SOCIAL AND ECONOMIC IMPACTS OF HYDROGEN TECHNOLOGIES IN DEVELOPING COUNTRIES.

Presentation and lecture by

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MEETING FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE & IMPLEMENTATION. FUNDAMENTAL QUESTIONS ARISE:

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1. Social and economic impacts for enterprises and the population in the establishment of a "hydrogen economy" with specific conditions and prerequisites in the respective developing country

1a) What is the overall plan?
The development and use of new energy technologies, requirements, acceptance, impacts, idea and advantage behind it, overall benefits, mitigation measures

2. Consideration and evaluation of the measures from the point of view of an entrepreneur and dipl. expert in the field of hydrogen and fuel cells, from the industrial country Germany and from Bonn, with 25 years of affiliation and cooperation with the hydrogen sector

2a) How can it work?
2b) Positive and negative impacts
2c) The way to get there
2d) Social, economic and environmental considerations
2e) Best plan incl. a structure
2f) Mitigation of C02, G- development with new and proven technologies, especially affordable technologies

3. Co-benefits. Social benefits - climate benefits and thus /mitigation measures

3a) Additional and other technologies with relevance to climate change mitigation and energy infrastructure development in developing countries

4. Overall economic benefits

BONN CLIMATE PROJECT - THE CASE FOR HYDROGEN

Bonn Climate Project White Paper | UNFCCC

Developing countries need energy infrastructure construction to open up and develop the respective country for the first time. Only then can economic progress happen.

History and experience tell us that countries are not making progress because of the high cost of electricity supply or the construction of expensive electricity grids. Interestingly, the whole world thinks of energy only in terms of electricity and electricity grids.

The size of the countries and the enormous distances continue to make it difficult and immensely expensive to build infrastructure with electricity grids, due to centralized large-scale power plants.

Electricity is not available in rural areas. Progress cannot take place. Water shortages add to the problem.

Therefore, other technical and, above all, economical and decentralized simple solutions must be found and made available.

The cheap alternative for transporting energy is gas. Hydrogen is a gas and a chemical energy and should be called that. The Chinese have been transporting natural gas to their fireplaces in simple bamboo pipes as a pipeline for more than 2,000 years.

Hydrogen gas. It can be produced decentrally using a wide range of technologies, stored, transported easily and used universally.

The solution for developing countries; see Bonn Climate Project; the case for hydrogen.

HYDRO (WATER) & HYDROGEN MUST BE CONSIDERED AND DEVELOPED TOGETHER. INCREASING WATER SHORTAGES WORLDWIDE MUST BE TAKEN INTO ACCOUNT.

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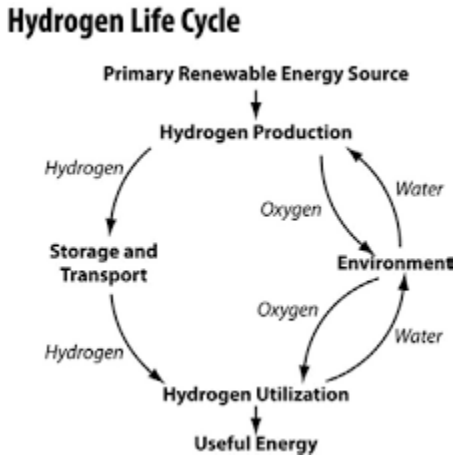
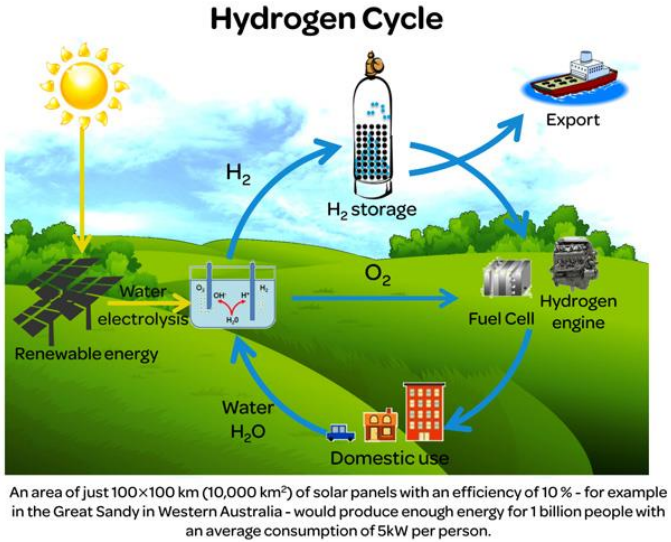
Linguistic scientific differences briefly explained: Water is called hydro (Greek) and in many roman languages & countries. In this respect, water generally means hydro.

Thus, the derivation hydro-gen is easier to understand.

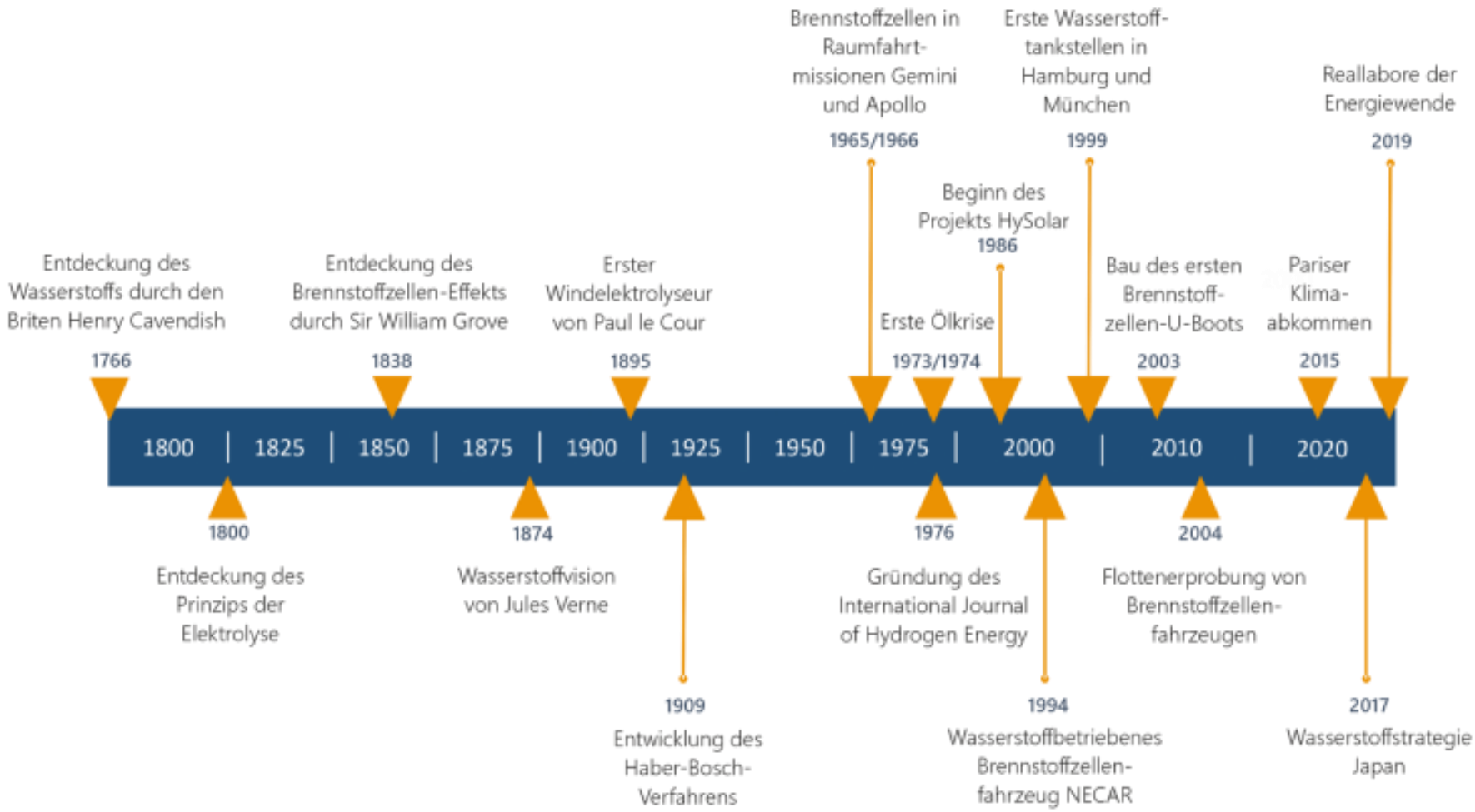
Hydro (water) is energy - Hydrogen is energy - Hydro & Hydrogen belongs together





An area of just 100×100 km (10,000 km²) of solar panels with an efficiency of 10 % - for example in the Great Sandy in Western Australia - would produce enough energy for 1 billion people with an average consumption of 5kW per person.

HYDROGEN HISTORY IN GERMANY



DEVELOPING COUNTRIES PRIMARILY NEED LOW-COST GAS INFRASTRUCTURE IN THE FORM OF PIPELINES

Germany and many countries in Europe have an existing gas infrastructure in the form of pipelines and pipe networks. A cheap distribution of energy. We use it to heat the houses and run the gas power plants that generate electricity from it.

Instead of natural gas/methane, in the future we will transport and use hydrogen via these pipelines. As C02 free energy

Using the fuel cells, we will continue to generate electricity from it in our houses.

Power station; the actual fuel cell provides the power station. Decentralised, without electricity grids.

Germany has been working with hydrogen for more than 150 years and has the corresponding knowledge and technologies.

"I call on all Member States to be more ambitious in their national contributions to Cop 26 and to translate their commitments into concrete and immediate action," appealed UN Secretary-General António Guterres in New York on 23 September 2021.

„Climate protection with hydrogen as the only solution for a global climate policy, starting from Germany and from Bonn !”

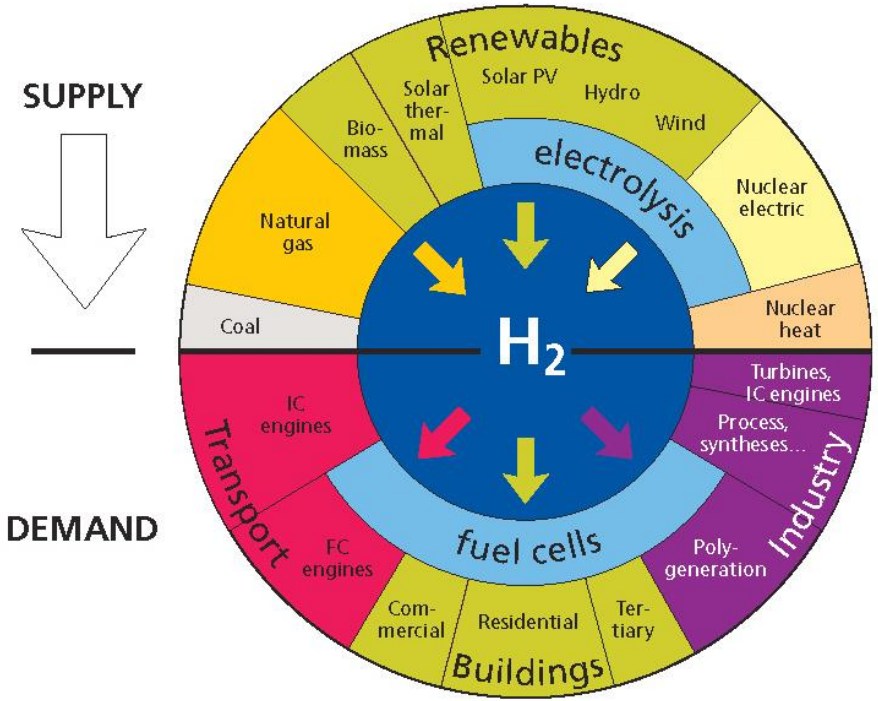
1. How do we move forward without delay?
2. How can we steer and influence a global climate policy?
3. How do we become a pioneer?

WHAT IS BASICALLY NEEDED - CLEAN & AFFORDABLE ENERGY

- Decentralised energy production in the form of (at best) green hydrogen from waste.
- Thus import-independent - 100% value creation in the country - in the region -.
- Easy storage and distribution to homes
- Easy use for all sectors

Consideration and evaluation of conditions and resources

Selection of the best technologies for the country



ELECTRICITY & HYDROGEN GAS IN COMBINATION AN OPTION DEPENDING ON COUNTRY, REGION & POSSIBILITIES

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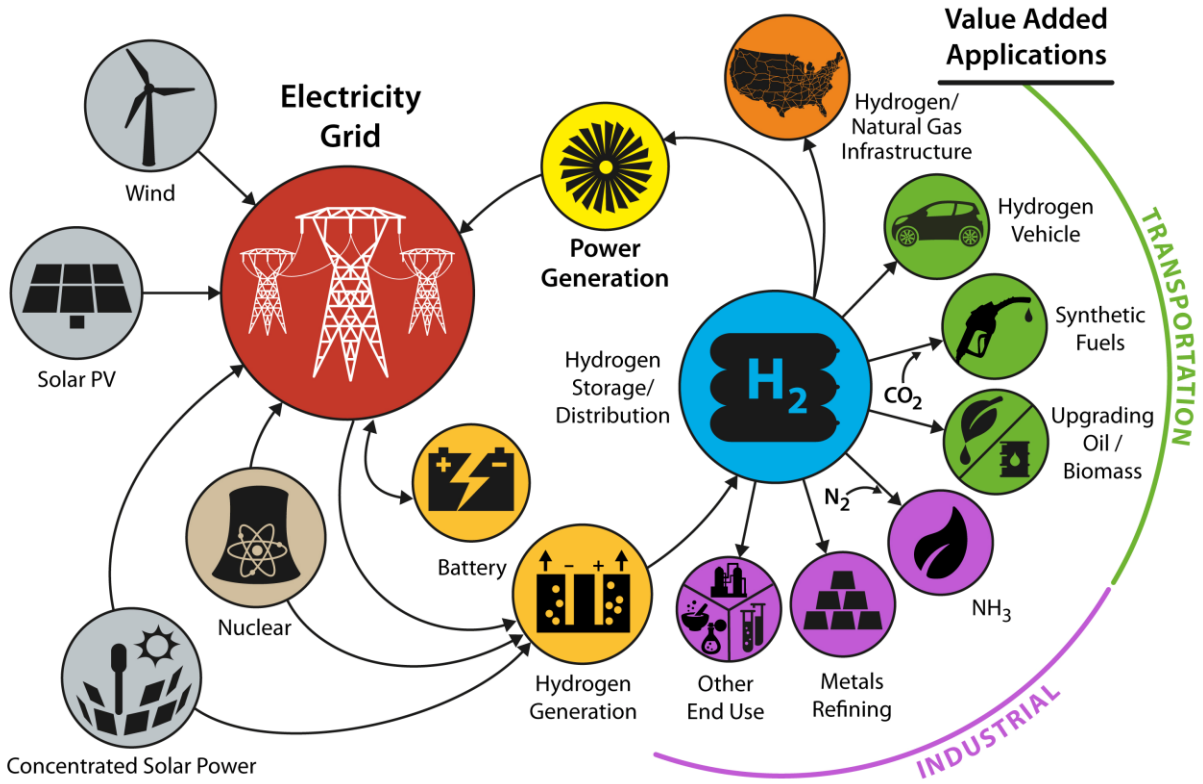
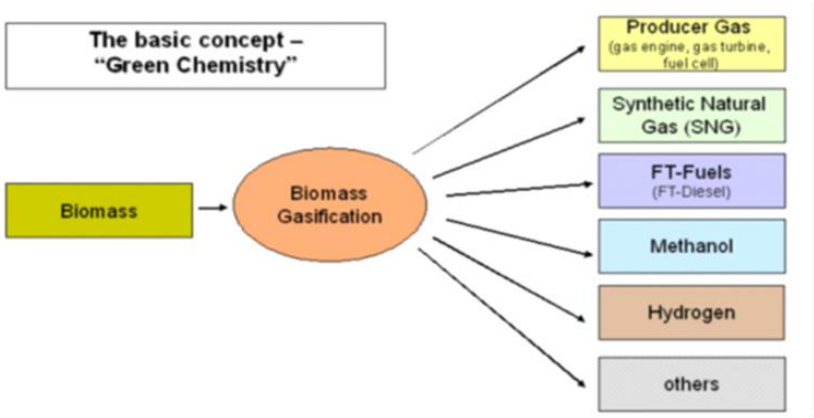


BASIC PROJECT IDEA – BIOMASS WASTE TO GAS

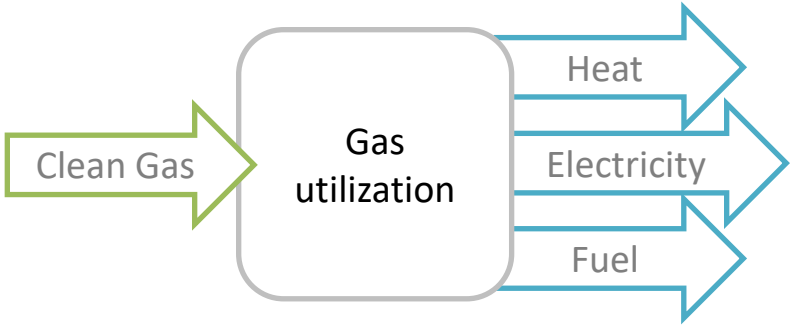
This is the only way to achieve a total energy chain efficiency of almost 100%.



In industrial plants of 50-500 MW practically all the energy of the biomass is transferred into hydrogen. Only these systems fit into a hydrogen infrastructure.

It's the basis for the development of many poor developing & emerging countries, Avoiding an energy grid infrastructure, only by providing them autonomous and self-sufficient energy systems.

HYDROGEN for all applications



STRATEGY FOR CLIMATE-NEUTRAL DISPOSAL OF BIOMASS WASTE WHILE SOLVING WORLDWIDE ENERGY PROBLEMS

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CO^2 and O^2(oxygen) also have a closed material cycle.

We have seriously disrupted the carbon footprint over the last 200 years, we should strive to restore the former balance.

Since CO^2 accumulates in concentrated form, this is easily possible without significant effort.

All types of biological waste can be gasified, solid, gaseous, liquid:

- Household waste
- Sewage sludge
- Slaughterhouse waste
- Food recirculation or over-food
- Nurseries & orchards
- Farms of all kinds
- Forestry & livestock farming
- Waste processing plants & green waste collection points

It should be considered, for further advantage, that during the steam reforming of biomasses and waste, high amounts of valuable water are returned to the cycle - in addition to other elements such as valuable minerals that are used as fertiliser - and that the separated C02 can thus be stored in the earth. The more cheap bio-hydrogen is produced from biomass and cultivated energy crops, the more C02 we therefore remove from the atmosphere.

What will be needed in most countries in future is the combination of a circular economy with the hydrogen economy, which we are rapidly developing here for the first time as a holistic system. This is part of my work in international climate policy .

International climate protection, if it is to be successful, must therefore look at the individual areas such as H2 technologies, politics, climate policy, geopolitics, economic policy, development policy, social policy and other areas holistically and link them together.

In summary, it must be socio-political, economic and ecological. This is a big task and takes a lot of time, which I can reduce to a few years through the programmes already developed and the Bonn Climate Project.

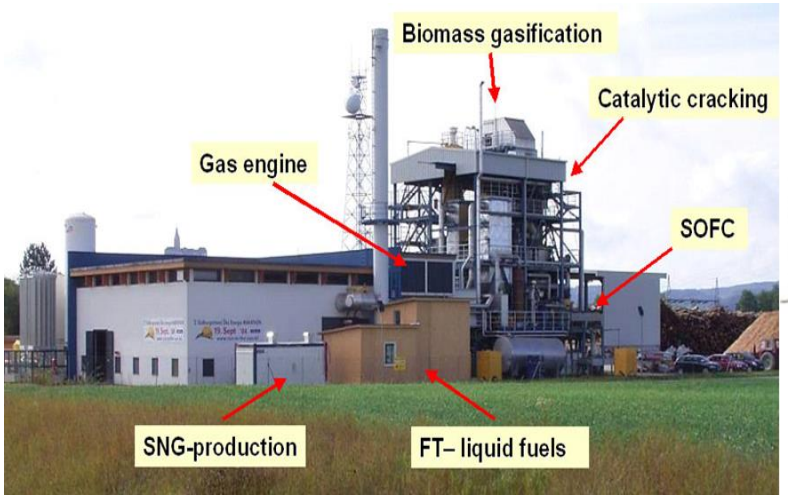
Moreover, only very few industrialized countries are in a position to develop, establish and internationally market such a comprehensive program.

It is clearly recognizable and understandable that Germany will be the main actor and therefore urgently needs to lead the way in international climate protection and global hydrogen technology transfer.

Due to my many years of preparatory work and the announcement and implementation of the "Bonn Climate Project", Germany has been given this enormous head start in "climate protection with hydrogen" of many years and, beyond that, a unique selling point.

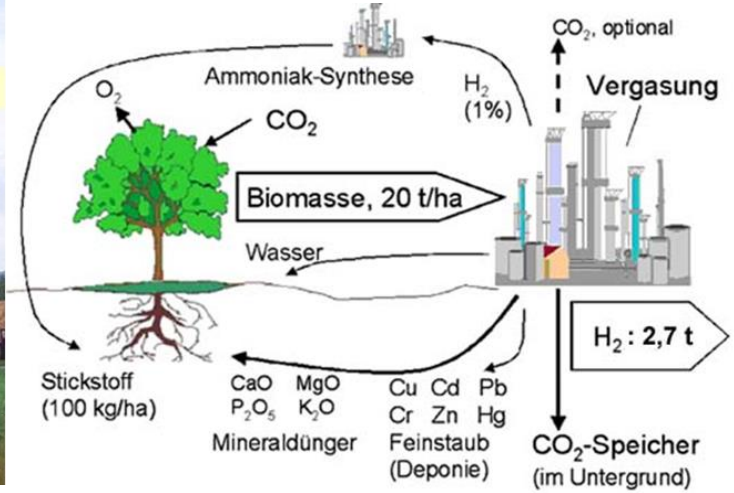
INNOVATION – A NEW TYPE OF POWER PLANT up to 500 MW H2 Production – possible in rural areas.
Cheap Hydrogen from organic Waste

BIOMASS POWER PLANT



Fluidized bed gasification *(Thermal gasification)*

STEAM GASIFICATION



In future, steam gasification instead of combustion

CONCRETE NEED FOR ACTION AND IMPLEMENTATION OF THE STRATEGIES

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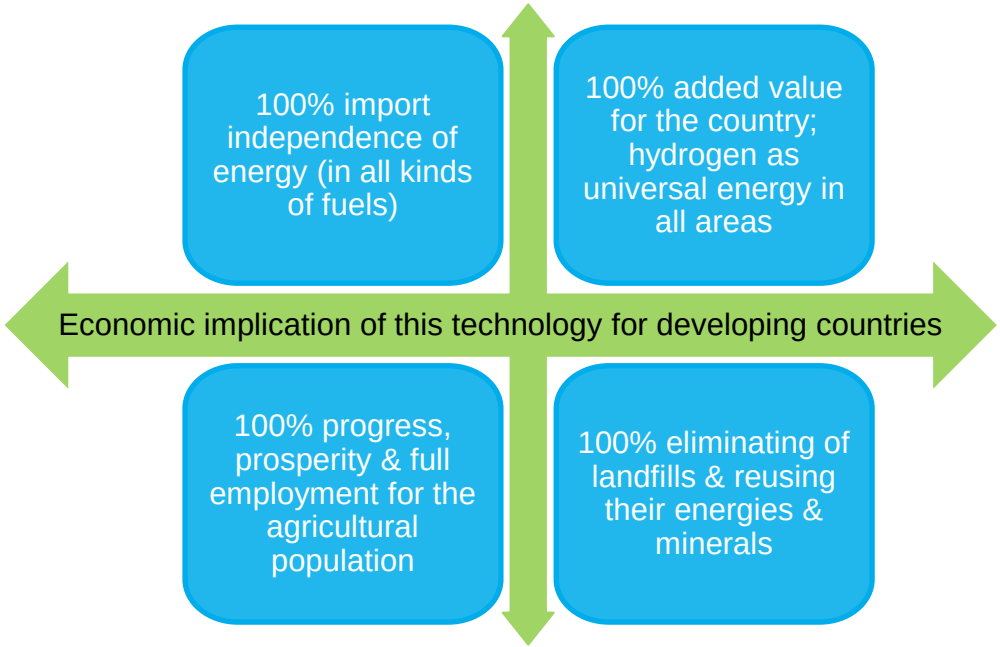
Implementation of the "H^2 Strategy National and International", a guide for:

- ✓ Governments
- ✓ International Organisations
- ✓ Universities
- ✓ Research centres
- ✓ NGOs
- ✓ The corporate sector for the development of energy infrastructures



A socio-political, economic and ecological project in applied climate protection and development work. A technical & operational guide to building a global hydrogen economy.

- Contribution to achieving the highest possible C02 reduction target
- Potential solution for developing countries worldwide
- A presentation on policy options, technological innovations and best practices to generate energy from waste

1. Objective
2. Rationale
3. Activities
4. a. Enabling environmental activities / challenge b. Key
5. c. Barriers
6. Feasibility studies
7. Preparation for implementation / solutions
6. Outputs are linked to economic, environmental & socio-political aspects
7. Knowledge/Teaching/Capacity Building
8. Risk management plan
9. Consideration of gender aspects
10. Time and budget plan
11. Benefits and uptake for different sectors and governments

DEMONSTRATION & PILOT SECTORAL COUPLING PROJECTS

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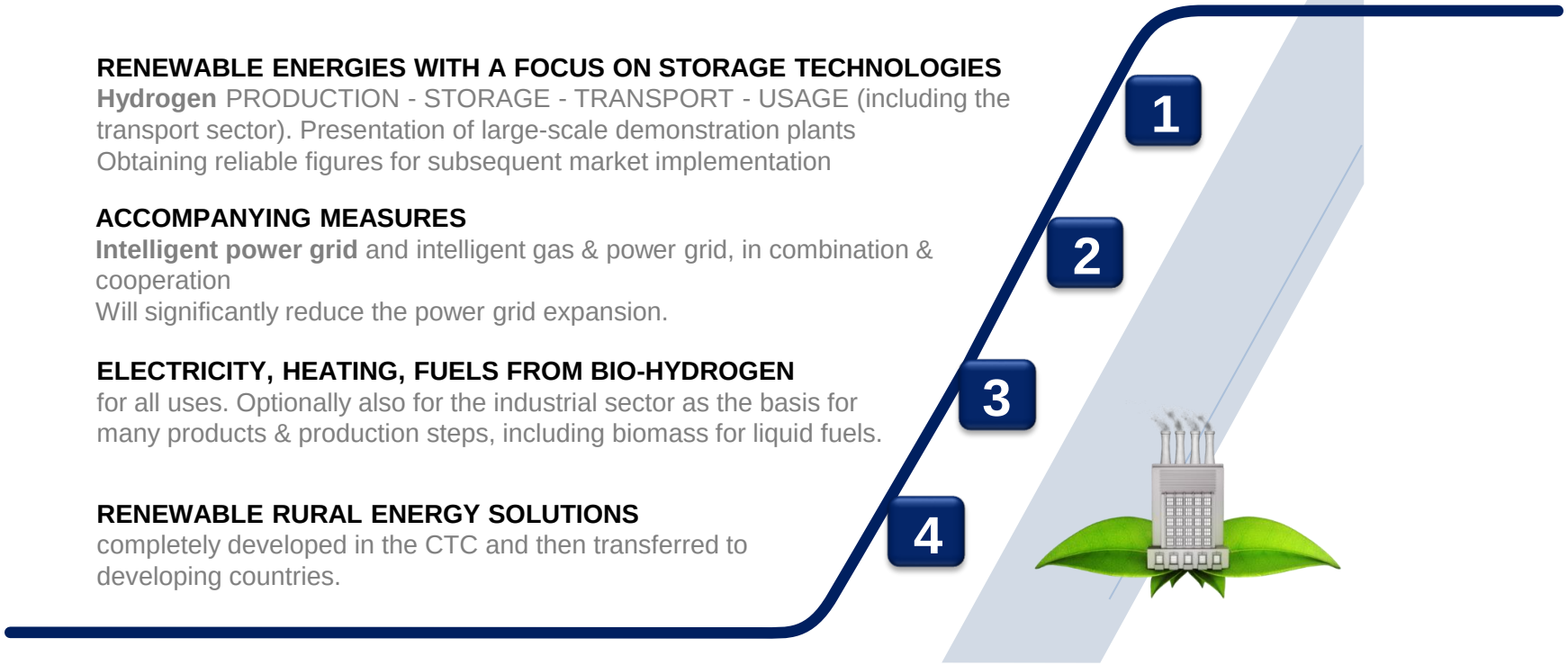
The site in Bonn/Meckenheim provides the basis for carrying out demonstration & pilot projects, so-called sector coupling projects in the field of renewable energies, according to the enclosed presentation "CTC INTRO" :

RENEWABLE ENERGIES WITH A FOCUS ON STORAGE TECHNOLOGIES
Hydrogen PRODUCTION - STORAGE - TRANSPORT - USAGE (including the transport sector). Presentation of large-scale demonstration plants
Obtaining reliable figures for subsequent market implementation

ACCOMPANYING MEASURES
Intelligent power grid and intelligent gas & power grid, in combination & cooperation
Will significantly reduce the power grid expansion.

ELECTRICITY, HEATING, FUELS FROM BIO-HYDROGEN
for all uses. Optionally also for the industrial sector as the basis for many products & production steps, including biomass for liquid fuels.

RENEWABLE RURAL ENERGY SOLUTIONS
completely developed in the CTC and then transferred to developing countries.



DEVELOPMENT OF COMPLETE ENERGY & TRANSPORT/MOBILITY SOLUTIONS BASED ON GREEN HYDROGEN, FOR DEVELOPING COUNTRIES.

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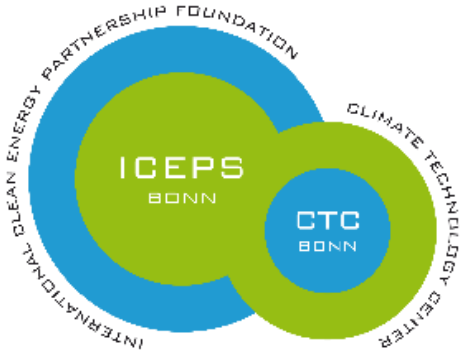
COORDINATION AND PROJECT DEVELOPMENT BY CLIMATE TECHNOLOGY CENTER BONN

- Battery - H^2/Fuel Cell - Synthetic liquid fuels for combustion



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"Only those who know the many different possibilities of a holistic concept can also show the way and recommend economic and sustainable overall concepts."
by Heinz Sturm