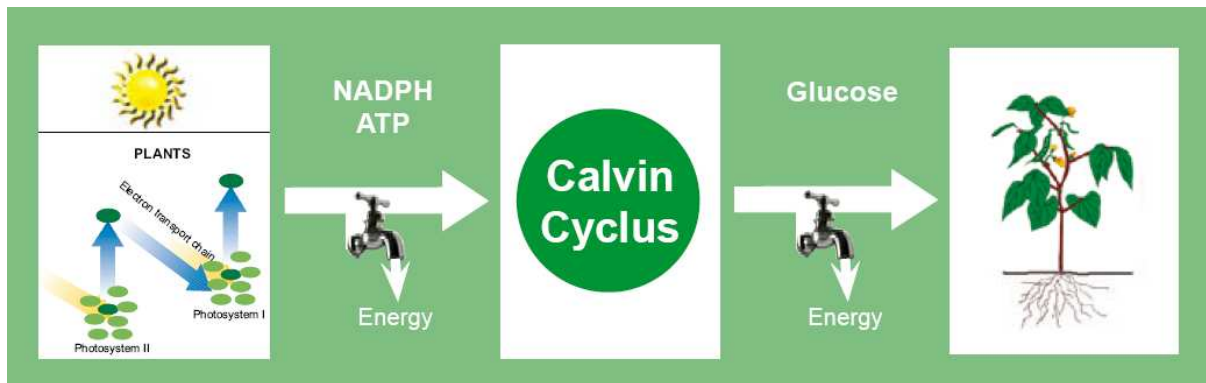


Towards BioSolar Cells: Sustainable energy from photosynthesis

Photosynthesis is a complex process that occurs in many variations. The *Towards BioSolar Cells* initiative aims to specifically use this diversity to improve the process and enhance its potential as a source of energy.

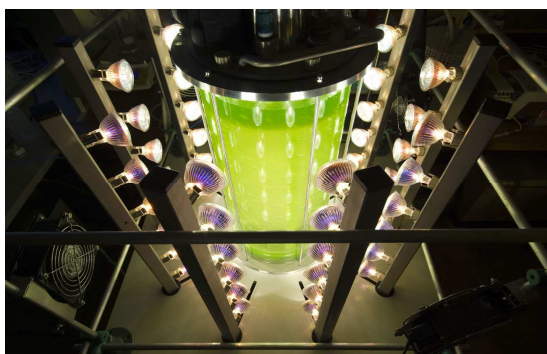


Energy

Everyone is convinced of the need to switch to sustainable sources if mankind is to have sufficient energy supplies in the future. The largest option available is the sun and it is our challenge to make the most of this incredible resource. While solar power currently revolves primarily around the application of photovoltaic cells, new options are available with photobiological cells or BioSolar Cells. These have various benefits:

- Production of these cells is in principle inexpensive;
- The biological materials used are not rare;
- The cells can produce liquid fuels directly.

An additional advantage is that BioSolar Cells can capture the greenhouse gas CO₂.



Photosynthesis

Photosynthesis is one of the key processes on this planet - the foundation for all (fossil) energy and therefore for life. Less well known is that photosynthesis is an enormously diverse process that occurs in many different organisms. This means that there is a great

deal of biological variation that can be explicitly deployed to improve photosynthesis.

What are BioSolar Cells?

BioSolar Cells are natural systems or systems based on natural processes that use photosynthesis to convert sunlight into useable energy. This occurs in many ways, and *Towards BioSolar Cells* focuses on three options:

1. Increasing the photosynthetic efficiency of plants. Outcome: More biomass and higher energy yields per given surface area.
2. Direct production of fuels, bypassing the biomass phase. Outcome: Photosynthetic cyanobacteria or algae that produce butanol, for example.
3. Combining natural and technological components. Outcome: Sustainably produced solar collectors that supply fuel.

Results

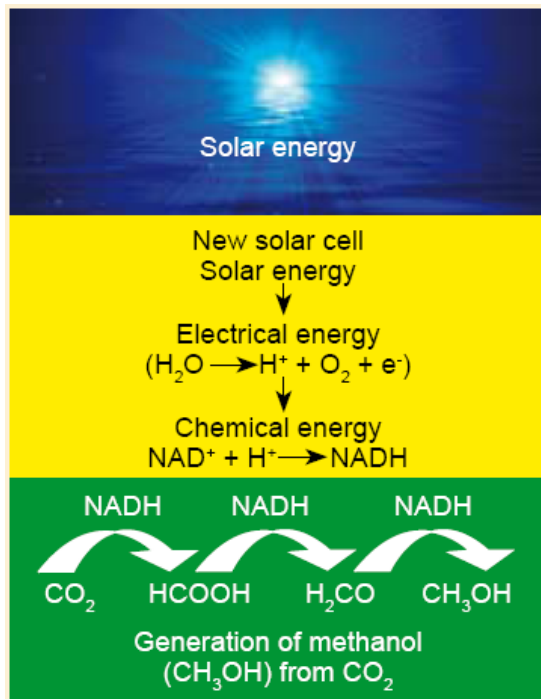
There are many possible results. One example is the development of high production plants that are used for both food and energy. Another is the cultivation of micro-organisms on large patches of land or (sea) water that are currently unusable for biofuel. And then there is the development of solar collectors that can refuel our cars at night.

There are already numerous possibilities and some applications are within reach. Further exploration of photosynthesis will result in new, unexpected options. Although true innovations cannot be predicted, they can be guided...

Initiators

The Netherlands has a rich tradition in the field of photosynthesis research and excellent research groups in all relevant subsectors. This has created a considerable background of photosynthesis know how. We now face the challenge of combining and enhancing this knowledge so as to be able to use photosynthesis for sustainable energy supplies. Driven by the social relevance and scientific possibilities, a number of authoritative Dutch research groups decided to join forces in *Towards BioSolar Cells*:

- Wageningen University and Research Centre
- Leiden University
- VU University Amsterdam
- University of Groningen
- Delft Technical University
- University of Amsterdam



Public-private

Towards BioSolar Cells is a joint initiative of companies and knowledge institutions, supported by the Dutch government. The programme will last five years and has a total budget in excess of 40 million euros. Companies and knowledge institutions will account for ten million euros, and the government has been requested to provide the remaining amount.

Room for new partners

Towards BioSolar Cells aims to bring together the best that the Netherlands has to offer in the photosynthesis sector and is always on the lookout for new partners and ideas. The participation of leading knowledge institutions and companies guarantees constant renewal and the utilisation thereof. We invite all organisations that believe they can contribute to the project's success to contact us.

Knowledge economy

Towards BioSolar Cells is Holland's way of achieving its ambitions to become *the* knowledge economy in the field of sustainable energy. New knowledge is developed and made ready for application. *Towards BioSolar Cells* is a major economic stimulant for new and innovative established companies. The programme is also aimed at a new generation of highly educated employees for business and research purposes.

The Towards BioSolar Cells initiative aims to bring together the finest knowledge institutions and businesses. It is always interested in meeting potential new partners.



Information

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