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DATAHUB SWITZERLAND TOWARDS A NOVEL DATA INFRASTRUCTURE IN THE ENERGY SECTOR



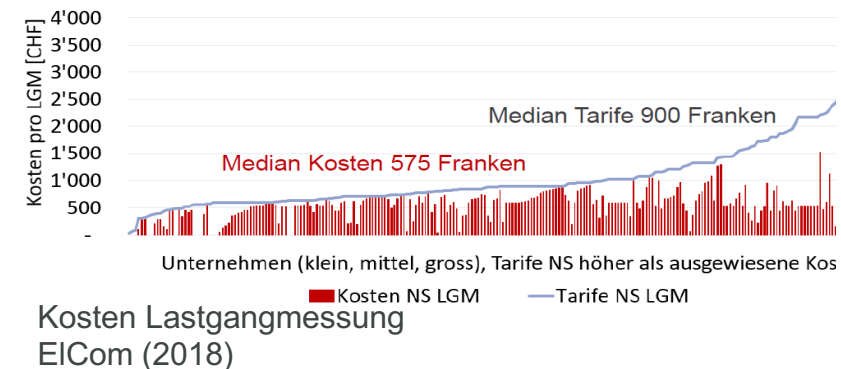
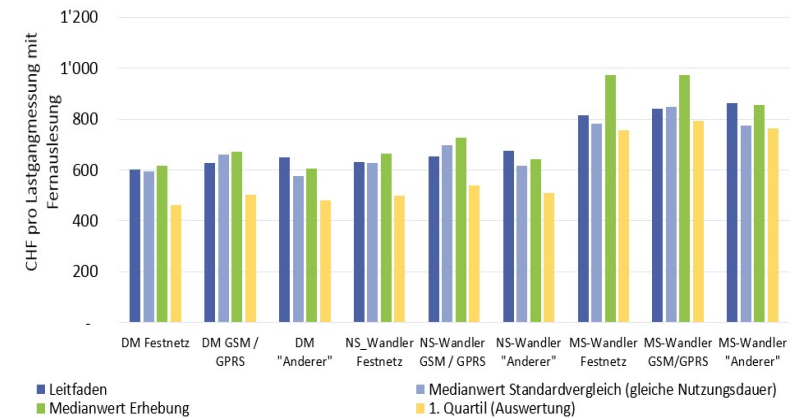
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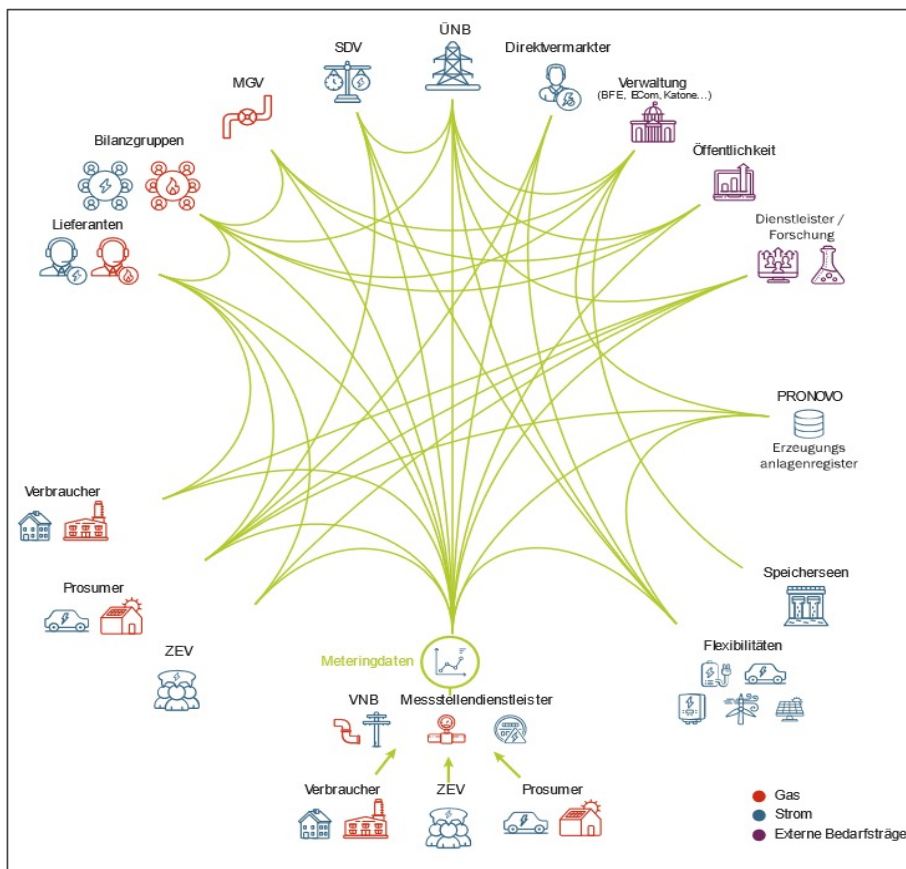
DATA EXCHANGE IN THE ELECTRICITY MARKET AN INTRODUCTION

- Tariffs of measuring and data exchange high, even higher as accountable costs.
- Data quality not very high. Swissgrid ooften needs to correct data after T+6Months.
- Process quality and costs for corrections intransparent.
- Data Access for interested third parties (research or service providers) cumbersome.





DATA EXCHANGE ELECTRICITY & GAS SECTOR HIGHLY DECENTRALIZED AND FRAGMENTED



- Exchange of data & processes in the electricity market fragmented. Characterized by many interfaces and duplications, only partially standardized.
- Problems with availability of and access to good measurement data, data quality, etc.
- More data is collected with smart meters. If the system remains the same, this data can only be used for services to a limited extent.
- Data plays a fundamental role in the future of energy markets in a wide variety of applications.
- Security of supply, opening of the electricity market, freedom of choice in metering, flexibility market, statistics (cantonal, national) and digital innovation all need good data.



REVIEW OF DATAHUB ACTIVITIES WHAT HAS HAPPEND

Study Swissgrid «Energy Datahub Switzerland. Economic Analysis». (2014)

Study VSGS «Datenplattform Schweiz». (2015)

Study SFOE «Datahub Switzerland. Costs & Benefits and regulatory needs». (2018)

Study Misurio, Raiffeisen. «Swiss Hub for Energy Data. Digital Innovation & Potential Services». (2020)

Consultation Datahub in Proposal for RevStromVG & **Decision Federal Council.** (2020)

Study SFOE «Datahub for a future Data Infrastructure in Electricity & Gas market». (2021)

E-StromVG. Subsidiarity. Possible Extension. Costs Bearing. Regulation. Data Access. (2021)

- Complex topic, affects many topics (electricity market suppliers, flexibility, data, statistics, RES & CoO).
- Meanwhile, digital technologies and approaches have continuously developed and made new things possible.
- International developments very dynamic. Many activities or realizations.



EXPLORING THE SOLUTION SPACE DIFFERENT FORMS OF DATAHUBS

Communication Hub

- No data stored centrally.
- Interface for data exchange & routing.
- Standardization of «Interface» - «Message» - «Outbox» «Inbox».

Datahub Light

- Master data stored and managed centrally.
- Interface for data exchange & routing. Some process automation.
- Measurement data routed to participants.
- Standardization of «Interface» - «Message» - «Outbox» - «Inbox» - «some content»

Datahub Full

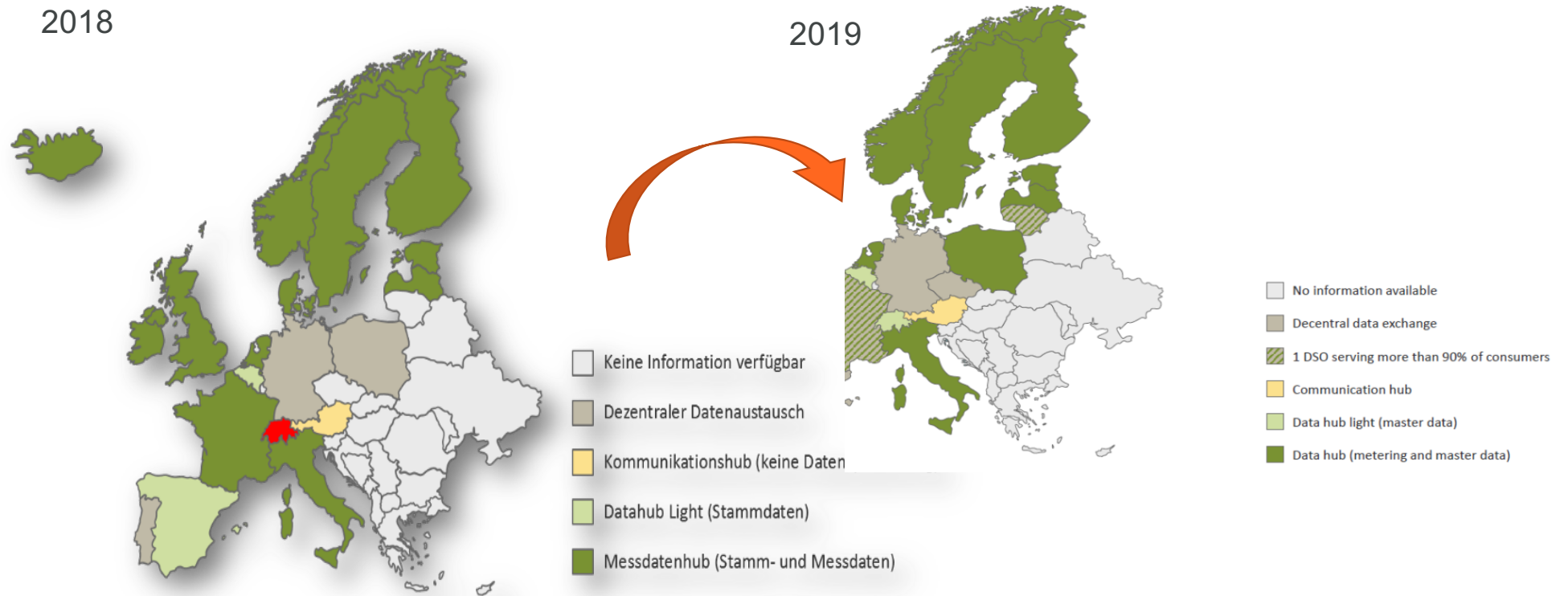
- Master data stored and managed centrally.
- Measurement data stored and managed centrally.
- Data processing options: plausibility check, substitute values, aggregation.
- Standardization: «Interface» - «Message» - «Outbox» - «Inbox» - «Content»

Standardization











STATE OF INTERNATIONAL DEVELOPEMENTS DATAHUBS GROWING IN EUROPE



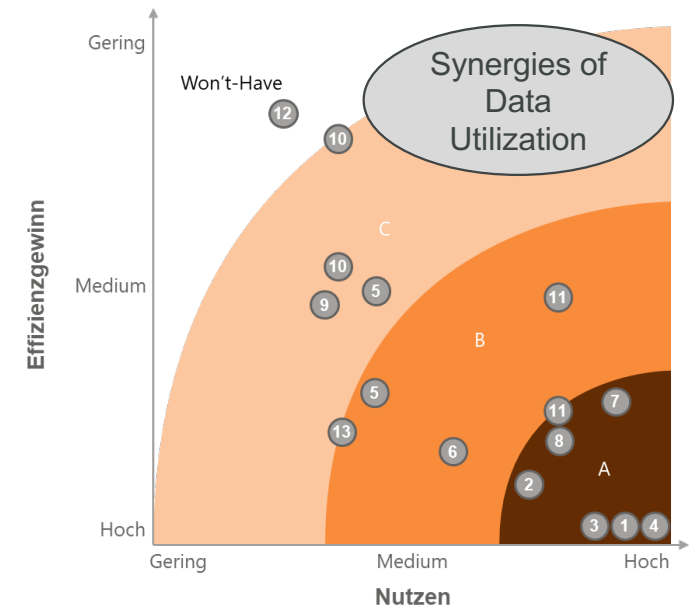
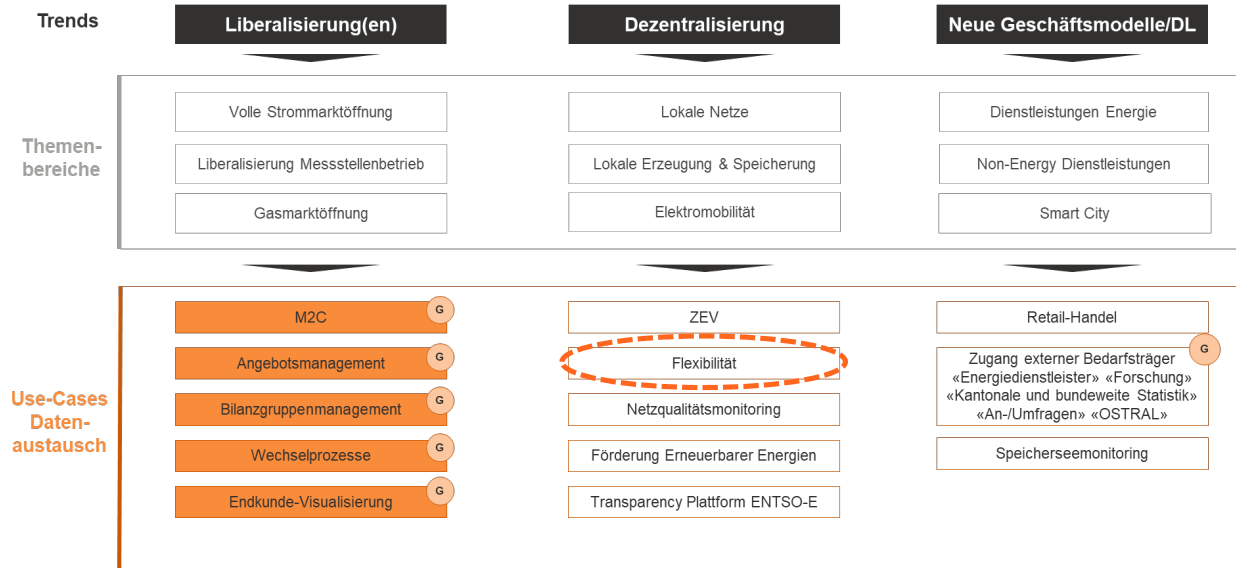


DESIGNING A SWISS DATAHUB CHALLENGES

-  **Unclear use cases electricity / gas market. Pronovo. Flexibility.** Which use cases should a Datahub support? What is a DH supposed to do, how is it supposed to support the flex market? How is the interaction with Pronovo?
-  **Data and data retention (decentralized vs. centralized).** Where should be the data be located so that the most important use cases for the future electricity / gas market can be efficiently implemented?
-  **Responsibilities processes.** Which processes of the data exchange electricity and gas market are affected and which actor has which task, responsibility and competence in the system with DH.
-  **Data quality & availability.** How can the DH improve the data quality in the stream note? How can it support cantonal and national statistics and promote digital innovation and services?
-  **Data protection.** How sensitive are the data stored in the DH (data protection impact assessment)?
-  **Ensuring data and cybersecurity.** Which measures are necessary and how do they relate to the recommendations of the cyber security concept?



MARKET TRENDS AND RELEVANCE OF DATA IDENTIFYING USE CASES



G Relevant für Gasmarkt

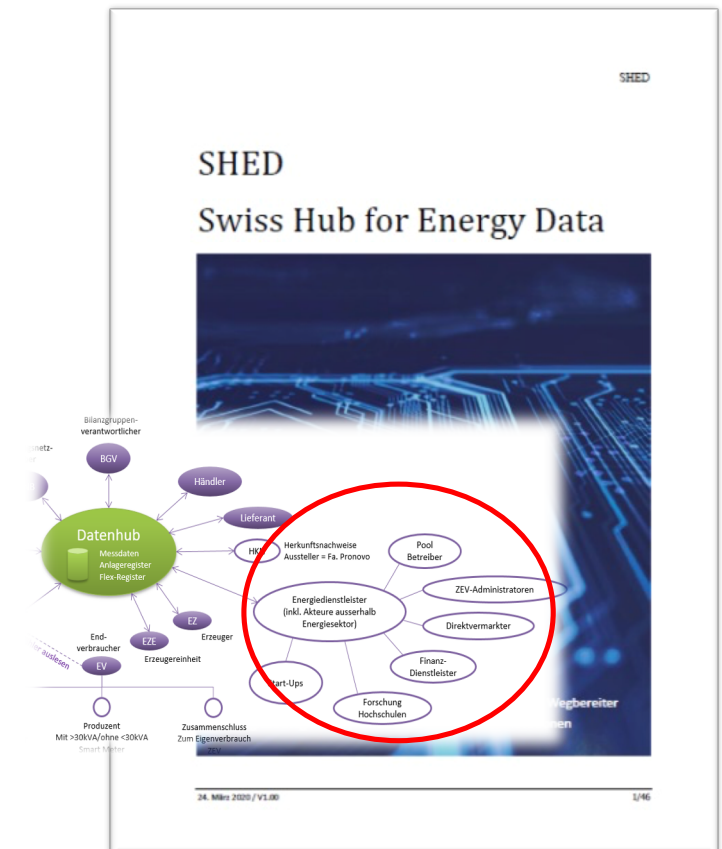
- Databus supports market design RevStromVG. Standard processes (change, meter-to-cash, HKN) taken into account. Electricity and gas sector analyzed.
- New use cases renewable energies, flexibility, statistics / monitoring, energy services, transparency, digital innovation are taken into account.
- Cost-benefit analysis (positive) with new use cases: national generating plant register, flexibility register, open data & data register.
- Data protection assessment carried out in accordance with the new DSG (uncritical). Cyber security requirements drawn up.



DATAHUB AND DATA ACCESS POTENTIAL FOR DIGITAL INNOVATION

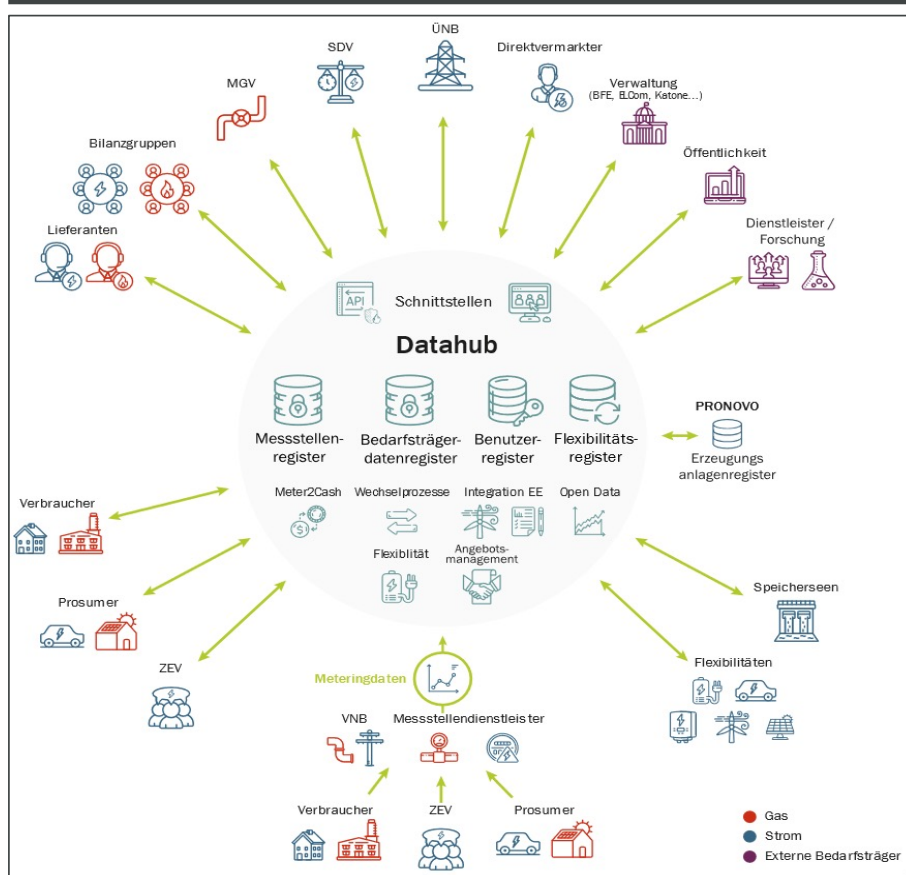
Datahub and efficient data access allow for numerous novel energy services.

- Energy account at E-Banking
- Financial services for real estate sector
- Peer-2-Peer Market and direct accounting
- Loans for sustainable energy renovations
- SME platform for energy services





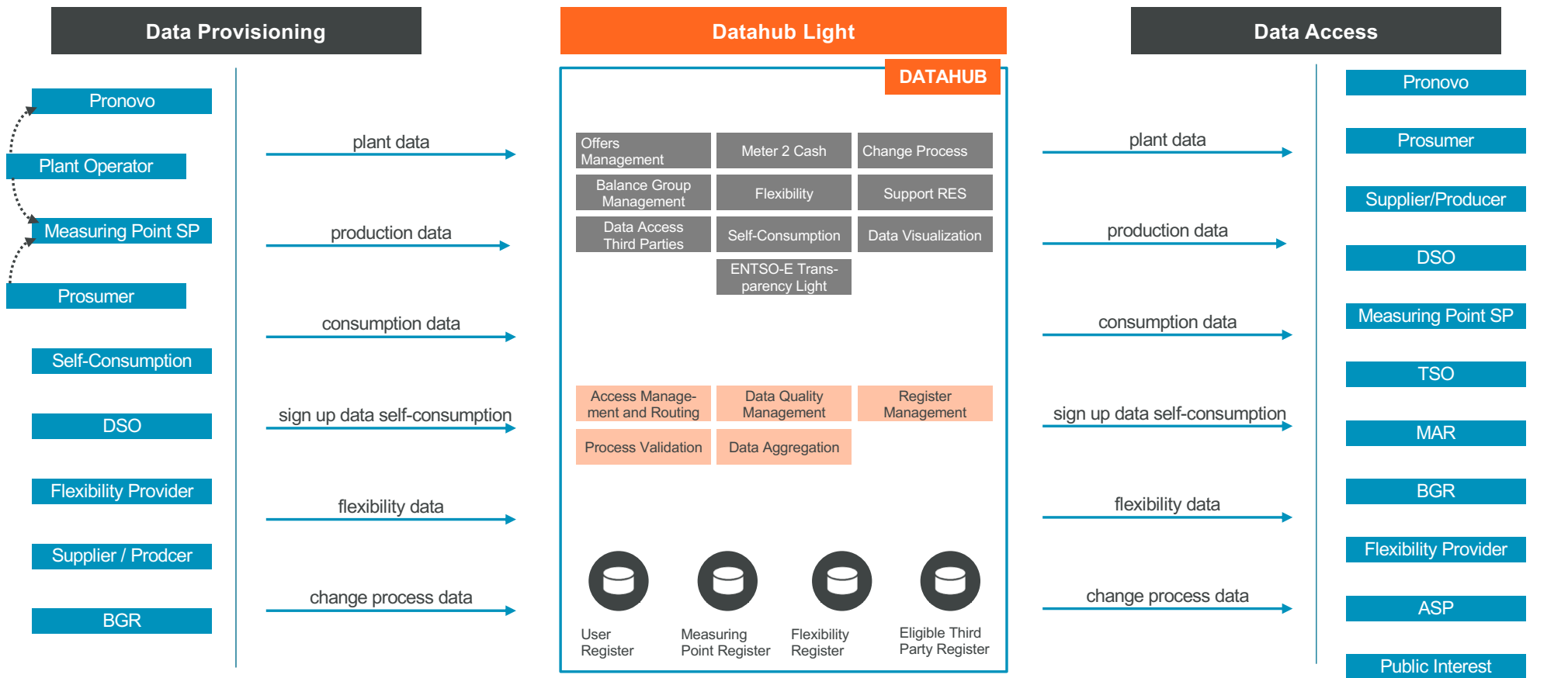
DATAHUB LIGHT CONNECTED DATA SILOS



- Datahub Light as the central electricity data platform. Master data and aggregated data for statistics / open data centrally. Processes for change and data quality centrally by DH. Decentralized data silos (VNB, MDL, Pronovo, balance groups, reservoir) connected. and standardization.
- Process maps drawn. The result can be used as a basis for a regulation or for a specification sheet or for a regulation.
- Datahub gas if Datahub electricity is used. Separate solution shows slightly negative cost-benefit.
- Flow of metering data for forecasting and billing purposes is fundamental. Real-time is not possible, because VSE market processes are not real-time.



DATA PROVISION AND ACCESS WITH DATAHUB ACTORS AND INTERACTIONS

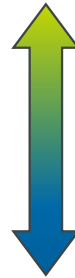




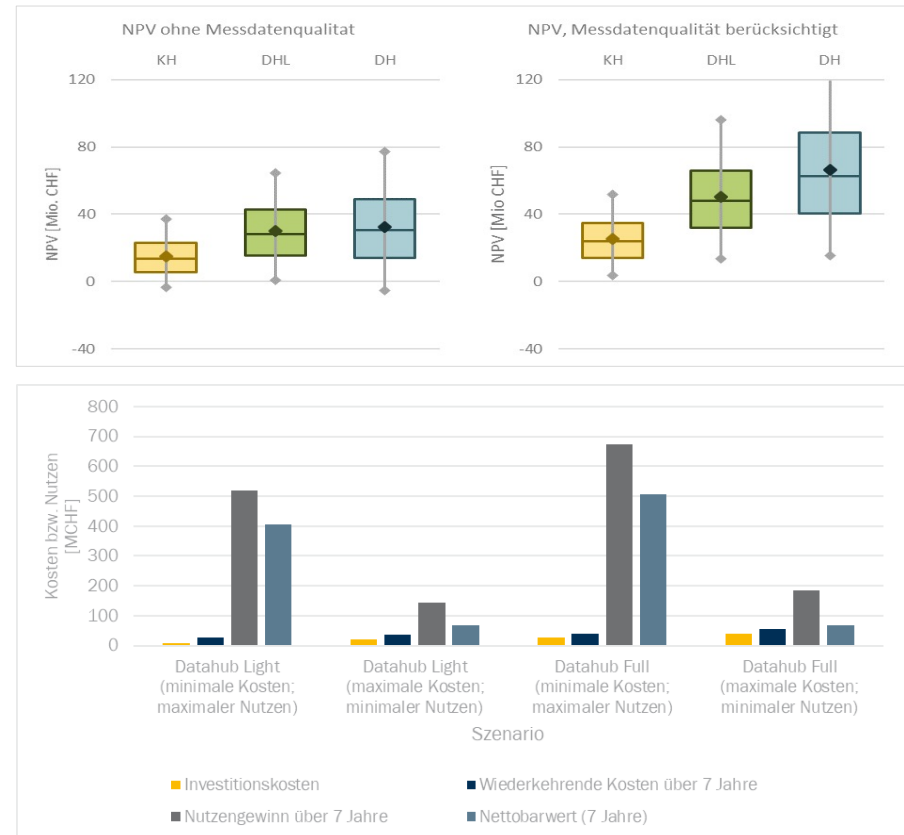
COST AND BENEFIT ANALYSES DATAHUB A CLEAR MESSAGE «IN A BOTTLE»

- Datahub Full offers high benefit but bears also high risks.
- Datahub Light offers still a high benefit while reducing risks.
- Accounting for better data quality gives higher benefit.
- Communication hub lowest benefit.
- Status quo is no option.

THEMA
2018



AWK
2021





RECOMMENDATIONS DESIGNING THE SWISS DATAHUB LIGHT

1. For the future energy system, the data infrastructure must be strengthened or expanded in order to make better use of data.

2. The future energy data infrastructure should serve all essential market processes, increase standardization and reduce interfaces.

3. For electricity, the data infrastructure should support the most important use cases: change processes, access to data / open data, HKN, flexibility.

4. Maintaining a decentralized data infrastructure is not recommended. DLT / blockchain is not ready, but it has potential. More work is needed.

5. Electricity Data Infrastructure should be organized around a Datahub Light. Cost-benefit analysis shows clear advantages. For the gas sector, Datahub-EI should be used because of Synergies;

6. The Datahub Light should have process functions such as data routing and data access. Quality assurance, aggregate value formation, change processes.

7. The data hub should keep various data registers (measuring points, generation systems, flexibility, data users).

8. The CoOS of Pronovo is to serve as a national register of generation plants, to be expanded and to include all plants. The Pronovo must be connected to the datahub. The Datahub routes and uses the Pronovo data.

Alternatively: Complete integration of Pronovo in Datahub.

9. Access to data from external users (service providers, etc.) & Open Data should be implemented for digital innovation and transparency.

10. Datahub is to offer functions for flexibility market & coordination of market players. Access to the Flexibility Register plays an important role here.

11. Datahub must have a data protection mgt. as well as data governance. ICT minimum standards for cyber security should be observed and checked.

- Recommendations take into account international developments and findings from pilot projects for the organization of flexibility markets.
- Findings from the Cyber Security and Cyber Resilience study were incorporated into the Datahub design study.



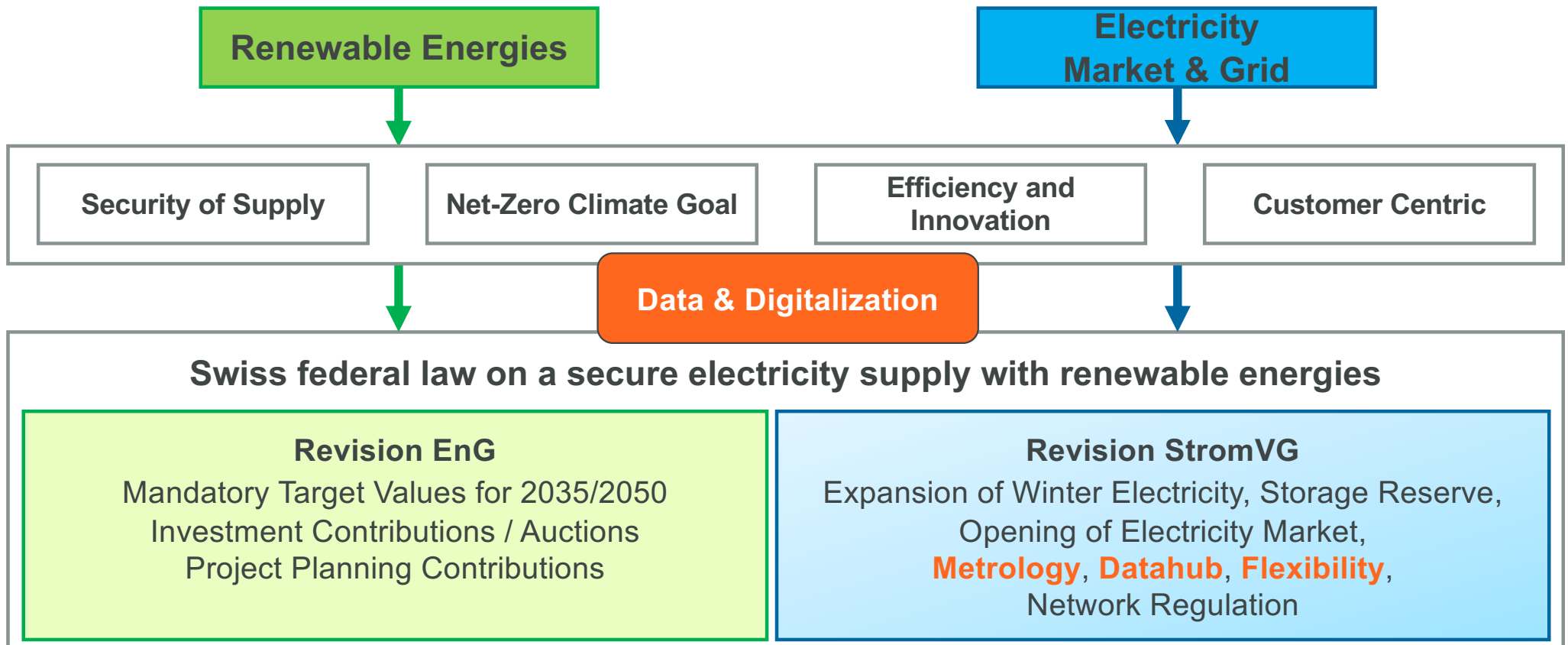
GOVERNANCE DATAHUB ... AN IMPORTANT DECISION

| | Option 1 | Option 2 | Option 3 | Option 4 |
|---------------------------------|---|--|--|--|
| Ownership | DSO & Utilities | TSO | Federation | Private |
| Challenge Neutrality | Possibility to exert influence on enforcing market rules when operating, on first realization and further development | Possibility to exert influence on accounting and balancing energy market. Already today some conflict of interests for ownership. | Potential conflict of interests because of ownership of utility companies by cantons and communities. Interest for a well functioning electricity market. | No conflict of interest when investors are not active on the electricity market. |
| Measure to ensure Neutrality | Independent board members elected by SFOE or EICom Compliance and reporting requirements | Independent board members elected by SFOE or EICom Compliance and reporting requirements | No representative of utility industry in the governing board. Compliance and Reporting requirements | No representative of utility industry in the governing board. Compliance and Reporting requirements |
| International examples | Belgium, Netherlands, Austria | Denmark, Norway, Finland, Sweden, Estonia | Italy | Austria |



GOALS AND INTERDEPENDENCIES

REVISION ENG / STROMVG





RECOMMENDATIONS DATAHUB AND THE STROMVG-PROPOSAL

| Measure | Proposal in E-StromVG E-GasVG? |
|---|--------------------------------|
| 1. Strengthening energy data infrastructure. | ✓ |
| 2. Consider essential market processes, reduction of interfaces, increase of standardization. | ✓ |
| 3. Datahub design to support future key use cases. | ✓ |
| 4. No maintenance of the previous decentralized organization. Too early for DLT / blockchain. | ✓ |
| 5. Organization of the data infrastructure around Datahub Light. No separate Datahub gas → Use Datahub electricity. | ✓ |
| 6. Datahub should have process functions, such as creating aggregate values, supplier change processes, etc. | ✓ |
| 7. Datahub should keep various registers (measuring points, flexibility, user data, etc.) | ↔ |
| 8. Expansion of the generation plant register. Connection of Pronovo. | ↔ |
| 9. Ensure access to data for external users. | ✓ |
| 10. Provide functions for flexibility market and coordination of market players (flexibility register). | ↔ |
| 11. Ensure data protection and cyber security at Datahub. | ✓ |

