N-I-S-F-D

Nordic Initiative for Solar Fuel Development

SUSTAINABLE ENERGY SYSTEMS 2050
KICK-OFF EVENT WITH PROJECT PRESENTATIONS
HELSINKI 12 October 2011
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N-I-S-F-D
NORDIC INITIATIVE FOR SOLAR FUEL DEVELOPMENT

→ RESEARCH PROJECT OVER 4 YEARS
→ 5 UNIVERSITY, 2 INDUSTRIAL PARTNERS
→ ALL NORDIC COUNTRIES
• What we want to do and why it is a good idea?

• Direct conversion of solar energy to fuels is superior to photovoltaics (avoids storing electrical energy).

• It could be an order of magnitude more efficient than natural photosynthesis.

• …
Objectives

• The aim is to develop a system that efficiently and cost effectively produces fuels from water, CO₂ and sunlight.

• Addresses several energy related problems simultaneously:
  – efficient conversion of solar energy
  – fuel that can easily be stored, distributed and used within present infrastructure
  – serve the transport sector, where the energy consumption growth/demand is biggest.
**Challenges:**

- Currently used materials and methods are **expensive and ineffective**.
- The Nordic countries need a **common platform for advance** in this field.

**Specific challenge** → to meet **simultaneously** the demands of:

→ ... and simultaneously use stable, nontoxic and cheap materials, suitable at the extremely oxidizing environment created by the holes.
• **Leading ideas:**

• The scientific uniqueness lies in the *Nanoscience and Nanotechnology approach*:

  → the three components of energy transformation: light harvesting, charge carrier separation and catalytic transformation can be optimized using nano-structured materials.

• Significant advantage is the possibility to have all these complex transformations happening at the *same* photoelectrode.
**Goals:**

- **System** with increased optical absorption and efficiency of photo catalytic synthetic fuel production by new design and materials composition.

- **Synergy** - the advances that will be made on the various individual components of the system can be used in a range of contexts, such as formation of fuel from CO$_2$ and other energy sources (wind, geothermal, natural gas ...). With focus on producing liquid fuel, the formation of methane gas is also of interest ...

- **Nordic Added Value**
  - Project at the international research frontier in the area of solar energy and photo catalytic conversion of CO$_2$.
  - Forming a collaborative group with complementary expertise opens up for rapid advances and improved products.
Thank you for your attention!