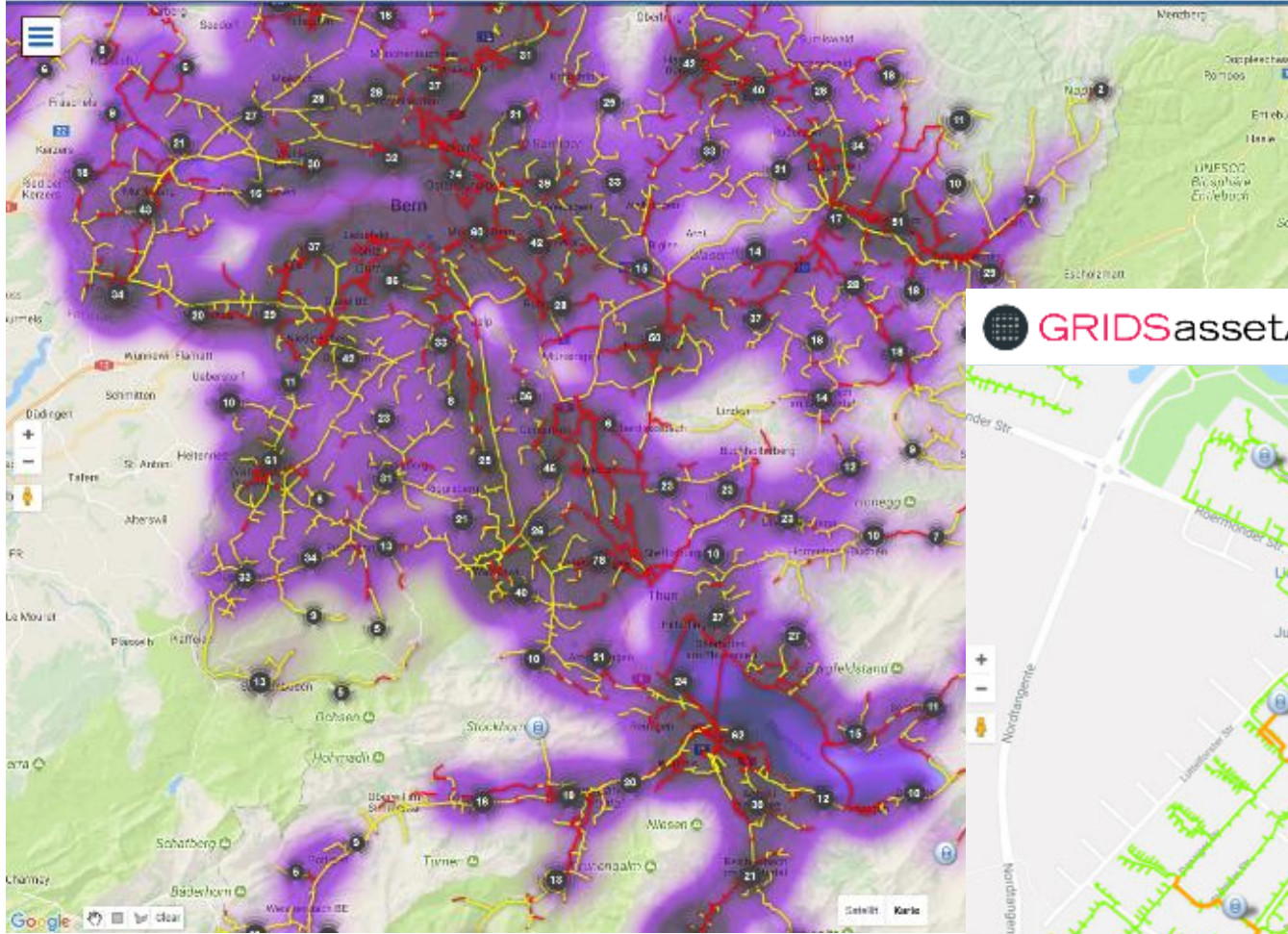
Building ID	840546
Construction year	1992
Main allocation	Administration
Building status	Unknown Multi family house Single family house
Energy label	Administration
Altitude	School Stores Catering Meeting places Medical institutions Industry Deposit Sports facility Swimming pools Special
Living area (m²)	
Height	
Volume (m3)	
Number of floors	5
Neighboring buildings	Freestanding building
Number of residential units	



Multiselection

Rotation

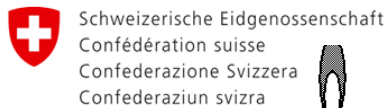




From the "MEU" project to GRIDS energyCity



2009 - 2014
R&D



FOGA

Forschungs-, Entwicklungs- und Förderungsfonds der schweizerischen Gasindustrie
Fonds de recherche, de développement et de soutien de l'industrie gazière suisse



Several papers, articles and presentation to CH and International conferences

- P. Puerto, G. Cherix, L. Darmayan, M. Pernet and M. Capezzali, "Towards pre-dimensioning of natural gas networks on a web-platform", WGC 2015, Paris, 2015.
- P. Puerto, M. Pernet, M. Capezzali, L. Darmayan and G. Cherix, "The MEU web platform: A tool dedicated to urban energy management", CISBAT 2015, Lausanne Switzerland, 2015.
- M. Capezzali, "Un nouvel instrument de planification énergétique bientôt sur le marché", domotech magazine N°1, 16-18, 2015.
- M. Capezzali, G. Cherix, L. Darmayan, S. Restani, P. Puerto, J. Rager. "Evolution of and additional functionalities to the city energy planning platform MEU", Proceedings of the International Gas Union Research Conference (IGRC), Copenhagen (DK), September 2014.
- M. Capezzali; G. Cherix, D. Perez; J. Rager; H.-B. Püttgen, "Une plateforme web pour les villes", Acqua&Gas N°7/8, Fachartikel, 2013.
- G. Blanc, G. Cherix, L. Darmayan, "How to plan the desirable development of the energy use and supply of a local territory with the use of GIS tool", 8th Conference on Sustainable Development of Energy, Water and Environment Systems, Dubrovnik (Croatia), September 2013
- M. Capezzali, G. Cherix, "MEU – A cartographic-based web-platform for urban energy management and planning", ESRI International User Conference 2012, San Diego (USA), July 2012.
- ...

From the "MEU" project to GRIDS energyCity



Navitas Consilium SA
une spin off du cem



2009 - 2014
R&D

2015 - 2016
Prototype

2017 - 2018
Go to market



Énergies



Ville de Vevey
Direction de l'architecture,
des infrastructures et de
l'énergie
Case postale
1800 Vevey

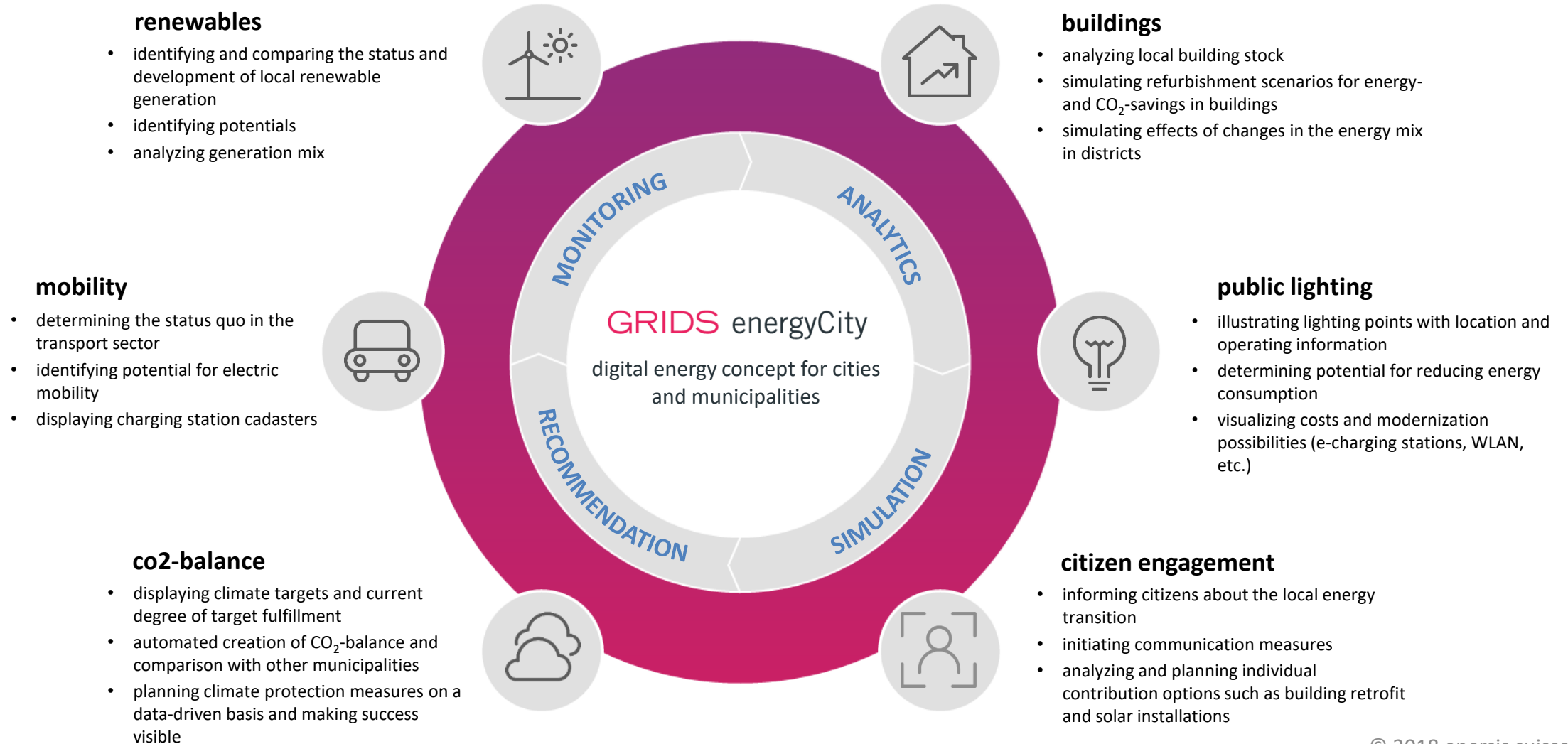
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra



FOGA

Forschungs-, Entwicklungs- und Förderungsfonds der schweizerischen Gasindustrie
Fonds de recherche, de développement et de soutien de l'industrie gazière suisse

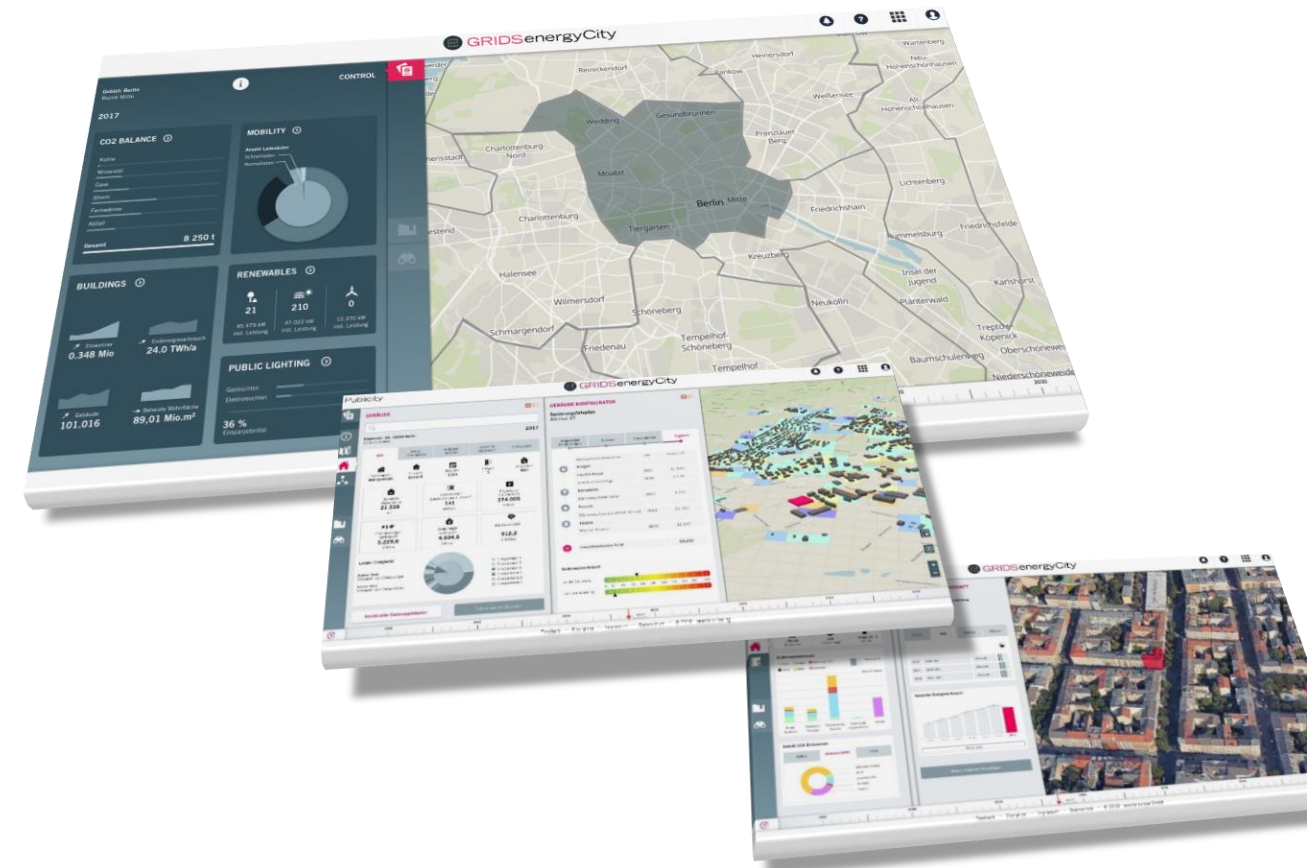




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Our digital platform for the urban energy transition

- **Create transparency** among the complex interrelations and processes in the city
- **Creates synergies** by connecting the different sectors and perspectives
- **Leads to good decisions** thanks to the simulation of scenarios and measures
- **Supports the implementation** of valid strategies and targets
- **Simplifies data management** and reduces the cost of data collection
- **Allows a continuous monitoring** of progress
- **Professionalize the communication** with stakeholders thus facilitates the implementation of the energy transition





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