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Sustainable Energy
Systems 2050

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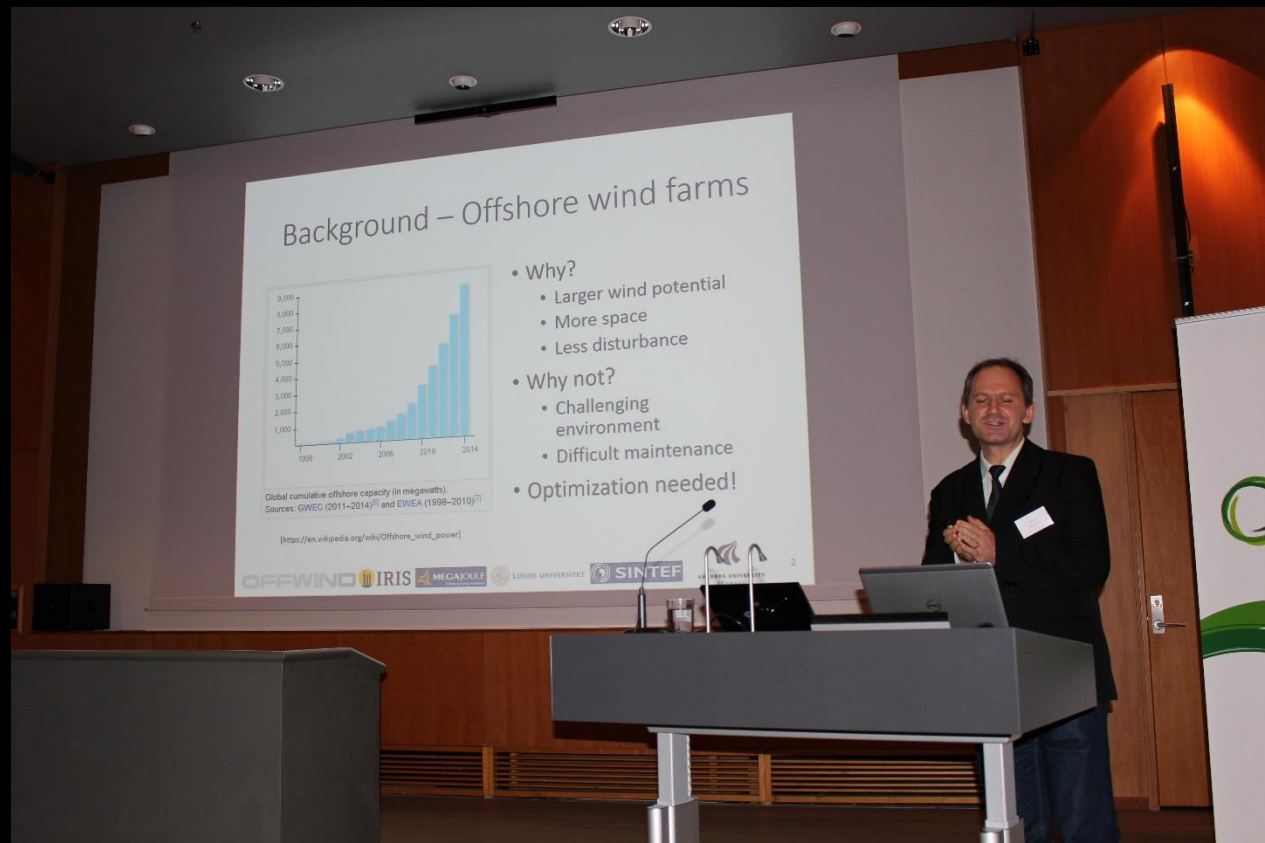
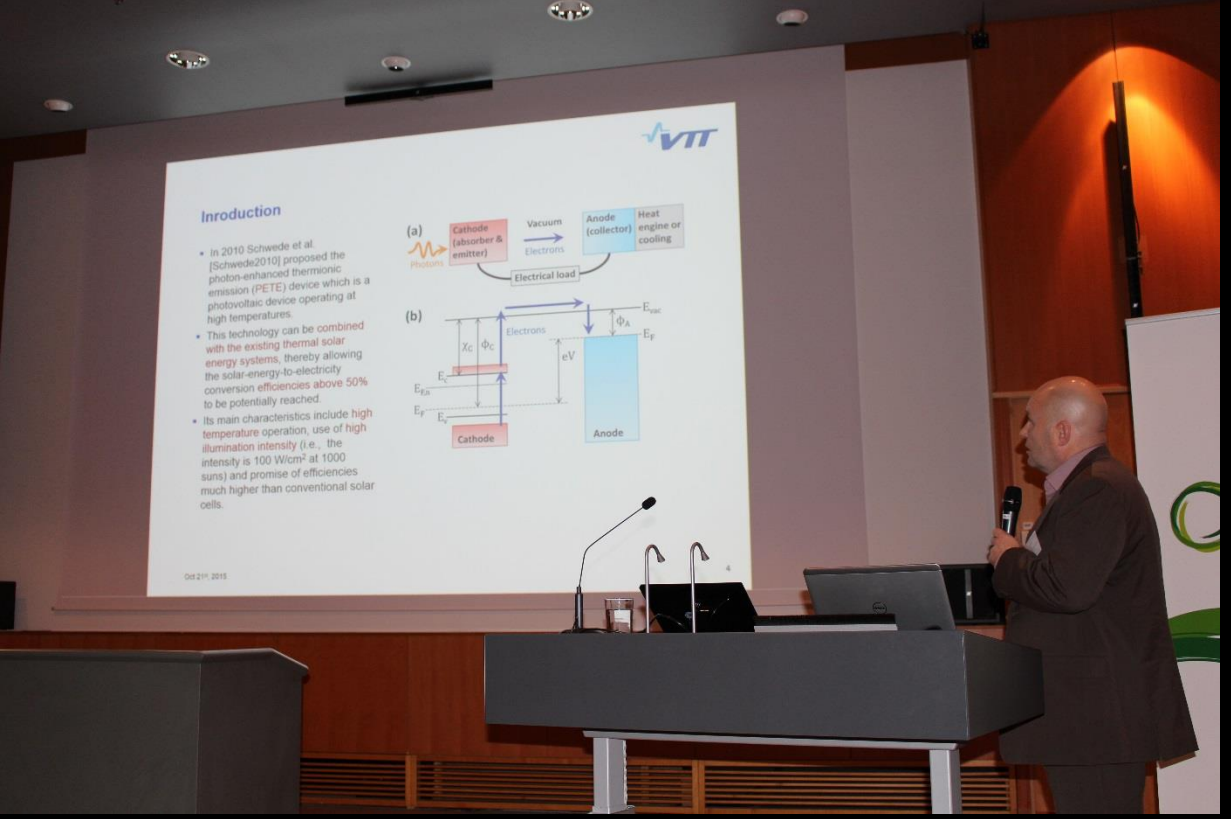
Forest & Landscape
UNIVERSITY OF COPENHAGEN
Key points
- Forests and forestry's role in supporting a sustainable development of World Society
- Links to global Forest Landscape Restoration efforts on forest adaptation and mitigation
- Focus at forest management and silvicultural opportunities increase supply of wood and woody biomass
- Modern transportation and logistic systems
- Optimised use of woody biomass in the energy systems
- Focus at opportunities at the stand scale
- Perspectives as well as new methods, systems and approaches (more or new tools in the toolbox)
- The potential is very large
- It is up to society to decide to what extent this potential is going to be utilized
ENERWOOD


Background – Offshore wind farms
• Why?
• Larger wind potential
• More space
• Less disturbance
• Why not?
• Challenging environment
• Difficult maintenance
• Optimization needed!
Global cumulative offshore capacity (in megawatts)
Sources: GWEC (2011–2014) and EWEA (1998–2010)
[https://en.wikipedia.org/wiki/Offshore_wind_power]
OFFWIND
IRIS
MEGAJOULE
LUNDS UNIVERSITET
SINTEF


VTT
Inroduction
In 2010 Schwede et al. [Schwede2010] proposed the photon-enhanced thermionic emission (PETE) device which is a photovoltaic device operating at high temperatures.
This technology can be combined with the existing thermal solar energy systems, thereby allowing the solar-energy-to-electricity conversion efficiencies above 50% to be potentially reached.
Its main characteristics include high temperature operation, use of high illumination intensity (i.e., the intensity is 100 W/cm² at 1000 suns) and promise of efficiencies much higher than conventional solar cells.
(a)
Photons
Cathode (absorber & emitter)
Vacuum
Electrons
Anode (collector)
Heat engine or cooling
Electrical load
(b)
Electrons
Cathode
Anode
Oct 21st, 2015

THE BEST PERFORMING PV SYSTEM IN SWEDEN
Two dual-axis tracking systems in Piteå, Sweden
Installed size: 20 kWp
Yearly yield: 1500 kWh/kWp
Research features – solar tracking, different module technologies, weather monitoring, power optimizing system.

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NORDIC ENERGY RESEARCH PROGRAMME

RTSILA
countries?
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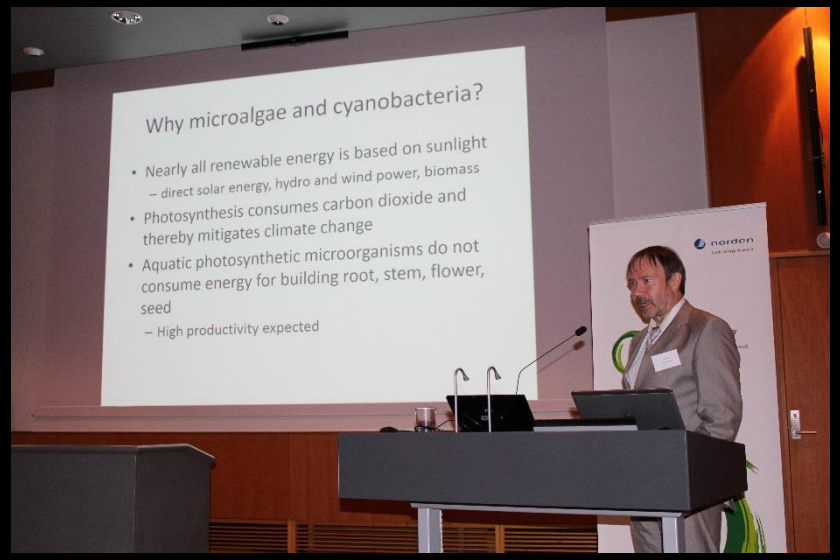
Why microalgae and cyanobacteria?
• Nearly all renewable energy is based on sunlight
– direct solar energy, hydro and wind power, biomass
• Photosynthesis consumes carbon dioxide and thereby mitigates climate change
• Aquatic photosynthetic microorganisms do not consume energy for building root, stem, flower, seed
– High productivity expected
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NISFD!
NORDIC INITIATIVE FOR II SOLAR FUEL DEVELOPMENT!
DESIGN OF A WONDER
Dinko Chakarov
(PROJECT COORDINATOR)
Department of Applied Physics
Chalmers University of Technology
GÖTEBORG, SWEDEN
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NORDIC ENERGY RESEARCH PROGRAMME
Final seminar for Sustainable Energy Systems 2050
21–22 October, Oslo
October 21
DC-NISFD

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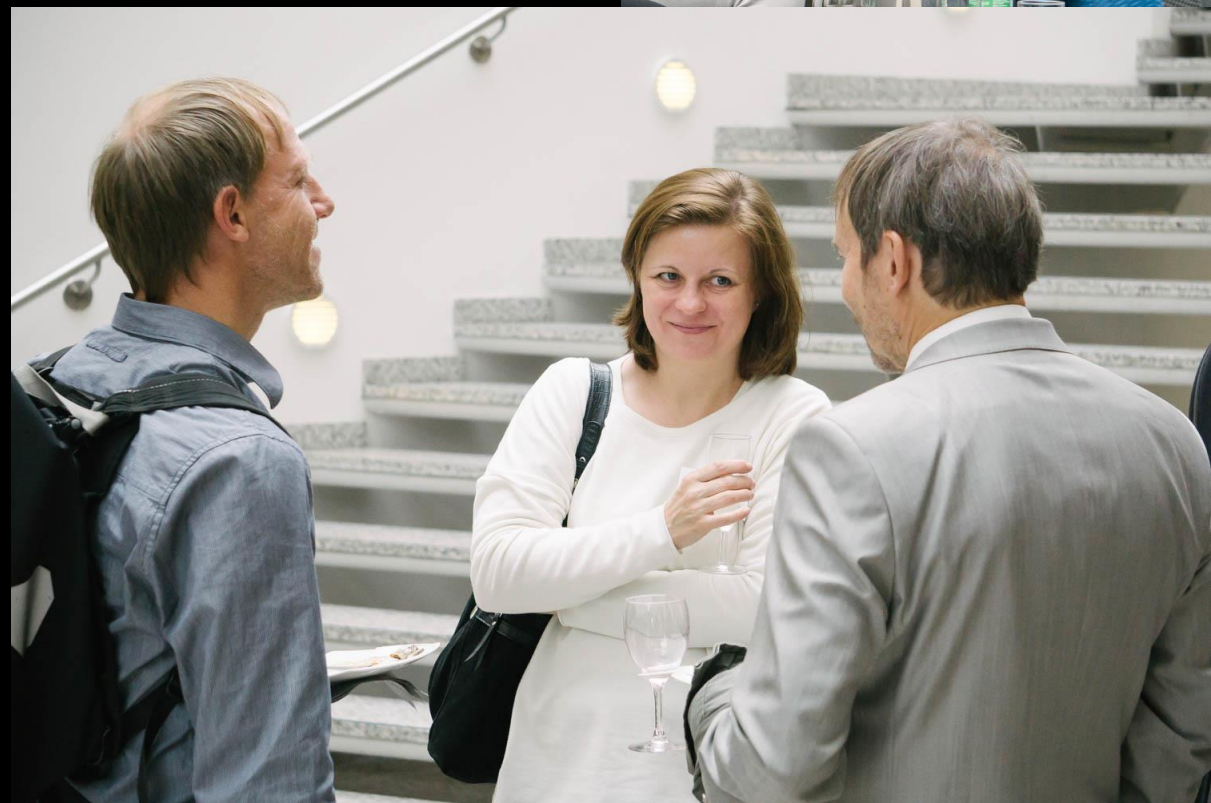
BONNEVIE 2-7
TOALETTER



Kommentar
intpow
Hans Jürgen Koch

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Nordic Energy Research
Nordic Energy Road Map 2050
Strategic Choices towards Carbon Neutrality (NORSTRAT)
Final conference
Leif Warland and Ingeborg Graabak, SIN
Qiuwei Wu and Zhaoxi Liu, DTU
Måns Nilsson and Bjö

Smart Transmission Grids Operation and Control
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Nordic Energy Research
A project funded by
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Nordic Energy Research
– And co-funded by Nordic TSOs and DSOs
Objectives:
– Support the development of better tools for operation
power grids
– Create innovative applications that will enable more reliab
control of the Nordic power grid and with better information a
margins.
– Develop a research platform and softw
hardware) for application prototyping and
– Identify technology gaps and limitation
future as an input to roadmaps for s
energies.
Sustainable Energy Systems 2050

151022 Mats Rydehell.pdf - Adobe Reader
Challenges
• Anticipation of return of investment
– Staying ability
• Timing
– When is what needed where?
• Responsibilities
– Related to impact
• Cultural differences
– Vocabulary/language

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Hans Jørgen Koch
Nordic Energy Research