

Innovation & Intelligence Artificielle: Quelles réponses aux besoins des acteurs du domaine énergétique?

Dr Silvia Quarteroni, Head of Innovation

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Mission and structure of the Swiss Data Science Center



ETH zürich

Zurich



EPFL

Lausanne



PSI

Villigen

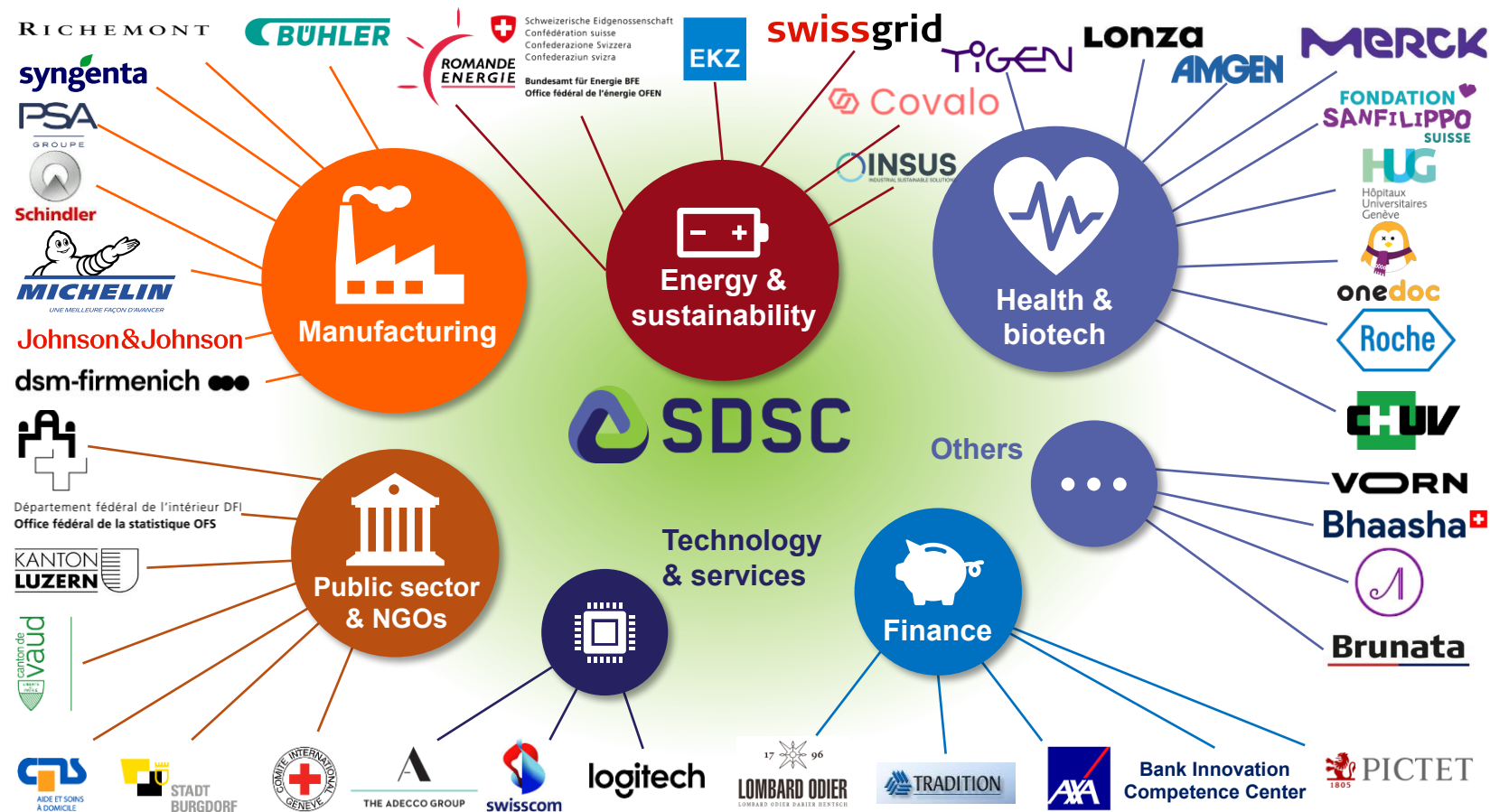
Supporting the entire **data science journey** — from collection and management to machine learning, AI, and industrialization — serving **academic labs, hospitals, industry** and **public sector** stakeholders, including cantonal and federal administrations.

From a **Strategic Focus Area** of the ETH Domain to a **National Research Infrastructure** in 2025

Multidisciplinary, agile and impact-driven team of **120 professionals** across three locations

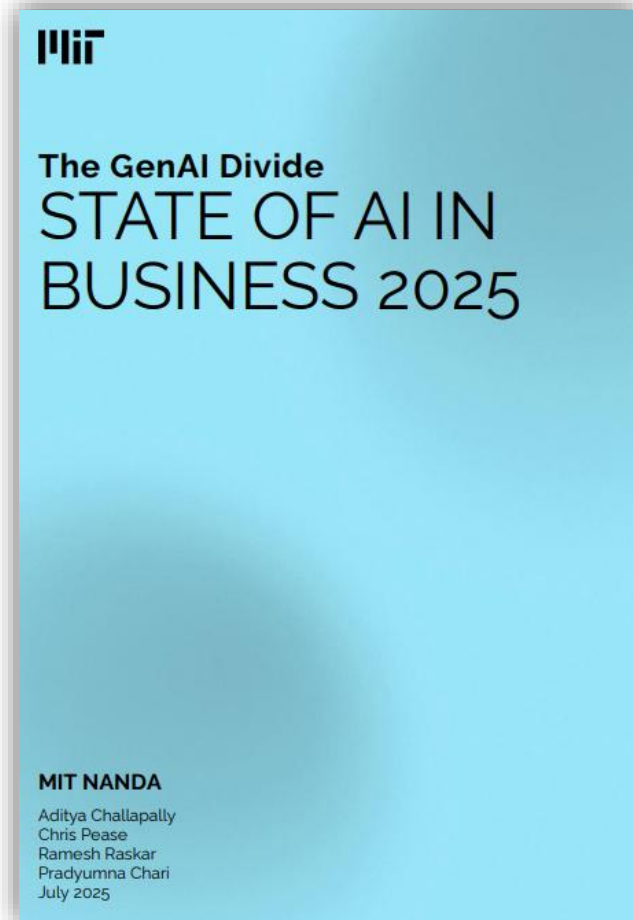
Applied Research,
Innovation, Engineering,
Education

Health & Biomedical,
Climate & Environment,
Energy & Sustainability,
Large-scale scientific
infrastructures



(How) Are we taking advantage of AI?

Job market, data culture in Swiss organizations



- Despite \$30–40Bn in enterprise investment into GenAI, 95% of organizations are getting “**zero return**”.
 - Tools like ChatGPT and Copilot are widely adopted enhancing productivity, not P&L performance
 - 60% of organizations evaluated such tools, but only 20% reached pilot stage and 5% reached production
- Chatbots “succeed” because they're easy to try and flexible, but “fail” in critical workflows due to lack of memory and customization.

Source: https://mlq.ai/media/quarterly_decks/v0.1_State_of_AI_in_Business_2025_Report.pdf

Homepage > News & Events > ... 2024 > 06 > Release of our report “State of AI in Swiss Tech Industry”

Release of our report “State of AI in Swiss Tech Industry”

Release of our report “State of AI in Swiss Tech Industry”

25.06.2024 by Sharon Teitler

🔊 Read

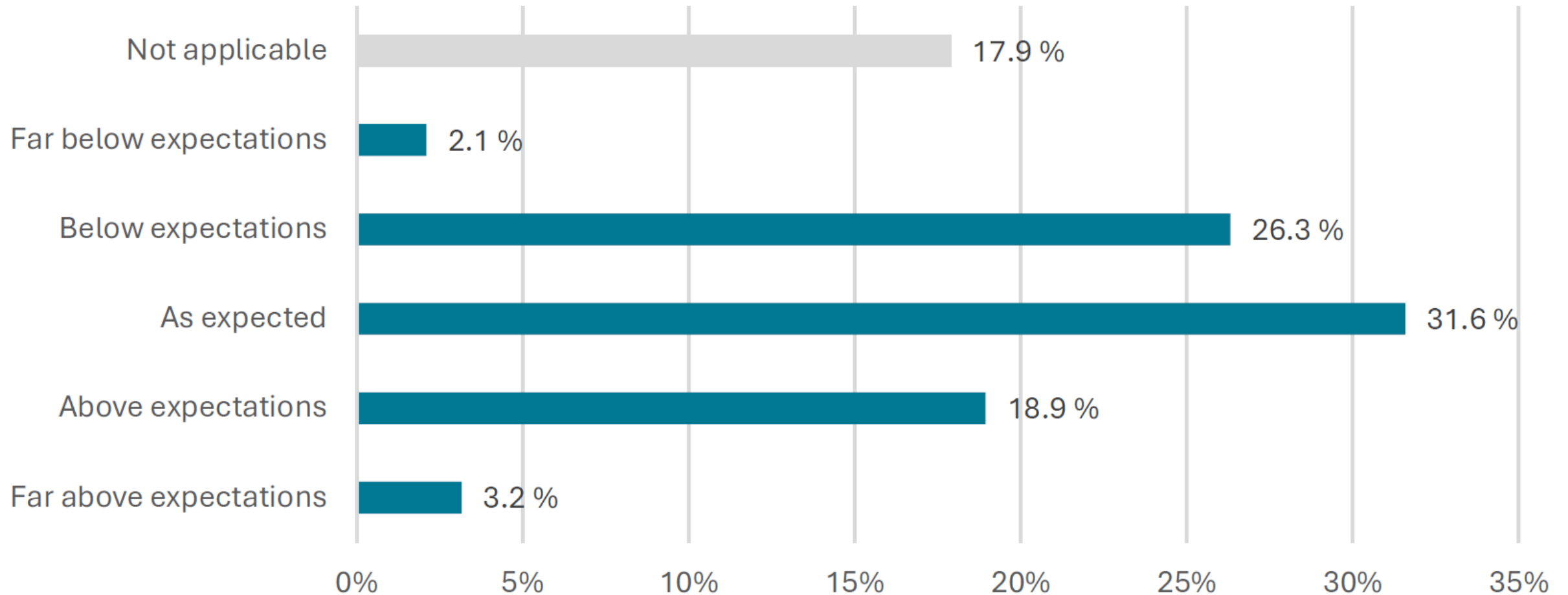
The report summarizes the results of a study into the state of AI adoption and plans in the Swiss tech industries. The survey was sent to all Swissmem members in March 2024. Within a month, a total of 209 senior managers answered the survey. We followed up a selection of answers by interviewing ten senior managers. The findings provide unique insights into the state of AI adoption in the Swiss tech industry as of spring 2024 and the plans for the upcoming three years.

In contrast to many reports that suggest AI is already well implemented in manufacturing industries, we methodologically show that this isn't necessarily the case. However, we show that those who have tried it tend to be satisfied with what AI delivers.

[Link to the study webpage](#)

[Link to the research paper](#)

Figure 19: Returns on current AI applications (N = 144)



- Why are few organizations really benefitting from AI applications?
- Often, top-down directives clash with governance and operational concerns
- There is a remarkable tendency to pick the wrong battles
 - Technology-first approach
 - Lack of data culture
 - “Scratching the surface” for fear of changing human processes/rituals

ÉTUDES

Divergence

Adoption de l'IA: un écart de perception entre dirigeants et équipes techniques

Mer 07.05.2025 - 13:50
par Yannick Chavanne

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Si la plupart des dirigeants affirment disposer d'une stratégie IA claire, son application reste complexe. Les équipes techniques signalent des défis persistants, notamment en matière de gouvernance des données, de compétences et de sécurité.



(Source: Sophia Kunkel sur Unsplash)

ICT Journal, May 8, 2025

What can AI really do for industry, public sector and society?

Some concrete examples

Analysis of the national electricity consumption and related forecast

Collaboration SDSC – OFEN - ECube

- The winter 2022/2023 crisis required drastic measures to guarantee electricity and gas supplies.
- The Confederation has launched an awareness campaign to encourage energy savings in the face of supply challenges.

Challenges:

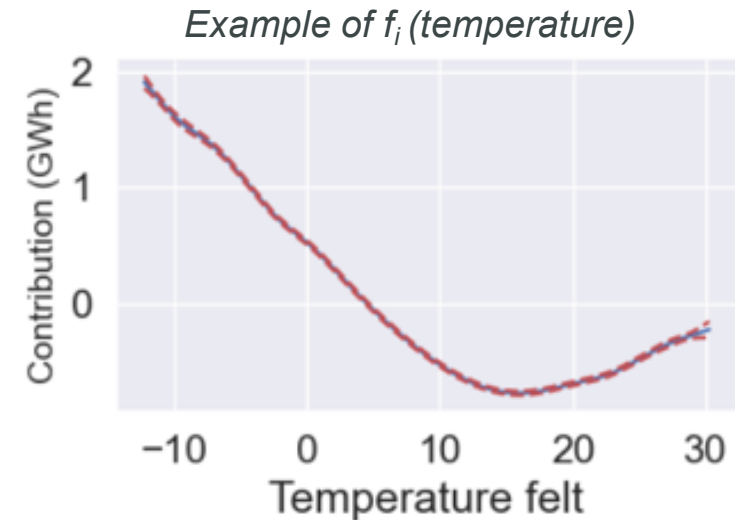
- It can take **up to a month** for some DNOs to transmit the electricity consumption data, limiting Swissgrid's ability to publish aggregated national data quickly.
- Evaluate **changes in behavior and energy savings** in the various sectors (households, services, industry) as part of the ambitious national objective of reducing consumption by 10%.



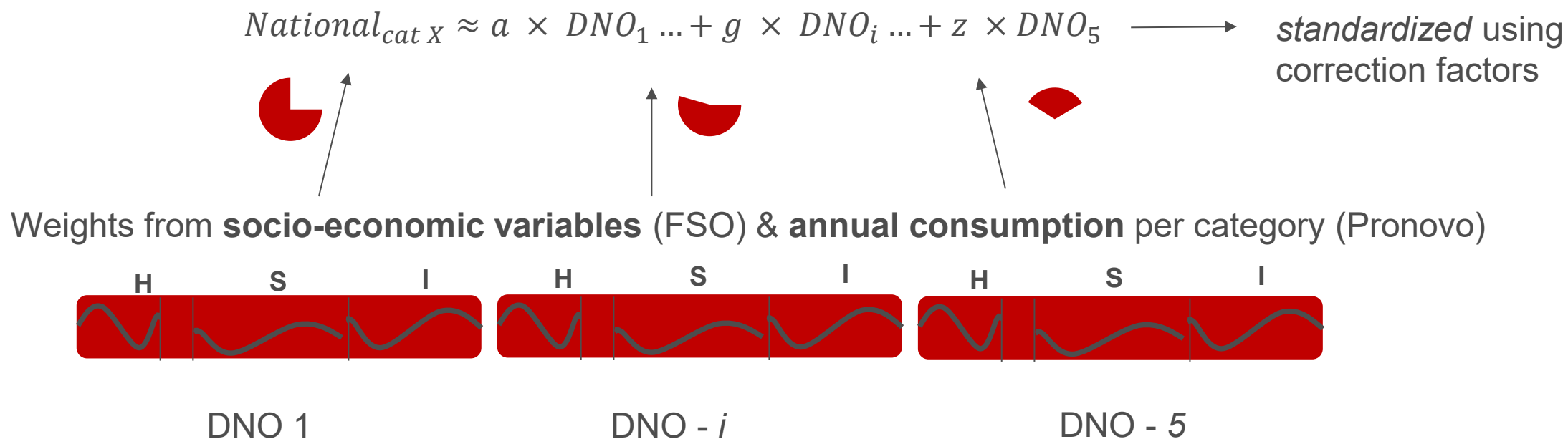
- A predictive approach, including calendar data and meteo data
- The model is trained on historical data of consumption (Swissgrid) and meteo (Meteoswiss)
- **Generalized Additive Models** (GAMs)

$$\text{Electricity (GWh)} = f_1(X_1) + f_2(X_2) + \dots + f_n(X_n)$$

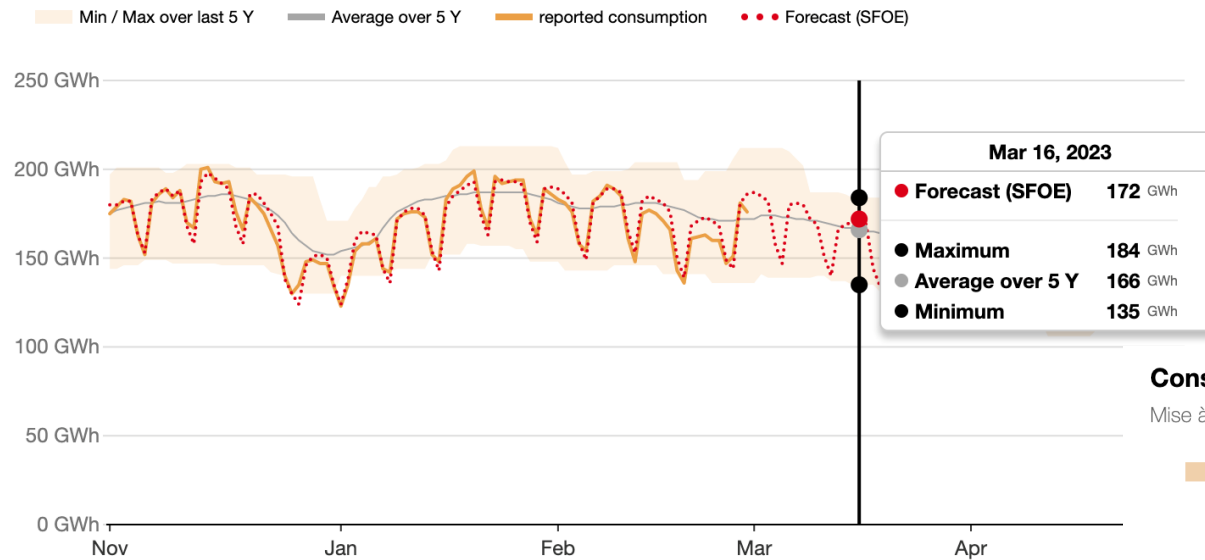
- For each hour, the model expects an array containing:
 - Calendar data (hour of the week, day of the year,...)
 - Meteorological data (Temperature, solar irradiance, wind speed,...)
- The model **forecasts 6-8 weeks ahead** at hourly (unc. 3%) and daily (unc. 2%) resolution



- From individual load curves recorded by smart-meters of DNOs we extrapolate the load to the national level using scaling factors and corrections
- Three categories: Households (< 20 MWh/y), Services (20-100 MWh/y), Industry (> 100 MWh/y)
- A bottom-up approach (only 5 DNOs provided inputs) :

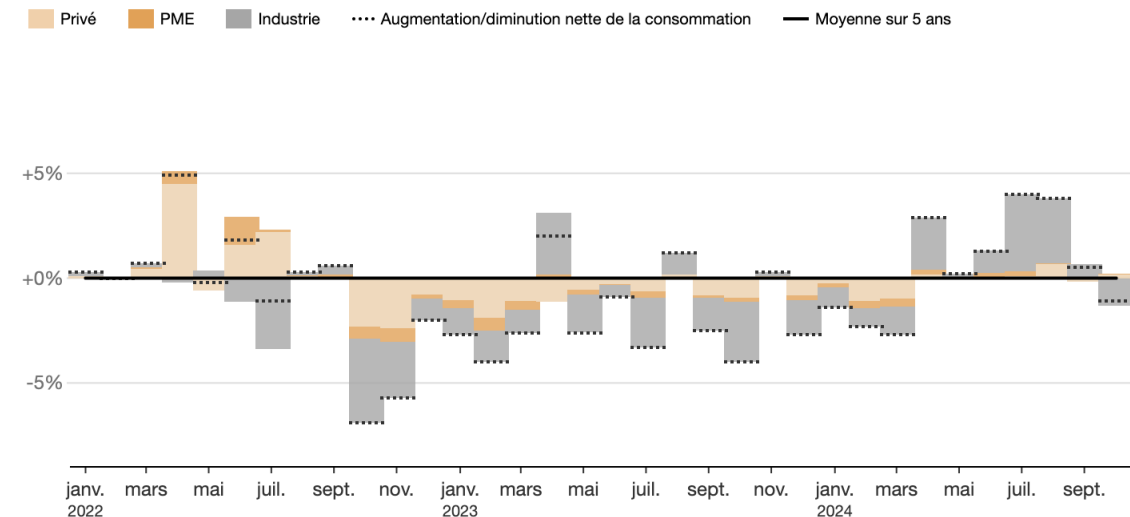


Democratizing the results: the OFEN dashboard



Consommation supplémentaire/inférieure par mois et par groupe de consommateur

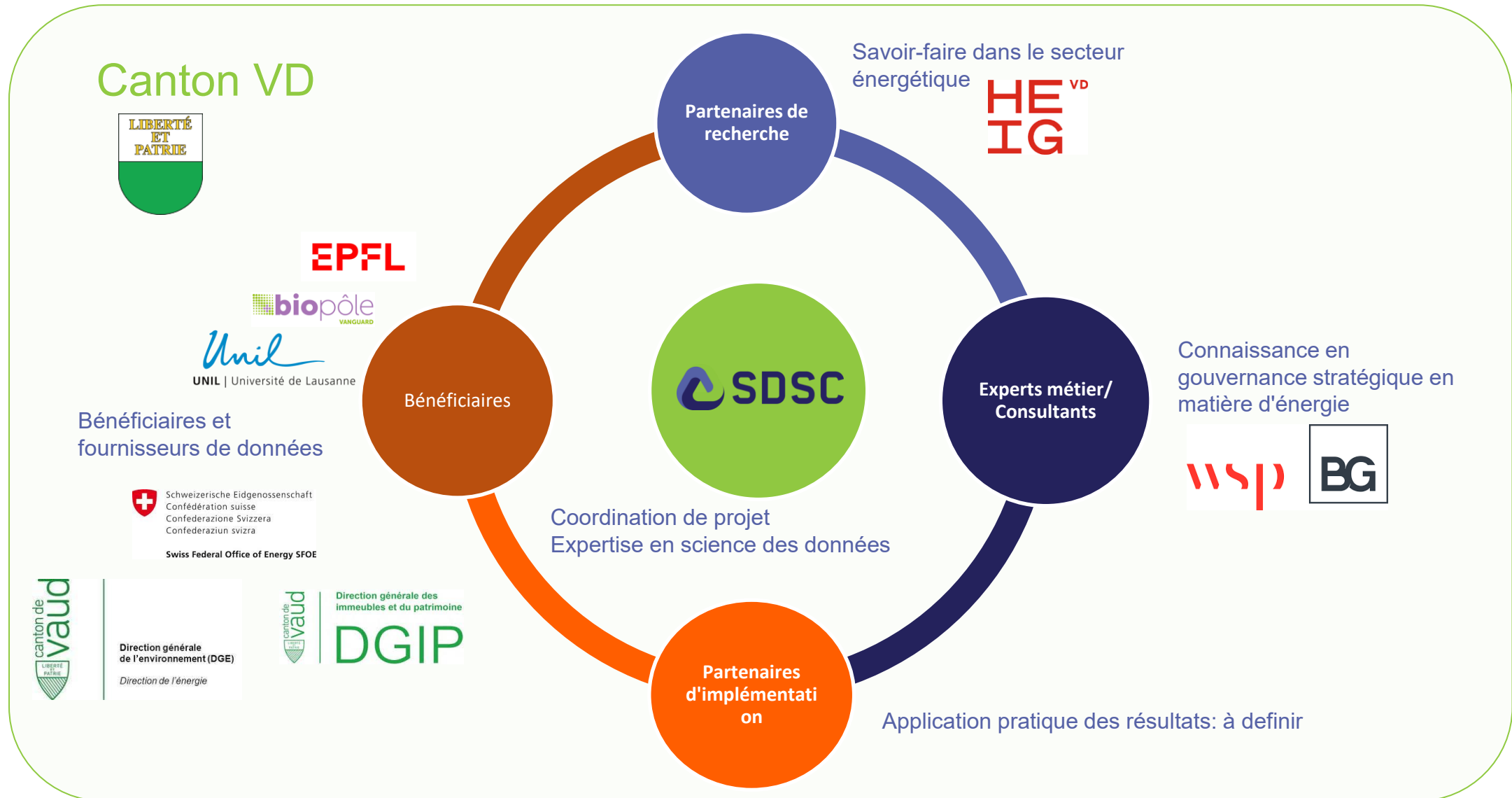
Mise à jour mensuelle - État novembre 2024



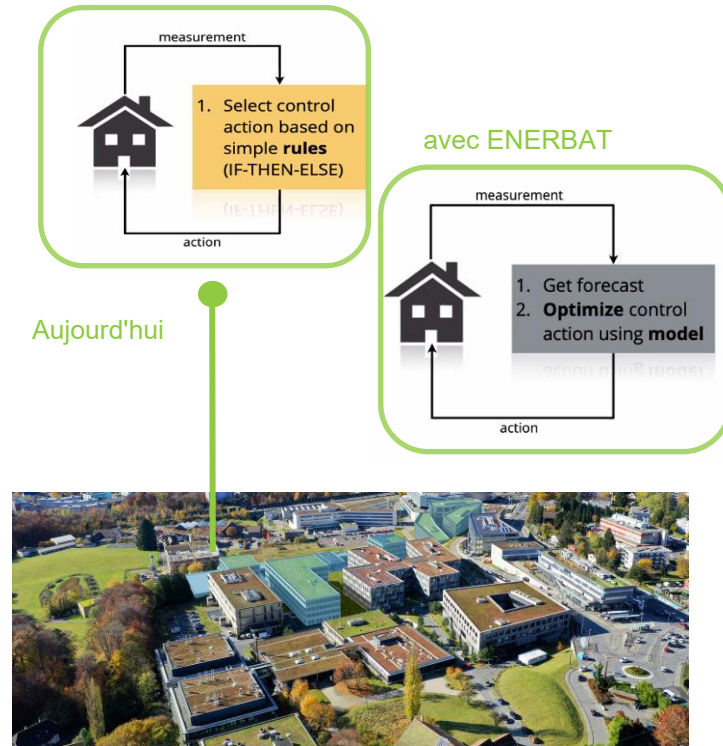
<https://www.energiesdashboard.admin.ch/strom/stromverbrauch>

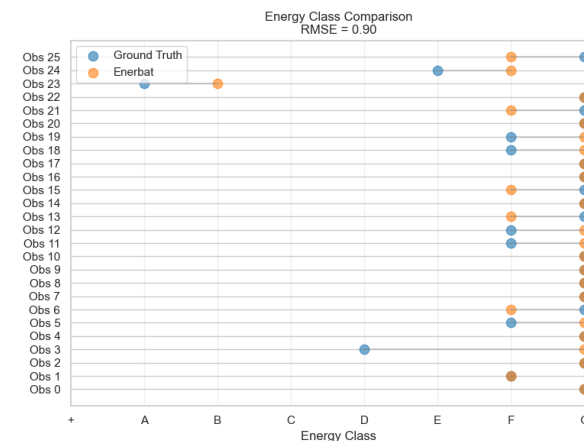
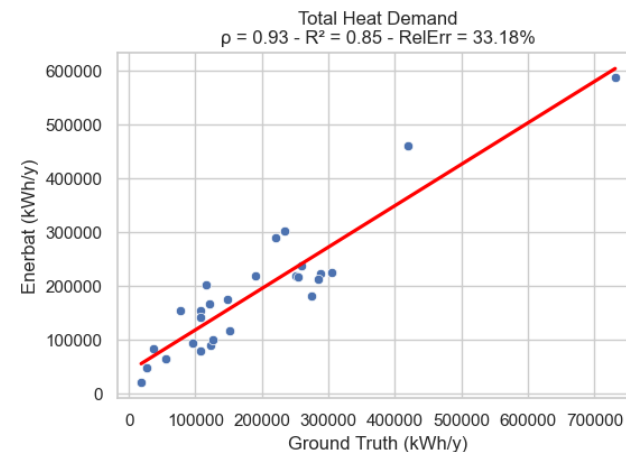
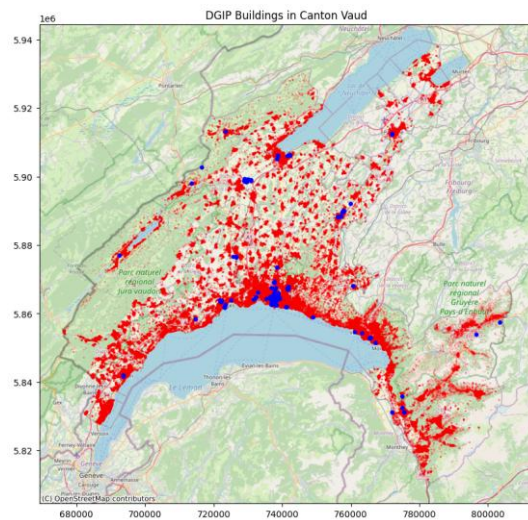
Data-driven renovation strategies and energy efficiency in the built environment

Collaboration SDSC - Canton VD SPEI/DGIP



- Identification of data-driven strategies for the reduction of CO₂ emissions in the building stock of the Canton of VD(horizon 2040).
 - Input: Technical data on buildings, historic DB of the renovation strategies (DIREN), electricity/energy consumption of buildings, building stock (DGIP), Federal Register of Buildings and Dwellings (RegBL).
 - Deliverable: Identification by building of the most favourable renovation scenario for the reduction of CO₂.
- Improving the energy efficiency of buildings during use with data-driven control methods.
 - Input: Room temperature, weather data, occupancy, etc.
 - Deliverable: Algorithm capable of optimizing consumption and of adapting to different buildings without being fully re-trained.





Modelling of the consumption and energy class of buildings



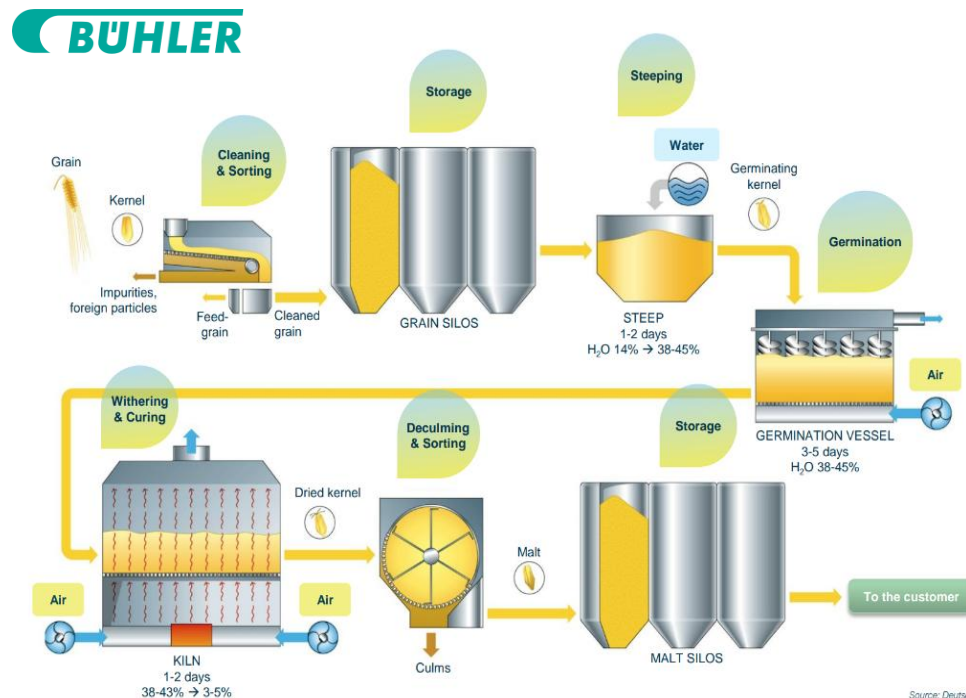
Identification of an optimal strategy to make the DGIP's real estate stock "net zero"

Improving industrial process sustainability

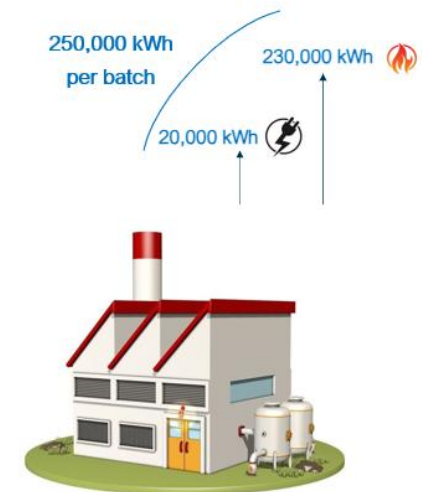
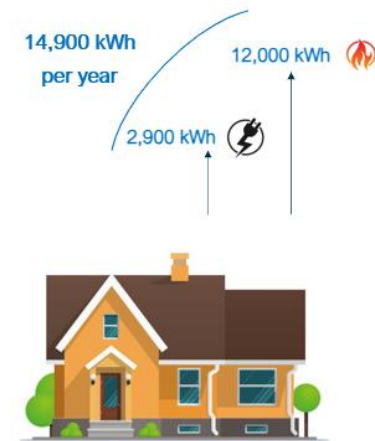
Collaboration SDSC - Bühler

Reducing the carbon footprint in malting

- Malting makes grain (barley) germinate by soaking it in water and then halting the germination process by drying it with hot air.



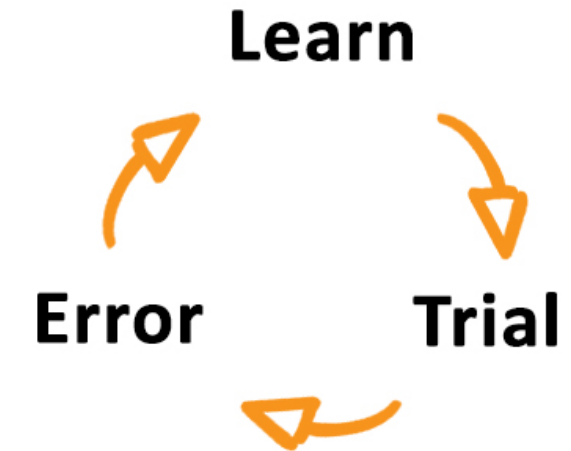
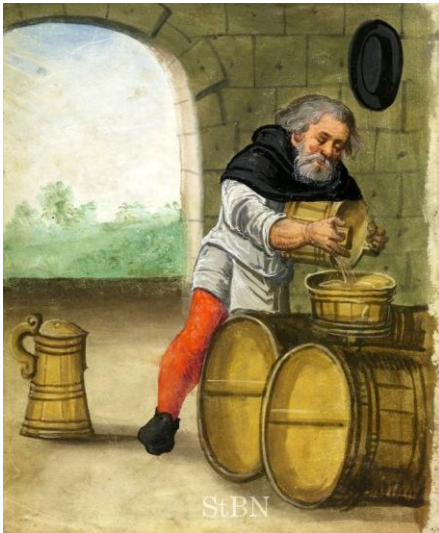
Source: Deutscher Brauer Bund e.V.



Credits: D. Bachmann

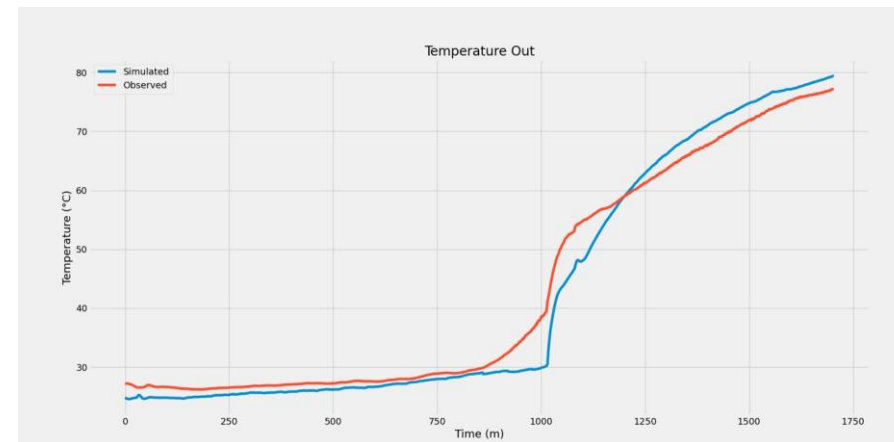
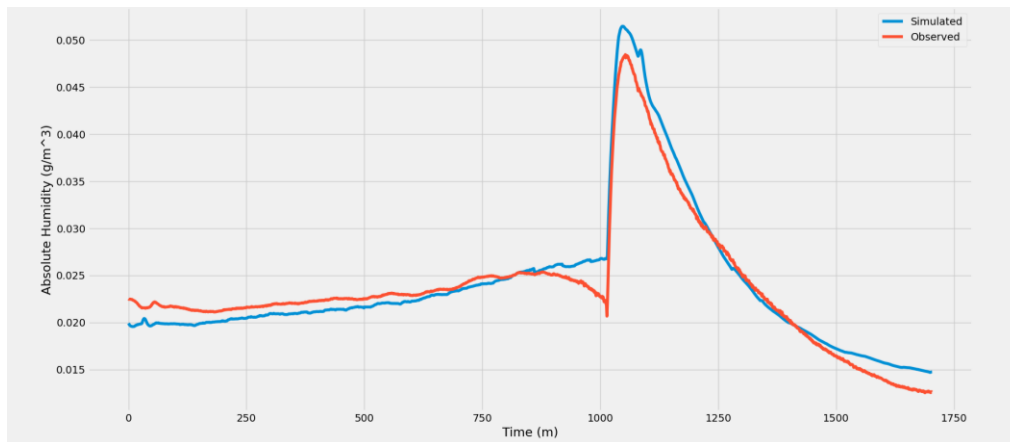
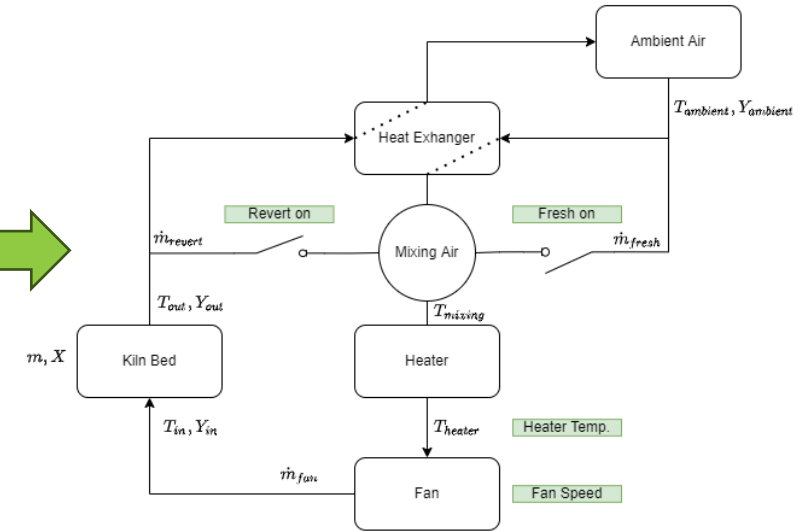
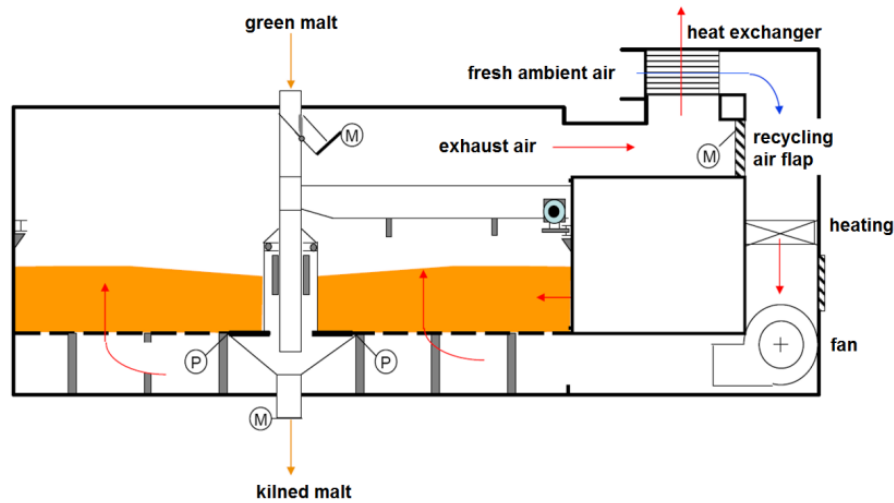
- Kilning is the most energy-intensive phase.
 - 1 batch (20-36 hrs) = x 16 UK household y. consumption
 - Cost of one batch (200t of barley) ~ 10K CHF

- What would you do if you were told to optimize an industrial process but didn't know the 'rules of the game'?

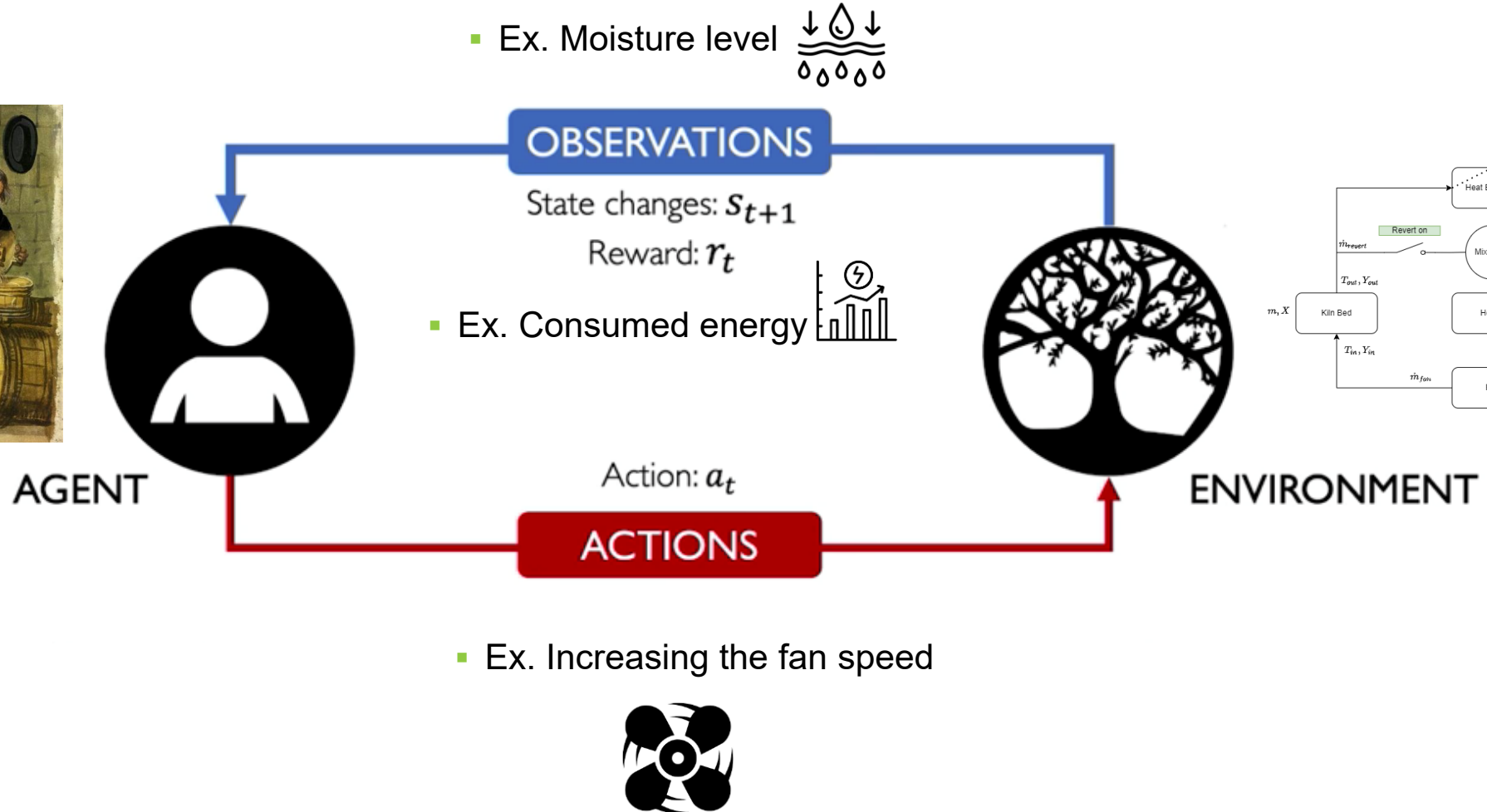
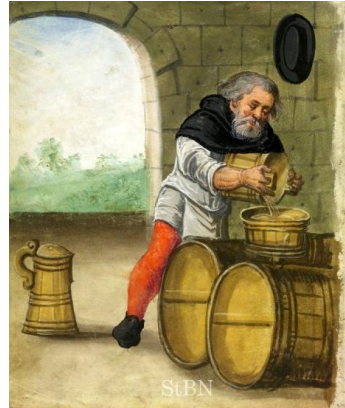


- You try and learn, until you get it right!
 - But do it first in a harmless (virtual) environment.

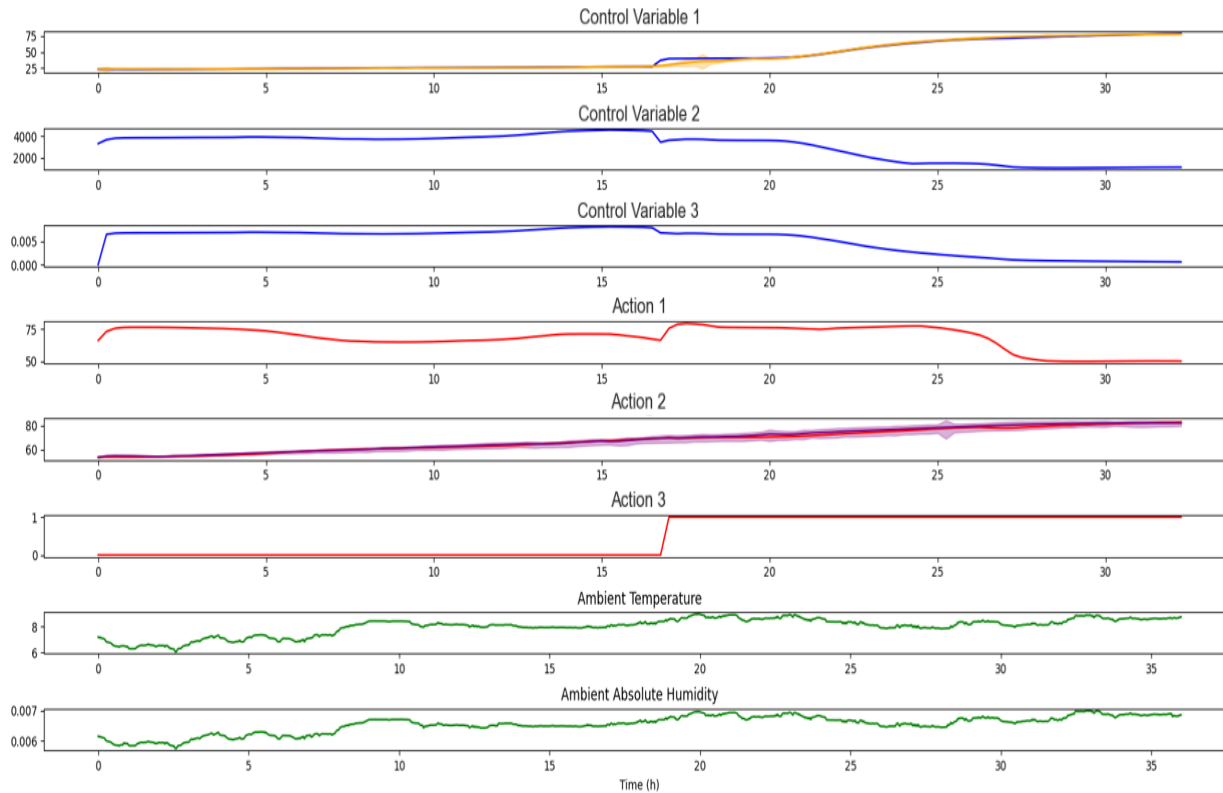
Digital Twin of the kilning phase



Reinforcement Learning: an agent who learns



A new recipe to try



- Average savings of a recipe

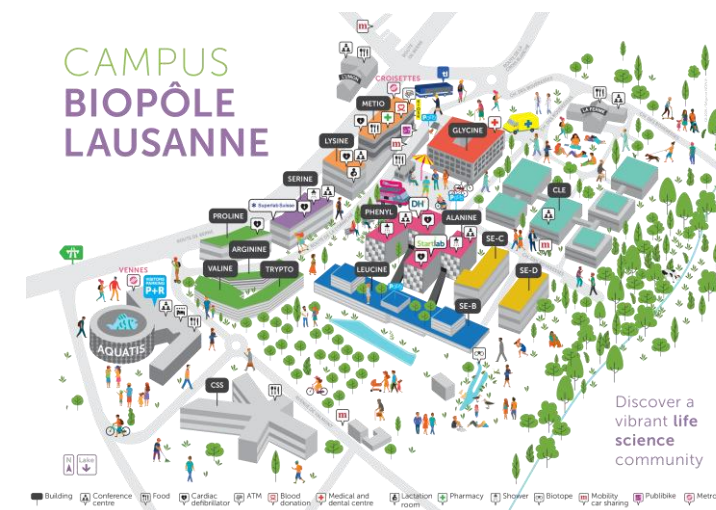
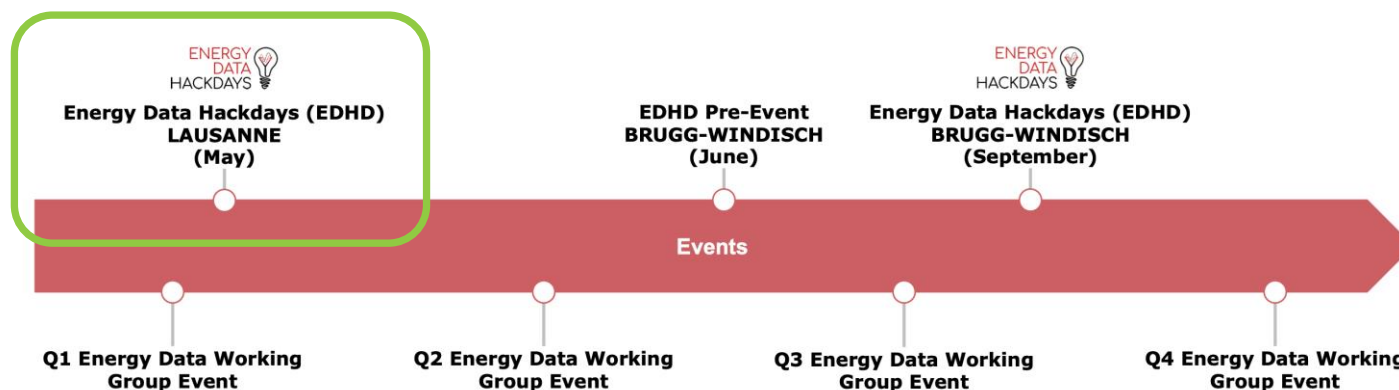


500 CHF/batch
(5%)



3hrs/batch
(7%)

- “Agent’s actions make sense!”
by Anonymous Maltster
- Step-wise deployment:
 - Trust/Recommendation /Autonomy



When: Thu 7 May - Fri 8 May 2026

Where: new SDSC office on Campus Biopôle, Lausanne

Thank you!

www.datascience.ch