



IEA Technology Collaboration Programme

2nd webinar by IEA-ES Task 45:

LTES Systems: Technical Feasibility, Design, Tendering, Monitoring & Economic aspects

Tuesday, 16 December 2025

9:30 – 12:30 (CET)

Learn more at <https://iea-es.org/task-45/>

Workshop Program

LTES Systems: Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect

9:30 - 9:50

- Welcome, introduction and brief technical overview of LTES stages and economic order of magnitudes, based on IEA-ES Task 39. *Romain Sucche (PlanEnergi)*

9:50 - 10:15

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Aquifer Thermal Energy Storage case study: Middenmeer (NL). *Bas Godschalk (DTESS BV)*

10:15 - 10:35

- Optimised integration of thermal aquifer storage in district heating systems. *Benjamin Köhler (Öko-Institut)*

10:35 - 10:45

- Break

10:45 – 11:10

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Borehole Thermal Energy Storage case study: Emmaboda (SE). *Olof Andersson (Lund University)*

11:10 - 11:35

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Tank Thermal Energy Storage case study: Berlin (DE). *Julian Formhals (BEW Berliner)*

11:35 – 11:45

- Break

11:45 - 12:10

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Pit Thermal Energy Storage case study: Høje Taastrup (DK). *Per Alex Sørensen (PlanEnergi)*

12:10 - 12:30

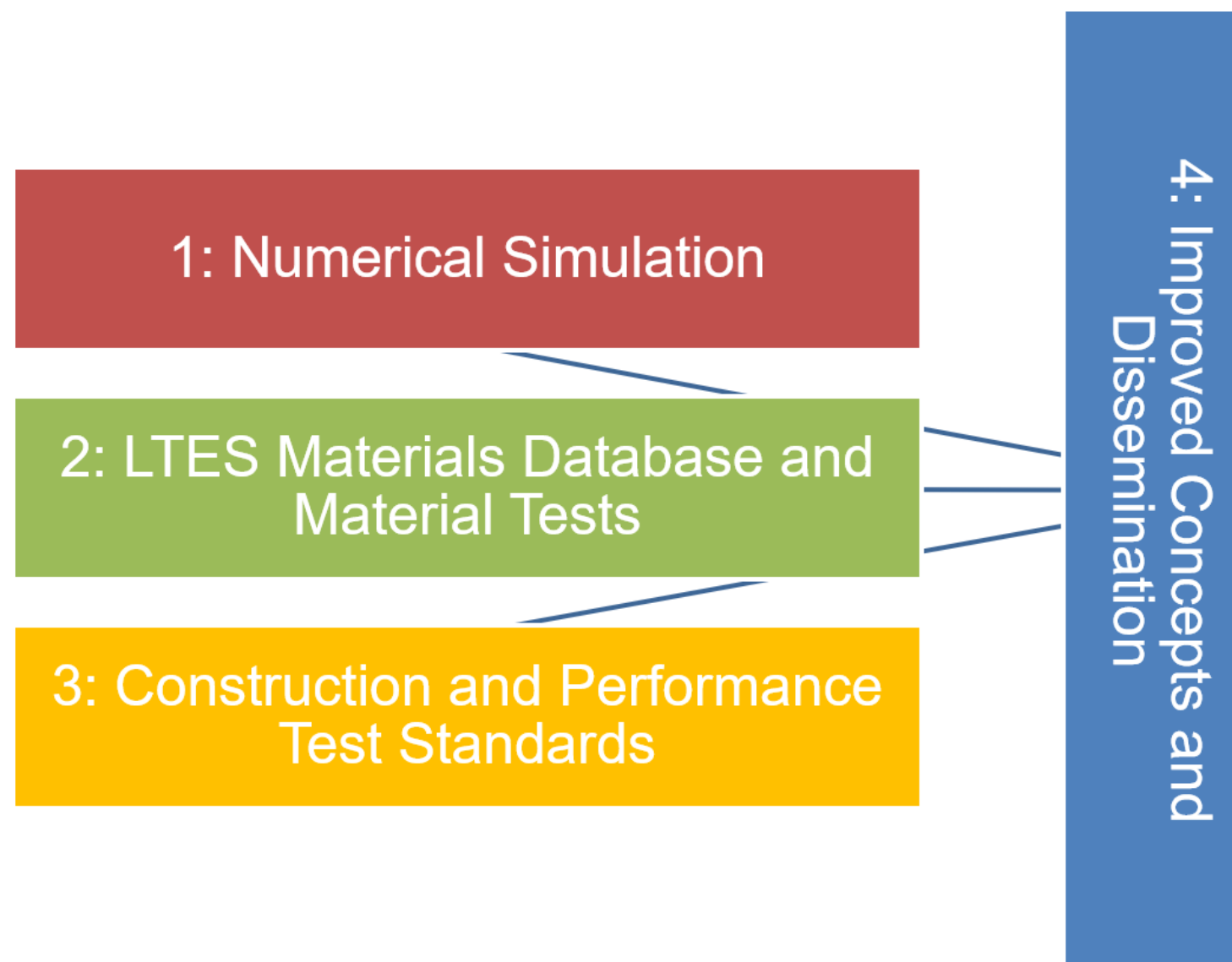
- Wrap-Up & Open Discussion. *Geoffroy Gauthier (PlanEnergi)*

Introduction to IEA-ES Task 45

Goal of IEA-ES-Task 45

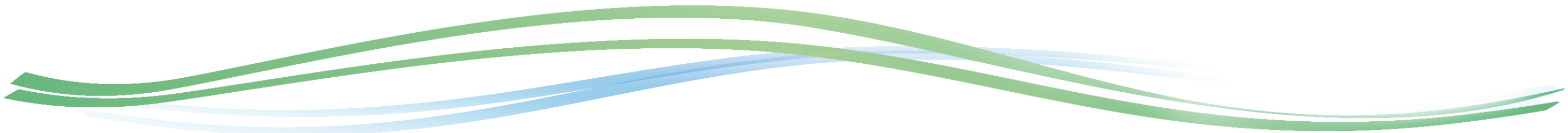
"Accelerating the uptake of Large Thermal Energy Storages"

Task subtasks



Download the
IEA-ES Task 39
deliverables





Submit your questions !



- Ask at the end of the presentations (if time permits)
- Or submit your questions by filling in this form

Questions will be considered during the planned Q&A sessions

➡ <https://forms.office.com/e/3826HwsSUw>



IEA Technology Collaboration Programme

For more information, check out our website

<https://iea-es.org/task-45/>

Webinars

Accelerating the Uptake of Large Thermal Energy Storages

Task 45
Currently running
Energy storage in energy systems

About Institutes/companies and experts Q&A bank **Webinars**

Webinars

Recordings & presentations from the webinar series of IEA-ES Task 45

[First webinar: Planning, regulatory, societal & financial aspects of LTES implementation](#)

- Introduction & brief technical overview of LTES technologies, PlanEnergi
- Medium and high-temperature ATES (Aquifer) implementation, dtess
- Seasonal crystalline BTES (Borehole), TU Darmstadt
- Stakeholder engagement & public perception in LTES projects, Fenix TNT
- Planning, regulatory, societal & financial aspects of PTES (Pit) implementation, PlanEnergi
- European framework, Hamburg Institut
- LTES financing methods, PlanEnergi
- Wrap-up & open discussion, PlanEnergi

Upcoming second webinar (December 16th, 2025 – 9:30-12:30 CET): Technical aspects of LTES (feasibility, design, tender, monitoring, etc.) & economic aspects. Registration [at the following link](#)

[All tasks →](#)

Q&A sessions

Accelerating the Uptake of Large Thermal Energy Storages

Task 45
Currently running
Energy storage in energy systems

About Institutes/companies and experts **Q&A bank** Webinars

Q&A bank

Recordings of Q&A sessions

[Q&A session 1.1](#)

Planning, legal, regulatory and societal aspects

No question answered in this category yet

Technical aspects (feasibility, design, tender, monitoring, etc.)

- ▶ Design (PTES, BTES, LTES)
- ▶ Application (LTES)
- ▼ Cost (ATES, BTES, PTES, LTES)

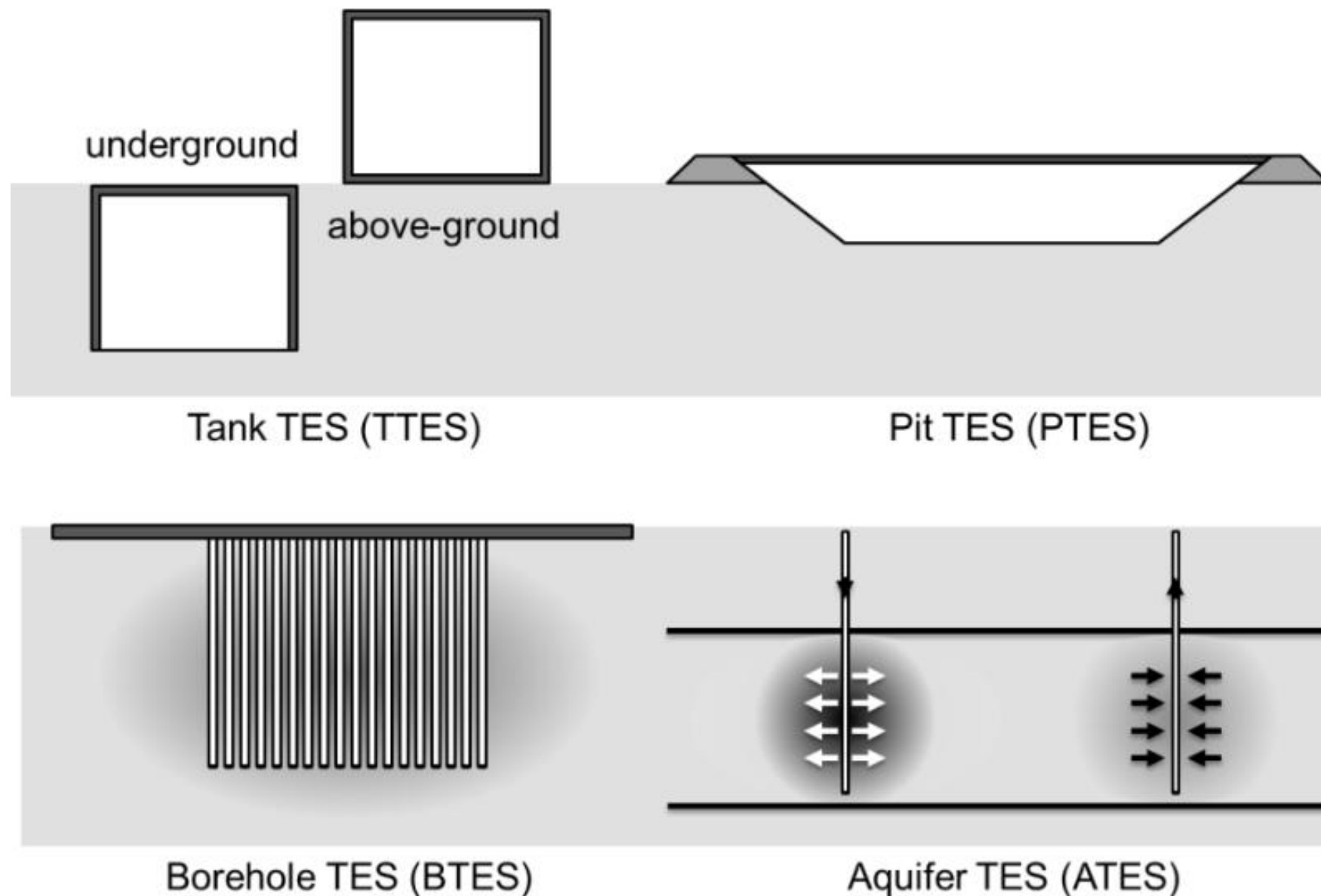
▼ *Between planning and construction of LTES, costs can increase significantly (due to delay(s), inflation, etc.). How can we ensure that heat generation costs remain manageable and that end-user prices for district heating do not increase to the point where the system becomes economically unattractive?*

Guaranteeing future energy prices is generally not possible. The energy prices for the charge of a thermal energy storage might vary over time. When it comes to the thermal energy storage itself, once the tendering results are known, future cost of storing heat can be estimated, since most of the investment is made upfront, and operational costs are relatively low. This is similar for solar thermal systems, where the majority of the cost is capital expenditure, giving a predictable cost of heat over time. The same applies when using solar or wind energy combined with heat pumps – the upfront investment defines the long-term cost structure. Other heat sources usually have prices which vary more over time and as such are more uncertain.

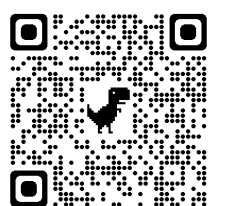


IEA Technology Collaboration Programme

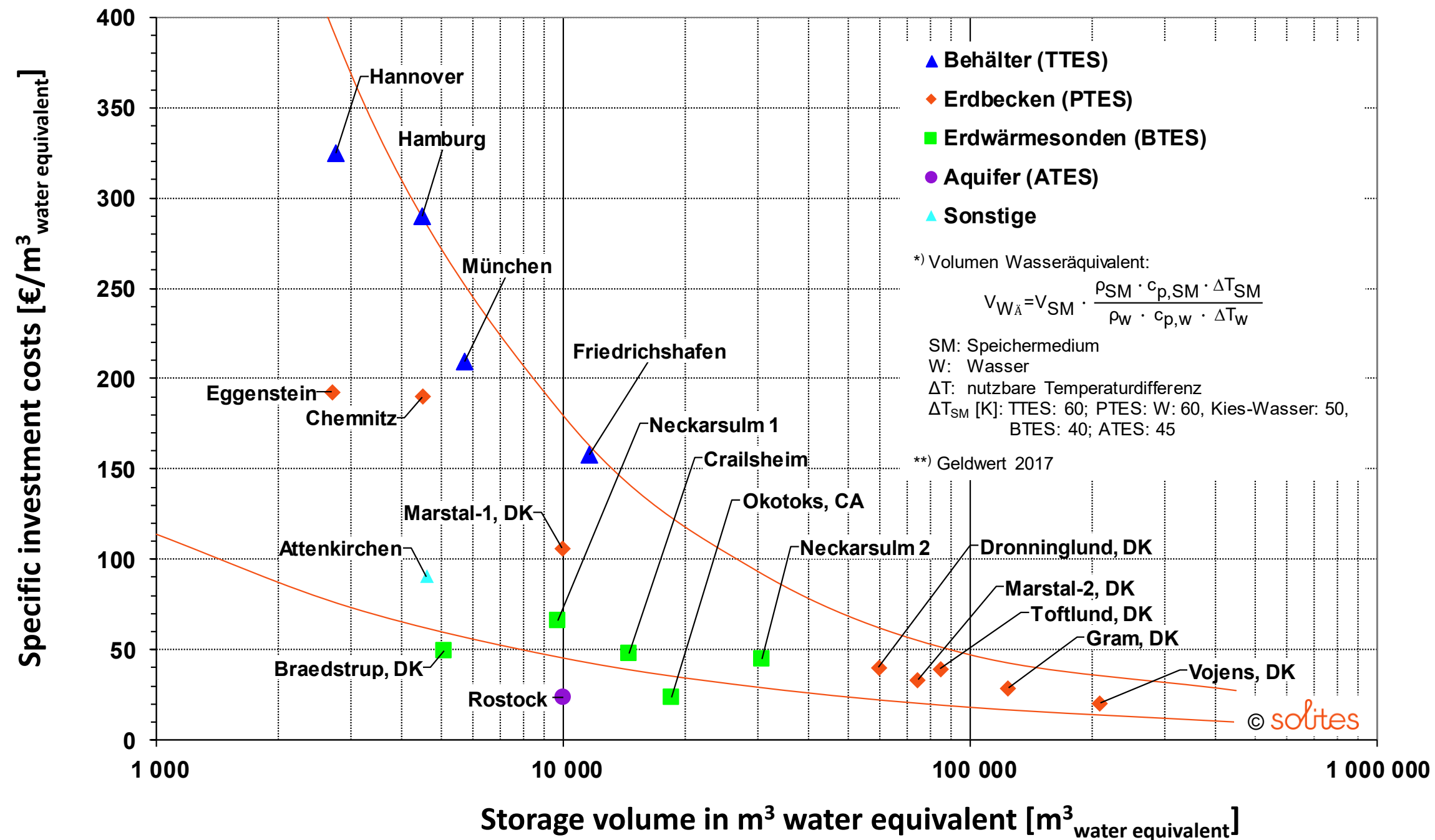
Task scope : Investigation of the 4 main LTES technologies and improved concepts



- Yearly stored energy > 1 GWh
- Typical storage temperatures 100 °C – 120 °C
- Daily, weekly and seasonal storage
- DH or industries



LTES benefit from economies of scale



Source: Epp, Bärbel. „Seasonal pit heat storage: Cost benchmark of 30 EUR/m³ Solarthermalworld.org“ May 17th, 2019. <https://www.solarthermalworld.org/news/seasonal-pit-heat-storage-cost-benchmark-30-eur-m3>

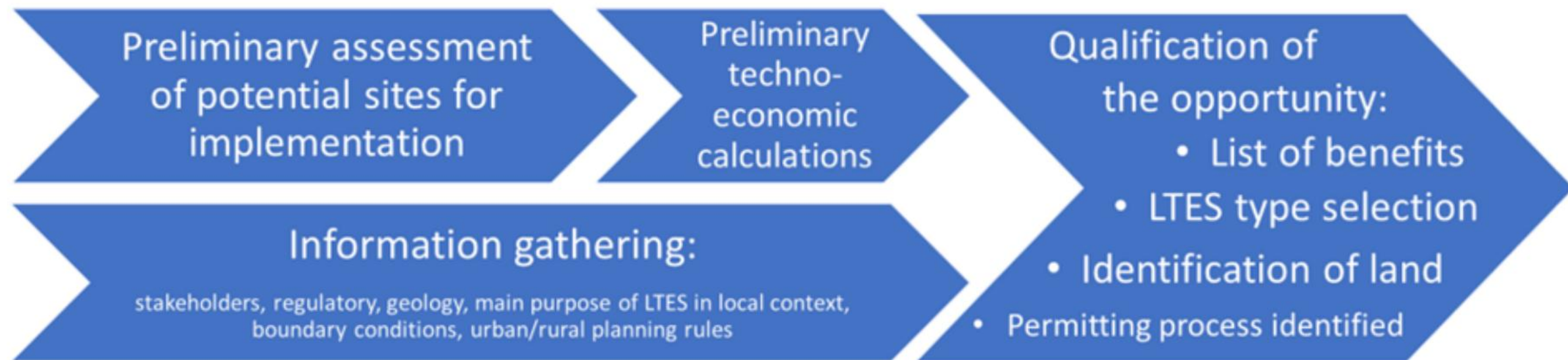
Download the
IEA-ES Task 39
deliverables



LTES implementation takes place in 4 main phases



Opportunity phase



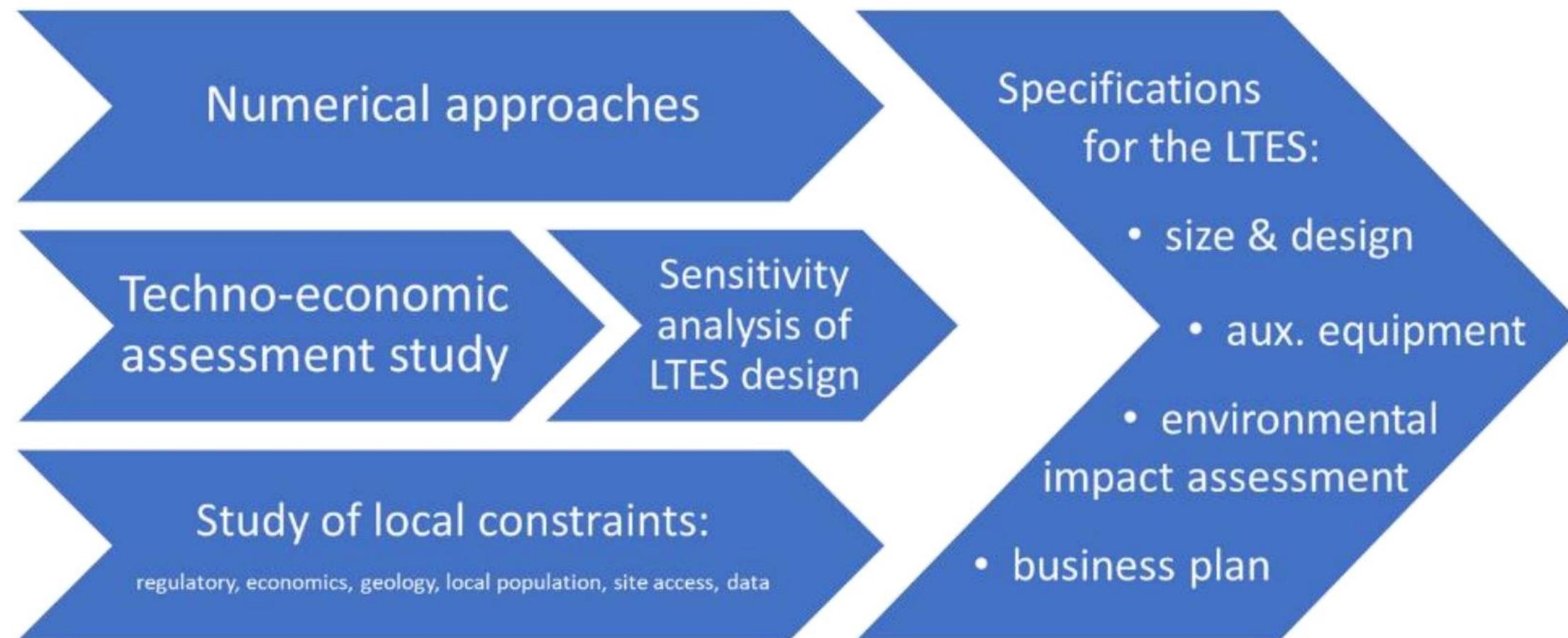
Main technical goals:

- Assess viability of a LTES within a specific context
- Pre-select LTES type

Download the
IEA-ES Task 39
deliverables



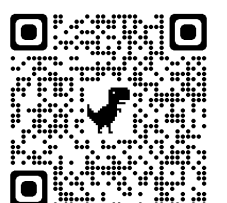
Design phase



Main technical goals:

- Analyze DHN data
- Run feasibility studies
- Define size and specifications

Download the
IEA-ES Task 39
deliverables



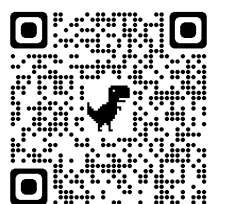
Tender phase



Main technical goals:

- Prepare technical specifications
- Initiate tender
- Sign contract

Download the
IEA-ES Task 39
deliverables



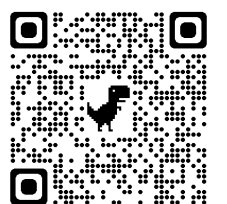
Implementation phase



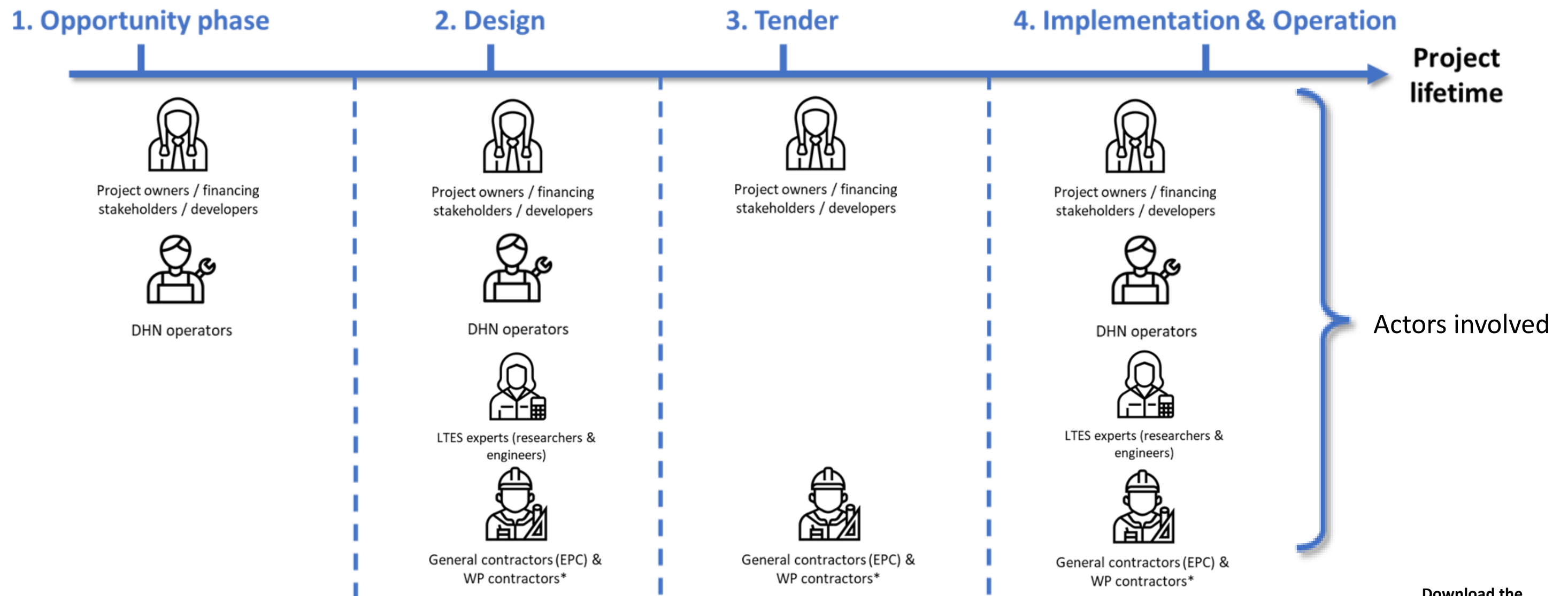
Main technical goals:

- Build, operate and maintain the LTES, under regulatory oversight

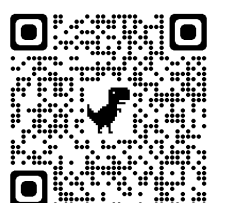
Download the
IEA-ES Task 39
deliverables



LTES implementation takes place in 4 main phases



Download the
IEA-ES Task 39
deliverables





IEA Technology Collaboration Programme

Thanks for your attention !



Romain Sucche



rsu@planenergi.dk



Learn more at <https://iea-es.org/task-39/> & <https://iea-es.org/task-45/>

Download the IEA-ES Task 39
deliverables



IEA Technology Collaboration Programme

Workshop Program

LTES Systems: Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect

9:30 - 9:50

- Welcome, introduction and brief technical overview of LTES stages and economic order of magnitudes, based on IEA-ES Task 39. *Romain Sucche (PlanEnergi)*



9:50 - 10:15

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Aquifer Thermal Energy Storage case study: Middenmeer (NL). *Bas Godschalk (DTESS BV)*

10:15 - 10:35

- Optimised integration of thermal aquifer storage in district heating systems. *Benjamin Köhler (Öko-Institut)*

10:35 - 10:45

- Break

10:45 – 11:10

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Borehole Thermal Energy Storage case study: Emmaboda (SE). *Olof Andersson (Lund University)*

11:10 - 11:35

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Tank Thermal Energy Storage case study: Berlin (DE). *Julian Formhals (BEW Berliner)*

11:35 – 11:45

- Break

11:45 - 12:10

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Pit Thermal Energy Storage case study: Høje Taastrup (DK). *Per Alex Sørensen (PlanEnergi)*

12:10 - 12:30

- Wrap-Up & Open Discussion. *Geoffroy Gauthier (PlanEnergi)*

Break until 10:45

LTES Systems: Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect

9:30 - 9:50

- Welcome, introduction and brief technical overview of LTES stages and economic order of magnitudes, based on IEA-ES Task 39. *Romain Sucche (PlanEnergi)*



9:50 - 10:15

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Aquifer Thermal Energy Storage case study: Middenmeer (NL). *Bas Godschalk (DTESS BV)*



10:15 - 10:35

- Optimised integration of thermal aquifer storage in district heating systems. *Benjamin Köhler (Öko-Institut)*



10:35 - 10:45

- Break

10:45 – 11:10

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Borehole Thermal Energy Storage case study: Emmaboda (SE). *Olof Andersson (Lund University)*

11:10 - 11:35

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Tank Thermal Energy Storage case study: Berlin (DE). *Julian Formhals (BEW Berliner)*

11:35 – 11:45

- Break

11:45 - 12:10

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Pit Thermal Energy Storage case study: Høje Taastrup (DK). *Per Alex Sørensen (PlanEnergi)*

12:10 - 12:30

- Wrap-Up & Open Discussion. *Geoffroy Gauthier (PlanEnergi)*

Break until 11:45

LTES Systems: Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect

9:30 - 9:50

- Welcome, introduction and brief technical overview of LTES stages and economic order of magnitudes, based on IEA-ES Task 39. *Romain Sucche (PlanEnergi)*



9:50 - 10:15

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Aquifer Thermal Energy Storage case study: Middenmeer (NL). *Bas Godschalk (DTESS BV)*



10:15 - 10:35

- Optimised integration of thermal aquifer storage in district heating systems. *Benjamin Köhler (Öko-Institut)*



10:35 - 10:45

- Break



10:45 – 11:10

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Borehole Thermal Energy Storage case study: Emmaboda (SE). *Olof Andersson (Lund University)*



11:10 - 11:35

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Tank Thermal Energy Storage case study: Berlin (DE). *Julian Formhals (BEW Berliner)*



11:35 – 11:45

- Break

11:45 - 12:10

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Pit Thermal Energy Storage case study: Høje Taastrup (DK). *Per Alex Sørensen (PlanEnergi)*

12:10 - 12:30

- Wrap-Up & Open Discussion. *Geoffroy Gauthier (PlanEnergi)*

Workshop Program

LTES Systems: Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect

9:30 - 9:50

- Welcome, introduction and brief technical overview of LTES stages and economic order of magnitudes, based on IEA-ES Task 39. *Romain Sucche (PlanEnergi)*



9:50 - 10:15

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Aquifer Thermal Energy Storage case study: Middenmeer (NL). *Bas Godschalk (DTESS BV)*



10:15 - 10:35

- Optimised integration of thermal aquifer storage in district heating systems. *Benjamin Köhler (Öko-Institut)*



10:35 - 10:45

- Break



10:45 – 11:10

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Borehole Thermal Energy Storage case study: Emmaboda (SE). *Olof Andersson (Lund University)*



11:10 - 11:35

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Tank Thermal Energy Storage case study: Berlin (DE). *Julian Formhals (BEW Berliner)*



11:35 – 11:45

- Break



11:45 - 12:10

- Technical Feasibility, Design, Tendering, Monitoring & Economic Aspect – Applied on a Pit Thermal Energy Storage case study: Høje Taastrup (DK). *Per Alex Sørensen (PlanEnergi)*



12:10 - 12:30

- Wrap-Up & Open Discussion. *Geoffroy Gauthier (PlanEnergi)*

Upcoming Webinars and Q&A Sessions



Year	2025												2026												2027											
Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Webinar						1						2						3						4												
Q&A Session						✓			1.1		2.1	✓	2.2		2.3		3.1		3.2		3.3		4.1		4.2											
							✓			✓																										

- ✓ **Webinar 1** Planning, legal & societal aspects of LTES implementation & financial aspects
- ✓ **Webinar 2** Technical aspects of LTES (feasibility, design, tender, monitoring, etc.) & economic aspects
- Webinar 3** Practical experiences with LTES & economic aspects
- Webinar 4** Results from IEA-ES Task 45 studies/work (+ potential information wishes from stakeholders)

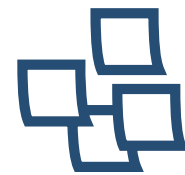
Q&A Sessions Depending on the questions gathered through the online form

➡ <https://forms.office.com/e/3826HwsSUw>



IEA Technology Collaboration Programme

Evaluation form



Please fill in this evaluation form to help us improve the upcoming sessions



<https://forms.office.com/e/ePFLBQhzp2>



IEA Technology Collaboration Programme



IEA Technology Collaboration Programme

Thanks for your attention !

Learn more at <https://iea-es.org/task-45/>

PlanEnergi

