

Students compare energy sources for a real district, and see what every choice means

Symphony turns energy planning into something students can experiment with. Field-tested in a continuing-education course at ZHAW School of Engineering, ready for your institution.

Swiss federal research (Empa) · Taught at Swiss universities ZHAW and HSLU · Research with Lawrence Berkeley National Laboratory

Symphony is web-based software for the strategic energy planning of sites and districts. Students model a district and put every candidate energy source on the table: solar PV, heat pumps, borehole storage, waste heat, batteries, gas and wood, or a shared anergy network. Mathematical optimization computes each supply variant, and the Sankey diagram and the cost and CO₂ dashboards show immediately what each choice means for the system. Trying an idea costs minutes, not weeks, so students explore options instead of verifying a single design. In 2026, participants of a ZHAW continuing-education course did exactly that for the Uster city-centre heat network.



An example Sankey created in Symphony: the seasonal energy-flow view that the course debrief singled out for praise.

What your students get

- **Experimentation, not just verification.** Gas against heat pumps against waste heat against an anergy network: each variant is recalculated in minutes and compared side by side.
- **The whole system, visible.** The seasonal Sankey diagram and the cost and CO₂ charts show how every choice ripples through the system.
- **Depth through doing.** At ZHAW, it was applying the tool that got participants engaging deeply with technologies such as borehole storage sizing and waste-heat integration.
- **A real district, defended for real.** Results students can present and defend, on a planning area that exists.

What your institution gets

- **A course that stands out.** Hands-on planning of a real district is a strong differentiator in any energy or planning curriculum.
- **No IT project.** Browser access with two-factor authentication. Nothing to install, no licences to distribute.
- **Low preparation load.** Technology database, intuitive default values and demand profiles keep the modelling within limited contact hours.
- **You are not alone.** Tutorials, manuals and support from the Symphony team, up to co-designed and co-taught course days.

«In the Uster city centre I compared three networking options: no network, an anergy network, and one with additional electricity trading. The result was clear — maximum thermal and electrical networking is the best solution, economically and ecologically. I couldn't have run a variant comparison at this depth without Symphony.»

Ervin Rakipi · Energy Solutions Sales Consultant, St. Galler Stadtwerke · CAS participant 2026

Sources: course debriefing by ZHAW and Symphony, 9 July 2026. Quotes from participants of the 2026 CAS, used with consent.

From the lecturer's debrief

After the 2026 run of the CAS «Energiesysteme für klimaneutrale Areale und Quartiere» at ZHAW School of Engineering, course lecturer **Dr. Adrian Kammer** debriefed the course with us. From his findings on what worked:

- **Ran without a hitch.** Sympheny ran smoothly for the whole course, including two-factor authentication, and support on modelling and technical questions was excellent.
- **Browser access praised.** Participants singled out the browser-based platform access as very user-friendly.
- **Intensive use, deeper learning.** Participants worked heavily with Sympheny in their projects, and it was through applying it that they engaged in depth with individual technologies.
- **A playful way into energy flows.** Special praise went to the Sankey diagram showing how the energy flows of a system shift with the seasons.
- **Built for teaching.** Few, intuitive settings per technology, with default values largely provided by the Sympheny database.
- **Concept graphics that click.** The conceptual diagrams of technology options and connections proved very helpful in class.

Dr. Adrian Kammer teaches the CAS at ZHAW and is independent of Sympheny. Sympheny provided the platform and learning materials, and several course days were taught by Dr. Andrew Bollinger, Sympheny's co-founder and CEO and an experienced lecturer.

Two ways to bring this to your institution

Path A: Start a new course

One proven way to structure it, as an example: the sequence ZHAW runs. Adapt it freely to your programme.

- 1 **Kick-off.** The principle of the tool and the basics of modelling PV, heat pumps, batteries, gas and wood. The first hub is modelled together in class, supported by a dedicated manual.
- 2 **Deep dive.** Strategic energy planning on real examples, plus reversible heat pumps, chillers, waste heat, anergy networks and borehole storage.
- 3 **Checkpoint I.** All hubs modelled individually and handed in (input file and dashboard link), with Q&A. Then thermal connections, energy communities and e-mobility.
- 4 **Checkpoint II.** The full model with connections is handed in and discussed, with input on presenting results.
- 5 **Finale.** Interpreting results, sensitivity analyses, and modelling multiple time phases on a real long-term energy perspective.

Design principles from ZHAW: small homogeneous hubs, demand profiles provided up front, first hub modelled together.

Path B: Embed Sympheny in a course you already teach

Add a project-work module around a district your students know: a campus, a neighbourhood, a local heat network.

Students get browser access, model supply variants and compare them on cost and CO₂ in the dashboard. The technology database and provided demand profiles keep the modelling within limited contact hours, so it fits an existing course without redesigning the curriculum.

What participants say

«With Sympheny I compared far more energy-system variants in my project work than would ever have been possible by hand in Excel. And for each variant I could see straight away what it meant technically, in energy terms, and economically.»

Immanuel Stadermann · Renewable Energy Specialist · CAS participant 2026

«Sympheny builds charts on cost, CO₂ emissions and performance on its own, and fast. Excel isn't that quick. And you can download the output file directly and keep working with it in Excel. An excellent program when you want to compare several energy solutions at once.»

Davide Botelli · PV Project Manager · CAS participant 2026

What Sympheny provides universities

Platform access

Browser-based for students and lecturers, no installation.

Technology database

Default values and demand profiles included.

Tutorials and manuals

Learning materials plus support during the course.

Course co-design

Dr. Andrew Bollinger and our team co-teach course days on request.

We came out of research, and our academic terms reflect that. Generous, and agreed individually with each institution.

Bring Sympheny into your teaching?

We will walk you through the course concept and set up trial access for you.

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