Bonn Welcomes You

Industry - Implementation of circular economies and industrial waste re-use and prevention solutions

UN- technical expert meeting on mitigation

1-2 May 2018 – Bonn, Germany

BONN CLIMATE PROJECT Motivation

"Due to the drastic climate change & its already perceptible consequences which daily cascade over us somewhere in the world, large-scale climate protection combined with development work is urgently & immediately needed, especially in many poor countries, which are plagued by extreme heat, droughts, water shortages, crop failures, diseases & warfare."

AGENDA

1. Waste-to-Energy – basic principles and ideas

2. Project in Kumasi, Ghana – implementation of a Waste-to-Energy project

3. Coordination of implementation by Climate Technology Center, Bonn, Germany

1. WASTE-TO-ENERGY – BASIC PRINCIPLES & IDEAS

IT IS A FACT.

THE WORLD NEEDS AN ENERGY TRANSMISSION

What is the solution? What kind of energy?

The first element is: **HYDROGEN**

The universe consists of it, it is the foundation of all being.

Consequently, the transmission to a clean energy can be only hydro/water & hydrogen.

“POTENTIA HYDROGENII IS THE ONLY ENERGY!”

INTERNATIONAL CLEAN ENERGY PARTNERSHIP FOUNDATION
ICEPS BONN
CTC BONN
CLIMATE TECHNOLOGY CENTER

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

CO2 and O2 (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 CO2 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

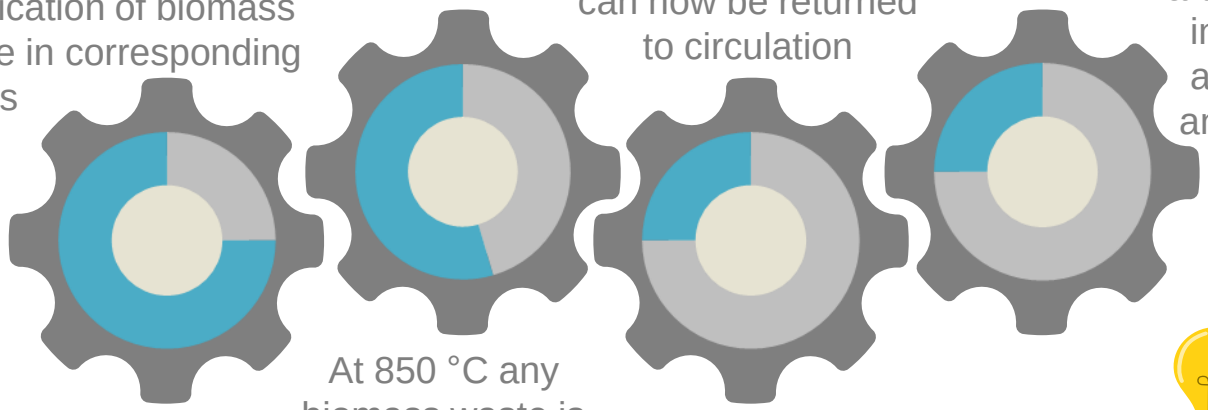
STRATEGY FOR CLIMATE NEUTRAL DISPOSAL OF BIOMASS WASTE / Hydrogen Strategy Paper

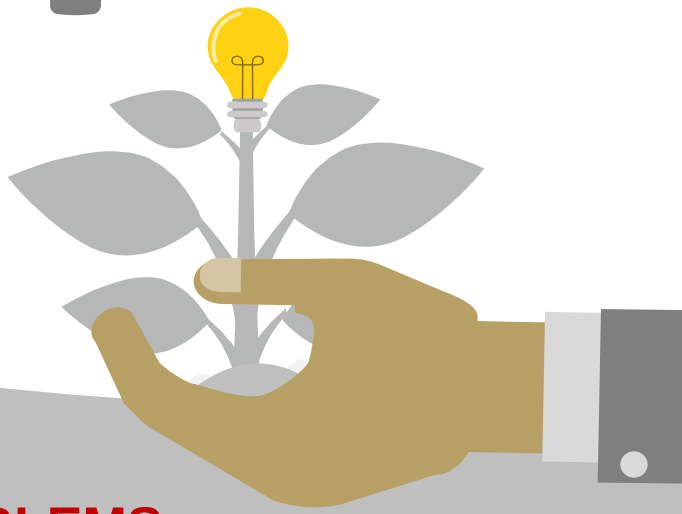
Thermochemical gasification of biomass waste in corresponding plants

At 850 °C any biomass waste is gasified, broken down into its individual elements

Individual elements can now be returned to circulation

Partial heavy metals in the form of ash are finally split off and can be stored





SOLUTION TO WORLDWIDE ENERGY PROBLEMS

DEMONSTRATION & PILOT SECTORAL COUPLING PROJECTS

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 DR Congo, Ghana & many other African countries.

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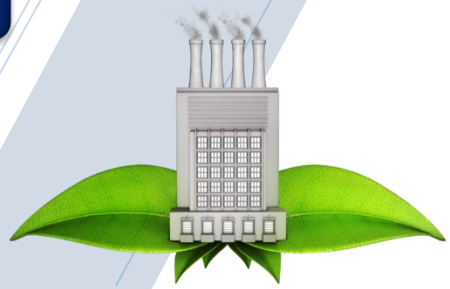
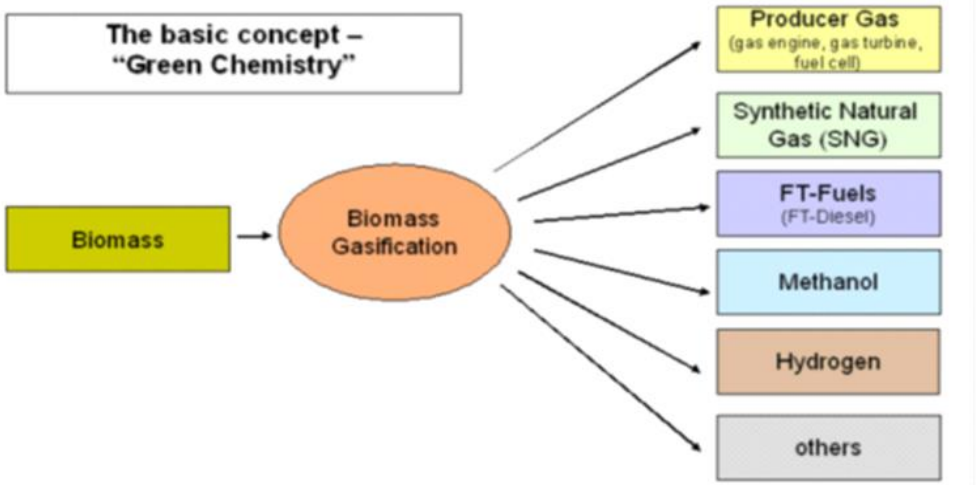


BASIC PROJECT IDEA

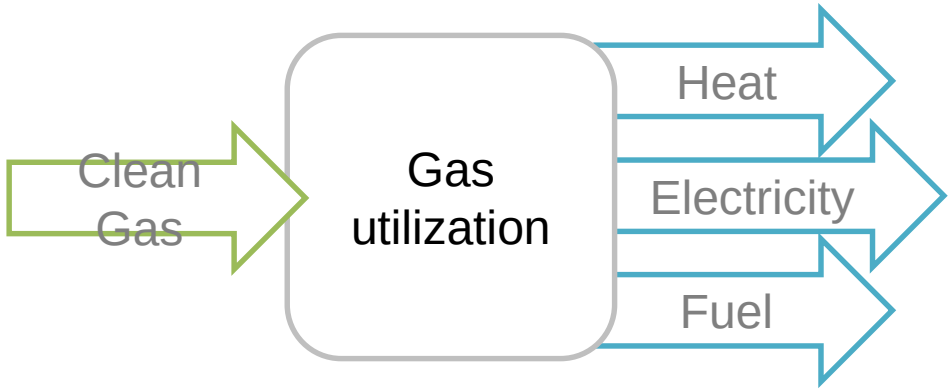
This is the only way to achieve a total energy chain efficiency of almost 100%.



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.

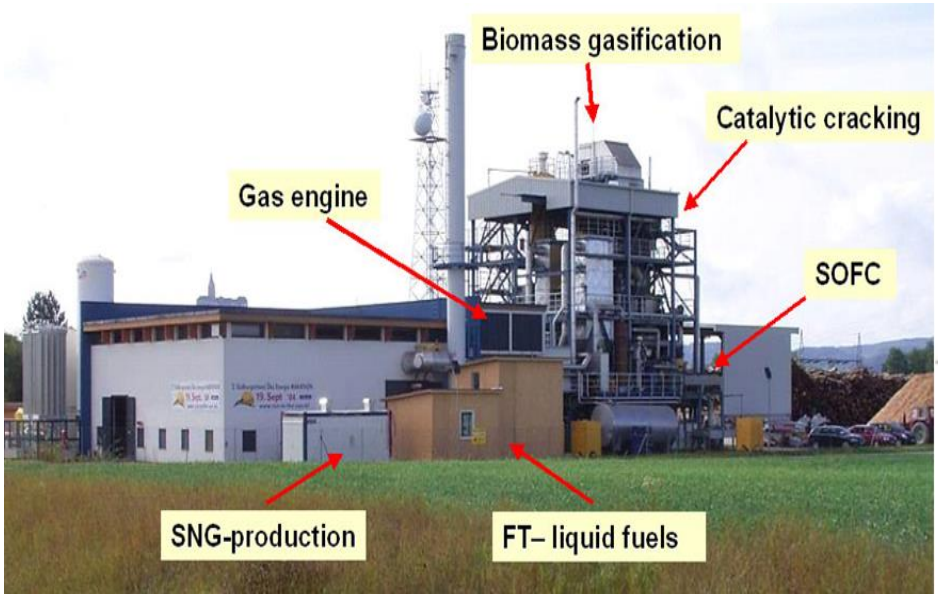
It's the basis for the development of many poor developing & emerging countries, Avoiding an energy grid infrastructure, only by providing them autonomous and self-sufficient energy systems.

HYDROGEN for all applications



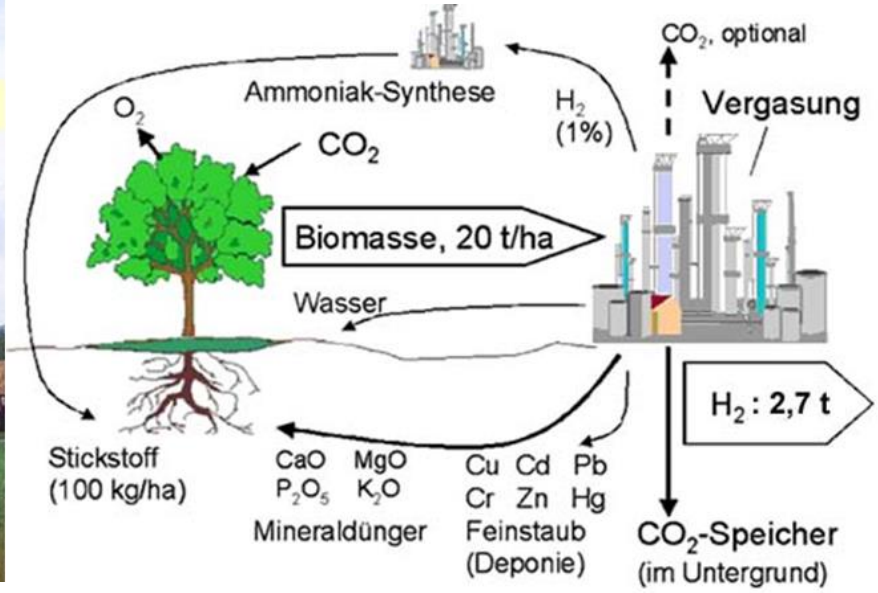
INNOVATION – A NEW TYPE OF POWER PLANT

BIOMASS POWER PLANT



Fluidized bed gasification *(Thermal gasification)*

STEAM GASIFICATION



In future, steam gasification instead of combustion

BRIEF DESCRIPTION & SKETCH OF HYDROGEN FACTORY

- Right next to the CTC, a factory for the production of hydrogen from biomass is planned to be built.
- As a first reference factory in Germany & worldwide, in a required & economical size of 500 MW output.
- Such a reference factory is urgently needed for many social policy reasons. To finance this reference factory, and other similar factories, CO^2 certificates / paper can also be used in the future.
- Germany is one of the most important manufacturer & supplier of plant Technologies & systems engineering.

Research will investigate & develop CO^2 separation during the production of hydrogen & feed it into a separate network for the optional supply of the chemical industry, agriculture, further uses of CO^2 and/or the storage of CO^2 in the earth, for a very low price of about € 1-2 /ton.

2. PROJECT IN KUMASI, GHANA – IMPLEMENTATION OF A WASTE-TO-ENERGY PROJECT

BARRIERS ON INNOVATION & DEVELOPMENT FOR BIOMASS TO HYDROGEN IN DEVELOPING COUNTRIES

- Conveying the socio-political & economic value of the thermochemical gasification of biomass (including waste & garbage).
- Incredible opportunities to produce a final, clean, adequate, solar & low-cost energy in form of bio-hydrogen on an industrial scale.

H^2 as the basic energy & raw material

The right training can demonstrate how nature is built on H^2

That's why.
it's better to invest directly in H^2 instead of spending a lot of time & money on other energies

HYDROGEN ECONOMY PROGRAM IN KUMASI – KSI H2E

- Contributes to achieving the highest possible level of mitigation ambition
- Potential solution for Ghana & possibility of extending to other countries
- A presentation on Policy Options, technological innovations & best practices on Waste-to-Energy

1. Objective
2. Rationale
3. Activities
   a. Enabling environment activities / Challenge
   b. Key
   c. Barriers
4. Feasibility studies
5. Implementation preparation / Solutions
6. Outputs are associated with economic, ecologic & social-political aspects
7. Knowledge/Apprenticeship / Capacity Building
8. Risks Management plan
9. Gender consideration
10. Time and financial plan
11. Benefits & Take up for different sectors & governments

3. COORDINATION OF IMPLEMENTATION BY CLIMATE TECHNOLOGY CENTER IN BONN, GERMANY

CLIMATE PROJECT, BUT WHY BONN?

Bonn is the world's climate protection capital due to the presence of the UNFCCC & the CTC with it's activities in Hydrogen & Fuel Cells.

- The Bonn Climate Project mainly concerns the areas:
  - climate protection
  - energy policy
  - development policy
  - economy, industry & agriculture
- These areas are present through their respective organizations & institutions in Bonn which can quickly & easily be brought into cooperation.

- Hydrogen & fuel cells experts from North Rhine-Westphalia, Germany & Europe work closely & trustfully together with the CTC.
- Bonn is a climate hub

We are ready do start with the Project, everything is in place
CTC Bonn & the preparation of "Bonn Climate Project - the case for hydrogen" in the past 20 years

CTC & THE BONN CLIMATE PROJECT – BACKGROUND

The Bonn Climate Project contains all essential aspects of climate & environmental protection & is based on the following fundamental findings:

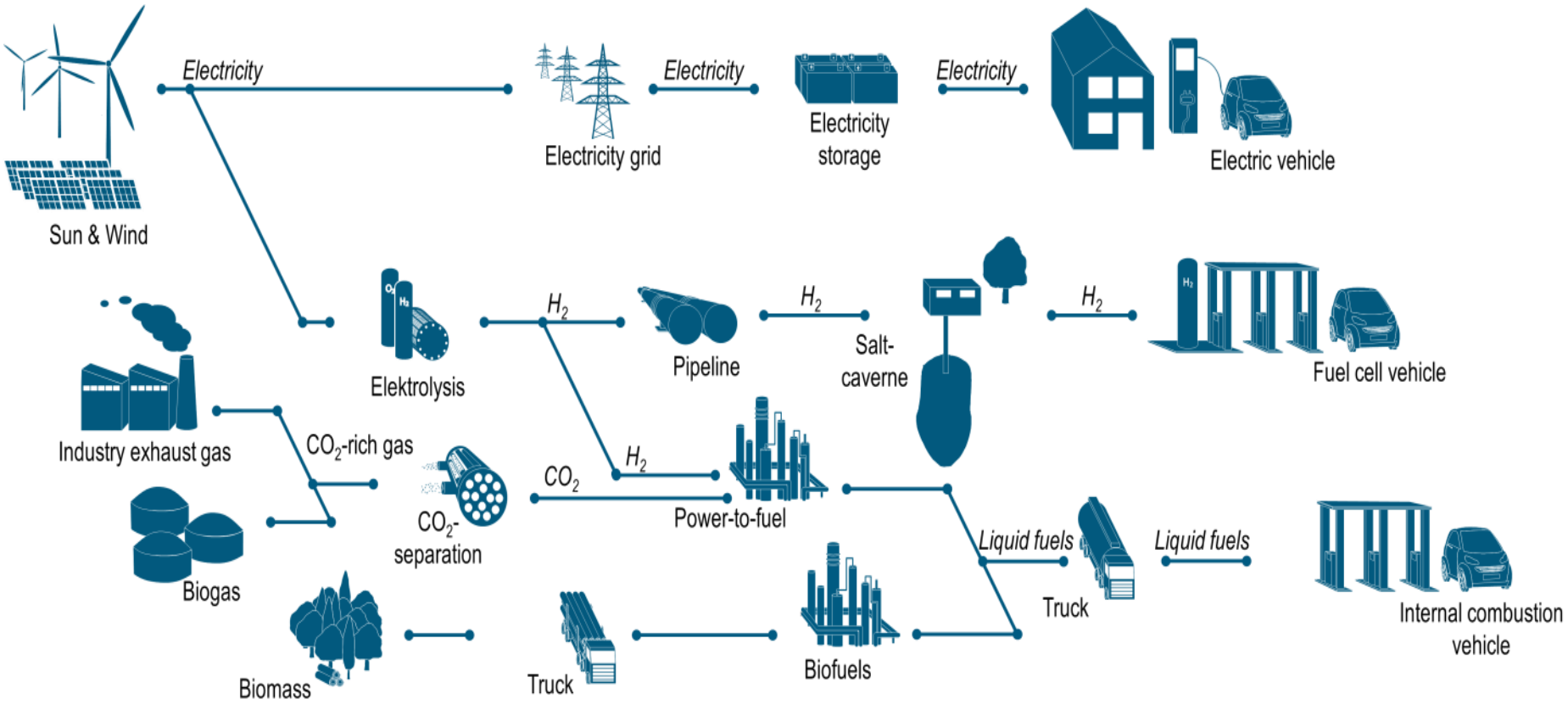
- Lack of energy is the main poverty cause in developing countries.
- Almost all of the world's poor countries rely on agriculture & live stock breeding for survival.
- World's population actually drown in biomass wastes & often unable to make use of it due to lack of knowledge & technologies.

  While all essential resources like water, minerals & energies exist and need only to be deployed
- Required to switch to a materials' cycle & to complete & immediate recycling. This enables the global population to entirely live thereof.

THE CTC IS THE EXECUTING BODY OF THE PROJECT BY ADVISING ON AND COORDINATING CLIMATE PROJECTS

SECTOR COUPLING SCOPE AT THE CTC BONN

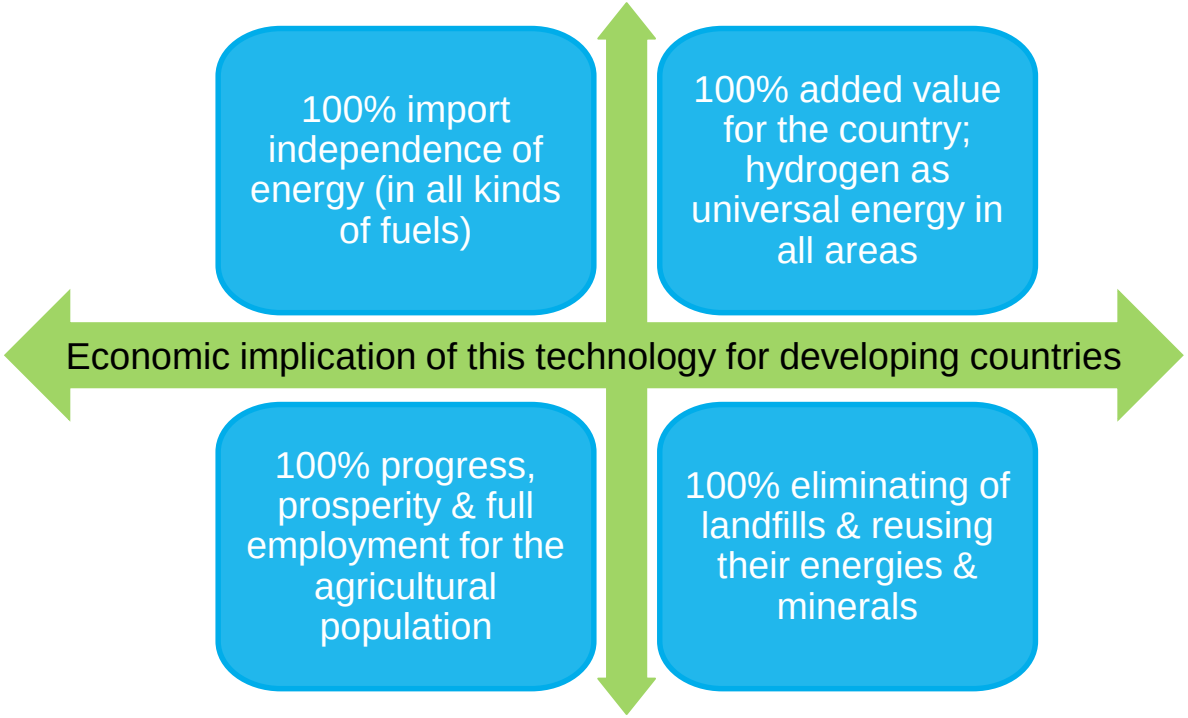
Power to Gas & Power to X



CONCRETE NEED FOR ACTION & IMPLEMENTATION

Implementation of ICEPS's "H² Strategy International" which is a guide for:

- ✓ Governments
- ✓ International organizations
- ✓ Universities
- ✓ Research centers
- ✓ NGOs
- ✓ The Business Sector for energy infrastructure building



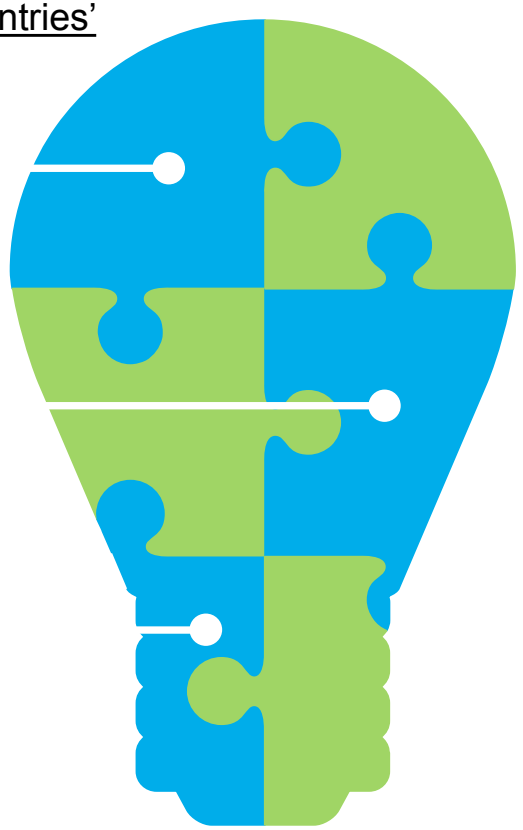
A socio-political, economic & ecological project in applied climate protection & development work.
A technical & operational guide to build a worldwide Hydrogen Economy.

WHY & WHEREFORE & BENEFITS FOR OUR PARTNERS

Due to my qualifications, visions, in the view of which, I have developed the Bonn Climate Project, which is now being steadily implemented.

<u>Facilitating fulfilling international commitment in bettering developing countries' quality of life through:</u>

1. Technology transfer
2. Pilot projects simulation
3. Education & Training
4. Efficient allocation of resources



<u>Based on the success of pilot projects, they be used on large scale, in several developing countries to achieve sustainable development.</u>

- Corporate Social Responsibility (CSR) implementation
- Tax exemption
- Training of companies' staff
- Production cost saving through new innovative energy solutions
- Helping governments provide better quality of life for their citizens.
- Protecting their domestic environment.
- Efficient allocation of limited domestic energy & resources

ICEPS BONN - CTC BONN

www.clean-energy-bonn.org

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"Only those who have a complete knowledge of the many different opportunities of a holistic concept can also point the way and recommend economical and sustainable overall concepts."