

# ESEIA International Summer School 2022

19–30 September 2022 Online

## Long Duration Energy Storage (LDES) Solutions for Climate Friendly Energy Production



Organized by  
Finnish Heat Circulation Innovation Platform (FINHCIP) Universities in  
Finland and with  
European Sustainable Innovation Energy Alliance (ESEIA)  
network in Europe



Leverage from  
the EU  
2014–2020



**SAVONIA**



Pohjois-Savon liitto  
Regional Council of Pohjois-Savo



**Energy Cluster**  
POHJOIS-SAVO • NORTH SAVO



# ESEIA International Summer School 2022

## Course information

### Objectives

Long Duration Energy Storage (LDES) solutions will have an important role in future energy systems when energy is produced by using renewable sources and the production and consumption should be balanced by LDES systems.

Students will receive comprehensive overview of LDES solutions suitable for future energy systems and students are able to apply this knowledge for real cases in their work.

The ESEIA International Summer School 2022 is arranged together with Finnish Heat Circulation Innovation Platform (FINHCIP) Universities in Finland and with European Sustainable Energy Innovation Alliance (ESEIA).

### Content of Summer School

- Introduction
- Lectures of Long Duration Energy Storages (LDES) Solutions
- Orientation to project works
- Supervised group works
- Preparation of preliminary project plan for Horizon Europe call related to energy storage
- Presentations of group works

### Teaching methods

The ESEIA International Summer School 2022 is online course arranged on September 2022 during weeks 38 and 39 daily from 3 p.m. to 6 p.m. Several academics from organizing universities and partner universities will give lectures.

### Target group

**Prerequisites** Higher education degree. Master and Ph.D. students, Bachelor degree student with good knowledge of topic are welcome to apply for the course.

The official language of the course is English.

### Registration

The enrollment for the Summer School is done online <https://ssl.eventilla.com/event/Y7WVO>.

Deadline for registration is 18 September 2022.

Studying places will be filled in order of registration. Information of Acceptance/being on the waiting list is relayed to the student by e-mail immediately after sending of the registration form. Those on the waiting list are notified by e-mail of any possible free places at the latest five working days before the schooling begins.

### Fee info

Participation in the Summer School is free of charge, but attendants are responsible for covering all other possible costs.

### Learning material

Online course includes the course materials in Moodle environment and online lectures.

### Academic recognition

The ESEIA International Summer School 2022 is the equivalent of 5 ECTS.

### Contact information

Markku Huhtinen  
Savonia University of Applied Sciences  
Varkaus, Finland  
[markku.huhtinen@savonia.fi](mailto:markku.huhtinen@savonia.fi)  
+358 44 785 6763

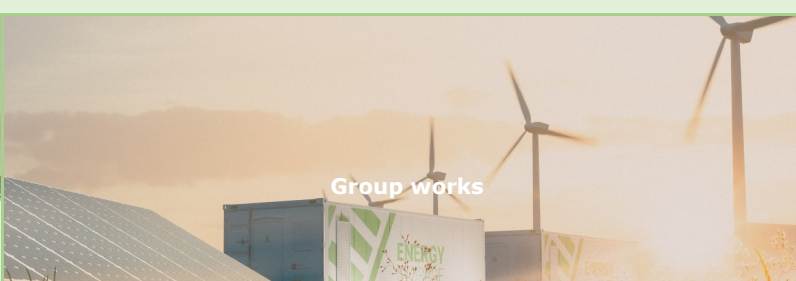


# ESEIA International Summer School 2022 Schedule

## Week 38 Lectures

EEST Time	Monday 19 <sup>th</sup> September	Tuesday 20 <sup>th</sup> September	Wednesday 21 <sup>st</sup> September	Thursday 22 <sup>nd</sup> September	Friday 23 <sup>rd</sup> September
<b>Lecture topic of the day</b>	Role of LDES in Future Energy System and Overview of Horizon Europe funding for Energy Research Projects	Thermal Sensible Energy Storage	Electrochemical Energy Storage (EES), Battery Technology	Mechanical LDES (PSH, CAES, LAES)	Hydrogen Technology/ Power-to-X
<b>15.00 -16.00</b>	<p>Welcoming</p> <p>Opening speech, Markku Huhtinen, Manager of Education and RDI, Savonia UAS</p> <p>Introduction to Course, Kirsi Kinnunen, RDI Specialist Savonia UAS</p> <p>Participants</p>	<p>Pilot Case of Finn Spring, Borehole Thermal Energy Storage (BTES), Fabian Sander, R&amp;D Expert (Energy Efficiency) Centria UAS</p> <p>15.30—16.00</p> <p>Cavern Thermal Energy Storage CTES, Patrick Yliluoto, Technical Specialist, Tekres Group</p>	Battery Technology for Electric Storage, Professor Jorma Jokiniemi and Associate Professor Anna Lähde, University of Eastern Finland	The Energy Storage Project, The Pumped Hydro Energy Storage Station for Pyhäsalmi Mine, Aki Hakulinen, EPV Energy (Presenter Markku Huhtinen, Savonia UAS)	Microalgae-based Solutions for CO2 Capture and Storage, Dr. Alberto Reis, PhD, Deputy Head of the Bioenergy and Biorefineries Unit within the National Laboratory for Energy and Geology (LNEG), Lisbon, Portugal
<b>16.00 – 17.00</b>	<p>16.00—16.45</p> <p>Role of LDES in Future Energy Systems, Markku Huhtinen, Manager of Education and RDI, Savonia UAS</p>	Tank Energy Storage (TTES), Peter Seppälä, Director, Production, Kuopion Energia	Materials for Energy Storage, Mark Huijben, Professor, UT-University of Twente, The Netherlands	Pilot Case: Waste-to-resource: HTC technology for resource and energy recovery, Cynthia Söderbacka, Project Leader, Novia UAS	Riikinneva Gas Project, Recovery of Synthetic methane and production of liquefied biogas, Saku Kimpimäki, Specialist, Wega
<b>17.00 – 18.00</b>	<p>16.45 - 18.00</p> <p>Orientation to project work</p> <p>How to create a successful EC proposal, Richard Wheeler from the ESEIA Team</p>	Pilot Case of Reinforced Concrete Energy Piles, Patrick Yliluoto, Technical Specialist, Tekres Group	Use of Battery Technology in Wind Power Plants, Olli-Pekka Kähkönen, PhD, Senior Lecturer, Savonia UAS	<p>17.00—17.30</p> <p>Liquid Air Energy Storage (LAES), Ashok Krishnan, Senior Power System Analyst Sumitomo SHI FW</p> <p>17.30—18.00</p> <p>Group work, Teija Honkanen, Lecturer, Savonia UAS</p>	<p>17.00—17.30</p> <p>The Fuelling Mix Disruption and Vision of three road, Jari Sistonen, Owner, U-Cont Ltd</p> <p>17.30—18.00</p> <p>OXY Combustion, Oxy-steam-Gasification to Green Chemicals and Calcium Looping for Carbon Capture Combined to Hydrogen Production, Lari Temonen, Director Forecasting and Analysis Sumitomo SHI FW</p>

## Week 39 Group works

EEST Time	Monday 26 <sup>th</sup> Sep-tember	Tuesday 27 <sup>th</sup> Sep-tember	Wednesday 28 <sup>th</sup> Sep-tember	Thursday 29 <sup>th</sup> Sep-tember	Friday 30 <sup>th</sup> Sep-tember
	Supervised group works Groups have their own guiding instructor				
<b>15.00 – 16.00</b>	<p>Orientation to group work</p> <p>Adapting LDES technology, case study/project plan</p>	 <p>Group works</p>			Presentations of group works
<b>16.00 – 17.00</b>	Group works				
<b>17.00 – 18.00</b>					Wrap-up farewell