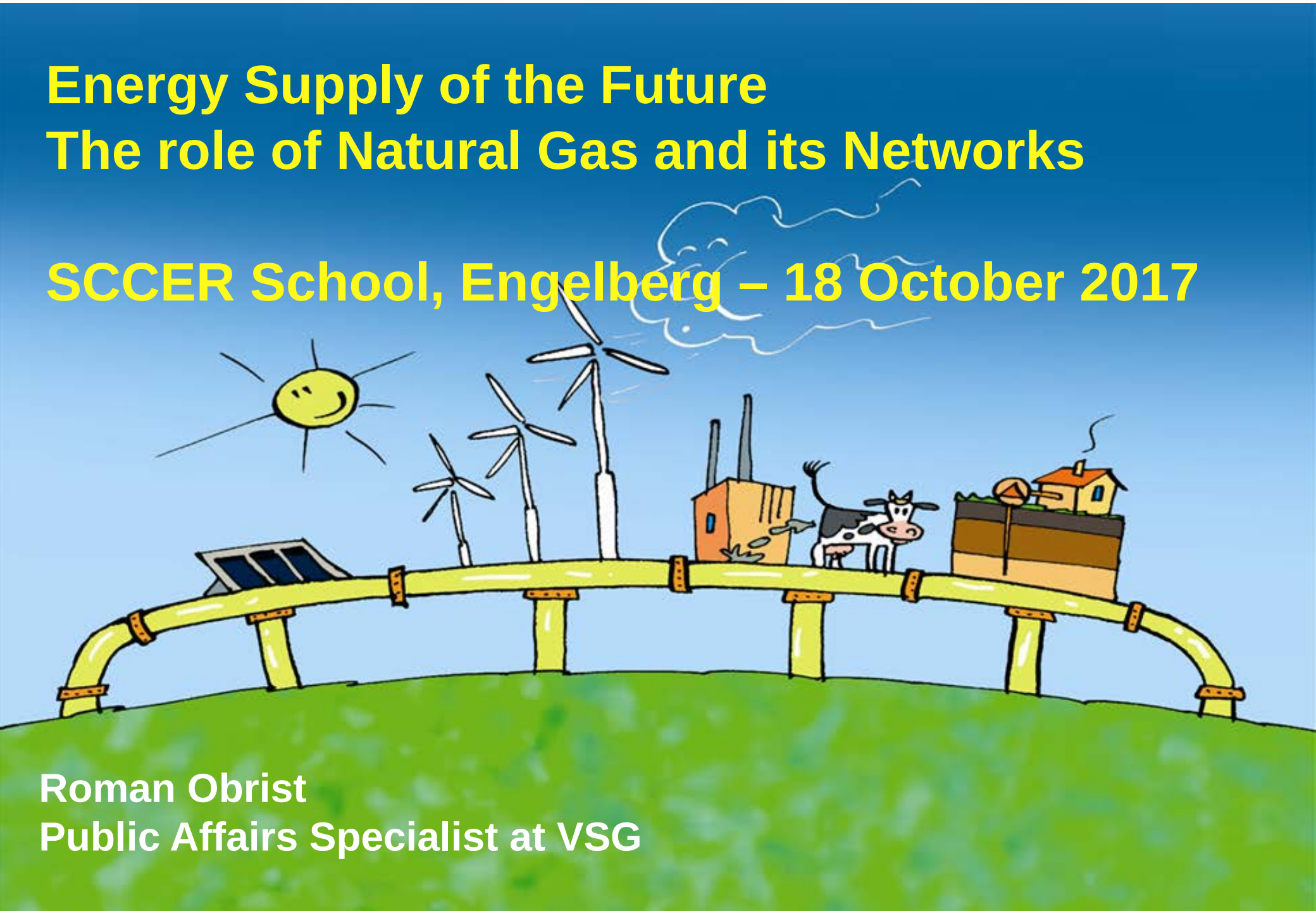
Energy Supply of the Future
The role of Natural Gas and its Networks

SCCER School, Engelberg – 18 October 2017



Roman Obrist
Public Affairs Specialist at VSG

Climate Targets – Paris Climate Agreement

- Paris climate conference in 2015: Goal(s)
- Meeting this goal requires a rethinking
- By the year 2030 we need to have a reduction of …
- Europe is on course to miss the 2030 targets
- Much more needs to be done

Swiss Energy Policy's Starting Point after 21 May 2017

- **Swiss citizens voted on 21 May 2017 for the Energy Strategy 2050:**
  - **Four central priorities**
  - **and unsolved questions …**

Getting out of (domestic) nuclear power and, at the same time, to reduce CO_2 emissions leads to a central unsolved question:

Energy Strategy 2050 – Open questions

How can the goal of nuclear phaseout, and, simultaneously, the reduction of CO_2 emissions, be attained medium- and long-term?

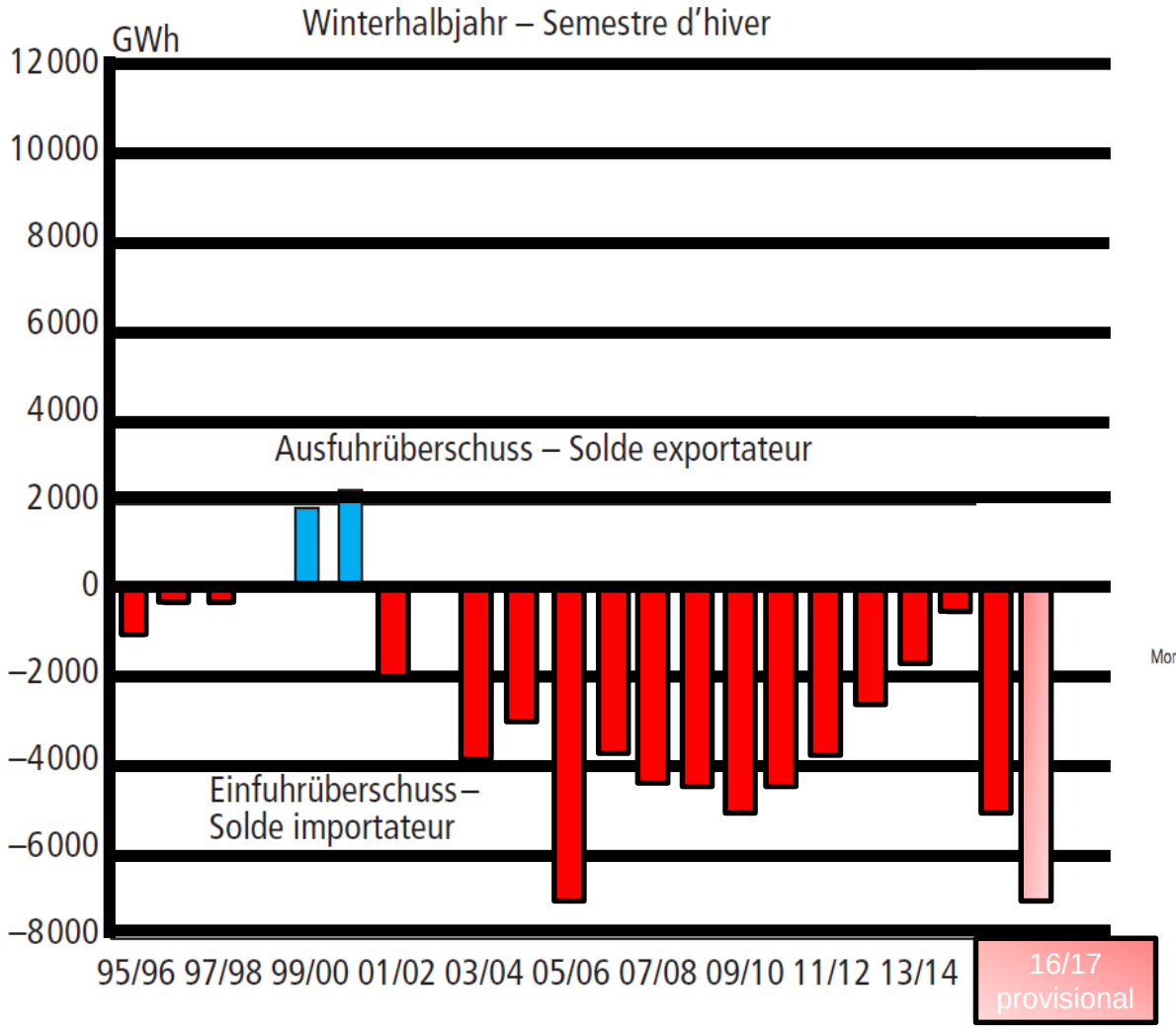
In particular:

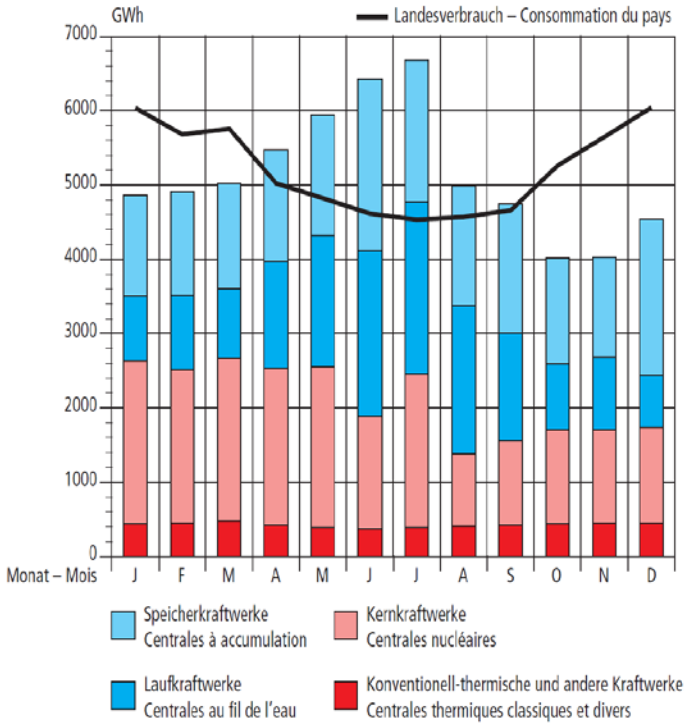
- **How to ensure <u>security of electricity supply in winter</u>?**
- **How to solve the problem of <u>electricity storage</u>?**

Security of supply – Risks especially during winter

- **Delicate situations when domestic electricity reserves become scarce**
- **Imports from abroad were limited due to grid bottlenecks**
- **In the coming years, further power plants are expected to be shut down in Germany and France**
- **Controllable capacities are declining and non-taxable, from new renewable energy sources are increasing.**
- **The security of the supply must therefore be clarified in the medium term.**

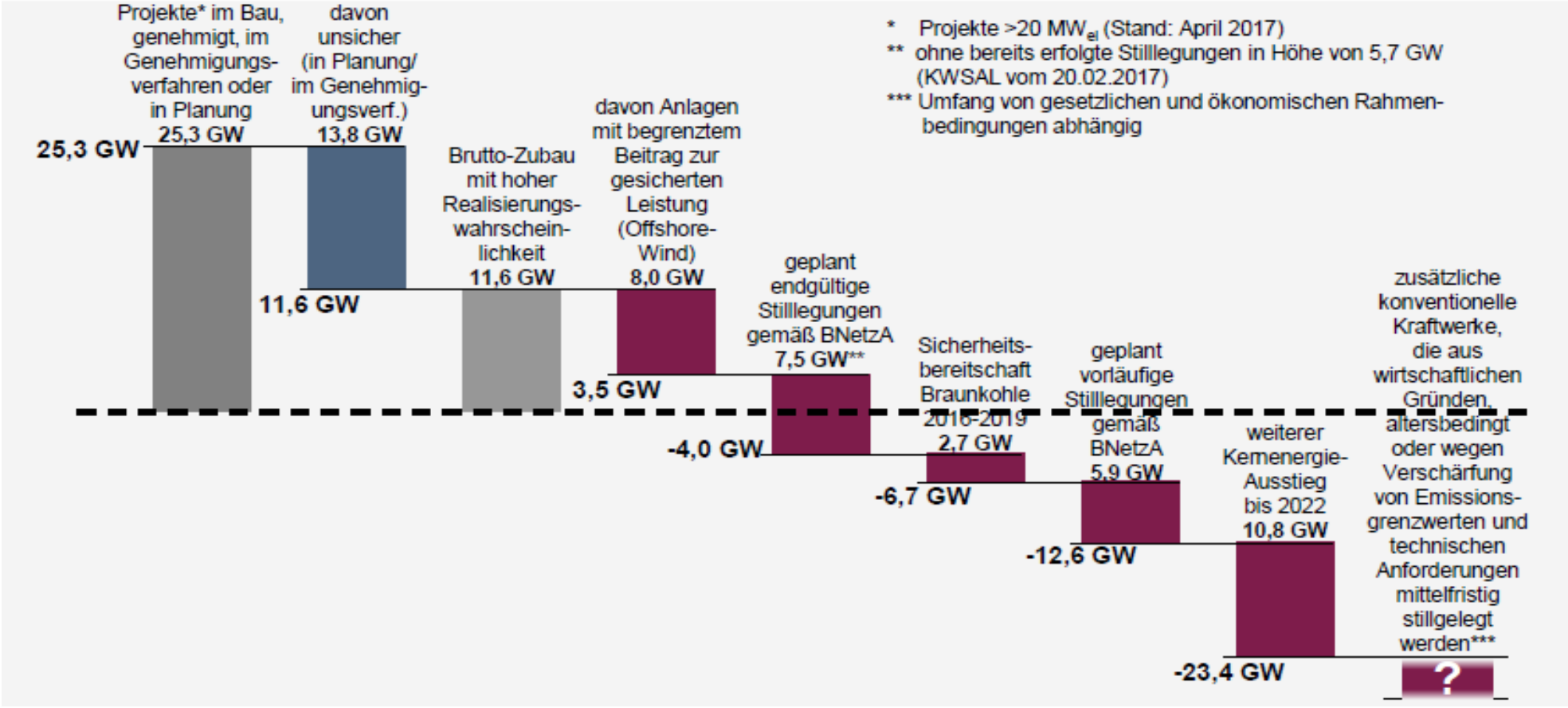
Electricity Supply: Import / Export and Production Mix





Capacities of Power Plants in Germany - Expected Development until 2025

Additional imports of electricity appear less secure medium-term:



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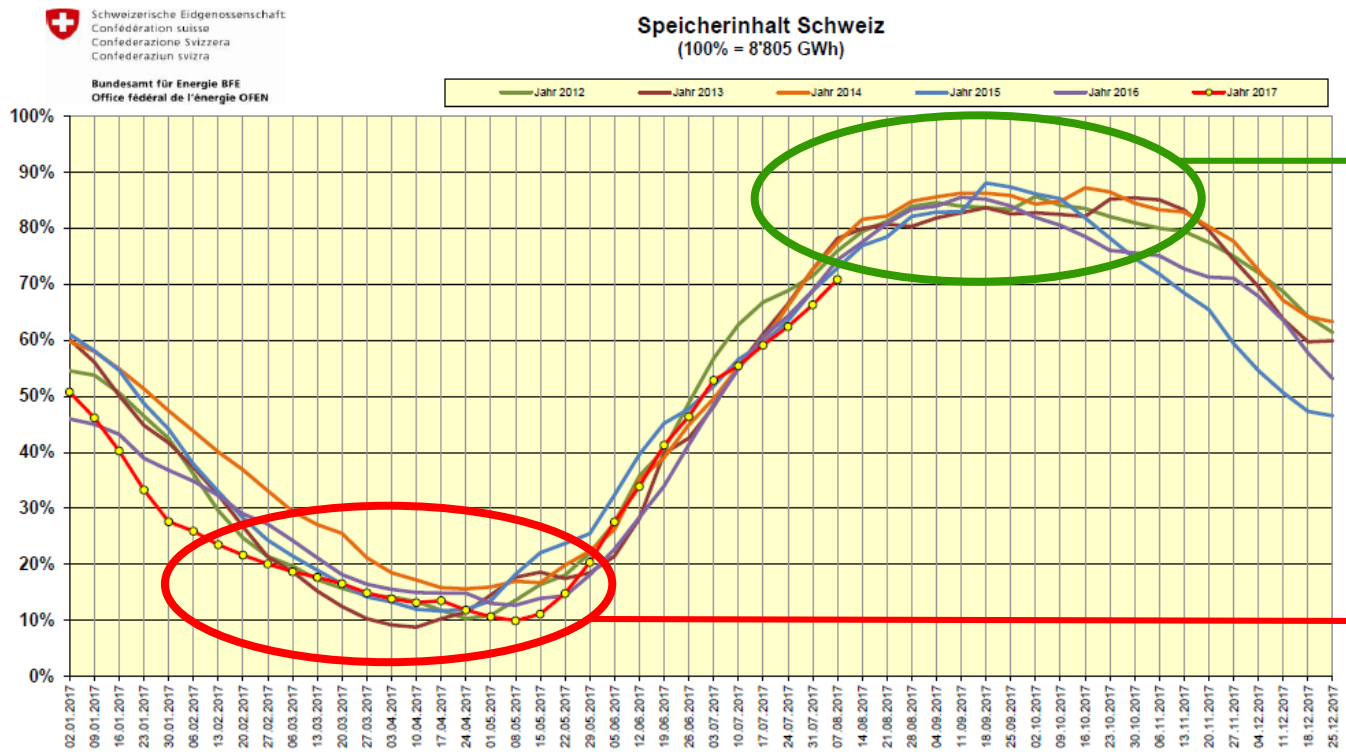
Hydropower Reserves Summer vs. Winter Semester



Storage capacities nearly exhausted in summer

Few reserves in winter

Source: BFE, 15.08.2017

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Additional strategies needed

- **As mentioned, in winter, Switzerland has been dependent on electricity imports for years**
- **The risk on import of electricity will increase**
- **Import strategy or additional domestic production of electricity from alternative sources are needed**

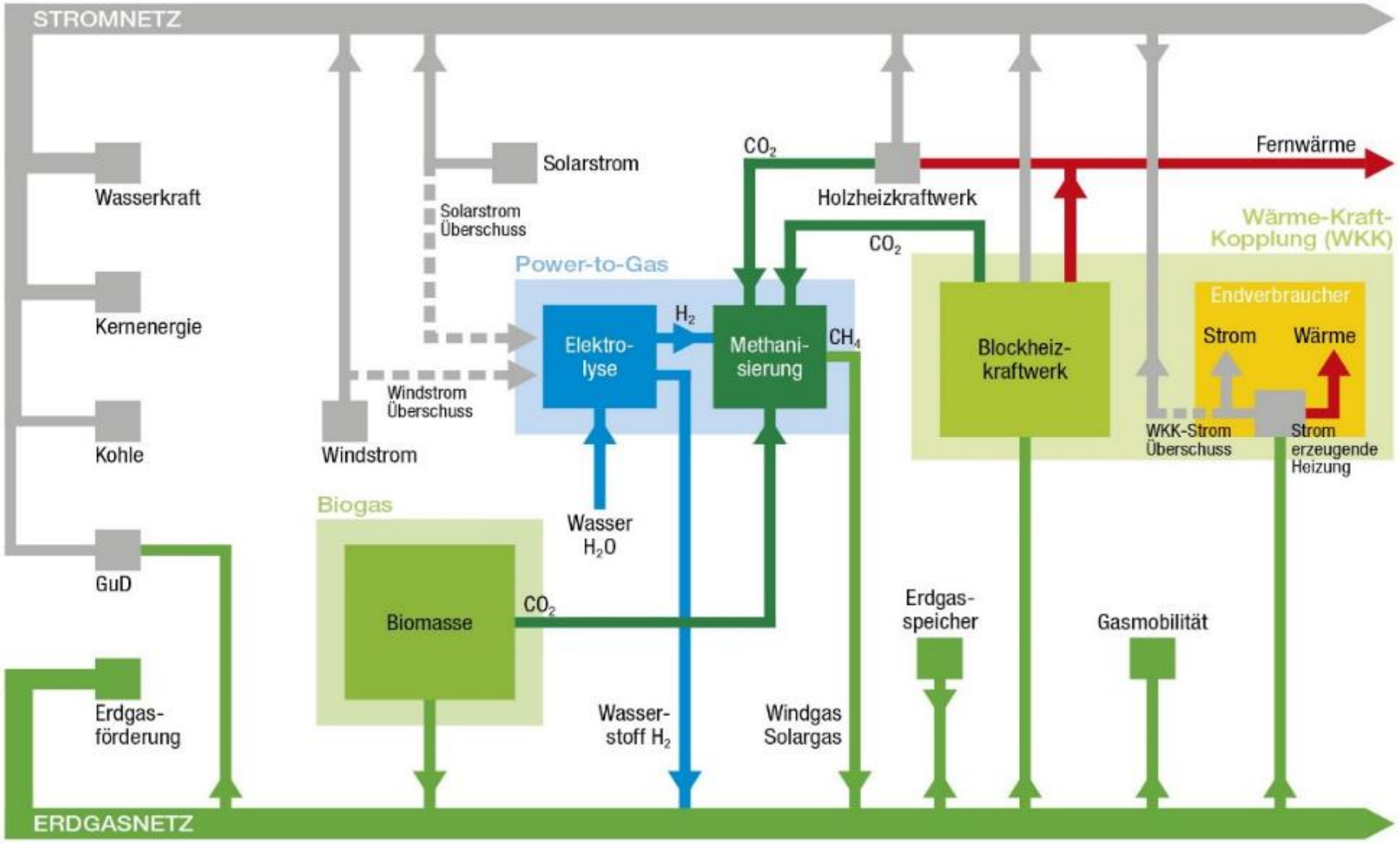
Various solutions are possible, e.g. Convergence

- **Innovative technologies and new concepts for the energy supply have not been taken into account in the decided measure packages**

- **It requires a competition of ideas. Today it's limited by the fact that the energy industry traditionally works in sectors**

- **A coupling of the sectors and / or the convergence of the various existing networks can be achieved by various technologies which are in place already today:**
  - **Cogeneration (WKK),**
  - **Power To Gas**
  - **Power To Heat,**
  - **Gas**
  - **Electromobility**

Convergence of Networks and Energy Storage



Power to Gas

- **Power to gas: in the gas sector, there is particular innovation potential in turning excess power from variable renewable sources into synthetic methane, in increasing the efficiency of gas-fired power stations when they are used flexibly to back up electricity from variable renewables, and in carbon capture and storage.**

- **In other words: when there is a surplus of wind and sun energy, the innovative power to gas technology provides the ideal storage as well as renewable gas.**

Cogeneration («WKK»)

- **Expressed in simple terms, cogeneration refers to a form of heating that simoultaneously produces electricity, or vice versa, a power plant that simoultaneously supplies heat.**

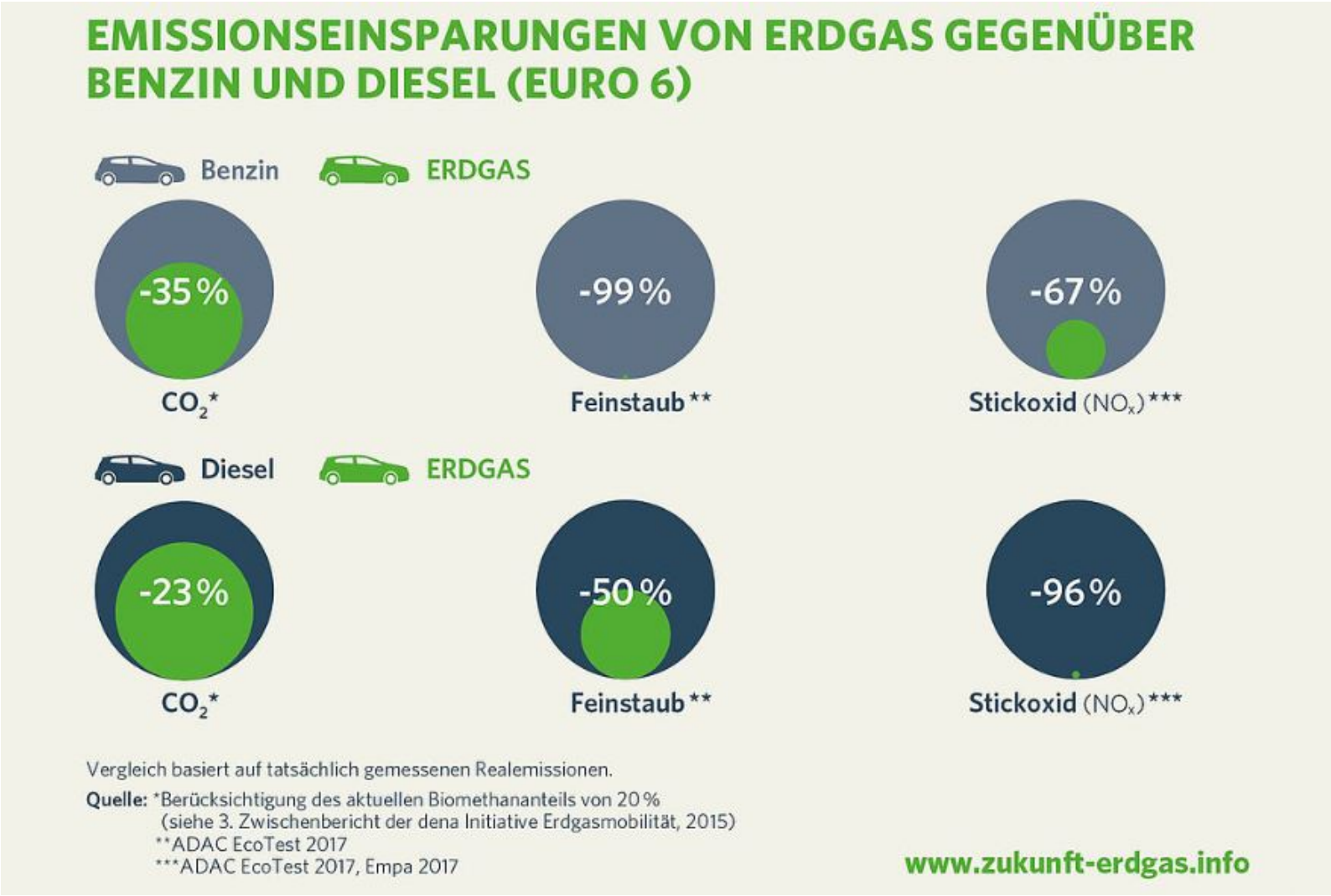
- **In this way, consumers are supplied with the two most important forms of energy: electricity and heat.**

- **In combination with electric heat pumps, the broad use of cogeneration plants represents a great deal of potential: it would be possible to reduce primary energy and the associated CO_2 emissions for heating and hot water substantially.**

Using Cogeneration («WKK») means…

- **dependencies of electricity imports in winter could be reduced**
- **30 percent of electricity could be generated with cogeneration plants**
- **such plants have the advantage of a high degree of efficiency and, with the use of renewable gas, they can reduce even more CO_2 emissions**
- **competitiveness against electricity imports would have to be further improved**

Reduction of CO_2 within Mobility



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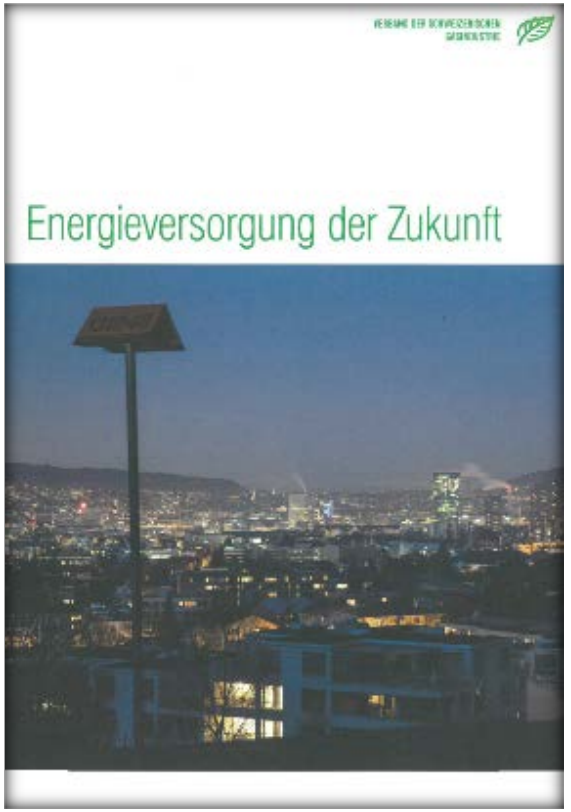
Role of the Gas Industry within the Energy Future

- **Open questions after First Package of measures of 2050 Energy Strategy require new appraisal of role of gas supply**

- **Gas industry convinced that natural gas, with its network infrastructure, is indispensable for conversion of energy systems, willing to contribute**



⟶ Position paper of VSG about energy supply of the future

The Key Elements of the Position Paper

1. **Ideal combination with renewable energies:**
   - **With photovoltaic**
   - **With heating networks at the local level to cover peak demand**
   - **Within the entire supply system for the of photovoltaic and wind energy**

2. **Natural gas ensures calculable and sustainable reduction of greenhouse gas emissions in short time (25% less compared to Oil)**

3. **Natural gas / biogas and its network infrastructure are systematically relevant to the energy future. Without the gas network, no conversion of energy supply is possible.**

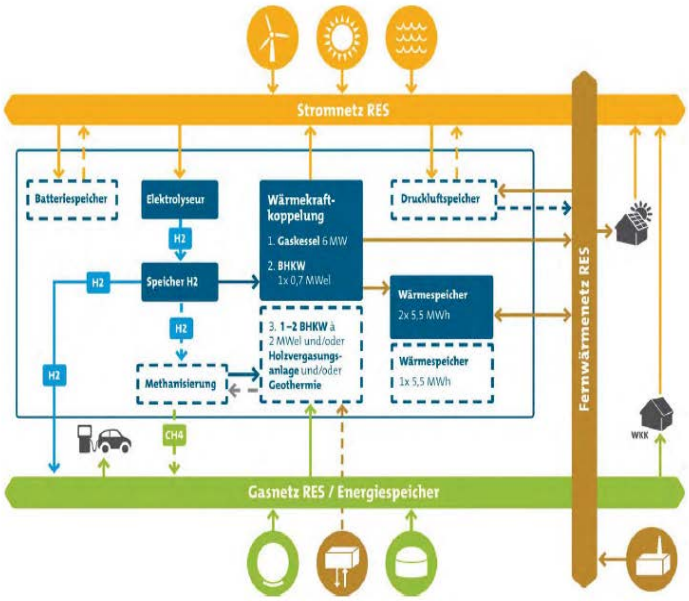
4. **The greening of natural gas allows for further reduction in CO_2**

We build the Future

- **Our “Forschungs-, Entwicklungs- und Förderfonds der Schweizer Gaswirtschaft (FOGA - *Fund for research, development and promotion of the Swiss gas sector*)” supports the industry on future-oriented projects in the following areas:**
  - **Energy Efficiency**
  - **Renewable gas**
  - **Gas networks**

Power-to-Gas in tangible Terms

Hybridwerk Aarmatt Solothurn



Pilot- und Demonstrationsanlage

- Anschlussleistung ca. 360 kW
- H_2-Erzeugung ca. 60 m^3/h

Partner

- Regio Energie Solothurn
- Bundesamt für Energie
- Gasverbund Mittelland
- Hochschule Luzern
- Hochschule Rapperswil
- Kanton Solothurn
- Stadt Solothurn
- Schweizerischer Verein des Gas- und Wasserfaches

E.ON Falkenhagen

Finanzierung

- E.ON Gas Storage
- Swissgas AG

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Conclusion

- An overall view in respect of energy supply is required
- After the vote on the First Package of measures of the 2050 Energy Strategy, many important questions need to be discussed under new premises:
  - Security of energy supply
  - Possibilities and limits of Swiss hydropower
  - Solution of the seasonal problem of storage
- Convergence of networks: Guiding principle for the energy supply of tomorrow

- **Let’s make the energy transition happen by using the full benefits that gas can offer!**

Roman Obrist
Public Affairs Specialist

Verband der Schweizerischen Gasindustrie
Grütlistrasse 44
8027 Zürich

obrist@erdgas.ch
044 288 31 31