



# MSc SELECT Project in Energy Systems Analysis

Grand Challenge Project for the 1<sup>st</sup> year MSc SELECT students 2018-19

Peter Hagström, course responsible



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## Course prerequisites

- Handling real life energy engineering problems of a practical importance.
- “Real” projects are assigned by companies, authorities or other external organizations.
- Supervision is performed by external consultants and academic staff.
- It is performed throughout the whole first academic year, consisting of 5 ECTS credits during the autumn semester and 7 credits during the spring semester,

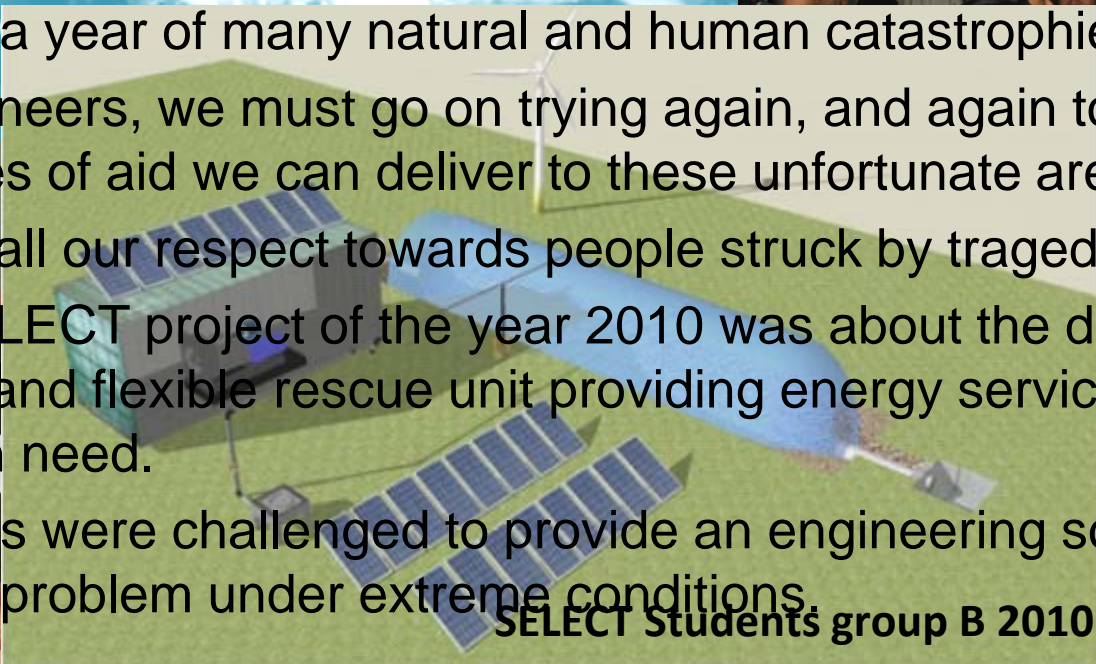


## SELECT Project of the Year 2010

### *Emergency Energy Module*

- 2010 -- a year of many natural and human catastrophies.
- As engineers, we must go on trying again, and again to improve the types of aid we can deliver to these unfortunate areas...
- ... with all our respect towards people struck by tragedy.
- The SELECT project of the year 2010 was about the design of a mobile and flexible rescue unit providing energy services for areas in need.
- Students were challenged to provide an engineering solution to solve a problem under extreme conditions.

SELECT Students group B 2010



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# MSc SELECT Project of the Year 2011-12

## *Polygeneration, for the benefit of humankind*

- Polygeneration ?
  - Simultaneous utilization of various primary energy sources
  - Simultaneous generation of various energy services
  - In its "simplest form", Combined Heat and Power.
- The SELECT project of the year 2011 took on the design of technically sound innovations with large potential for business opportunities.
- Two topics to choose from:
  - Ships to Generate Hydrogen at Sea



- Low Cost Housing with integrated Polygeneration for Sustainable living



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## MSc SELECT Project of the Year 2012-13

### *Polygeneration in a Sustainable Energy Society*

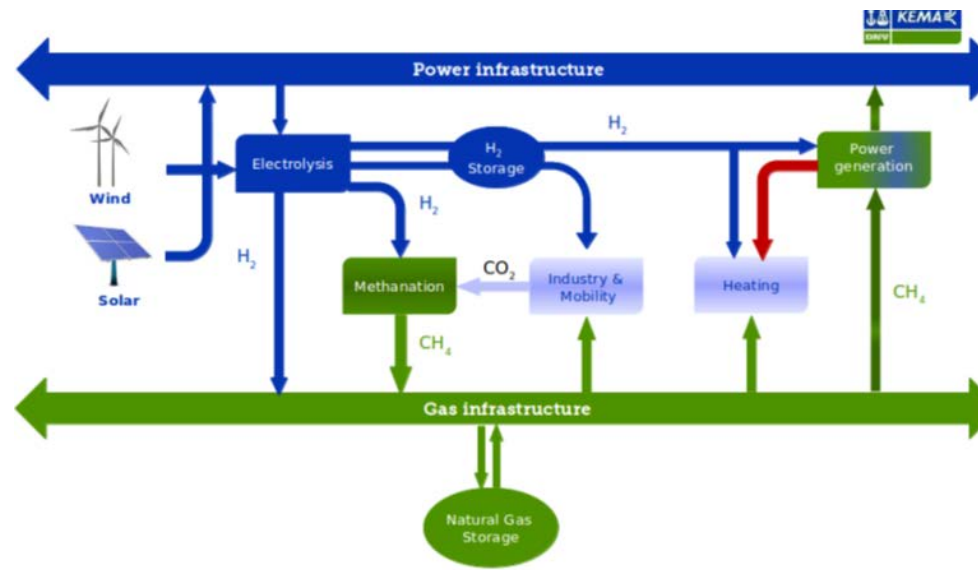
- Clean water and Electricity in developing regions of the World
- Cut greenhouse gas emissions in Europe by 80–95 % by 2050
- CO<sub>2</sub> free aviation



# MSc SELECT Project of the Year 2013-14

## *Power-to-gas to Energy Services for a Sustainable Mankind*

- How may gas and other energy carrier infrastructures be linked to each other in the most efficient way, in respect to energy and energy losses, economic and business concerns and for receiving the most optimal energy services? Explore novel systems solutions with the starting point being today's best technology.





## MSc SELECT Project of the Year 2014-15

### KTH:

- **Energy Storage for Renewable Energy Systems**  
Supervised by the division of Heat & Power Technology, KTH
- **Solar Distillation**  
Supervised by Solarus, Gävle
- **Chicken Coop**  
Supervised by Solarus, Gävle

### UPC:

- **TeknoCEA Programmable Emulators - Prospects in Research and Development of Microgrids**  
Supervised by Smalle Technologies, Barcelona
- **Electromagnetic Power Application for Energy Harvesting: eForcis**  
Supervised by teknoCEA, Barcelona



# MJ2415 Project in Energy Systems Analysis

**2015-16**

- **Going off-grid on Utklippan**
  
- **Management strategies for transforming the energy system of the Faroe Islands**





# MJ2415 Project in Energy Systems Analysis



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**2015-16**

- **Smart Rural Grid - Business Expansion Proposal**



# MJ2415 Project in Energy Systems Analysis



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**2016-17**

- 1) Smart Rural Grid with Estabanell Energia, Spain
- 2) Energy Storage with Estabanell Energia, Spain
- 3) Tylön with the National Property Board Sweden



# MJ2415 Project in Energy Systems Analysis



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**2016-17**

## 4) The Honde Valley Zimbabwe Challenge with FDC



# MJ2415 Project in Energy Systems Analysis



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**2016-17**

## 5) Sri Lankan newspaper company project





# MJ2415 Project in Energy Systems Analysis



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**2017-18**

- 1) The Eco-Bot Project, Estabanell Energia, Spain
- 2) Business Model for Energy Efficiency





# MJ2415 Project in Energy Systems Analysis



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**2017-18**

3) Grid optimization

4) Ngenic Växel Challenges



# MJ2415 Project in Energy Systems Analysis



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**2017-18**

5) Gotland - The Renewable Island in the Baltic Sea



# MJ2415 Project in Energy Systems Analysis



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**2017-18**

6) Reduce air pollution in new thermally comfortable dwelling by integration of clean and innovative energy systems

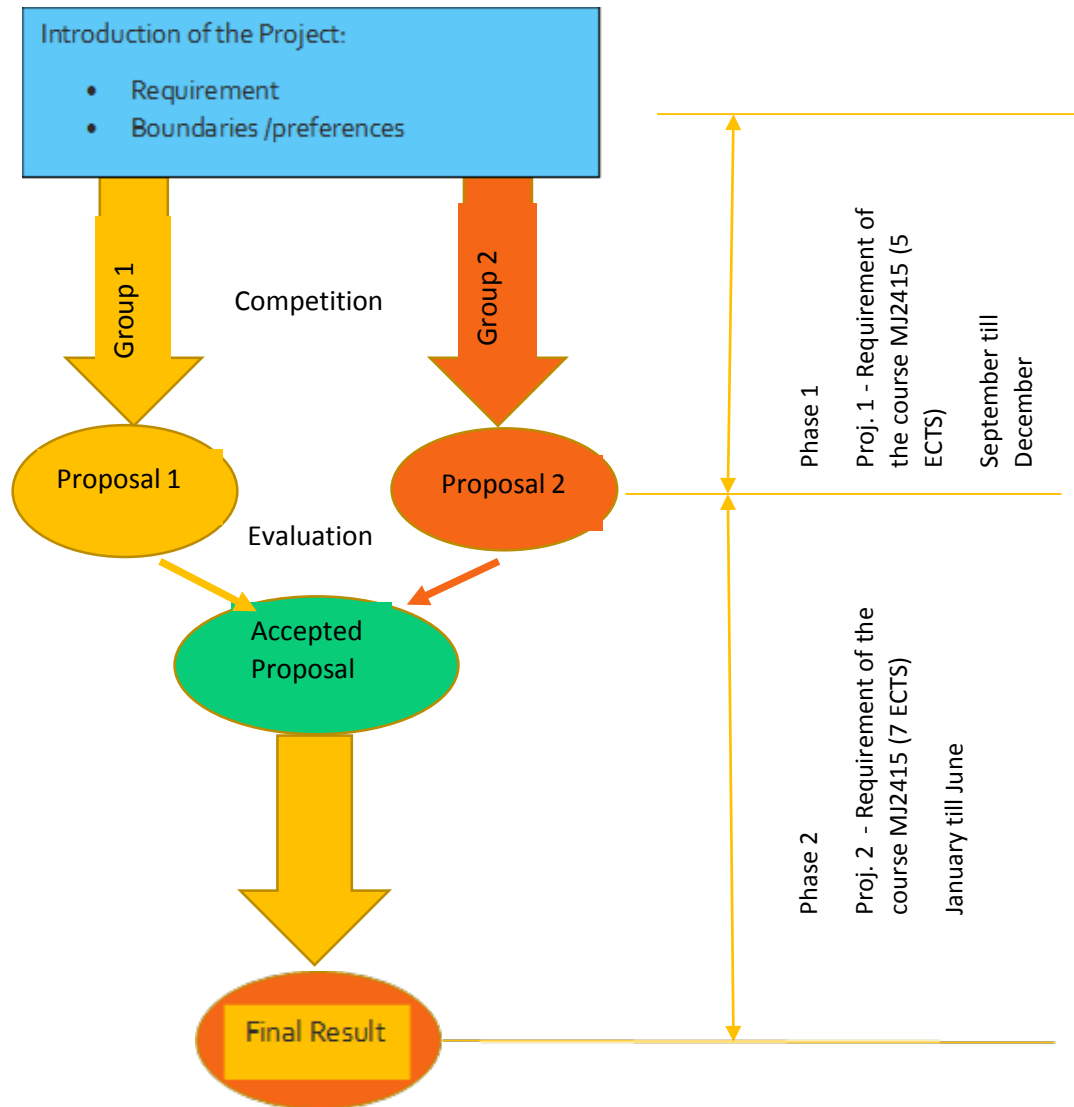




# Learning Materials, Teaching Aids and Assistance

- Main learning materials are the teaching and learning provided through SELECT program related regular courses (*i.e.* Challenge Driven Education).
- Assistance and continuous assessment of the work is provided by specific project supervisors/industrial partners.
- Field trips are arranged within each project.
- Students are highly encouraged to go deep into learning by their own through provided materials (*i.e.* through SELECT courses) and any other open source learning materials of their selection.

# SELECT Year 1 Project – Grand Challenge





# SELECT Year 1 Project – Grand Challenge

## *SCHEDULE FOR THE AUTUMN TERM:*

Activity	Location	Date
<b>Introduction to Project Management</b>	KTH and UPC (remotely)	September
<b>Inauguration of the project</b>	MSc SELECT Fall seminar	October 5th
<p><b>Project progress – phase 1: (At least) bi-weekly project meetings organized formally by the project teams. Scheduling up to the convenience of the team members and supervisor. Each team should make a draft project plan (including time schedule) within a week after the project groups have been formalized.</b></p>		
<b>Submission of PRO1 draft report</b>	In Canvas	November-December
<b>Oral presentation PRO 1</b>	KTH and UPC (remotely)	December
<b>Submission of PRO1 final report and individual deliverables</b>	In Canvas	December

# Assessment Criteria and Grading

Project – 100 points of which:

A: 90-100

$76 \leq B < 90$

$62 \leq C < 76$

$55 \leq D < 62$

$50 \leq E < 55$

$49 \leq FX < 50$

F < 49

The individual performance of each student will be assessed by the examiner, in close collaboration with the evaluators. The basis for this assessment will **for PRO1** include:

- Overall group score of the project reports (70%)
- Peer-grading within each group (everyone within a group anonymously assigns a grade to their peers, including a motivation). An averaged “peer grade” weighs 10% towards the final grade.
- Time sheet on weekly basis and individual statements of contributions to work (10% of grade).
- Assessment by the supervisors and MSc SELECT faculty of each student’s oral presentation (10% of grade).

# SELECT Year 1 Project – Grand Challenge

## SCHEDULE FOR THE SPRING TERM:

Activity	Location	Date
<p>Project progress – phase 2: (At least) bi-weekly project meetings organized formally by project teams. Scheduling up to the convenience of the team members and supervisor. Each team should make a draft project plan (including time schedule) within a week after the announcement of the winning proposal.</p>		
Field trips	Site of the project	January - April
Submission of PRO2 midterm report	In Canvas	March - April
Oral presentation PRO 2	MSc SELECT Spring seminar	May
Submission of PRO2 final report and individual deliverables	In Canvas	June

# Assessment Criteria and Grading (cont.)

Project – 100 points of which:

A: 90-100

$76 \leq B < 90$

$62 \leq C < 76$

$55 \leq D < 62$

$50 \leq E < 55$

$49 \leq FX < 50$

The individual performance of each student will be assessed by the examiner, in close collaboration with the evaluators. The basis for this assessment will **for PRO2** include:

- Overall group score of the project reports (70%)
- Peer-grading within each group (everyone within a group anonymously assigns a grade to their peers, including a motivation). An averaged “peer grade” weighs 10% towards the final grade.
- Time sheet on weekly basis and individual statements of contributions to work (10% of grade).
- Assessment by the supervisors and MSc SELECT faculty of each student’s oral presentation (10% of grade).

# SELECT Year 1 Project – Grand Challenge

## Examination and Grading

### *Project – PRO1 and PRO2*

PRO1 - Project, 5.0 credits, grade scale: A, B, C, D, E, FX, F (autumn term)

PRO2 - Project, 7.0 credits, grade scale: A, B, C, D, E, FX, F (spring term)

The final grade will be a weighted grade of PRO1 and PRO2 respectively.

The following criterias are utilized in general:

<b>Grade</b>	<b>Relation to learning outcomes</b>
A	Excellent performance showing a high level of ambition, initiative, and attention to detail.
B	Very good performance showing clear efforts to go beyond minimum requirements.
C	Good performance where requirements are met sufficiently and in some cases are exceeded.
D	Adequate performance.
E	Marginally adequate performance requiring significant efforts from supervisor and/or examiner to see project to completion.



## SELECT Project – Grand Challenge 2017 – 2018

# Canvas will be used!

**Name of the Canvas event:**

**“MJ2415 HT18-1 Project in Energy Systems Analysis”.**

# SELECT Year 1 Project – Grand Challenge

## COURSE RESPONSIBLE TEACHERS/SUPERVISORS AND CONTACTS

Name	Function	Affiliation
<b>Peter Hagström</b>	Course responsible for MJ2415 and examiner of the course	KTH/MSc SELECT
<b>Magnus Linden</b>	Senior consultant, Project supervisor and evaluator	SWECO, Stockholm
<b>Other staff at Sweco</b>	Consultants, Project supervisors and evaluators	SWECO, Stockholm
<b>Louis Jestin</b>	Senior Manager, Project supervisor and evaluator	EPPEI, Johannesburg, RSA
<b>Stuart Piketh</b>	Professor, Project supervisor and evaluator	North-West University, Potchefstroom, RSA

## SELECT Project – Grand Challenge 2018 – 2019

### Next steps:

- **Submission of project selection in Canvas (where a template will be made available).  
Deadline: October 11<sup>th</sup> at 24.00 CEST.**
- **The formation of groups will be announced on  
October 17<sup>th</sup> at latest.**
- **Submission of a draft project plan (including time schedule) for the autumn term, to be submitted in Canvas within a week after the project groups have been announced.**

# SELECT Year 1 Project – Grand Challenge

