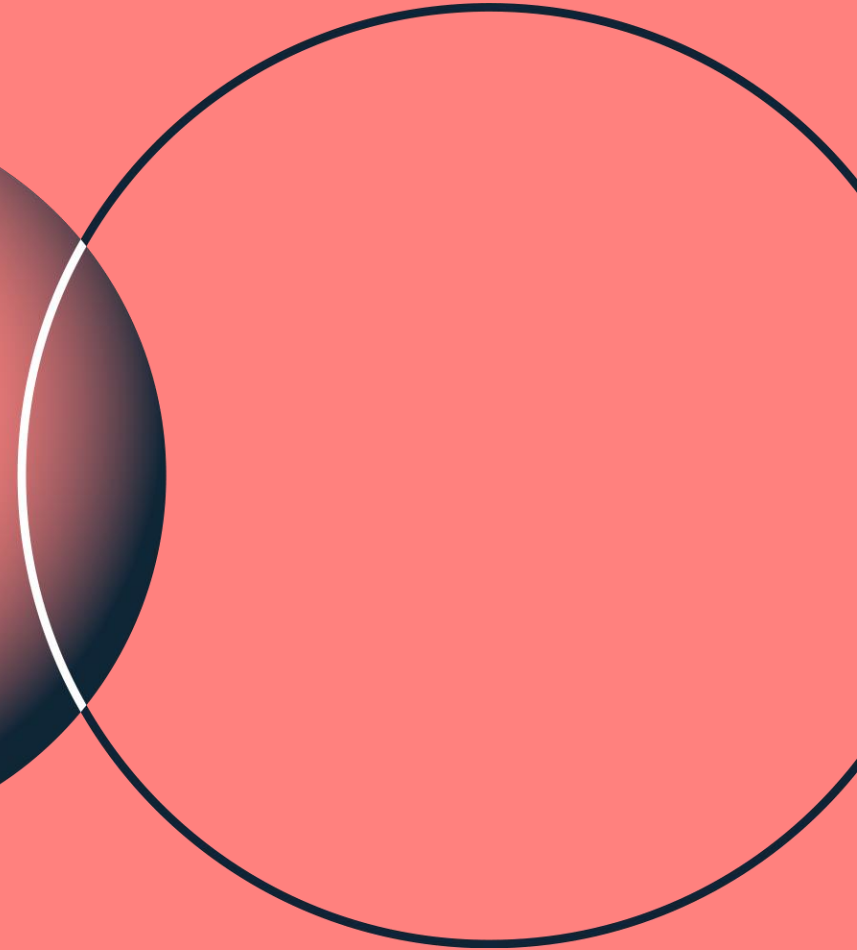
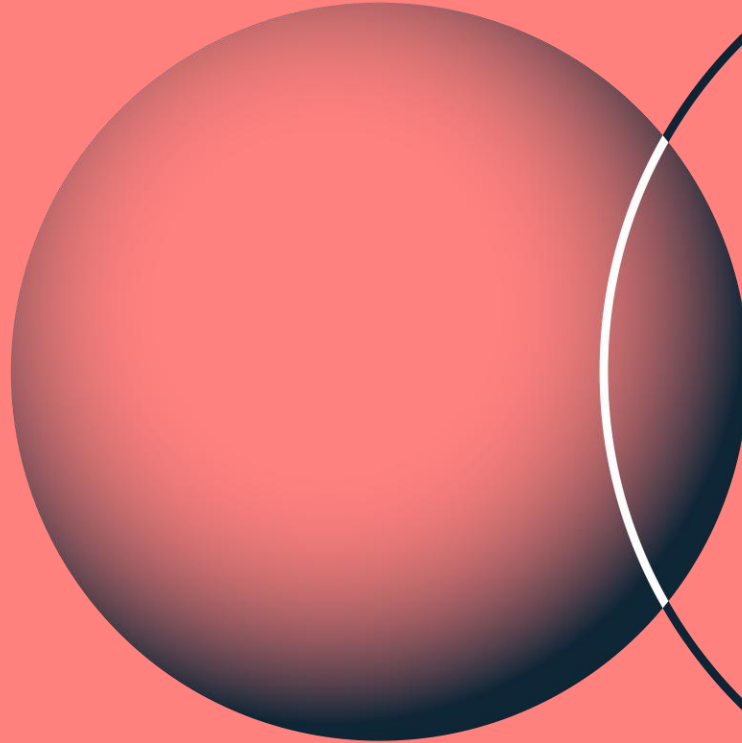


EPIC Meeting on Sustainability

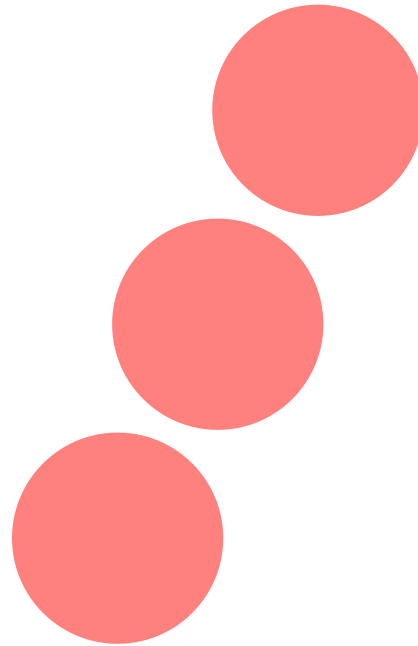
Energy Control, Cost Efficiency &
Smart Infrastructure



Beyond Efficiency:

How Our Building Became Part of the Process

About Us

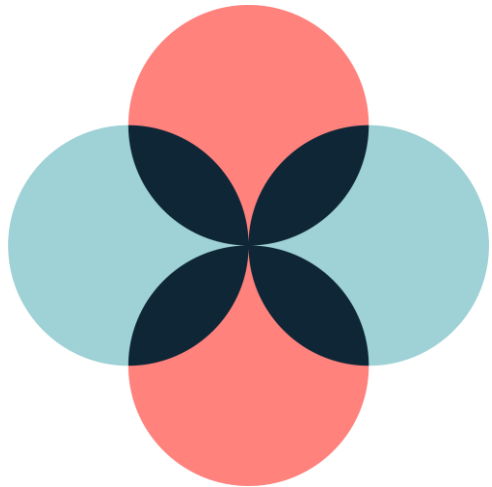


Founded 1989
Based in Baar, Switzerland

2800 sqm building
300 sqm clean room (ISO 5 - 7)
+40 specialized machines

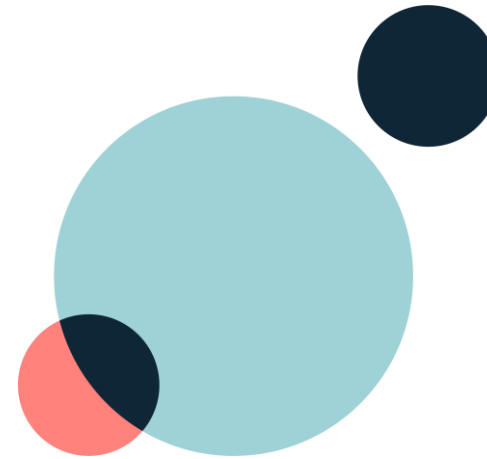
We are: Future focused, sustainable,
transparent & human

Our Two Worlds



Brandbuilding & Security Partner

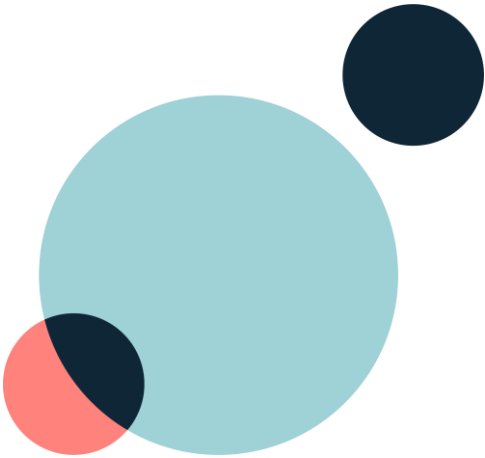
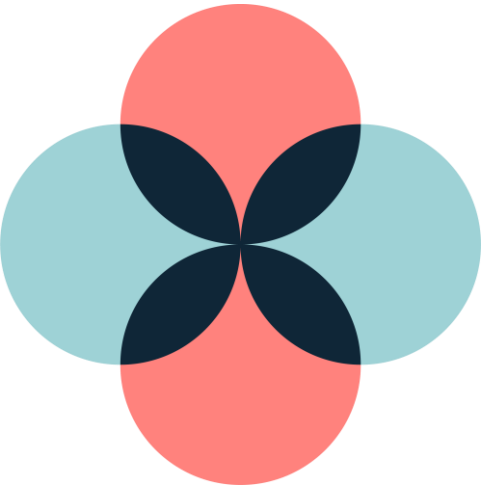
High-security, digitalization
and consumer engagement
solutions tailored for brands
and governments.



Micro & Nano Lab

Your innovation and
development partner
in micro and nano
technologies.

Our Two Worlds



Agenda

-
- 01 The Journey's Catalyst
First Steps & Ultimate Triggers
 - 02 The Construction Site
Vision, Project Scope & Underestimations
 - 03 Sustainable Transformation
Key Infrastructure
 - 04 Life at 3D AG
Employee Retention & Lean Management
 - 05 Beyond Efficiency
Building as Part of the Process
-



The Journey's Catalyst

The Mental Shift

Why sustainable mentality must precede strategic planning.



- **EPIC Meeting on Sustainability**

- » Individual efforts vs. corporate footprint
- » Companies are the true catalyst for change

- **The Scale of Responsibility**

- » Standard manufacturing facility can emit more carbon in just a few days than an average human does in their entire 80-year lifetime
($\approx 10,000$ to $50,000+$ metric tons per year vs. ≈ 360 metric tons (Data from EPA and EEA))

- **Mindset Over Compliance**

- » Every company's journey is unique
- » Commitment must be genuine

Our First Steps

We began without a master plan, just a mentality to improve.

- LEDs in all accessible areas outside of specialized clean rooms
- Partnered with “Schneider Umweltservice” for challenging waste streams
 - » Generated rubbish and waste codes
 - » Non-recyclable excess waste to concrete plant processing, achieving a 98% recovery rate (thermal).
- Connected to Baar's local wood chip heating network by partnering with a neighbor's project in 2019.
- ISO 14001: Environmental Management System as a Part of 3D AG’s Strategy since 2018.

Our First Steps – “You can’t do it alone!”

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Key Takeaways

1. Get in touch with local experts and companies.
2. Speak to neighbours, join initiatives for strategic advantage.
3. Small projects with dedicated team for the side quest.
4. Include goals to KPIs for motivation / ideas.



The Trigger

Reaching the next level: From small steps to structural needs forced us to reach for the next level.

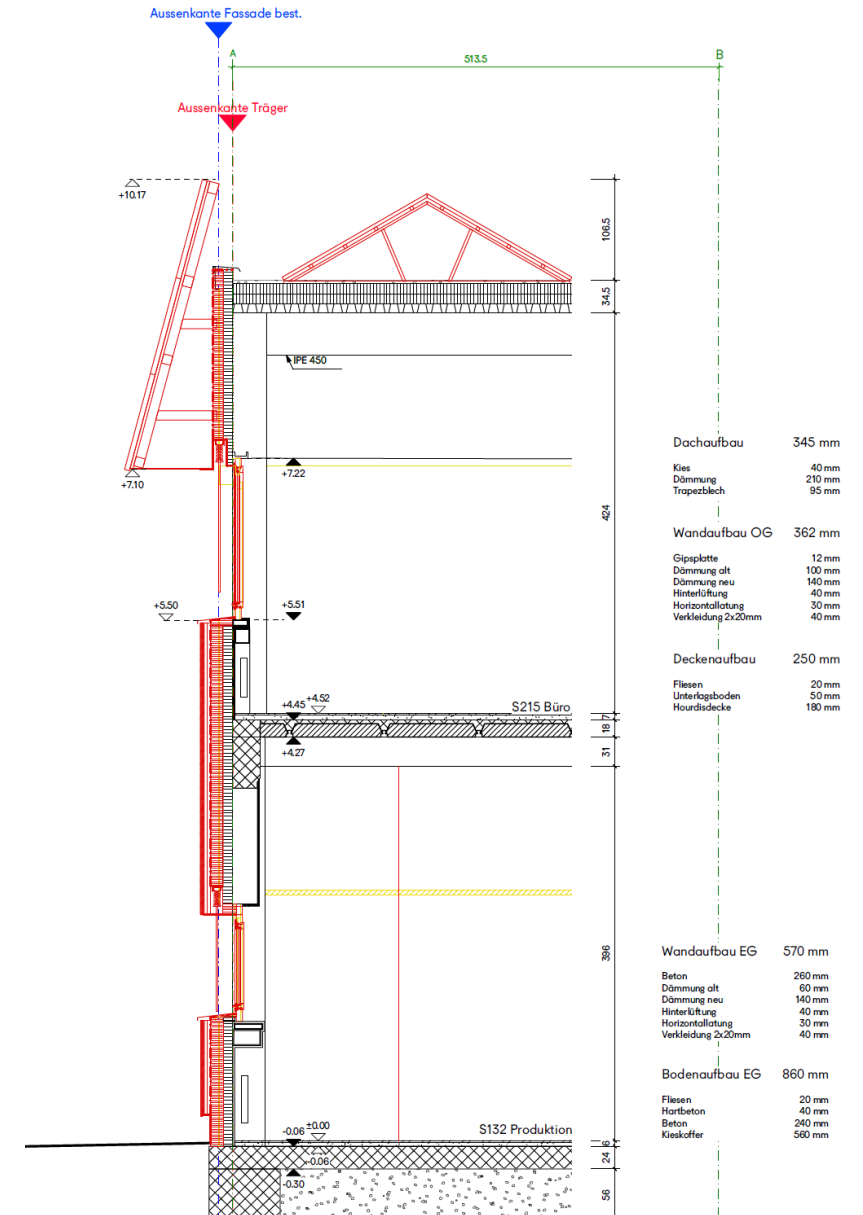
1. Aging Infrastructure: Our 60-year-old building facade needed refurbishment (outdated insulation)
2. The Client Mandate: A major US client delivered a strict ultimatum: achieve Net Zero by 2030 or risk losing the partnership
3. Geopolitical Energy Risk: Volatile energy prices pushed us from standard solar integration to a battery storage system

The Construction Site

Project Scope

Operational continuity: The refurbishment challenge.

- **Regulatory Blueprint:** Building permit triggered a detailed preliminary project for precise cost analysis
 - » Focused on sustainable materials
- **The Refurbish vs. Rebuild Dilemma:** Relocating or rebuilding was cheaper upfront, but halting operations was not an option
 - » We chose to refurbish while staying fully operational
- **Production-First Timeline:** Intentional extension to 3-year project
 - » Safeguard continuous manufacturing
 - » Ensure client-first strategy



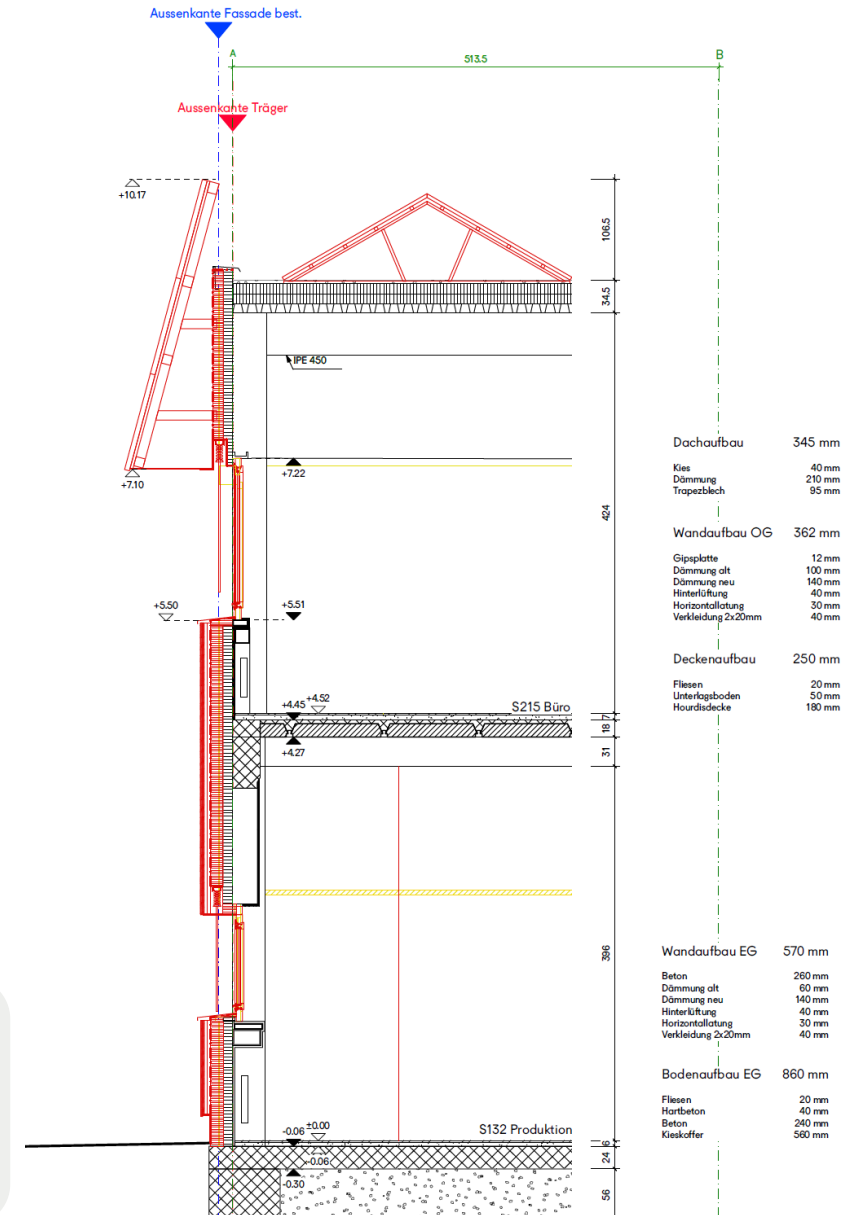
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Key Takeaways

1. Pro-Tip: Data is key - collect, calculate, and plan.
2. Long-Term Vision: Where do you want your company to be 10-30 years from now?



The Vision

Grounded in current data, focused on long-term goals.



Are We Crazy?

Operating a high-security facility inside a live construction zone.

Key Takeaways – What we underestimated!

Constant Relocation

Underestimated the effort required to continually shift processes and workstations to different sites for construction

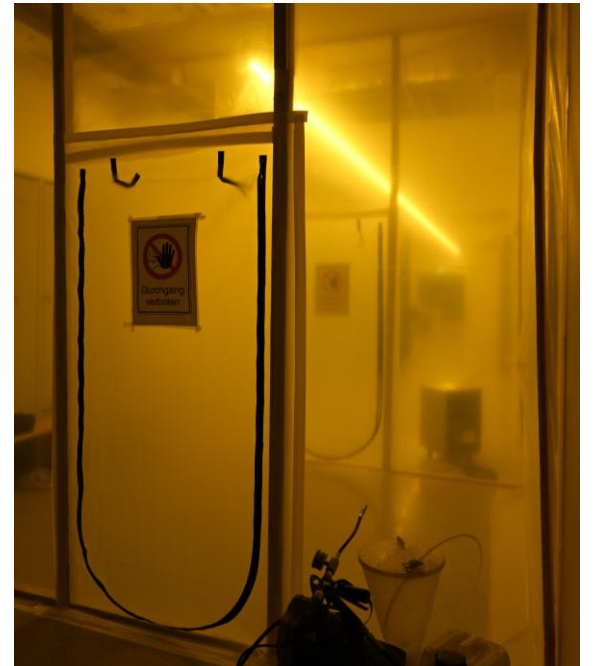
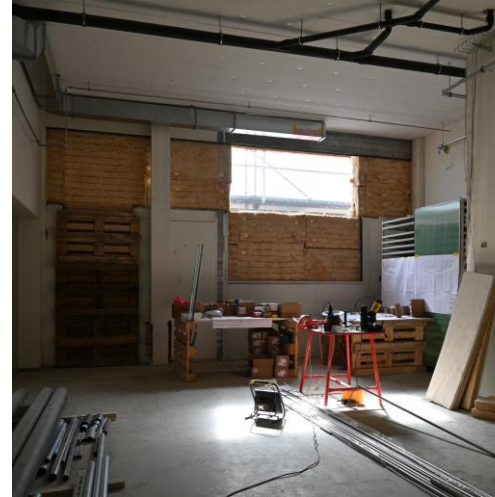
The Dust Battle

We underestimated how difficult containment would be; despite extensive barrier walls, staying dust-free was challenging

Planning & Flexibility

We successfully minimized production outages but underestimated the flexibility needed.

→ Builders simply do not plan with the meticulous precision of engineers



The Result

Would we do it again? Yes!



The Result

Would we do it again? Yes!



The Result

Would we do it again? Yes!



The Result

Would we do it again? Yes!



Your welcome to visit us!



Sustainable Transformation

Key Infrastructure Updates

Scaling energy autonomy and thermal recovery for a 24/7 facility.

- Advanced Insulation

- » Upgraded the building envelope facade
- » Exceptional thermal retention → Less energy for process stabilisation
- » Soundproofing & enhanced indoor comfort

- Solar & Storage Powerhouse

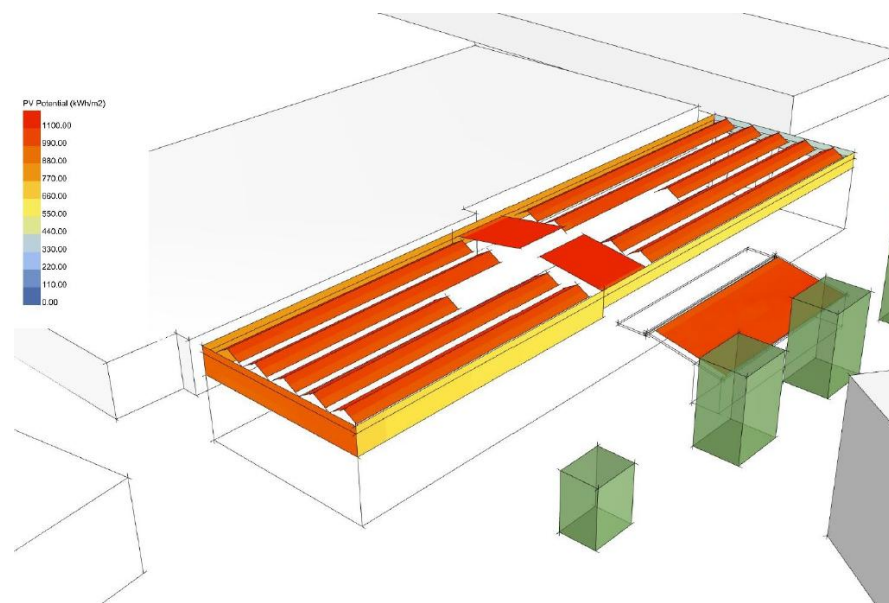
- » Solar “Hat” and an integrated battery system achieving net-zero energy
- » ROI calculations are positive (365-day production & local government subsidies)

- Smart Waste Heat Recovery System

- » Capturing from active manufacturing processes and the battery technology
- » Empowering our building heating requirements during winter

- Free Cooling Integration Upgrade

- » Leveraged Switzerland’s regional climate
- » Upgrade "free cooling" methods, driving down seasonal energy costs



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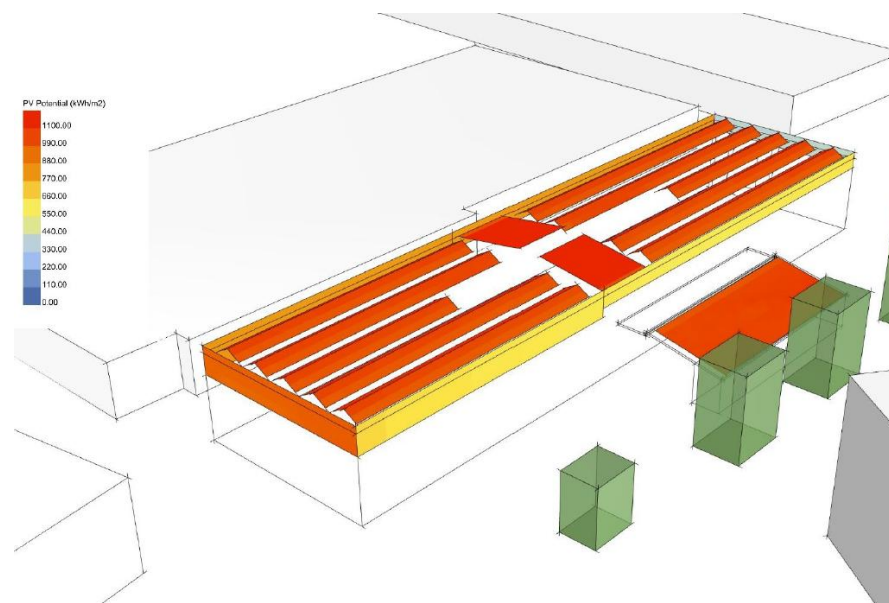
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Key Takeaways

1. We faced many unknown variables and data gaps, but don't fear assumptions.
2. Further bridge data gaps by strategically measuring real-time baseline data in the planning phase.



From Cost Center to Commercial Shield

Balancing payback benchmarks with long-term revenue protection.

- The ROI Benchmark

- » A blended payback of 6 to 12 years puts our sustainability transformation right in line with traditional corporate investments
- » Sitting comfortably between following renewal periods
 - short-term software assets (3–5 years)
 - long-term machinery (5–15 years)
 - core building infrastructure (15–20 years)

- The Commercial Shield

- » No active new revenue line, and a short-term financial hit
- » In an era of growing demand of strict climate compliance, it aggressively protects existing revenue
- » Infrastructure is a powerful commercial asset that secures the company's long-term market position

Cost-Efficient Building Automation: Flexibility Over Rigid Elegance

Prioritizing Scalability and Pragmatism to Minimize Capex

- Decentralized Controls vs. Unified Systems

- » Planners will push for a single, building-wide automation system. While elegant, this is costly and restricts future changes.

The Upside: Separating equipment controls allows future integrations and one can shut down unused tech (save energy)

The Trade-off: Aggregating data for reporting is more complex, but we prioritize long-term flexibility over a centralized dashboard.

- Modular IoT Monitoring

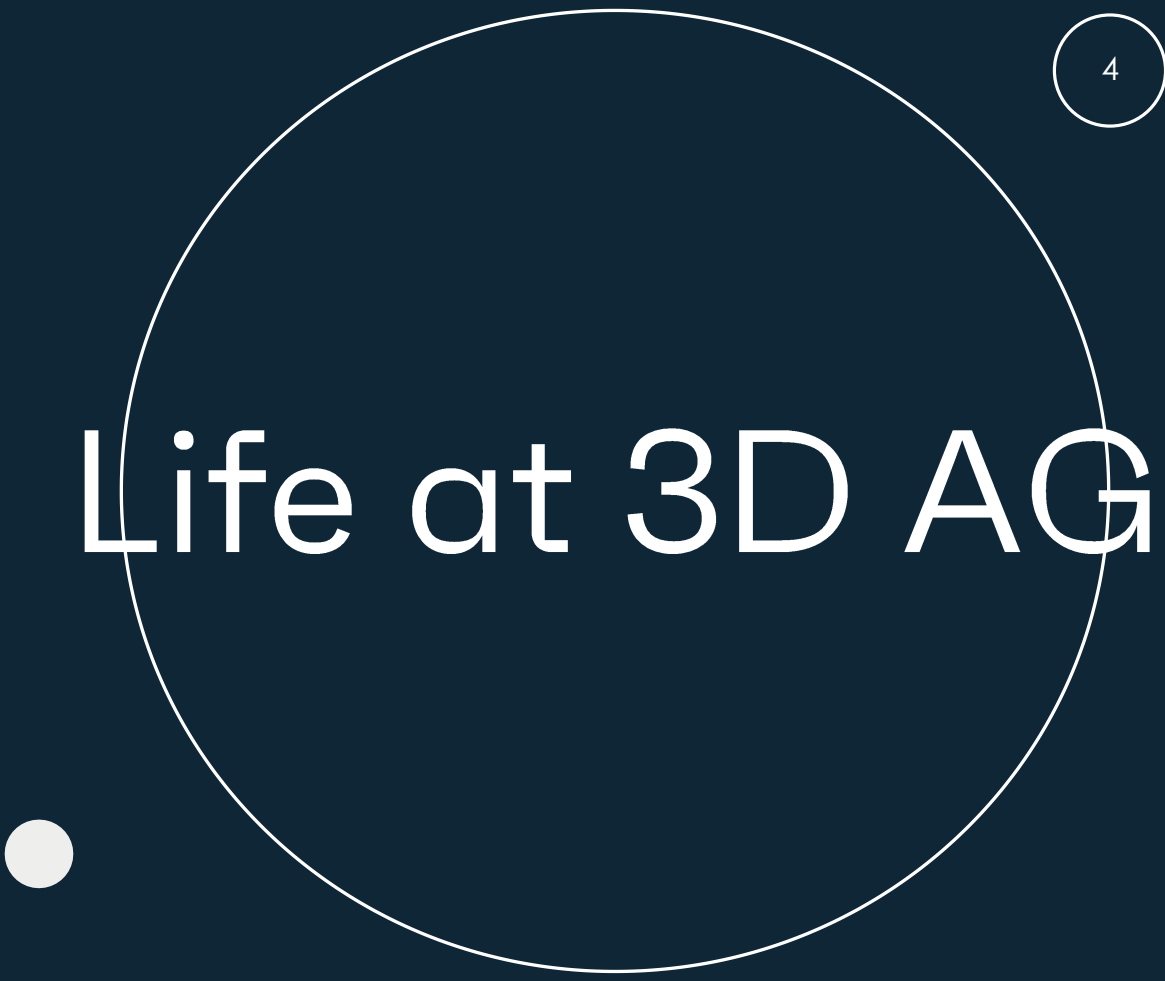
- » Instead of hardwiring every asset into an expensive system, we utilized modular ecosystems like **Shelly to track energy consumption**

- » This allows us to add, test, and pivot rapidly at a fraction of the cost

- Pragmatic Interfaces over High-Tech Overkill

- » We skipped expensive, wall-mounted tablets and over-engineered tools

- » Distributed, manual controls proved to be highly cost-effective, easily maintained, and fully sufficient



Life at 3D AG

Employees First

Why human sustainability is the foundation of long-term operational efficiency.

We spend a significant portion of our lives at work.

Prioritizing employee retention is not just a cultural choice. It is a core pillar of a sustainable, efficient business model.

- The Central Hub

Designed a vibrant, central gathering space equipped with a kitchen, comfortable couches, and open areas dedicated to "white space," informal collaboration, and downtime.

- Natural Garden Spaces

Integrated outdoor garden zones featuring lawns, diverse plants, and direct access to nature to provide a restorative breakout environment (although government mandatory, make it pretty).

- Biophilic Interior Design

Distributed indoor plants extensively throughout the entire building, actively improving air quality, acoustics, and the overall visual comfort of the workspace.

Agile Lean Management

Streamlining Spatial Workflows Through Continuous Iteration

“How we use every corner of the building”

- Iterative Workstation Optimization

- » Workstation layouts were continuously re-evaluated
- » Simple, targeted upgrades: ergonomic desks, optimized lighting, tailored tool placements
- » Significantly enhanced daily workstation productivity.

- Process-Driven Space Allocation (Lean Management)

- » We dynamically relocated entire functions to mirror our actual production flows
- » Minimizing unnecessary movement

- Strategic Point-of-Use Inventory

- » We restructured our raw material and stock distribution
- » breaking down centralized storage into dedicated, localized zones adjacent to workspaces

Beyond Efficiency

How Our Building Became Part of the Process

Beyond Efficiency

How are building became part of the process

1. **The Core Asset:** Your building is not an expense. **Your building is the living shell holding your technology.** Just like any machine, it requires continuous upgrades to support your evolving manufacturing processes.
2. **The Sustainability Unifier:** Sustainability spans **from solar power to employee retention.** Your physical building is what turns that mindset into reality, connecting clean technology with human workspace.
3. **Agility over Rigid Planning:** Baseline data is key, but the future can't be rigidly planned. **Stay agile with flexible, modular systems** and look outward.
4. **Neighborhood Symbiosis:** Your building does not exist in isolation. It drives **structural and strategic advantages by actively collaborating with neighbors** and tapping into local networks..

Do you have any questions?

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