



Baden-Württemberg

REGIERUNGSPRÄSIDIUM FREIBURG

From hydro-electric to hydrogen Seveso establishment

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Hydro-electric power plant Wyhlen



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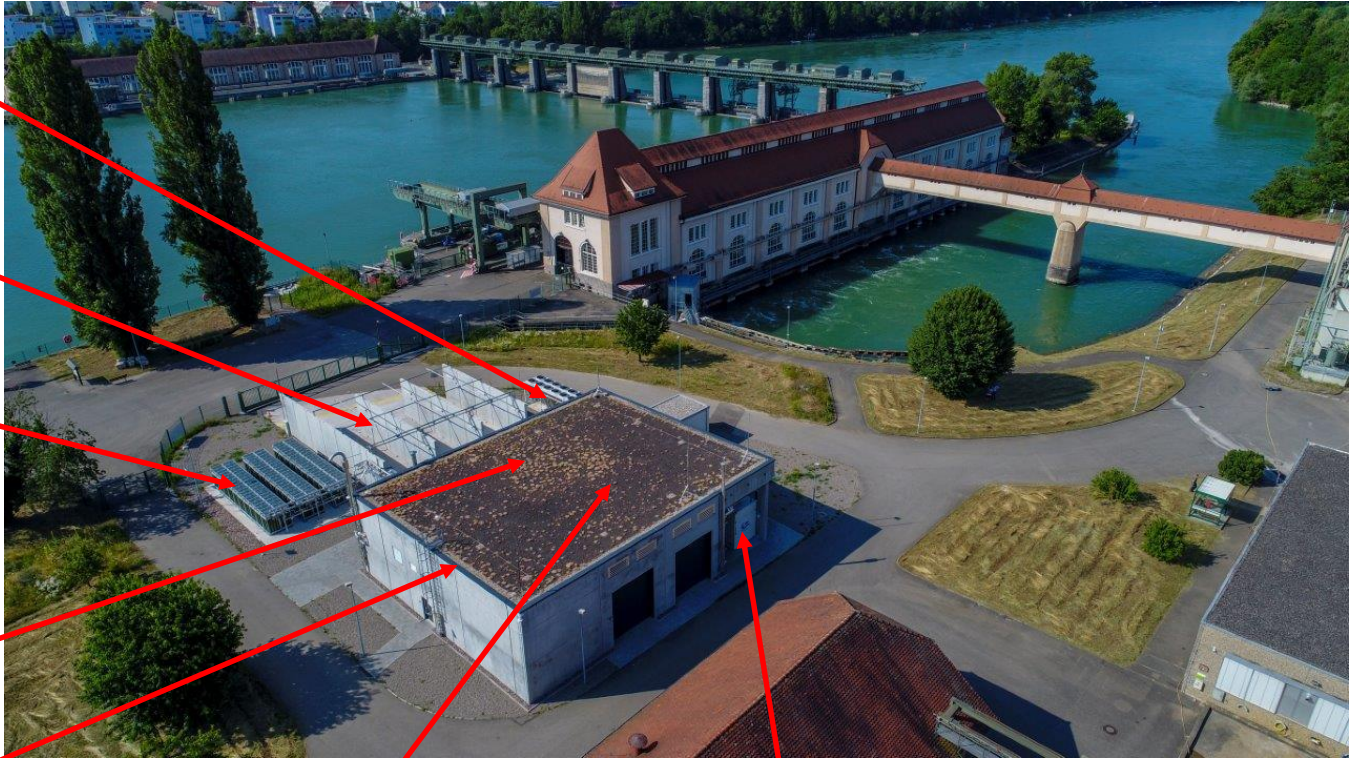


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First permit (03/2018)

Cooler
Trailer station
Storage
Compressor
Control room



Electrolysis with RTA

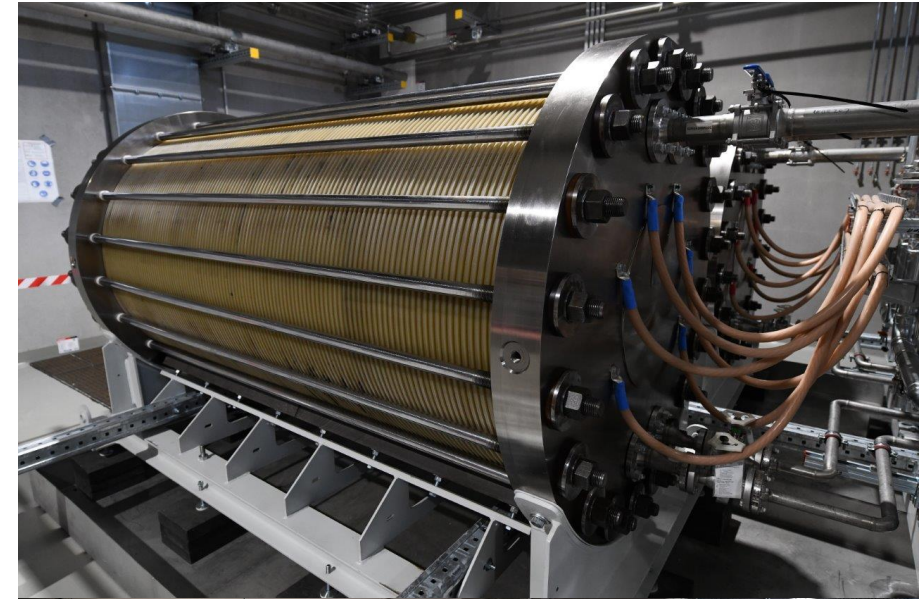
ZSW-Research facility

Provided by Energiedienst GmbH



Electrolysis with RTA

- Alkaline electrolysis (potassium hydroxide solution), 1 MW
- Hydrogen production
 - at 30 bar
 - ~200 Nm³/h
 - Operating temperature ca. 80°C
- Purification of H₂ to remove contamination and humidity (5.0 purity)

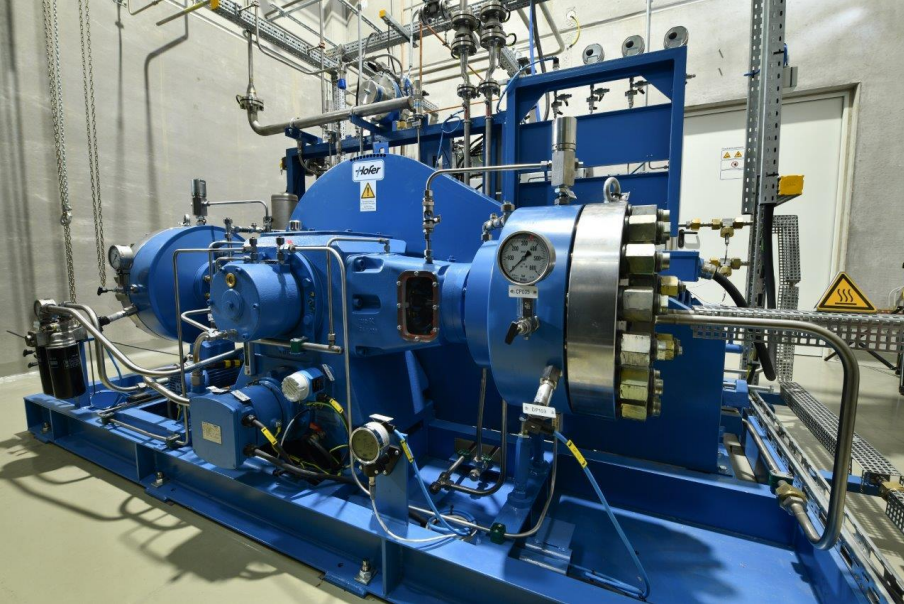


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Compressor & Storage

- Compressor: Compression to max. 311 bar
- Noise level 101 dB(A) → noise reduction measures are required
- Storage consists of cylinder bundles
- 285 bar (300 bar)
- ca. 1,2 t hydrogen in total
- 3 units



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Trailer filling points

Filling points with 3 boxes for a trailer at 200 bar



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Operating experience

- 12/2019: start of operations
 - 06/2020: fire in the venting pipe
 - 09/2020: restart of operations
 - 06/2021: release of alkaline from the electrolysis stacks
 - 08/2023: restart with new stacks for 100 h
 - Future: again problems with stacks, stacks have to be changed by manufacturer
- Operation is intermittent with no long term practice



Expansion – Seveso establishment

- Current planned expansion:
 - Additional 5 MW electrolysis (PEM)
 - Compression to 500 bar
 - Additional storage of 3800 kg
 - 4 new trailer filling points with 200, 300 and 500 bar
 - Connection of the new unit to the existing storage
 - Connection of the new unit to the existing trailer filling points (boxes)
- Maximum quantity of hydrogen on site: **12,8 t**
- **Welcome to Seveso!**
- **Key problem: Land-Use-Planning and determining the appropriate safety distance**



Conclusion

- Hydrogen is not new → but the operators are new
- Time pressure due to government R&D funding and new regulations, e.g. EU „green hydrogen“
- Many proposals / advice and consultation by the authorities
- No proposal is the same → different questions and concepts



Conclusion

- Very few experienced third-party experts for hydrogen
- The location is significant for the permitting process
- Until now little experience from incidents
- We would like to avoid a Déjà-Vu with biogas plant





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