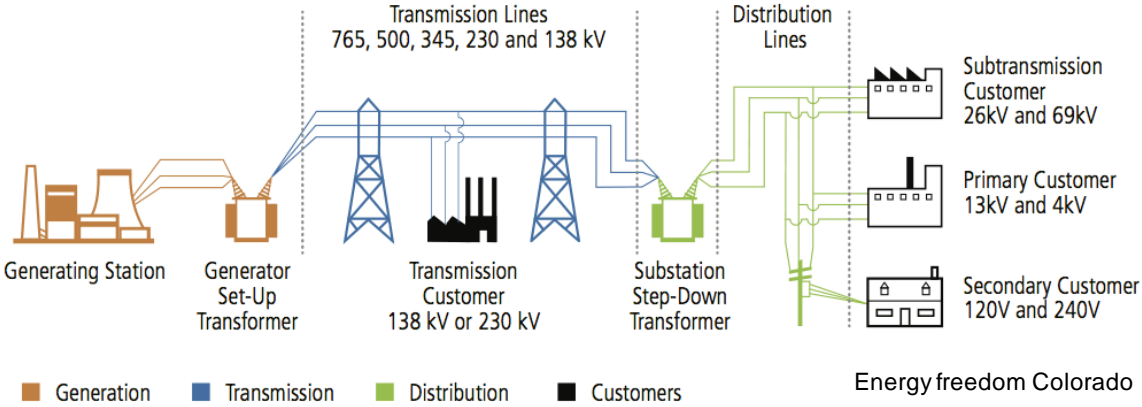


AAE-E3071
Electrical Energy Storage Systems
Theory (3 ECTS)
Course Practicalities
2022

Electrical Energy Storage Systems



**Electricity grid
ELEC**

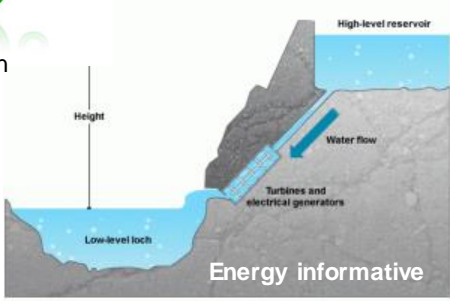


New energy updates



European commission

**Storages
ENG**



Energy informative

Indented learning outcomes (ILO)

1. Describe operating principles of key energy storage technologies, including their benefits and fundamental limitations.

2. Select relevant technologies for energy storage, including storage and conversion components.

3. Evaluate the features and the costs of electrical energy storage systems, based on industrial and student solutions.



Annukka Santasalo-Aarnio
Aalto - ENG



Floran Martin
Aalto - ELEC



Mikko Routimo
Aalto - ELEC

Teaching
Staff



Hassan Rouhi
Aalto - ENG

Teaching methods

Active self-study
(Read / Reflect / Report)

Information from Flip Talk/Industrial talk
Contact session live Tuesday 8.30-10.00 am
Or available also as videos

Teaching methods

Sister Course running parallel

AAE-3070 Electrical Energy Storage System

Has same theory content, but also has applied team work

At 3 ECTS course, you do not participate to the team works, but will have opportunity to follow poster presentation session, ask questions and reflect

Teaching Schedule (Preliminary)

Week	Theme	Personal task	Team Project for 3070 course
1 (11.1)	Background (ELEC/Storage)	Assignment 1 (basic concepts)	
2 (18.1)	Energy storage interfaces	Quizz I	<i>Poster presentation 1</i>
3 (25.1)	Power conversion devices in EESS	Assignment 2 (storages)	
4 (1.2)	Finalizing Storage system	Quizz II	<i>Poster presentation 2</i>
5 (8.2)	UPS (combining different purpose for storage)	Quizz III	
6 (15.2)	ESS Systems + sustainability	Assignment 3 (Industrial reflection)	<i>Poster presentation 3</i>
Week 8	Final report	Review report of 2 presentation	<i>Final presentation</i>

Assessment

Tasks for the course

Quizz (3 x 4 p.)	12
Assignment 1	10
Assignment 2	10
Assignment 3	10
Final report	15
<u>Course Official Feedback</u>	<u>3</u>
	60 p.

Timetable at first contact session (11.1)

Available also online, but recommended to participate

- 8.30 – 9.10 Introduction to Electrical Engineering

Break 5 min.

- 9.15 - 10.50 Introduction to Storages

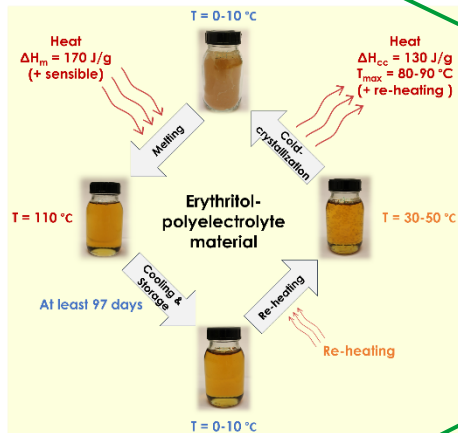
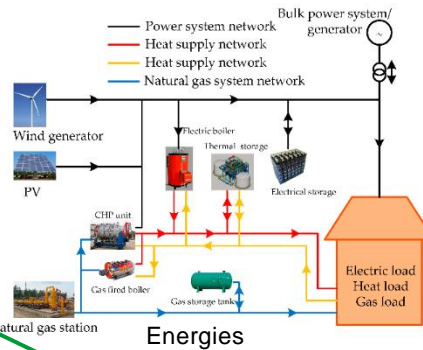
- 9.50- 10.00 Questions on Course Practicalities

Courses of Energy Conversion or Storage (Aalto)

- **CHEM-E4255 Electrochemical Energy Conversion**
Introduces in more detail of electrochemical energy storage systems
- **ELEC-E8412 Power Electronics**
Introduces electric power conversion devices that are commonly needed in energy storage systems.
- **ELEC-E8405 - Electric Drives**
Covers fundamentals of the electric-to-electric and electric-to-mechanical power conversions
- **AAE-E3100 Energy Carriers**
How energy carriers are used in traffic (power to fuels/hydrogen) and EVs

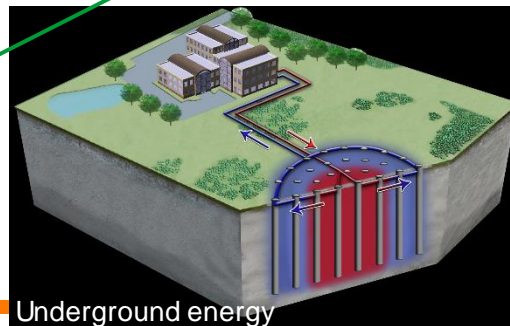
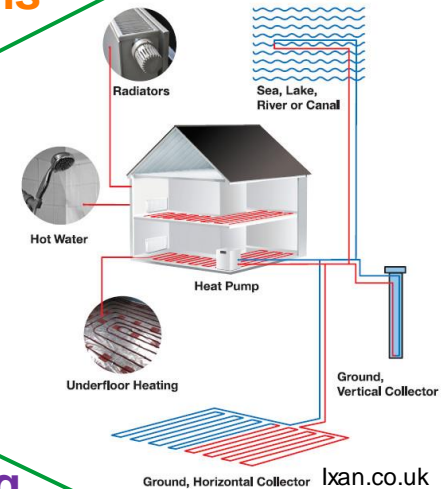
AAE-E3080 Thermal Energy Storage Systems (period IV-V)

Thermal Energy Storage Systems



New Heat Storage materials

Heat pumps



Using soil/buildings as Energy Storage

Your Activities

- Assignment 1 – Design a storage system for diverse household applications
- Assignment 2 – Compare electrical energy storage technologies from a list of articles
- Assignment 3 – Reflect on the industrial open questions
- Quizzes – Reflect on the course material
- Review presentation – Follow two groups from the EEA-3070. Review their progress from their poster until their final presentation.

Questions?

At first session (11.1) we will have also question session where the teachers are present

If you have question before, contact course assistant
(hassan.rouhi@aalto.fi)