Alsace

Status Quo Report and Masterplan

Author: **Arnaud MORA, Freshmile (Novae Alsace)**

Contact: **arnaud.mora@freshmile.com**

Status Quo Reports are contributing to AlpStore WP4, Action 4.2
Masterplans are contributing to AlpStore WP5, Action 5.2

Work Package 4 Responsible: University of Liechtenstein,
Prof. Peter Droege and Team

Work Package 5 Responsible: Novae Alsace (Freshmile), Arnaud Mora

Lead Partner: B.A.U.M. Consult,
Ludwig Karg, Patrick Ansbacher, Anja Lehmann

AlpStore Status Quo- and Masterplans:

Status Quo Reports: All subconsortia describe the regional situation in their pilot region concerning the current impact and future trends of hybrid, electric and gas powered vehicles, energy storage systems, smart grids and renewable energy sources - taking planned demonstration sites as representative examples and considering transnational opportunities (e.g. roaming with electric cars, cross border aggregation of flexibility of mobile storages).

Masterplans: All subconsortia develop holistic masterplans for their respective regions with the specific emphases listed in Table 1. The masterplans build on the overarching STORM principle as developed in WP4 (see Appendix). With the masterplans developed in WP5 decision makers in the involved regions are to receive long-range concepts to enhance their regional and municipal development planning. With many different types of regions being involved many other decision making and planning processes in the Alpine Space can be informed by these masterplans as blueprints.

Table 1: Overview of AlpStore Status Quo- and Masterplans:

No.	Region		Specific Emphasis of Masterplan according Application	Resp. PP
1	**West Milan**	**IT**	EV fleet management and VPS, involvement of ESCO and PAES for efficient energy management	**EU-IMP**
2	**Aosta**	**IT**	"AOSTA Valley Regional Energy Plan 2011-2020"	**AOSTA**
3	**Lombardy**	**IT**	electric public transport	**ALOT**
			integration of VPS long term plan (gas, PV) with sustainable mobility needs and storage opportunities	**AGIRE**
4	**Alsace**	**FR**	fleet management with EV ~~and fuel cell vehicles in office buildings~~	**FRESH** ~~**UTBM**~~
5	**Vorarlberg**	**AT**	small hydro pump vs. mobile and stationary battery storage, mass roll-out of EV	**VLOTTE**
6	**Güssing**	**AT**	mobile vs. stationary use of biogas	**EEE**
7	**Haslital Brienz**	**CH**	controlled charging with 2nd life batteries in semi-public areas (supermarkets)	**KWO**
8	**Gorenjska**	**SI**	off grid situations of small mountain villages	**UL RDA JEZ**
9	**Allgäu**	**DE**	integrated storage and mobility for public transport, electric car and e-bike charging infrastructure	**BAUM**
			fully integrated plus energy houses	**EZA**
10	**Ebersberg**	**DE**	managing biogas and wind energy in Ebersberg	**BAUM FFE**
11	**Berchtesga-**	**DE**	small hydro pump, pressed air storage in salt mines in	**BAUM**

Kommentar [AM1]: No fuel cell vehicles included in the research work carried out by FRESH. Not included neither in the pilot project led by FRESH (Alsace Auto 2.0 is a pilot project on EV only).

Kommentar [AM2]: Fuell cell topics are covered by UTBM and are located in the Franche-Comté region, not in Alsace. Franche-Comté should probably be treated as a separate topic, and separate report.

	den		Berchtesgaden	**FFE**
12	**Ticino**	**CH**	Ticino RE Platform	**USI**
13	**Liechtenstein**	**LI** **FL**	potential for RES in various settlement forms (masterplan focused on potential for RES in various settlement forms)	**LIECH**

Contents

Abbreviations

CAES	compressed air energy storage
CHP	combined heat and power plant
P2G	power-to-gas
RE	renewable energies
SNG	power-to-substitute natural gas

1 Summary

- *2-3 pages*
- *What is the essence of our Status Quo and Masterplan?*
- *Please provide a brief and concise overview.*

2 The Pilot Region: Région Alsace

2.1 Economy and infrastructure

Map

Main cities

Basic numbers

Economic indicators

Industrial sectors

2.2 Land Use

In hectares

Bas Rhin, Haut Rhin, total

2.3 Demographic Development

Key indicators

2.4 Working population

Key indicators

2.5 Existing energy and climate activities

2.5.1 Schéma régional Air Energie Climat Alsace

Summary of objectives

3 Status quo of Energy System

3.1 Energy Production

3.1.1 Conventional Power Plants

Fessenheim nuclear plant

Others

3.1.2 Renewable Energies

Operating plants (most recent figures available for each source)

3.2 Energy Consumption

3.2.1 Energy Consumption in Transport

3.2.2 Energy Consumption of Enterprises

- *large-scale consumer, > 100.000 kWh/a*

3.2.3 Energy Consumption of Private consumers and small-scale business clients

- *consumption < 100.000 kWh/a*

3.3 Trends

Objectives for new energy production capacity
o/w renewables

3.4 Energy Transmission and Distribution

3.4.1 Power grid

Map

Key data

Grid upgrade plans for 2020

Feed-in

- *High-voltage*
- *Medium-voltage*
- *Low-voltage*

3.4.2 Metering points

Not available

3.4.3 (Smart) grid issues and development status

No data besides the grid upgrade plans for 2020

3.5 Energy Storage

Kommentar [AM3]: Basically, there is no storage capacity available in Alsace for the time being.

3.5.1 Local storage of biogas - Biogas digesters and storage tanks

List of biogas plants if available

3.5.2 Storage of up-graded biogas (bio-methane from biogas) in the natural gas infra-structure:

None

3.5.3 Power-to-Gas

None

3.5.3.1 Power-to-Gas - methane in gas grid

None

3.5.3.2 Power-to-Gas - hydrogen in gas grid

None

3.5.4 Power-to-Gas (hydrogen local)

None

3.5.5 Chemical storage (zeolite etc.)

None

3.5.6 Compressed air storage

None

3.5.7 Pump storage (regional in Alpine Space)

3.5.7.1 Pump water storage

None

3.5.7.2 Thermal energy storage systems – High temperature

None

3.5.7.3 Thermal energy storage systems – Low temperature

None

3.5.7.4 Thermal energy storage system – Water

None

3.5.7.5 Thermal energy storage system - Salt

None

3.5.7.6 Thermal energy storage system – Materials like concrete, stones or sand

None

3.5.7.7 Flywheels (small-sized)

None

3.5.7.8 Flywheels (large-sized)

None

3.5.7.9 Mobile batteries (electric vehicles)

None to date organised as such. However, there are already 800 EVs in Alsace. The Alsace Auto 2.0 pilot project aims at aggregating some of these EVs into demonstrating the virtual storage capacity thesis.

3.5.7.10 Stationary batteries

None

4 Future Energy System

- *10 - 20 pages*
- *What will be the situation in the future concerning energy production, energy consumption and energy transmission and distribution*

...

Kommentar [AM4]: Should this prospective vision be the result of FRESH's work or should it reflect the views of the established stakeholders (local utilities, state-owned utility, centralized policy makers in Paris and regional members of parliament?

While exploring future potentials on renewable energy production four different kinds of potentials can be defined after Kalkschmitt (2003):

- **Theoretical potential:** this is the physical available potential of a certain region in a certain period (insolation, biomass grown on a certain area etc.) (deENet, 2010)
- **Technical feasible potential:** the part of the theoretical potential which can be unlocked by available technologies and by complying with the regulatory framework (deENet, 2010)
- **Economically reasonable potential:** the part of the technical feasible potential which can be considered under an economic point of view (deENet, 2010)
- **Deducible potential:** the part of the economically reasonable potential under which also ecological and social aspects, acceptance and institutional affairs are considered (deENet, 2010)

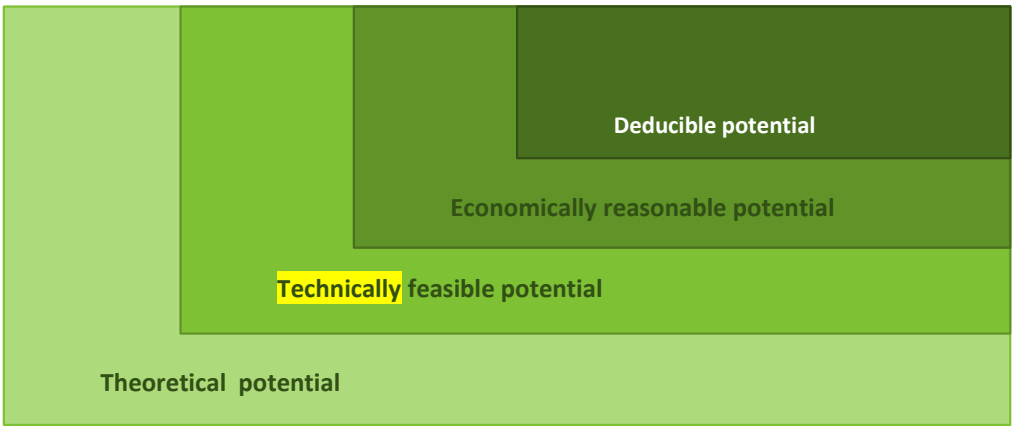

Figure 1: definition of potentials (Kaltschmitt, 2003), (B.A.U.M. Consult GmbH, 2012)

In this chapter of this report only the deducible potential of renewable energies will be considered. Furthermore this potential is split into the already used potential and the potential which can be used until 2030.

4.1 Regional Energy Production

4.1.1 Conventional Power Plants

Includes the uncertainties around the announced closure of Fessenheim, the first nuclear power plant to be shut down. It is a goal of the government, by 2016, but it is unclear whether it will happen or not.

4.1.2 Renewable Energies - Assumption on the deducible potential of renewable energies

The date for unused potential of resources was appraised by research and empirical value and approved by experts and relevant actors in workshops and interviews.

Photovoltaik

Biomass

Geothermal heat & power

Wind

Water

4.2 Regional Energy Consumption

Potential for savings in terms of thermal energy

Building sector:

Enterprises:

Potential for savings in terms of electric energy

Enterprises

4.2.1 Business clients

- *consumption > 100.000 kWh/a*

4.2.2 Private consumers and small-scale business clients

- *consumption < 100.000 kWh/a*

Kommentar [AM5]: Frankly, it is impossible in centralized France to summon the decision makers for such a transparent discussion.
Such objectives will not be discussed with FRESH or anybody else outside government and ministries circles.

Kommentar [AM6]: We do have information on geothermal power plant development planned until 2020, but this is considered by the local utility as confidential information and we are not allowed to disclose it.

Kommentar [AM7]: Figures for wind and other sources can be drawn from the "Schéma Régional".
At least it is an official document with some targets that have been reviewed by the various stakeholders.
This document was published in 2012 and is based on 2011 studies, so it is recent enough.

Kommentar [AM8]: Not sure that we are able to provide figures for this section.

4.3 Trends

Kommentar [AM9]: See comment AM5 above.
Trends can be described by FRESH but will not bear any official seal of approval.

4.4 Transmission and Distribution Grids

Kommentar [AM10]: All this section will be based on reports published by RTE, the national transmission grid operator.

4.4.1 Stressors for the Regional Power Grid

- *High-voltage*
- *Medium-voltage*
- *Low-voltage*

4.4.2 (Smart) Grid Solutions

- Grid Operation and Automation
- Balancing Energy and Flexibility Management

5 Future Energy Storage

- *10 - 20 pages*
- *What will be the situation in the future concerning our AlpStore key issue energy storage?*

5.1 Storage Requirements

5.1.1 Short Term Storage

5.1.2 Long Term Storage

Key Question:

- *What are the relevant results and conclusions from the status quo and future energy system assessment?*

5.2 Potentials for Regional Storage

- Description of technical and spatial potentials, limitations etc.
  - Biogas digesters and storage tanks
  - Power-to-Gas (methane in gas grid)
  - Power-to-Gas (hydrogen in gas grid)
  - Power-to-Gas (hydrogen local)
  - Chemical storage (zeolite etc.)
  - Compressed air storage
  - Pump storage (regional in Alpine Space)
  - Pump storage (Scandinavia etc.)
  - Thermal energy storage systems – High temperature
  - Thermal energy storage systems – Low temperature
  - Thermal energy storage system - Water
  - Thermal energy storage system - Salt
  - Thermal energy storage system – Materials like concrete, stones or sand
  - Flywheels (small-sized)
  - Flywheels (large-sized)
  - Mobile batteries (electric vehicles)
  - Stationary batteries

5.3 Benefits of Regional Energy Storage

Kommentar [AM11]: Will be based on the target figures from the Schéma Régional.

Kommentar [AM12]: We will also try to interview stakeholders.

Kommentar [AM13]: This will reflect FRESH opinion.
For the reasons stated above, unlikely to get an official position on this topic.

6 Framework for future Storage Systems

Kommentar [AM14]: FRESH's views + possible interviews of stakeholders.

- *5 -10 pages*
- *What will be the influences on the situation in the future?*

6.1 Governance

- *Summary and Reference to the documents about National and EU-frameworks*
- *Regional specifics*
- *Regional binding plans (spatial planning)*
- *Political aspects*

6.2 Technology Trends

- *e-mobility, plus-energy-house,…*
- *market development*

6.3 R&D activities

6.4 Stakeholders

- *enterprises*
- *energy groups*
- *…*

7 Master Plan

Kommentar [AM15]: Based on FRESH opinion + interviews with stakeholders

- *20 - 30 pages*
- *What is our plan for the region?*

7.1 Objectives

7.1.1 Vision

Energy security

Local supply

Minimum carbon footprint

Real time management

7.1.2 Goals

Figures

Technical choices

Transport sector

7.2 Regional Storage Park

- description of future storage elements to be implemented in the region, their potentials etc.
  - Biogas digesters and storage tanks
  - Power-to-Gas (methane in gas grid)
  - Power-to-Gas (hydrogen in gas grid)
  - Power-to-Gas (hydrogen local)
  - Chemical storage (zeolite etc.)
  - Compressed air storage
  - Pump storage (regional in Alpine Space)
  - Pump storage (Scandinavia etc.)
  - Thermal energy storage systems – High temperature
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  - Stationary batteries

7.3 Storage Roadmap

7.3.1 Measures and Projects

- Focus on EV: large-scale application of pilot project Alsace Auto 2.0
- Other storage topics if relevant

Kommentar [AM16]: The roadmap will likely recommend mass-electrification of transportation through EVs.
No obvious other solution for storage adapted to Alsace

7.3.2 Timelines, milestones and Controlling

Kommentar [AM17]: Tentative

7.4 Implementation Structure

7.4.1 Performance framework and criteria for storage strategies, plans and pilots

7.4.2 Options for storage strategies, plans and pilots

7.4.3 Ideal Implementation Structure in the Region

7.4.4 Building up the Ideal Structure

Key Questions:

- *What are the relevant structures for the process at the moment?*
- *What are the needed structures for a successful implementation process?*
- *How can this ideal structure be accomplished?*