



«We make people independent  
from fossil fuels»

**silent**  
**POWER**

# The energy of the future. Already a reality today.



Entire ecosystems are being destroyed, sea levels are rising, extreme weather and irreparable environmental damage - climate change threatens us all. It is good that the energy turnaround has been decided and the Paris Climate Agreement has been ratified by 191 countries worldwide. These countries are obliged to drastically reduce their greenhouse gas emissions.

## Switzerland's energy strategy

With the energy transition 2050, Switzerland has decided that by then electricity will come exclusively from renewable energies. Coal, crude oil, natural gas and uranium will thus need to be completely replaced. The question, however, is: How are we going to meet our immense energy needs now and in the future with hydropower, wind power or energy from biomass? It is clear that the production with these energy sources is already reaching its limits today.

## Goals of the Energy Strategy 2050:

- Reduce CO2 emissions into the atmosphere to net zero.
- Minimise dependence on imports of fossil fuels.
- Ensure energy supply even during peak consumption periods.
- Keep energy industry value creation in Switzerland.
- Create jobs through innovation.

## Switzerland as an international leader with a role model function.

In order to continue to live, work, live and travel comfortably, we need new solutions worldwide. We are proud that the most promising one comes from Switzerland: Methanol M99 from Silent-Power, the CO2-neutral energy of the future. This «green» methanol is a chemically produced fuel with 99% purity, made from CO2, water and green electricity. An ingenious energy source that can be produced indefinitely and is suitable for all applications. Not only Switzerland, but rather every country will be able to produce methanol autonomously in the future. Developing countries in particular will benefit from this, as they will be independent of oil and gas imports and may even become energy exporters.



## Holistic, global approach instead of patchwork.

For the implementation of the Energy Strategy, a long-term and holistic approach is necessary. Silent-Power has already done pioneering work. We have succeeded in drastically reducing CO2 emissions by converting climate-neutral CO2 into methanol, storing it and reusing it as an energy source for buildings, industry, power generation and mobility. In this way we replace fossil CO2 from fuels and combustibles in an environmentally friendly way.

## Our lighthouse project as pioneering work.

Energy storage and energy transport are of outstanding importance in the fight against climate change. Silent Power is therefore building its own synthesis plant for the production of methanol - a technological lighthouse project that should set an example. Such methanol synthesis plants could shape the global landscape in the future – it makes 100% ecological and economic sense to push ahead with the construction of as many such plants as possible. As a technology leader, Switzerland can export this know-how worldwide and thus economic power.

«Avoiding CO2 emissions, removing large amounts of CO2 from the atmosphere, storing of CO2 from the atmosphere, store energy with this greenhouse gas and reuse it as an energy source for buildings, industry, power generation and mobility. That is what drives us.»

Prof. Dr. Urs A. Weidmann,  
Founder & President of the Board  
of Directors at Silent-Power AG



# Energy transition: An issue of the century, that moves the world.

**All forecasts show: Despite all the efficiency improvements and savings measures, energy demand will continue to rise in the future. On the one hand, because heat pumps are increasingly being used for heating and cooling. And on the other, because the population and mobility will continue to increase. Which means that in addition to power generation, the storage and transport of energy will also pose new challenges.**

## Energy consumption

Worldwide, 85 % of electricity is generated from nuclear power and fossil fuels. With a share of 70 %, electricity and heat generation is the largest source of CO2 emissions. If we in Switzerland want to achieve the international 2 degrees reduction target by 2050, we must reduce CO2 emissions by 70 %.

## Energy demand

When nuclear power and fossil fuels energy sources disappear, renewable energy sources will have to take over our supply. Unfortunately, solar energy and wind power fluctuate greatly in their output and require long-term storage to absorb the surplus electricity. Switzerland is dependent on imports, especially in Switzerland, especially in winter demand for electricity increases significantly. Our energy import quota of 75 % will not change even after 2050. Which means: renewable energy must be tradable and the right approach is to build a domestic synthetic fuels industry.

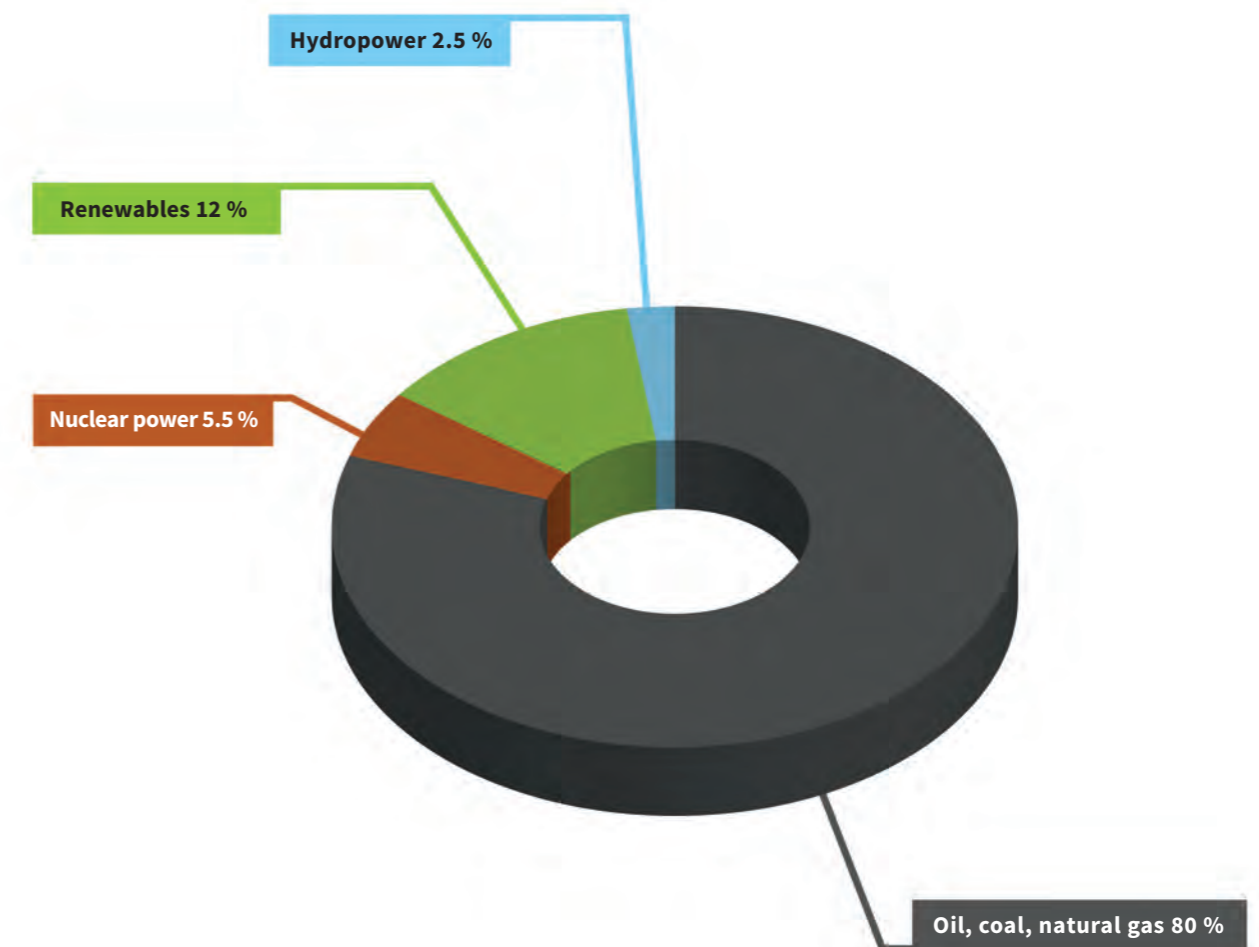
## Energy storage

The only economic alternatives are synthetic energy storage systems such as methanol. Unlike hydrogen, this energy carrier is liquid at ambient temperature and cannot volatilise if stored properly. Produced from CO2 with green electricity, this energy can then be stored and used sensibly.

## Energy supply

Electricity is usually produced centrally in large power and then delivered to the end consumer. These power plants are often not located close to settlements, and the electricity has to be transported over long distances. The distribution is handled by the grids, but these do not have the storage capacity to compensate for fluctuations in consumption. In addition, transport is risky and a power outage possible at any time. The solution is mini power plants from Silent-Power. These ensure high autonomy because the stored energy is stored as methanol at the consumer and the electricity is produced and consumed directly on site.

«Global energy consumption will continue to rise in the future while fossil fuels will disappear. The solution is methanol from Silent-Power. With it and with the use of decentralised small power plants, Switzerland can become a pioneer in the energy transition.»



Global electricity mix, approx. 20 % of the total worldwide energy consumption.  
Source: Silent-Power AG 2016

# Here everything revolves around the energy transition: The CO<sub>2</sub>-neutral methanol cycle.©

«A round thing: with methanol, a CO<sub>2</sub>-neutral energy supply is no longer a vision but a reality. You just have to implement the cycle consistently enough. Silent-Power is ready!»

**1** When nuclear power and fossil fuels sources are eliminated, renewable energy sources will take over the supply. However, electricity from wind and solar power is not reliably available at the consumer's location, and electricity can only be transported over long distances and stored seasonally with great effort. That's why we need long-term storage to keep the power supply going all year round. This is where Silent-Power's energy cycle comes in - it is based on synthetically produced methanol, made with green electricity.

**2** The Methanol from Silent-Power (M99) is a liquid, universal energy carrier and is produced synthetically with green electricity, CO<sub>2</sub> and water. The process can be carried out centrally in large-scale power plants or decentrally in small-scale plants – at locations and times where electricity from renewables is produced cost-effectively and is not needed immediately.

**3** Methanol is the world's most traded liquid after petroleum. It can be stored long-term at ambient pressure and temperature without energy loss and without danger.



**4** Methanol can easily be distributed through existing distribution channels such as those for petrol, diesel or paraffin; a filling station network for vehicles is available.

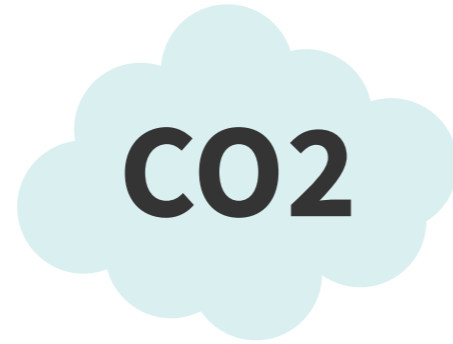
**5** Our Econimo mini power plants ensure a high degree of autonomy. By storing the stored energy as methanol at the consumer's, the electricity is produced and also consumed directly on site. When needed, the plants run at full capacity within a short period of time. In addition to electricity, they also supply hot water for heating and cold water for cooling the buildings.

**6** Methanol and Econimo converters in combination with electric motors ensure environmentally friendly mobility: smaller and thus lighter batteries, no lengthy recharging, range at the usual level, no noise, no vibrations and they are virtually maintenance-free.

**7** Through conversion into electrical and thermal energy, methanol is broken down again into its non-toxic components CO<sub>2</sub> and water and returned to the environment.

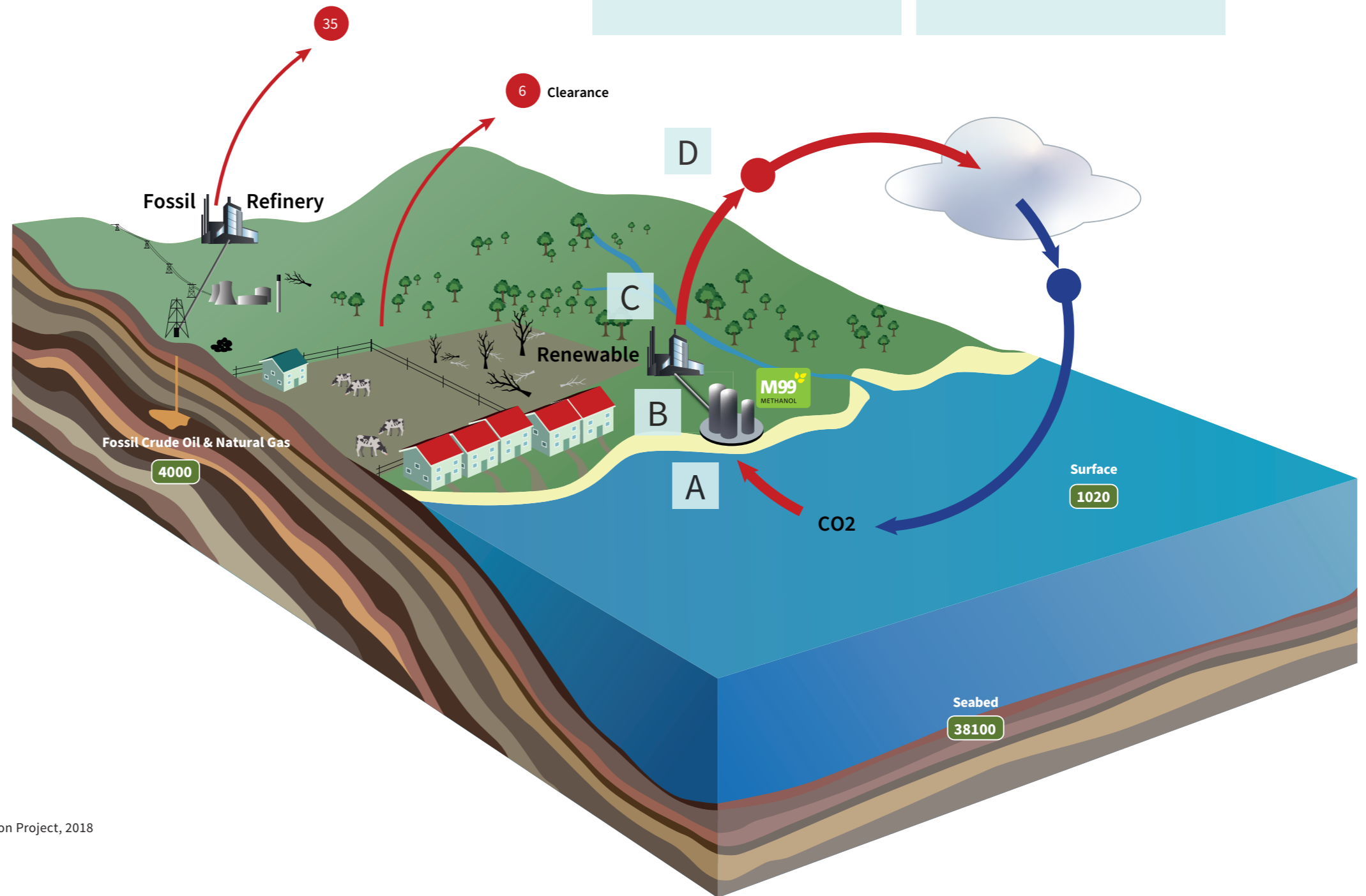
# The CO2 cycle.

1. Industry worldwide emits huge amounts carbon dioxide of fossil origin into the atmosphere.
2. Biological processes for recycling biowaste release additional CO2.
3. Changes in land use - for example massive slash-and-burn in tropical rainforests - cause further immense CO2 emissions.
4. The climate-damaging greenhouse gas moves across the sea with the air masses and is partly absorbed by the oceans. The CO2 dissolved in the sea leads to acidification of the oceans.
5. Marine organisms such as corals and mussels are severely threatened, because the low pH-value inhibits the formation of calcareous shells and skeletons.
6. If the carbon dioxide content in the atmosphere increases because more and more CO2 is emitted into the air, the ocean follows suit and also absorbs more.



# How positive the effects of methanol are.

- A** CO2 is extracted from the seawater. This creates a CO2 under concentration in the sea. This amount dissipates from the atmosphere into the sea water within a short period of time.
- B** Energy is chemically stored from CO2, water and renewable electricity in the form of methanol.
- C** Liquid methanol has the potential to replace all fossil fuels.
- D** Through conversion into electrical and thermal energy, methanol is broken down into its non-toxic components CO2 and water and returned to the atmosphere.



- Gigatonnes of fossil CO2 enter the atmosphere every year
- The oceans absorb CO2 from the atmosphere
- Stored carbon dioxide in gigatonnes

Graphic Sources: Courtesy of CO2CRC Ltd. Figures: Global Carbon Project, 2018

# M99 - the energy solution of the future.

We have given Silent-Power's methanol the name M99 because the number 99 stands for at least 99 percent purity of our product. Although M99 has similar combustion properties to petrol, diesel or paraffin, it burns without leaving any residue - i.e. without soot or ash - with an almost colourless flame. During the combustion process, M99 is broken down again into the elements from which it was obtained: CO<sub>2</sub> and water. As an inexhaustible supplier of energy, M99 covers all applications whether electricity generation, heating and cooling of buildings or mobility. Whether for purchasing, for trade or for logistics - the possible uses of M99 are inexhaustible.



## Energy sources in comparison.

No energy carrier is as versatile as methanol: not all of them can be used as fuels and combustibles.

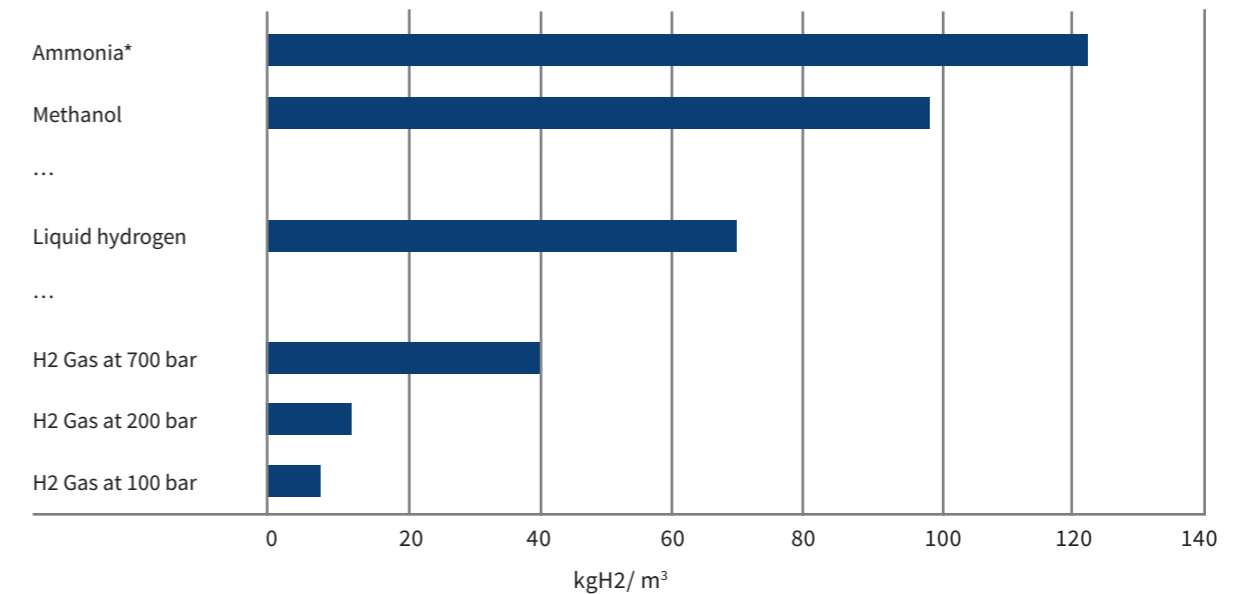
		Calorific value [per litre]	Specific CO <sub>2</sub> emissions	Final purchase price [centimes/kWh]	Investment costs Storage capacity
Primary energy sources	Fossil	Fuel oil	9.8 kWh/l	280 g/kWh	7.5 Rp/kWh 24 Rp/kWh
		Petrol	8.7 kWh/l	250 g/kWh	12.6 Rp/kWh 65 Rp/kWh
		Natural gas	0.0102 kWh/l	200 g/kWh	9.5 Rp/kWh 30 Rp/kWh
Renew-able	Wood pellets	3.1 kWh/l	390 g/kWh	8.0 Rp/kWh 27 Rp/kWh	
	Methanol	4.3 kWh/l	*0-250 g/kWh	7.2 Rp/kWh 65 Rp/kWh	
Secondary energy sources	Storage	Hydrogen	0.0030 kWh/l	0 g/kWh	30.4 Rp/kWh 70 CHF/kWh
		Li-Ion battery	**0.500 kWh/l	***120 g/kWh	20.7 Rp/kWh 127 CHF/kWh

\* Climate neutral depending on CO<sub>2</sub> source \*\* Energy density of lithium-ion battery \*\*\*Swiss supplier mix 2014

# Green methanol: One energy source, many advantages.

## Methanol - the «best» hydrogen storage medium

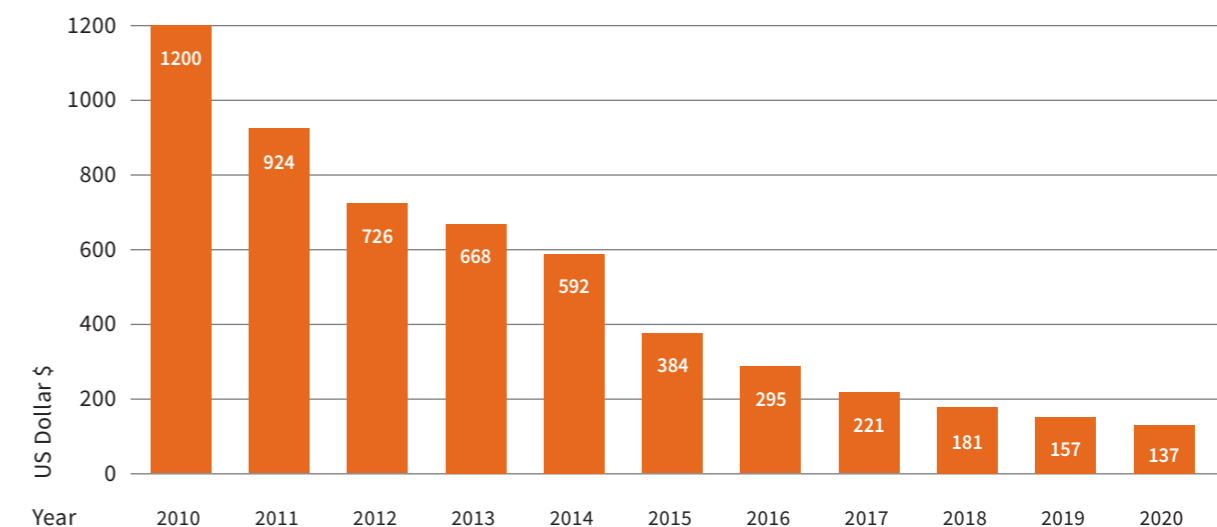
1. methanol is liquid at room temperature and room pressure.
2. combustion produces CO<sub>2</sub>, moisture and no fine dust particles.
3. methanol stores larger quantities of hydrogen than liquid hydrogen at - 253°C.



\*Ammonia ist a Gas  
Source: Andersson, J., Grönkvist, S.: Large-scale storage of hydrogen, International Journal of Hydrogen Energy No. 44 (2019) p 11911

## Development of battery manufacturing costs

Li-Ion batteries \$/kWh



Source: Bloomberg NEF vom 14.09.21

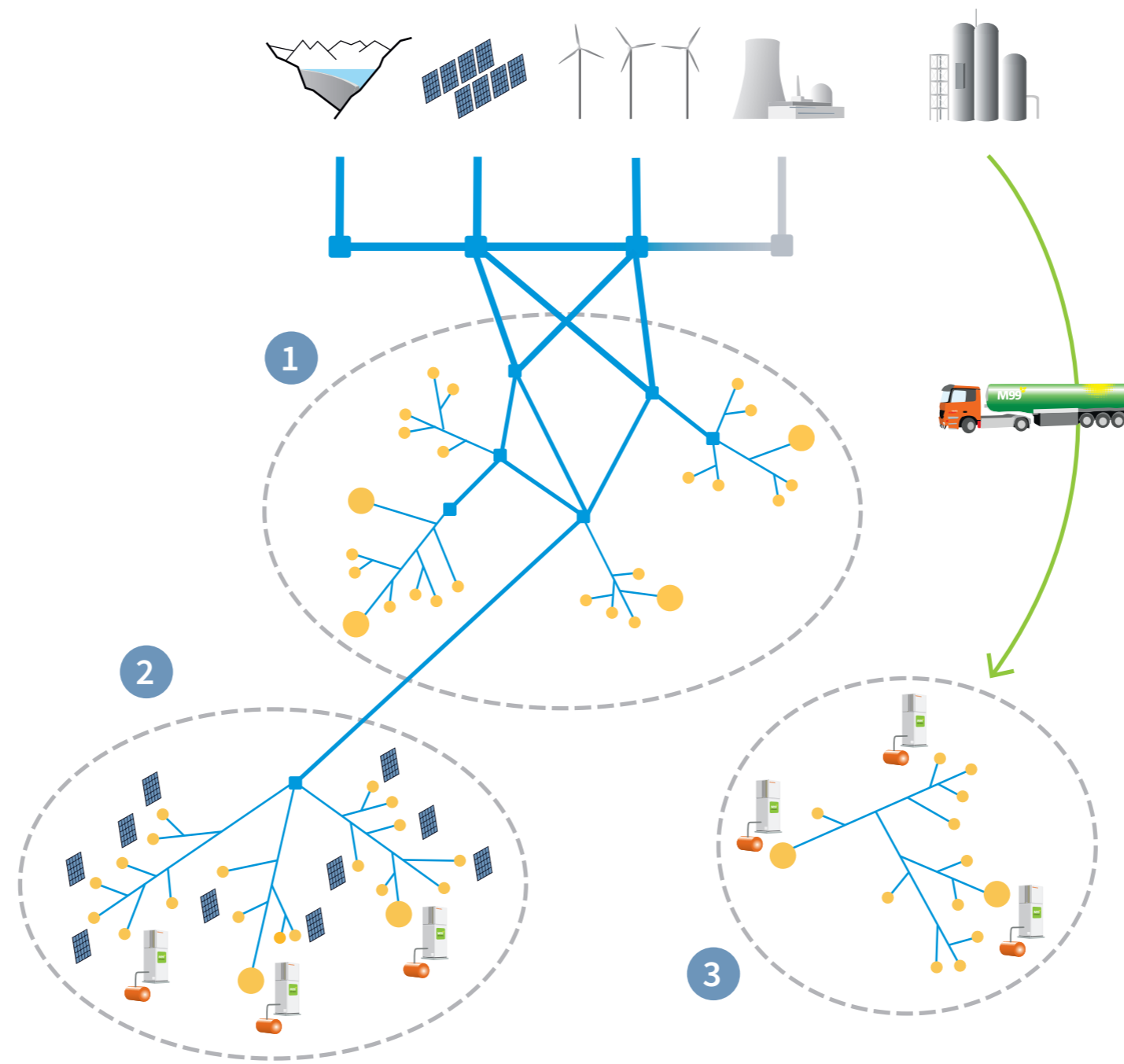
# Quiet. Powerful. Econimo. The mini power station directly at the consumer.



«Methanol M99 can be stored easily and for a long time. Without energy loss. And you can use the electricity you produce yourself in the building. It doesn't get more independent than that!»

A special milestone and proof of the innovative strength of Silent-Power AG is the development of the unique decentralised mini power plant Econimo. It supplies energy in three ways way: Electricity, heat and cooling. Econimo is a globally protected trademark and stands for «Energy Converter Integral Module».

The mini power plant is particularly quiet and is installed directly at the consumer's home. Not only the consumer is distinguished by its intelligence but also the power plant itself. When required, it starts up independently, feeds the electricity produced into the local grid and the heat and cold produced in the process can be used in the building. If there is a surplus of electricity in the grid, heat and cold for the building is no longer produced using methanol, but with surplus electricity. In this way, the Econimo mini power plants make a valuable contribution to grid stability and make the expansion of high-voltage grids unnecessary. With the Econimo mini power plant, a new electricity supply can be set up even without a grid connection (island operation).



## Central and decentralised energy supply

- 1 Electrical energy is fed into the high-voltage grid. Electricity is mainly supplied by large power plants. Since these power plants are usually not located close to settlements, the electricity has to be transported over long distances. This leads to relatively high losses.
- 2 On the other hand, the Econimo mini power plant is installed directly at the consumer's home. When required, it feeds the electricity produced into the local grid and the heat and cold produced in the process can be used in the building. If there is a surplus of electricity in the grid, heat and cold for the building are no longer produced using methanol, but with the surplus electricity.
- 3 The Econimo island system works autonomously, fully automatically and produces electricity for self-supply even without being connected to the power grid.

- Single-family house
- Apartment building, schools, retirement homes, offices, shopping centres
- Photovoltaic system
- Econimo mini power plant

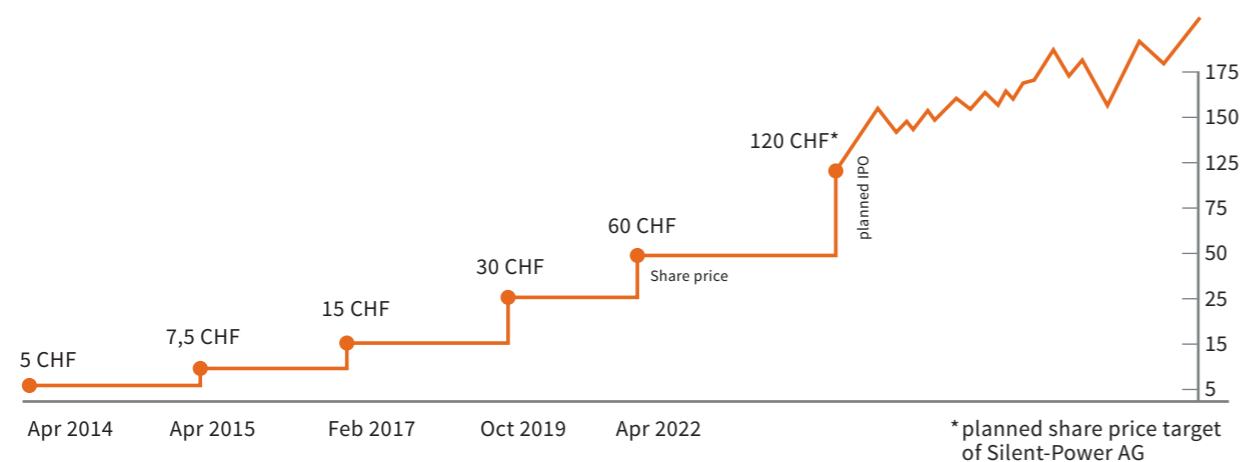
# The visionary from Cham: Silent-Power AG at a glance.

Prof. Dr Urs A. Weidmann, scientist, founder and chairman of the board of Silent-Power AG, has been a pioneer in the research and development of climate-neutral energy supply solutions. The company he runs in Cham has therefore specialised in a technology that produces CO2-neutral methanol and converts it into electricity and heating or cooling energy.

The dynamic Zug-based company has been the winner of the Swiss Innovation Prize IDEE SUISSE® 2016 and has the necessary experience and technology to make Switzerland a pioneer in the energy transition thanks to Methanol M99.

A special milestone has been the development of the unique decentralised mini power plant Econimo, additional mobile and stationary heating systems and heat applications for consumers.

The federal government, cantons, municipalities, the private sector, industry and commerce - all can benefit from Silent-Power's many years of development work - in the conversion of building parks, in future-proof mobility solutions, in energy storage and in the conversion of waste gases from waste disposal plants into energy.

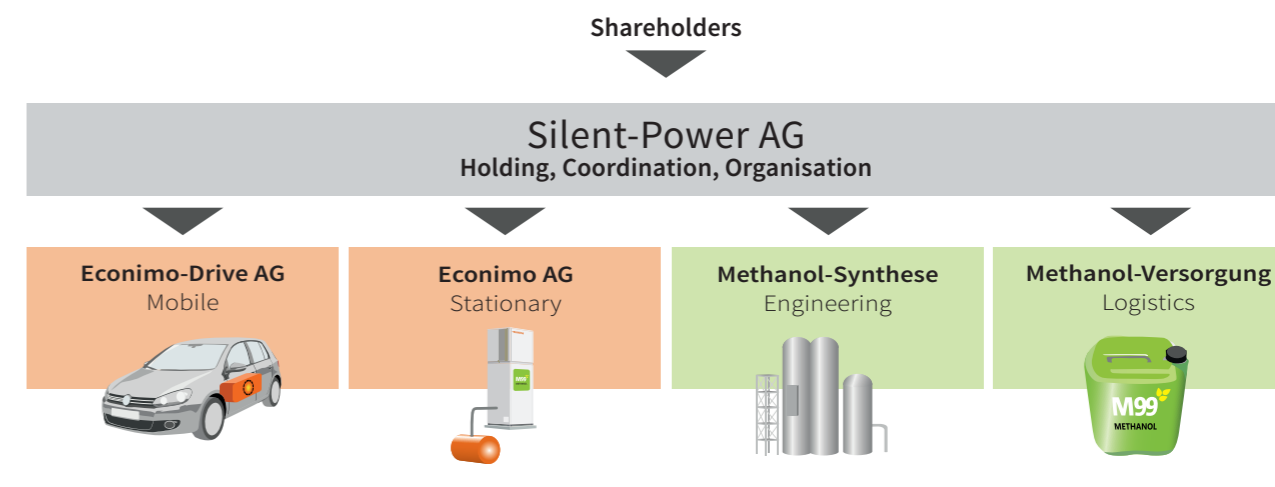


## Offer-for-shares: Silent-Power AG (Fully paid in)

Tranche	Invest [000 CHF]	Share Price [CHF]				Shares			Total Nominal Capital [000 CHF]	Ratio in %	
		Share A		Share B		A	B	Total		Capital	Voting
		Total	Nominal	Total	Nominal						
Tranche 1	5'900			5.00	0.05	0	1'180'000	1'180'000	59	19%	12%
Tranche 2	9'200			7.50	0.05	0	1'226'667	1'226'667	61	19%	13%
Tranche 3	10'000			15.00	0.05	0	666'667	666'667	33	10%	7%
Tranche 4	30'000			30.00	0.05	0	1'000'000	1'000'000	50	16%	11%
Tranche 5	19'790			60.00	0.05	0	329'833	329'833	16	5%	4%
Management A	100	0.02	0.02			5'000'000	0	5'000'000	100	31%	53%
<b>Total</b>	<b>74'990</b>					<b>5'000'000</b>	<b>4'403'167</b>	<b>9'403'167</b>	<b>320</b>	<b>100%</b>	<b>100%</b>

# The structure of Silent-Power AG.

We are consistently building the CO2-neutral methanol value chain and thus developing into an integrated energy service provider. In doing so, we are working on groundbreaking projects for a climate-friendly future in four areas.



## Board of Directors



**Professor Dr. sc. techn. ETH Urs A. Weidmann**  
President of the Board of Directors

### Education

- Professor of Energy Economics, University of Baku, Azerbaijan
- Doctor of Science (Technology), ETH Zurich
- Scientist at the Swiss Energy Research Institute (PSI)
- Dipl. Electrical Engineer, ETH Zurich
- International Finance Education (National Westminster Banking Group, London)

### Professional experience

- **PSI, Scientist at the energy research institute of Switzerland**
- **Credit Suisse AG, Zurich, Switzerland**  
Head of the Financial Engineering Department
- **UBS AG, Basel, Switzerland**  
Member of the Executive Management Board Corporate Finance, Domestic Corporate Clients  
Global Investment Banking: M&A, Venture Capital and Project Finance
- **Imes Management AG, Cham, Switzerland**  
CEO and Chairman of the Board  
Management of major projects in Asia

## Managing Director

### Dr. Albrecht Tribukait

#### Education

- University of Göttingen / Max Planck Institute for Biophysical Chemistry – Dr.rer.nat.
- Anaheim University AMSB – MBA
- University of Frankfurt – MSc.
- University of Göttingen – Medicines Law
- University of Hull – REACH Management
- University of Oxford – Corporate Affairs

#### Professional experience

- DNV GL London UK – Senior Strategy Advisor
- COTY Inc. NYC USA – Member of the extended Executive Committee
- Morris Plains NJ USA – Member of the R&D Leadership Team
- BAT Co. Hong Kong – Regional Head of Scientific Affairs Asia & Pacific

## Advisory board

### Albert Vollmer

- Former Vice Director UBS AG Zurich (CH), Wealth Management
- Partner of the German Max-Planck Society (D)

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More information is available at [www.silent-power.com](http://www.silent-power.com)



# The path to independence from fossil fuels. Let's walk it together!



Please contact us with any questions or concerns. We will be happy to answer them personally:

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