British Embassy Berne

swisspower

ENERGY & CLIMATE HACK

31 August & 1 September 2021



British Embassy Berne

swisspower

Open Data .ch

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Bundesamt für Umwelt BAFU
Office fédéral de l'environnement OFEV
Ufficio federale dell'ambiente UFAM
Uffizi federal d'ambient UFAM

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Bundesamt für Energie BFE
Swiss Federal Office of Energy SFOE

Energie Stadt Bern

Energie Wasser Bern ewb

swisstopo

YASAI
GROW MORE WITH LESS

Empa
Materials Science and Technology

u b
UNIVERSITÄT BERN
OESCHGER CENTRE
CLIMATE CHANGE RESEARCH

FHNW GEOMATIK

e-swissolar

aliunid

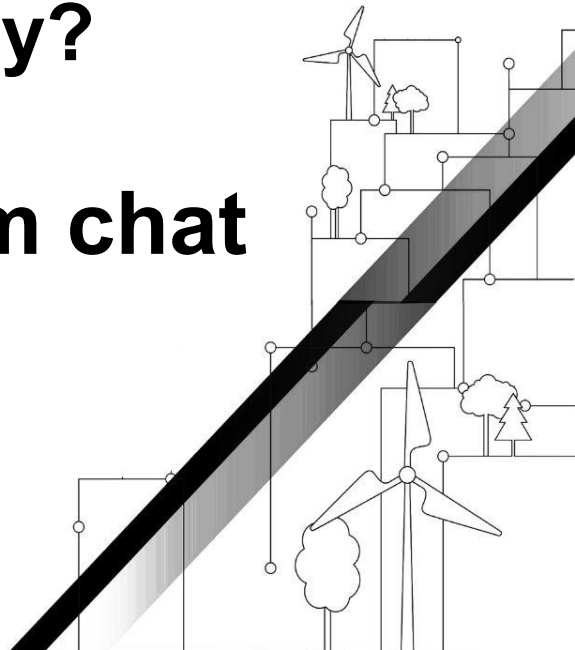
OST
Ostschweizer Fachhochschule



But before anything else:

How are you doing today?

Check the link in the Zoom chat



and:

What’s your favourite tipp for decarbonizing one’s life?

Check the link in the Zoom chat

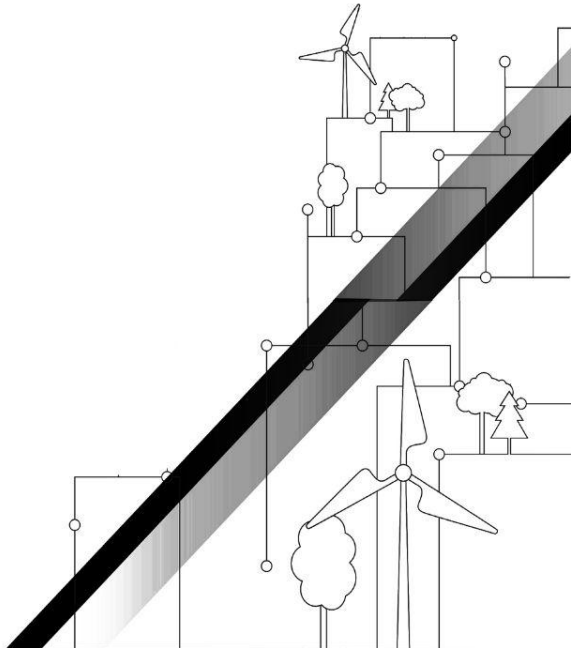


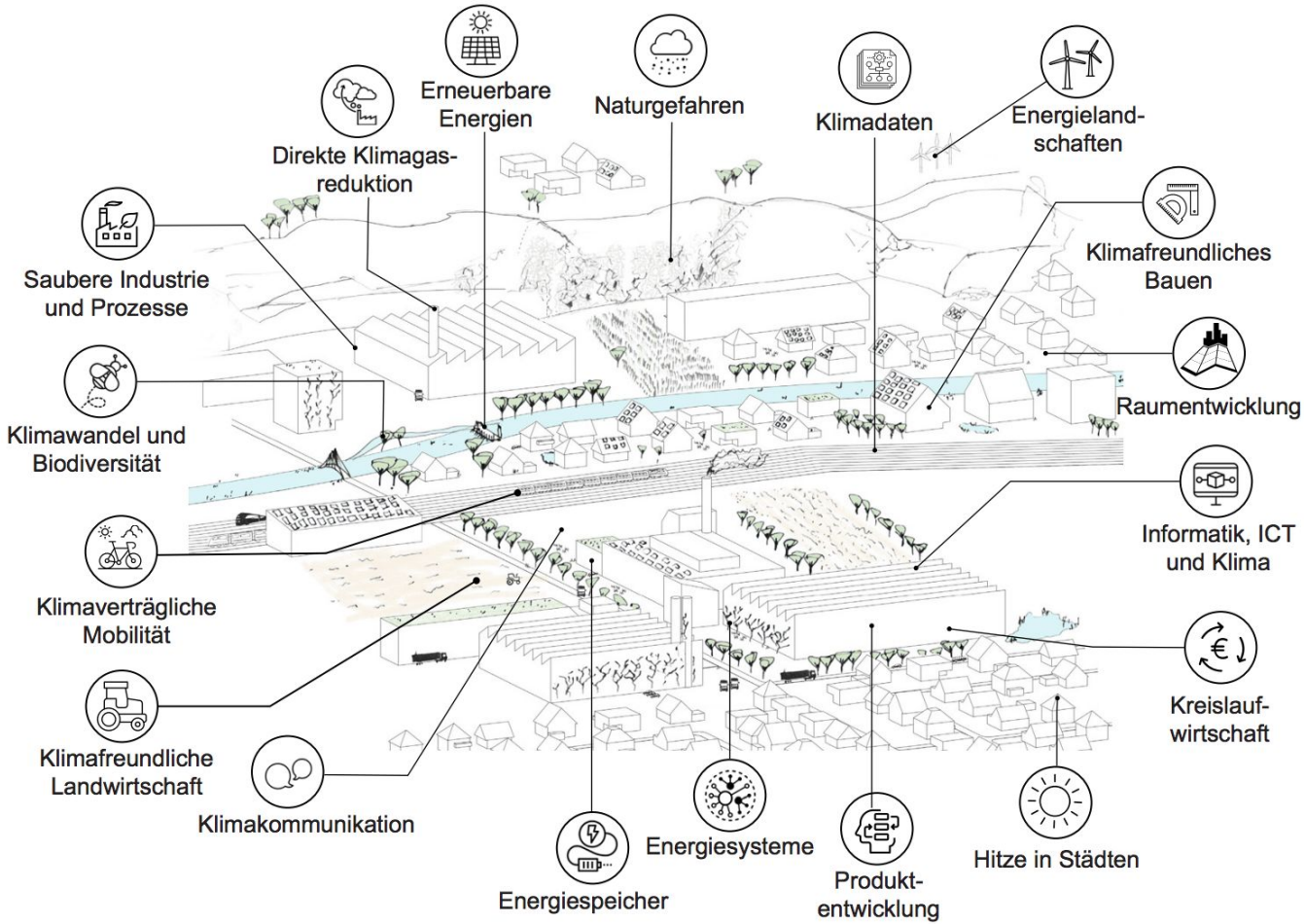
Average reduction per person per year in tonnes of CO_2 equivalent

- Live car-free **2.04**
- Refurbishment /renovation **0.895**
- Battery electric car **1.95**
- Vegan diet **0.8**
- One less long-haul flight per year **1.68**
- Heat pump **0.795**
- Renewable energy **1.6**
- Improved cooking equipment **0.65**
- Public transport **0.98**
- Renewable-based heating **0.64**

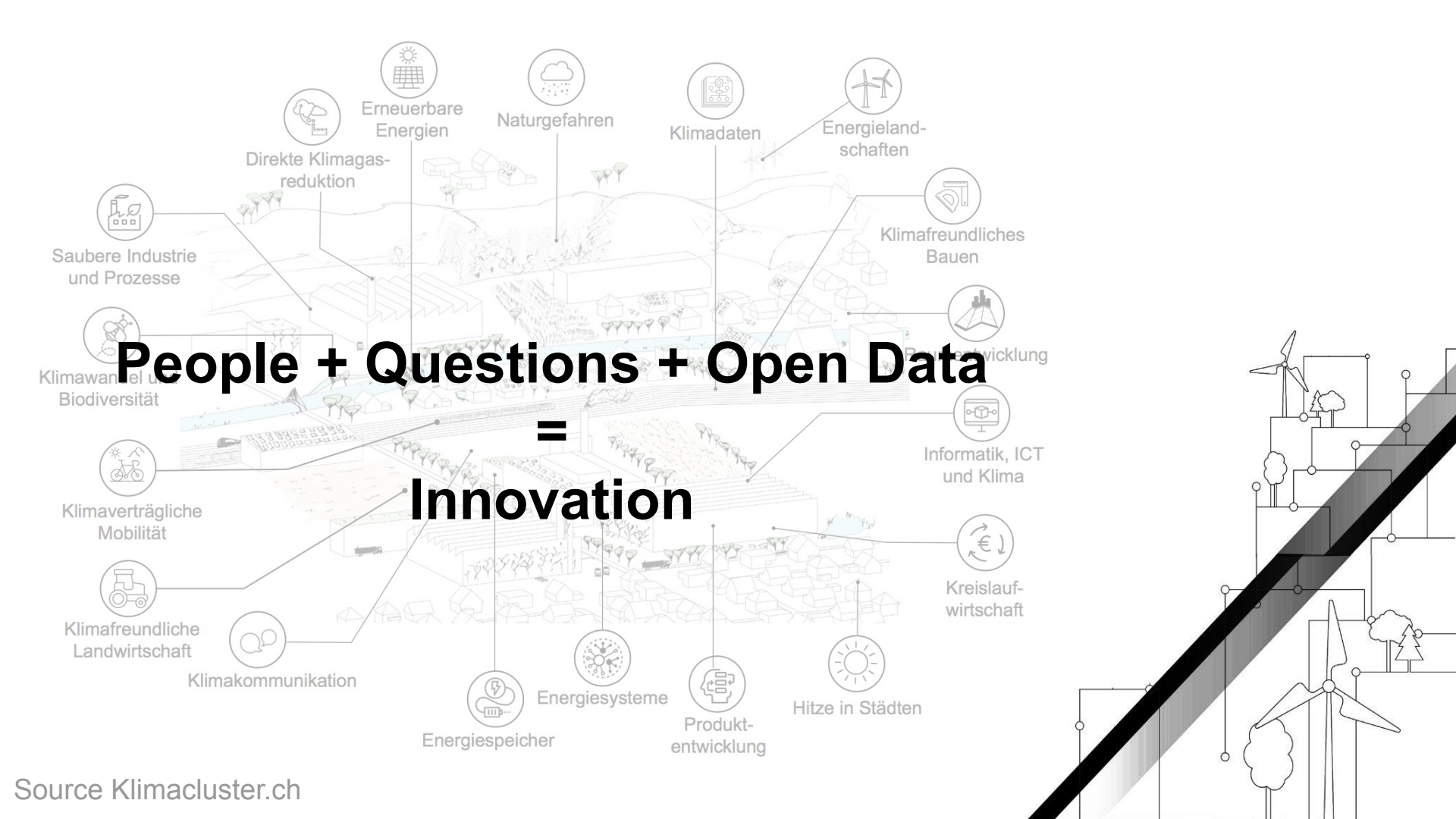
Source: Centre for Research into Energy Demand Solutions

BBC





Source Klimacluster.ch



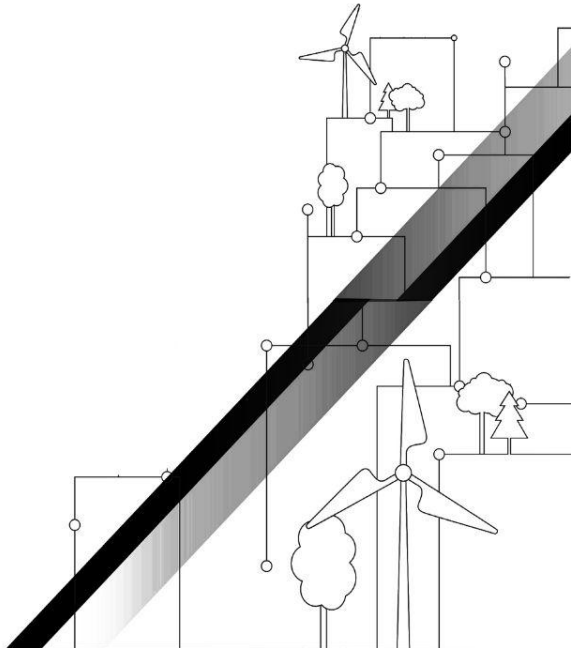
Source Klimacluster.ch

Tuesday 31st Aug. 21

	Where	and also...	What
08:40 - 08:55	https://www.wonder.me/r?id=6sjg8y-8ejo7		Wonder.me room is open if you like...
09:00	https://us06web.zoom.us/j/84016377389?pwd=QkNLeFh2MmZUYk5KTTcyUzV1c2tnUT09	https://youtu.be/H_27QR-kXvc	Welcome & Introduction
09:15			Welcome by Alec von Graffenried, Mayor of Berne
09:30			Challenge Presentations
10:30	https://www.wonder.me/r?id=6sjg8y-8ejo7		Group constitution & Project start
17:30	https://us06web.zoom.us/j/84016377389?pwd=QkNLeFh2MmZUYk5KTTcyUzV1c2tnUT09		Short info about the documentation
17:45			Check point -> Teams present shortly their results
18:30	https://www.wonder.me/r?id=6sjg8y-8ejo7		Virtual Apero
open end			Individual Work in Teams

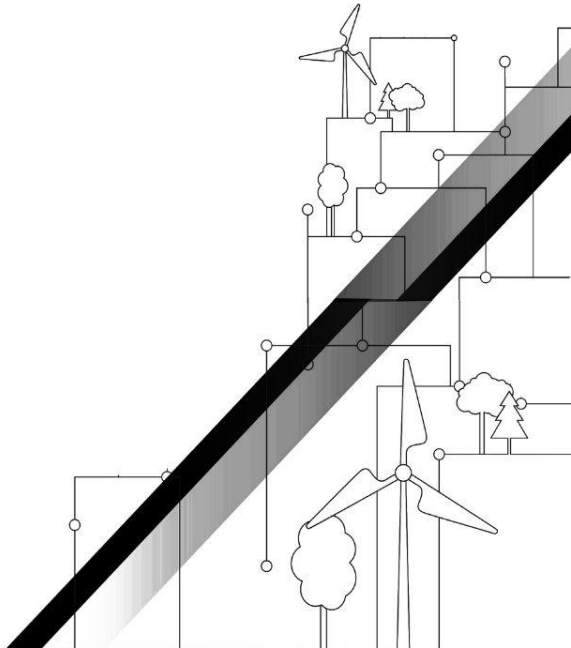
Wednesday 1. Sept. 21

	Where	and also...	What
08:40	https://us06web.zoom.us/j/84016377389?pwd=QkNLeFh2MmZUYk5KTTcyUzV1c2tnUT09		Short Breakfast Session
12:00	https://docs.google.com/presentation/d/1gYXR3Hr03T3v8YOBjuL17Dgy2pBqWmk4dss8XZobG0Y/edit?usp=sharing		Deadline Projects Slides
13:15	https://us06web.zoom.us/j/84016377389?pwd=QkNLeFh2MmZUYk5KTTcyUzV1c2tnUT09	https://youtu.be/ONAec9HWNQ	Short intro
13:20			EWB - Anina Stalder Presentation
13:35			ALIUNID - Till Richter Presentation
13:45			Result Presentation (1h30 - 10gr à 5 min + 10x4min)
15:10		menti.com	Voting
15:15	https://www.wonder.me/r?id=6sjg8y-8ejo7		Virtual Goodbye Apero





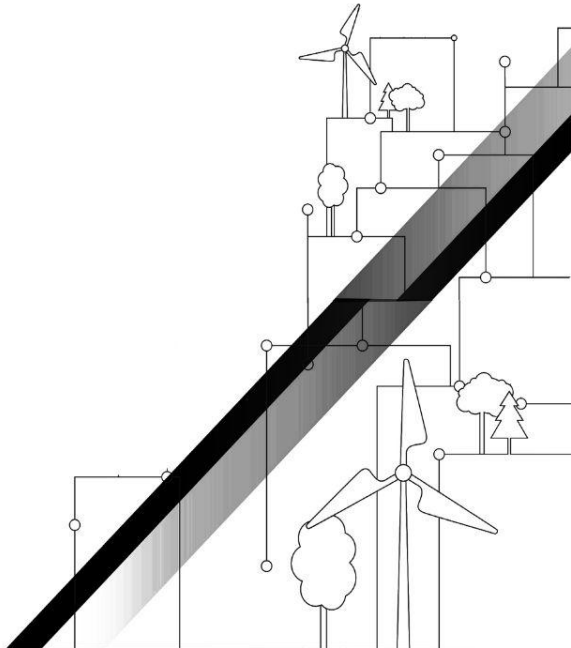
Alec von Graffenried,
Mayor of the City of Bern



Energy & Climate Hack, Online?

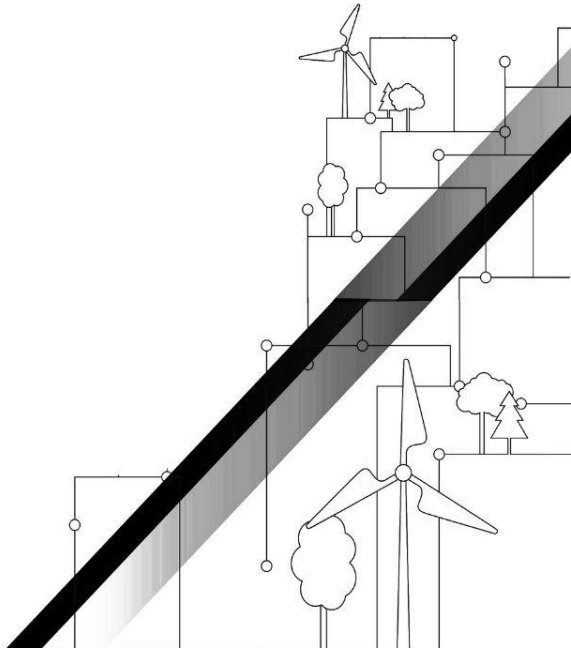
How will we work?

- Online tools
- Documentation
- Challenges
- Goal
- Presentations



With a few online tools…:

- **Zoom**
- **Wonder.me**
- **Slack**
- **hack.opendata.ch**
- **Airtable**
- **Miro**
- **...**



Energy&ClimateHacks durchsuchen

Energy&ClimateHacks

Threads
Alle DMs
Entwürfe 1
Erwähnungen & Reaktionen
Slack Connect
Mehr

Channels
_general
_important_links
_questions
_random
_share_cool_links_and_tools
---organisational_committee---
01_eco-booster
02_local-sustainability-booster
03_vertical_farming
04_nest_building-modelisation
05_solar-panel_detection
06_heat-spots_in_bern
07_dlt-4-financing-the-energy-transition
08_load-shifting-to-incentivize-renewable-en...
09_cool-urban-spaces
Channels hinzufügen

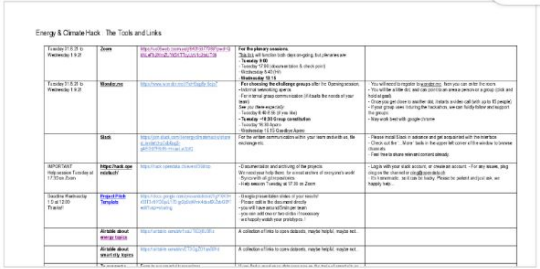
Direktnachrichten

 # _important_links 53

+ Channel-Lesezeichen hinzufügen

91 kB PDF

Gestern



1

Heute

Maud 17:14 Uhr
Below are all the channels that you should see in the menu on the left.
-If some of them are missing, browse channels under {...more} upper left side.
-Once you have chosen your challenge, for clarity, feel free to leave the challenges that you don't need.
-If you need more channels for your groups, just message me, Andrea or Oleg.

---organisational_committee--- (internal)
_general
_important_links
_questions
_random
_share_cool_links_and_tools

Nachrichten senden an #_important_links



Chat

Circle | Private | Everyone

offline chats

- Andy
- Mr ZURA
- Maud
- Oleg L., Organizer
- Lena
- dari
- Oleg

Smart City Lab - Lenzburg durchsuchen

Smart City Lab - Lenzburg

Channels hinzufügen

Direktnachrichten

- Slackbot
- maud.chatelet du
- Andrea Allemann
- Daniel Mosimann
- Dominik Grögler
- Eldhose Poulose
- Jin
- Luis Gisler
- Marc Suter
- Markus Blättler
- Matthias Eifert
- Oleg Lavrovsky
- Thorben Westerhuys
- Viktoria Molnar (cividi)
- Yetvart Artenoglu

Team-Mitglieder hinzufügen

Probe-Abo mit Premium-Funktionen f...

Andrea Allemann

Montag, 9. November | Zurückrufen

maud.chatelet 10:54 Uhr
ja, es sagt ich soll auf chrome wechseln oder vom app

Andrea Allemann 10:54 Uhr
aha, ich bin schon im chrome

gut zu wissen, dass es nur in chrome oder app geht.

maud.chatelet 10:56 Uhr
ja... jetzt starte ich chrome. App habe ich glaube ich nicht

so, jetzt wäre ich im Chrome!

Anrufen

Anruf beendet
Endete um 11:04 Uhr – Dauerte 6 Minuten

Ihr seid beide beigetreten

maud.chatelet 11:04 Uhr
https://www.wonder.me/r?id=6sjg8y-8ejo7

Nachrichten senden an Andrea Allemann

B I Aa

Details
Andrea Allemann



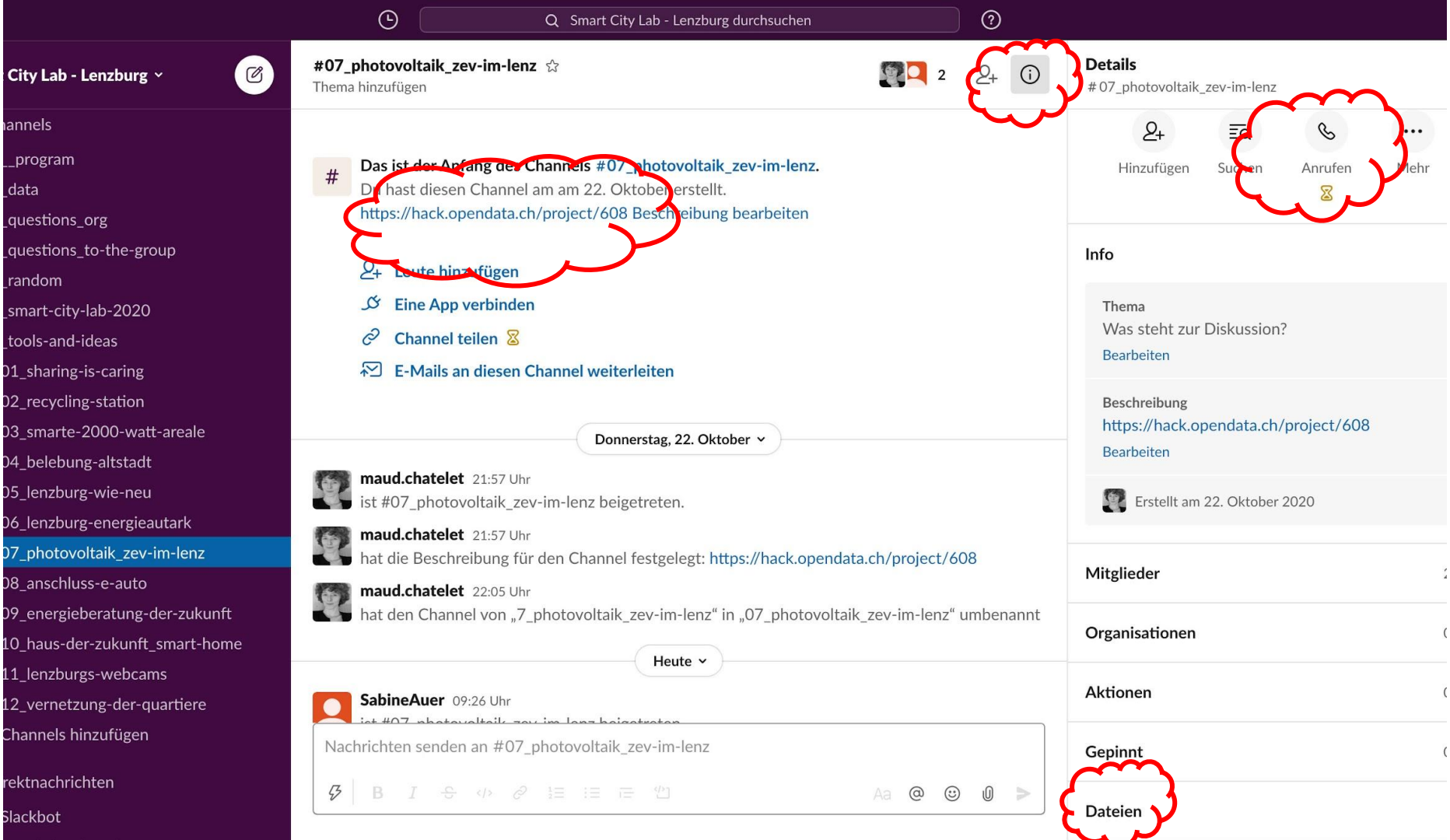
Andrea Allemann

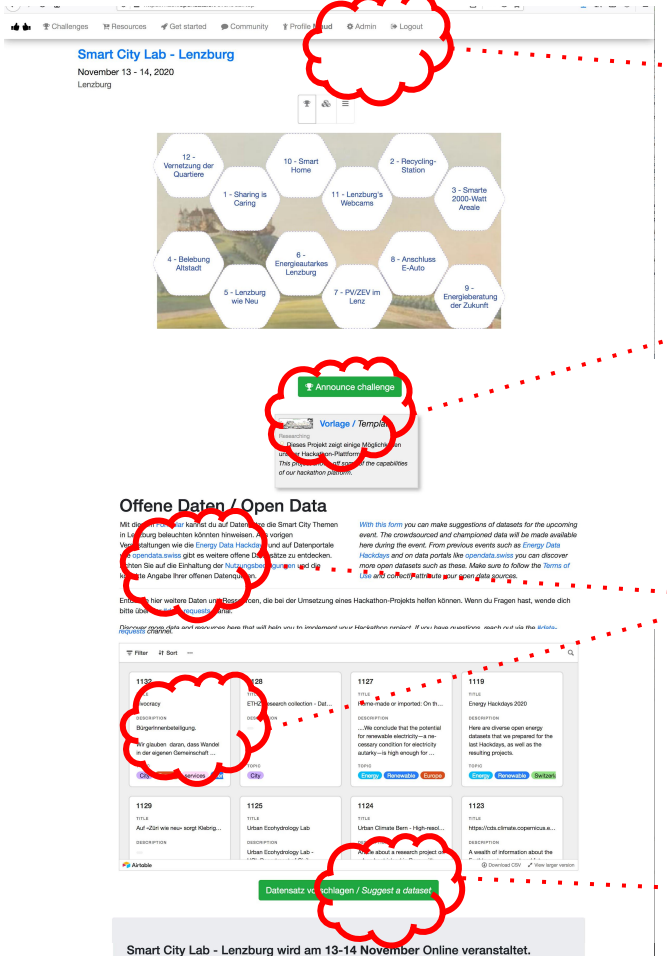
Suchen | Anrufen | Mehr

Info

Gepinnt 0

Dateien


Smart City Lab - Lenzburg durchsuchen
City Lab - Lenzburg
nannels
_program
_data
_questions_org
_questions_to-the-group
_random
_smart-city-lab-2020
_tools-and-ideas
01_sharing-is-caring
02_recycling-station
03_smarte-2000-watt-areale
04_belebung-altstadt
05_lenzburg-wie-neu
06_lenzburg-energieautark
07_photovoltaik_zev-im-lenz
08_anschluss-e-auto
09_energieberatung-der-zukunft
10_haus-der-zukunft_smart-home
11_lenzburgs-webcams
12_vernetzung-der-quartiere
Channels hinzufügen
rektnachrichten
Slackbot
#07_photovoltaik_zev-im-lenz
Thema hinzufügen
2
Details
07_photovoltaik_zev-im-lenz
Hinzufügen
Suchen
Anrufen
Mehr
Info
Thema
Was steht zur Diskussion?
Bearbeiten
Beschreibung
https://hack.opendata.ch/project/608
Bearbeiten
Erstellt am 22. Oktober 2020
Mitglieder
Organisationen
Aktionen
Gepinnt
Dateien
Das ist der Anfang des Channels #07_photovoltaik_zev-im-lenz.
Du hast diesen Channel am am 22. Oktober erstellt.
https://hack.opendata.ch/project/608 Beschreibung bearbeiten
Leute hinzufügen
Eine App verbinden
Channel teilen
E-Mails an diesen Channel weiterleiten
Donnerstag, 22. Oktober
maud.chatelet 21:57 Uhr
ist #07_photovoltaik_zev-im-lenz beigetreten.
maud.chatelet 21:57 Uhr
hat die Beschreibung für den Channel festgelegt: https://hack.opendata.ch/project/608
maud.chatelet 22:05 Uhr
hat den Channel von „7_photovoltaik_zev-im-lenz“ in „07_photovoltaik_zev-im-lenz“ umbenannt
Heute
SabineAuer 09:26 Uhr
Nachrichten senden an #07_photovoltaik_zev-im-lenz

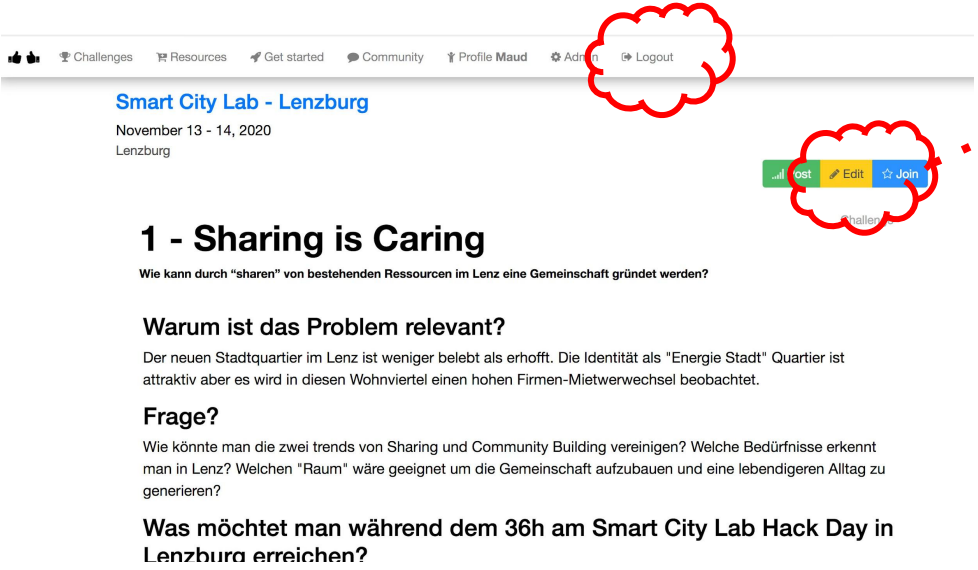


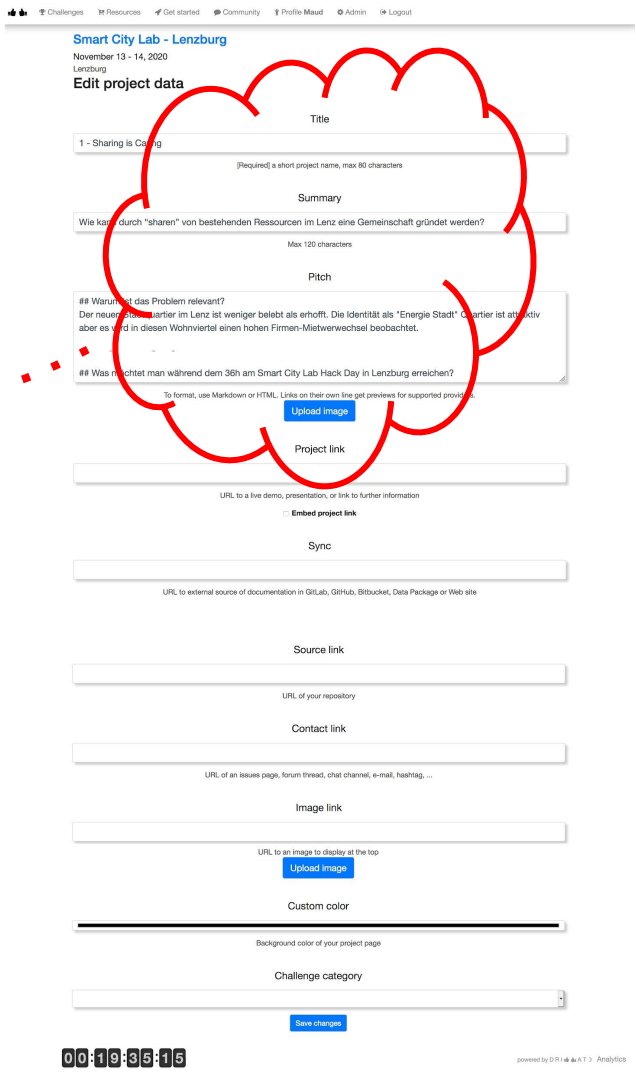
Register

Start project & examples

find more Data..?

Suggest Datasets you know of


Challenges
Resources
Get started
Community
Profile Maud
Admin
Logout
Smart City Lab - Lenzburg
November 13 - 14, 2020
Lenzburg
Edit
Join
1 - Sharing is Caring
Wie kann durch “sharen” von bestehenden Ressourcen im Lenz eine Gemeinschaft gründet werden?
Warum ist das Problem relevant?
Der neuen Stadtquartier im Lenz ist weniger belebt als erhofft. Die Identität als "Energie Stadt" Quartier ist attraktiv aber es wird in diesen Wohnviertel einen hohen Firmen-Mietwerwechsel beobachtet.
Frage?
Wie könnte man die zwei trends von Sharing und Community Building vereinigen? Welche Bedürfnisse erkennt man in Lenz? Welchen "Raum" wäre geeignet um die Gemeinschaft aufzubauen und eine lebendigeren Alltag zu generieren?
Was möchtet man während dem 36h am Smart City Lab Hack Day in Lenzburg erreichen?


Challenges
Resources
Get started
Community
Profile Maud
Admin
Logout
Smart City Lab - Lenzburg
November 13 - 14, 2020
Lenzburg
Edit project data
Title
[Required] a short project name, max 80 characters
Summary
Max 120 characters
Pitch
To format, use Markdown or HTML. Links on their own line get previews for supported providers.
Upload image
Project link
URL to a live demo, presentation, or link to further information
Embed project link
Sync
URL to external source of documentation in GitLab, GitHub, Bitbucket, Data Package or Web site
Source link
URL of your repository
Contact link
URL of an issues page, forum thread, chat channel, e-mail, hashtag, ...
Image link
URL to an image to display at the top
Upload image
Custom color
Background color of your project page
Challenge category
Save changes
00:19:35:15
Analytics

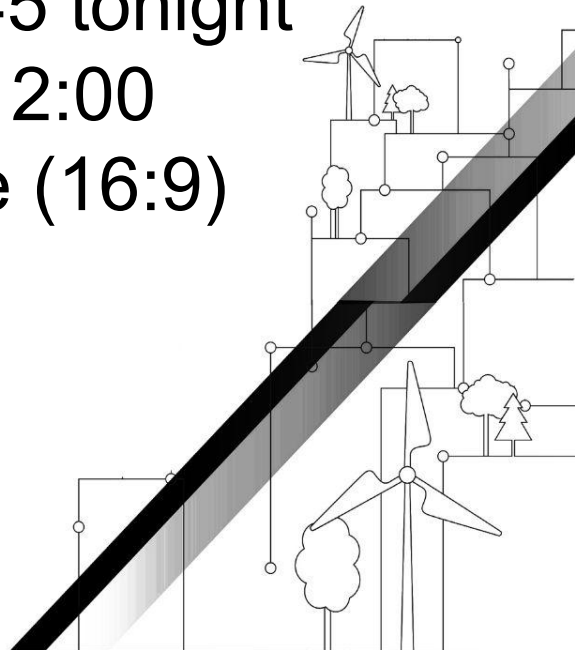
We want you to document:

- What was achieved during the Hackdays?
- -> a good executive summary helps us enormously to communicate further about the project!
- What problems did you encounter along the way?
- What are the next steps for this project?
- Links to source code, pitches, demos and prototypes and contacts.
- What data did you use? In what formats?
- Any relevant terms of use or licences.



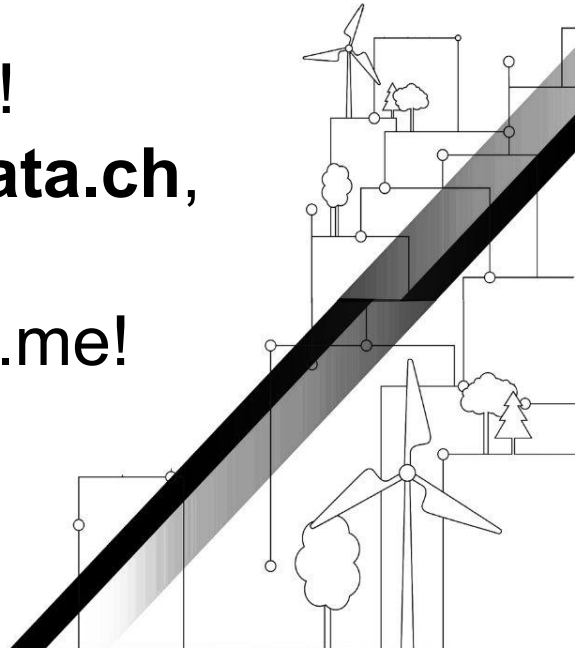
Presentations:

- Short Check-point at 17.45 tonight
- Final slides tomorrow at 12:00
  - in the Google-template (16:9)
  - link on Slack
- 3 min Pitch



Challenges

- Will be presented right now!
- Are visible on **hack.opendata.ch**,
- Choose your challenge and
- Meet your team on Wonder.me!



1 Eco - Booster

2 Local Sustainability Booster

3 Vertical Farming

4 NEST Building Modelisation

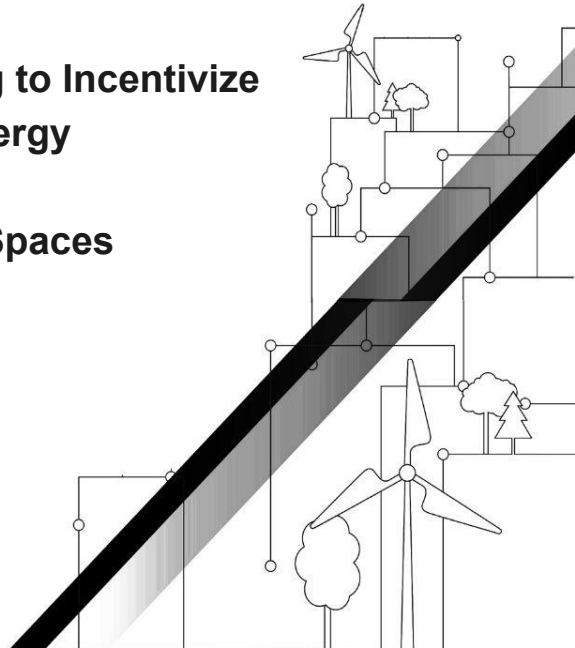
5 Solar-panel Detection

6 Heat-spots in Bern

7 DLT for the energy transition

8 Load-shifting to Incentivize Renewable Energy

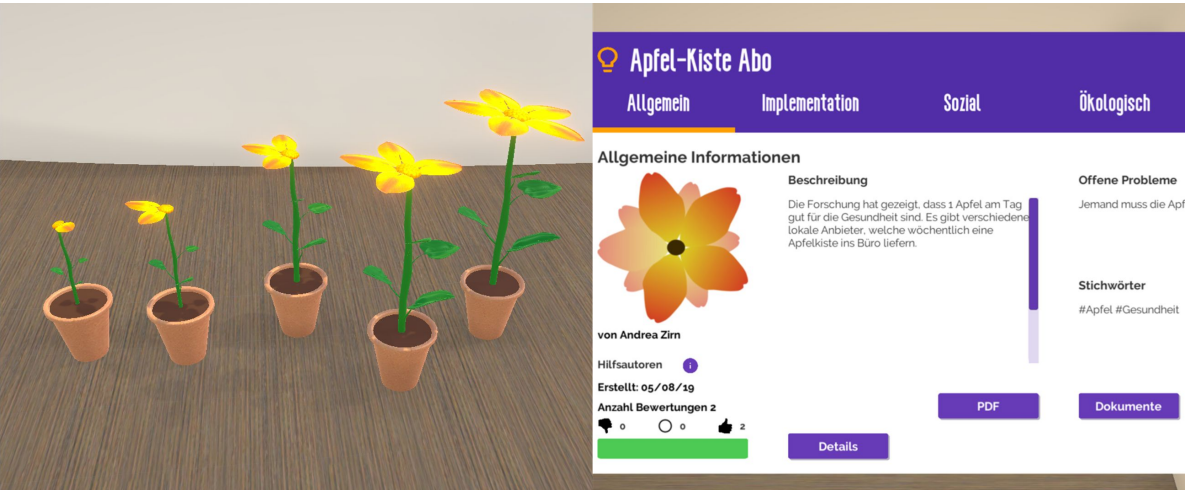
9 Cool Urban Spaces

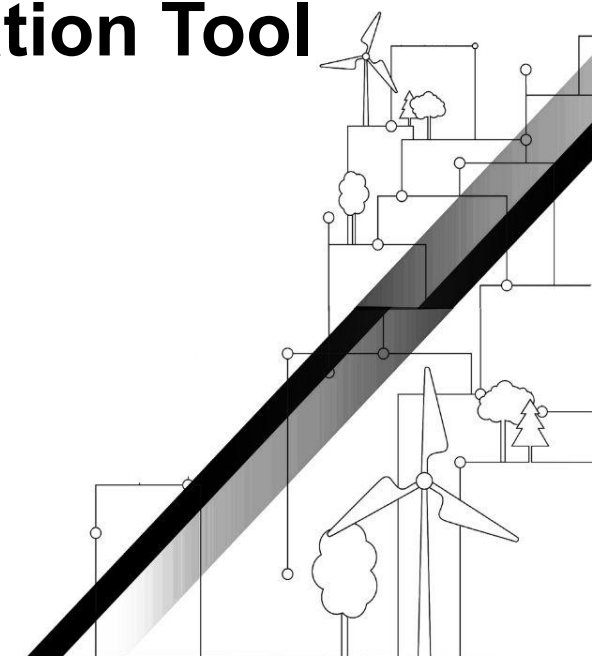


Challenge Nr 1

EcoBooster

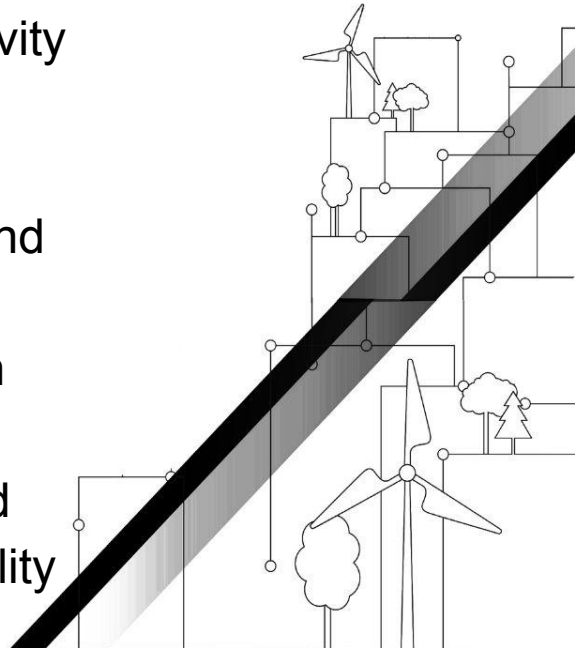
Innovation Tool





The topic:

- The EcoBooster is a gamified idea management tool for companies or public organisations
- It aims to activate the collective intelligence and creativity of the employees for the benefit of sustainability
- The game format enables new forms of cooperation and helps harnessing ideas within the company and make processes & planning visible, including geolocalization
- The ideas are collaboratively analysed, developed and evaluated, especially concerning impact on sustainability



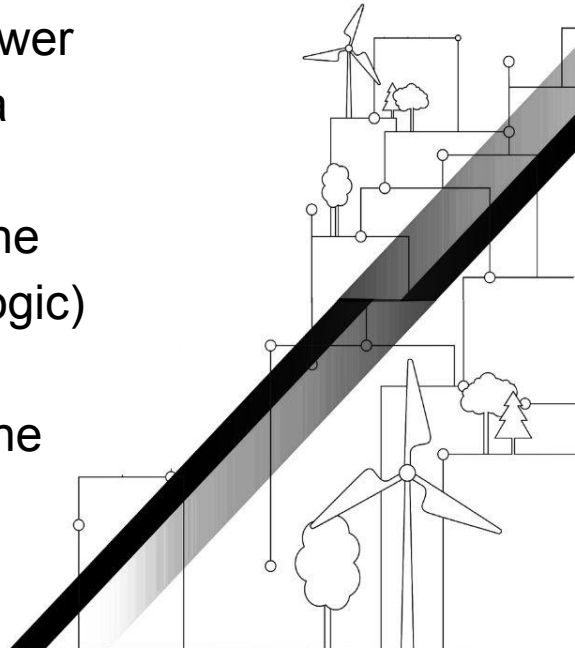
The topic:

- The EcoBooster is designed as a multiplayer serious game where user can experience live actions from other users

- Each player can create a new idea. It’s shown as a flower and it grows during the elaboration process of the idea

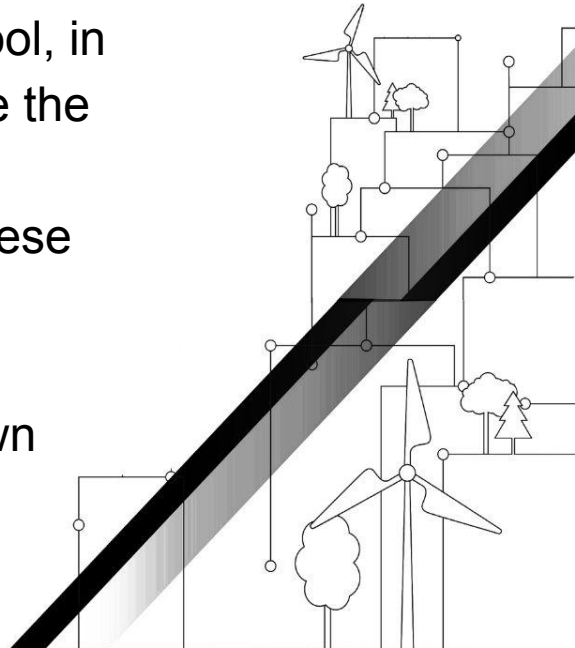
- Every idea has to be described in its impact towards the three aspects of sustainability (social, economic, ecologic)

- The tool is now in a conceptual prototype phase and the general challenge is to make sure that the interface supports the processes in the best possible manner



Challenges

1. Provider of public utilities administrate many different infrastructures in different locations: create a test modelling of the work area of a utility provider to localize new ideas
2. Ameliorate the design of the graphic interface of the tool, in order to best identify the new ideas as well as facilitate the development and collaboration process
3. Each player can earn points. Create a concept how these points can be used to develop the players avatar and profile and how a ranking system can look like
4. Do you see any other possibilities? We are open to own ideas!

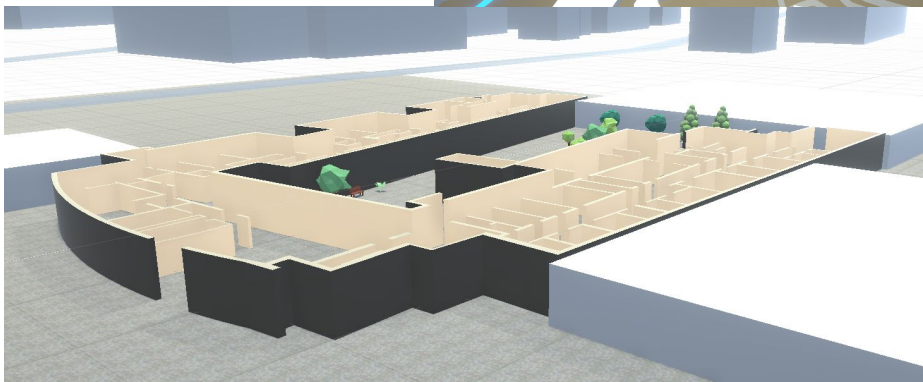


Challenge 1A: EcoBooster in different locations

If EcoBooster is used in a company that has several locations:

- How could the interaction between the different locations look like?
- How could the player move between the different locations?
- How could the game world look like with the different locations?





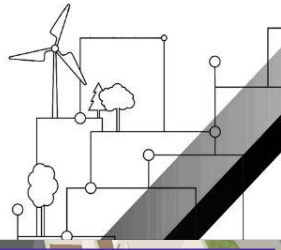
Possible outcomes:

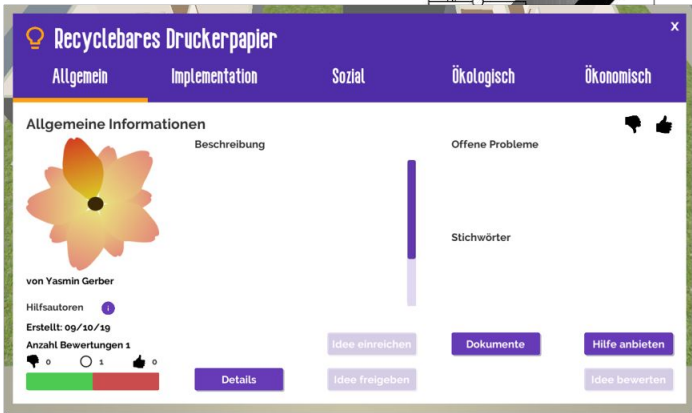
3D model, proof of concept, prototype in Unity

Challenge 1B: (UX) Design

Design never stands still. There are always new UX concepts and ideas:

- How could you take the interaction within EcoBooster to the next level?
- How could the design elements be redesigned?
- How can different elements (e.g. avatar, environment) be made more innovative?



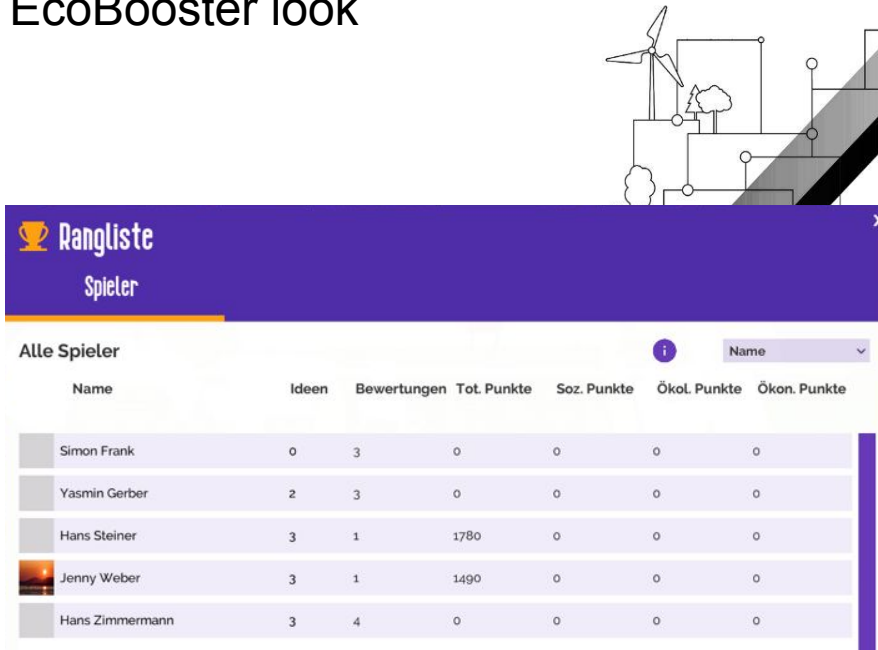


Possible outcomes:
UX Design, proof of concept, prototype in Unity

Challenge 1C: Achievement system

The number of points in EcoBooster shows how active and successful a player is.

- How can an achievement system within EcoBooster look like?
- How can the collected points be used?
- What ranks and roles could there be?



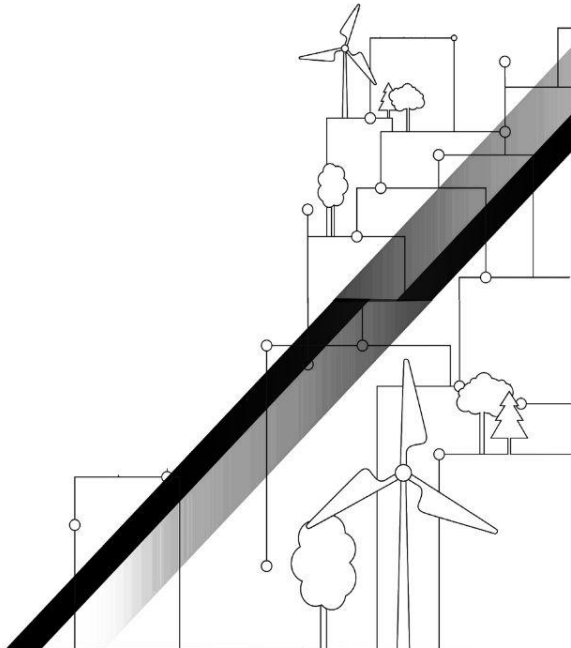
Possible outcomes:
proof of concept,
prototype in Unity

Ressources / Data

- www.ecobooster.ch
- Demo-movie on Youtube (1869) EcoBooster - YouTube
- game instance (more info in the Slack channel)
- EcoBooster is made with Unity (version 2019.2.14f1)

Contact:

- andrea.zirn@fhnw.ch
- louis.baumgartner@fhnw.ch
- Daniel.Zuercher@bafu.admin.ch

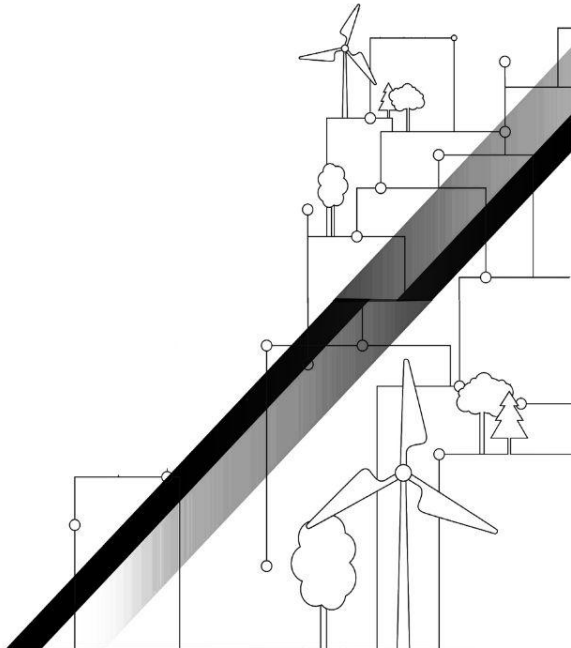


Challenge Nr 2

Local Sustainability Booster

What are the most important factors influencing the sustainable development at community level?





The topic:

The webtool "Energiereporter" (https://www.energieschweiz.ch/tools/energiereporter/) shows the sustainable development at community level.

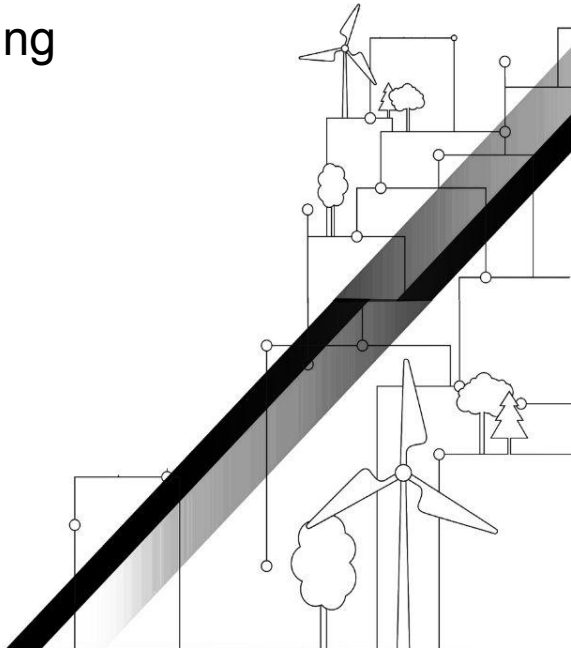
Website visitors can check the development in the areas of electro mobility, solar power and renewable heating.

It would be of great benefit for the municipalities to know **which are the most important factors influencing these figures,** in order to align their policies.



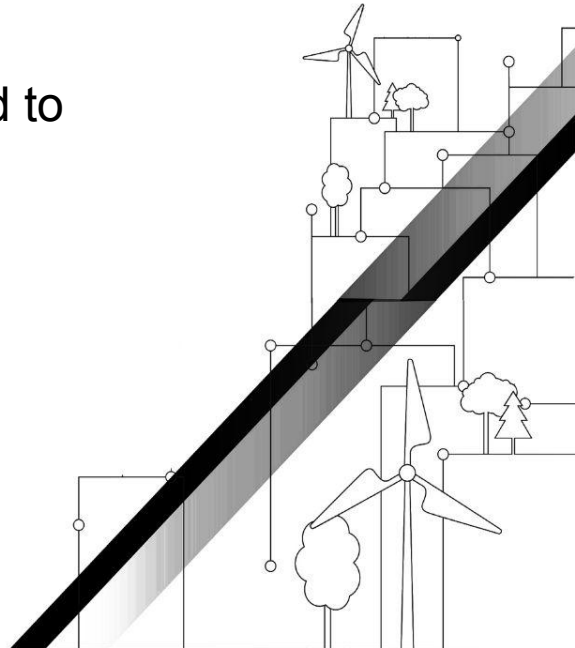
Challenge:

With the complete data set of the energy reporter and the sustainability KPI's and other municipality data, the participants could identify the most important influencing factors leading to sustainability. A small machine learning project would be suitable for this analysis.
The participants are free to choose the algorithm or statistical method.



Ressources / Data

- Csv File containing municipality, population demographics and electricity prices.
- A list of go-to open data catalogues for Switzerland will be available. We encourage participants to come up with ideas which data could be interesting and relevant and to enrich the existing data collection:



Contact:

lucas.tochtermann@bfe.admin.ch

Challenge Nr 3

Vertical Farming

Could vertical farms and Circular Food Systems become a part of the sustainability of the decarbonized city?

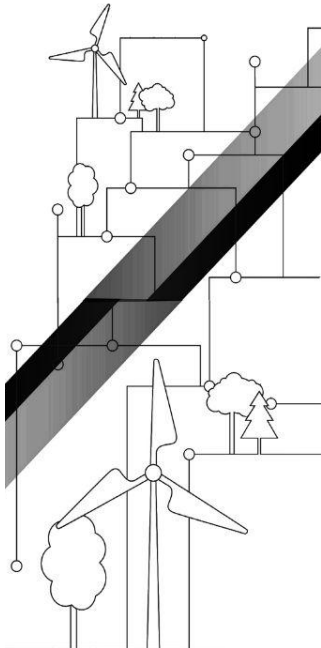
YASAI®

GROW MORE WITH LESS

Tobias Beeler

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Spin-off | ETH zürich



VERTICAL FARMING

YASAI

PROBLEM
FOOTPRINT OF FOOD INDUSTRY



40%

of all ice-free land



70%

of all fresh water



30%

of all greenhouse gas emissions

A SOLUTION
VERTICAL FARMING



15x

More produce per m², all year round



95 %

95 % less fresh water than traditional field farming



ZERO

Food miles or pesticides, because you can grow local & indoor



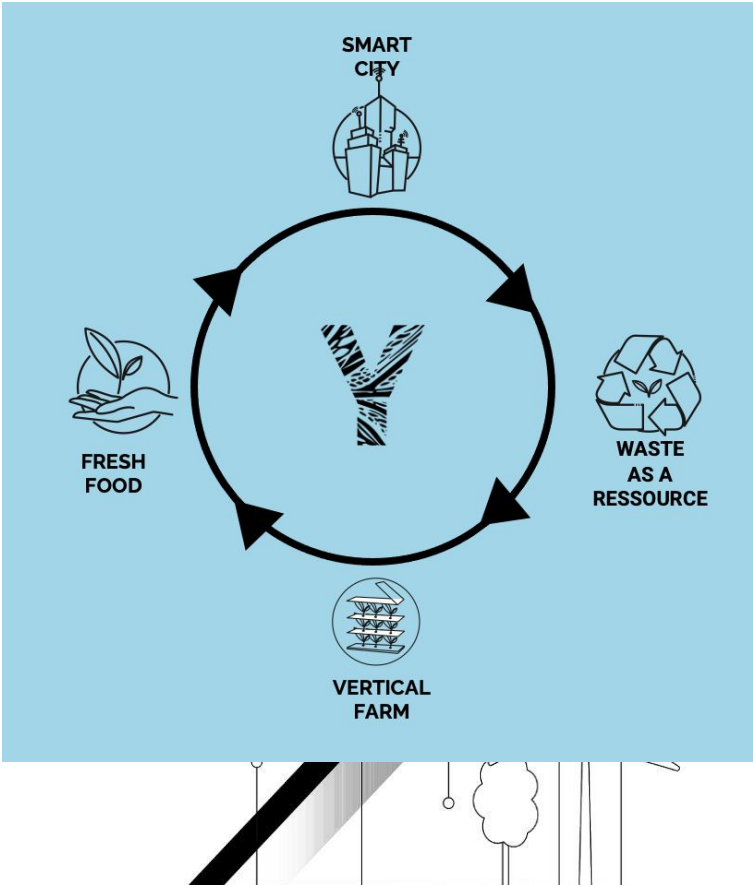
WE GROW
MORE WITH LESS

FOR THE HEALTH OF PEOPLE, PLANTS & PLANET

The topic:

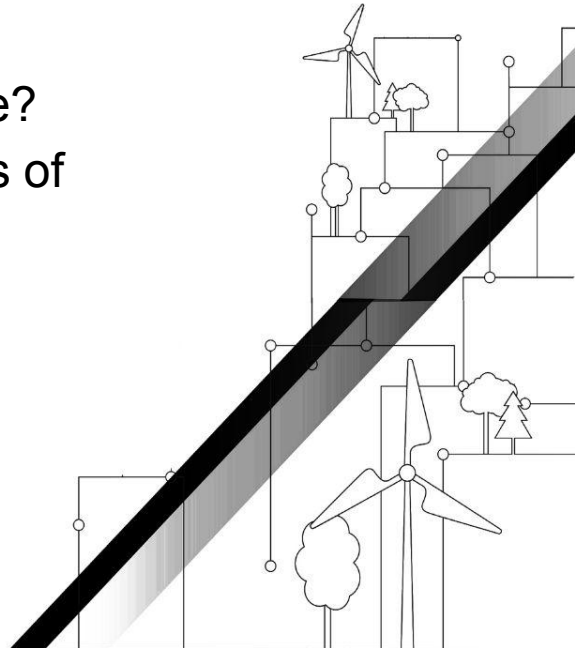
- Vertical farms have attracted great interest in recent years.
- However, a clear disadvantage of vertical farms is the high electricity consumption.

In this challenge, we want to find out how big the potential of vertical farms is and identify relevant criteria for the locations of such farms.



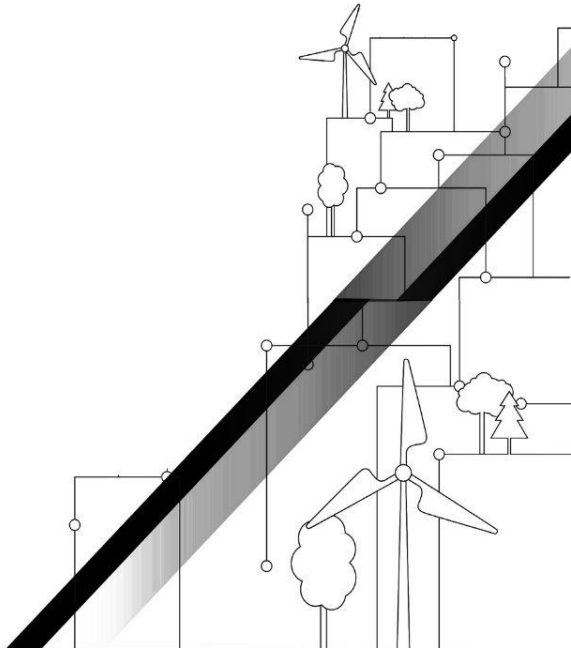
Challenge 3a)

- Is the supply with leafy greens and herbs of a city like Bern possible through vertical farms?
- What are the most important restrictions for the complete supply through vertical farming?
- Where is a clear advantage to conventional agriculture?
- Which are the advantages and disadvantages in terms of CO2 emissions, electricity and water consumption?



Challenge 3b)

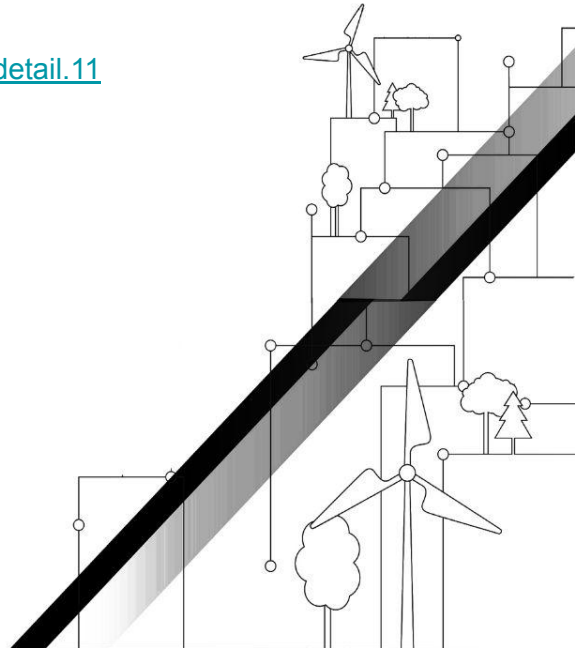
- Identify (and illustrate) ideal locations for vertical farms considering:
  - Local electricity costs
  - Cost to rent space to grow
  - District heating feed-in potential
  - Proximity to urban centres
  - Proximity to regenerative power plants
  - Other factors?



Ressources / Data

- Food consumption by type https://opendata.swiss/de/dataset/nahrungsmittelverbrauch-nach-art-der-nahrungsmittel4
- Development of food consumption: https://opendata.swiss/de/dataset/entwicklung-des-nahrungsmittelverbrauches-in-der-schweiz-je-kopf-und-jahr4
- Freight transport Road freight transport performance by commodity group, 2019: https://www.bfs.admin.ch/bfs/de/home/statistiken/mobilitaet-verkehr/gueterverkehr.assetdetail.11189-1900.html
- Electricity costs: https://www.strompreis.elcom.admin.ch/
- District heating feed-in: https://opendata.swiss/de/dataset/thermische-netze-nahwarme-fernwarme-fernkalte
- Proximity to regenerative power plants:
- https://www.uvek-gis.admin.ch/BFE/storymaps/EE_Elektrizitaetsproduktionsanlagen/

Contact: tobias@yasai.ch

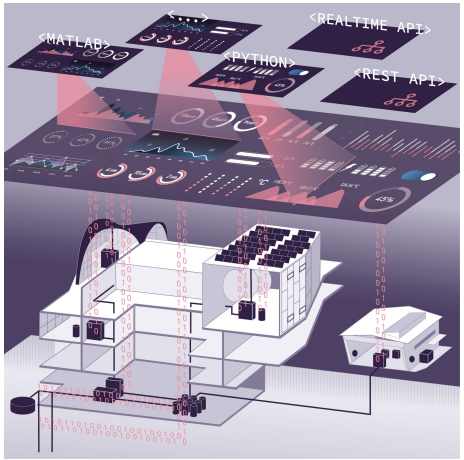


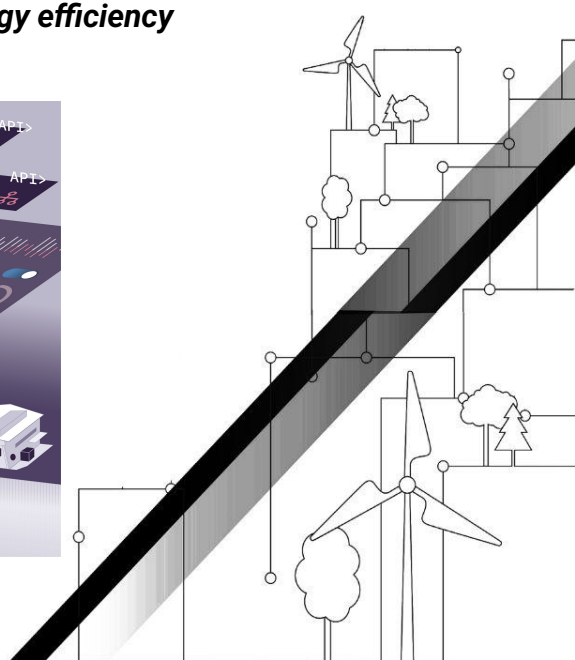
Challenge Nr 4

NEST, a Data-driven Building Model

Use the rich measurement data from NEST for prospective uses in digitalization and energy efficiency





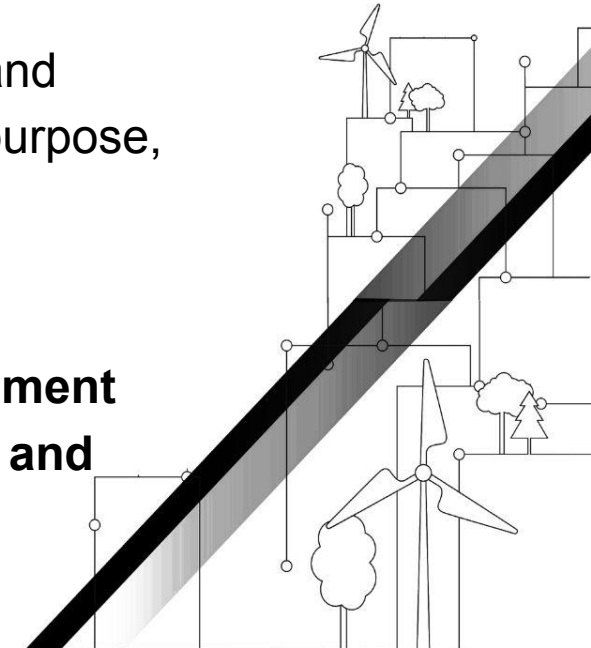


The topic:

- Although buildings account for almost half of Switzerland's total final energy consumption, digitalization in the building sector is not yet very advanced.

  At the Empa NEST demonstrator, new technologies and algorithms are being developed and tested. For this purpose, NEST is monitored in detail by some 10’000 sensors.

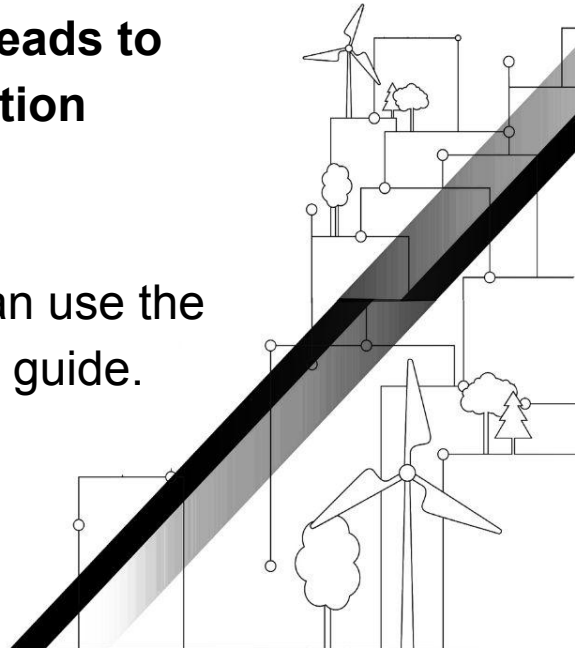
  The aim of this challenge is to **use the rich measurement data from NEST towards improving sustainability and energy efficiency by digitalization.**



Challenge

- The overall objective is to investigate the dependencies between the current energy input, indoor climate and weather, and the indoor climate at a later point in time.
  The corresponding question is: **Which energy input leads to which future indoor climate for a given initial situation (current indoor climate, weather)?**

- Participants can choose their own approach or they can use the following, more detailed objectives and questions as a guide.



Possible approaches:

1) Visualization of the interrelationships:

- Which energy input leads to which indoor temperature?
- How delayed is the reaction of the indoor temperature to a change in the energy input (i.e. how great is the thermal inertia)?
- What influence do boundary conditions such as the outside temperature or the current indoor climate have on the subsequent indoor climate?
- Do the above relationships vary between different rooms?
  Methodological note: H-scatterplots or cross-correlograms, among others, are suitable for the explorative investigation of "lagged correlations".



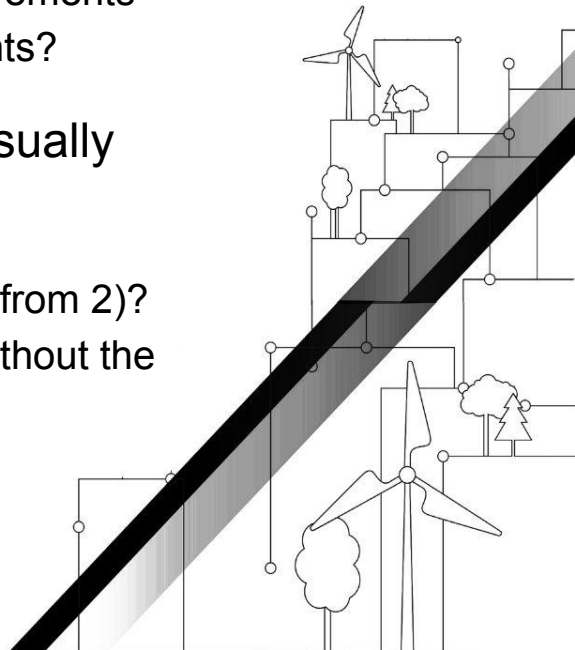
Possible approaches:

2) Statistical modelling of the correlations from 1):

- Can these correlations be quantified with a statistical model?
- Do the correlations become clearer if not only the current measurements are used as predictors, but also the last N historical measurements?

3) Sensors are expensive. In the real situation, there are usually fewer sensors available:

- Which sensors (predictors) have which significance in the model from 2)?
- Can the model be reduced by individual sensors to save costs without the prediction of future room temperature suffering greatly?



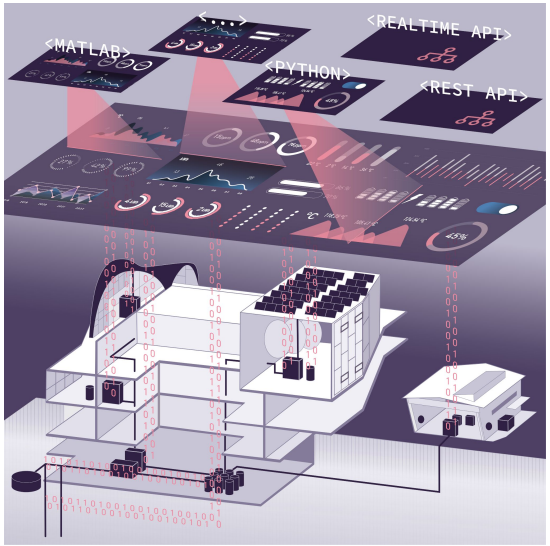
Resources / Data

The participants are provided with the data from the scientific study in an adjusted form, as CSV.

- https://figshare.com/projects/NEST_Open_Building_Data_for_Energy_Demand_and_User_Behaviour/101714
- An overview of the measurement data and infrastructure at NEST is available at the following link: https://info.nestcollaboration.ch/wikipediapublic/.
- The measurement data of the NEST research building can be accessed via REST API.
- A detailed description of the sensors (incl. costs) is provided.
- A Graphana dashboard provides visual access to all relevant measurement data.

- Additional measurement data, such as outdoor temperature or solar radiation, can be obtained via publicly accessible interfaces.

- Literature: Bünning, F., Huber, B., Heer, P., Aboudonia, A. and Lygeros, J., 2020. Experimental demonstration of data predictive control for energy optimization and thermal comfort in buildings. Energy and Buildings, 211, p.109792.
- More info: https://www.empa.ch/web/energy-hub/ehub-platform
  https://www.empa.ch/de/web/nest/



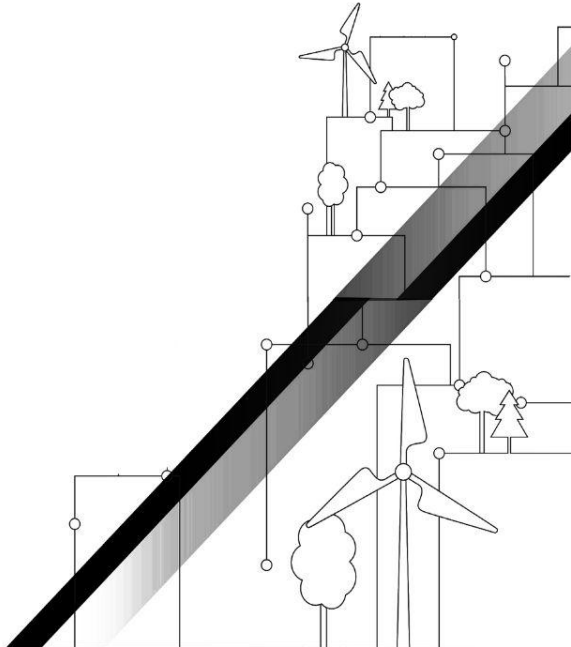
Contact: philipp.heer@empa.ch

Challenge Nr 5

Solar panel detection

Automatic Detection of Solar Energy Systems using Deep Convolutional Neural Networks

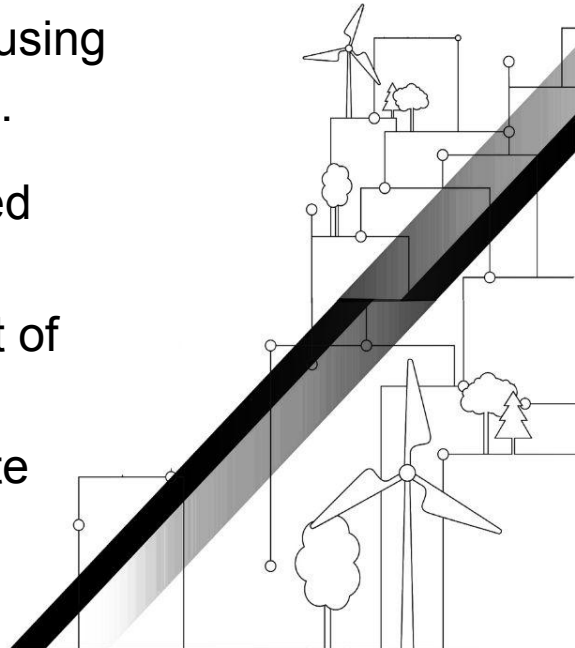




The topic:

The Swiss renewable energy statistics estimate the use of solar energy on the basis of market surveys. To validate these statistics, existing solar installations were identified by the SolAi Project and quantified fully automatically using deep learning algorithms based on aerial photographs.

Thanks to this method, the current inventory of installed solar systems can be determined more precisely.
Crossed with weather forecast data, the energy output of the installed photovoltaics could be predicted.
In addition, the results would allow to plan and evaluate the implementation of the Energy Strategy 2050.

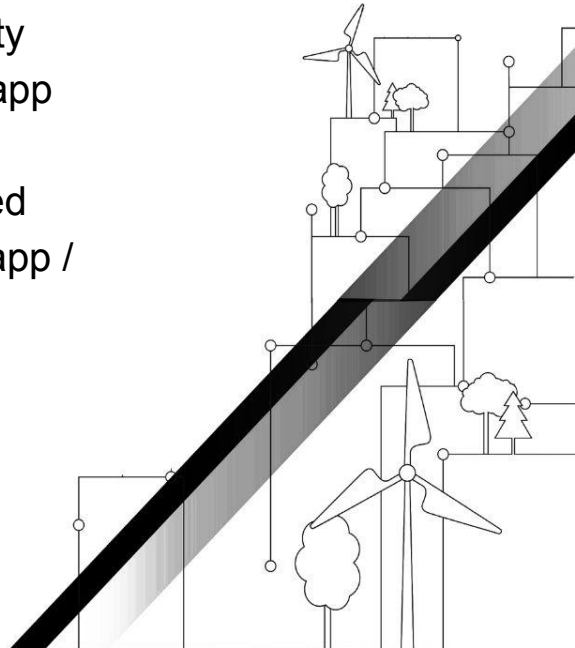


Challenge

- Analysing Swisstopo Aerial photographs with the help of artificial intelligence to either:

    - Calculate solar wattage of individual houses and a whole city depending on weather > predictive modeling maybe as an app

    - Identify (large) roofs that don’t have solar panels yet installed although their geometric potential is great maybe as a webapp / webgis



Ressources / Data

- https://opendata.swiss/en/dataset/luftbilder-swisstopo-farbig
- Swissimage at 10cm resolution, now unlimited usage available
- sonnendach.ch → An export of the city perimeter of Bern is provided as example
- Solar Energy Estimation 2020 (BFE) https://pubdb.bfe.admin.ch/de/suche?keywords=395
- meteoswiss (history not open source, to be validated); Current values:
  https://opendata.swiss/de/dataset/messwerte-sonnenscheindauer-10-min-summe
  https://opendata.swiss/de/dataset/klimanormwerte-sonnenscheindauer-1981-2010
  https://opendata.swiss/de/dataset/klimadaten-sonnenscheindauer-niederschlag-temperatur-und-neuschnee3
- Swissbuildings 3D (City perimeter of Bern as GPKG)
- Rooftop photovoltaic (PV) potential data for the Swiss building stock:
  https://zenodo.org/record/3609833#.YPB2ch1CRE4
- Deep Learning based Solar panel detections (vectors from pixel masks) from the project Sol Ai in the city perimeter of Bern
  https://fhnw.ch/de/die-fhnw/hochschulen/architektur-bau-geomatik/institute/institut-geomatik/forschung/solai
- A Pytorch/Detectron2 model to produce own inference of solar panel detections on aerial imagery with a system similar to the Swiss Territorial Datalab STDL Object detector
  https://tech.stdl.ch/PROJ-TGPOOL
- A Pytorch/Detectron2 model for Thermal Panels



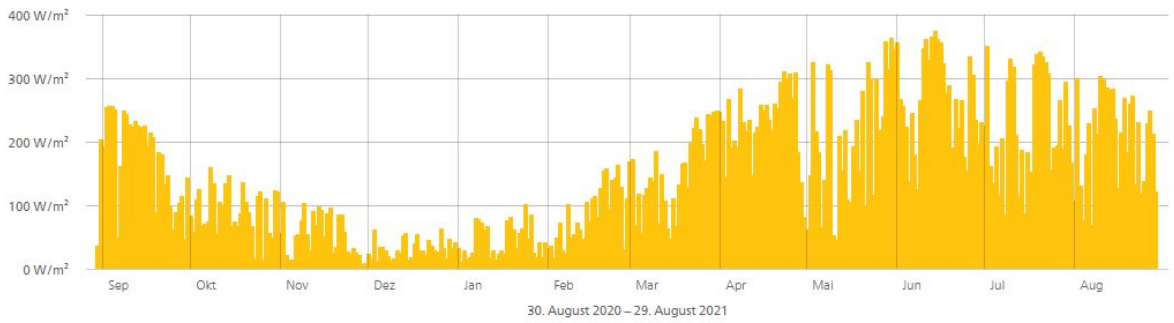
Bern / Zollikofen

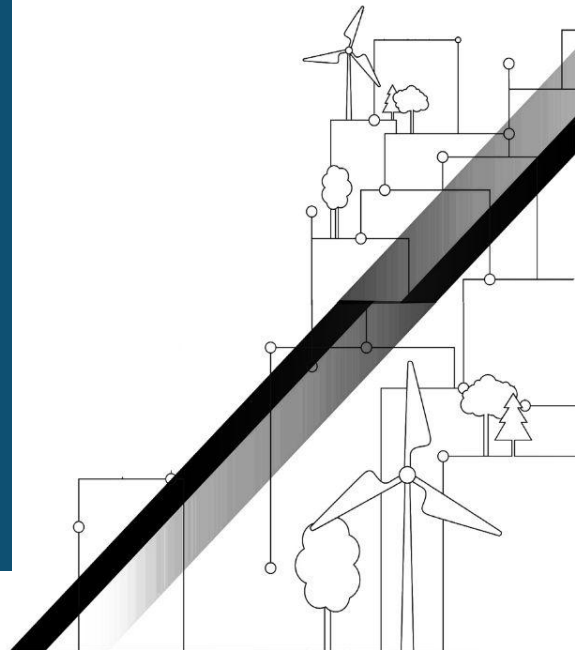
Schliessen ×

- Temperatur
- Niederschlag
- Wind
- Sonnenschein
- Feuchte
- Schnee
- Globalstrahlung
- Taupunkt
- Druck

Stundenwerte | Tageswerte

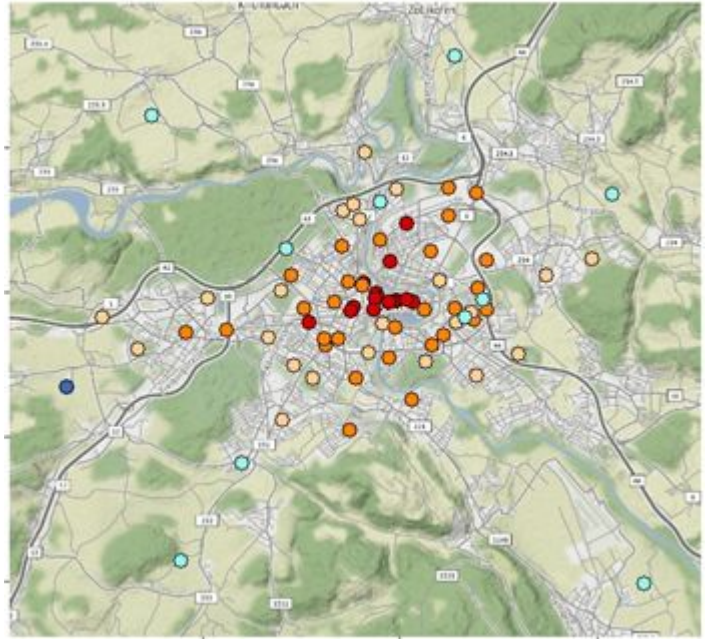
Globalstrahlung, Tagesmittel





Challenge Nr 6

Heat monitoring network Bern





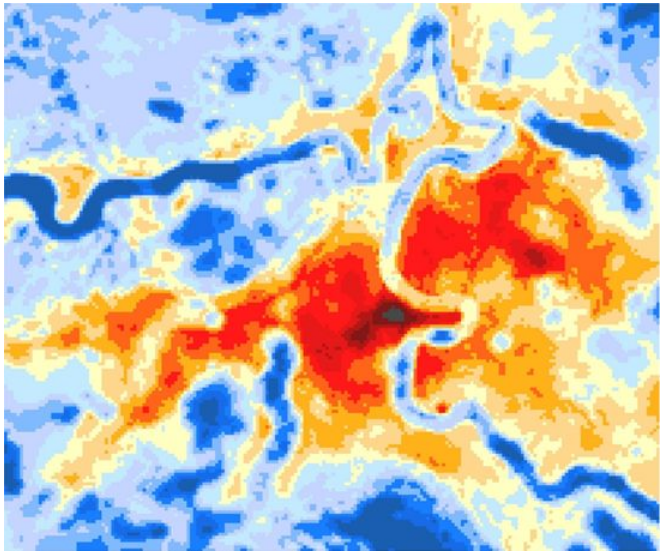
Urban Climate Bern:

- Research Subgroup of the Climatology Group @ University Bern & Oeschger Centre for Climate Change Research
- Since 2018 we investigate the Urban Heat of Bern with self-designed and low cost measurement devices (only ~ 65 Swiss Francs per station).
- Every summer 60-80 stations are distributed in the city, since 2021 in cooperation with the city and energie wasser bern.
- Our focus until now lies on the nighttime urban heat, due to the daytime bias of the low cost stations, which occur during periods of high solar irradiance and low windspeed.
- Reference measurements of three were performed to estimate the errors were conducted, **however, we still do not know how large the error is at the remaining stations of the monitoring network.**



The topic:

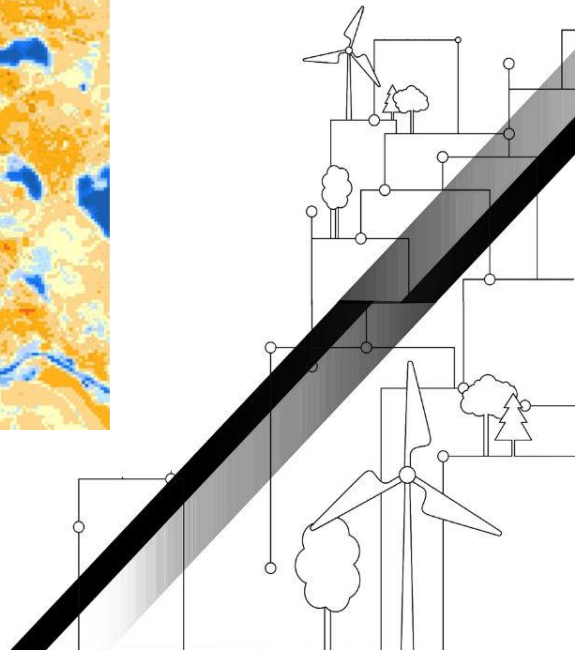
Nighttime map



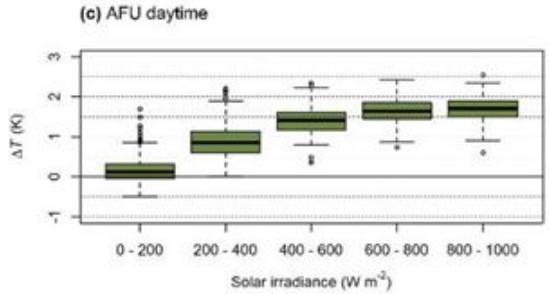
Daytime map

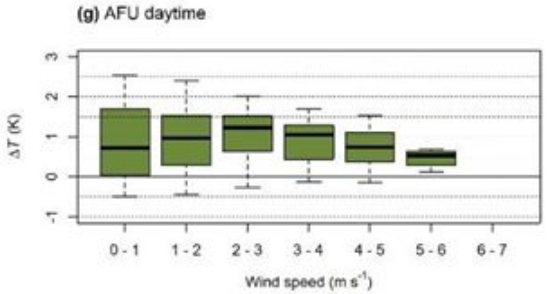


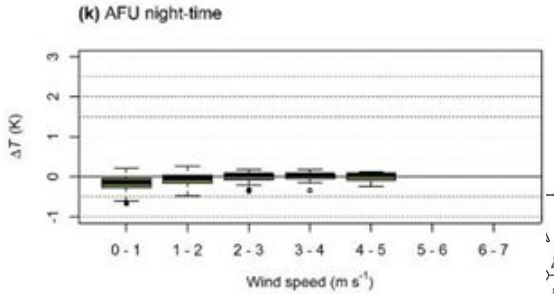
Burger et al. (2021)

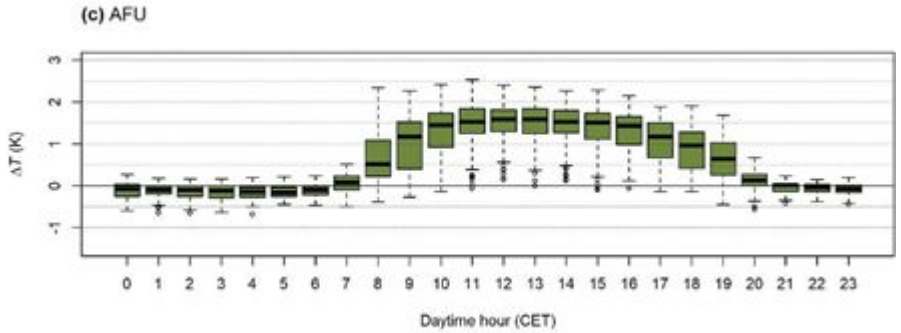


The topic:

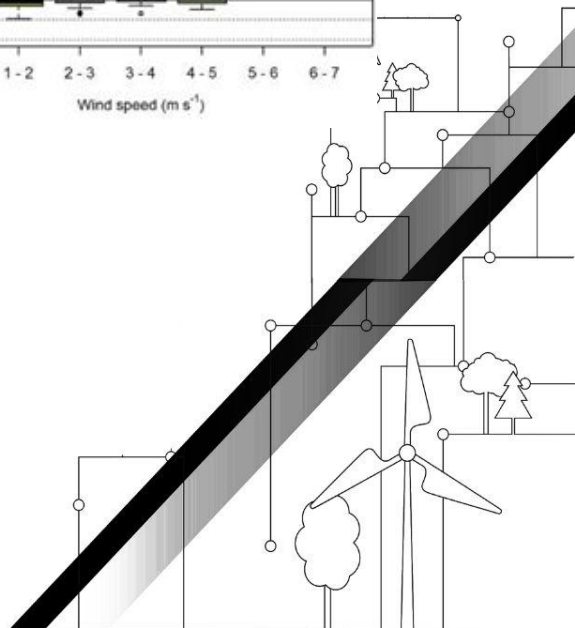






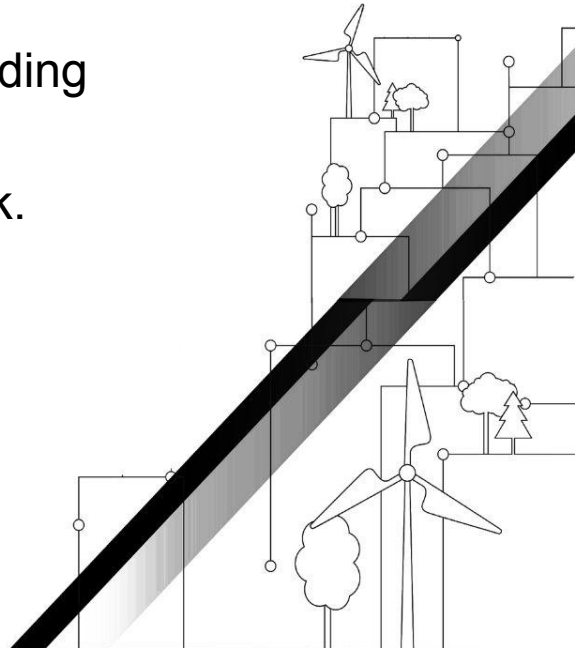


Gubler et al. (2021)



Challenge

- #Makeourdaytimedatagreatagain
- Develop a transfer function based on biases and meteorological parameters measured at the three reference stations, as well as land-cover data and building geometry data in order to correct for the estimated radiative bias of each station of the monitoring network.



Ressources / Data

- Raw temperature data of all stations of the monitoring network
- Meteorological parameters measured at the three reference stations
- Land-cover data
- Building geometry data

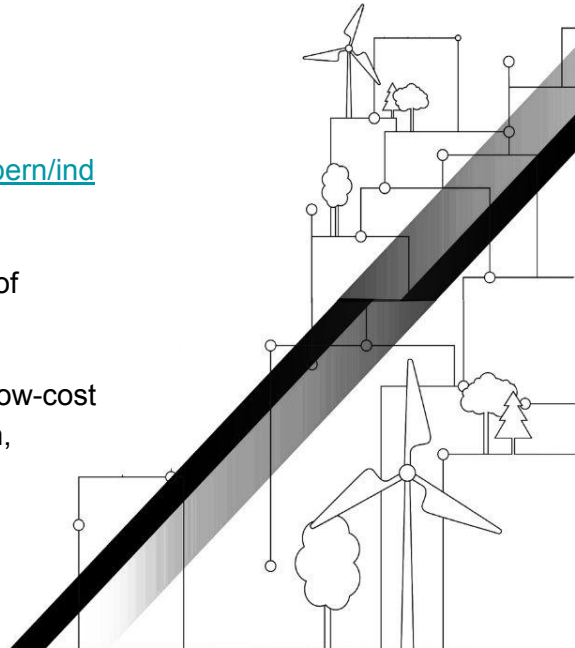
Link to the project:

https://www.geography.unibe.ch/research/climatology_group/research_projects/urban_climate_bern/index_eng.html

Burger, M., Gubler, M., Heinimann, A. and Brönnimann, S. (2021). Modelling the spatial pattern of heatwaves in the city of Bern using a land use regression approach. *Urban climate*, *38*, 100885.

Gubler, M., Christen, A., Remund, J., & Brönnimann, S. (2021). Evaluation and application of a low-cost measurement network to study intra-urban temperature differences during summer 2018 in Bern, Switzerland. *Urban climate*, *37*, 100817.

Contact: moritz.burger@giub.unibe.ch



Challenge Nr 7

DLT 4 Financing the Energy Transition

Tokenisation of Energy and Fractional Ownership of Digital Assets provide new possibilities for financing PV-projects



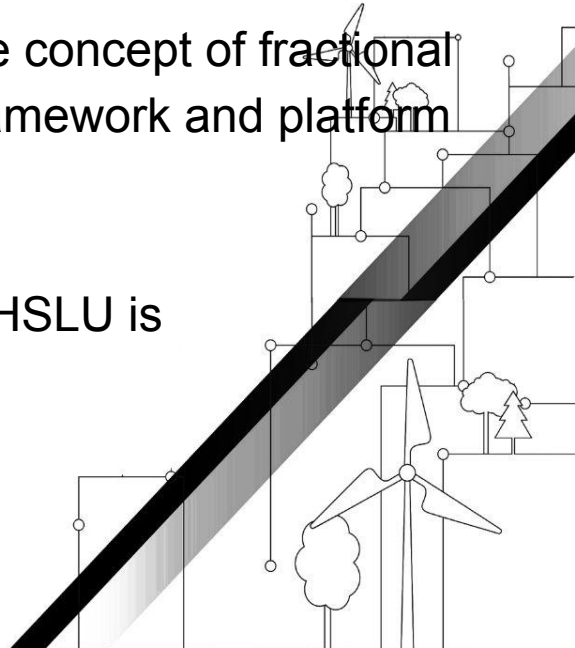
Supported by

Schweizerische Eidgenossenschaft
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Confederazione Svizzera
Confederaziun svizra

Bundesamt für Energie BFE
Swiss Federal Office of Energy SFOE

Introduction

- e-swissolar AG is working at the intersection of renewable energies and blockchain technology
- Recently initiated ReFi a project that will implement the concept of fractional ownership and tokenisation of energy for creating a framework and platform for mobilising funding for PV-projects
- Under the supervision of Prof. Dr. Christoph Imboden HSLU is conducting a preliminary study (Innocheque)

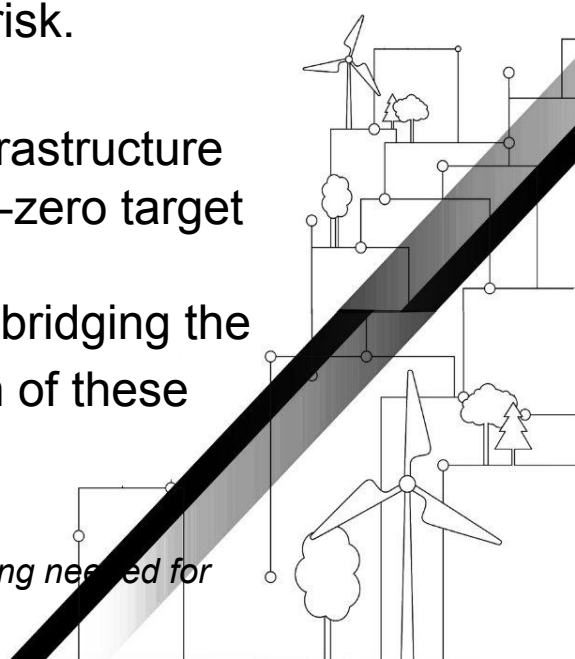


The topic:

- Cities emit **75 %** of the worldwide energy-related CO2-Emissions.
- More than **65 %** of the world population will live in cities by 2050.
- **80%** of the global GDP is produced in cities and is at risk.

1.1tn USD are needed annually to finance green urban infrastructure
Switzerland needs annually **12.9 bn** CHF to achieve its net-zero target

The challenge lies in the development of solutions that are bridging the financing, transperancy and efficiency gap and mobilisation of these funds



Sources: *Renewable Energy in Cities Status Report 2021, Investment and financing needed for Switzerland to reach net-zero by 2050*

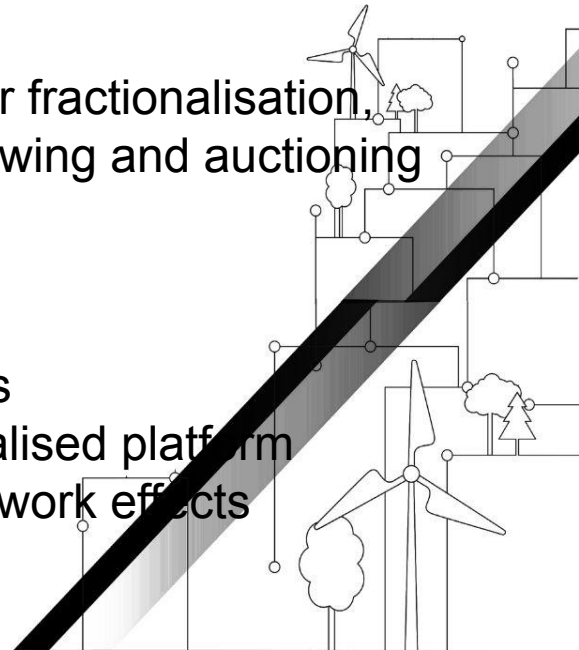
Challenge 7a

Implement the concept of fractional ownership, tokenization of energy by utilizing blockchain technology and open-source DeFi protocols

For participants with coding experience:
Build an minimum viable platform (front-end, back-end) for fractionalisation, auctioning and trading of ownership rights, lending, borrowing and auctioning of digital assets (one of those or a combination).

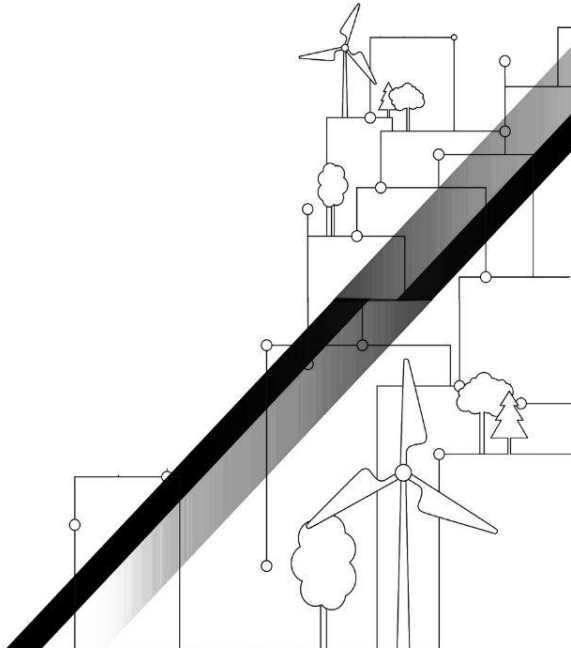
For participants with no coding experience:

1. Design an incentive model for all platform participants
2. Design the transition from a central to a fully decentralised platform
3. Create a strategy how the platform could achieve network effects



Challenge 7b

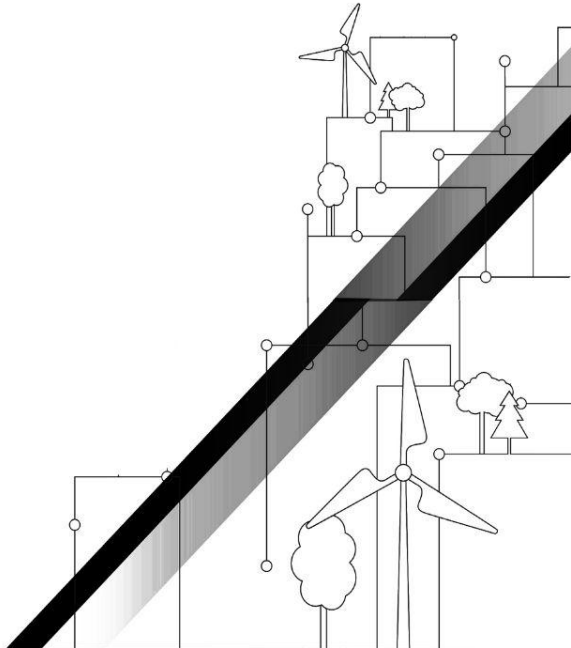
Create reward/incentive mechanisms for renewable energy production, provide flexibility, for sharing energy related data or work on your own finance related solution.



Ressources / Data

- GithubRepo (tools, code-examples)
- MiroBoard

Vasileios Panagiotidis Contact



Challenge Nr 8

Load Shifting to incentivize renewable Energy

aliunid

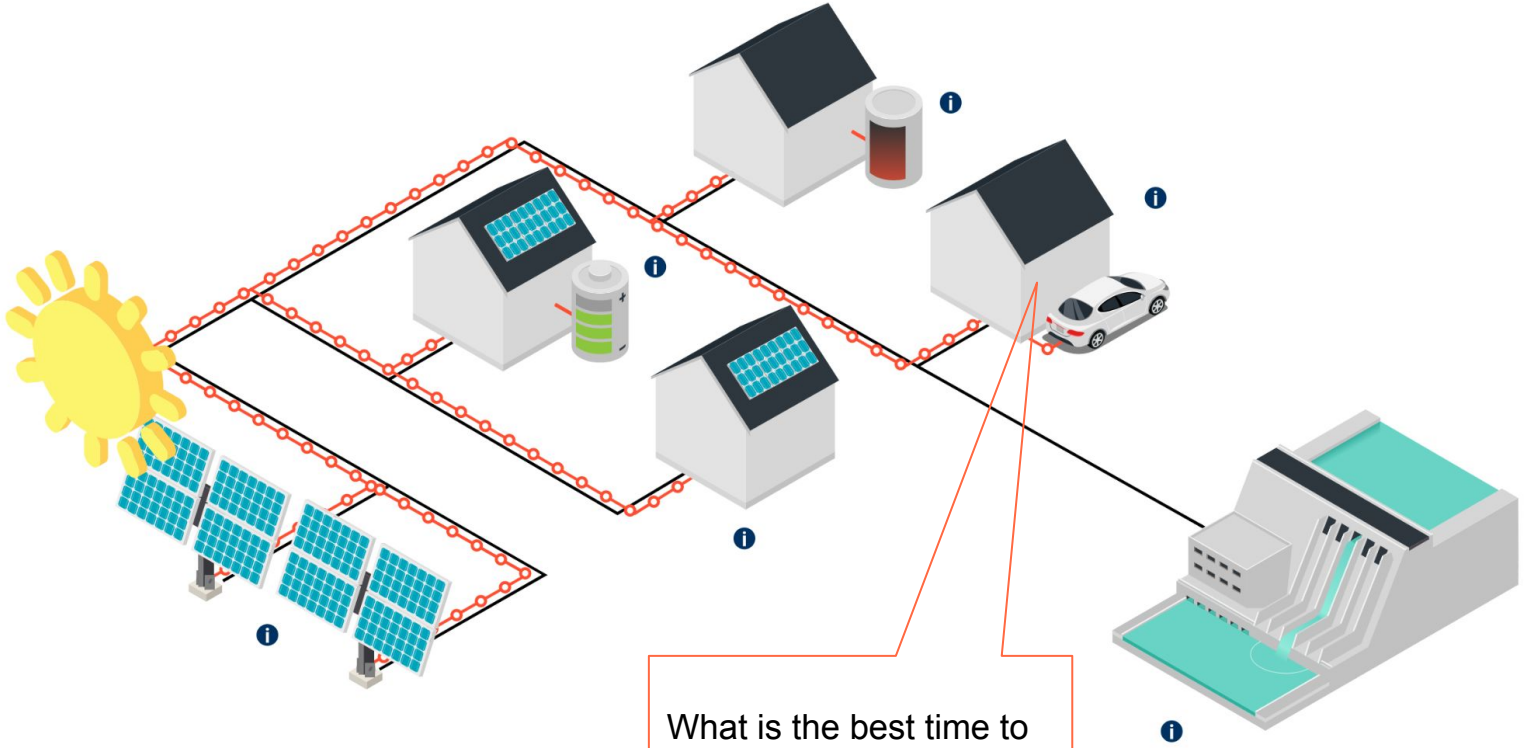






How can the complexity of the energy market be boiled down to a robust and effective metric for load shifting?

aliunid



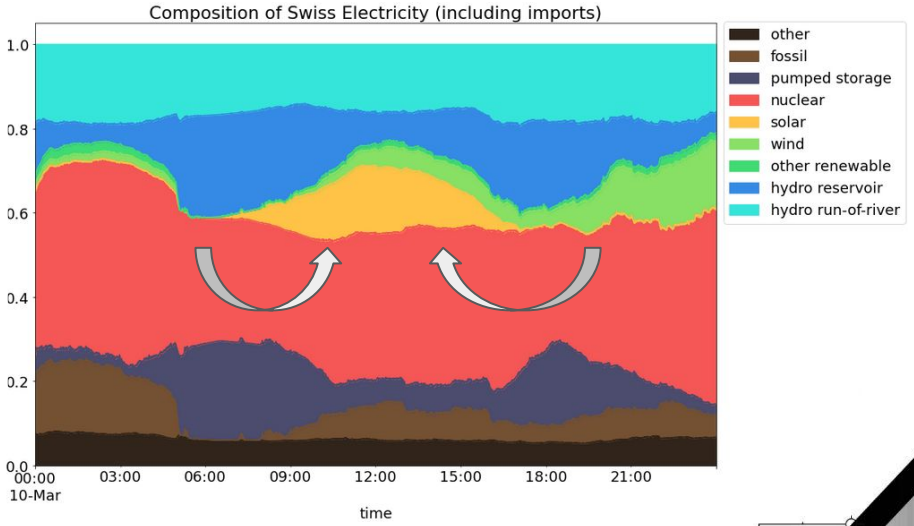
What is the best time to charge this car?

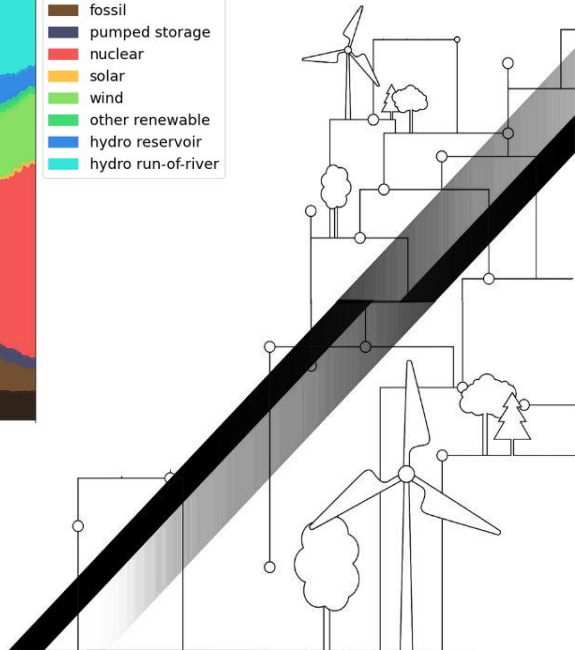
The topic:

aliunid

The composition of electricity production (renewable / non-renewable) as well as electricity imports fluctuate in time.

Using electricity in the right moment may potentially help to incentivise the production of renewable energy.

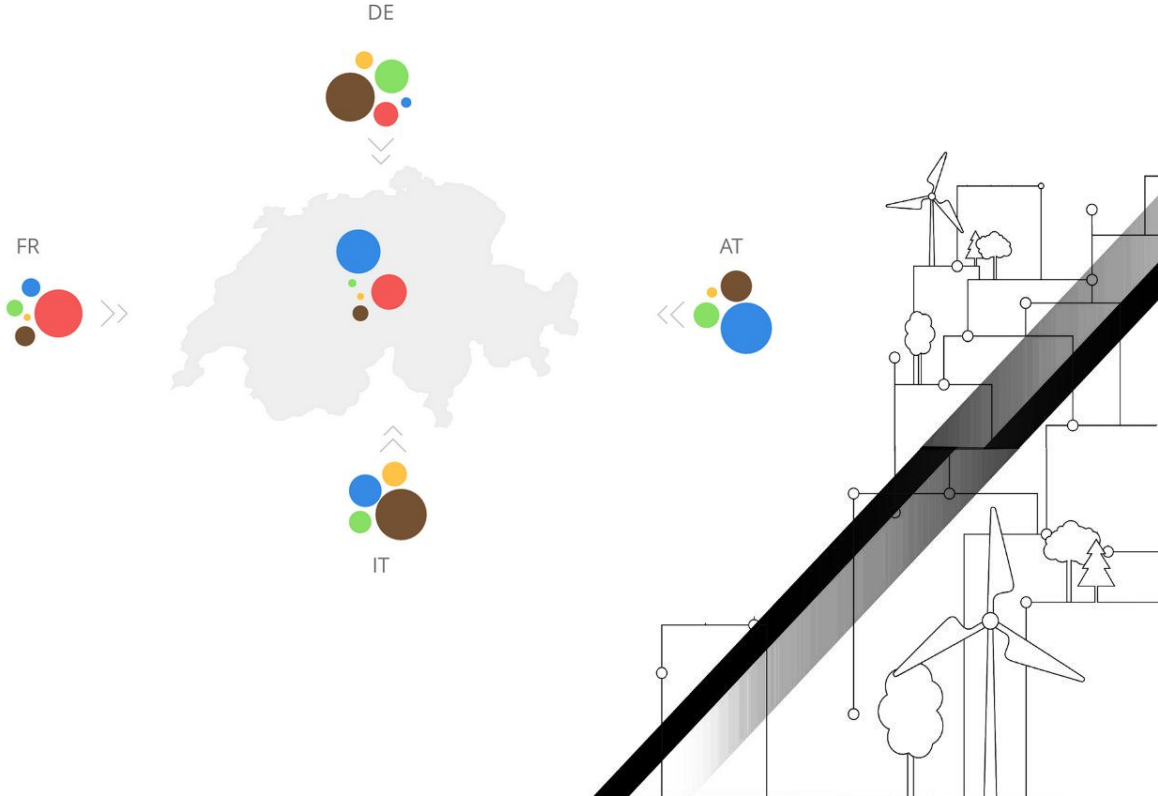




Challenge Step 1

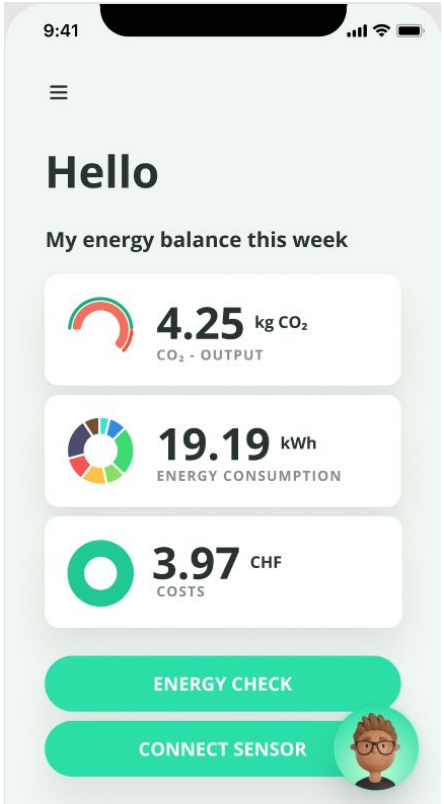
aliunid

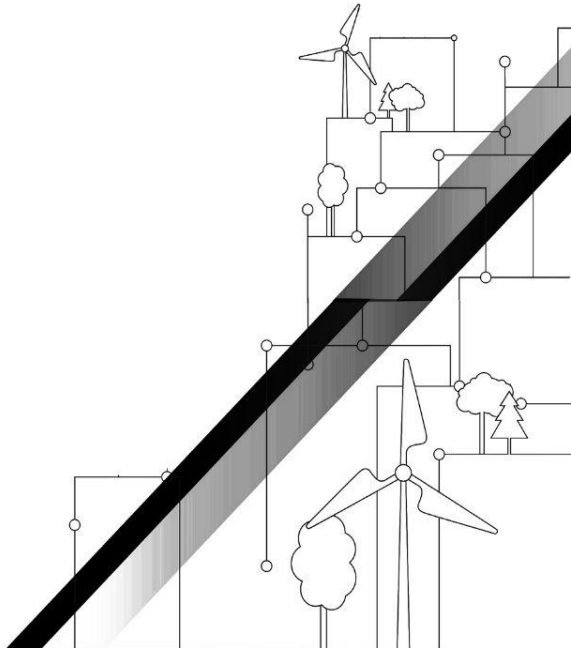
Analyze the causal relationships between time of energy consumption and impacts on energy production (given the complex coupling with neighboring countries)



Challenge Step 2

Create a metric according to which electrical load can be shifted to set the right incentives towards more renewable energy





Challenge Step 3

Investigate what such a metric means in practice, i.e. in case of e-vehicle charging



Resources / Data:

- ENTSO-E electricity production data (https://transparency.entsoe.eu/)
- Swissgrid Import/Export data (https://www.swissgrid.ch/de/home/operation/grid-data/generation.html)
- CO2 emission factors per production type and country (https://drive.switch.ch/index.php/s/RIixVBbccBwLGAy)
- E-charging data:
  dataset 1: https://drive.switch.ch/index.php/s/Vvm91J41FTDRpJa
  dataset 2: https://drive.switch.ch/index.php/s/ezE1hjXU0QnAA15

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- till.richter@aliunid.com



Challenge Nr 9

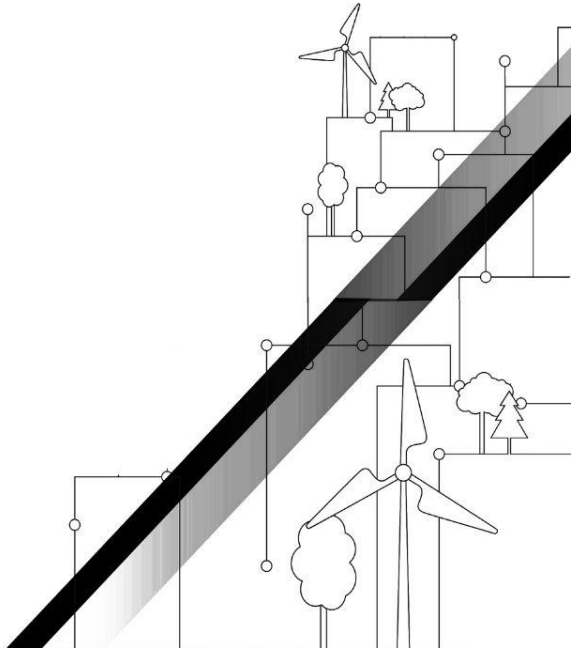
Cool Urban Locations (for a hot future)

Crowdsourced improvement of public and private urban open spaces



by Stefan Keller
Institute for Software

OST

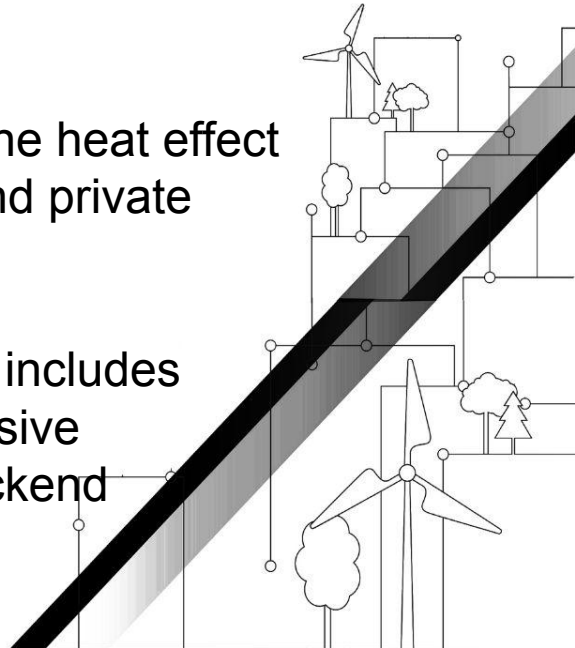


Introduction

- This is an application to identify and evaluate public and (semi-)private urban open spaces throughout Switzerland and to suggest ways to improve their infrastructure, such as shade structures (tents), trees, water points and green facades, etc.

- Project goals are to promote measures to counteract the heat effect during summer nights for the attention of authorities and private owners of settlements

- Design goals: Similar to "Züri / Lenzburg wie neu", but includes proposals in/for urban spaces; is a mobile first, responsive Webapp with services when possible and a simple backend

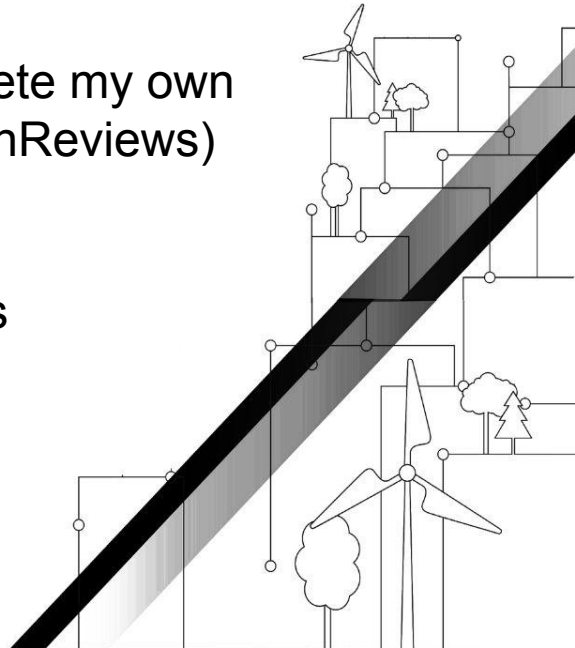


Introduction ff.

- Privacy preserving, using Open Source and Open Data

- User Stories: As a user I want to ...
  - add a note at any place or delete my own note
  - add a remark to any (selected) OSM object or delete my own
  - to rate a "spatial note" or an OSM object (via OpenReviews)

- User Stories con’t.: As an settlement owner I want to...
  - download a list (CSV) about ratings and proposals

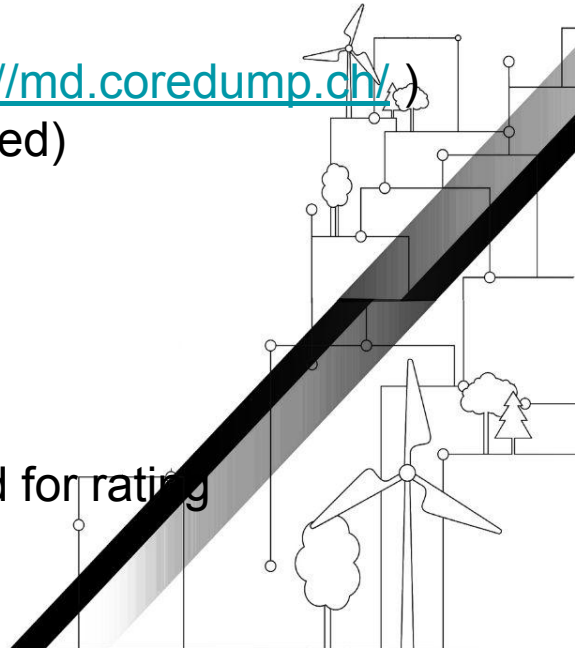


Possible tasks

1. Design GUI of the app
2. Organize data and services (e.g. find OSM tags for infrastructure like trees)
3. Implement frontend (Flutter)
4. Implement backend (Python Server)
5. Write website/blog post presenting the app (e.g. https://md.coredump.ch/)
6. Write reviews and add notes (if reviews are implemented)
7. tbd. ...

Everyone is invited to participate

- programmers
- and especially also designers
- and volunteers for data preparation (e.g. Wikidata) and for rating

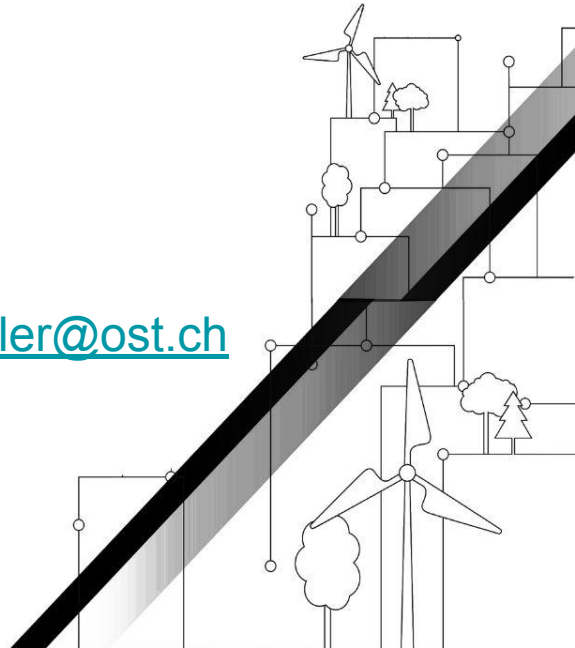


Resources / Data:

- OpenStreetMap OSM.ch - See also next (extra) slide
- City of Zurich and Swisstopo: opendata.swiss

Contact:

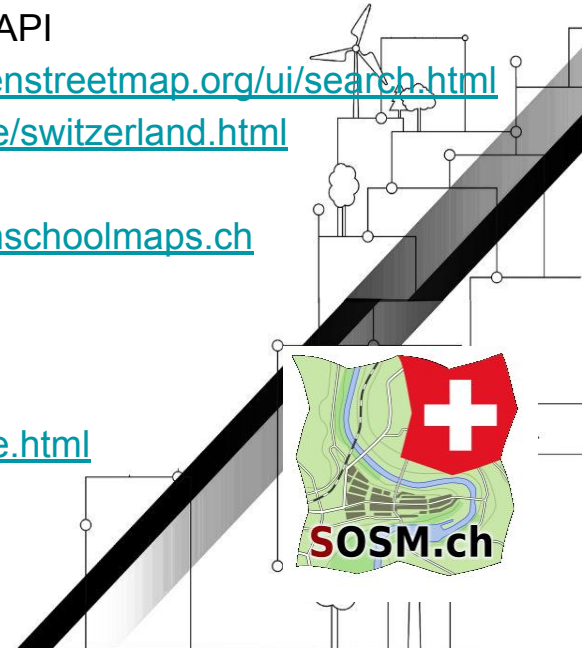
- Team AlmOST
- Prof. Stefan Keller, IFS & Klimacluster OST, stefan.keller@ost.ch



Resources / Data: OpenStreetMap



- The wiki map of the world - A treasure trove of vector geospatial data with streets, buildings and >1001 POIs: www.osm.ch / www.osm.org
- Services / Data:
  - Data API (returns GeoJSON): Overpass Turbo App / Overpass API
  - Geoname Search/Geocoding: Nominatim https://nominatim.openstreetmap.org/ui/search.html
  - Download data: Geofabrik https://download.geofabrik.de/europe/switzerland.html
- Ressources
  - Tutorials on OSM, Overpass, etc.: OpenSchoolMaps www.openschoolmaps.ch
  - Data entry in Airtable #OpenCityData 1601 for “OSM.ch”
  - More… See Etherpad https://etherpad.wikimedia.org/p/OSM
- Help / Support:
  - IRC of Swiss OSM Association, see OSM.ch https://osm.ch/hilfe.html
  - Team AlmOST, team of Challenge 9
  - Slack or mailto: stefan.keller@ost.ch



1 Eco - Booster

2 Local Sustainability Booster

3 Vertical Farming

4 NEST Building Modelisation

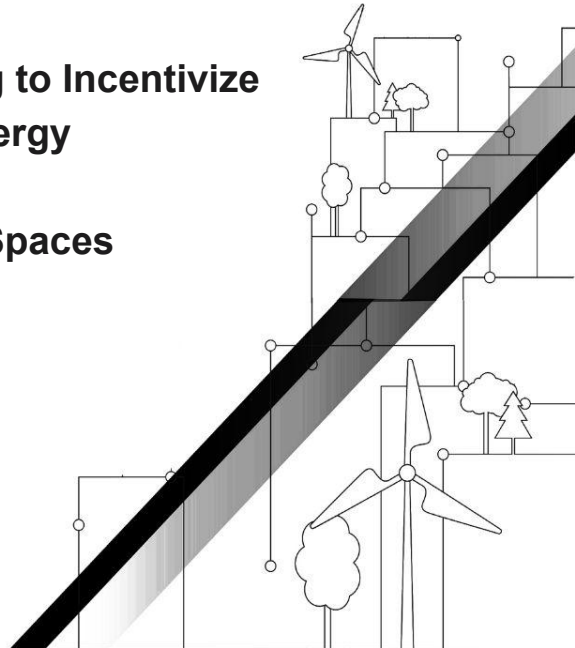
5 Solar-panel Detection

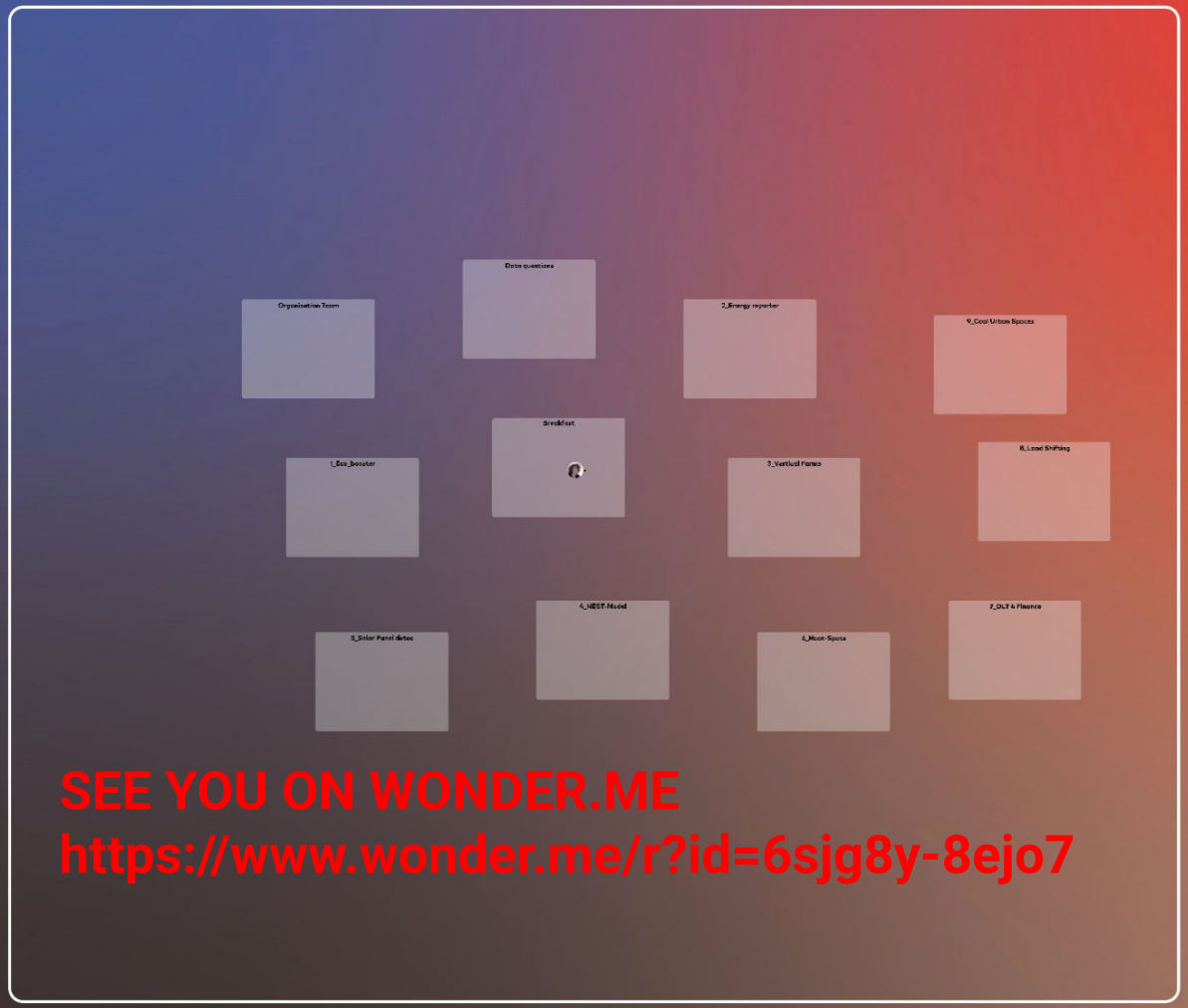
6 Heat-spots in Bern

7 DLT for the energy transition

8 Load-shifting to Incentivize Renewable Energy

9 Cool Urban Spaces





Chat

Circle | Private | Everyone

offline chats

- Andy
- Mr ZURA
- Maud
- Oleg L., Organizer
- Lena
- dari
- Oleg