

Imagining the EPFL Campus of Tomorrow

The **Ferme de Bassenges**
and the **Bernoulli Center**:
Finding sustainable solutions
to the growth of the campus
while respecting existing
heritage.

MA1 EPFL (un)studio



Summary

Introduction & Overview

The Ferme de Bassenges

Exploring the Swiss Campus Identity & The Spirit of Innovation

Densification: A Long-Term Sustainable Solution

The Bernoulli Center: A Hub for Collaboration

Key Take Aways & Conclusion

Appendix



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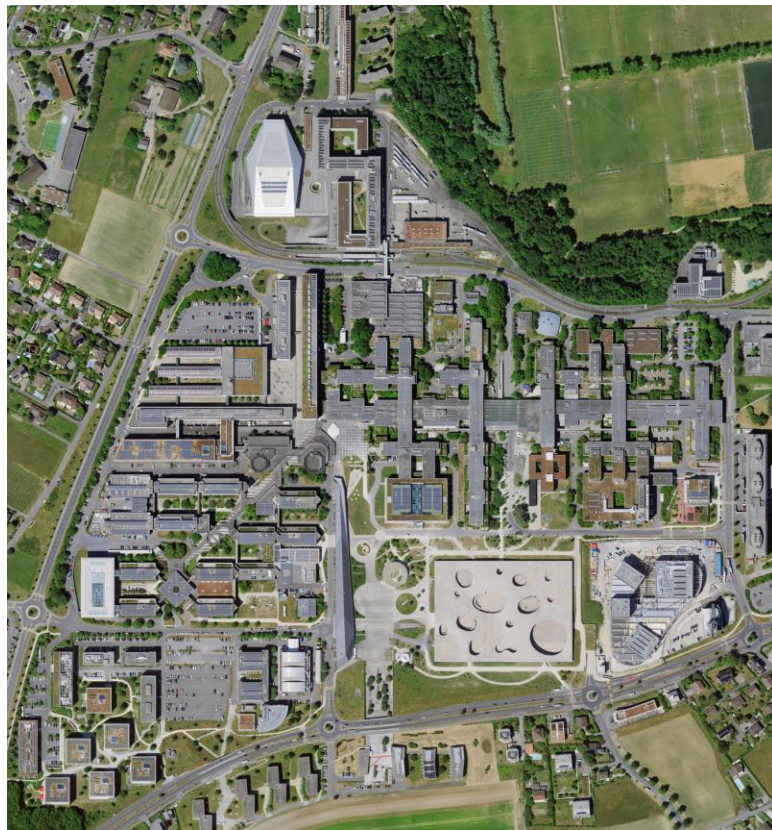
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Observations:

- Increasing pressure on land resources.
- Decrease in green spaces.
- Growing restrictions on land use.

Challenge:

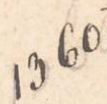
- Need for more space for research, teaching, and innovation.
- Complex expansion, impact on surrounding areas.
- Increased environmental responsibilities.

Proposed Solution:

- Innovation and sustainability at the heart of any expansion strategy.

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- Alexandre Srivastava



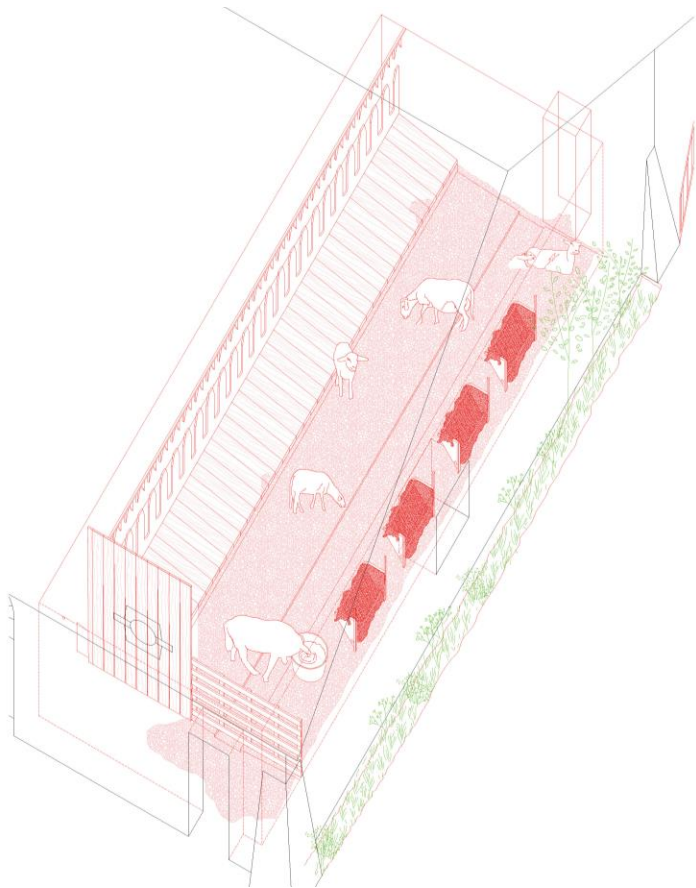
Bassenges Farm: A Living Lab for Sustainable Agriculture

- **Ferme de Bassenges:** A Living Laboratory: Sustainable agriculture at the heart of campus.
- **2019 - An Ambitious Challenge:** Reimagine agriculture on campus (EPFL & UNIL).
 - Create an inspiring model, beyond simple farming.
 - Raise awareness of food challenges and sustainability.
- **Cambium Collective's Vision:**
 - Participatory agroecology and respect for living systems.
 - Arboriculture, animal traction: a concrete and audacious approach.
 - Long-term commitment, in harmony with natural cycles.
- **Fruitful Collaboration:**
 - EPFL investment: 300,000 Swiss Francs
 - Farmers' involvement: energy, know-how, and renovations.

A Holistic Transformation: Integrating Systems and Functions

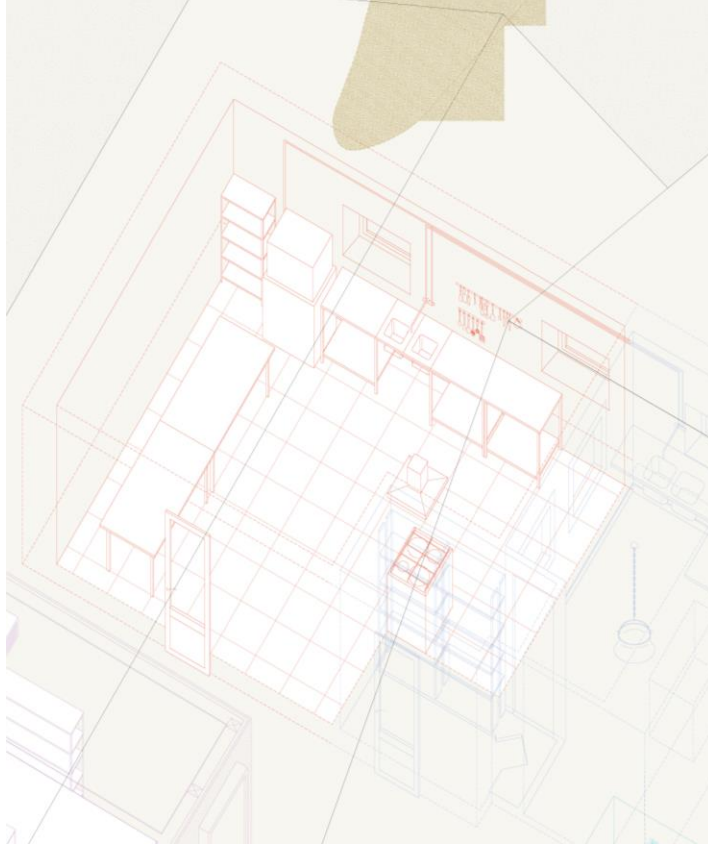


The Sheepfold: A Multifunctional Hub



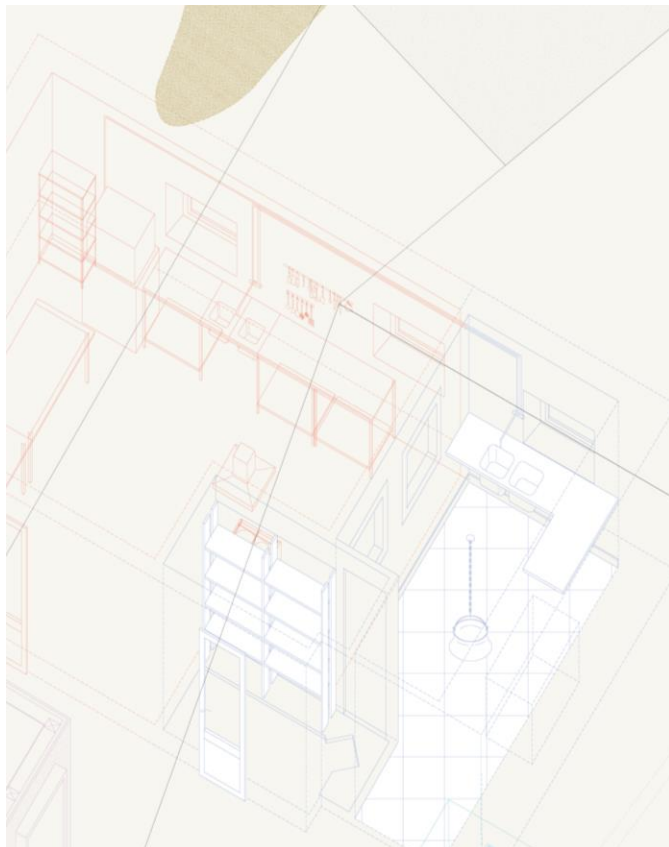
- **Complex Systems at Play:** The farmhouses intricate, interconnected systems. One of the many cycles that contribute to a circular economy.
- **The Sheepfold Cycle:**
 - Sheep shelter in the sheepfold at night and during winter.
 - Fodder is stored in an adjacent space and brought to the sheep during winter.
 - Summer grazing in designated fields.
 - Fodder hedges planted to enhance biodiversity and provide essential nutrients (tannins and minerals).
- **Adaptation for Milking:** The sheepfold has been adapted for milking, with milking stations built using reclaimed wood.
- **Generated Products:** The sheepfold generates various products: milk, wool, skins, and meat (though lamb is not part of the current farm model).

From Fleece to Feast: The Dairy Production Chain



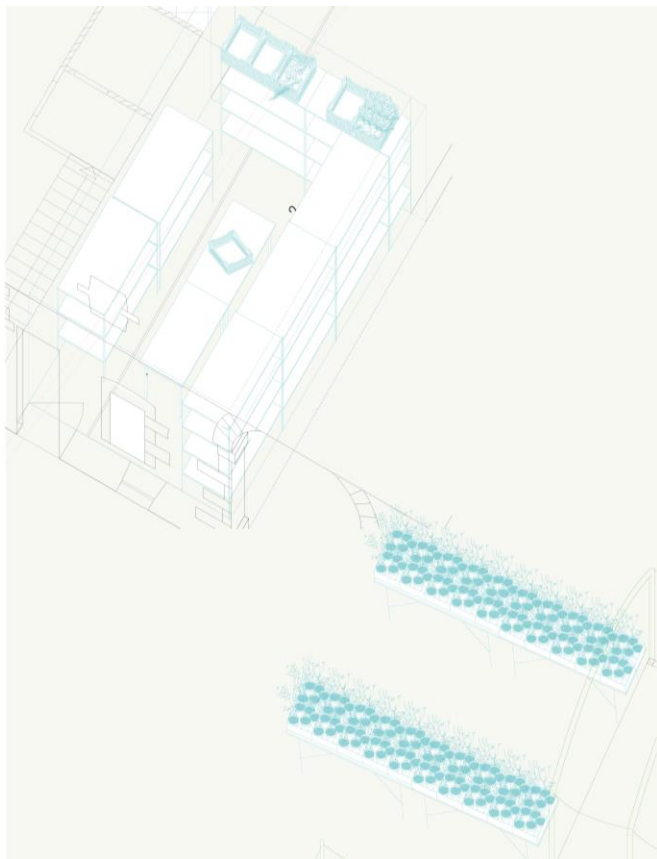
- **On-site Processing:** Milk from the sheepfold is directly processed in the cheesemaking facility.
- **Product Diversification:** Products include cheese, yogurt, and lactic bacteria cultures.
- **Direct Sales:** Fresh cheese is sold through a direct sales outlet.
- **Extending Shelf Life:** Some cheese is aged in the cellar to extend its availability, as ewes only produce milk during a limited season.

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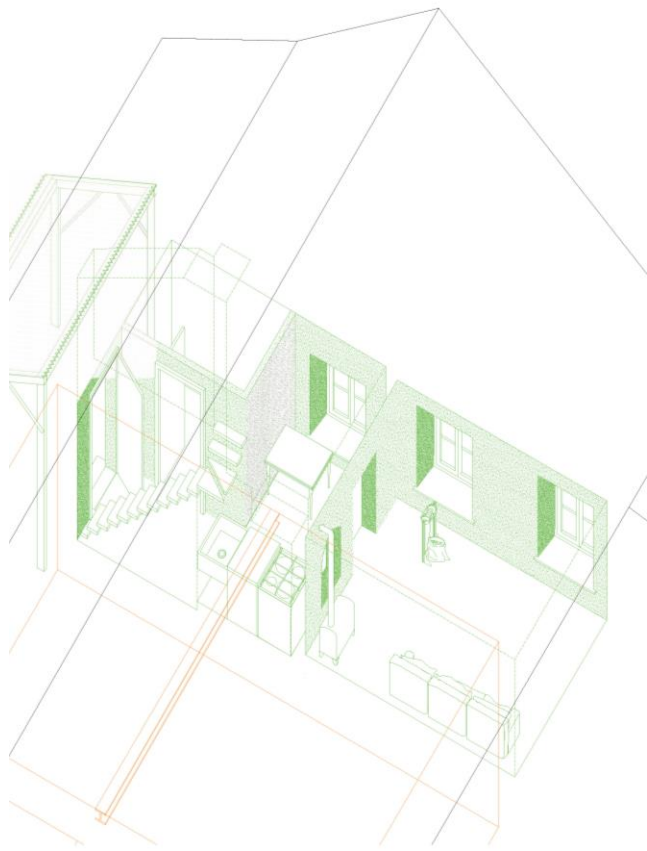
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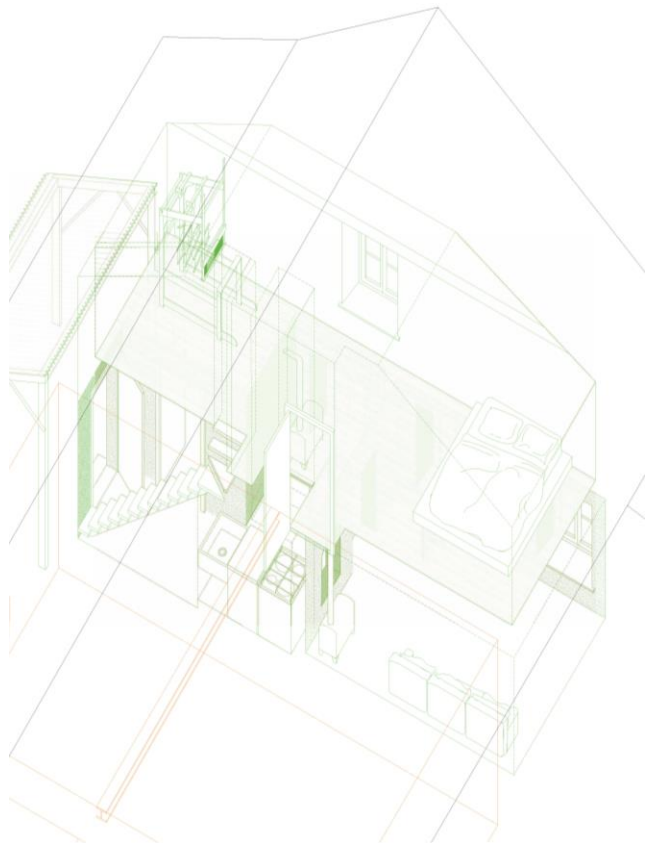
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La Maison Vigneronne: Adaptation to new uses



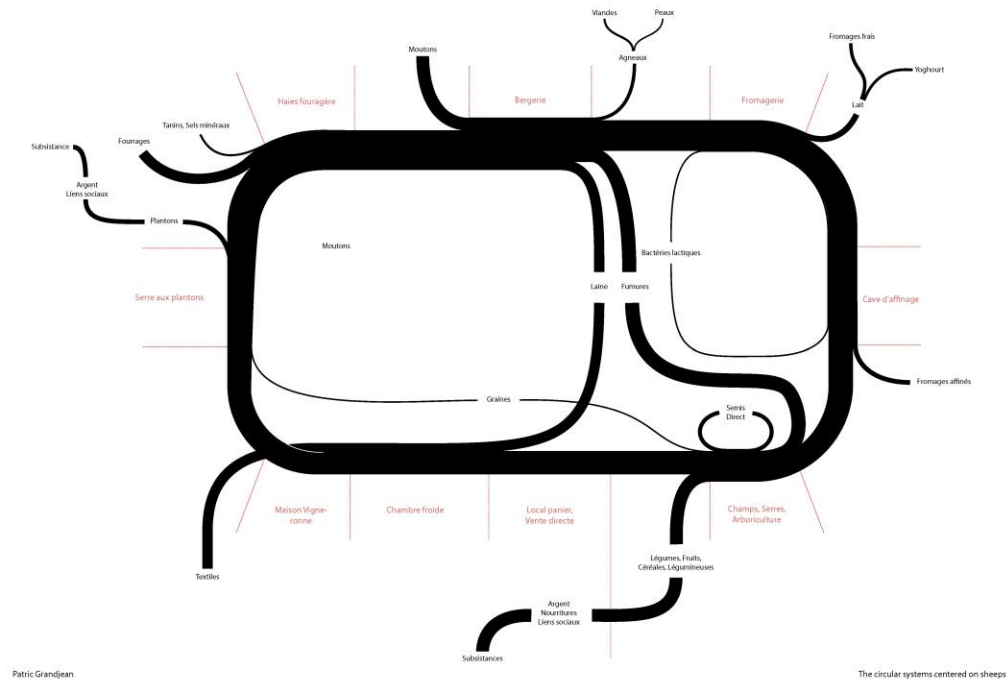
- **Wool Processing:** Wool from the sheepfold is spun and woven using a loom located in the Maison Vigneronne.
- **Integrated Spaces:** This highlights the blending of domestic and production spaces within the participatory agroecological system.
- **Human-Powered System:** The farmers are essential agents, their labor driving the entire process. This integration of living and working spaces occurs naturally.
- **Restoration:** The interior of the Maison Vigneronne was fully restored by the farmers themselves.

La Maison Vigneronne: Adaptation to new uses



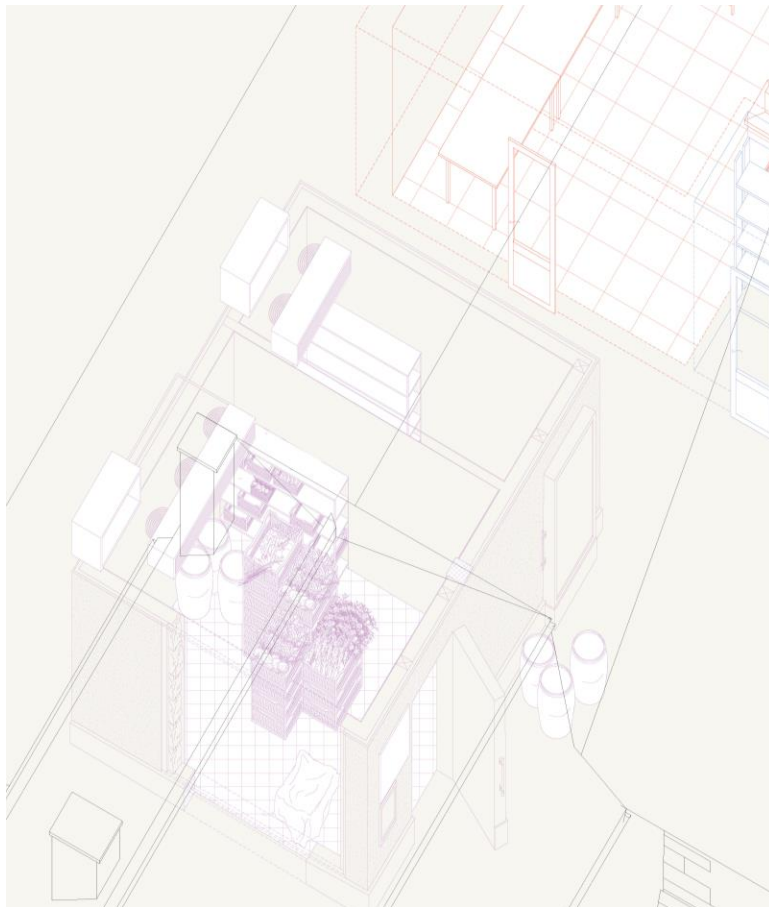
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Closing the Loop: Cycles of Sustainability



- **Essential Resource:** Manure: Animals produce manure, a vital resource for enriching compost. This enhances market gardening productivity.
- **Direct Sales:** Produce from the fields and greenhouses is sold directly through a self-service system and farm baskets.
- **Food Preservation & Security:** Cold storage, built with local and bio-sourced materials, preserves a portion of the harvest, enhancing food security.
- **Food Processing:** Preservation also occurs through transformation in the dedicated processing area.

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Bassenges Farm: An example of sustainable heritage



- **Vibrant Activity:** Cambium's presence generates a wide range of activities, impacting the physical heritage of Bassenges Farm.
- **Cultural Heritage:** This blend of social, productive, and domestic activities forms the living cultural heritage of the farm.
- **A Link to the Past:** Bassenges represents the last fragment of Dorigny campus's agricultural past.
- **Risk of Static Preservation:** Interrupting these activities risks reducing the farm to a mere symbolic image, a museum piece representing a lost agricultural tradition.

EPFL & Ferme de Bassenges: A Growing Collaboration

- **Living Laboratory:** The farm provides a platform for cutting-edge research in sustainable agriculture, offering hands-on learning experiences for students.
- **Community Food System:** Farm products nourish the EPFL community, creating a direct producer-consumer link.
- **Future Integration:** Deeper integration is envisioned, including projects on biowaste management, renewable energy, and community-supported agriculture.
- **Commitment to Sustainability:** This collaboration demonstrates EPFL's commitment to a sustainable future

The EPFL Ecosystem: Current State & Potential Connections

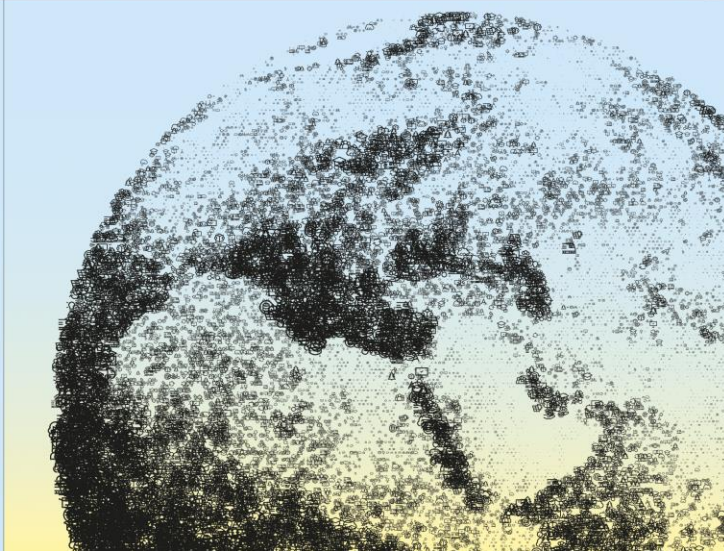


EPFL's Sustainability Initiatives – Amplified by Ferme de Bassenges

EPFL

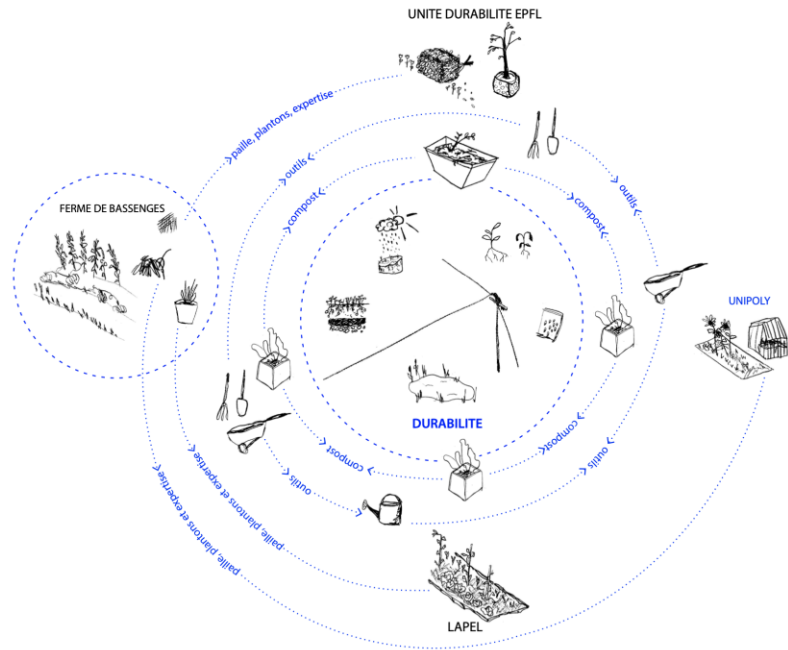
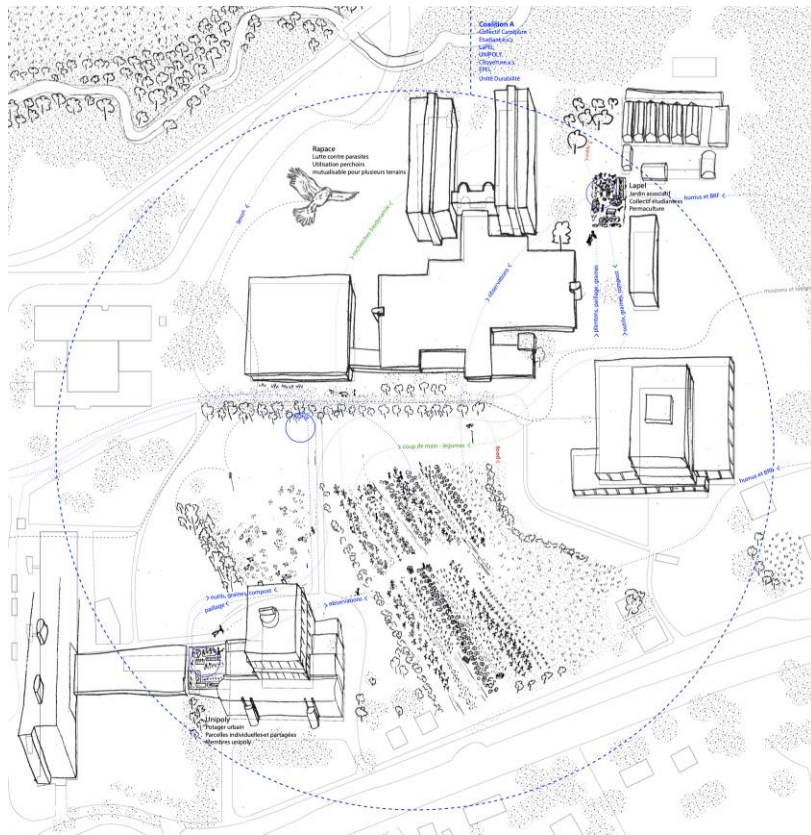
Stratégie Climat et Durabilité 2030

La Stratégie Climat et Durabilité définit la voie que l'EPFL s'est fixée pour assumer ses responsabilités envers sa communauté, la société et l'environnement. Ce document offre une vue à 360° des engagements de l'institution en matière de durabilité, à travers toutes les missions de l'EPFL et le fonctionnement de ses campus.

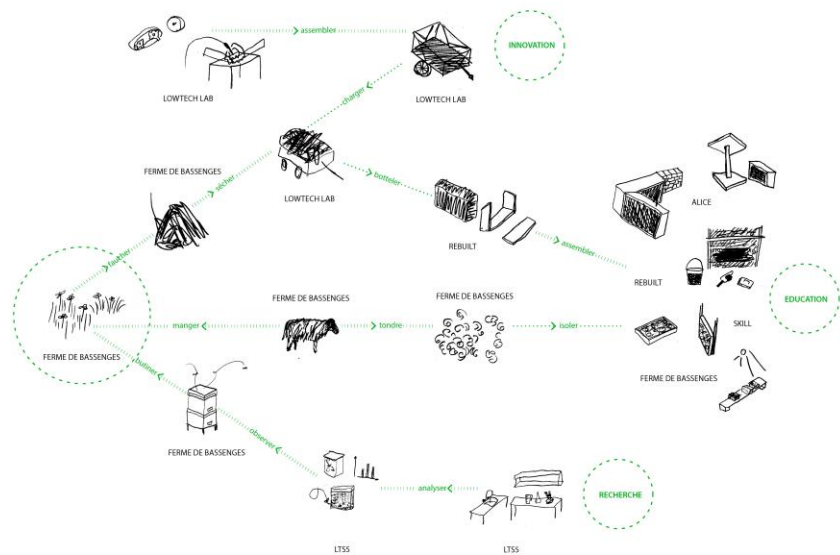
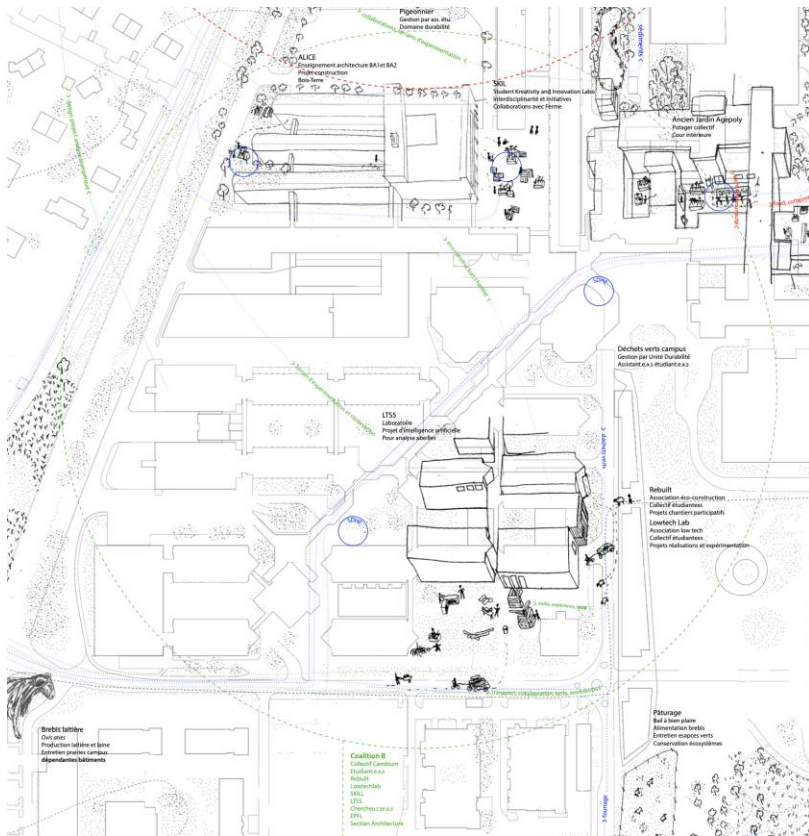


- **Strong Commitment to Sustainability:** EPFL demonstrates a clear commitment to sustainability.
- **Key Initiatives:** This commitment is evident in initiatives like:
 - "Climate and Sustainability Strategy 2030" (aligned with Confederation targets).
 - Development of green spaces.
 - "Charte Potager"

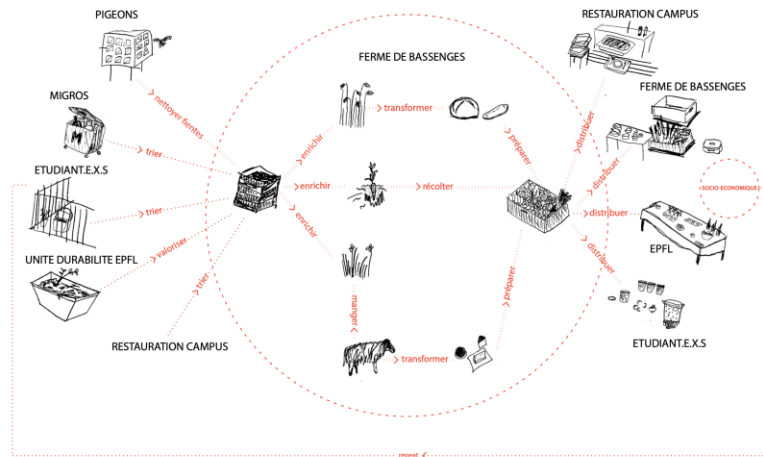
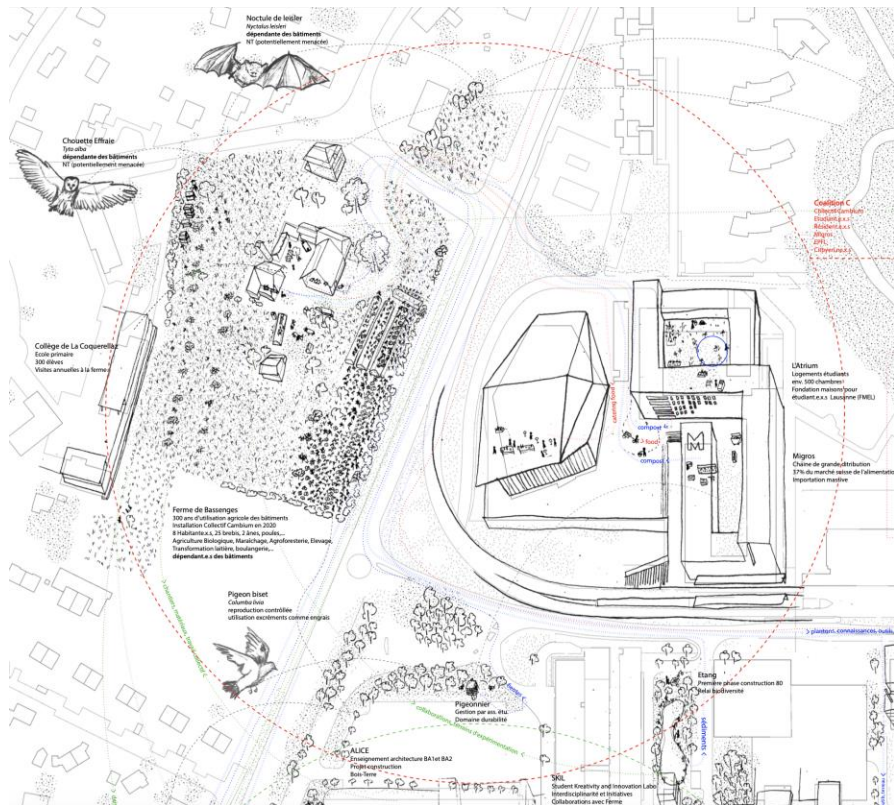
Growing Together: Community Gardens & Ferme de Bassenges



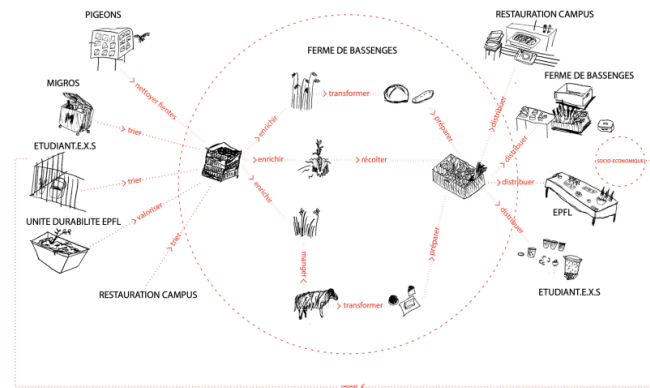
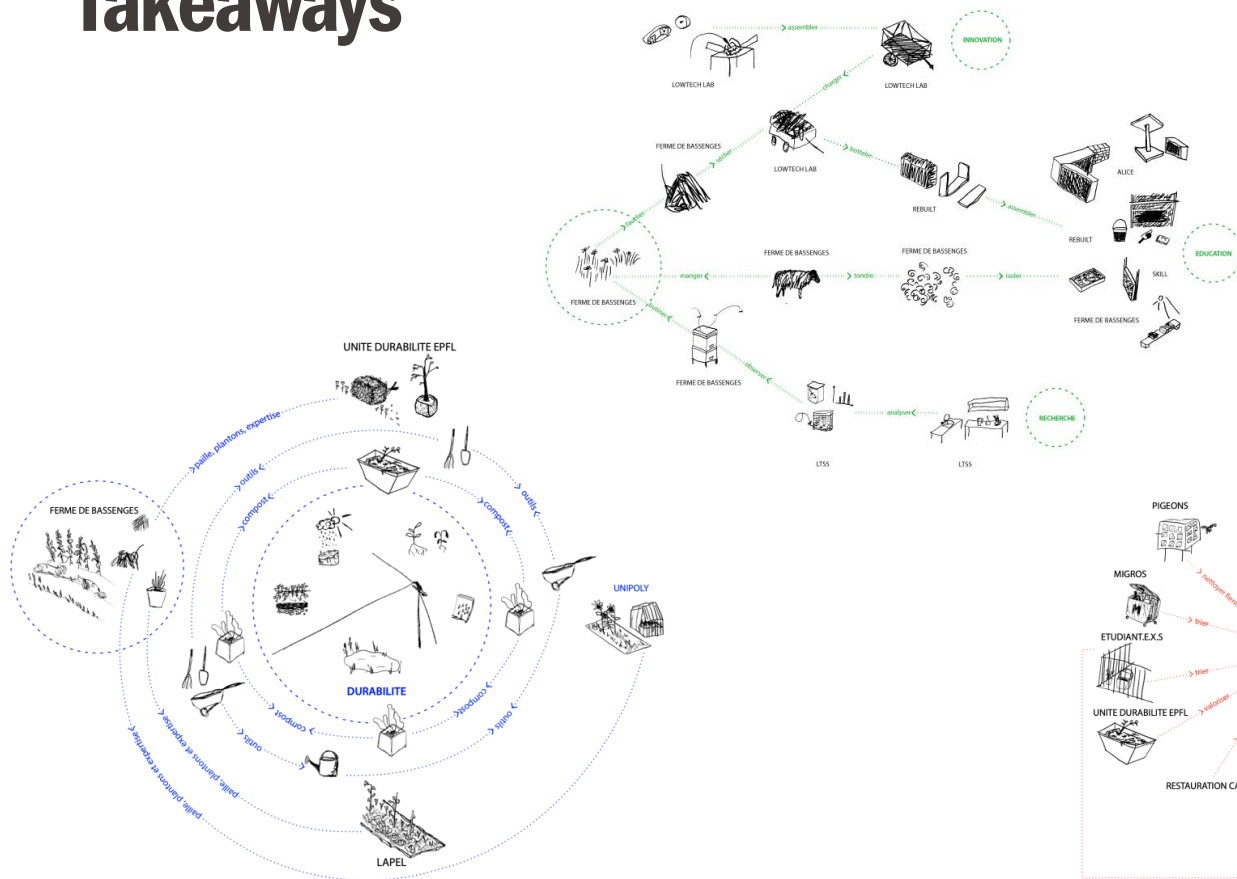
Innovation & Sustainability: Low-Tech Lab & Ferme de Bassenges



Closing the Loop: Sustainable Food Systems with Ferme de Bassenges



Nina Cruchaud 23



A Network of Collaboration: Realizing the Potential



The Dilemma: New Projects vs. Existing Investment



- **Critical Decision Point:** New projects must be carefully weighed against the existing investment and success of Ferme de Bassenges.
- **Established Value:** The farm's thriving activities and established infrastructure represent years of dedication and significant financial investment.
- **Beyond Land Use:** The existing Cambium Collective provides significant community value beyond simple land use (social, educational, research, collaborative aspects), a factor that should not be overlooked.



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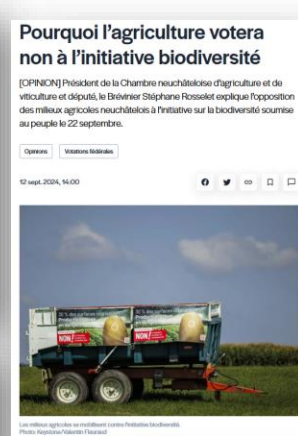
The Bernoulli Center: A Hub for Collaboration

Key Take Aways & Conclusion

Appendix

Land Use Sensitivity in Switzerland

- Land use - A sensitive topic in Switzerland: Public opinion is key in development decisions.
- Public resistance to excessive projects: Examples demonstrate a pattern of resistance to projects seen as detrimental to agricultural land and green spaces.
- Examples of public resistance: Motorway extensions, Marley Matran, wind turbine debates, farm conversions.
- Key takeaway: Prioritize community engagement and public consultation, especially given the decline of small-scale farms.



The Land Use Challenge



- **Limited space:** EPFL faces ongoing land constraints for expansion.
- **Finite land:** Aerial view demonstrates limited horizontal growth potential.
- **Increasing density:** Growing surrounding density, compounding the issue.
- **Respecting heritage:** Campus growth must acknowledge the site's agricultural history, such as The Ferme de Bassenges.
- **Long-term vision:** This requires sustainable and efficient land use strategies integrated with the existing context.

Defining a Swiss Campus



Yale University

Yale Sustainable Food Program

HOME ABOUT US THE FARM THE CLASSROOM ADDRESSING THE WORLD CONTACT US

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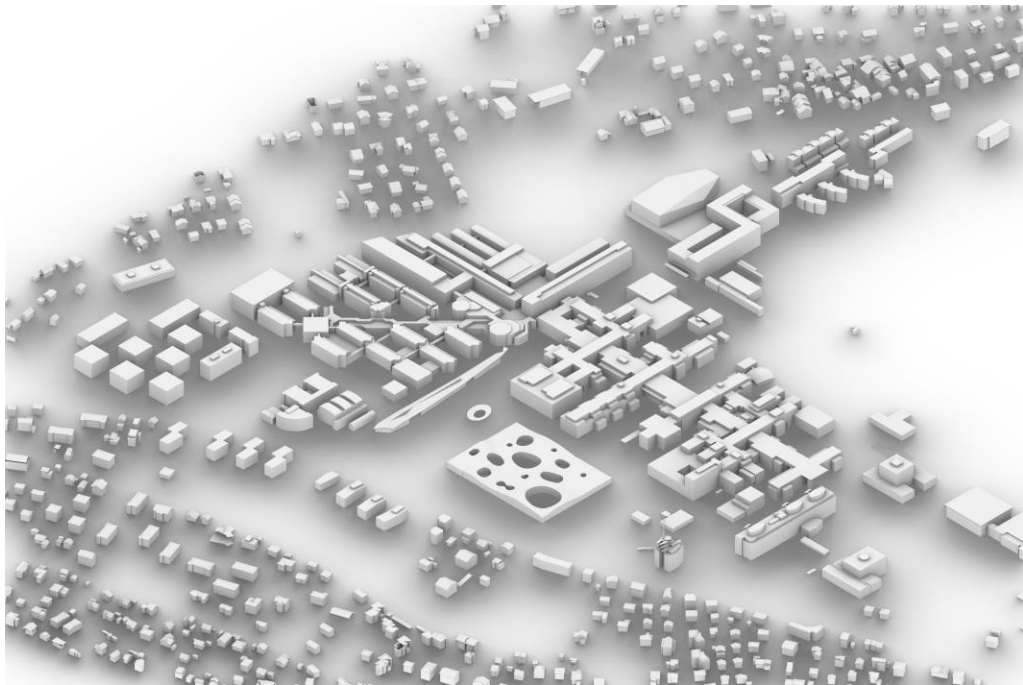
The Yale Farm

Embodied in the heart of the Yale University campus, the Yale Farm is a place where students learn about food, agriculture, and the environment.



- **Defining "Swiss Campus":** Goes beyond only replicating models; requires understanding Switzerland's unique cultural and environmental context.
- **Integration of Built and Natural:** These images showcase successful examples, emphasizing the balance between built and natural environments.
- **Distinct Swiss Identity:** Cultural and environmental factors define a distinct Swiss campus identity.

EPFL's 2D Grid & its 3rd Dimension



- **Current 2D Grid:** EPFL's existing 2D grid masterplan provides a solid foundation but faces limitations with increasing space demands.
- **Vertical Growth Potential:** The modular system allows for vertical expansion.
- **Densification through Elevation:** This strategy respects the original grid while addressing land scarcity, offering a necessary adaptation for the future.



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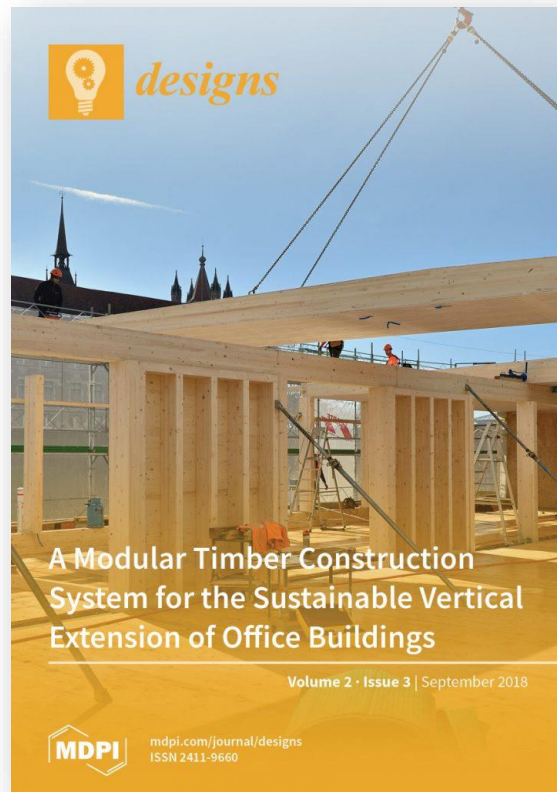
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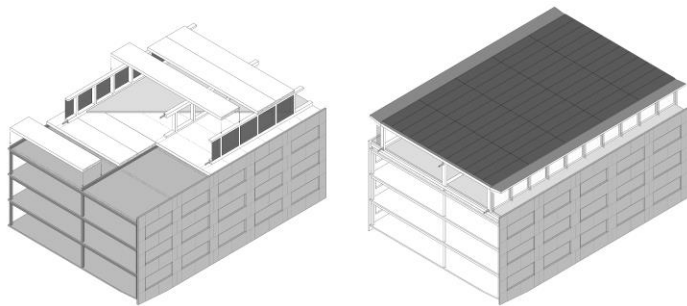
Appendix

Elevating Buildings as a Densification Strategy

- **Densification through Elevation:** A pragmatic and culturally relevant approach for Switzerland.
- **Reduced Footprint:** Elevating buildings reduces land use, preserves green spaces, and fosters greater campus interaction.
- **Socially Acceptable Alternative:** Offers a more socially acceptable solution compared to traditional densification of existing plots.

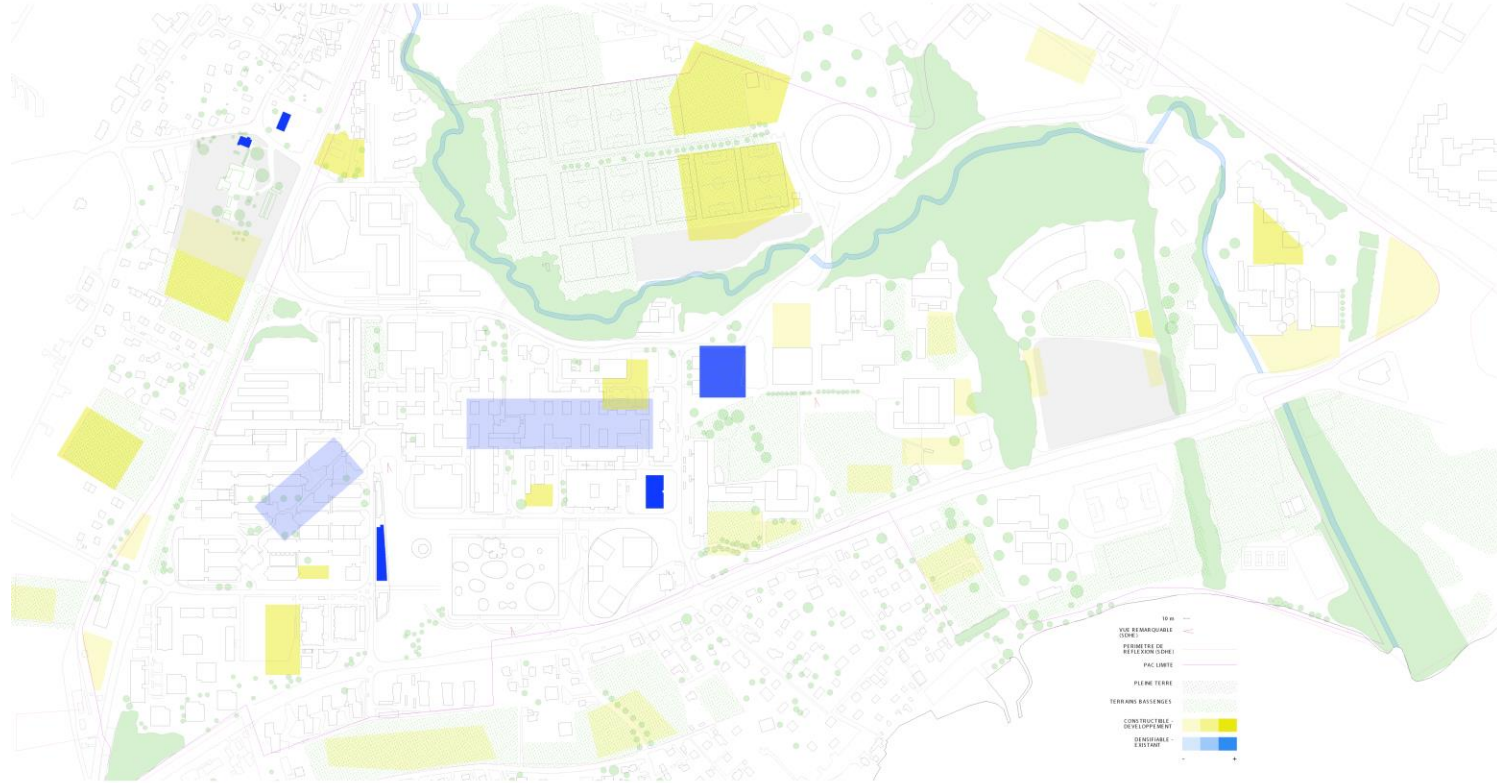


EPFL Case Study: Urban Office Densification



- **Project Goal:** Develop an innovative, modular, prefabricated timber system for vertical extensions of existing office buildings, focusing on sustainability.
- **Key Features:**
 - Adaptable to various structural grids (3.10m - 8.00m) and typologies.
 - High-performance bioclimatic envelope.
 - 100% photovoltaic roof coverage.
 - Prefabricated local timber components for rapid, on-site assembly.
- **Results:**
 - 20% below budget, final cost under 3 million CHF).
 - Negative energy demand.
 - Low carbon footprint.
 - Minimal environmental impact.
 - Successful demonstration of prefabrication and assembly process.

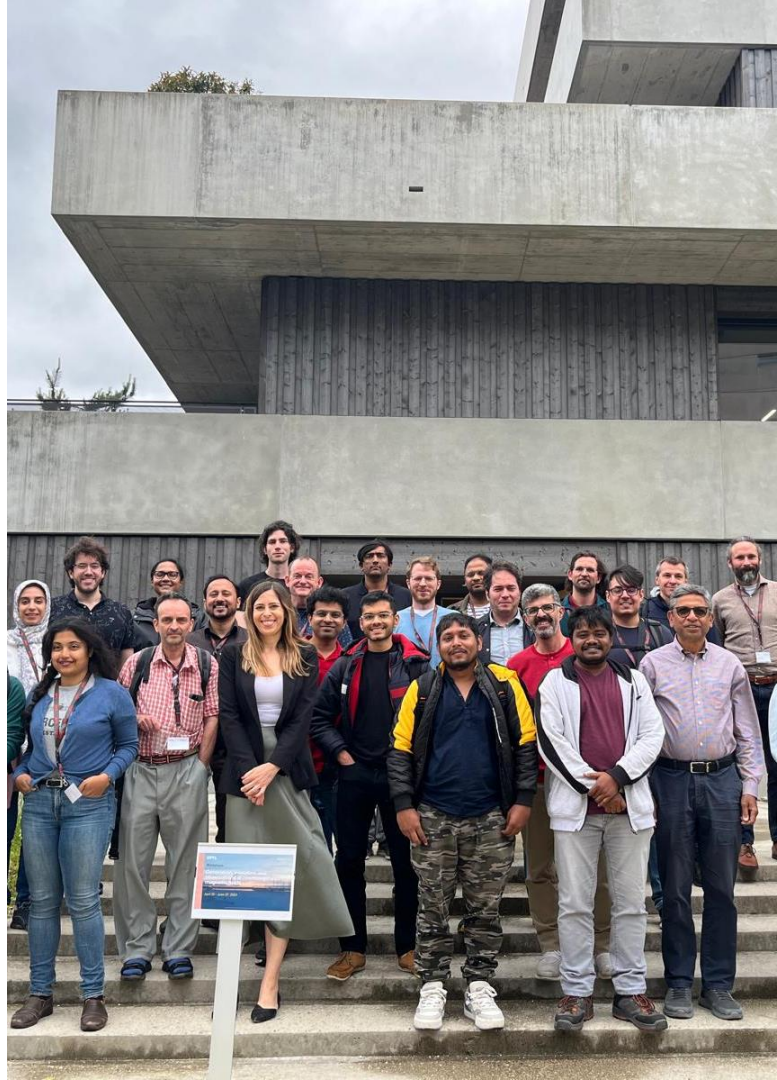
Applying Densification to the Campus



The Bernoulli Center as a Beacon of Innovation

- **Designed for Growth:** The existing Bernoulli Center offers a unique opportunity to embody EPFL's commitment to innovation.
- **Ideal for Vertical Expansion:** Its strategic location and current structure are perfectly suited for vertical expansion, showcasing our densification strategy.
- **Catalyst for a Sustainable Future:** More than just a recipient of this strategy, the Bernoulli Center is the ideal starting point for a more sustainable future.





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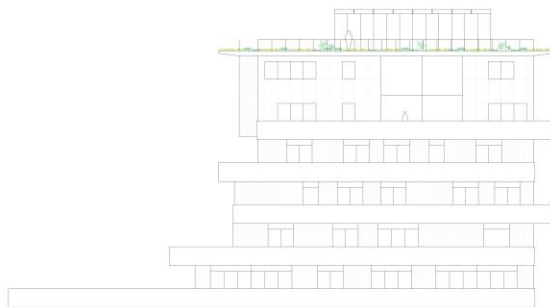
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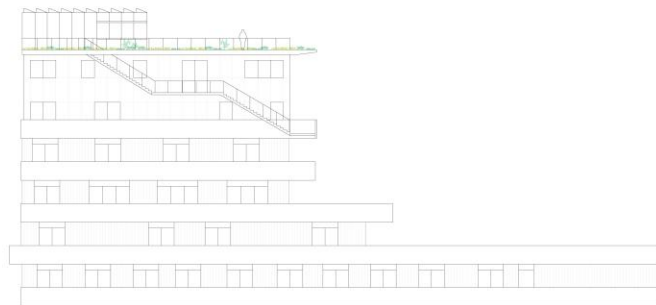
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The Light House. Design & Functionality



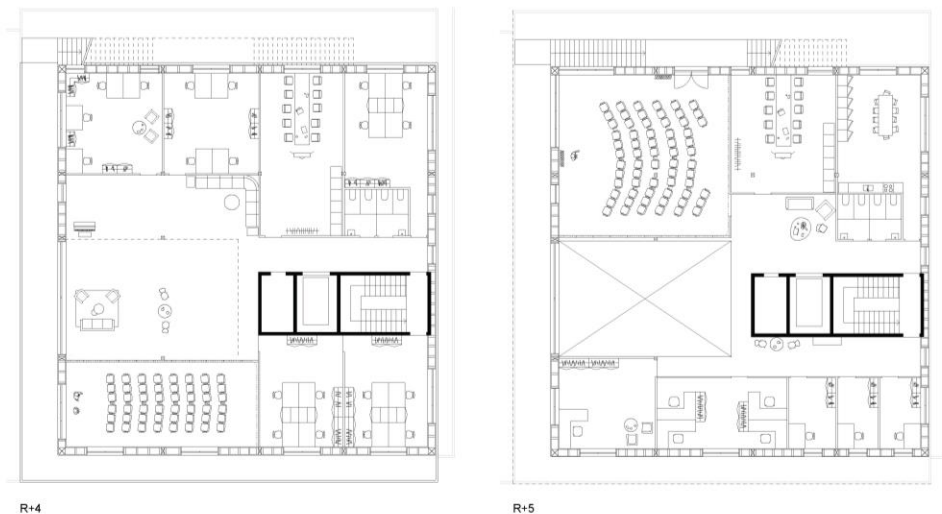
Elevation Sud



Elevation Est

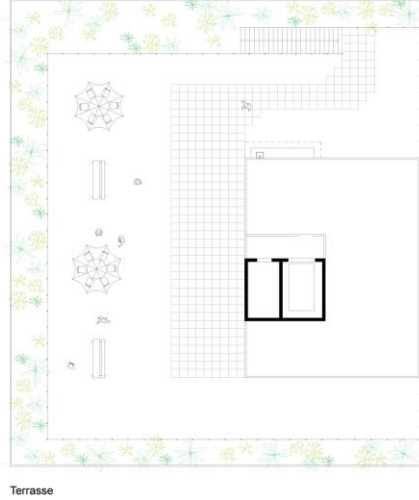
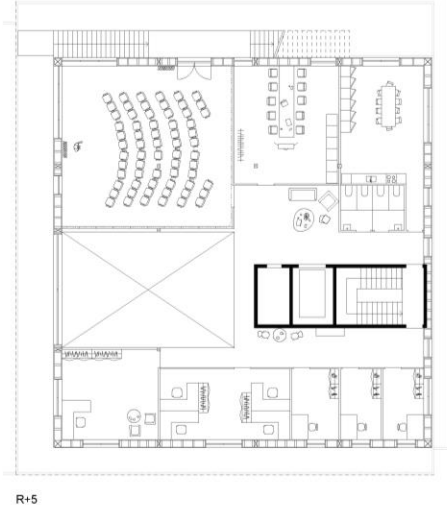
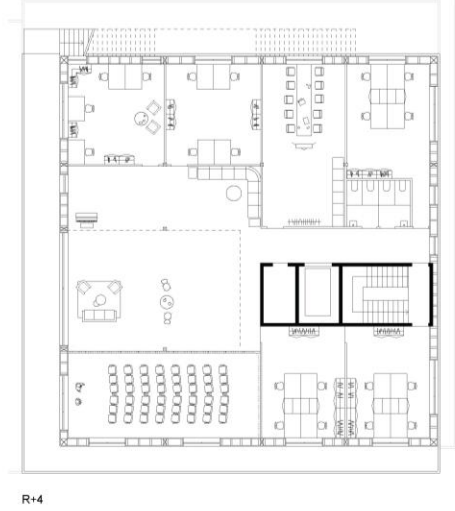
- **Adaptability & Efficiency:** Our Bernoulli Center extension prioritizes adaptability and efficiency.
- **Modular Design:** The modular design allows for flexible configurations to meet evolving research needs.
- **Inspiring Work Environment:** Maximizes natural light and ventilation, creating a healthy and inspiring workspace.

The Light House. Design & Functionality



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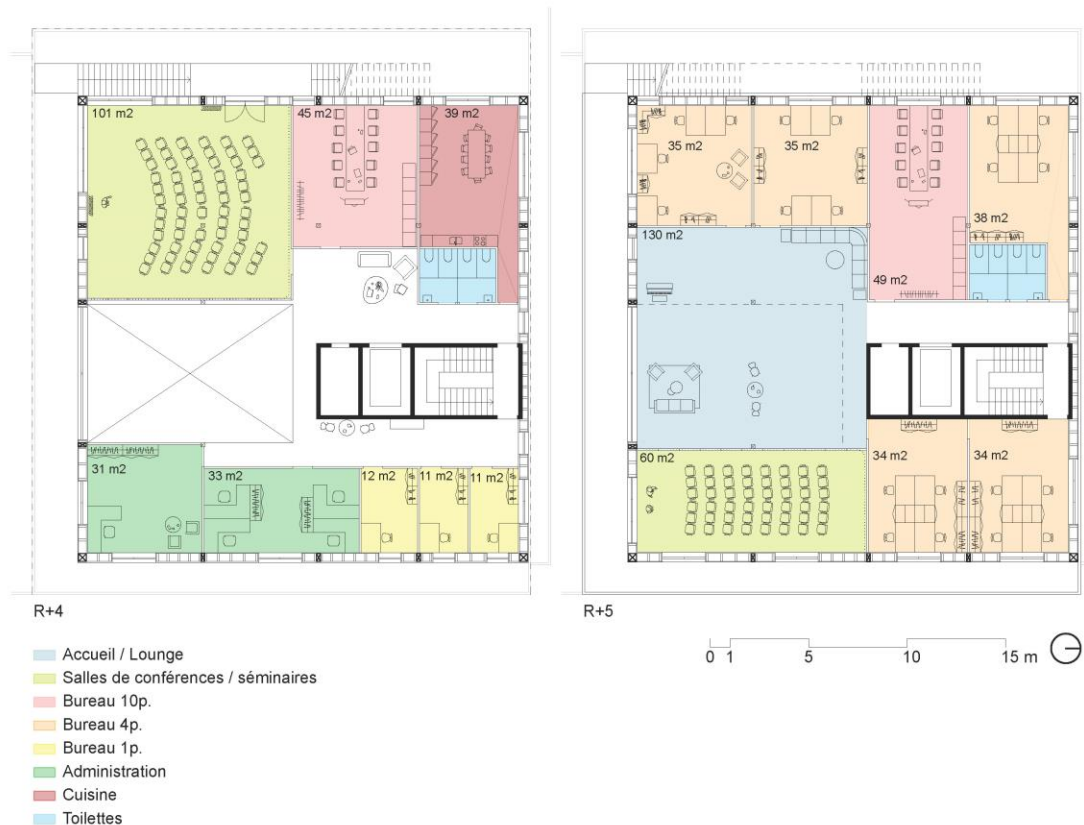


Table 1. Estimated performances in non-renewable primary energy (NRE), rounded values.

Working Space: Energy Balance		Final Energy (kWh/m ² y)	Conversion Factor (KBOB/SIA)	Primary Energy NRE (kWh/m ² y)	Total Amount NRE (kWh/m ² y)	Target Value NRE (kWh/m ² y)	Limit Value NRE (kWh/m ² y)
construction	materials			32	51	36	45
	photovoltaic roof			19			
heating							
heating + DHW	district heating (waste)	27	0.45	12	1		
heating savings	insulation existing roof	-23	0.45	-11		83	103
electricity consumption generation (PV)	Swiss consumer mix	22	2.52	56	-307		
	Swiss consumer mix	-144	2.52	-362			
mobility	large urban centre	139	0.35	49	77	64	
	Swiss average value	28	1.00	28			
energy demand					-177	183	kWh/m ² y

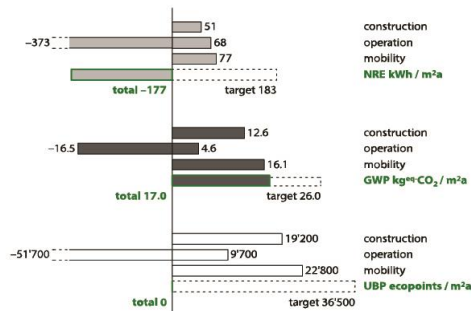


Figure 6. Estimated performances in non-renewable primary energy (NRE), global warming potential (GWP) and Umweltsbelastungspunkte (UBP) eco-points.

- **Sustainability:** A Guiding Principle: Sustainability is fundamental to the Light House's design and construction.
- **Resource Efficiency:** Infographics detail energy-efficient systems, water conservation, and sustainable materials used (based on the LAST Case Study).
- **Model for Sustainable Development:** The Light House exemplifies EPFL's commitment to environmental responsibility and serves as a model for sustainable campus development.

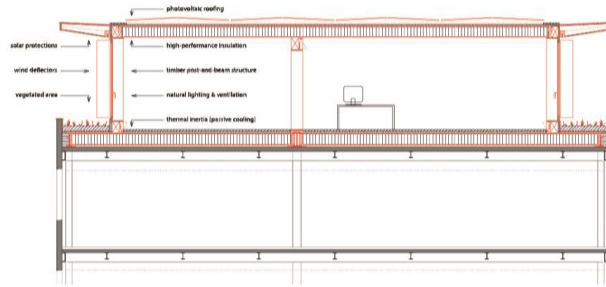


Figure 4. Cross section through the system's envelope showing its bioclimatic principles. Elements in red refer to the new construction, while elements in black refer to the existing building.

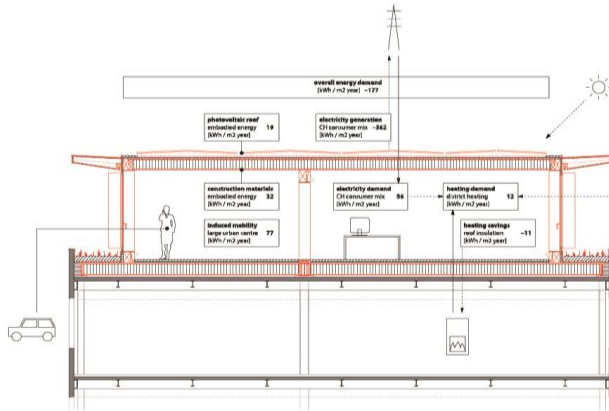
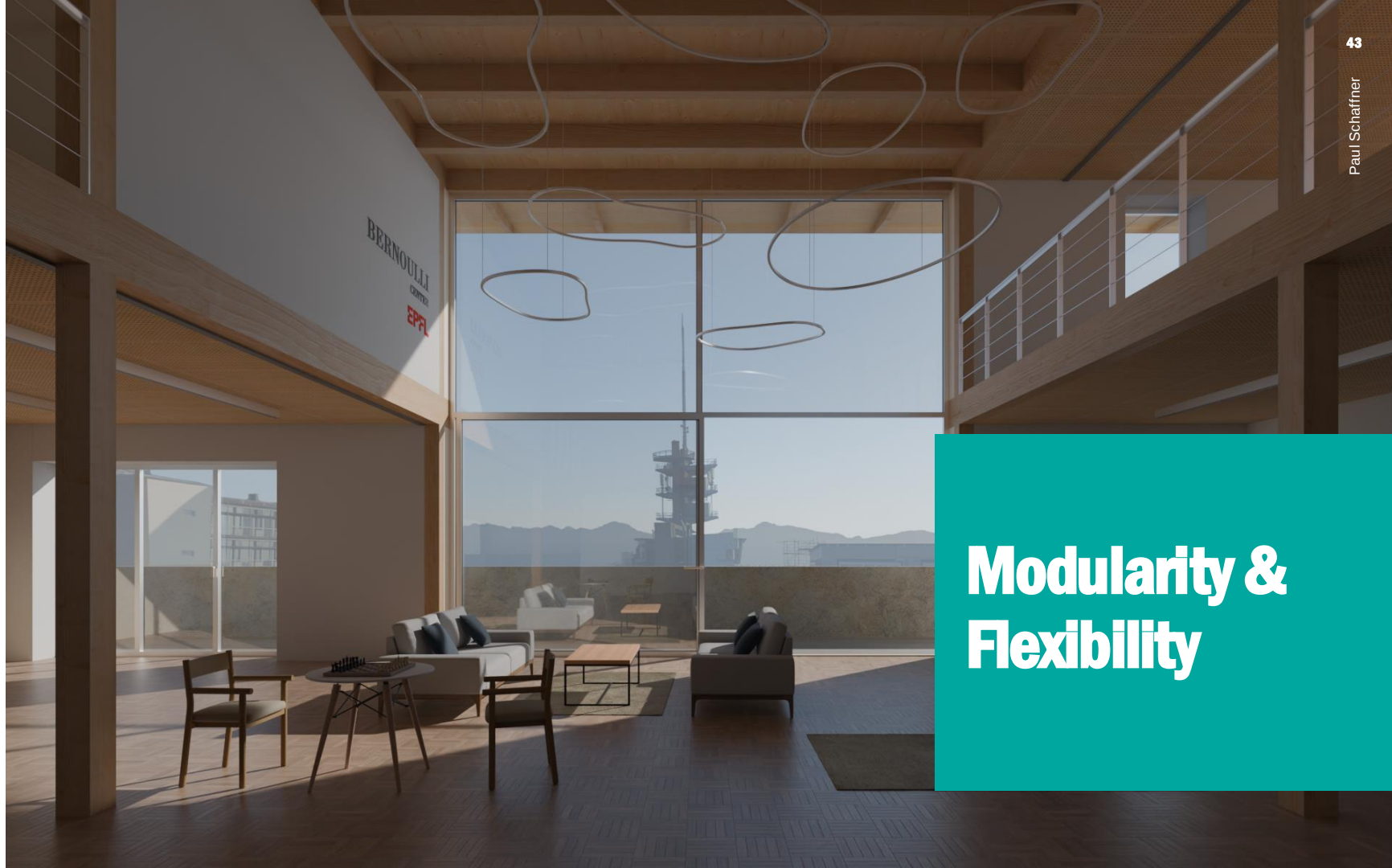


Figure 5. Section through the extension, showing the framework and results of the energy balance. Elements in red refer to the new construction, while elements in black refer to the existing building.

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BERNOULLI
CENTRE
EPFL

Modularity & Flexibility

Seminar Spaces

BERNOULLI
CENTRE
EPFL



Collaborative Environments



The Light House: An Iconic Location



BERNOULLI
CENTER
EPFL

Panoramic Views and Integration with Nature





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Key Takeaways:

Ferme de Bassenges

- **Historical and Cultural Significance:** The farm is a valuable historical and cultural asset for EPFL and the wider community.
- **Educational and Community Hub:** It serves as a vital educational resource and a hub for community activities.
- **Preservation is Key:** Continued preservation of the farm is essential. Its continued operation maintains its value and prevents it from becoming a static museum piece.

Key Takeaways: Bernoulli Center Extension

- **Meets Expansion Needs:** The Light House extension provides a compelling solution for EPFL's growing space requirements.
- **Sustainable Densification:** Represents a sustainable, functional, and innovative approach to densification, aligning with EPFL's values.
- **Embodies Innovation:** Showcases EPFL's commitment to innovation in both research and sustainable design.

- **Integrated Masterplan:** The presented concept integrates the Light House, the preserved Bassenges Farm, and other planned developments.
- **Cohesive Vision:** Creates a cohesive vision for a sustainable and vibrant future for the EPFL campus.
- **Prioritizing Key Values:** This vision prioritizes innovation, growth, community, and environmental stewardship. It demonstrates a commitment to balancing development with social and ecological responsibility.



Thank you!





Q&A



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