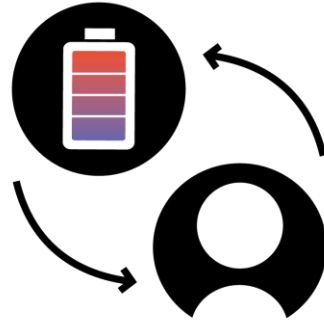


SOTES

Socio-Technological Breakthrough of Thermal Energy Storage



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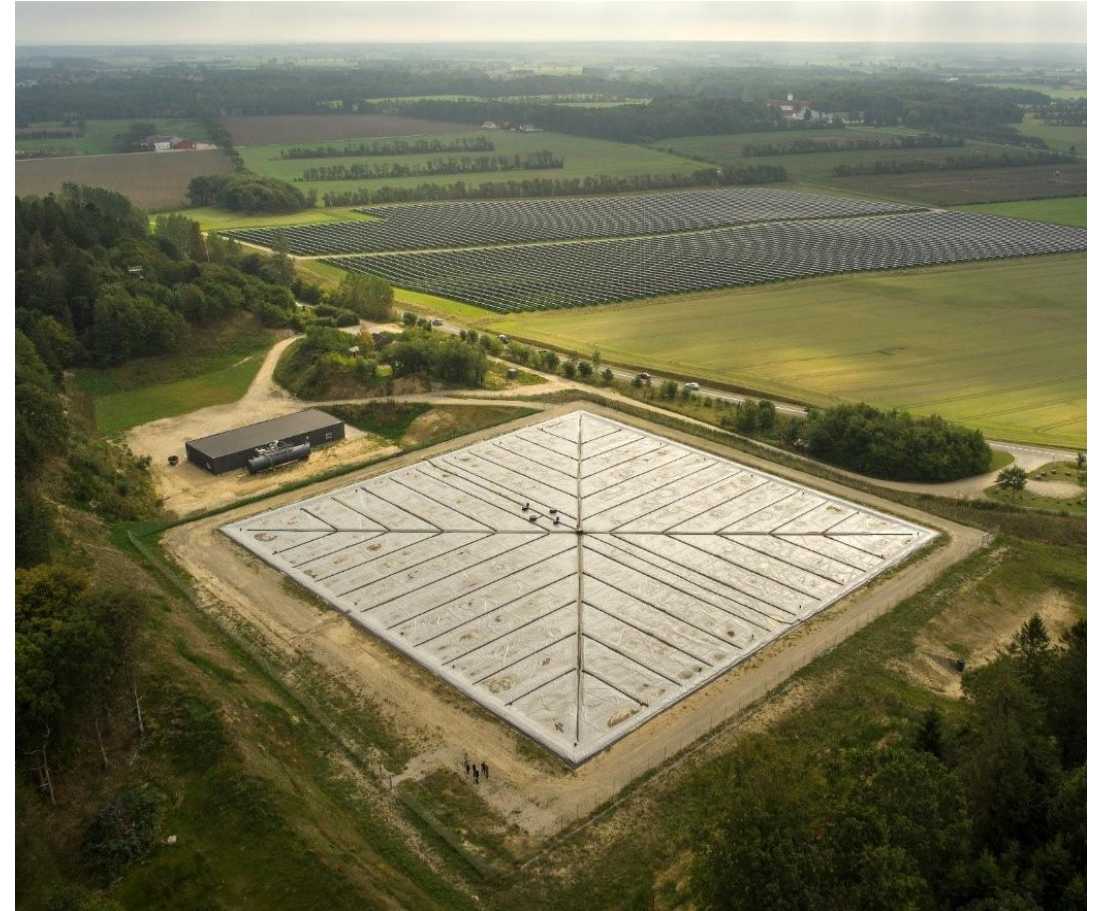
Sociotechnological Breakthrough of Thermal Energy Storage – a new Approach of Constructive Technology Assessment

Isabelle Stadelmann-Steffen

Swiss Symposium Thermal Energy Storage, Horw, 30 January 2026

What the project is about

- An interdisciplinary approach to improve technology assessment and development
- **Goals**
 - Understand **under which conditions** seasonal thermal storage would be better **accepted and more frequently used**.
 - Identify **relevant stakeholder groups** and segment them in terms of their awareness, social acceptance and preferences for seasonal thermal storage.
 - Understand the **critical factors for the breakthrough** of seasonal thermal storage and identify generally accepted seasonal thermal storage solutions.
 - To gain insights into the **role of information and awareness raising** for the social acceptance of seasonal thermal storage solutions.





SOTES

Understand under which conditions seasonal thermal storage would be better accepted and more frequently used.

WP 1

- Identify relevant actor groups and their (varying) sensitization, acceptance and preferences

⇒ Three-wave panel survey, including conjoint and vignette experiments



WP 2

- Identify optimal/relevant characteristics of current and future STES solutions



WP 3

- Integrate social acceptance perspective into modelling

⇒ Integration of survey results into technology assessment model



WP 4

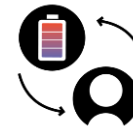
Dissemination

- Which solutions have break-through potential?
- How to communicate about STES?



Why is a sociopolitical perspective relevant?

- New technologies: opportunity to address societal problems
 - However: Which and how to use technologies has become a political issue
 - Public opinion matters
 - Implementing new technologies can become politically risky
 - It is important to understand how people form their opinions about new technologies
 - No previous knowledge and experience
 - Systematic or heuristic information processing
- ⇒ What role do information provision and individual predispositions play in the individual opinion formation process on novel technologies?

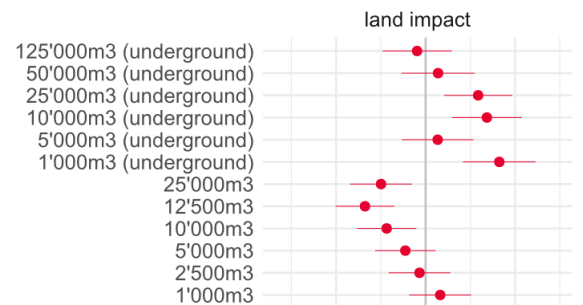
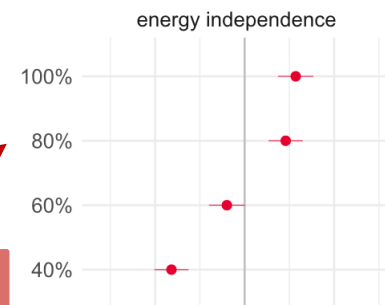
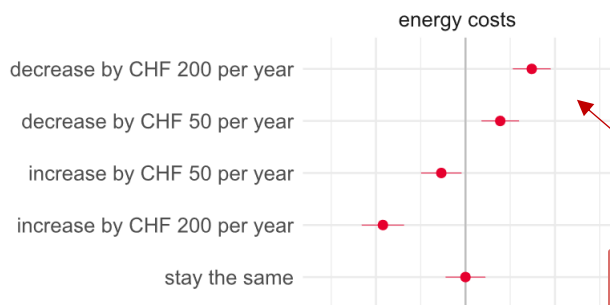
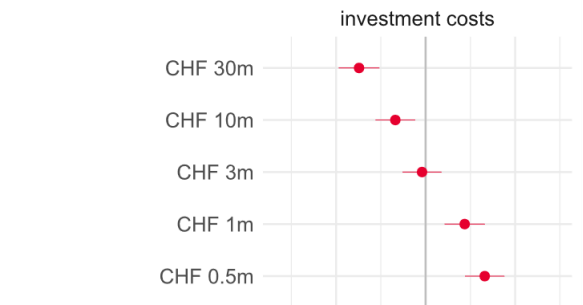
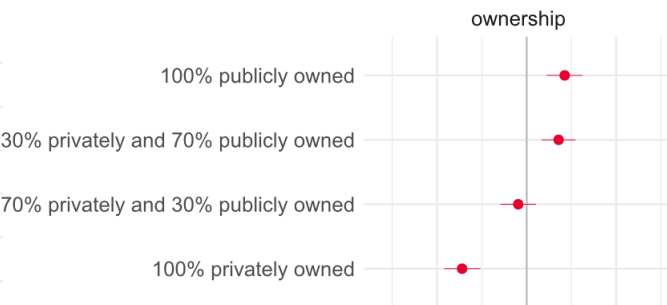
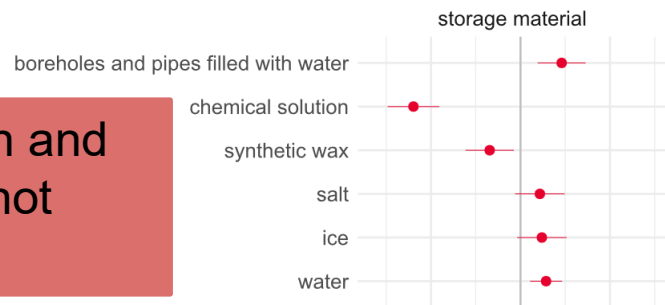


What I already showed you two years ago: They want to have it all!

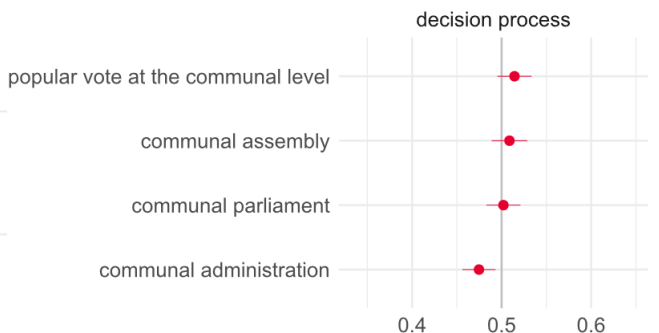
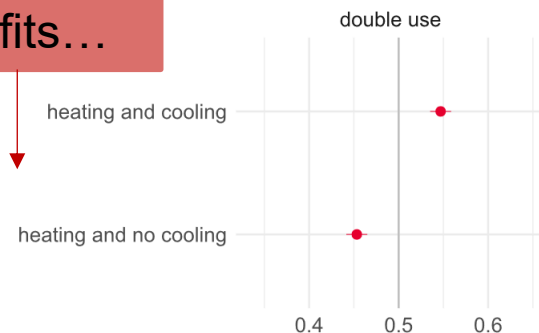
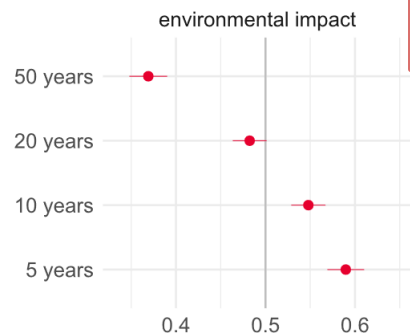
Chemical solution and synthetic wax is not preferred...

...at low costs

Supporting a STES Project



All the benefits...



Conjoint analysis for district level projects

Estimated Marginal Means

But what if people really need to make a trade-off?

- Another choice experiment
- But we forced respondents to choose between «equivalent» solutions
 - Size
 - Price
 - Storage material/technology
- SFH and district level
- Population and Stakeholders

Stellen Sie sich vor, es ginge um den Bau oder die Renovation eines Hauses.

Welchen der drei saisonalen Wärmespeicher würden Sie für das Energiesystem dieses Hauses wählen?

i	1	2	3	
Es handelt sich um einen	Thermochemischen Speicher	Thermochemischen Speicher	Thermochemischen Speicher	
Die Wärmeautarkie erhöht sich auf	60%	78%	86%	
Die Investitionskosten betragen	CHF 12'500	CHF 36'000	CHF 60'000	Keinen
Die Gesamtgrösse des Speichersystems beträgt	1 m³	5 m³	10 m³	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Welchen der drei saisonalen Wärmespeicher würden Sie für das Energiesystem dieses Hauses wählen?

i	1	2	3	
Es handelt sich um einen	Wasserspeicher (Tank)	Latentwärmespeicher	Thermochemischen Speicher	
Die Wärmeautarkie erhöht sich auf	83%	80%	82%	
Die Investitionskosten betragen	CHF 40'000	CHF 40'000	CHF 40'000	Keinen
Die Gesamtgrösse des Speichersystems beträgt	35 m³	15 m³	7 m³	
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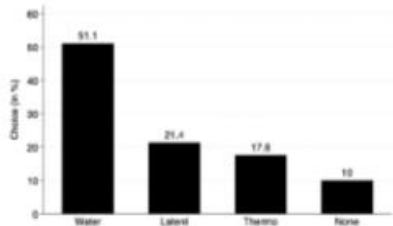
Welchen der drei saisonalen Wärmespeicher würden Sie für das Energiesystem dieses Hauses wählen?

i	1	2	3	
Es handelt sich um einen	Wasserspeicher (Tank)	Latentwärmespeicher	Thermochemischen Speicher	
Die Wärmeautarkie erhöht sich auf	73%	75%	78%	
Die Investitionskosten betragen	CHF 11'000	CHF 18'000	CHF 36'000	Keinen
Die Gesamtgrösse des Speichersystems beträgt	5 m³	5 m³	5 m³	
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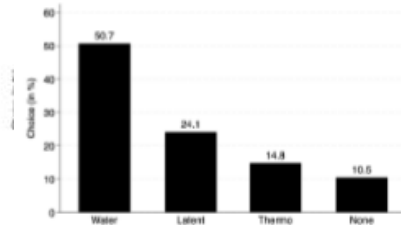
Results

Constant value: *Heat self-sufficiency*

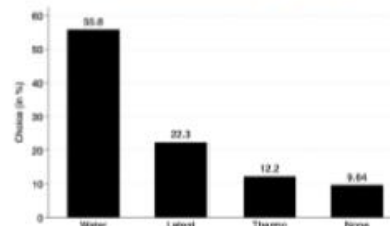
(a) Population - SFH



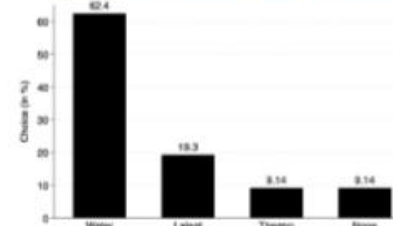
(b) Population - DISTRICT



(c) Professional - SFH



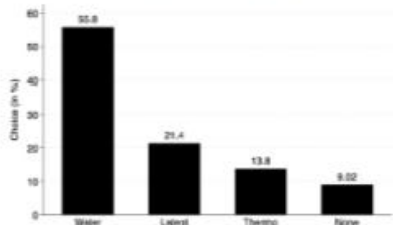
(d) Professional - DISTRICT



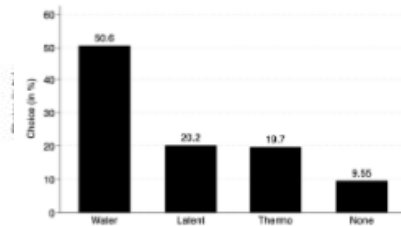
Choosing between equally effective solutions for providing heat self-sufficiency: water-based is preferred

Constant value: *Total size*

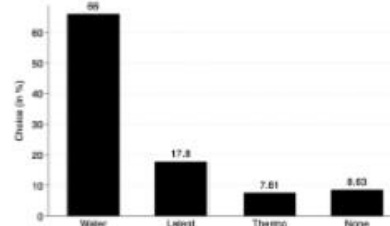
(e) Population - SFH



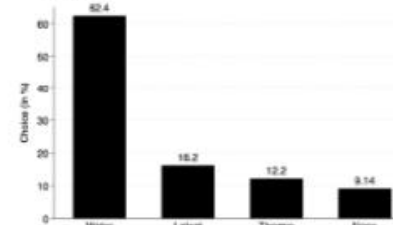
(f) Population - DISTRICT



(g) Professional - SFH



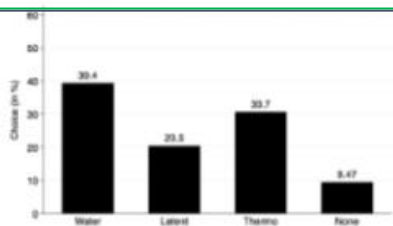
(h) Professional - DISTRICT



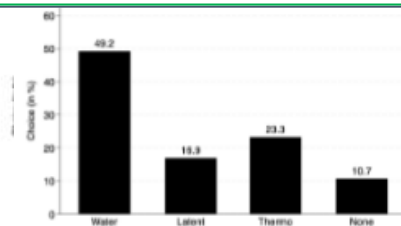
Water-based solutions are still preferred when «controlling» for the relative disadvantage of water, lower self-sufficiency accepted

Constant value: *Investment cost*

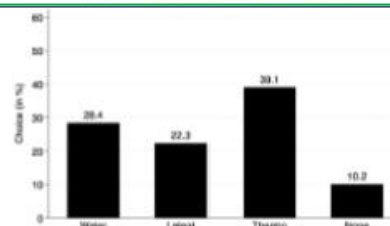
(i) Population - SFH



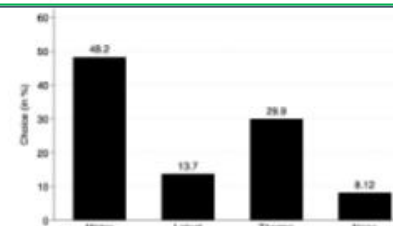
(j) Population - DISTRICT



(k) Professional - SFH



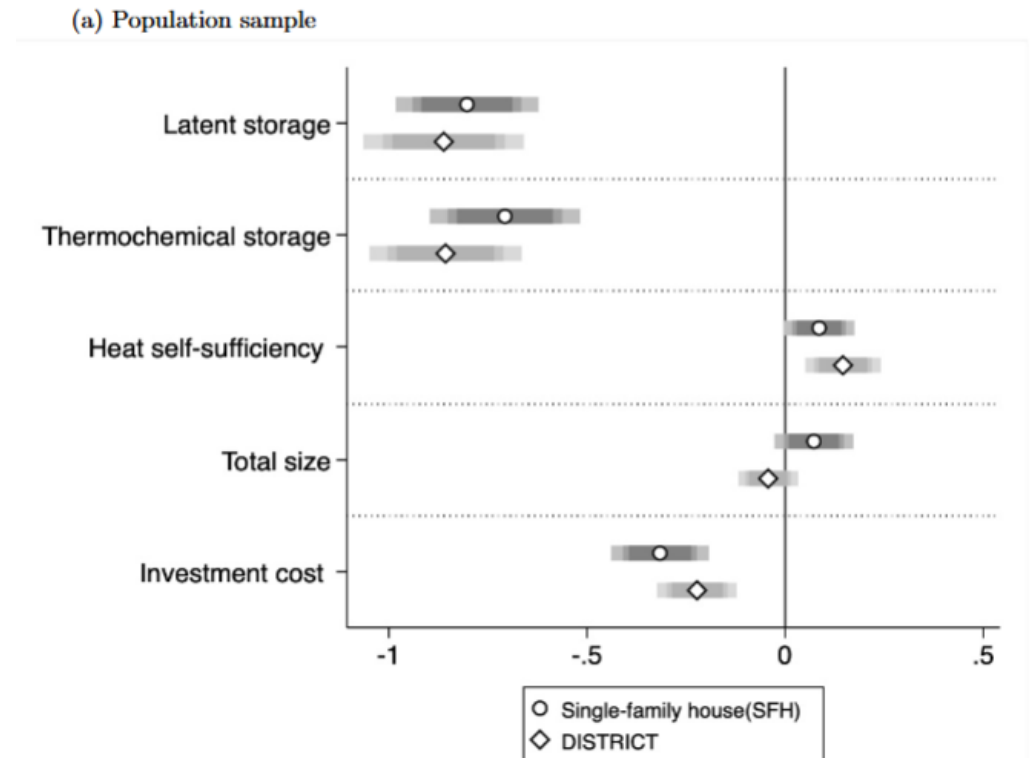
(l) Professional - DISTRICT



Keeping costs constant, increases preferences for thermo-chemical solutions!

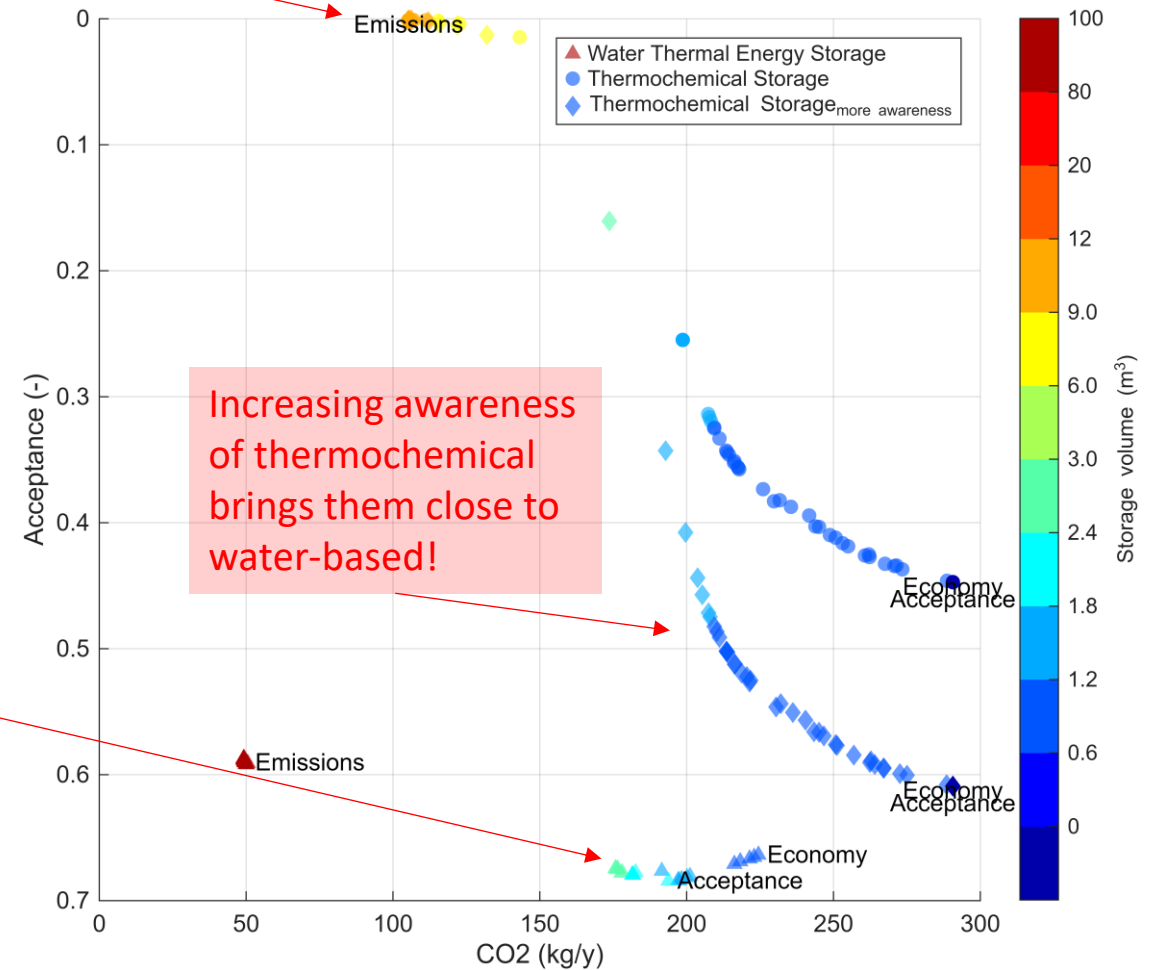
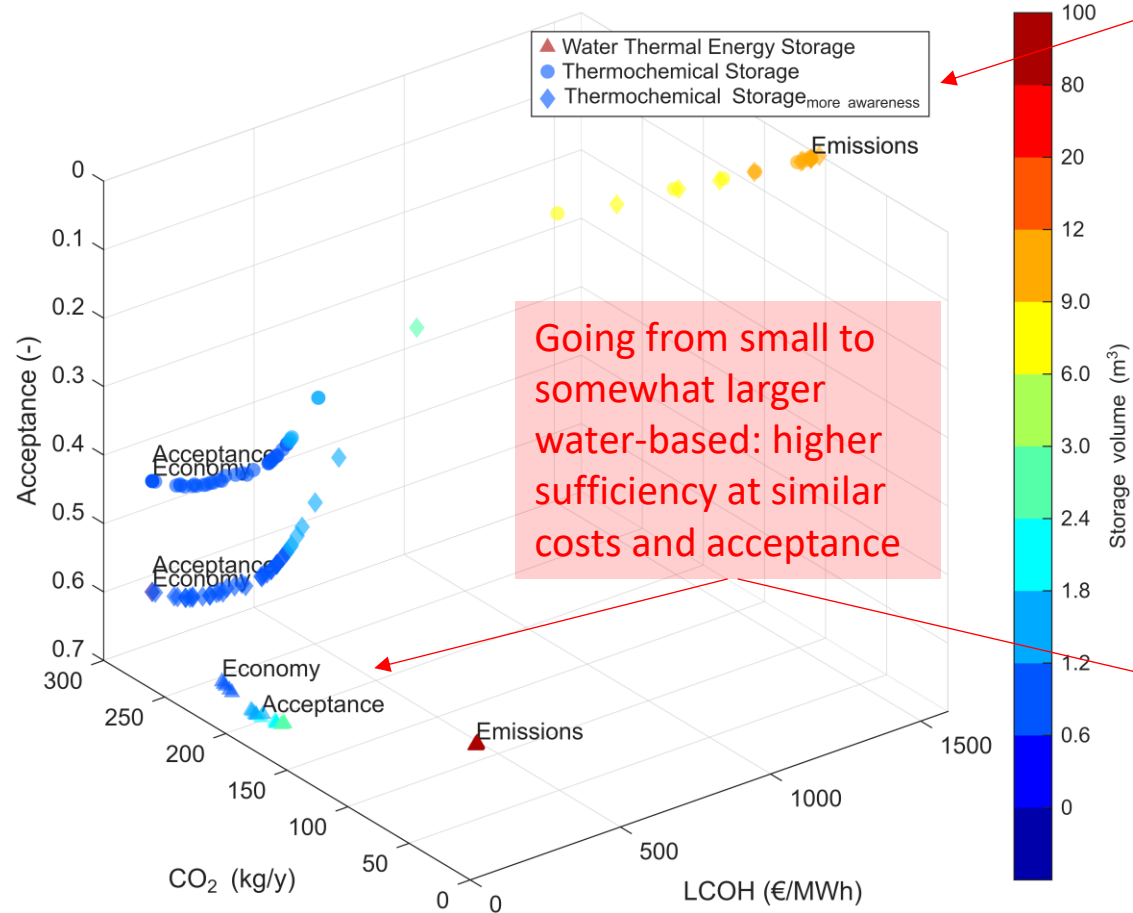
Results (2) – Regression results

- Confirm the **strong preference for water-based solutions** – storage material is the strongest factor
 - **Self-sufficiency** increases preference by citizens but not by professionals
 - **Size** barely matters
- ⇒ Similar patterns for SFN and district level
- ⇒ And also for professionals and the population



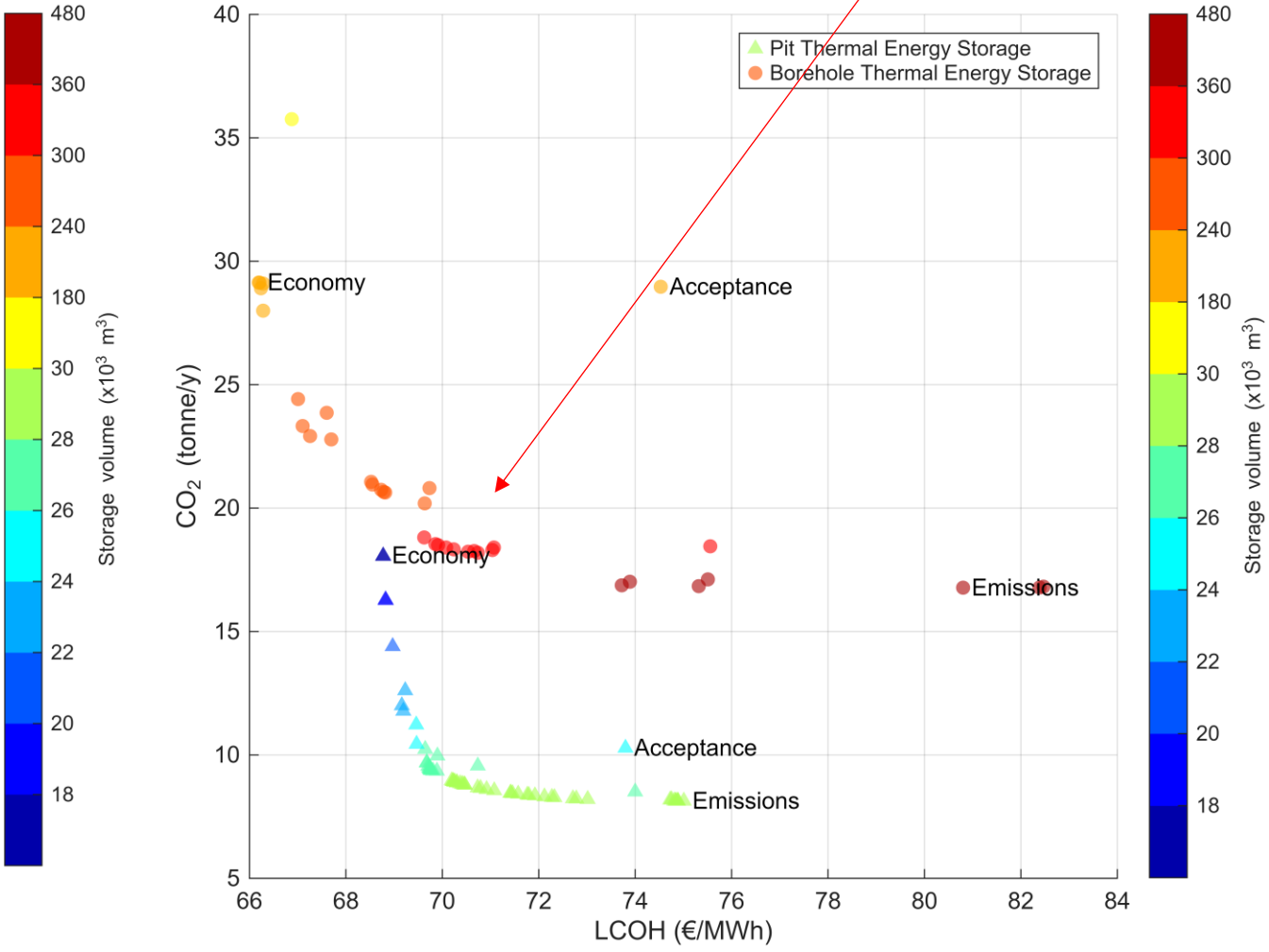
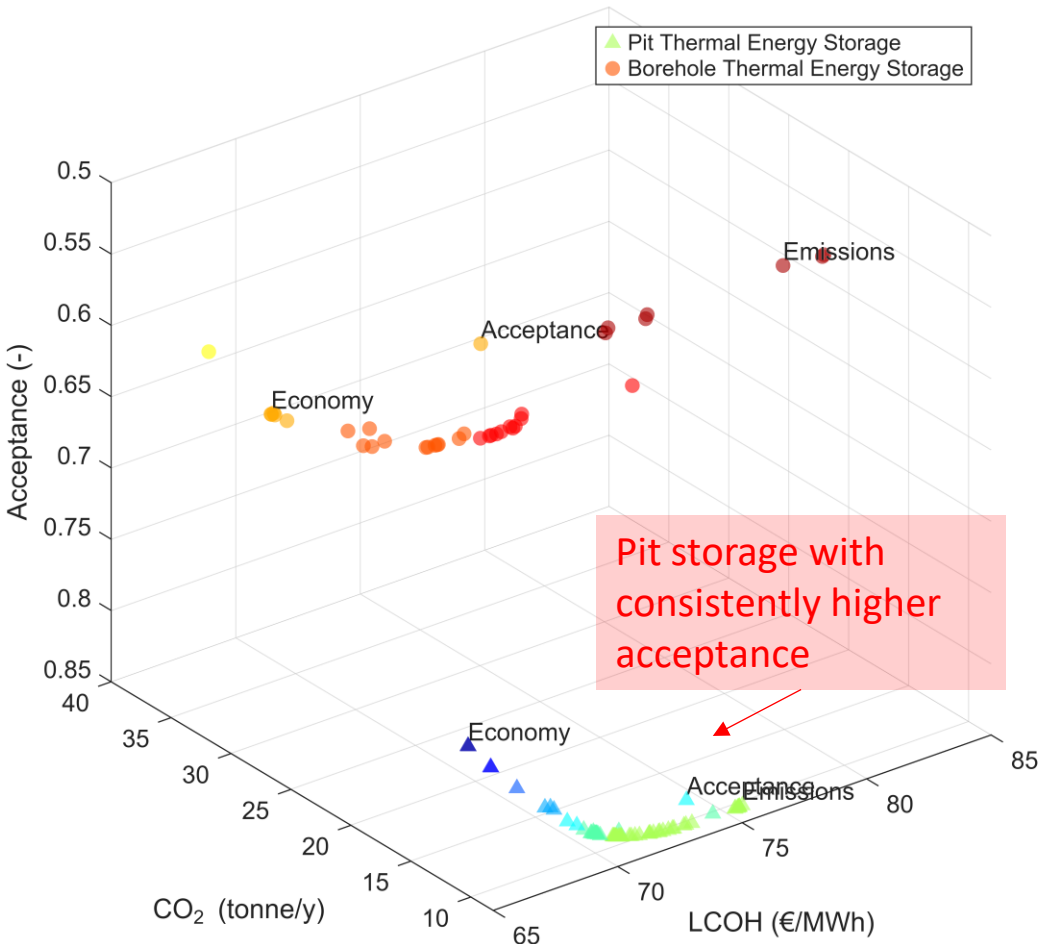
SFH: Water-based vs. thermochemical

Maximizing emission reduction with thermochemical storage is not a viable option: costs, acceptance



District level: Pit vs. borehole

From a techno-economic perspective, fronts meet, but borehole has two disadvantages: size and acceptance



Summary

- **Social acceptance** of technologies is **needed** for successful implementation
- We can **analyse and measure** social acceptance for different technologies and in varying conditions
- **Integrating the social acceptance into technology assessment matters!**
 - Affects optimization results
 - Provides additional and important implications for successful implementation of STES solutions