EEE407 - Renewable Energy
Week 1: Course Introduction and Scope

ADANA ALPARSLAN TÜRKEŞ
SCIENCE AND TECHNOLOGY UNIVERSITY

Dr Kasım Zor

Department of Electrical and Electronic Engineering

Fall 2021

Outline

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Course Instructor

Dr Kasım Zor
Electrical and Electronic Engineer, PhD

Research Interests

- Electrical Energy and Power Systems, Electric Load Forecasting, Data Analytics, Artificial Intelligence, and Renewable Energy

Contact Information

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Course Information

Course Title	Code	Semester	T+L (Hours)	Credits	ECTS
Renewable Energy	EEE407	7	3+0	3	5

Table 1: Table of Course Information

- Prerequisites: None
- Language: English
- Level: Bachelor
- Type: Elective

Course Assessment and Evaluation

Assessment Type	Quantity	Weight
Quizzes	2	5%
Assignment	1	10%
Midterm Examination	1	20%
Project Work	1	25%
Final Examination	1	40%

Table 2: Table of Course Assessment and Evaluation

	Course Type	Allowed Rate	Allowed Hours
Absentee Rate	Main Course	30%	13

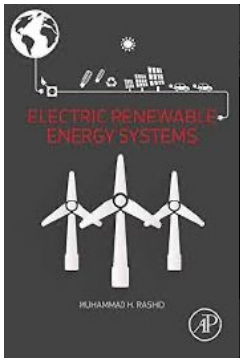
Table 3: Table of Absentee Rate

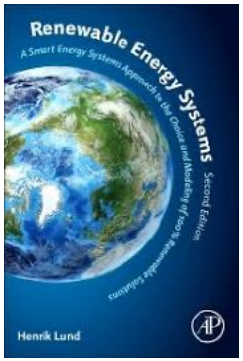
Learning Outcomes

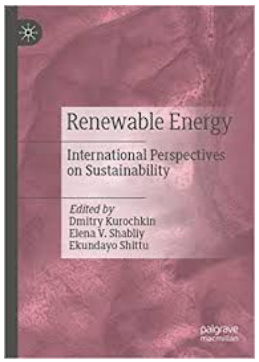
- Define commonly used terms in energy systems
- Distinguish between energy and power terms
- Describe energy production and consumption on a distributed, national, and global scale
- Explain technical principles behind a variety of power generation technologies
- Employ correct units while describing energy and power terms
- Calculate energy and power consumed or generated in a system scenario for given inputs or outputs
- Calculate the efficiency of an energy system
- Calculate and benchmark emissions from different energy production technologies
- Implement basic feasibility calculations for renewable energy systems

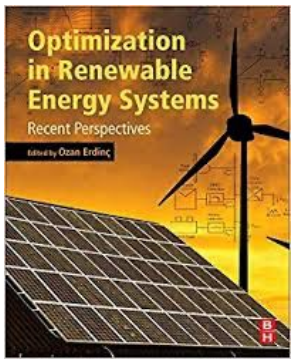
Recommended Sources

Textbooks [1, 2, 3, 4]

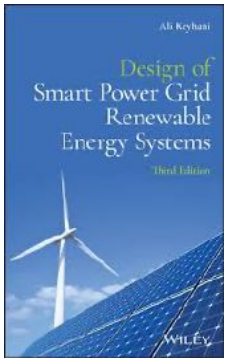


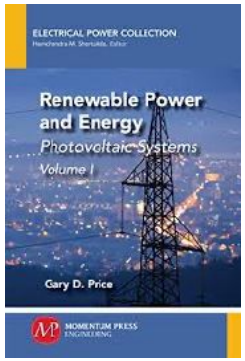


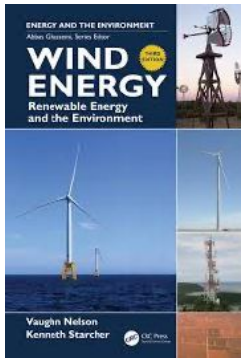


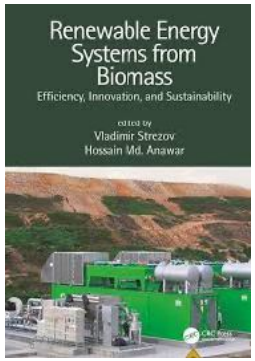


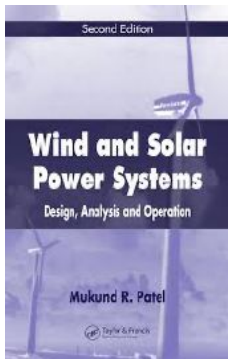
Additional Resources [5, 6, 7, 8, 9, 10, 11]

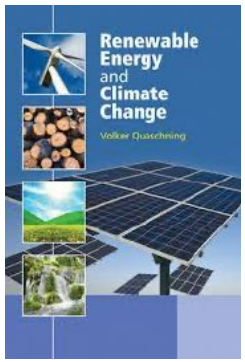


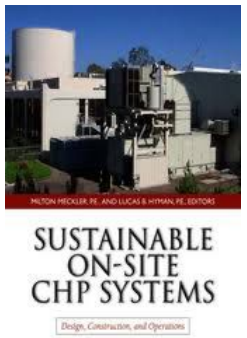












Outline

Course Contents – Week 2

Fundamentals of Energy, Transformations, and Units

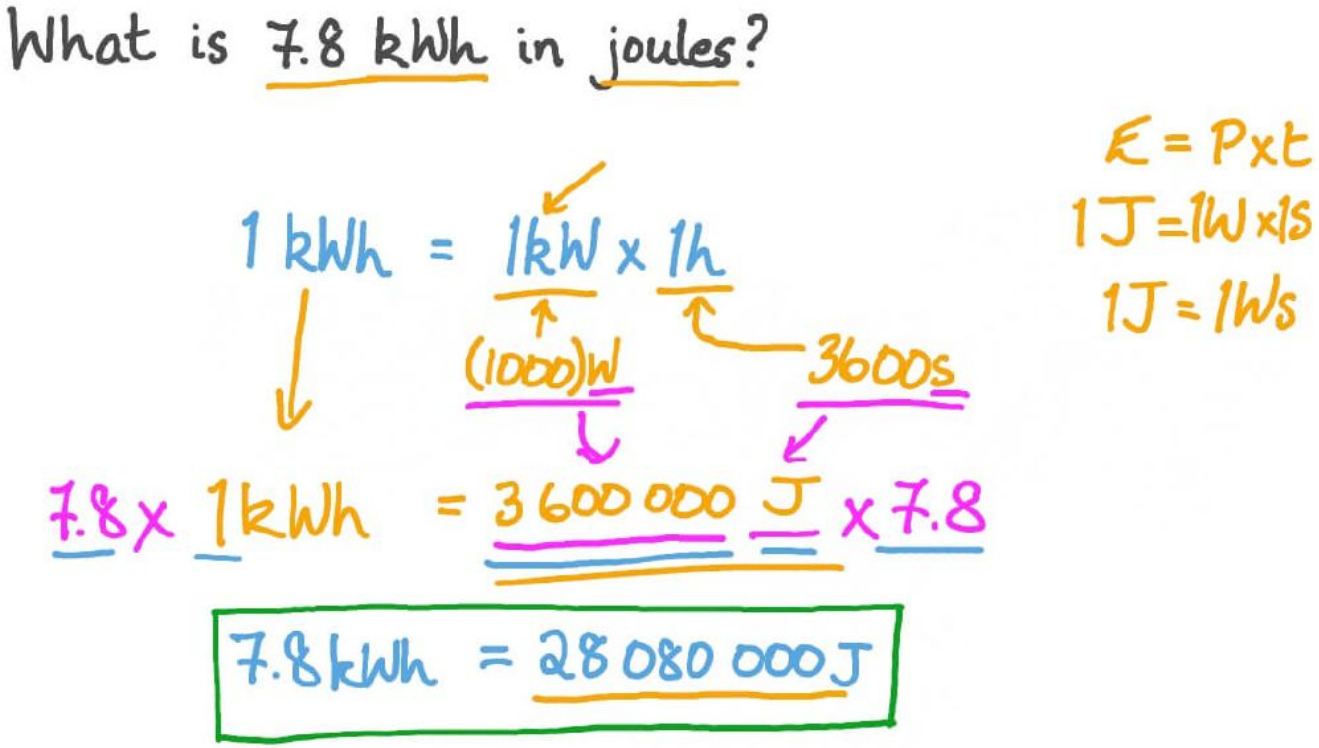


Figure 1: A transformation example [12]

Outline

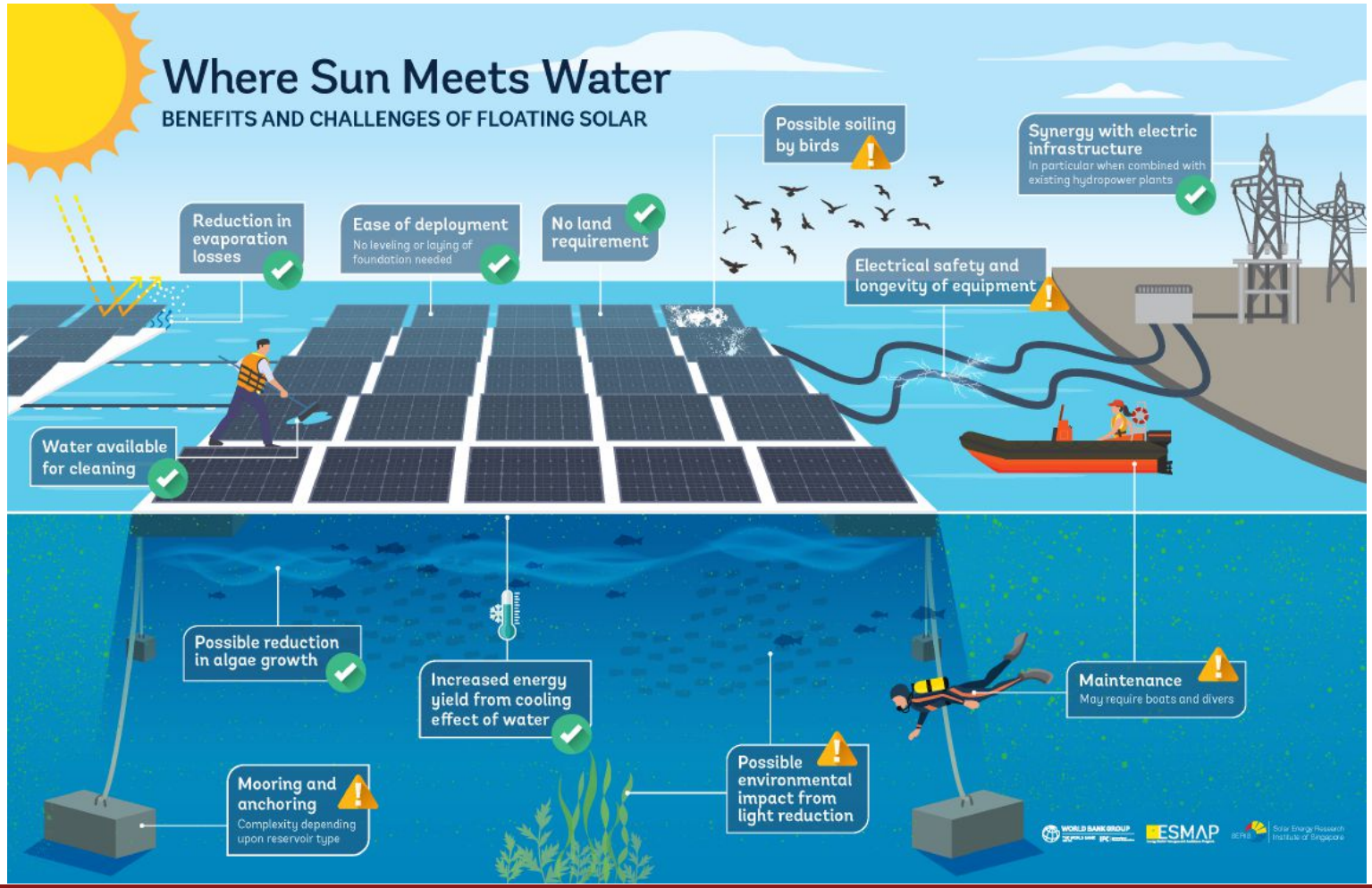
Course Contents – Week 3

Introduction to Renewable Energy [13]

Outline

Course Contents – Week 4

Solar Energy - Part 1 [14]



Outline

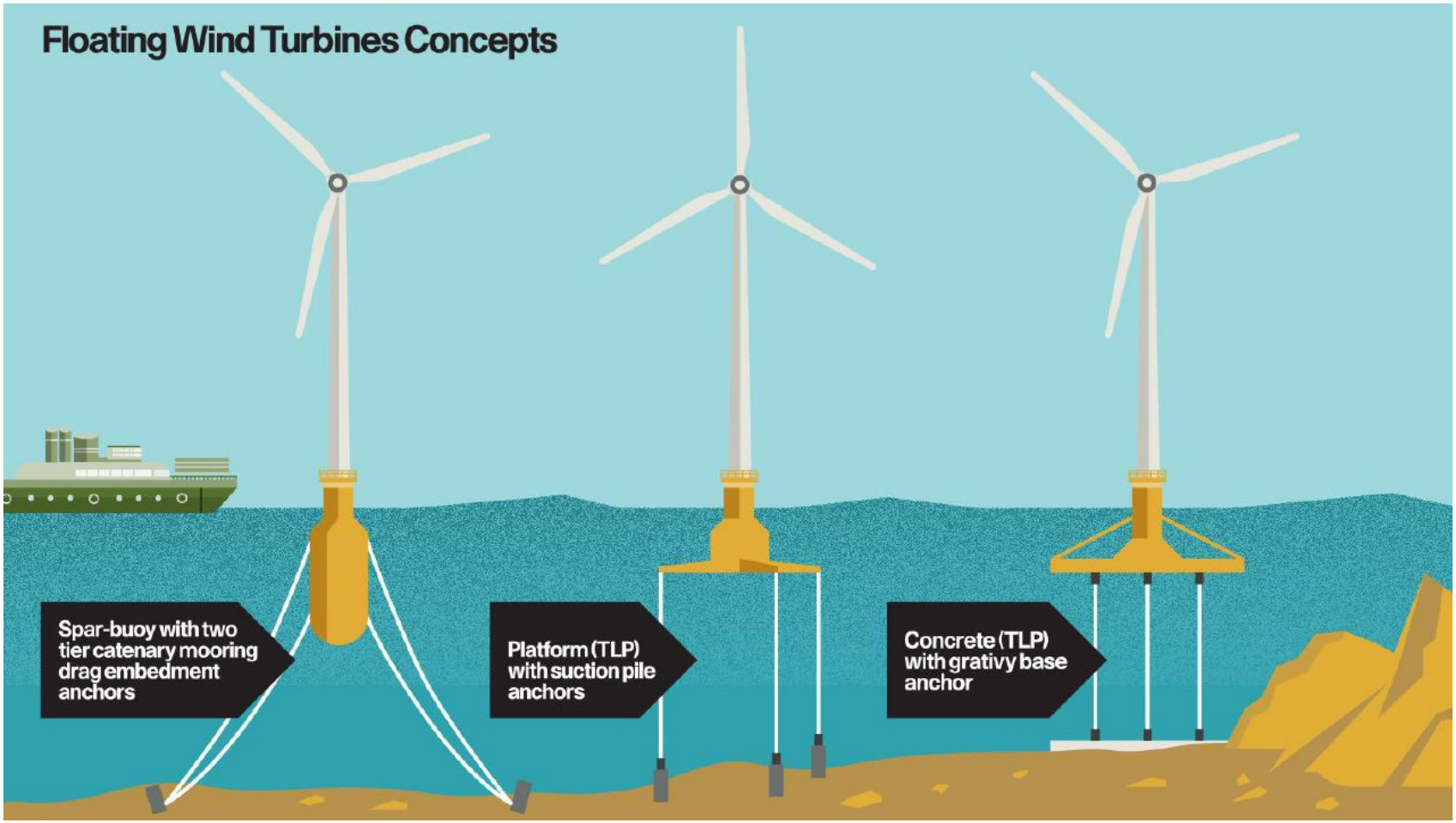
Course Contents – Week 5

Solar Energy - Part 2 [15]

Outline

Course Contents – Week 6

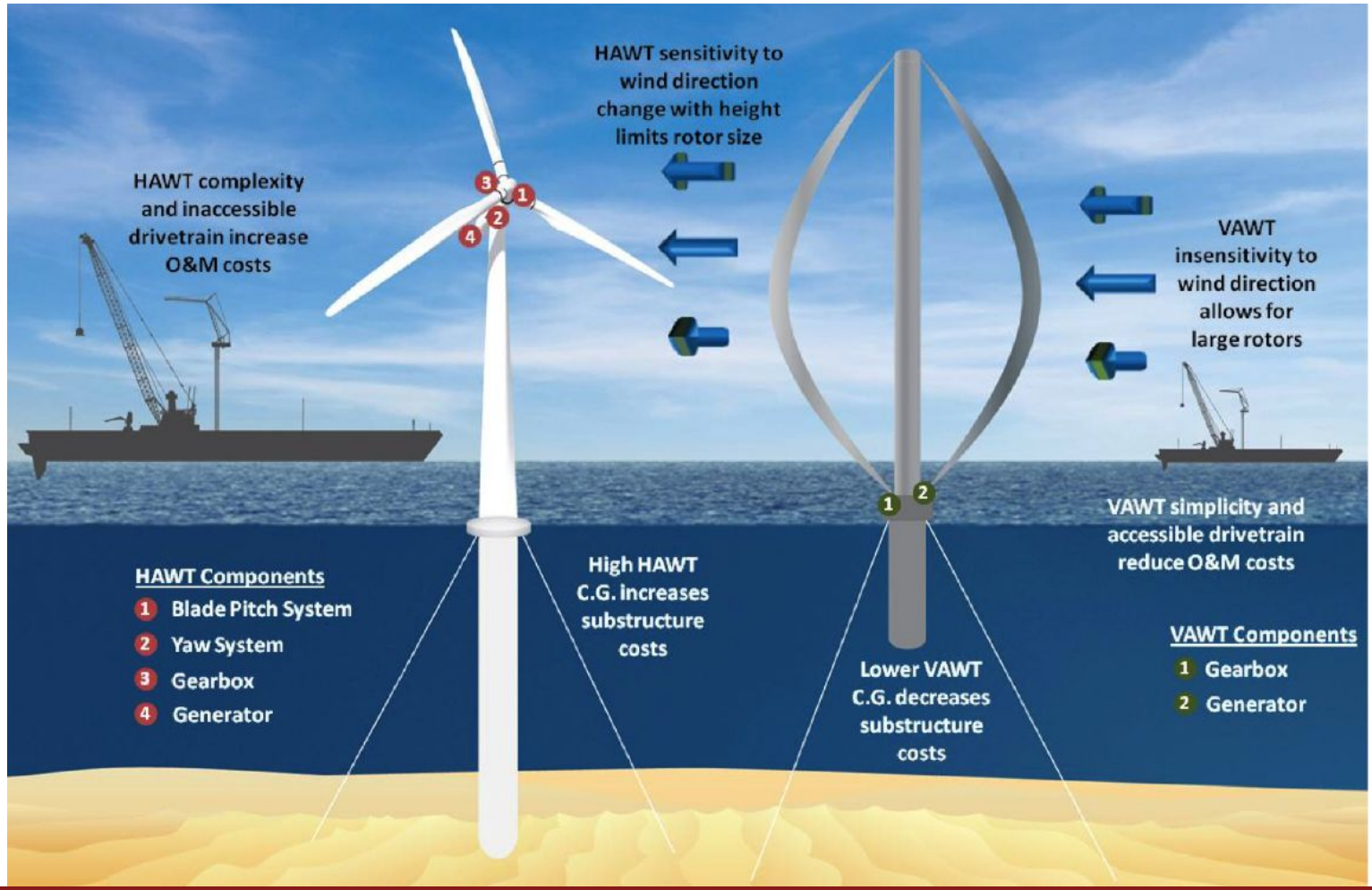
Wind Energy - Part 1 [16]



Outline

Course Contents – Week 7

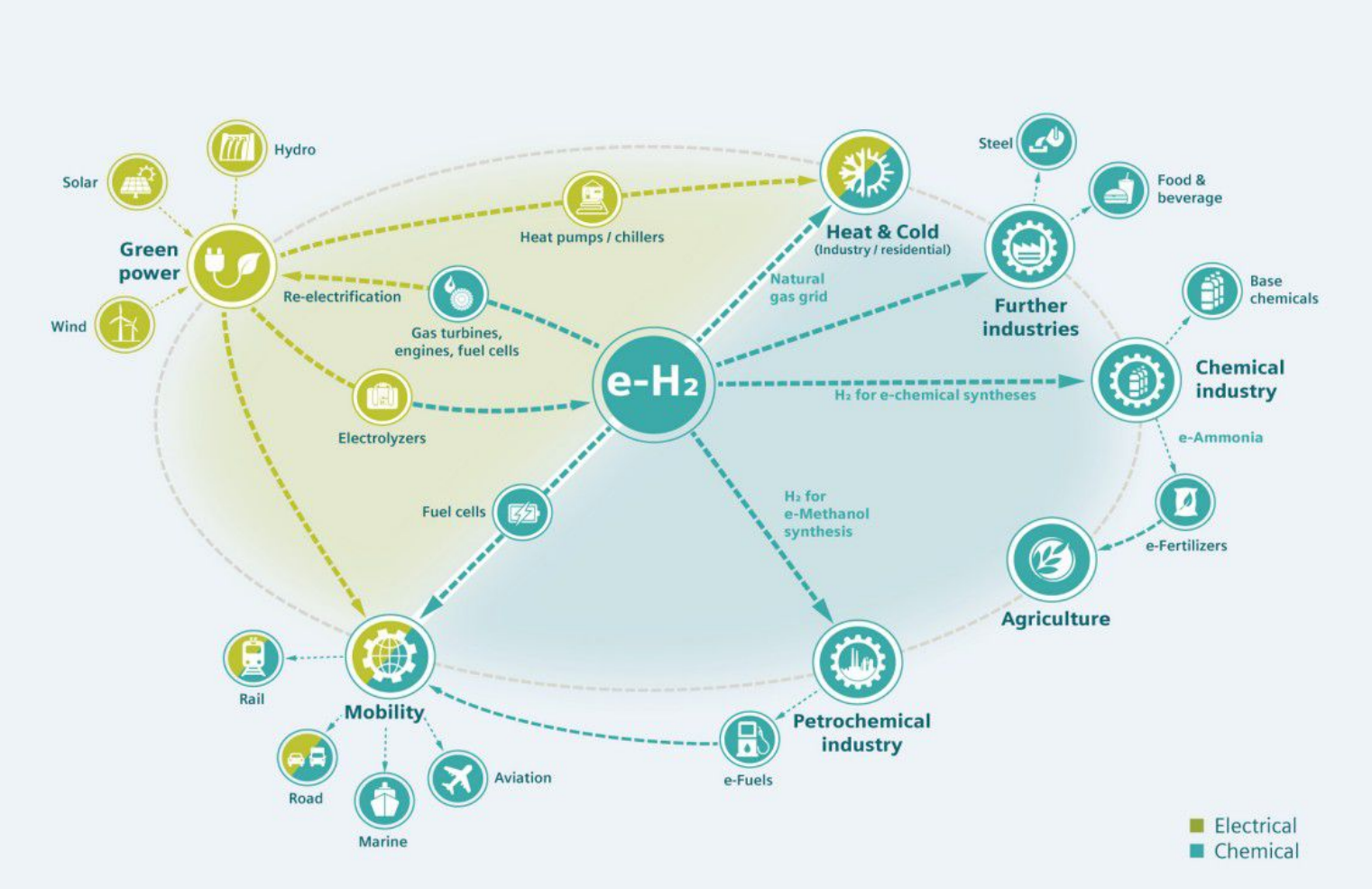
Wind Energy - Part 2 [17]



Outline

Course Contents – Week 8

Power-to-X [18]



Outline

Course Contents – Week 9

Midterm Examination (Paper-Based)

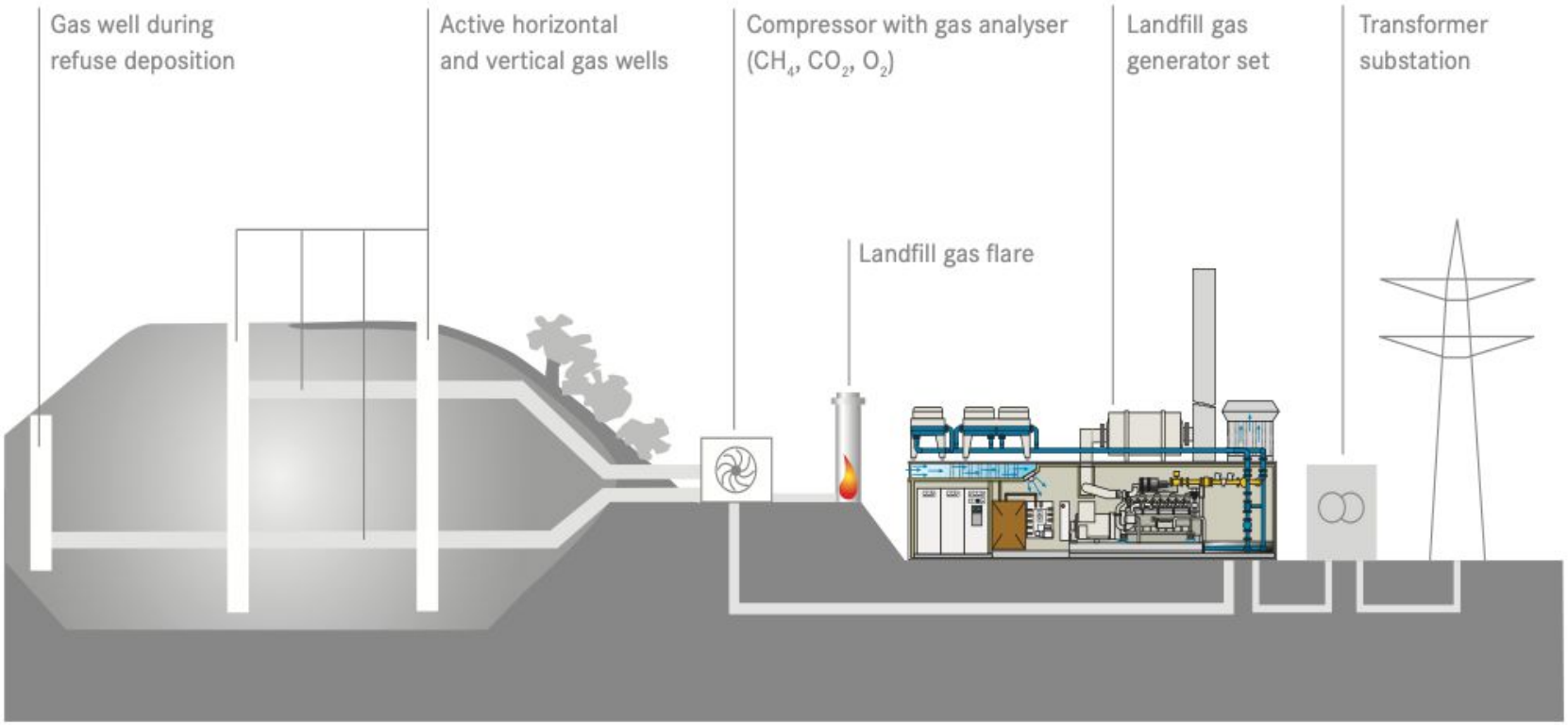
#	Difficulty	Minutes	Pts	Scope
Q1	Very Easy	5	10	W1–W3
Q2	Easy	10	20	W4–W5
Q3	Moderate	30	30	W6–W7
Q4	Hard	45	40	W3–W8
Total		90	100	W1–W8

Table 4: Assessment of Midterm Examination

Outline

Course Contents – Week 10

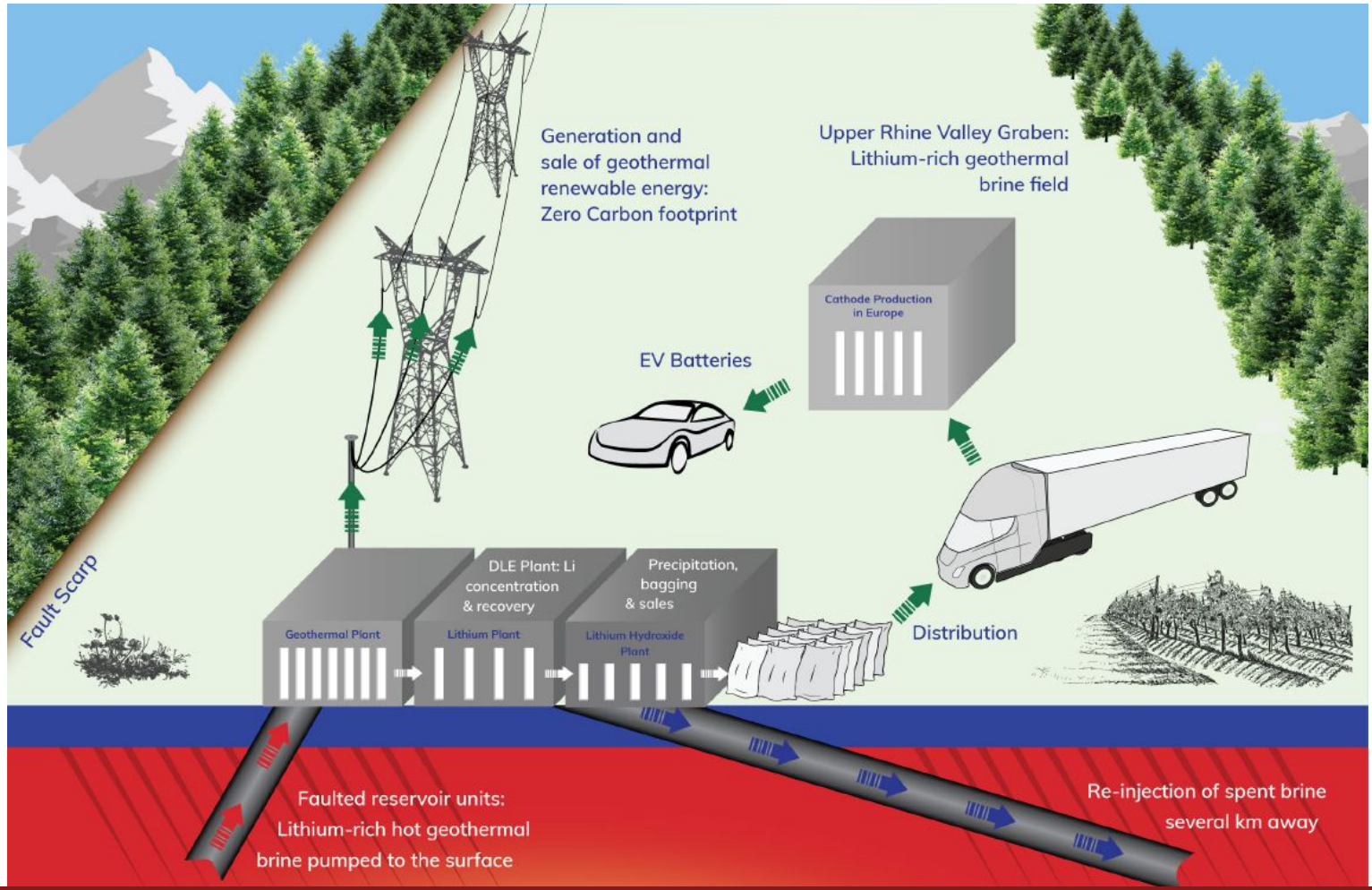
Bioenergy, Renewable Cogeneration and Trigeneration Power Plants [19]



Outline

Course Contents – Week 11

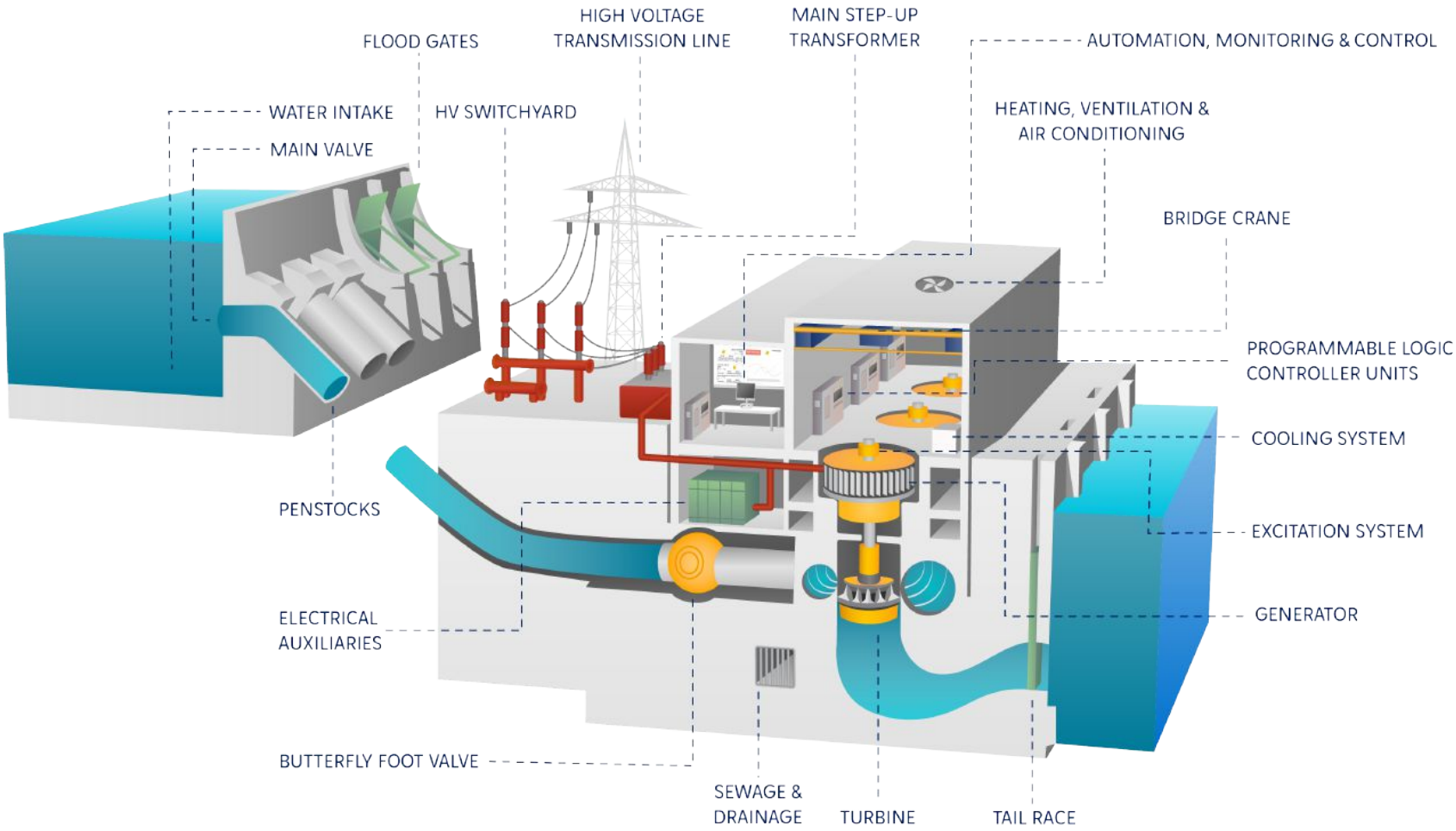
Geothermal Energy [20]



Outline

Course Contents – Week 12

Hydraulic Energy [21]



Outline

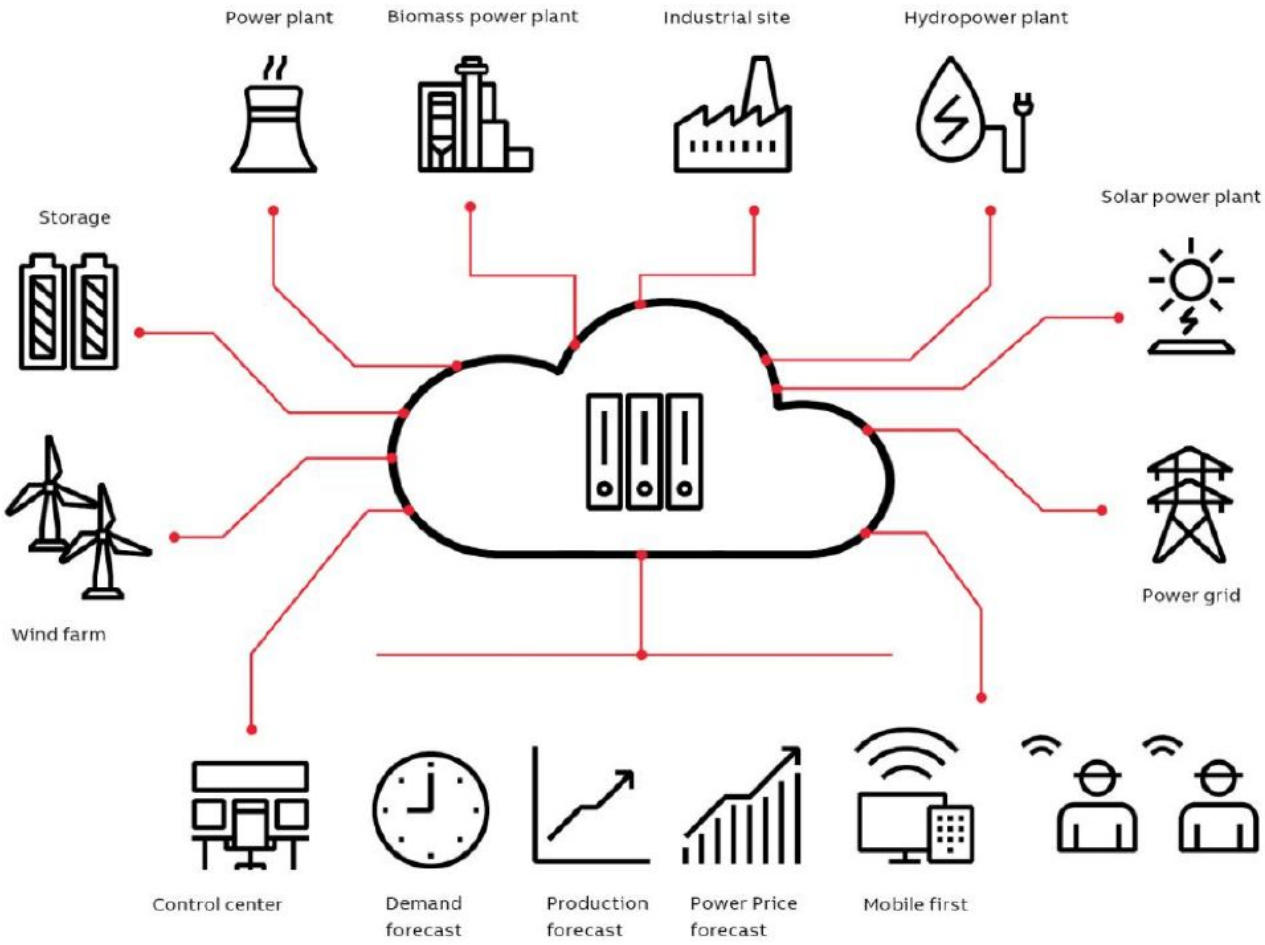
Course Contents – Week 13

Ocean, Wave, and Tidal Energy [22]

Outline

Course Contents – Week 14

Energy Storage, Microgrids, and Virtual Power Plants [23]



Outline

Course Contents – Week 15

Case Study: Feasibility Assessment for Renewable Energy Systems [24]

Outline

Course Contents – Week 16

Final Examination (Paper-Based)

#	Difficulty	Minutes	Pts	Scope
Q1	Very Easy	5	10	W1–W15
Q2	Easy	10	20	W10–W14
Q3	Moderate	30	30	W10–W14
Q4	Hard	45	40	W15
Total		90	100	W1–W15

Table 5: Assessment of Final Examination

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[16] Tim Probert. Bigger, better, stronger turbines, 2012. URL https://www.raconteur.net/wp-content/uploads/2012/05/offshore-wind-energy.jpg.

[17] D. Todd Griffith. Innovative offshore vertical-axis wind turbine: Rotors. URL https://energy.sandia.gov/wp-content/gallery/uploads/VAWT-vs-HAWT.jpg.

References IV

[18] Siemens. Power-to-x, 2020. URL https://assets.new.siemens.com/siemens/assets/api/uuid:3fd49401-2474-4916-a0e4-f9da35f22318/width:1125/quality:high/version:1587996899/ptx-what-is-it2.jpg.

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[23] Matti Vaattovaara. Microgrids and virtual power plants. ABB WEC seminar, 2019.

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