



The goal for Sunday is to settle into ETH Week. You will meet your team members and exchange your personal viewpoints on the topic of energy. Discuss your expectations and understand both the goals and the process of the week.

sunday
sep 9

- 12.00 — Registration and Snack at ETH Week Hall.
- 13.15 ◆ **OPENING ETH WEEK**
Welcome by our Rector Sarah M. Springman, Herbert Walder and Fabio Bargardi at ETH Week Hall.
- 14.00 ◆ **DESIGN CHALLENGE**
The Wallet—a demonstration.
- ↳ **Team building.**
- ↳ **Rich picture.**
- ↳ **Template.**
- ↳ **Check out.**
- 18.30 — Dinner
- 19.45 ▲ **INSPIRATIONAL NIGHT**
Marco Mazzotti, Ernst Hafen and Stefanie Hellweg discuss with you at ETH Week Hall.

Dear participants!

Welcome to 'Energy Matters', the fourth edition of ETH Week. This year, you and 150 students from over 30 countries and all across ETH Zürich will come together to work in interdisciplinary teams. Our aim is to design an inclusive and positive event, where you learn the state-of-the-art from professors and where professors learn from your critical attitude, enthusiasm and drive to rethink the world we live in today.

This year's ETH Week is organised in collaboration between ETH Sustainability, the Energy Science Center (ESC), and the Chair of Technology and Innovation Management at D-MTEC. As organisers, our role is to provide you with just enough structure to engage in a process that fosters creativity and critical thinking.

Creating a spirit of collaboration among a variety of different people is the foundation on which ETH Week rests. This set of workbooks contains those who had a part in making the fourth ETH Week possible. The short bios will introduce you to your Rector and President of ETH Zürich, to your tutors and facilitators, to the people running the event, to your professors and over 100 experts that join us during the week, and to us who designed the programme.



LUKAS BÜHLER holds a Master's degree in Atmospheric and Climate Science and founded the zero-waste catering startup "Zum guten Heinrich". He recently returned back to his Alma Mater and joined ETH Sustainability to organise ETH Week and its follow-up programme "The Hatchery".



CHRISTIAN SCHAFFNER is the Executive Director of the Energy Science Center (ESC) of ETH Zürich. The ESC is an interdisciplinary competence centre to promote energy research and teaching at ETH Zürich. Before, he worked with the Swiss Federal Office of Energy. He received his PhD degree in Electric Power Systems from ETH Zürich in 2004.



TANJA MEYER is a project manager at the Energy Science Center at ETH Zürich. As part of ETH Week, she is responsible for the Knowledge Fair and the content of the programme. Her background is in Business and Economics.



ANNA MARIA STALLMANN is a Cabinetmaker and Architect from Germany. After finishing her Master's degree at ETH Zürich last year, she joined the ETH Week team and contributes with her passion for problem solving, crafts and design. In her free time she enjoys rooftop gardening and swimming in the Limmat, close to ETH Sustainability headquarters.



LINDA ARMBRUSTER holds a Master's degree in Strategic Design from the design akademie berlin. As Project Manager at Spark Works, a strategic human-centered innovation firm, she builds and leads inspiring research and advisory programs with interdisciplinary teams to tackle complex challenges in the private and public sector.



ALAN CABELLO LLAMAS holds a PhD from EPFL focused on human-centered innovation processes, having been a Visiting Researcher at Stanford's d.school. He is the founder of Spark Labs, an initiative with the purpose of teaching Design Thinking as an approach to innovation, as well as a Research Associate at ETH Zürich, and the General Manager for Adjoint in Switzerland, a blockchain technology company for Financial Services.



CHRISTINE BRATRACH is the Director of ETH Sustainability. Research and applied projects on the topic of sustainability as well as interactions with interest groups in business, politics, and NGOs have characterised her career. She has always loved to work in interdisciplinary groups of engineers, natural and social scientists during her doctoral studies in Environmental Science at ETH Zürich and before.



ANDREAS VATERLAUS is Professor for Physics and Education at ETH Zürich. In October 2012, he was appointed as Vice-Rector for Curriculum Development. In this role, he assists the Rector in matters related to curriculum development and innovation processes. He chairs the Teaching Commission.



STEFANO BRUSONI is Professor of Technology and Innovation Management at ETH Zürich. He holds a DPhil in Science and Technology Studies from SPRU at the University of Sussex, UK. Earlier, he worked as a firefighter, which he enjoyed tremendously. His research interests include the emergence of alternative product architectures, firm dynamics and modularity.



RETO KNUTTI is the Associate Vice President for Sustainability and Professor in Climate Physics at the Institute for Atmospheric and Climate Science at D-USYS. His research focuses on changes in the global climate system caused by anthropogenic greenhouse gases, like carbon dioxide. He is also a member of the Intergovernmental Panel on Climate Change (IPCC).

WELCOME SPEECHES AND THE ETH WEEK TEAM

Our Rector Sarah M. Springman will open the fourth edition of ETH Week. Elaborating on her view on interdisciplinarity as one of the most important keys to innovation, she welcomes you from your respective departments in the ETH Week Hall to collaborate and actively shape an ETH spirit of togetherness.

Herbert Walder from ETH Zürich's Facility Management department will tell you more about this year's location of the ETH Week Hall.

Fabio Bargardi will share a personal story about what ETH Week has meant for him as a student in our first prototype in 2015 and in 2016, and as a tutor in 'Manufacturing the Future' in 2017. He will tell you about his hopes of what you as participants of the fourth edition will gain from the process of just six days in critical thinking.

The members of the ETH Week team are in charge of implementing your day-by-day activities: the keynotes and expert inputs, the excursions, the knowledge fair, the panels, the feedback loops, morning sports programme and inspiration nights. They are also responsible for the first level support of the tutors, and the setup in the ETH Week Hall, including food and the invisible logistics that hold everything together.



FABIO BARGARDI holds a Master's degree in Materials from ETH Zürich and is currently a doctoral student in the Complex Materials group studying Lithium ion batteries. He is a member of teampact, which is a group of students offering coaching sessions and focusing on ideation processes, project development, and team dynamics. In his free time Fabio likes swimming and paddling.



HERBERT WALDER received a Master's degree in Electrical Engineering and a doctoral degree in Computer Engineering from ETH Zürich. He has worked in hardware and software development and telecommunications industry for several years. Since 2016, he is leading the facility management section "ETH Zentrum". In this role, Herbert and his crew are responsible for the operation and maintenance of all technical building infrastructures.



SARAH M. SPRINGMAN is the Rector of ETH Zürich and Professor of Geotechnical Engineering. She studied soil mechanics at Cambridge University, then embarked on a career in industry before returning to Cambridge, where she earned her PhD and established an academic career. She also represented Great Britain as a athlete from 1983 to 1993, winning 20 elite European Triathlon Union (ETU) Championship medals in triathlon and duathlon.



ANDREA GERMANN has a background in tourism and started her career in Davos as a convention manager. After travelling the world she joined the corporate world by working for large financial companies based in Zurich. Andrea joined ETH Zürich a few months ago and is fascinated by the variety of people working and studying here.



MONIKA MOLNAR has started her Bachelor in Physics at the University of Zurich, after having spent one year at EPFL studying Microengineering. Sciences, innovation, but also theatre, arts and languages fascinate her. She looks forward to meeting interesting people and supporting creative learning at ETH Week.



CAROLE GUGGENHEIM just finished her doctorate in Aquatic Chemistry and joined the ETH Week team this summer after having experienced the tutor role at ETH Week 2017. She considers ETH Week a great opportunity to come across diverse fields, personalities, ways of thinking and traditions.



PADDY KÄSER recently joined our event partner Compresso AG as event project manager after having worked for an international sport federation. He will support the ETH Week team during the entire event. In his free time you can find him on the Curling ice or in the mountains. He is looking forward to be part of ETH Week the first time.



DANIEL KOTTMANN has worked in the business of event management for 10 years, in Switzerland and abroad, and has organised conferences, gala events, and TV shows. He recently joined ETH Zürich and loves the diversity of his new job. When he is not working, you will find Daniel on his bike touring through forests.



PIA AESCHLIMANN has worked for various international companies before joining ETH Academic Services seven years ago. People, cultures, celebration of differences and the joy in the little things are important to her. Pia is a mastermind when it comes to Excel. Since we realised this during the first ETH Week, we can no longer imagine the Info Desk without her.



ELKE TOMFORDE studied Educational Sciences, Anthropology and Social- and Preventive Medicine at the University of Zurich and holds a MAS degree in Work and Health. Since 2013 she works at the unit of Educational Development and Technology (LET) at ETH Zürich. The main focuses of her work are curriculum development and didactic programmes for student teaching assistants.

CONCEPTUAL FRAMEWORK OF ETH WEEK 2018 ENERGY MATTERS

We wake up, we turn on the light. We prepare our coffee. We have a hot shower, use our car or public transport to move from A to B. We read the latest news on our smartphone. Energy has become our constant companion, maybe without us even realising it. But where does all this energy come from? Can we assume it will always be there? And what are the direct and indirect effects of us consuming the products and services that are so tightly interwoven with our daily lives?

Today, Switzerland relies to a large extent on imported fuels for its overall energy consumption. In a public vote in 2017, the Swiss people supported the Swiss government's 'Energy Strategy 2050' to move ahead with decarbonising the energy system and phase out nuclear power. Given its growing population, Switzerland needs to coordinate a wide range of measures to reset its energy system on a path of environmental integrity to become more efficient and more diverse, while ensuring long-term economic viability.

THE THREE LAYER CONCEPT

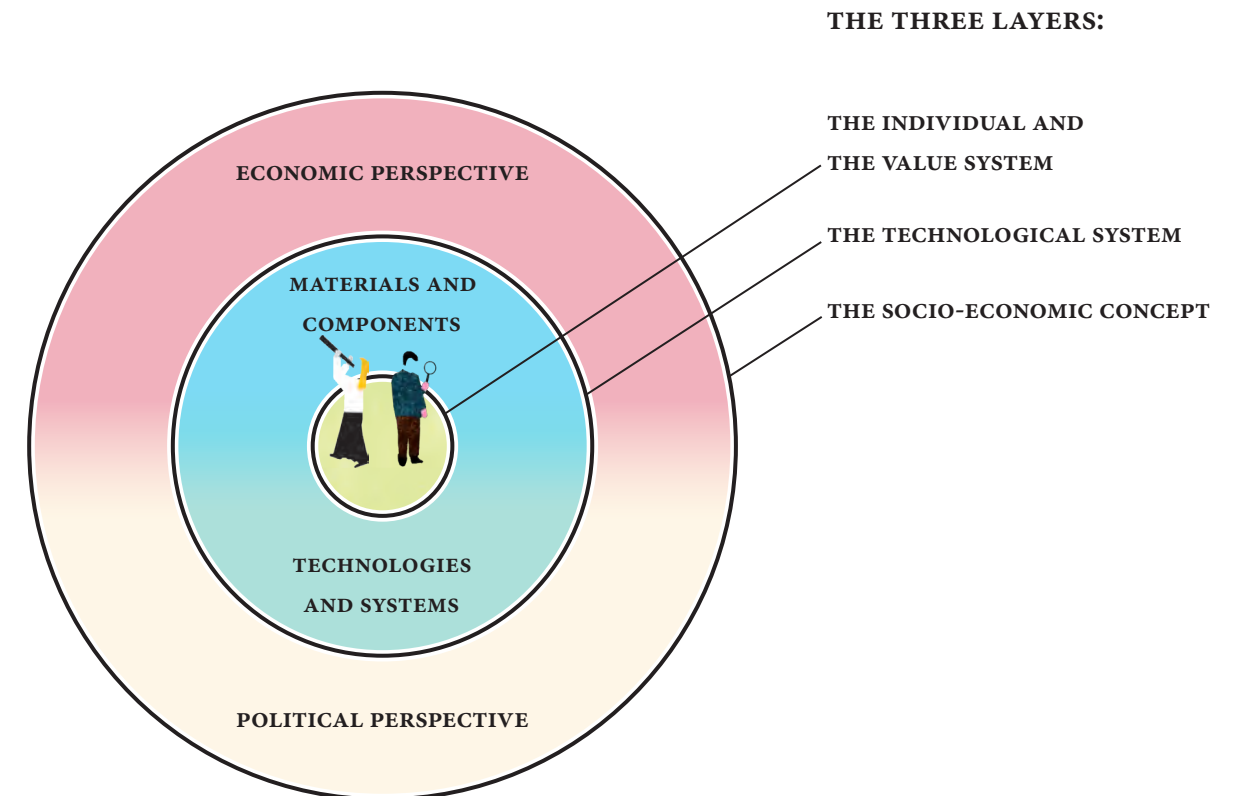
This year's ETH Week, which focuses on "Energy Matters" will be structured along three layers. The aim is to provide a holistic understanding of the topic and to highlight the interdependencies between the different layers. The three layers are:

- INDIVIDUAL AND THE VALUE SYSTEM
- THE TECHNOLOGICAL SYSTEM
- THE SOCIO-ECONOMIC CONCEPT

The first layer describes how individuals interact daily with the energy system, i.e., the use of energy services guided by pragmatic considerations and/or their value system. The VALUE SYSTEM describes how individual choices are linked to the "bigger picture" and each person's overarching values, such as fostering a sustainable development, preserving the environment or ensuring general accessibility to energy services. You will study this layer on Sunday afternoon and evening.

The second layer, THE TECHNOLOGICAL SYSTEM, describes all technical components and technologies needed to provide energy services. It is divided into MATERIALS AND COMPONENTS (i.e., the basic materials and components needed to develop energy technologies) and TECHNOLOGIES AND SYSTEMS (i.e., the functionality of different energy technologies as well as the functioning of the overall energy system that integrates these technologies). We will discuss this second layer on Tuesday morning.

THE SOCIO-ECONOMIC CONCEPT is divided into the ECONOMIC PERSPECTIVE, which describes the economic actors and mechanisms driving the energy system (activities of firms, development of markets, etc.), and the POLITICAL PERSPECTIVE, which describes policymaking and the underlying political framework. This layer will also be introduced on Tuesday morning.



FOOD & WATER

A small wake-up breakfast with tea and coffee is ready in the ETH Week Tent every morning before Kick-off.

For in-between snacks, go to the Energy Bar in the ETH Week Hall. You will find some fruits and other snacks to boost your energy levels during team work. We also provide you with a water bottle. Refill it at the Energy Bar or at any tap on or off campus. The water is safe and delicious in Zurich!

On Monday you will receive a lunch bag on your way to the field trip. To foster informal exchange and so that we can all come together in the evenings, dinner is served in the ETH Week Tent. All food provided is either vegetarian or vegan. In case of allergies, please ask the catering staff.

BADGES

Please wear your ETH Week badge at all times. The keychains are color coded.

SPORTS PROGRAM

Together with the ASVZ, we offer sport sessions in the mornings, starting on Monday. You can choose to join the morning run through the forest around Campus Höggerberg each morning. In addition, we offer Yoga (Monday), Zumba (Tuesday), Pilates (Wednesday), Body Balance (Thursday) and Tai Chi (Friday). The sports centre opens at 7.00. Classes run from 7.05–7.50. Rector Sarah M. Springman will join the morning run on Wednesday.

INSTA CHALLENGE

During ETH Week, we would love to see your posts on Instagram with our hashtag #ETHweek. Every day of the week, the best picture will be presented in ETH Week Hall as well as on the main page of ETH Zürich's website along with a blog post.

BREAKFAST / 7.30–8.30.

ENERGY BAR / available all day.

DINNER / Usually: 18.45

WHERE / find the sports classes at HPS arena 3. The meeting point for the morning run is in the lobby of the HPS building.

SIGN UP / the sports programme has a limited amount of places and requires a subscription at the Info Desk the day before! Access the classes with your ETH Week badge.

HOW / on Instagram, use the hashtag #ETHWeek. Please add one or two sentences.

EMERGENCIES

In case of an emergency, inform the info desk directly or call the ETH Week hotline (+41 44 633 99 10). In case of urgent emergencies, call the Emergency desk of ETH Zürich (+41 44 342 11 88). They will transfer your call to the ambulance (144), police (117), or fire brigade (118). Please immediately inform the Info Desk afterwards.

INFOBAR

On some nights, the Info Desk transforms to the so called InfoBar, where you can tie up the loose ends of the day and meet the students of the other teams. You can purchase alcoholic and non-alcoholic drinks there. Only guests with an ETH week badge can obtain drinks at the bar. Payments in cash only.

LAPTOPS

You are welcome to bring a laptop or tablet device. However, it is not necessary for all group members to bring one. Please note that you are responsible for your valuables.

PRINTING AND LOCKERS

Close to your team spaces, in the middle pavilion, is a VPP printing station where you can print PDF documents through the webform or the app. There are eight lockers available in some of the team spaces. If you do not have your own lock, the ETH Store sells cheap options.

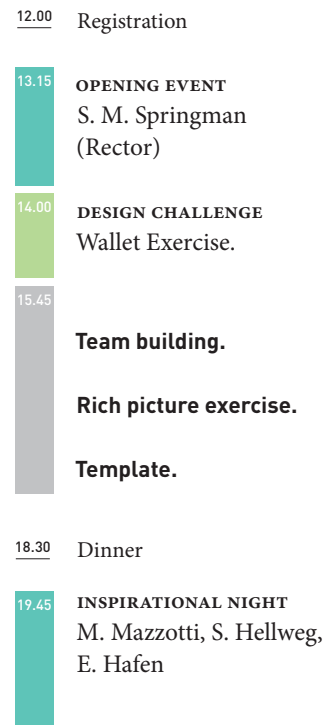
CREDIT POINT

To receive one credit point (1 ECTS) you must take part in the core program of ETH Week in full (8:30–18:30) and be present during the final presentation. Please subscribe for the course 701-0901-00L on mystudies.

DRINKS / available at the InfoBar in the Hall on Sunday, Monday, Thursday and Friday night.

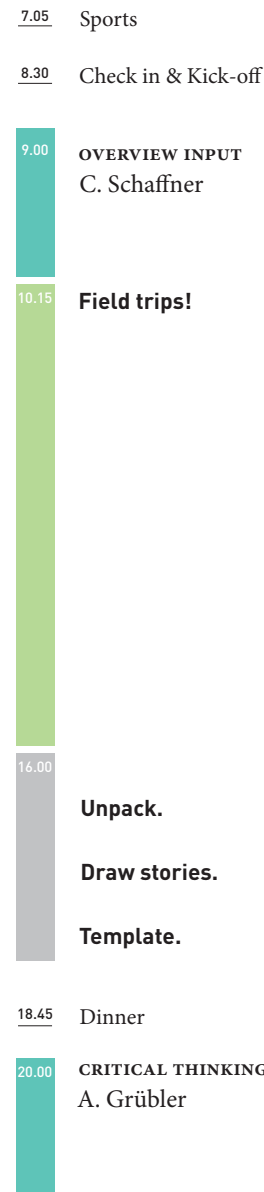
sunday
sept 09

↘
meet



monday
sept 10

↘
experience



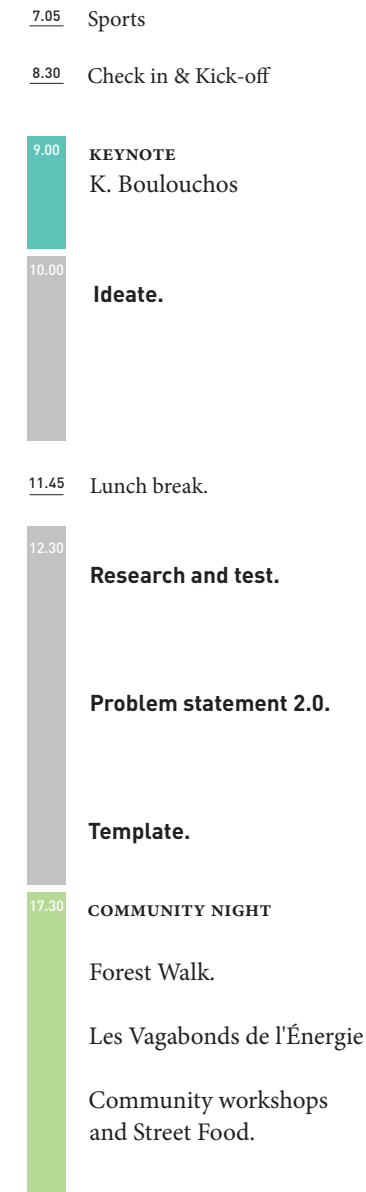
tuesday
sept 11

↘
funnel



wednesday
sept 12

↘
refine



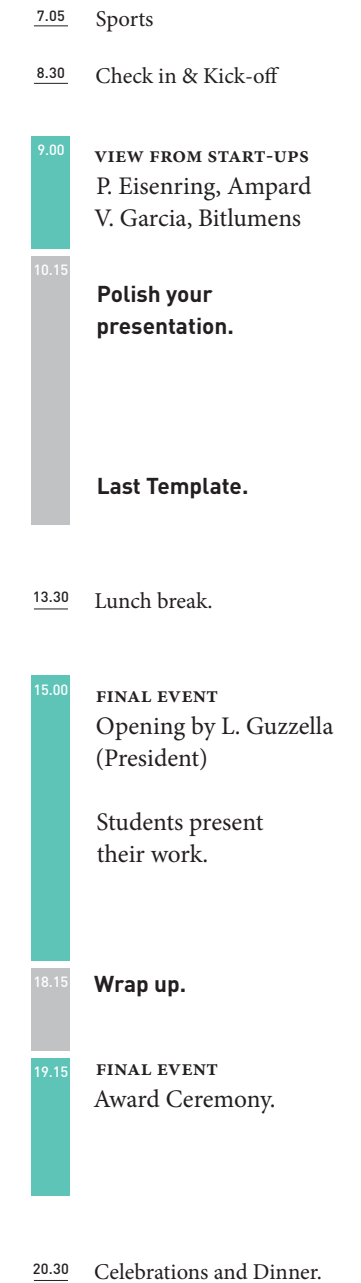
thursday
sept 13

↘
test



friday
sept 14

↘
communicate



THE TUTORS

The goal of ETH Week is to embed your learning processes in real-life problems. Your work will be self-directed to exercise your ability for problem solving. Your team will be accompanied by a tutor who is familiar with the different steps that you are expected to complete. He or she will explain if tasks are unclear, and will encourage constructive teamwork and team-forming processes.

The two tutor trainers Kerrin and Raphael have been coached by the administrative department Educational Development and Technology (LET) to become responsible for the tutor training program. They were tutors at last year's ETH Week and they know the challenges the tutors face quite well. During ETH Week, they will be present to assist and supervise.



KERRIN WEISS is in the last year of her Master's degree in Mechanical Engineering at ETH Zürich with a focus on Biomedical Engineering and Product Design. She sees ETH Week as an opportunity to engage and help others, to learn and to be challenged.



RAPHAEL PORTMANN spent his youth with music and soccer in beautiful Lucerne. He studied Environmental Sciences at ETH Zürich and he tries to live by his convictions and ideals. Currently, he's working on his doctorate, where he is trying to figure out why weather forecasts sometimes go really wrong. Please don't ask him for a personal weather prediction.



ALEKSANDRA KIM is a doctoral student at Paul Scherrer Institute and ETH Zürich. Her focus lies in the topic of Sustainability Assessment of Swiss Production and Consumption, which brings together data analysis, quantitative modeling and life cycle assessment. She is convinced that diversity fosters innovation and better research, especially in the context of energy and sustainability.



ALINA BEGLEY is a Master's student in Chemistry at ETH Zürich with an interest in bioanalytical chemistry. After completing her Bachelor's at University of Leipzig, she volunteered at an NGO in Guinea reviewing malaria diagnostic practices. She is an American who grew up in Beijing, Berlin, Seoul, and Washington D.C. and looks forward to discussing solutions to the world's biggest problems.



DIEGO C. RUIZ holds a Master's in Nanotechnology from the University of Valladolid and is now pursuing a doctorate at ETH Zürich. In his research he is involved in the manufacturing of high speed electronic devices used in cryogenic amplifiers for deep space communications. In his free time he loves doing all kinds of sports, travelling or going for a walk at the lake.



CHRISTOPHER MCLAREN has a Master's degree in Mechanical Engineering from ETH Zürich. He is currently working on his doctorate in Mechanical Engineering specialising in non-Newtonian fluids. In his free time he enjoys a variety of outdoor sports, kite surfing, swimming, hiking, and also dancing.



ENRICO SCOCCIMARRO is a Materials Science Master's student at ETH Zürich. He is intrigued by product development and seeks an interdisciplinary approach to innovation. In his free time he is split between skiing in the mountains, sailing at sea, and enjoying home made drinks from his 'gin & tonic lab' with friends.



CHRISTOS GLAROS grew up in Bremgarten, just a stone's throw away from Zurich. After an exchange semester in Sweden he is now working on his Master thesis about batteries to complete his Master's degree in Materials Science. He is in general interested in all kinds of materials related to energy generation, storage and conversion.



FABIO BARGARDI holds a Master's degree in Materials from ETH Zürich and is currently a doctoral student in the Complex Materials group studying Lithium ion batteries. He is a member of teampact, which is a group of students offering coaching sessions and focusing on ideation processes, project development, and team dynamics. In his free time Fabio likes swimming and paddling.

MORE TUTORS



FLORIAN EGLI is a PhD candidate in the Energy Politics Group at ETH Zürich. He is passionate about tackling climate change and currently working on renewable energy finance. He also is the vice-president of foraus, a Swiss foreign policy think tank, he regularly moderates workshops, and gives talks. He is looking forward to an exciting week full of new ideas!



HELEN MEYER is focusing on product development in her Master's in Mechanical engineering at ETH Zürich. She collected a lot of coaching experience and considers ETH Week as the perfect opportunity to learn more about interdisciplinary and international teams. Besides ETH, Helen loves rock climbing and everything else that combines nature and sports.



MARCEL NEIDINGER is a Master student at D-INFK specialising in information systems. His main interest is in the application of machine learning systems to medical and sport-scientific problems. When not studying Marcel spends most of his time swimming, biking or running training for long distance triathlon.



JOHANNA THEILMANN is a Master's student in Environmental Science with a focus on environmental policy and renewable energies. She is particularly interested in climate change and the interaction between natural science and society. In her free time, she enjoys travelling, cooking, baking, drawing, discussing politics and spending time in nature.



MARTIN HOLUB is a Master student in Mechanical Engineering at ETH Zürich where he specialises in Bioengineering. His mission is to bring more engineering into biology and vice versa. When he is not hacking on Arduino projects or training a machine to learn models, he keeps himself away from the computer by cooking and doing sports.



LILIAN HÖRLER holds a Bachelor's in Graphic Design from the HSLU Design & Kunst. She is a trained Design Thinker from ETH Zürich, develops the internal visual communication at Spark Labs and supports Spark Works in design and consultancy projects. She enjoys working and experimenting with different design methods to find new, effective ways to communicate.



MATTIA MÄDER is a Swiss-Belgian Master student at ETH Zürich who grew up in the "capital" of the European Union. He is interested in the complexities of the energy sector and focuses on policies to make it more sustainable. He is excited to meet the motivated, creative and diverse minds getting together at ETH Week.



MAXENCE RYAN is a Master's student in Integrated Building Systems. After studying Architecture at Stanford University and working in Berlin, London and Zurich, he is now passionate about energy efficiency in buildings, decentralised energy distribution, and alternative building materials. In his free time, Max enjoys hiking, baking bread and napping with his two fat cats.



MÜGE ÖZLÜTIRAS is currently an MA candidate in Comparative and International Studies at ETH Zürich. Curious about sociology, culture and art, she wishes to create value for the world as a political scientist. She is passionate about languages and speaks Turkish, French, English, Italian and is learning German.



SANDRO KALBERMATTER grew up in Brig-Glis in the south of Switzerland. He is currently finishing his Master's degree in Computer Science. In his spare time, he builds little robots, runs tasks for several student associations and does technical projects with children and teenagers. He loves music, nature and technology and he's always up for a swim in the Limmat.



MICHAEL LIEM holds a Master's degree in Mechanical Engineering and has just started his doctorate at the Institute of Fluid Dynamics. In his free time, Michael enjoys playing Volleyball and hiking. He is a member of the coaching network 'teampact', where he exchanges coaching experience with like-minded students from different



OLENA BERKOVSKA is a Master's student in Pharmaceutical Sciences. She has enjoyed an international upbringing and came to Switzerland for her studies. She is currently conducting research in drug delivery, which is supporting her passion for interdisciplinarity and innovation.



SEBASTIAN KRUMMACHER is a Mechanical Engineering Master student at ETH Zürich. His interest in team dynamics lead him to write his Bachelor thesis about success factors in teams. He is excited to accelerate the team process of students from diverse backgrounds that have the courage to come together, think about today's challenges and make an impact for tomorrow.



SABINE PYTHON has a background in Mechanical Engineering and is a Master's student in Integrated Building Systems. She thinks it brilliantly mixes engineering, architecture and sustainability. Sabine is active as president of L-Punkt, the student organisation for lesbian, bi and queer women, and cycles through Zurich as a passionate bike messenger.



SILVIA BURGDORF is a Master's student in Environmental Science at ETH Zürich and is currently doing an internship at the Swiss Association for Recycling of building materials (ARV) in Zurich. During her studies she focused on human-environment conflicts, gained experience in tutoring in the lecture 'Environmental Problem Solving' and now has developed a great interest in Design Thinking.

↘ Team-building.

We have set aside time for you to get to know the people you will work with over the course of the next six days. Your tutor has prepared this initial team-building session. He or she will make sure that you become familiar with working in an interdisciplinary group setting. Take this time to learn about your different backgrounds, experiences, and motivations for joining ETH Week.

During the week, you will need to collaborate closely, take decisions together, share tasks, coordinate, and produce a presentation by Friday afternoon. This will be challenging. The role of the tutor is to help you navigate through the different phases of the team process so that you can eventually become a well-functioning team. A first step to becoming this team will also be your first decision: You must select a team name.

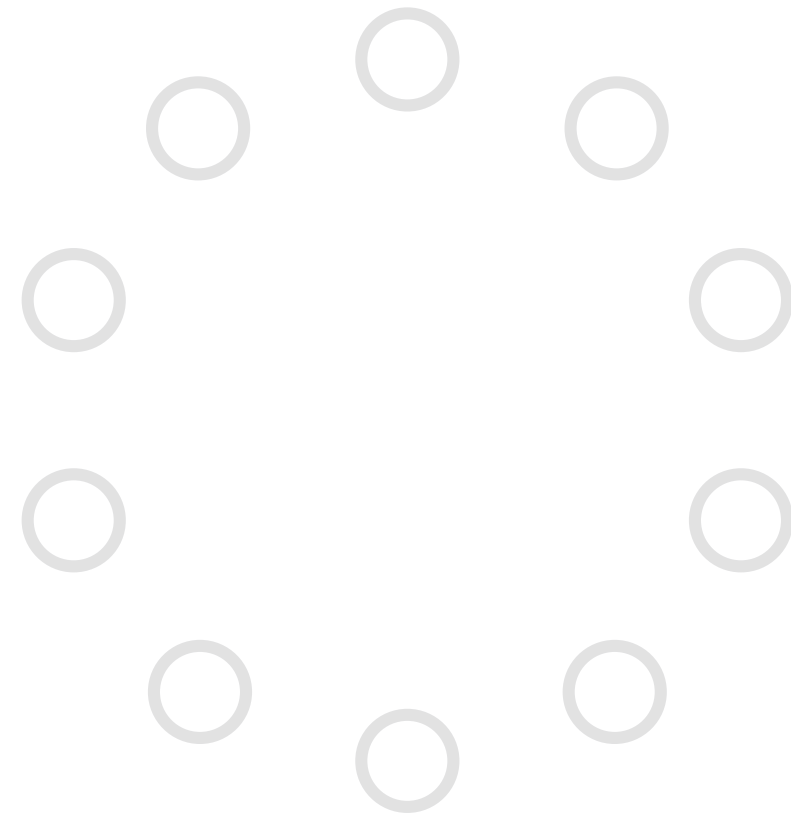
ROLES / During the week, you will take on different roles within the team. If your contribution actively reflects that role, that will make it easier for the team to grow together. There are also different task-related roles that you may distribute, such as: moderator, timekeeper, documenter, photographer, note-taker, mood encourager, etc. Try to rotate regularly and clarify who has which role.

× NOTE

This workbook is designed with plenty of white space for you to make it yours, to take notes and to keep track of what you judge to be important during the week. Some hints for how to fill this page:

- Who is who? Can you remember all the names of your team mates?
- What is your team name?

sunday
15.45
TEAM SPACES



Pick a name

THE BRIEF

The curriculum of ETH Week brings together elements from research and design thinking to solve real-world problems. As a team, you will go through a number of steps that urge you to think outside of the boundaries of your discipline. One goal of ETH Week is to provide a safe environment that encourages free-spirited critical thinking, while building on the scientific research tradition as an essential foundation for bringing responsible solutions to problems.

Instead of handing you a problem to solve, we ask you to define your own challenge, to frame a problem that you identify within the topic of 'Energy'. On the next page, you will find 'the brief', your task for the week. Every step of the way will bring you closer to finding answers to its three points.

The focus will not be on finding a compelling solution, but on defining a good problem, as mentioned in point (1). You will start with a first definition on Tuesday and improve it on Wednesday and Thursday. As you move through the week, you will deepen your understanding so that you can formulate a more and more concise 'problem statement'.

Point (2) is related to learning how to explain something complex in a simple and compelling way, so that your audience can understand why your work is relevant and how the problem you define is actually solvable in the real-world context.

Last, point (3) gives you guiding questions to help you reflect your ideas critically, based on the scientific research tradition of ETH Zürich.

× NOTE

Refer back to this page regularly throughout the week. Make sure you remain on track and use it as a guide during your creative process.

1. Define a problem statement that describes the challenge you want to address. It needs to be linked to a Swiss actor and to one of the three layers of the ETH Week concept (which will be introduced to you on Monday and Tuesday morning at 9.00).
2. Tell an inspirational story that explains where your ideas come from, why your problem statement is relevant and what a possible solution could look like.
3. Critically reflect your ideas by answering the following questions:

SCIENTIFIC RIGOUR

- What are your underlying assumptions?
- What facts and figures did you rely on?

FEASIBILITY

- How feasible is your solution?
- Are there uncertainties related to your solution that would need further clarification?

SYSTEMS THINKING

- How is the problem embedded in the ecological, societal and economical context?
- What are the implications and tradeoffs of your solution?

↘ Rich picture.

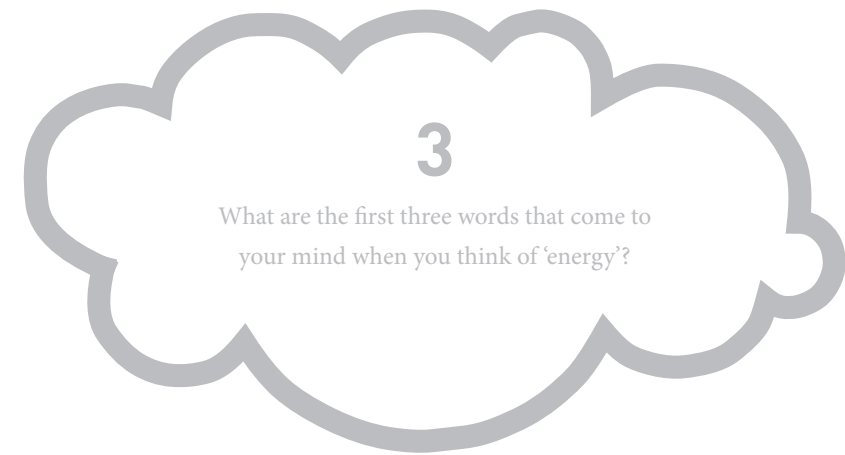
Enter the topic: Energy. As it is Sunday and the afternoon is reserved for team-forming activities, we refrain from input talks. Instead, we want you to build on the knowledge and the perspectives available within your team. Start building on your own experiences today and draw a visual image or diagram of where your energy comes from, how it gets to you, and how you use it. Think in various categories, draw different elements and show how these are related to each other to form a system. Use the pictures as a basis for discussions on different levels and share your views and opinions.

DOCUMENTATION / At the end of every day, you will fill in a daily template. We call this last step of the day 'Template'. Start by tidying up your workspace. Make sure that the results of your discussions and your ideas are clearly documented on the pin boards for the next day. Add structure and remove everything unnecessary. Also, make sure there are no documents lying on the floor, as this is related to respecting your work.

Your daily template is basically the essence of your day. It reflects what is pinned up in your workspace, documents your process, and contains the main results. We give you instructions for how to fill each template at the end of the day. When it is complete, you will hang it on your process wall in the ETH Week Tent. It will remain there until the end of the week. The process walls are public so that ideas can flow and build on each other, and to foster informal discussions between you and students from other teams, experts and guests of ETH Week.

× HEADS UP

Sign up before 20.00 at the Info Desk for tomorrow's BodyArt class or the morning run.



↘ Template.

Your first template will contain the results of the discussions had during the rich picture exercise. It highlights the team-building goals of the day: to familiarise yourself with the interdisciplinary group setting and to build on and discuss your own experiences, values, and perspectives.

◆ INSPIRATIONAL NIGHT

In the afternoon, you had the opportunity to reflect on the topic of "Energy" and on own experiences, values and perspectives. Sunday evening is the time to discuss your ideas with three ETH professors. Be critical and active, and enjoy a lively exchange.

THE INDIVIDUAL AND THE VALUE SYSTEM

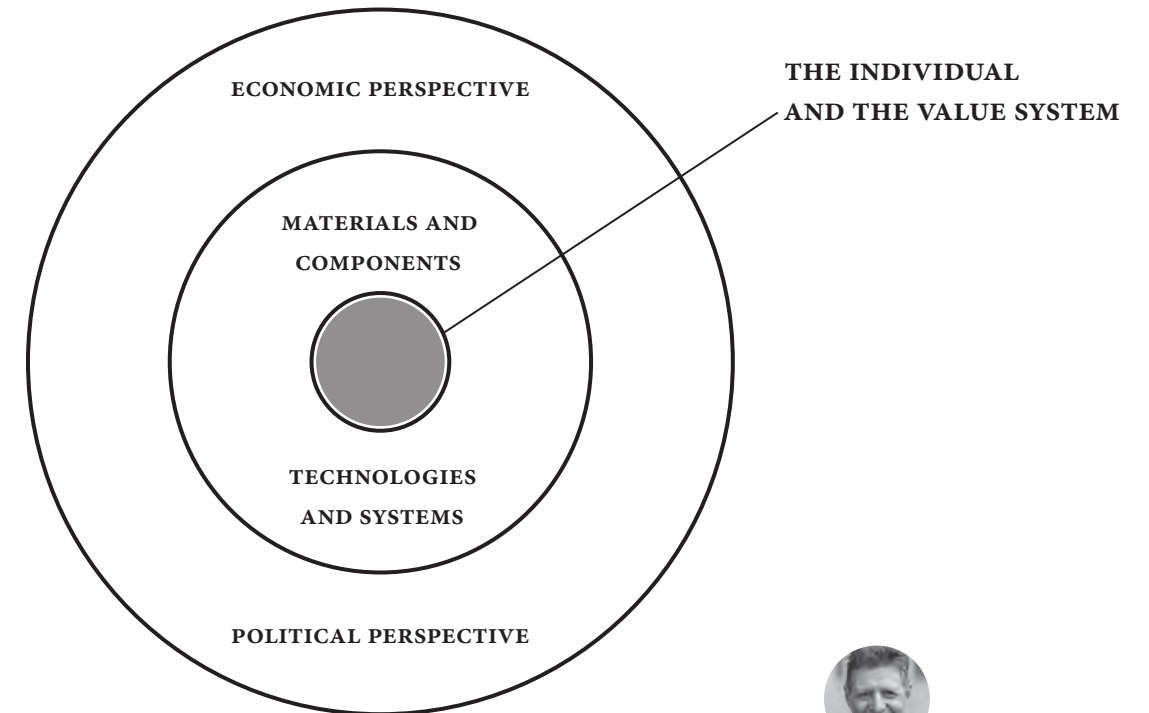
"Eat a lot, burn a lot" is the motto of top-performing athletes. This could also be the epitaph for our society, which exploits resources and produces waste for purposes, that far too often go unquestioned in terms of their rationale and sustainability.

Energy matters in this context indeed, not only for society at large, where economic growth requires more and more energy and leads to unsustainable amounts of greenhouse gas emissions, but also in many different ways for the individual.

On the one hand, our bodies need energy in the form of nutrients to perform actions, generate ideas and show emotions. Transforming energy, together with handling genetic information, is the task of living organisms' cells. Understanding the role of energy in life helps us to unravel the history of evolution as well.

On the other hand, individuals interact with technical energy systems in their everyday life. Such interaction is regulated by their value system, namely when they decide whether to use the car or the train to reach their holiday destination, whether to switch on the air conditioning or not, whether to eat bananas from Costa Rica or apricots from the Canton of Valais and whether to support the phasing out of Swiss nuclear power plants or not.

The goal of the Inspirational Night is to introduce the above issues and many more, and to discuss them in depth with the ETH Week participants, so as to provide them – from the different perspectives of the three panelists – with hints, motivations, ideas and visions for challenges to tackle within the upcoming group work.



MARCO MAZZOTTI is ETH professor of Process Engineering. He works on the science and technology needed to mitigate carbon dioxide emissions from industry, thus aiming at a sustainable energy system. Since 2011, he has been a Board member of the Energy Science Centre of ETH Zürich.



STEFANIE HELLWEG is ETH professor for Ecological Systems Design. She works on modeling, evaluating and improving the resource efficiency and the environmental impact of products and processes, new technologies and consumption patterns. She is a member of the Swiss National Research Council and of the UN Environment Programme (UNEP) International Resource Panel.



ERNST HAFEN is ETH professor for Systems Genetics at the Institute of Molecular Systems Biology. In 2005-2006, he served as president of ETH Zürich. He is interested in how people can actively participate in research through their personal data collected continuously using smartphones. He is a co-founder and president of MIDATA.coop, a non-profit citizen-owned data cooperative that provides a new trust framework for data-sharing and the democratisation of the personal data economy.



Your projects start tomorrow. Stay tuned.



The goal for Monday is to dive into the topic of energy, and to get an overview of its complexities and opportunities. You will build empathy for a range of actors you meet during the field trips, and discuss stories that include your personal interpretations. In the evening, we will build a foundation for your critical approach to the topic.

7.05 — BodyArt and morning run at the HPS Sports Centre.

8.30 — Arrive at Process Walls in the ETH Week Tent.

↘ Check in.

8.50 — Kick-off at ETH Week Hall.

9.00 ◆ **OVERVIEW INPUT**
'Energy Matters' by Christian Schaffner.

↘ Field trips!

15.30 — Return to ETH Week Hall.

↘ Unpack.

↘ Draw stories.

↘ Template.

↘ Check out.

18.45 — Dinner

20.00 ▲ **CRITICAL THINKING NIGHT**
Keynote by Arnulf Grübler,
Discussion followed by informal exchange
at ETH Week Hall.

monday
sep 10

↘ Check in.

We have structured the week so that each day has a specific focus and that at the end of each day, you will document your results. The results of Sunday are visualised on the Sunday template on your process wall in the ETH Week Tent. The templates will also function as a roadmap for the whole week. Every morning you will meet there, look back at the previous days and plan the day ahead together with your tutor.

SELF-REFLECTION / The notion of self-reflection is linked to critical thinking. It covers the ability and willingness to understand how your own values influence your communication. This enables empathy, which is the willingness (and capability) of understanding other people's viewpoints. When you understand where you come from, and you are able to critically reflect on how your judgement is affected by your background, your mind should also be flexible to accept the different perspectives of other individuals. While you do not have to agree with the standpoint of the other individual, at least you should be able to see where they are coming from (or be willing to do so), and thus support a fair and rational communication, laying the groundwork for a positive and productive working process.

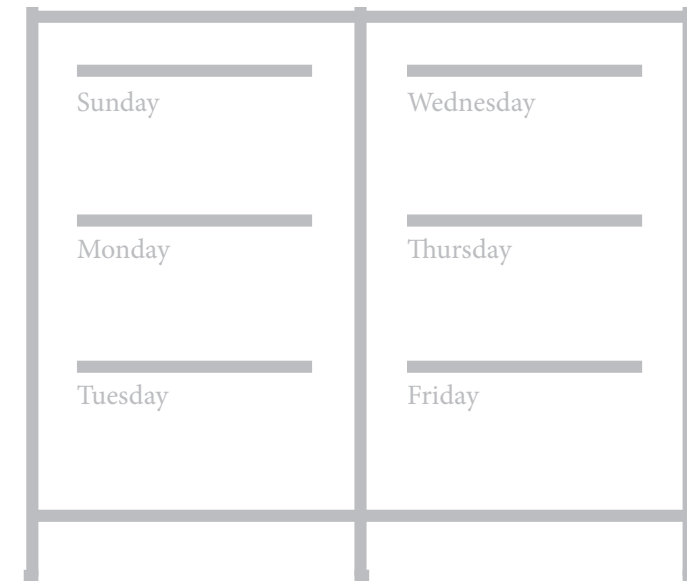
THE THREE LAYERS / we structure the topic 'Energy' along three interconnected layers, to foster disruptive thinking for all participants involved. **THE THREE LAYER CONCEPT** (as described in the Sunday Workbook) will enable us to get a holistic understanding of the topic as well as comprehend the interdependencies between the different layers. With this transdisciplinary approach, we aim to allow key challenges and opportunities to be identified thereby empowering us, as a community of responsible citizens, to proactively shape the future of our energy system.

× NOTE

This slot repeats every day. Walk to your process wall before Kick-off, where you will meet your tutor. Please be on time every day!

monday
8.30

ETH WEEK TENT



Process walls

◆ OVERVIEW INPUT

On Monday, we will start with a comprehensive overview of this year's topic. Christian Schaffner will elaborate on the structure of the three layer concept and provides you with the basis for the week.

ENERGY MATTERS

The energy and climate policies in Europe and worldwide call for a major transformation of the existing energy system. The main goal is the reduction of CO₂ emissions while maintaining a secure and affordable supply. The main factors influencing the carbon emissions of the energy systems are:

- The carbon intensity of the energy used.
- The energy needed to create value.
- The economic growth.
- The development of the population.

Since the CO₂ emissions have to decline over time to meet climate goals while the two last factors will continue to grow, the first two factors have to change dramatically. In other words, we have to use more renewable energy instead of fossil energy and/or become more efficient. Achieving this goal in an existing system where huge investments have been made over the last decades in the areas of energy supply, conversion, distribution and use is challenging.

This talk will introduce these challenges along the lines of

THE THREE LAYER CONCEPT:

- INDIVIDUAL AND THE VALUE SYSTEM
- THE TECHNOLOGICAL SYSTEM
- THE SOCIO-ECONOMIC CONCEPT

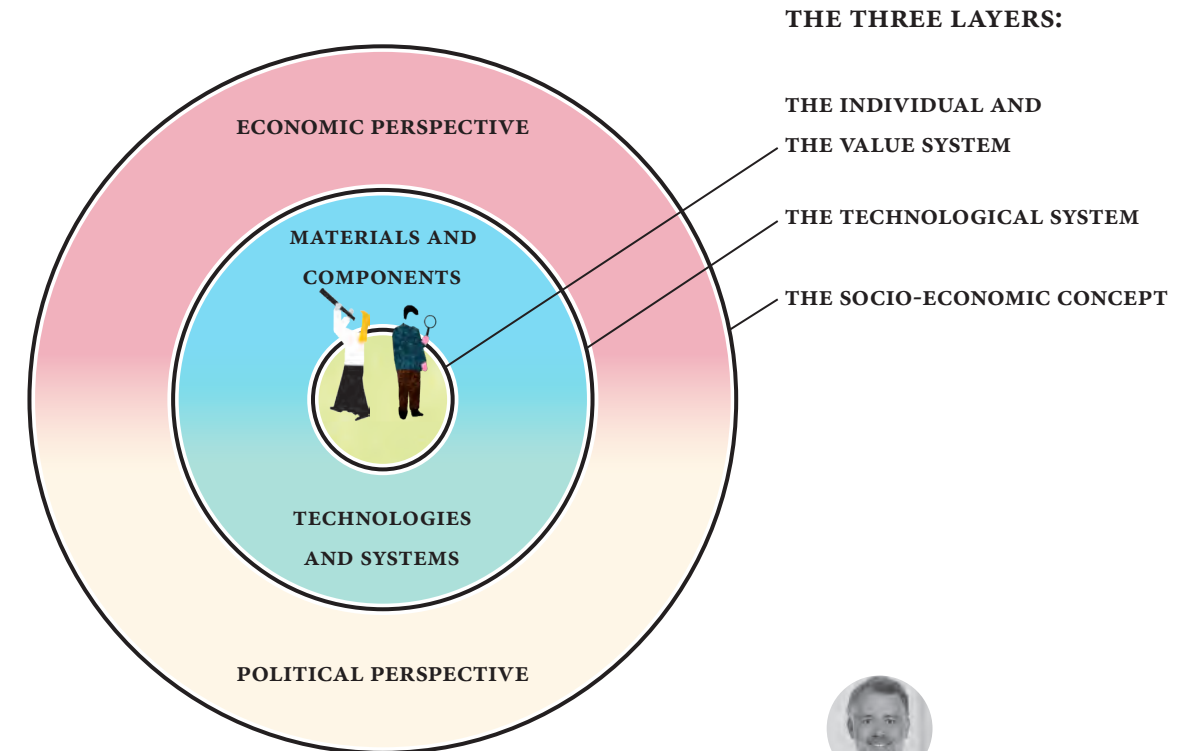
It will describe the current system as well as possible changes for the future, looking at natural resources, energy conversion systems and processes, networks and storage systems, energy applications and waste and pollution issues.

× HEADS UP

Please make sure to pick up your lunch bag opposite the Info Desk before heading to the meeting point for the excursions. Please only take the vegan option if you specified so during registration. All buses leave at 10:15 in front of ETH Week Hall.

monday
9.00

ETH WEEK HALL



CHRISTIAN SCHAFFNER is the Executive Director of the Energy Science Center (ESC) of ETH Zürich. The ESC is an interdisciplinary competence centre to promote energy research and teaching at ETH Zürich. He has previously worked with the Swiss Federal Office of Energy. He received his PhD degree in Electric Power Systems from ETH Zürich in 2004.

↘ Field trips!

During ETH Week, the problems you will try to solve are most probably not your own. They are also set in a real-world situation. You will define a problem within a complex system of actors and an existing environment of ideas and mindsets.

Today, you will join students from other teams to go on a field trip. This is a chance to link the overview talk of this morning to a specific context. Keep an open and critical mind and pick another student so that you can work in pairs.

On the field trips, we ask you to engage with real-world partners by formulating your own questions, from the electricians who work on site to the CEOs who take high-level decisions. We want you to put yourself into their shoes and understand what is important to them, the way they think, and the values they hold. A deep understanding of people will help you find better problems to solve. This is called empathy, and it will give you a fresh perspective on the world around you. Without empathy, your mind will automatically filter out information without you realising it.

On your way back, you will translate your experience into a story that others can relate to.

× HEADS UP

You might want to contact these experts on Wednesday to get feedback on your ideas. Ask for their business card and if they have 15 min on Wednesday afternoon for a brief telephone call (between 13:00 and 16:00).

monday
10.15
DEPARTURE FROM
ETH WEEK HALL

Build rapport.

Shift the focus to the actor and offer something of yourself.

Seek stories.

Learn about what he or she does, and more importantly thinks and feels.

Ask why?

What opinion made them take a decision, why it is it important to them?

HOW TO INTERVIEW

You will start by directly observing what people say and do, what challenge they are trying to solve, and how are they solving it. Then you will move on to infer what they think and feel. We offer a simple scaffolding as guidance: what? how? why?

It is a tool that helps you advance to deeper levels of observation, moving from the concrete and obvious to the more complex and inferred. Start by documenting the facts and descriptions and ask: 'what?' 'how?' Then move on to the inferences. Ask 'why?'. You will need to evaluate the answers and use your own judgement. We want you to become comfortable with taking your own decisions. Be critical and put things into relation with the bigger picture discussed during the first talk in the morning.

Some tips on interviewing:

- When interviewing people, don't suggest answers to your questions. Even if they pause before answering, don't help them by suggesting an answer. This can inadvertently get people to say things that agree with your expectations. Ask questions neutrally.
- Don't be afraid of silence. Often, if you allow there to be silence, a person will reflect on what they've just said and say something deeper.
- Look for inconsistencies. Sometimes, there will be discrepancies between what people say and what they do (or say later). Probe these contradictions, but do so gracefully.
- Stay on the same path of a question. Respond to what your interviewee offers and follow up to go deeper. Use simple queries to get him to say more. Ask 'why?'.

× NOTE

Use this scaffolding to move beyond facts and observations to inferences and interpretations.

what

is the expert trying to solve?
the facts

how

are they solving it?
the emotions and the techniques

why

are they doing it in this way?
your inferences

**CEMENT PLANT SIGGENTHAL, HOLCIM (SCHWEIZ) AG,
WÜRENLINGEN**

Cement plants - large energy consumers

The plant in Siggenthal operates since 1912 and is one of the largest cement plants in Switzerland. The plant produces more than 900,000 tonnes of cement annually and employs 118 people. The limestone and marl is supplied by the quarry Gabenchopf closeby.

In 1955 and 1970 the plant was expanded. Siggenthal produces specialised cements for demanding applications, for example the Gotthard tunnel or the Roche Towers in Basel. The plant regularly supplies large infrastructure construction projects such as currently the Eppenbergtunnel.



MICHAEL SUTER has more than 20 years of experience in cement production. He collected process and managerial skills in projects and long-term assignments worldwide. Since 2017 he is plant manager in Siggenthal and holds an Engineering Diploma in Process Technology from ETH Zürich.



CLEMENS WÖGERBAUER joined Holcim in 2001 in the corporate function of Commercial Services as a consultant for commercial strategy projects (vertical integration, channel management, commercial tools). In 2005 he joined the sustainable development division being responsible for corporate projects in AFR (alternative fuels and raw materials). He took over the operational responsibility for Geocycle in the region Central Europe which now is converted to Switzerland & Italy. He studied Chemical Engineering holding a Master's degree from the Vienna University of Technology and a PhD from ETH Zürich.

NUCLEAR POWER PLANT BEZNAU & AXPORAMA, BÖTTSTEIN

Nuclear energy - how to keep it safe?

Axpo Group reliably produces, trades and sells energy for over 3 million people and thousands of companies in Switzerland and over 30 European countries. About 4,200 employees combine the expertise from 100 years of climate-friendly electricity production with innovative power for a sustainable energy future.

Additionally, students will visit the Axporama visitor centre in Böttstein to find out more about the topic in the exhibition "Living with Energy", which offers a wealth of interesting information and entertainment.

It is very important to not forget to bring your passport/national ID to this excursion!

Two of Axpo's English speaking tour guides and an expert from the nuclear power plant in Beznau will accompany the excursion.

KEZO & CLIMEWORKS, HINWIL

Carbondioxide removal strategies and innovative waste management

KEZO (Kehrichtverwertung Zürich Oberland) is a waste-to-energy plant with a high focus on urban mining. Through the combustion of municipal and industrial waste we produce around 500,000 MWh of thermal energy in a year. It is used for the production of electric power, district heat and to heat up two adjacent greenhouses. Our main goal and an important contribution to an efficient resource management is the highest possible efficiency of metal recovery. In 2017, we recovered around 15,000 tons of valuable materials out of 100,000 tons of bottom ash (coming from 5 different plants) – metals until the small size of 0.3 mm.

Climeworks captures CO₂ from ambient air with the world's first commercial carbon dioxide removal technology. Direct air capture plants like the one installed at KEZO capture CO₂ with a filter, using mainly low-grade heat as energy source. They are modular, scalable and can be mass-produced, enabling deployment on a large scale. The pure CO₂ gas is sold to customers in key markets, including commercial agriculture, food and beverage industries, the energy sector and the automotive industry. Customers utilize this atmospheric CO₂ in carbonated drinks or to produce carbon-neutral hydrocarbon fuels and materials.



BETTINA HÄUSELMANN has a Master's degree in Environmental Science from ETH Zürich and is Head of the KEZO Information Centre. She has more than 20 years experience in waste and resource management.



ANNA AHN is currently working in the marketing and sales department of Climeworks, and mainly supporting communication processes. She is a HSG graduate, with a Bachelor's degree in Business Administration, and currently completing her Master's degree in International Affairs and Governance.



DANIEL BÖNI has a Master's degree from ETH Zürich in Mechanical Engineering and is Managing Director of the incineration plant KEZO Hinwil. At the same time he is Managing Director of the foundation ZAR (Development center of sustainable management of recyclable waste and resources). Together with his ZAR team he developed the Thermal Recycling process (ThermoRe) which represents a world-wide unique bottom ash treatment.

HEPP HIGH EFFICIENCY POWER-TO-METHANE PILOT, HSG

RAPPERSWIL

Research on energy storage in gas

The section Power-to-Gas at IET Institute for Energy Technology (HSR Hochschule für Technik Rapperswil) leads national and international Power-to-Gas projects and thus contributes to climate protection and sustainable energy supply.

The core competence at the Institute is Power-to-Methane technology. This technology converts renewable electricity, water (H₂O) and carbon dioxide (CO₂) into water (H₂O) and synthetic methane (CH₄), which can be stored in the existing natural gas grid. The renewable methane can be used in conventional technologies for heat generation and mobility.



JUSTIN LYDEMENT graduated with a Bachelor's degree in Renewable Energies and Environmental Engineering at HSR Rapperswil. He specialised in Process Engineering and brings his capabilities into the Power-to-Gas team. He is primarily involved in the research projects Pentagon and HEPP and would like to use his expertise in energy technology to make sure that the ecological footprint in mobility is being



CHRISTOPH STEINER is a degreed electronic technician and owns a Bachelor's degree in Renewable Energies and Environmental Engineering at HSR Rapperswil. His knowledge is incorporated in the research project HEPP to construct the high-efficiency-power-to-methane plant. He wants to contribute to store the surplus of new renewable energies with power-to-gas technology, and thus support the transition of the energy supply system.

HYDROELECTRIC POWER PLANT LAUFENBURG

Hydropower and its role in the future energy system

The Energiedienst Group is a regional German-Swiss corporation with an ecological approach. This energy producer generates green hydroelectric power and distributes both electricity and gas. Its subsidiary utilities supply power to customers. Energiedienst is also seeing growth in new business areas created by the decentralised renewable and digital energy systems of the future. The group offers smart connected products and services such as photovoltaic arrays, heat pumps, power storage systems and electromobility as well as e-car sharing that allow customers to undertake their own energy transition.



MARCEL HERZOG is a member of the mechanics team at Energiedienst Laufenburg. After four years of training at an engineering company, he graduated with a Federal Diploma in Mechanics. He has worked in many countries worldwide as a service technician. Since 2010, he has been working for Energiedienst at the Laufenburg power plant, where he is responsible for operations and maintenance.

PUMPED-STORAGE POWER PLANT ETZELWERK, ALTENDORF

Efficient and reliable storage of electric energy

From 1932 to 1937, Etzelwerk AG built the pumped-storage power plant Etzelwerk for joint use by the SBB rail company and Nordostschweizerische Kraftwerke (NOK). Since 1987, Etzelwerk AG has been a full subsidiary of SBB. The complex consists of the Sihlsee, an artificial reservoir in the high valley of the Sihl river northeast of Einsiedeln, the pressure tunnel and line as well as the control centre at Altendorf on the upper end of Lake Zurich.

This excursion will be held in German.

An expert from the pumped-storage power plant in Altendorf will accompany the excursion.

ANERGY GRID ETH HÖNGGERBERG, ZURICH

Save fossil fuels by moving heat between the seasons

At its campus Hönggerberg, ETH Zürich has been implementing a low energy cooling and heating system. This system gradually replaces the conventional district heating and cooling system, which traditionally supplies the buildings. A key feature are seasonal storage systems, consisting of hundreds of borehole heat exchangers. They allow to seasonally shift waste heat originating from cooling the various buildings and processes on campus. By managing the differing demands, the consumption of electricity and fossil fuels can be drastically reduced. It is estimated that greenhouse gas emissions originating from heating and cooling can be reduced by 60% until 2030 (compared to 2006), whilst increasing the gross floor area by 40%.



PETER GRAF is Head of the Energie Production and Distribution System for the Campus ETH Hönggerberg. It includes the production of steam, heating and cooling systems, the distribution of gas and the production of demineralised water. He is also responsible for the Anergy grid. He has experience in commissioning of electric power plants and water treatments. He works with ETH Zürich since 2010.



MARC HÄUSERMANN is Division Manager and member of the management board at Amstein + Walthert and responsible for grid projects in industrial and residential contexts. The trained mechanical engineer can draw on many years of experience in building technology, especially with heat pumps. He has been with Amstein + Walthert for 7 years and supervises various energy networks such as the ETH Hönggerberg Anergy grid.

HUNZIKER AREAL, MEHR ALS WOHNEN, ZURICH

Residential living in the future - use and produce energy

'Baugenossenschaft mehr als wohnen' is committed to sustainable development in accordance with the goals of the 2000 Watt society. Heating is provided by the warm exhaust air from the neighboring data center of the city of Zurich. Two heat pumps supply the different temperature levels for heating and hot water via district heating networks. Photovoltaic systems on all roofs produce electricity. For the first time in Zurich, 'more than housing' implemented an internal consumption regulation for tenants with the local energy provider ewz. We are an innovation and learning platform for non-profit housing construction, which is why it is important to learn from experience and to pass on impulses to the entire industry. This is how the city of the future is created.



UELI KELLER is Member of the board of the cooperative 'mehr als wohnen' since its beginning 2007. He studied Architecture at the ETH Zürich and is running his own architecture office. In the field of not-for-profit-housing he is also engaged as a President of the foundation for low-cost residential and commercial premises of the city of Zurich (PWG) and as a member of the board of the umbrella organisation Swiss Housing Cooperatives (WBG Schweiz).

ABB HIGH VOLTAGE LAB, ZURICH

Testing for safety in high voltage systems

ABB is a pioneering technology leader in power grids, electrification products, industrial automation and robotics and motion, serving customers in utilities, industry and transport & infrastructure globally.

As accredited laboratories for high-voltage products, we provide the necessary infrastructure to carry out development and type tests competently. In our combination of the 5 laboratories high voltage, high current, high power, mechanics and climate, we cover the complete test spectrum for high voltage products.

We support our customers with a modern prototype workshop and provide our experienced, highly qualified staff for use in Switzerland and abroad.



JUDITH KESSLER is Senior Engineer at ABB Switzerland Ltd. in Baden. She studied at TU München and holds a Dr.-Ing. degree in Electrical Engineering. She started her career in ABB at Corporate Research. Later on she changed to the laboratories, today as expert in testing issues, representing the laboratory in the PEHLA technical committee.

× ÖV

MASOALA HALLE, ZOO ZURICH

Tropical conditions in Swiss winter - how to do it efficiently?

The Masoala Rainforest is tempered with a sophisticated system which keeps energy consumption levels low. 50 geothermal probes, each 250 meters deep, generate the majority of the required heat through a heat pump. Additional heat, also CO₂-neutral, is supplied by a central woodchip heating system when required. Two cisterns with a capacity of 500 cubic meters each collect rain water for irrigation. The Masoala Rainforest requires up to 140,000 liters of water per day in summer and only 40,000 liters per week in winter. You will tour the impressive Masoala Hall and visit the technology behind the scenes that makes this ecosystem possible.

This excursion will be held partly in German.

× ÖV

ADAPTRICITY, ZURICH

Smart grids need intelligent software

Adaptricity is an ETH Zürich spin-off company that, founded in 2014 at the ETH Power Systems Lab, develops highly innovative software that enable grid operators to automate repetitive tasks. These tasks include connection requests, the performance of in-depth time-series based analyses of grid behavior across all voltage levels and the evaluation of effects of demand response, renewable energy production and electric vehicles. These insights into the electric grid infrastructure enable more cost-efficiency in grid operation and planning.

LEONI, Europe's leading manufacturer of cables and cable systems, became the majority shareholder of Adaptricity in early 2017.

× ÖV

This excursion will be accompanied by an English speaking tour guide and a German speaking technician.



ANDREAS ULBIG is a co-founder and COO of Adaptricity. He obtained a PhD from ETH Zürich. He is a part-time lecturer for electric power systems at ETH Zürich and vice president of the Swiss Energy Foundation. Previous work positions include the French transmission grid operator RTE and the International Energy Agency (IEA).

↘ Unpack.

After the field trip, you will go back to your team and share your new knowledge with the others. To make it easier, you have prepared a story on four post-it notes. This is a simple way to condense a vast amount of information into a standardised sentence. Use the template for the story on the opposite page.

The story you bring back will help you externalise data and structure the conversation. Think of it as a hook to the experiences you have made. During the discussion, your teammates will use it as a starting point to dig deeper, probing your assertion. Stories can uncover knowledge, reinforce discussions, and stimulate creative thoughts, actions, and alternatives. Unpack and identify tensions, contradictions, and surprises.

× NOTE

Make sure to use the following color coding: Someone (yellow), wanted (green), but (pink), so (orange).

Someone ... (a person, a group)

wanted ... (sought, desired, had a goal)

but ... (complications, obstacle, conflict)

SO ... (climax, outcome, learning, resolution)

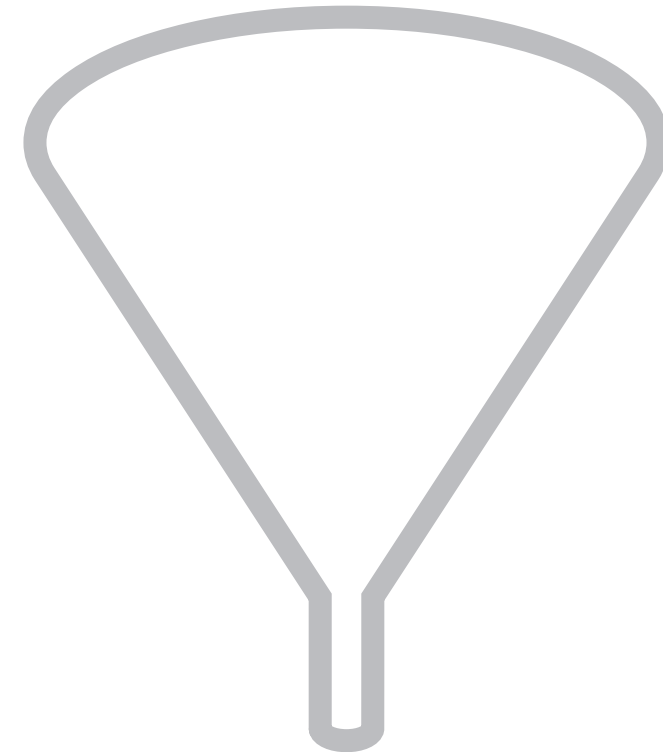
↘ Draw stories.

Learning how to take decisions together will be crucial in order to become a well-functioning team during the week. Only by creating room for exchange, you will be able to build on the thoughts of others. This will also help you to bring different ideas, opinions, and values together. Time pressure actually helps you in this process: it keeps you away from postponing important decisions.

Consider this slot a dry-run for the more important decisions that will need to be taken later in the week. Become comfortable with this work mode and learn how to establish a team culture that works for you. It needs to enable you to take decisions efficiently, representing the opinions of the team. Find out what rules could help you to stay focused and move ahead one decision at a time.

× HEADS UP

Sign up before 20.00 at the Info Desk for tomorrow's Zumba class, or the morning run.



↘ Template.

Despite the fact that all teams have mostly visited the same excursions, we are almost certain that the results of your discussions in the afternoon will be very different from one team to the next. To visualise this, we ask you to draw three comics, representing the three most significant stories from the excursions onto the Monday template.

◆ CRITICAL THINKING NIGHT

The aim of the Critical Thinking Night is to provide you with historical insights. We also want you to reflect critically on the role of society when it comes to energy-related decisions.

LESSONS FROM ENERGY TRANSITIONS: PAST AND FUTURE

The presentation first provides a synthesis of our understanding of the main patterns and drivers of historical energy transitions, highlighting in particular the critical importance of end-use and novel energy services, technological innovation, as well as efficiency and granularity. We will also see that the widely held view that major transitions take place over periods of multiple decades up to a century is, inter alia, the result of a measurement bias in the energy transition literature that focuses on changes to resource inputs (which are slow) rather than energy outputs (useful energy or energy services, which can be rapid). Novel concepts of applying exergy analysis to energy service levels are also presented and examined in terms of their impact on the efficiency and speed of transitions.

Based on a summary of factors driving slow versus fast transitions, our discussion will move from a historical perspective to the future outlook. We will showcase recent work on a rapid transition scenario that meets an ambitious 1.5 climate target without negative emissions technologies and within an overall framing provided by the Sustainable Development Goals (SDGs) and discuss its implications for knowledge and innovation strategies.

Why?



ARNULF GRÜBLER is Acting Program Director of the Transitions to New Technologies Program at the International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria. From 2002 to 2017, he also served as Professor in the Field of Energy and Technology at the School of Management at Yale University, New Haven, USA. His teaching and research focuses on the long-term history and future of technology and the environment with emphasis on energy, transport and communication systems.



Tomorrow will be about framing the problem.



On Tuesday, we will introduce the three layers to create some structure that is supposed to help you think about energy along additional dimensions. You will get to meet 25 experts so that you can start defining the problem you will be working on for the rest of the week. Learn to take decisions quickly and act as a team.

7.05 — Zumba class and morning run at the HPS Sports Centre.

8.30 — Arrive at Process Walls.

↘ **Check in.**

8.50 — Kick-off at ETH Week Hall.

9.00 ◆ **INPUT TALKS**
Introduction to the three layers.

11.05 ◆ **REFLECTION & DISCUSSION**
Students reflect and discuss with four researchers.

11.45 — Lunch break.

↘ **Prepare for knowledge fair.**

13.30 ◆ **KNOWLEDGE FAIR**
30 representatives from industry, research, and society.

↘ **Unpack.**

↘ **Problem statement 1.0.**

↘ **Template.**

↘ **Check out.**

18.45 — Dinner

◆ INPUT TALKS

Arno Schlueter will present the first lecture on THE TECHNOLOGICAL SYSTEM.

MATERIALS AND COMPONENTS

Materials and their functional capacities are essential in any energy-related processes, from energy conversion to distribution, storage and efficient utilization. Primarily driven by advances in materials science, entirely new processes are created, which are then combined to form new components and systems.

In many fields, we are witnessing a transition from machines to materials, from mechanical to physical and chemical processes. The utilisation of solar energy, for example, is driven both by developments in semiconductor materials for converting sunlight into electricity and by improving storage capacities in batteries to make up for the stochastic availability of solar energy. Coatings added to the protective glass layers allow for more flexibility regarding the visual appearance of photovoltaic modules, which helps to increase the societal acceptance of their application in the built environment.

Our dependence on materials also poses challenges. For innovations and applications to be scalable, materials must be available in sufficient quantities. We need to be able to mine, produce, and utilise them with reasonable amounts of energy, capital, while minimising the risk to human health and the environment.

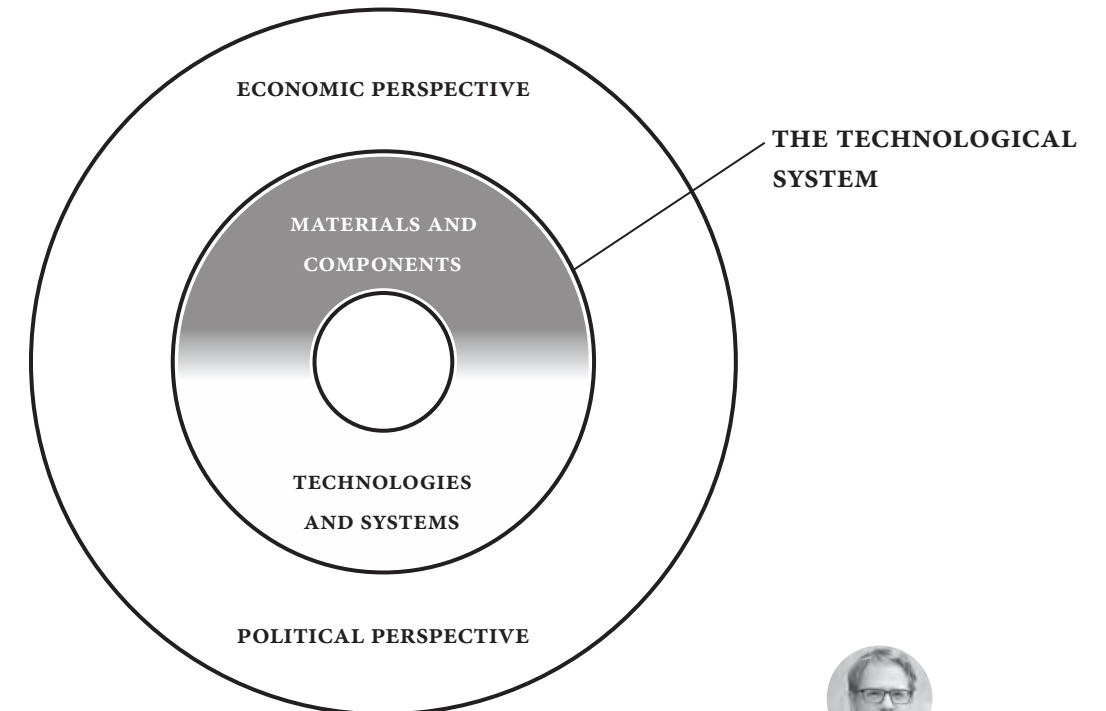
New and emerging digital manufacturing processes further stress the importance of materials. Future components will be fabricated using functional materials to achieve the desired characteristics and performance. Moreover, they can most likely be manufactured at the price of current standard components, opening up opportunities for entirely new applications, products and business models.

× HEADS UP

You will meet researchers from the four chairs later today and on Thursday during the feedback round.

tuesday
9.00

ETH WEEK HALL



ARNO SCHLUETER is Professor of Architecture and Building Systems at the Institute of Technology in Architecture at ETH Zürich. He is also a Principal Investigator at the Singapore-ETH Future Cities Lab (FCL). In his research, he and his interdisciplinary team focus on sustainable building systems, new adaptive components and their synergetic integration into architecture and urban design using computational approaches for modelling, analysis, and control.

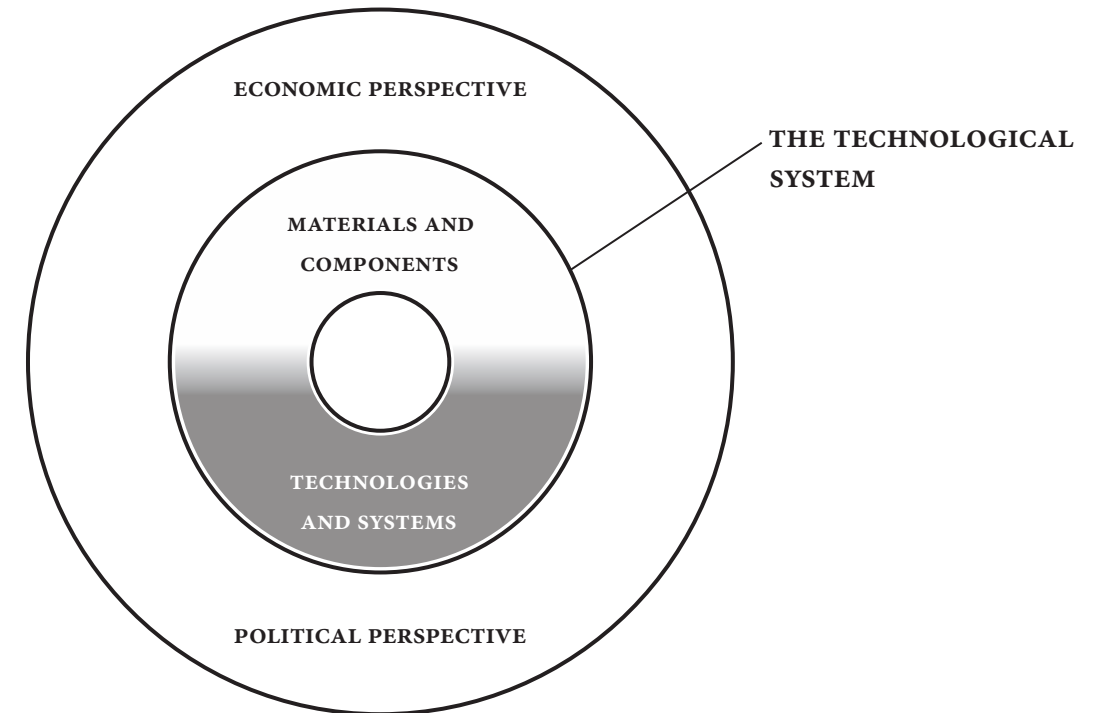
After learning about MATERIALS AND COMPONENTS, you are now going to get an overview on how to use these in order to build the systems and technologies fulfilling the needs of society.

TECHNOLOGIES AND SYSTEMS

The electric power system is the largest man-made system and it has continuously evolved over the past 140 years. The recent push towards a more sustainable energy system and the capabilities provided by information and communication technologies have brought significant changes and challenges but also opportunities to the traditional power grid.

The increasing levels of renewable generation from wind and solar power plants raise the question of how to balance the variability and uncertainty in their power outputs. Storage devices and flexible consumers, aside from traditional power plants such as hydropower, are capable of providing flexibility and therefore are viewed as enablers of a sustainable energy future. Nevertheless, the coordination of millions of such resources located in the low voltage system that traditionally has been rather passive brings new challenges to grid operation and planning. However, increased computational powers, ubiquitous communication and the spreading of sensing technology allow embedding intelligence anywhere in the grid, therefore enabling distributed and decentralized coordination approaches.

The layer TECHNOLOGIES AND SYSTEMS will focus on outlining the expected changes and the arising challenges but also give insights into how such challenges can be tackled in operating and planning by taking advantage of available real-time data, a multitude of flexible resources and newly devised coordination approaches.



GABRIELA HUG is Associate Professor of Electric Power Systems at the Power Systems Laboratory at ETH Zürich. Her main research focuses on the control and optimisation of electric power systems with the objective to integrate renewable generation. She examines how decentralised control systems can support a smarter grid.

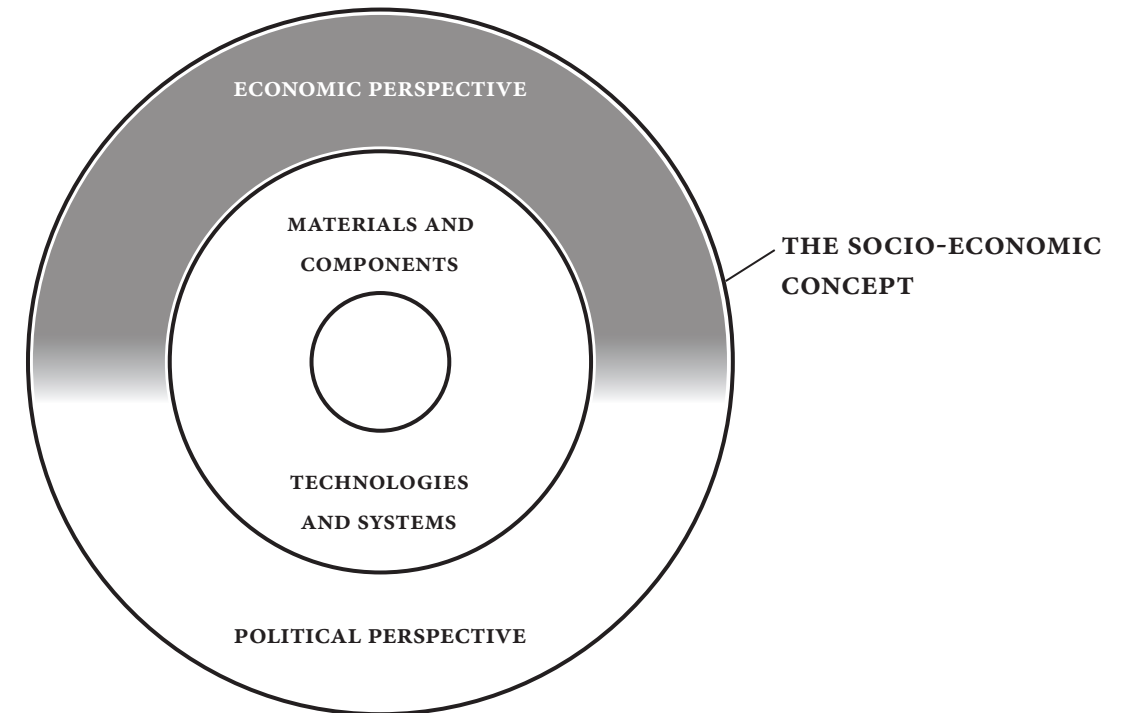
Next, we will turn from THE TECHNOLOGICAL SYSTEM to THE SOCIO-ECONOMIC CONCEPT to take into account the perspectives of economic and political actors.

ECONOMIC PERSPECTIVE

A network of economic agents is working seamlessly around the clock to ensure that we can switch on our light and heating anytime at an affordable price. This system is undergoing profound transformations to make energy provision, transport and consumption more sustainable. In this section, we will analyse how economic agents bring about technological change as well as barriers and obstacles to the energy transition.

In recent decades, the energy transition has sped up. Technological change has enabled a rapid growth of renewable energy technologies, has moderated energy demand by making devices more efficient, and has informed and empowered consumers through digitalisation. As a result, energy markets have become more competitive, and what was previously a slow-moving industry is now driven by constant innovation. However, the energy transition is far from complete. Incumbent firms such as electric utilities struggle to explore new business models while exploiting their current assets, new entrants face bottlenecks that endanger progress and require extensive collaborations, and all actors are faced with increasing complexity as multiple individual and combined technologies need to be integrated into the energy system.

The decisions of managers, entrepreneurs, policymakers and consumers will shape the future energy system. Managers need to adapt their organisations and choose new technologies to invest in. Entrepreneurs should hone new business models to introduce innovative solutions into the market. Policymakers have to align the interests of industry and consumers and set the direction of the transition. Ultimately, the configuration of the energy system and its economic mechanisms will go a long way towards determining whether we succeed in mitigating climate change.



VOLKER HOFFMANN is Professor for Sustainability and Technology and at the Department of Management, Technology, and Economics of ETH Zürich. His research centres on corporate strategies with respect to climate change, with a focus on climate policy, energy policy, and innovation.

After the presentation about the **ECONOMIC PERSPECTIVE**, we switch to the **POLITICAL PERSPECTIVE**. Tobias Schmidt will share insights from his research about energy policy and its underlying politics.

POLITICAL PERSPECTIVE

The energy sector is not only one of the most important but also one of the most regulated parts of our economy. As access to modern forms of energy (such as electricity) is a fundamental prerequisite of economic activity, energy policy aims to secure the supply of energy. At the same time, it aims to limit energy cost and reduce the environmental burden of the sector.

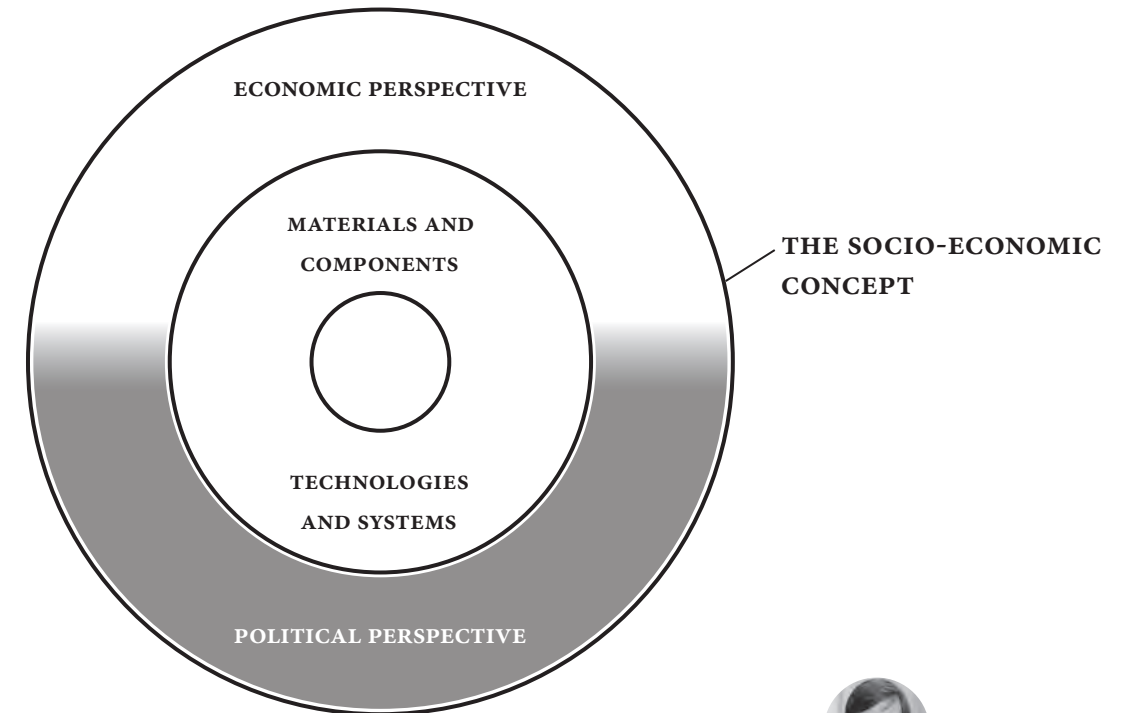
Policy plays an even more important role in times of technological transitions, given the many market, coordination and system failures involved in technological transitions. Supporting technological transitions requires shifts in current policies, which involves politics – a messy process characterized by information and power asymmetries, short-term thinking, and trade-offs. As a result, policy is often not as stringent as would be required in order to achieve societal targets, such as mitigating climate change.

At the same time, the link between policy and technological change is not unidirectional. Technology is a key driver of the economy and the economy, in turn, is highly important for policy decisions. Consequently, technological innovation can alter political dynamics. Engineers, designing new technologies, can therefore have an indirect effect on policy change.

The **POLITICAL PERSPECTIVE** will discuss the importance of different policy interventions and how technology and innovation can be a barrier or driver of politics and policy.

× HEADS UP

After the presentations we will have a short panel where scientists from each research group will interact with the professors on stage. Then you will divide into groups to reflect and discuss.



TOBIAS SCHMIDT is Assistant Professor of Energy Politics and head of the Energy Policy Group at ETH Zürich. In his research, he analyses the interaction of energy policy and its underlying politics with technological change in the energy sector. His policies support a change towards low carbon technologies and governance for transition analysis including carbon finance. His research covers both developed and developing countries.

THE RESEARCHERS

THE CHAIR OF ARCHITECTURE AND BUILDING SYSTEMS, ETH ZÜRICH

Efficient building systems with high-quality architectural and urban design

The Chair of Architecture and Building Systems (A/S) researches on active and passive systems for the energy supply and climate control of buildings. Our projects range from components to neighborhoods, from design to operation. The motivation and aim of our research is to realize a CO₂ neutral built environment that efficiently consumes and produces energy while providing high user comfort.



ILLIAS HISCHIER is senior researcher at the Chair of Architecture and Building Systems. He holds a PhD in Mechanical Engineering and worked as a postdoctoral researcher in the USA and in industry. Illias' expertise is applying energy conversion processes in the field of solar engineering and buildings.

THE POWER SYSTEMS LABORATORY, ETH ZÜRICH

Design, control and analysis of electric energy systems

The Power Systems Laboratory (PSL) is part of the Energy Transmission and High Voltage Laboratory of the Department of Information Technology and Electrical Engineering of ETH Zürich. The scientific field of the PSL comprises analysis and design of electric and integrated energy systems including their planning, design and operation. Its research focuses on developing methods of design, control and analysis based on system theory tools from e.g. control theory, optimization, operations research, that can be used in the industry.



NADEZHDA DAVYDOVA has a Master degree in Electrical Engineering. She is currently a doctoral student at Power Systems Laboratory at ETH Zürich. She is interested in developing algorithms that enhance security of modern power systems.

GROUP FOR SUSTAINABILITY AND TECHNOLOGY (SUSTEC), ETH ZÜRICH

Change to steer economic development onto a low-carbon pathway

SusTec's research investigates organisational, technological and institutional change in the energy sector from two complementary perspectives. The first focuses on the system level to analyse the role of institutions, such as public policy, for innovation and diffusion of low-carbon technologies. The second focuses on the firm level to explore corporate strategies and organisational change for supplying clean and reliable energy. Sus.Lab – the Sustainability in business lab – brings SusTec's research into practice through collaborations with practitioners.



ALEJANDRO NUÑEZ-JIMENEZ is a PhD Student and Research Associate at the Group for Sustainability and Technology in ETH Zürich. His research focuses on how to design energy policies that work effectively and cost-efficiently in the presence of rapid technological change such as in solar photovoltaics.

ENERGY POLITICS GROUP, ETH ZÜRICH

Public policy and politics with technological change in the energy sector

ETH's Energy Politics group analyses questions related to the governance of technological change in the energy sector. The research area "Finance and technological change" addresses the crucial role of the financial sector in the deployment of new technologies, and how public policy can enable low-carbon investments. The research takes a global perspective and includes both developed and developing countries.



BJARNE STEFFEN is a senior researcher with the Energy Politics Group at ETH Zürich. His research informs energy and innovation policy with a focus on renewables and storage. Formerly a Principal with the Boston Consulting Group, he is particularly interested in the role of investors and banks in financing innovative technologies.

◆ **REFLECTION & DISCUSSION**

After hearing the input talks by the four professors you will have the opportunity to reflect on their input and discuss what you have heard with the professors and their researchers in eight groups. Feel free to challenge them and raise any questions you may have.

DEEPEN YOUR KNOWLEDGE AND DISCUSS WITH SCIENTISTS

After the input talk, go directly to the space where your discussion will take place (in the morning, you should have received a note indicating a dedicated space and a professor/researcher).

The procedure is as follows:

REFLECTION ROUND

Think about the input talks, prepare questions for the upcoming discussion and write them down on post-its. Please keep in mind that you should only ask questions about the input talk that the professor/researcher is representing).

You might think about this when formulating your questions:

- What did you learn from the lecture? What surprised you?
- Can you connect some aspects of the presentation to an insight from yesterday's excursions?
- Was something missing that you would like to follow up on?

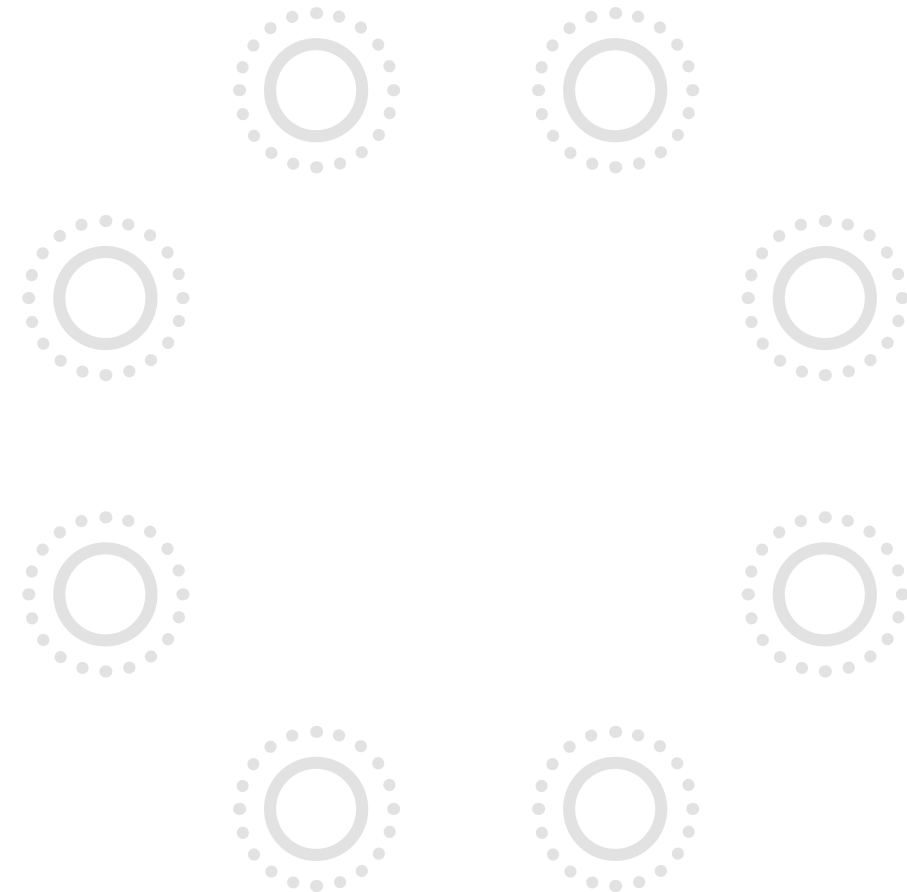
DISCUSSION ROUND

Help your professor/researcher in clustering your post-its and start interacting with them.

× **HEADS UP**

You will meet these and other researchers of these chairs on Thursday during the feedback round.

For tips regarding interview methods, please have a look in the Monday workbook (field trips section).



↘ Prepare for knowledge fair.

Between the input you received this morning and the knowledge fair this afternoon, you will get the chance to reflect and build on the information gathered so far. We want you to identify links between the key topics and the actors you will get to meet at the knowledge fair.

The knowledge fair is organised into 5 sectors. Each sector includes 5 different expert booths. You will again work in pairs, each pair in your team covering a different sector. The knowledge fair has four rounds of 15 minutes each. For every round, you will switch to a different expert, which means you will get to see 4 of the 5 experts of the chosen sector. You will not be able to predict whom you will get to meet exactly or in which order, as the fair follows a free-market approach within the sector. Therefore, prepare at least five questions per expert for the chosen sector, and do this for all experts. Also, in each round, students from different teams will be present in one booth. Use the 'what—how—why' questions on the opposite page, but try to be more specific. You will also find short abstracts, guiding questions, and portraits of the experts you will meet.

× NOTE

Use this scaffolding to move beyond facts and observations to inferences and interpretations. Also, refer back to the pages on the field trips.

tuesday
12.30

TEAM SPACES

what

is the expert trying to solve?
the facts

how

are they solving it?
the emotions and the techniques

why

are they doing it in this way?
your inferences

◆ **KNOWLEDGE FAIR**

Area 1

AVENIR SUISSE FOUNDATION

Developing Ideas for Switzerland's Future

Avenir Suisse is a free-market liberal think tank focused on Switzerland's future in political, economical and social areas. Its main goal is to stimulate the public debate and to provide new ideas through the publication of studies and the regular organisation of events and seminars. It is composed of a team of experts from many horizons and encourages a liberal vision of the world and the society.

SWISS SEISMOLOGICAL SERVICE, ETH ZÜRICH

The Federal Agency for Earthquakes

The Swiss Seismological Service (SED) at ETH Zürich is the federal agency responsible for monitoring earthquakes in Switzerland and its neighbouring countries and for assessing Switzerland's seismic hazard. When an earthquake happens, the SED informs the public, authorities, and the media about the earthquake's location, magnitude, and possible consequences.

EWZ, POWER STATION OF THE CITY OF ZURICH

Energy Service Provider

ewz is the leading company with pioneering energy and communications solutions. Its staff of 1,200 provides services such as ecological energy production, secure electricity supply for the city of Zurich and parts of Grisons, smart energy and telecommunications solutions for companies, the high speed fibre-optic network for the city of Zurich, as well as public lighting and public clocks.

× **HEADS UP**

You might want to contact these experts on Wednesday to get feedback on your ideas. Ask for their business card and if they have 15 min on Wednesday afternoon (between 13:00 and 16:00) for a brief telephone call.

What are the characteristics of a future energy system for Switzerland that supports the future sustainable development?

How does the risk of seismic activity affect energy production in Switzerland? What are the risks of geothermal energy?

What are possible scenarios for the energy supply of the biggest city in Switzerland in 2050?

tuesday
13.30
ETH WEEK TENT



PATRICK DÜMMLER is head of research "Open Switzerland" at Avenir Suisse. He is responsible for topics such as free trade, farming and energy. He holds a Master's degree in Economics of the University of Zurich and holds a PhD from ETH Zürich.



STEFAN WIEMER is head of the Swiss Seismological Service at ETH Zürich. He attained a diploma in geophysics from the Ruhr Universität Bochum and a PhD at the Fairbanks University in Alaska, and completed his postdoc studies in Tsukuba, Japan.



KATHRIN VOLKART studied Environmental and Energy Science and has completed her PhD studies in Energy Economics. She is now employed as Research Analyst at ewz and responsible for electricity price forecasts, regulatory topics, research collaborations and internal analyses and reporting.

◆ **KNOWLEDGE FAIR**

Area 1

IWB, INDUSTRIAL PLANTS BASEL

Renewable Energy and Energy Efficiency

IWB is the company for energy, water and telecommunications. On behalf of and owned by the canton of Basel-Stadt, as an independent company IWB ensures the supply of the population in the Basel region and beyond with electricity, heat energy, drinking water and telecom infrastructure. The company also is responsible for the construction, operation and maintenance of the networks and facilities. IWB is a leader as a service provider for renewable energy and energy efficiency.

SWISS ENERGY FOUNDATION (SES)

Sustainable Energy Policy

The Swiss Energy Foundation works for an ecological, equitable and sustainable energy policy. Their strategy promotes better energy efficiency and use of renewable energy resources other than fossil fuels or nuclear power. The SES shows ways how Switzerland can break free from its dependence on a fossil-nuclear energy supply. Based in Zurich, SES is entirely financed by private donations.

× **HEADS UP**

You might want to contact these experts on Wednesday to get feedback on your ideas. Ask for their business card and if they have 15 min on Wednesday afternoon (between 13:00 and 16:00) for a brief telephone call.

What are the influences of future developments in e.g. e-mobility on the electricity supply system of a city?



ADRIAN AMBORD studied Electrical Engineering, followed by an MBA at ETH Zürich. He has held various positions in the areas of rail vehicle technology and energy supply at ABB, SBB and Stadler Rail Switzerland. Currently, he is responsible for the Business Unit Engineering at iwB.

How could Switzerland move to a fossil- and nuclear-free energy supply?



FELIX NIPKOW is a project manager at the Swiss Energy Foundation since 2011, specialised on renewable energies and electricity markets. He studied geography at the University of Zürich.

**tuesday
13.30**

ETH WEEK TENT

◆ **KNOWLEDGE FAIR**

Area 2

AXPO HOLDING AG

Energy Production and Trading

The Axpo Group produces, trades and distributes energy reliably for over 3 million people and several thousand companies in Switzerland and in over 30 countries throughout Europe. Around 4300 employees combine the expertise from 100 years of climate-friendly power production with innovative strength for a sustainable energy future. Axpo is an international leader in energy trading and in the development of tailor-made energy solutions for its customers.

SWISS FEDERAL OFFICE OF ENERGY (SFOE)

Promoting Energy Research and New Markets

The SFOE is the competence centre for issues relating to energy supply and energy use at the federal administration. Amongst others it promotes and coordinates national energy research and supports the development of new markets towards a sustainable energy future. Targeted funds are deployed to foster the development of innovative technologies and concepts aligned with specific research programs.

× **HEADS UP**

You might want to contact these experts on Wednesday to get feedback on your ideas. Ask for their business card and if they have 15 min on Wednesday afternoon (between 13:00 and 16:00) for a brief telephone call.

How could energy trading look like in 2050? What role will hydro power play?

What is the role of future smart grids?

tuesday
13.30
ETH WEEK TENT



GAUDENZ KOEPEL is Head of Models & Optimization at Axpo Trading AG and responsible for various aspects of model-based commercialisation of hydro power plants. He holds a doctoral degree from ETH Zürich as well as an Exec. MBA from IMD Lausanne.



MICHAEL MOSER is a scientific advisor to the SFOE and is responsible for research coordination in the fields of electricity, hydro and nuclear power. He holds a Master's and doctoral degree in cosmic ray physics from the University of Bern.



MATTHIAS GYSLER is Chief Economist and Head of the Market Regulation Section, and responsible for energy market regulations for the electricity and gas markets, socio-economic energy research and economic analysis of energy policy topics at SFOE.

◆ **KNOWLEDGE FAIR**

Area 2

ENERGIE 360°

Sustainable Energy and Mobility Solutions

Energie 360° AG, headquartered in Zurich, is a Swiss company that offers natural gas and renewable energies such as biogas and wood pellets as well as energy and grid services nationwide. The company employs around 240 people and has a 1,300 km pipeline network.

RENEWABLE ENERGY POLICY GROUP, ETH ZÜRICH

Decarbonisation of the Electricity Sector with Renewables

The Renewable Energy Policy Group (REP) conducts interdisciplinary research about policy options, strategies and instruments for the complete decarbonisation of the electricity sector using only renewables. The REP Group's focus is on Europe and the immediately surrounding regions.

CITY OF ZÜRICH

Energy Master Plan Zurich

Since 2006 the City of Zurich has applied the 2000-Watt methodology as guideline for its energy policy. The concept has been developed at ETH Zürich in the 1990s and Zurich was the first city to implement it as an energy policy strategy and guideline. The 2000-Watt society aims for each resident to reduce primary energy by factor 2 and greenhouse gas emissions by factor 5.

× **HEADS UP**

You might want to contact these experts on Wednesday to get feedback on your ideas. Ask for their business card and if they have 15 min on Wednesday afternoon (between 13:00 and 16:00) for a brief telephone call.

What role will utilities of the future have? Will they still be suppliers? Or just service providers?

How could a 100% renewable energy system for Europe look like? Is this feasible?

What is the role of cities in future energy systems? What are the challenges?

**tuesday
13.30**

ETH WEEK TENT



ROMEO DEPLAZES is Head of Solutions and member of the Executive Board of Energie 360° and has 15 years of experience in the energy sector. He holds a PhD in Electrical Engineering from ETH Zürich and an MBA from the University of St. Gallen.



JOHAN LILLIESTAM is head of the Renewable Energy Policy Group at ETH Zürich, focusing on policies for a transition to a 100% renewable electricity system, in Europe and worldwide.



MARTINA BLUM is in charge of Zurich's Energy Master Plan and is the city's coordinator for the European Energy Award. She is an environmental engineer and holds a Master's degree in Ecological Economics from the University of Edinburgh.

◆ **KNOWLEDGE FAIR**

Area 3

ANDRITZ HYDRO

Hydraulic Power Generation

ANDRITZ Hydro is a global supplier of electromechanical systems and services for hydropower plants and with 175 years of experience, one of the leaders in the world market for hydraulic power generation. ANDRITZ Hydro is headquartered in Graz, Austria, and operates more than 250 sites in over 40 countries.

EMERALD TECHNOLOGY VENTURES

Connecting Capital with Industrial Innovation

Emerald Technology Ventures is a globally recognised investment firm in the areas of energy, water, advanced materials and industrial IT. Innovative SMEs, which are developing and marketing climate friendly technologies, can apply for a loan guarantee of up to CHF 3 million from the Technology Fund.

ENERGIE 360°

Sustainable Energy and Mobility Solutions

Energie 360° AG, headquartered in Zurich, is a Swiss company that offers natural gas and renewable energies such as biogas and wood pellets as well as energy and grid services nationwide. The company employs around 240 people and has a 1300-kilometer pipeline network.

× **HEADS UP**

You might want to contact these experts on Wednesday to get feedback on your ideas. Ask for their business card and if they have 15 min on Wednesday afternoon (between 13:00 and 16:00) for a brief telephone call.

Will hydro power still be competitive in the future? What needs to change?

What kind of innovations are needed to make the transition to a more sustainable energy system? How can funds help make this transition?

How can start-up companies be successful in the energy sector, being quite static?

**tuesday
13.30**

ETH WEEK TENT



MIRJAM SICK is Vice President for the R&D program and Innovation management at ANDRITZ Hydro. Her focus is digitalisation of products, services and internal processes. She holds a degree as mechanical engineer and PhD from the Technical University Karlsruhe.



MARTINA LOOSER is the credit specialist for the management agency of the Technology Fund. She is responsible for analysing and evaluating the applications for loan guarantees and submitting recommendations to the guarantee committee. She holds an MBA from University of Zurich.



METIN ZERMAN, Investment Manager Smart Energy Innovationsfunds at Energie 360°, is an MBA-Trained Engineer and expert in incubating innovative technologies. He has several years of experience as a consultant for Innovation and Business creation.

◆ **KNOWLEDGE FAIR**

Area 3

PHOTOVOLTAICS-LABORATORY (PVLAB), EPF LAUSANNE
Developing novel technologies for photovoltaic applications

The PV-Lab supports the transition to an energy system in which solar plays an essential role. The PV-Lab is developing the next generation of photovoltaic cells, modules and renewable energy system solutions. In close collaboration with the Swiss Center for Electronics and Microtechnology (CSEM) the PV-Lab brings high-tech solutions for photovoltaics and systems to industrial applications.

SINN POWER
Innovative wave energy conversion

SINN Power develops the renewable energy supply of the future. The company was established in Germany in 2014 and has quickly become a leader for worldwide innovation and technology in the field of wave energy conversion. SINN Power realises the ideal energy solution for coasts worldwide with individually customised hybrid systems, including wave energy, small-wind, solar PV and storage solutions.

EWZ, POWER STATIONS OF THE CITY OF ZURICH
Energy Service Provider

ewz is the leading company with pioneering energy and communications solutions. Its staff of 1,200 provides services such as ecological energy production, secure electricity supply for the city of Zurich and parts of Grisons, smart energy and telecommunications solutions for companies, the high-speed fibre-optic network for the city of Zurich, as well as public lighting and public clocks.

× **HEADS UP**

You might want to contact these experts on Wednesday to get feedback on your ideas. Ask for their business card and if they have 15 min on Wednesday afternoon (between 13:00 and 16:00) for a brief telephone call.

Is photovoltaic technology still advancing? What can we expect in the future?



JOSUA STUCKELBERGER holds a Master's in Physics from ETH Zurich and a PhD in Material Science from EPF Lausanne. The wish to contribute for a cleaner energy solution guided him through his recent positions at EMPA, HSLU and EPFL.

What can we expect from alternative energy sources like wave energy in the future?



TRISTAN JOCHNER is Chief Financial Officer and Co-Founder at SINN Power GmbH. He is responsible for the company's financial development. He holds a Bachelor's degree in Engineering and a Master's degree in Business Administration from Fachhochschule München.

Are distribution grids in the future still needed, when we have PV on every roof and batteries in the cellar? What will be their role?



BENEDIKT LOEPFE is the Head of the Electricity Distribution Network at ewz since 2014. He has extensive experience in maintaining a traditional grid combined with a substantial know-how of modern and smart technologies to expand net capacities.

tuesday
13.30
ETH WEEK TENT

◆ **KNOWLEDGE FAIR**

Area 4

EKZ, POWER STATIONS OF THE CANTON OF ZURICH

Secure Power Supply

EKZ is one of Switzerland's biggest energy suppliers. As an integrated utility EKZ offers a wide range of energy services ranging from medium voltage services to solar rooftop solutions. EKZ aims to shape the energy transition towards power generation based entirely on renewable resources and the decarbonisation of the sectors mobility and heating.

FIRST CLIMATE

Green Energy – Climate Neutral & Water Services

First Climate is a leading environmental consultancy with 19 years of experience and local presence in six countries. The firm supports private companies in achieving their sustainability objectives and help building the capacity of the public sector towards low-carbon development. 40 experts advise on clean energy, carbon finance, and green investments.

MCKINSEY

Growth Strategies, Operational Performance, and Organisational Structures

McKinsey is a global management consulting firm that serves a broad mix of private, public and social sector institutions. McKinsey has offices in over 120 cities worldwide and serves clients in broad range of topics.

× **HEADS UP**

You might want to contact these experts on Wednesday to get feedback on your ideas. Ask for their business card and if they have 15 min on Wednesday afternoon (between 13:00 and 16:00) for a brief telephone call.

How can new technologies like grid connected battery storage or smart grids help make the transition to a renewable energy system?

How can the CO₂ emissions from the energy sector be reduced to zero (or close to zero)? What is needed in terms of technologies, regulations, investments?

How will the energy demand of in the industrial sector evolve in the future? What are the needs of large industries in terms of energy supply?

**tuesday
13.30**

ETH WEEK TENT



MICHAEL KOLLER holds a Bachelors degree in Chemistry and a Masters degree in Energy Science & Technology with distinction from ETH Zürich. He joined EKZ in 2011 and as CTO he is responsible for the selection of technologies across the value chain of EKZ.



MISCHA REPMANN is a Senior Advisor at First Climate, dedicated to a low-carbon economy. CO₂ has been his career's common denominator: from his Master's degree in Environmental Science to a PhD on carbon sequestration to positions at UNDP and soon-to-be at Swiss Re.



MARCO ZIEGLER is a Senior Partner at McKinsey & Company and holds a PhD in Chemistry. He is the EMEA leader of the Chemicals & Agriculture practice and Operations practice. He spent three years in the Tokyo Office, where he led the Chemicals practice activities in Asia.

◆ **KNOWLEDGE FAIR**

Area 4

SWISSGRID

The Backbone of Swiss Electricity Supply

Swissgrid is the Swiss national Transmission System Operator, responsible for the 6,700 km-long extra-high-voltage grid. Swissgrid plays a key role in the energy transition with 450 highly qualified employees from 24 countries. The company closely cooperates with Swiss and European stakeholders to ensure the security of electricity supply for Switzerland.

BITS TO ENERGY LAB, ETH ZÜRICH

Consumption Feedback, Customer Engagement, and Data Analytics

The Bits to Energy Lab is an interdisciplinary research lab at ETH Zürich which aims at leveraging information technology and behavioral economics to support the design of innovative products or services and new business models in the energy sector. They are currently running a lighthouse project in which they are building a blockchain-based microgrid in which households can trade solar energy.

× **HEADS UP**

You might want to contact these experts on Wednesday to get feedback on your ideas. Ask for their business card and if they have 15 min on Wednesday afternoon (between 13:00 and 16:00) for a brief telephone call.

What role will transmission grid operators play in 2050 in an energy system with high shares of distributed energy sources?

How will ICT and big data change the energy supply system? In addition to distributed energy sources, will we also have distributed energy (trading) systems?

tuesday
13.30
ETH WEEK TENT



JÖRG SPICKER, a doctor of Astrophysics, has held management positions in natural gas, electricity generation and trading companies in the US, UK, Germany and Switzerland. A member of the Executive Board at Swissgrid from 2013 until 2017, he is now Senior Strategic Advisor.



ANSELMA WÖRNER is a PhD candidate and doctoral researcher at the Bits to Energy Lab, conducting research on decentralised markets and peer-to-peer electricity exchange. She holds a Master's degree in Industrial Engineering and Management from Karlsruhe Institute of Technology, Germany.

◆ **KNOWLEDGE FAIR**

Area 5

BKW GROUP

Analysing Effects of Regulatory Changes on Markets and Price Developments

The BKW Group is a Bern-based international energy and infrastructure company employing about 6,500 people. Its company network and extensive expertise allow it to offer its customers a full range of overall solutions. The Group plans, builds and operates infrastructure to produce and supply energy to businesses, households and the public sector, and offers digital business models for renewable energies.

MATERIALS AND DEVICE ENGINEERING (MADE) GROUP, ETH ZÜRICH
Novel Nanomaterials and Next Generation Device Architectures

The Materials and Device Engineering (MaDE) Group at ETH Zürich studies commercial technologies such as lithium-ion batteries and applies advanced characterisation techniques to quantify how structure on multiple length scales influences material and end-device performance. Guided by simulations, the MaDE Group develops design guidelines and explores how new materials and device architectures can be manufactured at scale.

× **HEADS UP**

You might want to contact these experts on Wednesday to get feedback on your ideas. Ask for their business card and if they have 15 min on Wednesday afternoon (between 13:00 and 16:00) for a brief telephone call.

How can we insure security of supply in the future with high shares of distributed renewable energy sources?

How will battery technology evolve? Will we see further increase in capacity and reductions of costs?

tuesday
13.30
ETH WEEK TENT



URS MEISTER is Head of Regulation Management, Market Analysis and Energy Product Management at BKW group. He is also member of the management board of the Association of Swiss Electricity Companies (VSE) and Head of Energy at the Federal Office for National Economic Supply.



MARIE FRANCINE LAGADEC is a postdoctoral researcher in the MaDE group focusing on quantitative 3D imaging of lithium-ion battery separators (a battery's safety mechanism) to derive design guidelines for safer and longer lasting batteries.



NILS WENZLER is a doctoral student in the MaDE group researching degradation and aging mechanism in nickel rich cathode materials (the positive electrode of the battery) using X-ray tomography in order to improve battery lifetime.

◆ **KNOWLEDGE FAIR**

Area 5

NOVAVOLT AG

Charging Solutions for Electric Vehicles

NovaVolt is the exclusive Swiss Distributor for the ZapCharger Pro charging solution for electric vehicles, which is designed and manufactured in Norway by Zaptec. The ZapCharger Pro product design is based on a unique combination of all-in-one hardware and state-of-the-art cloud platform. With the ZapCharger Pro, charging infrastructure for electric vehicles has become fully scalable.

SBB CFF FFS AG

Increasing Energy Efficiency

SBB is the national railway company of Switzerland and the largest national consumer/prosumer of electricity (consumption approximately 2400 GWh p.a.). It provides electricity for itself but also for 12 further infrastructure managing companies such as BLS or SOB. SBB manages its own electricity system, consisting of own production units, transmission power grid, converters and substations.

OFFICE FOR URBAN DEVELOPMENT ZÜRICH (STEZ), CITY OF ZÜRICH
Society and Space, Economic Development, External Relations and Integration Promotion.

As a centre of excellence for sustainable urban development, STEZ is active at the interfaces between politics, business, the public and the administrative authorities, and prepares the bases for strategic decision-making for the City Council of Zurich. In order to promote the City's location and economy as well as integrate its foreign population, STEZ initiates and carries out projects in dialogue with stakeholders and partners.

× **HEADS UP**

You might want to contact these experts on Wednesday to get feedback on your ideas. Ask for their business card and if they have 15 min on Wednesday afternoon (between 13:00 and 16:00) for a brief telephone call.

Will batteries of electric cars play a role in distribution grids? If yes, how?

Can mass transport be made more energy efficient in the future? How?

Could we plan cities of the future to be more energy efficient? How will smart cities help?

tuesday
13.30

ETH WEEK TENT



FLORIAN KIENZLE is CEO of NovaVolt and holds a doctoral degree in electric power systems from ETH Zürich. Before founding NovaVolt, he worked for ewz and the Swiss Federal Office of Energy.



TIMUR SOEMANTRI is Business Development Manager at SBB Energy and is responsible for the SBB Energy strategy and Innovation management. He collected 10 years of work experience in the international energy industry in different positions for Swissgrid, RWE and Pricewaterhouse Coopers.



ANNA SCHINDLER is responsible for the office for Urban Development which contains the four subdivisions Office for Cross-cultural Issues, City and Neighbourhood Development, Economic Development and the Office for Foreign Affairs. She studied geography at the University of Bern.

↘ Unpack.

About half of the time this afternoon is reserved for you to bring the information gathered during the knowledge fair into your teams, discuss it, and structure it into different clusters or frameworks that make sense.

To simplify sharing and understanding, the findings are aggregated into categories: actors—needs—insights. As time is limited and the amount of information gathered is large, you need to synthesise the discussions held at the fair into a few concise findings that you can share with your team. Make sure the other students understand why the finding was meaningful to you. Indeed, this synthesising process is very personal. You have to infer meaning and interpret what has been said. Then you must decide which information is important and filter the data accordingly.

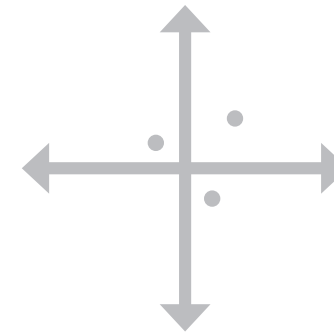
× NOTE

A few hints for writing post-it notes in style:

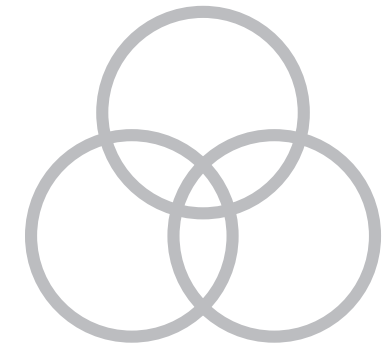
- One aspect per post-it note, to regroup ideas.
- Incorporate drawings to make your ideas more understandable.
- Be concise and adapt to the size of the post-it note.
- Color code! Today: actors (yellow), needs (green), insights (pink).

1 → 2 → 3 → 4

journey map



two-by-two



venn diagrams

Use frameworks

HOW TO FORMULATE A PROBLEM STATEMENT

A problem statement is short and has three ingredients: actor, need, and insight. By combining them into a sentence, they are put in relation and reveal initial dependencies. Problem statements are standardised sentences that guide the process of your team, like a slogan. They also provide focus to generate ideas during ideation tomorrow.

Example:

*Peter, who produces individualized fashion, needs a process to establish mass customization for “personalized clothes”; however, fashion is nowadays produced by either inflexible mass production or labor-intensive, highly costly tailoring service.
(Project Snow White, ETH Week 2017 Manufacturing the Future).*

A good problem fulfils the following criteria:

1. Is the problem statement focused enough to have a specific impact?
2. Does the question allow for a variety of solutions?
3. Does the question take into account context and constraints?

You may have to play with the scope of your problem statement. If too broad, you might not know where to start and develop concepts that are unspecific. If too narrow, you might already have a specific solution in mind. In both cases, you need to adjust and dig deeper in order to find at what ‘altitude’ the real need lies so that you can overcome a precise constraint and innovate.

× NOTE

In pairs, use this scaffolding to formulate a first problem statement. Discuss your answers to each question, then move on to the next.

describe

the problem you have identified in three lines.

version 0.1

Phrase it as a problem statement.

impact

State the ultimate impact you are trying to have.

context and constraints

Finally, write down some of the context and constraints that you’re facing.

version 0.2

it as a problem statement.

↘ Problem statement 1.0.

Now it is time to start defining the problem you want to solve. You will do this by formulating a first problem statement that is short and simple and that inspires your team.

The trick is to feel comfortable with taking quick decisions. As this is an iterative process, there will be enough time to make it more precise tomorrow or change it if need be. At the same time, the trick is to iterate in a constructive way, which means to build continuously on every step and include the knowledge gathered. With every iteration, you will gain a better understanding of your problem, which is why your problem statement will become clearer and more precise.

In pairs, you will use the template on the opposite page to phrase a first problem statement. It is the least straightforward task of the week, and it is not easy to get right in a first attempt. The result will be a draft that you will improve again and again.

× HEADS UP

Sign up before 20.00 at the Info Desk for tomorrow's BodyBalance class or the morning run, with your rector, Sarah M. Springman.

(Actor)

needs

(need)

however

(insight)

■

↘ Template.

The crucial lesson of today was to take decisions quickly as a team. As you have become familiar with the dynamics, understand that your ideas are not lost, but may return later in the process, when they can be used to build on another thought. Therefore, the template contains more than just the selected problem statement.



You will redefine the problem statement tomorrow.



The goal for today is to formulate a refined problem statement that reflects the deeper understanding gained during the first iteration. During the morning, you will think of initial solutions to really understand your problem. The afternoon is reserved for integrating feedback and research results.

7.05 — BodyBalance class and morning run with your rector Sarah M. Springman at the HPS Sports Centre.

8.30 — Arrive at Process Walls.

↘ Check in.

8.50 — Kick-off at ETH Week Hall.

9.00 ▲ KEYNOTE
Konstantinos Boulouchos at ETH Week Hall.

↘ Ideate.

11.45 — Lunch break.

↘ Research and test.

↘ Problem statement 2.0.

↘ Template.

17.30 ▲ COMMUNITY NIGHT
Forest walk to Brache Guggach.

Presentation by Les Vagabonds de l'Énergie.

Community Workshops and Street Food.

wednesday
sep 12

◆ **KEYNOTE**

On Wednesday morning, we will take a closer look at interactions between humankind and the environment. One crucial aspect is mobility and the way it impacts the world around us.

ENERGY, TRANSPORTATION AND SOCIETY

The energy system serves as an interface between the natural world and the anthroposphere. By extracting primary energy carriers and materials from the environment and returning to it different types of waste (including pollutants) in an open cycle, useful energy is provided to various services that are essential for economic growth and the overall well-being of human society. Past developments have led to a situation where adverse environmental impacts, in particular global climate change, threaten the ecosystem of the planet.

On the other hand, the vast physical resources as well as the intellectual capital and knowledge at our disposal can in principle pave the way to a sustainable energy future. The envisioned long-term goal is thus to close the involved material cycles based on essentially unlimited renewable energy that originates from the sun and is continuously available. For this transformation path, targeted policies as well as breakthrough technology innovations will be necessary.

In the second part of the talk, we will focus on the role that the transport sector plays in the current energy system. Because globalisation is associated with high volumes of freight and passenger transport over increasing distances and at higher speeds, worldwide mobility will be the major driver of rapidly growing global energy demand. Though efficient management and containment of this demand growth will be important, defossilisation of the transport sector through renewable energy carriers will ultimately be indispensable. In addition to direct vehicle electrification, renewable hydrogen for fuel cells and hydrocarbons for combustion engines will lead to a strong coupling of the electricity and transport sectors and to a radical transformation of the global energy system within the next few decades.



KONSTANTINOS BOULOCHOS holds a diploma from NTU Athens and a doctoral degree from ETH Zürich in Mechanical Engineering. After a postdoctoral stay at Princeton University, he joined ETH Zürich as Research Group Leader at the Institute of Energy Technology. In 1955 he became Head of the Combustion Research Laboratory at PSI, and in 2002, he was appointed full professor at ETH Zürich. During the last ten years, he became increasingly interested in modelling and optimisation of energy systems, including policy advice on energy and transport-related strategy development and implementation.

THE DESIGN THINKING FACILITATORS

The design thinking facilitators will accompany you today and tomorrow to provide you with a wide range of methods that will be used to develop solutions and improve your problem statement. They will be the pacemakers of the week and collaborate with your tutors. As experts in creative processes, they will help your team take decisions in the right order.



ALICE REPETTI is a Social Scientist with a background in Economics. As a visiting Master's student at the George Washington University, innovation strategy consultant at Spark Works and teaching assistant at ETH Zürich, she has experience in designing research projects and facilitating training programs using collaborative and agile techniques. Her ambition is to explore new ways to integrate technology, innovation and design into effective strategies to create social change and shape new educational approaches.



BARBARA SCHNYDER holds a Master's degree in World Society and Global Governance. She worked as journalist and researcher in an interdisciplinary think tank engaged with global trends in business, science and society before she joined Spark Works as an Innovation Consultant.



EVA AHBE studied Physics with a focus on Environmental Science in her Bachelor's and Master's studies. Driven by the wish of working on solutions for climate change she switched to Engineering in her PhD, where she is now engaged in the automatic control of a novel wind energy technology consisting of power kites.



HAZEM AHMED is a doctoral student at the Institute of Pharmaceutical Sciences, ETH Zürich. Hazem obtained his Bachelor's degree in Pharmacy and Biotechnology in Egypt. He oscillated between academia and industry before joining ETH Zürich. He is attracted to negotiations, project management and has a passion for challenges and solving problems.



JOSE ARRIETA is a Costa Rican, physicist and electrical engineer, turned Innovation Management doctoral student after coming to Zurich. Jose studies the process of how managers and entrepreneurs solve strategic problems, and develop routines in dynamic environments, in the hope of helping in fostering creativity.



LINDA ARMBRUSTER holds a Master's degree in Strategic Design from the design akademie berlin. As Project Manager at Spark Works, a strategic human-centered innovation firm, she builds and leads inspiring research and advisory programs with interdisciplinary teams to tackle complex challenges in the private and public sector.



MATTIS STOLZE holds a Master's degree in Mechanical Engineering. He was part of several engineering design teams, mentored student projects and worked with NGOs in Switzerland and Nepal. Being genuinely interested in people's stories, and in tailoring products to user needs, he made the transition to user-centered product development and currently works at Spark Works.



MARTIN BUTTENSCHÖN studied Management, Technology, and Economics at ETH Zürich, investigating automation by Artificial Intelligence for his Master thesis. He has a background in Engineering Physics and is passionate about collaborating with others to innovate technology. Last year he participated as a student at ETH Week and he is back to facilitate others to have a great experience.



SOPHIE BERNHARDT holds a Master's degree in Design Management and is an experienced facilitator having designed and lead a variety of Design Thinking workshops around the world. She is a storyteller able to translate abstract insights into sustainable solutions and passionate about co-creating scalable innovation strategies



MARTIN COUL was one of the first employees at the consortium that established the smartphone industry and subsequently played a key role in establishing Skype's mobile presence. Today he is an Entrepreneur in Residence at ETH Zürich and leads client engagement activities for Spark Works. He holds a Business Studies degree from the University of the West of England - and just so happens to make the best burger you'll ever taste!



WILFRED ELEGBA is a final year doctoral student in Plant Science and Policy at ETH Zürich. He loves working with interdisciplinary teams to help tackle everyday problems of society. This is the third time he is participating in ETH Week. He also enjoys working on social intervention projects such as the EquipSent, an initiative which focuses on improving teaching and research in underdeveloped countries by donating unused but functional equipment from ETH Zürich.

After establishing a first draft of the problem statement yesterday evening, it is time to see if it holds and if it is productive. You will start ideating, which means generating solutions in a democratic way. First of all, the goal is not yet to develop good solutions, but to get the obvious solutions out of your heads and advance beyond them. This will result in an improved problem statement and clusters of initial ideas.

Next, you will start sketching. This is a quick way to bring ideas onto paper and figure out the details of different solutions. You will need to take decisions, going from an abstract idea to concrete details. In this way, you can probe and clarify different aspects of an idea. As you are under time pressure, you will automatically have to focus on the essentials, which helps you discard weak ideas in the process. Sketching is also a quick way to make ideas shareable. In fact, you will work in sub-teams all morning, advancing different ideas in parallel.

× NOTE

Make sure that yesterday's problem statement and the actors-needs-insight post-its are visible in the space where you ideate.



Brainstorming rules

Research and test.

After generating first ideas, please set aside some time to evaluate the ideas and remain critical. Reconsider the brief that we introduced on Sunday, and start answering the scientific rigour questions from the opposite page.

This goes hand in hand with preparing for the first round of testing. In order to get feedback from the experts you have met so far (during the field trips or at the knowledge fair), choose who would be relevant to talk to and schedule a phone call or ask for an answer by e-mail.

During the research and test phase in the afternoon, you will deepen your understanding of the problem you are trying to solve. For this, you will split up to work in parallel:

- do research to back up your assumptions;
- get feedback from experts by phone or e-mail;
- test your idea sketches with non-experts.

You will learn to build on other people's knowledge and decide which feedback is useful for advancing your project, and how to integrate it. You will learn to be critical about your own ideas and evaluate them as you move on.

We suggest that during this phase, you should listen as much as possible and talk as little as possible while explaining your ideas. You don't want to convince anybody; rather, you want to observe their reactions and learn from the exchange.

This marks the end of the first iteration. After this, you will jump back to defining, i.e. reframing your problem statement. You will go through a second iteration tomorrow.

× NOTE

Start answering the scientific rigor questions under point (3) of the brief:

- What are your underlying assumptions?
- What facts and figures did you rely on?

Now you may use the feedback capture grid below. Try to include getting answers to the feasibility part of the brief:

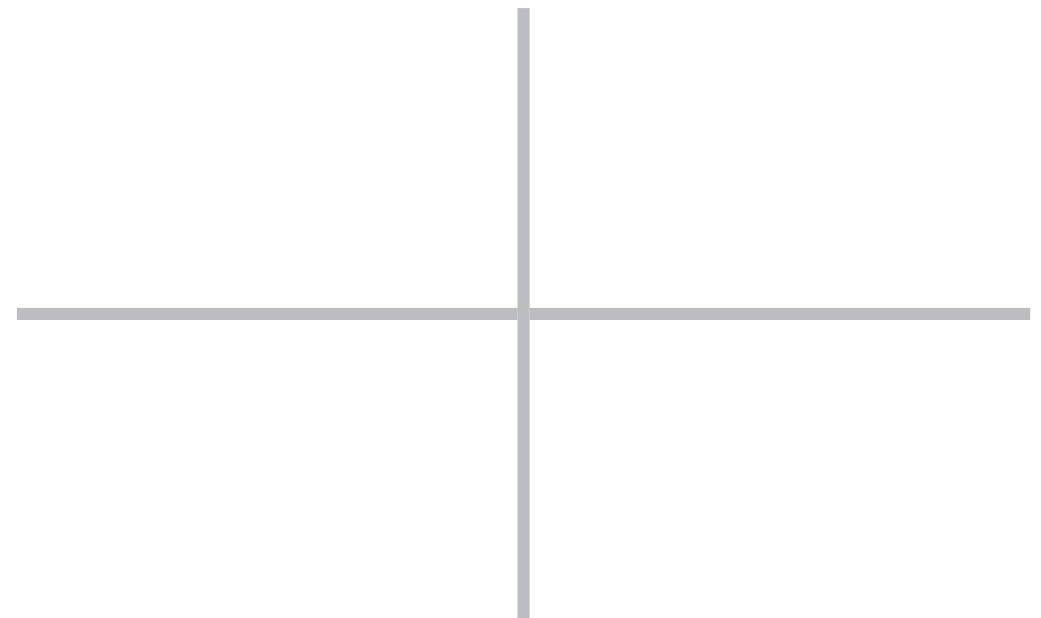
- How feasible is your solution?
- Are there uncertainties related to your solution that would need further clarification?

wednesday
12.30
TEAM SPACES

What worked well?



What did not work?



What questions remain?



New ideas that emerged.

↘ Problem statement 2.0.

Because we want you to fall in love with the problem and not with solutions, the formulation of the problem statement is always the goal of the day. Make sure it reflects the lessons learned from the ideation phase in the morning and the testing phase in the afternoon.

Make sure it fulfils the following criteria:

- Is the problem statement sufficiently focused to have a specific impact?
- Does the question allow for a variety of solutions?
- Does the question take into account context and constraints?

A problem statement has the following goals:

- It phrases a problem as a standardised sentence to guide the process of your team, like a slogan.
- It provides focus to generate ideas during brainstorming.
- It serves as an evaluation tool for competing solutions, so that your team can take decisions when working in parallel.
- It documents the progress of your understanding of the problem, deepening with every iteration.

× HEADS UP

Sign up before 20.00 for tomorrow's Pilates class or the morning run.

The sign up-sheets will be at Brache Guggach.

(Actor)

needs

(need)

however

(insight)

■

↘ Template.

The main result of Wednesday is an improved problem statement. The template will contain two solution ideas, the sketches of the morning, and the answers to the first questions of the brief: scientific rigour and feasibility. Additionally, you can talk to the various people you'll meet on today's Community Night. Consider it another forum to test your ideas.



THE FOREST WALK

While walking along the edge of the forest, overlooking Zurich, please use the opportunity to casually debrief with your team but also to exchange your views with students from other groups. Clément Bresciani will already join to give you insights on his travels before giving his presentation at Brache Guggach later this evening. Lukas Bühler will guide you.

◆ COMMUNITY NIGHT

Following the input talks, the knowledge fair, the keynote lecture and a lot of teamwork in time-constrained settings, this evening is all about informal discussions and the community in which we live.

DISCOVER AND CONTRIBUTE TO YOUR COMMUNITY

Our society needs healthy communities where people help each other and create a common understanding of a vision. New ideas emerge where people refuse to accept the status quo. But innovators need an open-minded environment to be able to express their ideas and get feedback. Such communities inspire them to find solutions for specific challenges.

The Community Night on the Guggach Brache is dedicated to networking and exchanging ideas. With food and drink stalls, sports instructors, informal presentations and workshops, visitors will find plenty of interesting things to do. You will have the opportunity to meet various protagonists involved in the Guggach Brache, a vacant lot that the City of Zurich has temporarily made available for community activities where people from different cultures can meet, exchange ideas and organise events. Sustainability is one of the most important topics here. You might meet local beer brewers, some of whom are ETH students, or visit the beehives that produce the honey which our speakers and guests receive as thank-you gifts.



MICHAEL KUHN, the organiser of the Community Night, is starting a Master's in Applied Psychology at the Zurich University of Applied Sciences (ZHAW) in September. He has previously worked in Human Resource Management for the Migros corporation. This summer, he went on a two-month cycling tour through Europe, aiming to reduce CO₂ emissions while exploring the world.



RENATO MAGGI hardly ever stops to play. Responsible for team sports at ASVZ (Akademischer Sportverband Zürich), he loves to shoot hoops, play some pond hockey or beach volleyball. As a sports teacher he has been working for Zurich University Sports for 20 years and also teaches a few lessons at D-HEST to future sports teachers. He is convinced that exercising and playing keeps you young, healthy and gets you ready to perform on a daily basis at work and in life.

THE ENERGY BACKPACKERS

Les Vagabonds d'Énergie

Technical solutions exist to rationalise our energy consumption and to produce more sustainable energy. However, these solutions are not systematically applied. The failure to transform energy production and consumption on a global scale is largely due to a lack of consideration for socio-cultural factors. For the energy transition to succeed, it must take the human factor into account. This is where sociology meets with energy.

Based on these considerations, we started a world tour to conduct on-site analyses of various energy transition initiatives where citizens are involved in decision-making and modes of governance, either as organisers or as participants. In doing so, we used travel as a means of studying the relationship between humans and energy.

At ETH Week, this topic will be discussed using the example of a cooperative in Haiti that produces energy with a hybrid PV-diesel system for three off-grid villages.



CLÉMENT BRESCIANI is head of the NGO Energy Backpackers. He holds a Master's degree in Energy Efficiency and spent four years working as a building energy management consultant. In 2016, he became a travel reporter. Today, he is working to promote intelligent design in energy projects.

◆ FOLLOW UP PROGRAMME

Do you want to take the next step in Design Thinking? During ETH Week, you will go through a process that starts with finding a relevant problem and ends with a mock-up prototype of your solution. We don't want you to stop there, but take you a step further!

ETH WEEK - THE HATCHERY

After ETH Week, we will launch a new version of the follow-up programme: Over the course of ten weeks, we will support you in developing your idea into a functional prototype that you can show and test with potential implementation partners. Bring your solution to life, be it as a research project, a start-up company or even your future doctoral thesis.

“The Hatchery” will let you experience teamwork on a new level. Weekly workshops, a grant for prototyping expenses and access to relevant experts from academia and industry will provide an environment where you can make your ideas real. At the final event, you will have the opportunity to present your improved prototype to organisations, institutions and ETH Zürich chairs that could be interested in supporting you beyond this program.

The program is open to all ETH Week participants. You will be required to show a high level of self-responsibility, commitment and enthusiasm to develop your own project and actively participate in the workshops over ten weeks. The course takes place every Tuesday from 17.00-20.30 at the Student Project House at ETH Hönggerberg, starting on 18 September. We will also provide snacks during the workshops.

× NOTE

If you want to participate in “The Hatchery”, please use the sign up-sheet at the InfoBar or indicate your interest by e-mail until Friday, 14 September. Please let us know if you plan to participate as a team.

- The number of participants in this program is limited to 30.
- If you have any questions, approach Lucie Rejman or Michi Augsburg, who will join us at the community night. You can also contact them via e-mail: thehatchery@sph.ethz.ch.



MICHAEL AUGSBURGER is finishing his Master's degree in Environmental Systems and Policy at ETH Zürich. His research focuses on the use of human-centered innovation processes for policy design. An advocate of interdisciplinary team work, he has experience in designing and facilitating Design Thinking Workshops for companies, NGO's and student teams.



LUCIE REJMAN holds a doctoral degree in Food Engineering from ETH Zürich. She has worked in a sustainable chocolate start-up and co-founded ZüriCHips. She is an experienced facilitator having designed and lead a variety of Design Thinking workshops. She is passionate about bringing out the best in people, co-creating an atmosphere where people can be themselves and most importantly developing human-centered solutions to global challenges.



Tomorrow, you will get to prototype and test.



It is time to start prototyping. During the morning, you will work on solutions and make your ideas tangible. You will then use your prototypes to get feedback from experts, making a dry run of a first presentation. Afterwards, you will integrate their comments and reconsider the brief.

7.05 — Pilates class and morning run at the HPS Sports Centre.

8.30 — Arrive at Process Walls.

↘ **Check in.**

8.50 — Kick-off at ETH Week Hall.

9.00 ▲ **DIALOGUE - VIEW FROM MULTINATIONALS**
Martin Naef, ABB
Prasad Ramakrishnan, GE
at ETH Week Hall.

↘ **Prototype.**

13.15 — Lunch break.

↘ **Expert feedback.**

↘ **Integrate feedback.**

↘ **Template.**

↘ **Check out.**

19.30 — Dry Run and Dinner

20.30 — Stage test

thursday
sep 13

◆ DIALOGUE

Before you start prototyping your ideas, we will switch angles and consider the perspective of large companies. What roles do they have as major players in the energy sector? What challenges and opportunities does an energy transition create for them?

VIEW FROM MULTINATIONALS

In this section, you will learn how new technologies lead to changes in consumer behaviour and new business opportunities.

RESEARCH CHALLENGES FOR THE POWER SYSTEMS OF THE FUTURE

For Martin Näf (ABB), the move away from traditional electro-mechanical generators opens up new opportunities for controlling the grid, but also challenges the current mechanisms for ensuring the stability and safety of the grid.

Designing and building the energy system for the next generation creates exciting opportunities, whether in the fundamental sciences or in the engineering disciplines. Adoption, however, is not decided by technology, but by the needs and acceptance of the society combined with economic forces. The future of energy research therefore lies in a multidisciplinary approach that fosters an understanding of the whole energy system and the complex interactions within it.

THE STRENGTH OF THE WIND, THE FORCE OF WATER, AND THE HEAT OF THE SUN

GE Renewable Energy has installed more than 400 gigawatts of energy capacity globally, combining onshore and offshore wind power, hydro power, and innovative energy technologies. Prasad Ramakrishnan will share insights from onshore windfarms as example to draw a bigger picture of the future energy system. Prasad Ramakrishnan has a very diverse background and has lived in a variety of cultures. He will explain how he contributes to the energy transition, both personally and as a member of a multinational company.



PRASAD RAMAKRISHNAN is General Manager, Global Supply Chain, for GE's Global Onshore Wind Business. In 30 years of living and working in the Americas, Asia and Europe, he has been a transformational global leader and change agent in the automotive industry, fashion apparel, thermal power and renewable energy. He is a lecturer on Innovation and Leadership in ETH Zürich's MAS and MBA Programs.



MARTIN NAEF leads the Automation Department at the ABB Corporate Research Center Switzerland. The department covers control research topics in the field of industrial automation and power systems, and information and communication technology applied to industrial and grid automation systems. In addition, Martin Naef leads the Swiss Federal Energy Research Commission. He holds a Master's degree and a doctorate in Computer Science from ETH Zürich.

↳ Prototype.

Prototyping is a chance to bring ideas out of your head into the material world, making them tangible. Your idea is just beginning to come to life. Also, try to forget about precision and perfection for the moment: low-resolution prototypes are quick and cheap to make, but they are still sources of valuable insights as you study, discuss, and test them with your peers. Similar to yesterday morning, you will again work in sub-teams and produce different prototypes in parallel. You will present two prototypes to the experts after lunch.

While prototypes can be very different in format, ranging from a wall of post-it notes to 3D models, and role-play, the general idea is the same: to gain an understanding of how your solution will function in reality and how it will be experienced from the actor's perspective.

In this iterative process, you need to take one decision after another in order to move from intangible ideas to a concrete model. What was unknown when you started off should now become precise. Also, design your prototype according to what you want to learn from it.

By making ideas tangible, they also become shareable. And the more you go into detail, the less chance there is of a misunderstanding. Therefore, prototypes are valuable conversation pieces that can have a rhetorical value of their own.

× NOTE

Some more reasons to prototype, in bullet points:

- To ideate and problem-solve
- Solve disagreements
- Communicate
- Start a conversation
- Fail quickly and cheaply
- Manage the solution-building process
- Test possibilities

thursday
10.15

TEAM SPACES

what

do you want to prototype?

how

do you want to prototype?

why

is it relevant?

Feedback from Researchers.

The feedback is organised in three rounds. You will first present the two final prototypes of this morning. Once you are done presenting, the experts give you feedback.

Some hints:

- Define beforehand what you want to test.
- Let the researchers experience the prototype:
Show, don't tell!
- Actively observe.
- Follow up with questions.

Make the most of this time. Keep track of what is being said and think about what this means for your project. What needs to change, what needs to be improved, what needs further research or clarification? Take notes on the feedback capture grid on the opposite page.

Also, make use of the time when experts are giving feedback to other teams. Focus on the third point of the brief: systems thinking. You can find the brief in the next step.

× HEADS UP

The experts will come into your team spaces, so that you lose no time in transit. There are three slots, 14.00, 14.30 and 15.00.

thursday
14.00
TEAM SPACES

What worked well?



What did not work?



What questions remain?



New ideas that emerged.

THE RESEARCHERS

The following researchers are going to meet you in groups of three to give feedback to your problem statement and the two solutions you have been working on during the morning. They are related to the three layers of 'Energy Matters'. In addition, it is our pleasure to welcome the four professors who provided insights to THE THREE LAYER CONCEPT.



GEORGIOS MAVROMATIDIS is a postdoctoral researcher at the Chair of Building Physics of ETH Zürich and holds a doctoral degree in the area of Urban Energy Systems. His research interests lie mainly in the design of distributed energy systems and the sustainable transformation of urban buildings and districts via building retrofits and local renewable energy generation.



GLORIA ROMERA is an Industrial Engineer by the ESII Carlos III, of Madrid, and specialised in Mechanics and Energy. She did a PhD at ETH Zürich at the Mechanical Department and worked as R&D Engineer at Sensirion AG. In May 2014 she joined the SCCER Mobility as Managing Director and helped to build up and coordinate the Swiss Competence Center of Energy Research dedicated to Efficient Mobility.



TOBIAS SCHMIDT is Assistant Professor of Energy Politics and head of the Energy Policy Group at ETH Zürich. In his research, he analyses the interaction of energy policy and its underlying politics with technological change in the energy sector. His policies support a change towards low carbon technologies and governance for transition analysis including carbon finance. His research covers both developed and developing countries.



ULRIKE GROSSNER is Professor of Power Semiconductors at the Advanced Power Semiconductor Laboratory at ETH Zürich. She was Principal Scientist at ABB Corporate Research in Baden. Her research focuses on design, optimisation and manufacturing of power semiconductor devices.



ARNO SCHLUETER is Professor of Architecture and Building Systems at the Institute of Technology in Architecture at ETH Zürich. He is also a Principal Investigator at the Singapore-ETH Future Cities Lab (FCL). In his research, he and his interdisciplinary team focus on sustainable building systems, new adaptive components and their synergetic integration into architecture and urban design using computational approaches for modelling, analysis, and control.



KIRSTEN OSWALD completed her PhD at ETH Zürich and Eawag in Environmental Systems Science in 2016. Since 2017, she works in the management of the Swiss Competence Center for Energy Research - Efficient Technologies and Systems for Mobility (SCCER Mobility) at ETH Zürich.



PAOLO BURLANDO is professor at the Chair of Hydrology and Water Resources Management. Among other fields, he carries out research in rainfall field analysis, hydrologic extreme forecasting and prediction, global change and water resources, hydrology and ecology interactions in mountain floodplains. He holds a degree in Civil Engineering from the University of Genoa.

MORE RESEARCHERS



ALEJANDRO NUÑEZ-JIMENEZ is a PhD Student and Research Associate at the Group for Sustainability and Technology in ETH Zürich. His research focuses on how to design energy policies that work effectively and cost-efficiently in the presence of rapid technological change such as in solar photovoltaics.



MARCO MAZZOTTI is professor for Process Engineering at ETH Zürich. He works on the science and technology needed to mitigate carbon dioxide emissions from industry, thus aiming at a sustainable energy system. Since 2011 he has been a Board member of the Energy Science Centre of ETH Zürich.



MARIE FRANCINE LAGADEC is a postdoctoral researcher in the MaDE group focusing on quantitative 3D imaging of lithium-ion battery separators (a battery's safety mechanism) to derive design guidelines for safer and longer lasting batteries.



ILLIAS HISCHIER is senior researcher at the Chair of Architecture and Building Systems. He holds a PhD in Mechanical Engineering and worked as a postdoctoral researcher in the USA and in industry. Illias' expertise is applying energy conversion processes in the field of solar engineering and buildings.



GABRIELA HUG is Associate Professor of Electric Power Systems at the Power Systems Laboratory at ETH Zürich. Her main research focuses on the control and optimization of electric power systems with the objective to integrate renewable generation. She examines how decentralised control systems can support a smarter grid.



PRASAD RAMAKRISHNAN is General Manager, Global Supply Chain, for GE's Global Onshore Wind Business. In 30 years of living and working in the Americas, Asia and Europe, he has been a transformational global leader and change agent in the automotive industry, fashion apparel, thermal power and renewable energy. He is a lecturer on Innovation and Leadership in ETH Zürich's MAS and MBA Programs.



MARYAM KAMGARPOUR is an assistant professor at ETH Zürich, Automatic Control Laboratory. She obtained her Doctor of Philosophy in Engineering from University of California, Berkeley (2011) and her Bachelor of Applied Science from University of Waterloo, Canada (2005). Her research is on multi-agent decision making and control, game theory, hybrid systems and stochastic systems with applications in intelligent transportation networks, robotics and power grid systems.



NILS WENZLER is a doctoral student in the MaDE group researching degradation and aging mechanism in nickel rich cathode materials (the positive electrode of the battery) using X-ray tomography in order to improve battery lifetime.



OLGA WEISS is a post-doctoral researcher at the Energy System Group, ETH Zürich. She has more than six years of experience in energy system analysis, policy and economics. Her current research is focusing on building a sector coupling model to analyse co-evolution pathways of the Swiss energy and mobility sectors.



ANSELMA WÖRNER is a PhD candidate and doctoral researcher at the Bits to Energy Lab, conducting research on decentralized markets and peer-to-peer electricity exchange. She holds a Master's degree in Industrial Engineering and Management from Karlsruhe Institute of Technology, Germany.



ERNST HAFEN is ETH professor for Systems Genetics at the Institute of Molecular Systems Biology. In 2005-2006 he served as president of ETH Zürich. He is interested in how people can actively participate in research through their personal data collected continuously using smartphones. He is a co-founder and president of MIDATA.coop, a non-profit citizen-owned data cooperative that provides a new trust framework for data sharing and democratisation of the personal data economy.



JAMES ALLAN is a postdoctoral researcher at Empa, Dübendorf. His field of research is urban scale building energy modelling. He has an Engineering Doctorate in Environmental Technology from Brunel University, London, UK. Before moving to Switzerland, James worked at the Building Research Establishment (BRE) in Watford, UK, where he developed dwelling-level data models of the UK housing stock.

↘ Integrate feedback.

By now, you have learned to be open to feedback and how to be critical of it. You have almost 24 hours left before you get to present your story on stage. As you are part of a large team, this is a lot of time and the most exciting part of the week. Start by including the feedback and iterate a third and last time. Also, reconsider the brief:

1. Define a problem statement that describes the challenge you want to address. It needs to be linked to a Swiss actor and to one of the three layers of ETH Week.
2. Tell an inspirational story that explains where your ideas come from, why your problem statement is relevant and what a possible solution could look like.
3. Critically reflect your ideas by answering the following questions:

SCIENTIFIC RIGOUR

- What are your underlying assumptions?
- What facts and figures did you rely on?

FEASIBILITY

- How feasible is your solution?
- Are there uncertainties related to your solution that would need further clarification?

SYSTEMS THINKING

- How is the problem embedded in the ecological, societal and economical context?
- What are the implications and tradeoffs of your solution?

DRY RUN

We meet at 19:30 to explain how we will organise the final presentations and make a quick run through.

× HEADS UP

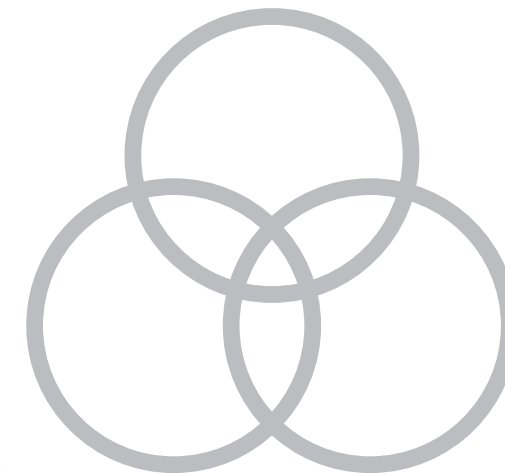
Test microphone and technics today between 20.30–21.30. Send some representatives to understand what you need to pay attention to and what technical tools are available when preparing your presentation tomorrow morning. The ETH Week team, facilitators and tutors will have a drink afterwards, so stay with us if you like, the InfoBar closes at 22.00.

Sign up before 20.00 at the Info Desk for tomorrow's Yoga and Pilates class or the morning run.

thursday
15.30

TEAM SPACES

Systems thinking



Scientific rigour

Feasibility

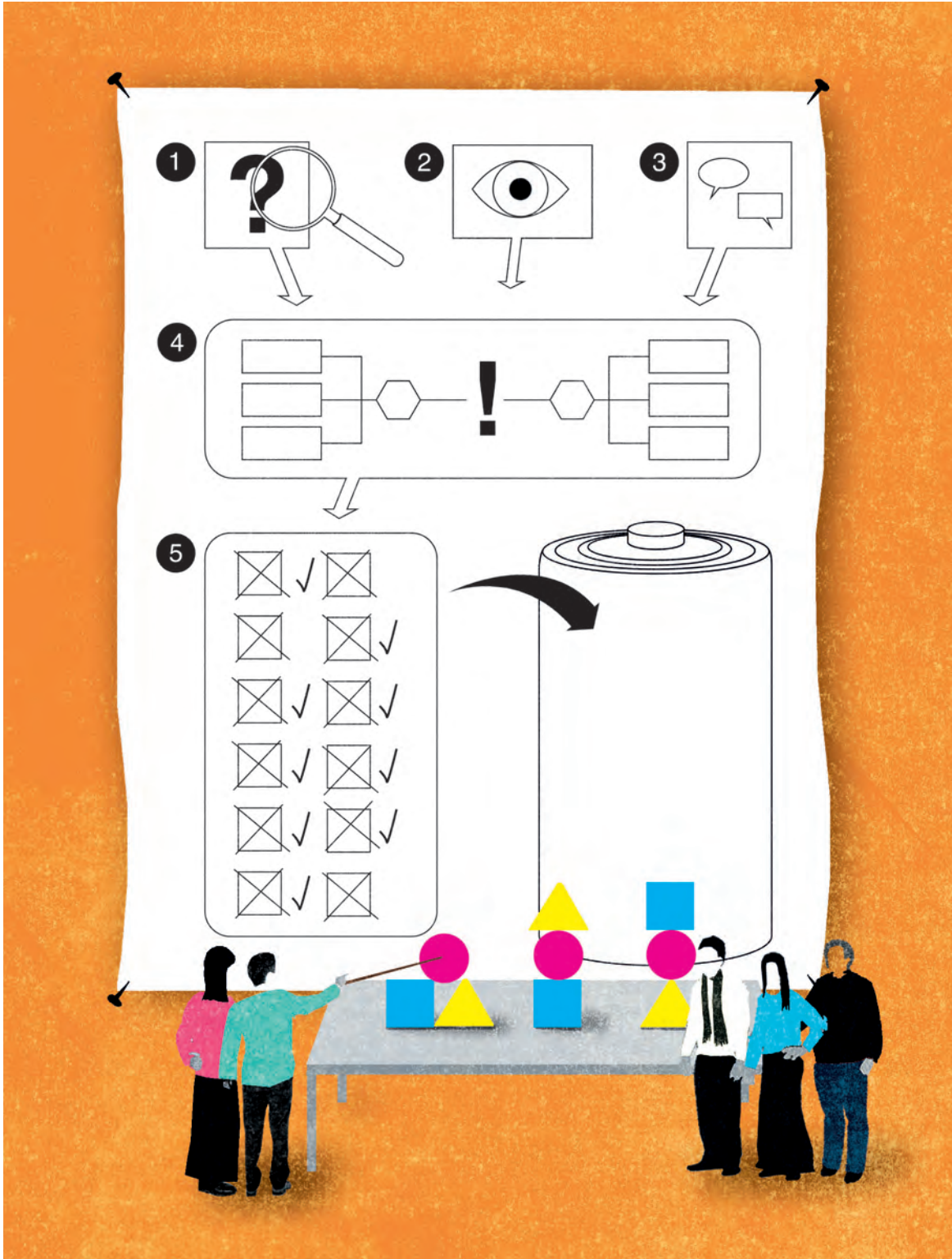
Name your project

↘ Template.

You will be amazed to see how much you can achieve in just one day. In order for everyone else to be able to put your advancements into perspective, we ask you to document both the ideas that you presented as well as the feedback you received. Also, answer the last questions of the brief before getting ready for tomorrow.



Good night! Tomorrow's the day.



On this last day of ETH Week, we ask you to focus on telling a balanced story that takes into account all three parts of the brief. Convince the audience of your problem statement and solution. We then conclude with a bigger picture before we all come together to celebrate six days of critical thinking!

7.05 — Yoga class and morning run at the HPS Sports Centre.

8.30 — Arrive at Process Walls.

↘ **Check in.**

8.50 — Kick-off at ETH Week Hall.

9.00 ▲ **DIALOGUE - VIEW FROM START-UPS**
Philipp Eisenring, Ampard
Veronica Garcia, Bitlumens
at ETH Week Hall.

↘ **Polish your presentation.**

↘ **Last Template.**

13.30 — **DEADLINE FOR HAND IN AND LUNCH BREAK**

15.00 ◆ **FINAL PRESENTATIONS**
It is time to get on stage and tell
a convincing story at ETH Week Hall.

↘ **Wrap up.**

19.15 ◆ **CLOSING CEREMONY AND
ANNOUNCEMENT OF THE AWARD WINNERS**
Christian Schaffner, Marco Mazzotti, Veronica Garcia,
Reto Knutti and Andreas Vaterlaus.
Stefano Brusoni, Anil Sethi, Barbara Schnyder, Martin
Coul and Sophie Bernhardt at ETH Week Hall.

Our president Lino Guzzella concludes
at ETH Week Hall.

20.00 ▲ **UNTIL NEXT YEAR?**
It is time to celebrate the last six days at ETH Week Hall.

friday
sep 14

◆ DIALOGUE

We will begin the last day of ETH Week with the insights of two start-up founders. After two days of intensive discussions about the future, this will be an opportunity for a reality check before participants start to fine-tune their presentations.

VIEW FROM START-UPS

Start-up companies can be game-changers. Their agility and willingness to think outside the box contribute new ideas and technical innovations.

DECENTRALIZED ENERGY SYSTEMS USING BLOCKCHAIN TECHNOLOGY

BitLumens distributes solar power devices in areas without a power grid and connects them to the blockchain. Veronica Garcia will talk about how she founded her company and the benefits and disadvantages of the blockchain hype, including whether cryptocurrency investors are ready to support sustainable projects that facilitate energy access and financial inclusion of rural regions and their inhabitants.

DIGITISATION OF POWER SUPPLY INCLUDING THE INTEGRATION OF HOMES, CARS, GRIDS AND MARKETS

Ampard's energy management and aggregation software optimises the production and consumption of green power. It connects private households to the energy markets and enables the creation of new offerings for the energy retail market. The founder and CEO of Ampard, Philipp Eisenring, will discuss developments in the energy sector from the perspective of his startup company and describe the iterative path from initial ideas to a scalable product with an international customer base.



VERONICA GARCIA was an investment consultant at Credit Suisse and UBS for Latin American Asset Managers. After finishing her graduate studies at D-MTEC at ETH Zürich, she joined IBM Research Lab. She has also worked as a consultant for the World Bank, IADB and Castalia. Her research focused on renewable technologies and on quantifying investment needs to reach the country targets for renewable power generation. In 2017, she founded BitLumens, which brings solar power and water to rural areas in developing countries using the Internet of Things (IoT) and blockchain technology.



PHILIPP EISENRING holds a Masters degree from the D-MTEC at ETH Zürich and has completed the Multi-Annual Executive Development Program from IMD (Lausanne). Prior to founding Ampard Ltd, Philipp worked for ABB and significantly shaped the development of their electricity storage business strategy at group level. At ABB, he was a member of the Industrial Automation division's management team. Among other things, he was responsible for integrating a corporation from the Pacific region.

↘ Polish your presentation.

Use this last session to finish your project. Decide how to best use the 5 minutes to tell your story. In order to be more time-efficient, you may delegate responsibility for finishing the prototype, polishing specific arguments, and writing the overall narrative. Integrate the final answers to the questions of the brief. You will also need to decide on a name for your project.

Your story can only be 5 minutes long, which is more than sufficient to bring a great idea across. In order to present successfully in such a short time, you need to practise. Rehearse your story to your neighbouring team and vice-versa. You would probably prefer to continue working on your presentation or prototype instead of wasting valuable time on a dry run. However, what matters is not only what you say, but also how you say it, and this is how you control that aspect.

Try to do 2–3 iterations and pretend there are 200 people in the audience. Include the logistics of the event: the time to prepare before getting on stage, the time you need to get on stage, and how to react to the ‘1 minute left’ notice. Also clap when the time is up to find an elegant way to wrap up in case you should run over time.

× HEADS UP

All documents and material needs to be handed in before 13.30 in the ETH Week Hall:

- 1. Your digital files for the screens during the presentation and the 1-pager at the [InfoBar](#).
- 2. Hang up your process templates and put your prototype to the [process wall](#).
- 3. Your props to the [backstage area](#).

friday
10.15

TEAM SPACES

↘ Last Template.

Your process wall will be part of the final exhibition together with your prototype. In order for your project to be understandable, write a short abstract, document your arguments for the questions in the brief, and write the final version of the problem statement on the last template. Also, answer to the question of why you believe your work is relevant. Fill all of this into your 1-pager digitally as well.

FINAL PRESENTATIONS

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- How feasible is your solution?
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SYSTEMS THINKING

- How is the problem embedded in the ecological, societal and economical context?
- What are the implications and trade-offs of your solution?

× HEADS UP

- Keep in mind that each group has 5 minutes for their final presentation.
- There are 2 hand microphones.
- There are only 2 minutes between presentations. Therefore, once finished, each group needs to leave the stage swiftly. Then, bring your prototype to the process wall.
- In order to guarantee a smooth change between two groups we ask you to take seats according to the sequence of the final presentation. Seats will be labeled.

friday
15.00

ETH WEEK HALL

Without Powerpoint

We are no fans of powerpoint and believe that you will find more inspiring ways to tell us a convincing story.

↘ Wrap up.

After all the time dedicated to your tasks, we have now reserved some time to reflect. Between the final presentations and the closing ceremony, you will have the opportunity to meet one last time in your teams and wrap up. Your tutor has designed this slot to help you reflect your team process. It is a chance to think about how your group worked together. Discuss what was good and what could have been improved. Also, sit together with your tutor and teammates and reflect on what you have learned during the last 6 days. As it will be your last formal meeting during ETH Week, use it as an opportunity to find a common understanding of the experience you have gone through together.

× HEADS UP

- Cast your votes before heading to the debriefing.

Your take home message

Anything that you would like to share with your team before closing the week?

◆ FINAL EVENT

We have invited ten guests to listen to your stories. Their task is to decide which team will get the awards for **THE MOST FASCINATING SCIENCE** and for **THE MOST INSPIRING STORY**. It is in your own hands to vote for **THE PEER-TO-PEER AWARD**.

AWARDS

THE PEER TO PEER AWARD

This award is going to the team of your choice. Every participant has one vote for their favorite project (apart of their own of course), so choose wisely! Consider all points of the brief and build your own assessment.

THE MOST INSPIRING STORY

Stefano Brusoni, Anil Sethi, Barbara Schnyder, Sophie Bernhard and Martin Coul are specifically responsible for evaluating point (2) of the brief. They will evaluate the teams in terms of who offered the most inspiring story, i.e., how the teams acted together, how their storytelling helped the audience to better understand the problem as well as the solution. They will also assess how well the teams managed to explain a complex issue in a simple way, while nonetheless communicating a clear message by using a compelling visualisation. They will select the group that wins the **AWARD FOR THE MOST INSPIRING STORY**.

THE MOST FASCINATING SCIENCE

Marco Mazzotti, Christian Schaffner, Veronica Garcia, Reto Knutti and Andreas Vaterlaus are responsible for evaluating point (3) of the brief. They will evaluate the teams in terms of scientific and technical quality, i.e., how solid the foundation of their work appears from the perspective of energy and sustainability experts. Their evaluation will be based on the questions for scientific rigour, feasibility, and systems thinking. They will select the group that wins the **AWARD FOR THE MOST FASCINATING SCIENCE**.



STEFANO BRUSONI



ANIL SETHI



BARBARA SCHNYDER



SOPHIE BERNHARDT



MARTIN COUL



MARCO MAZZOTTI



CHRISTIAN SCHAFFNER



VERONICA GARCIA



RETO KNUTTI



ANDREAS VATERLAUS

CLOSING CEREMONY

By the time we get to this point, André Sandmann will add his last touches to **THE BIGGER PICTURE** of ETH Week 2018. He accompanies us throughout the day and will have the difficult job to document the essence of what has been said, thought and discussed during ‘Energy Matters’. He will produce two drawings: The first one, called **THE SATELLITES** documents your projects as you present them. The second one, **THE BIGGER PICTURE** evolves during the concluding panel. They will be exhibited, together with your prototypes throughout the evening.

We are excited that our President, Lino Guzzella, is present during the last moments of the week, to listen to your presentations, and to close the week. But before we all fall into bed, a few more surprises await. Stay tuned! We hope you stay to celebrate, David Suiwez is in charge of the music on our final night in the ETH Week Hall. See you all under the disco ball!



LINO GUZZELLA is Professor for Thermotronics and, in addition, from August 2012 to December 2014 Rector of ETH Zürich. Since January 2015 he is President of ETH Zürich. With his group he focuses in research on novel approaches in system dynamics and control of energy conversion systems.



ANDRÉ SANDMANN is a graphic artist and illustrator, living in Zurich. He understands design as a term derived from disegno, Italian for idea or draft. He believes in the potential of hand-drawn sketches because they leave room for interpretation in the viewer. As a graphic recording artist, he uses them to document discussions and ideas.



DAVID SUIVEZ is a DJ, Yoga Teacher and producer of the Swiss band “Liricas Analas”. He also founded the ‘Movement Masterclass’, a platform where transdisciplinary approaches of movement based forms are being researched and investigated in a non-dogmatic way. He is as excited as we are about the last evening of ETH Week 2018.



Thank you!