

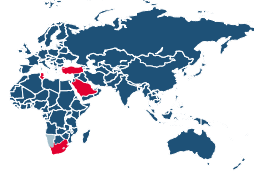
**EKONAMI** ©  
**H<sub>2</sub> + E-FUELS**

## Green Fuel – Concept South Africa

Creating a case for the hard to abet sector



# About Us



**Ekonami** Create a sustainable solution and stands for a green future and a livable planet.

As a German process provider, engineering EPCM company for Modular Standardized power to methanol plants (H<sub>2</sub> + E fuels), we integrate the most critical process units to achieve optimized fuel system solutions.

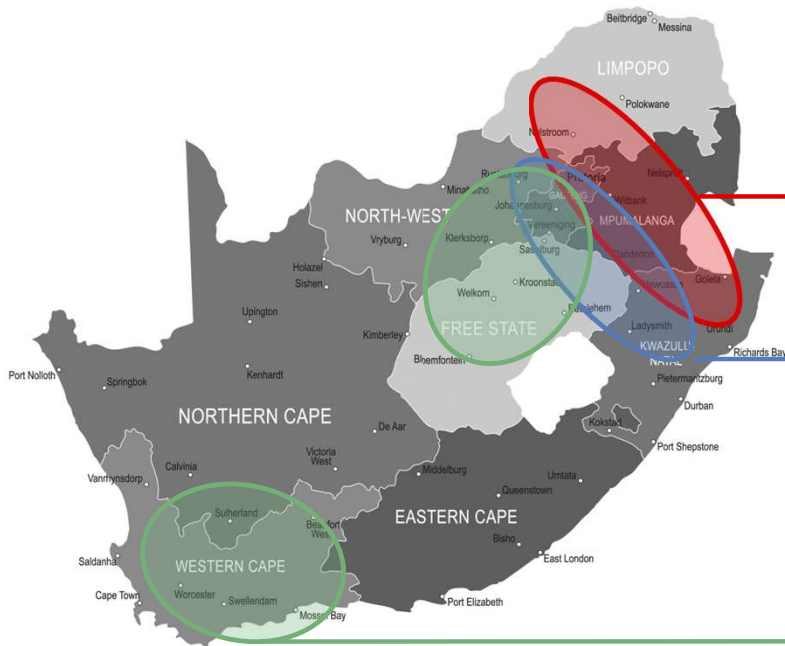


**Ekonami** Ekonami established plants as an industry partner in various countries to build the world's first complete PtoMeOH plant based on a modular standard. Investing in the greenest vision for the future is our mission and our declared purpose.

We believe that renewable energy sources must be affordable and reliable to everyone so that together, we can reduce the environmental impact of traditional energy sources by using hydrogen and green Methanol.

# Methanol Production Regens

## Methanol and CO<sub>2</sub> Sources South Africa



### CO<sub>2</sub> Biogenic Sugar and Wood

In the Northeast of South Africa, we are looking at two projects.

- CO<sub>2</sub> Source from Wood Chip Waist CO<sub>2</sub> volume 300 000 t/a
- CO<sub>2</sub> Source from Sugar Cane Waist CO<sub>2</sub> volume 125 000 t/a

### CO<sub>2</sub> Sewage

Green E-Fuel Corridor

-The Corridor Utilizes a Sewage to CO<sub>2</sub> concept to recover CO<sub>2</sub>, this process provides 750 000 t/a

### CO<sub>2</sub> Hard to Abate Sectors

South Africa has two major economic hubs, Gauteng and the Western Cape. Most industrial and mining activities are in these two provinces.

Gauteng and Western Cape CO<sub>2</sub> Sources from unavoidable sources e.g. steel industry 2 200 000 t/a

# CO<sub>2</sub> Biogenic Sugar and Wood

Methanol and CO<sub>2</sub> Sources in South Africa

## CO<sub>2</sub> Biogenic Sugar and Wood

We are looking at two projects in the North East and North of South Africa.

- CO<sub>2</sub> Source from Wood Chip Waist CO<sub>2</sub> volume 300 000 t/a
- CO<sub>2</sub> Source from Shuger Cain Waist CO<sub>2</sub> Volume 125 000 t/a

## CO<sub>2</sub> Capturing

## MeOH Production and Shipping

## CO<sub>2</sub> Capturing

The CO<sub>2</sub> will be captured for biogenic sources; wood chips, which are waste from the paper industry, and waste from the sugar industry will be utilized for CO<sub>2</sub>.

## MeOH Production and Shipping

The CO<sub>2</sub> will be transported to Richards Bay, where logistics, the MeOH production facility, and Bunkering terminals will be constructed.



400 MW<sub>el</sub> Syntheses

400 MW<sub>el</sub> Electrolyzes

# CO<sub>2</sub> Sewage

## Methanol and CO<sub>2</sub> Sources South Africa

## CO<sub>2</sub> Sewage to Methanol



### Consortium



1000 MW<sub>el</sub> Synthesizers  
600 MW<sub>el</sub> Electrolyzers

### Green E-Fuel Corridor

The Corridor Utilizes a Sewage-to-CO<sub>2</sub> concept to recover CO<sub>2</sub>, and this provides enough CO<sub>2</sub> for a production 750 000 ta of Green Methanol from Biogenic origin.

Green E-Fuel Corridor. It is developed in partnership with a German consortium developed.

South Africa, like many countries in the world, needs consistent infrastructure development and maintenance. This approach adds commercial value to something, which is usually dead waste sewage and causes ecological disasters if disposed of improperly.

Once the Sewage is processed, the remaining organic content will be utilized as organic fertilizer in agriculture

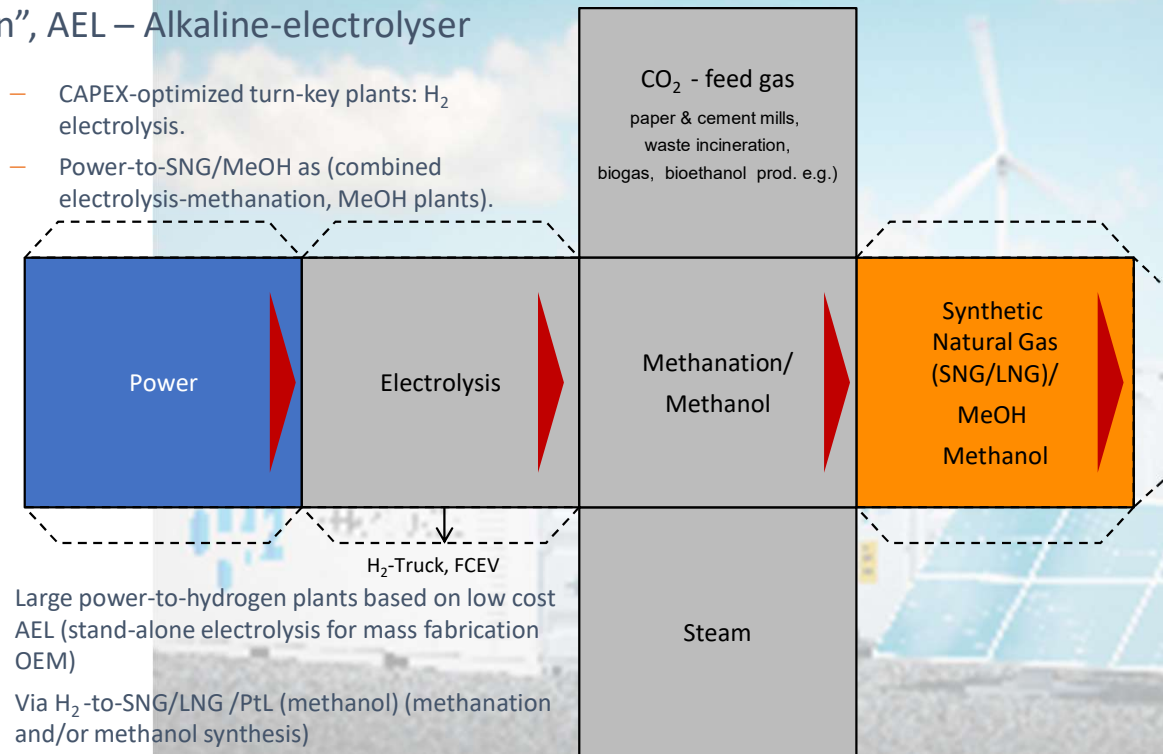
The Project, in total, will be installed in over 50 Units over 28 sites. The Methanol will be exported or used locally for re-electrification via fuel cells produced in South Africa.



# MeOH

## EKONAMI Methanol / Methanitation Production

- EKONAMI designs & builds CAPEX-optimized turn-key plants AEL/PtX(L)
- “smart energy conversion”, AEL – Alkaline-electrolyser



- CAPEX-optimized turn-key plants: H<sub>2</sub> electrolysis.
- Power-to-SNG/MeOH as (combined electrolysis-methanation, MeOH plants).
- Large power-to-hydrogen plants based on low cost AEL (stand-alone electrolysis for mass fabrication OEM)
- Via H<sub>2</sub>-to-SNG/LNG /PtL (methanol) (methanation and/or methanol synthesis)



# H<sub>2</sub>Module



**EKONAMISE**

specializes in process provider, engineering, and EPC services for power-to-methanol plants. They offer a range of modularized and standardized flexible methanol synthesis skids to optimize e-fuel system solutions. The company's approach involves integrating essential process units to ensure maximum efficiency. Additionally, their Modular Electrolysis EKO series can be seamlessly integrated into any Power to X solution without compromising efficiency.

**EKO H SERIES AT A GLANCE**

**AEL**

The modular EKO H Series from Ekonami utilizes AEL Electrolysis technology, which is backed by our innovative approach and supported by long-standing real-world data. The EKO series does not require a high-pressure compressor. The higher pressure allows us to reduce the requirement for buffer tanks and compressors. This concept improves the overall energy efficiency of our equipment and reduces operational costs.

**40 bar**

**AC/DC**

Electricity is the main operating cost, the EKO series can receive electricity in either AC or DC mode. This flexibility reduces total system complexity.

**COOST**

EKO series is a next-generation AEL Electrolysis technology, which has been developed to maximize energy efficiency. By using an innovative approach to AEL technology that is paired with our manufacturing capability. Through this pairing, we could minimize the use of PGM metals. This reduces the stack cost significantly.



*The photo shows a EKO Series H.10 MW unit which is ready to be shipped before being shipped to factory Germany. One of the units is commission ready.*



EKO Series	H.05	H.10	H.20
Input	5 MW	10 MW	20 MW
Water Consumption	0.9l/Nm <sup>3</sup> H <sub>2</sub>	0.9l/Nm <sup>3</sup> H <sub>2</sub>	0.9l/Nm <sup>3</sup> H <sub>2</sub>
Load range	Dynamic Operating 0-100% (CSJ 5 min)		
Output (Hydrogen Gas) / h	1250 Nm <sup>3</sup>	2500 Nm <sup>3</sup>	5000 Nm <sup>3</sup>
Purity	99.99%	99.99%	99.99%
H <sub>2</sub> production pressure	40 bar	40 bar	40 bar
Power Consumption / Nm <sup>3</sup> H <sub>2</sub>	4.9 kWhel	4.9 kWhel	4.9 kWhel
Other	CE conformity		
Safety	Continuous monitoring of H <sub>2</sub> in O <sub>2</sub> (HTO) and O <sub>2</sub> in H <sub>2</sub> (OTH) monitoring of H <sub>2</sub> gas		



H<sub>2</sub>

**EKO SERIES H.05**  
**EKO SERIES H.10**  
**EKO SERIES H.20**

# MeOH Module



**EKONAMI SE** specializes in process provider, engineering, and EPC services for power-to-methanol plants. They offer a range of modularized and standardized flexible methanol synthesis skids to optimize e-fuel system solutions. The company's approach involves integrating essential process units to ensure maximum efficiency. Additionally, their Modular Electrolysis EKO H or E-Fuel EKO EF series can be seamlessly integrated into any Power to X solution without compromising efficiency or cost. Furthermore, the Modular approach saves time on all phases of the project delivery.

## EKO EF SERIES

40 bar

Flex L

The EKO Series EF process is designed to address the challenges of fluctuating feed streams and partial load in E-methanol production. This process eliminates the need for costly H<sub>2</sub> buffer tanks and allows each module to operate within Flex load range of 10-100%. Additionally, the key innovation of decreasing operating pressure to 40 bar enables methanol plants to operate with fluctuating renewable energy sources, even off-rid

Service

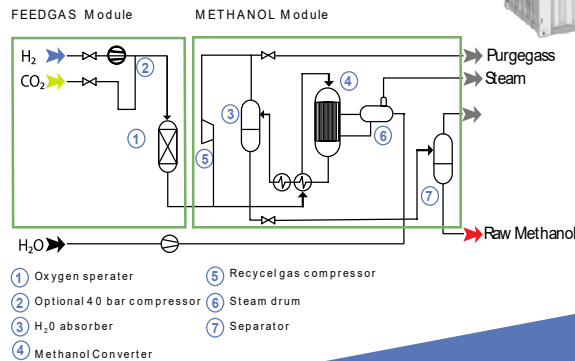
COST

Fast servicing and support can be achieved through a high grade of standardization in manufacturing. This approach does not only positively affect the availability of spare parts but also the cost.

EKO EF series is developed with the aid of long-standing relationships with industry partners. We pair this with innovation and mass production allowing us to manage cost carefully.



Eko Series	EF.05	EF.10	EF.20
Nominal methanol production in tons p.a. (8 000 hours)	4.000	8.000	16.000
Tons of CO <sub>2</sub> input per ton Methanol	1.4	1.4	1.4
kg H <sub>2</sub> per tone of Methanol	200		
Process pressure	40 bar	40 bar	40 bar
Process temperature	240° C	240° C	240° C
H <sub>2</sub> production pressure	40 bar	40 bar	40 bar
Min./max. load	10 - 100 %	10 - 100 %	10 - 100 %
Auxiliary power consumption in kW	90	160	300



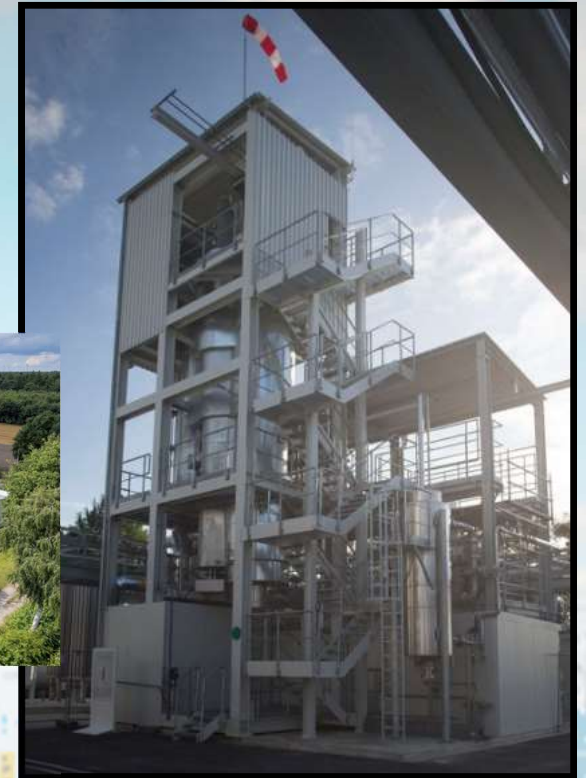
EKO SERIES EF .05  
 EKO SERIES EF .10  
 EKO SERIES EF .20



# Methanol Production

## EKONAMI References

The development and erection of the 2012 built and operated „Audi-plant“ was done by company *Solarfuel* (CTO of EKONAMI is technology and data holder and was shareholder and key manager.)





# EKONAMI<sup>®</sup>

H<sub>2</sub> + E-FUELS

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