



Shakti Photon Solutions Private Limited
(MSME: UDYAM-AP-04-0039934)

Vision: Building **net-zero** technology with **Green Hydrogen**.

Mission: Green Hydrogen, **Reducing Global warming**, Cleantech, Net Zero goals.

Founder and CEO

Dr. Mallikarjuna Rao M

Office Locations:

- IIT Madras Research Park, Chennai
- Phase 7, Spray House, Mohali
- 11/1, Indhira Gandhi Nagar, Guntur



info@shaktiphotonsolutions.com

Team



■ From India

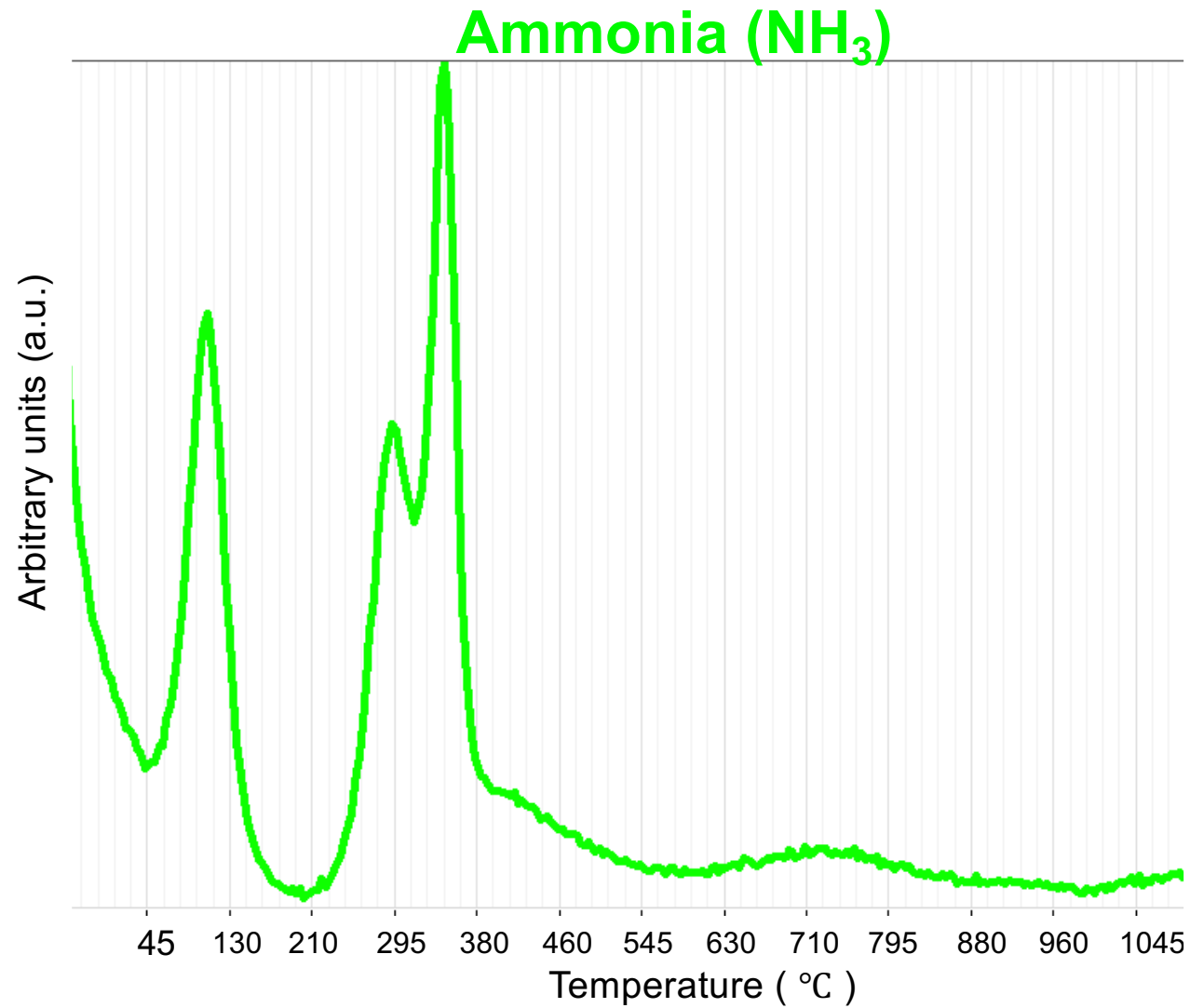
- **Shakti Photon Solutions Pvt. Ltd. (MSME):** Dr. Mallikarjuna Rao M
- **Spray Engineering Devices Ltd. (Scale-up Industry Partner):** Mr. Vivek Verma (Managing Director)
- **CSIR-CIMFR (Academic Partner):** Dr. Prakash Dhondiram Chavan

■ From the EU

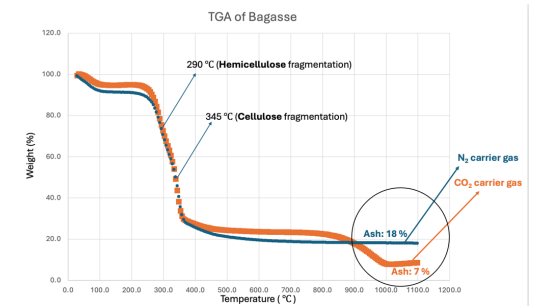
- **BEST - Bioenergy and Sustainable Technologies GmbH (Industry Partner):** Dr. Thomas Hannl
- **TU Wein**
- **Karlsruhe Institute of Technology**

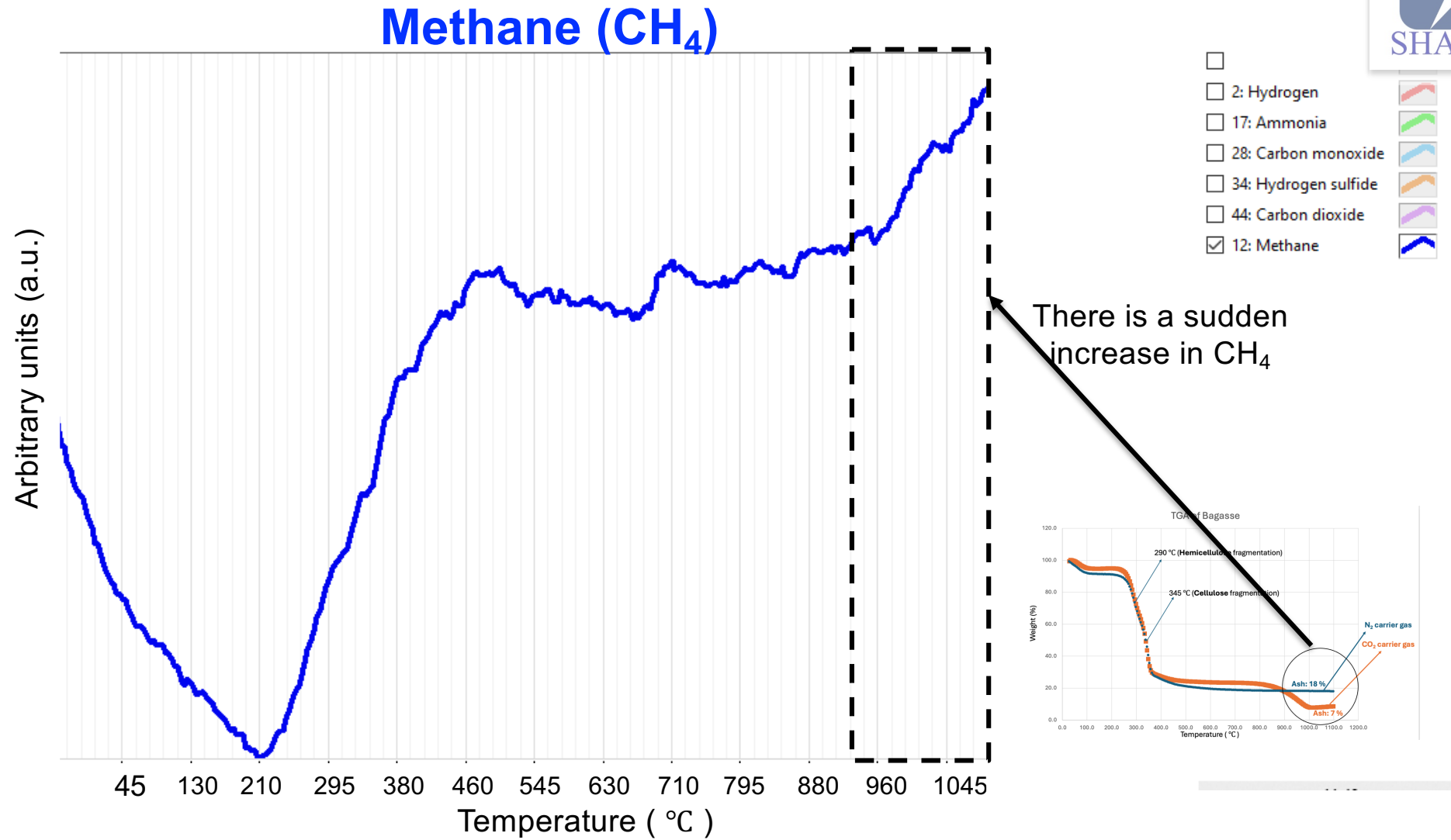


CO₂ Thermal reduction with Biomass: TGA-MS

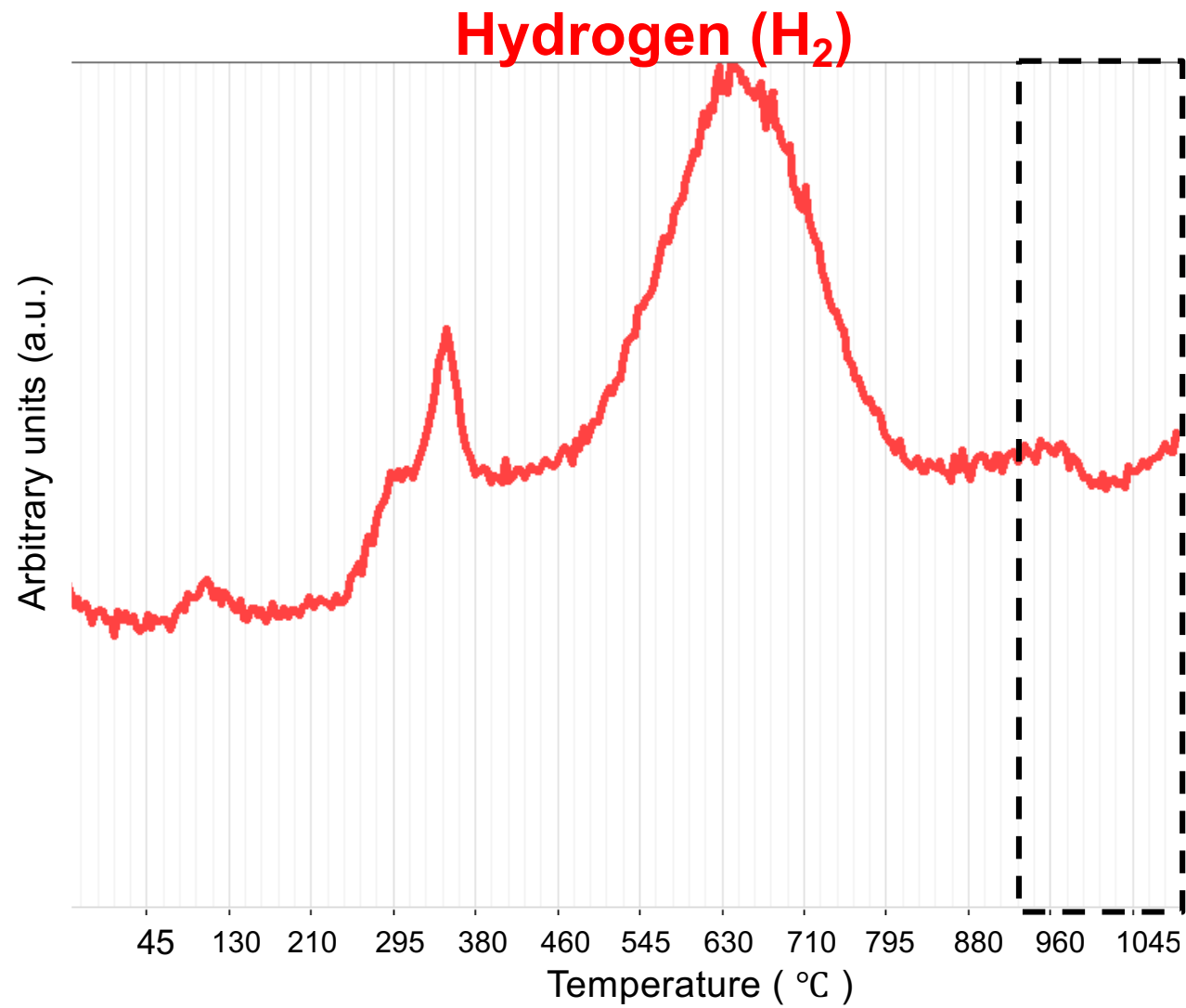


- ☐ 2: Hydrogen
- ☒ 17: Ammonia
- ☐ 28: Carbon monoxide
- ☐ 34: Hydrogen sulfide
- ☐ 44: Carbon dioxide
- ☐ 12: Methane

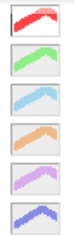




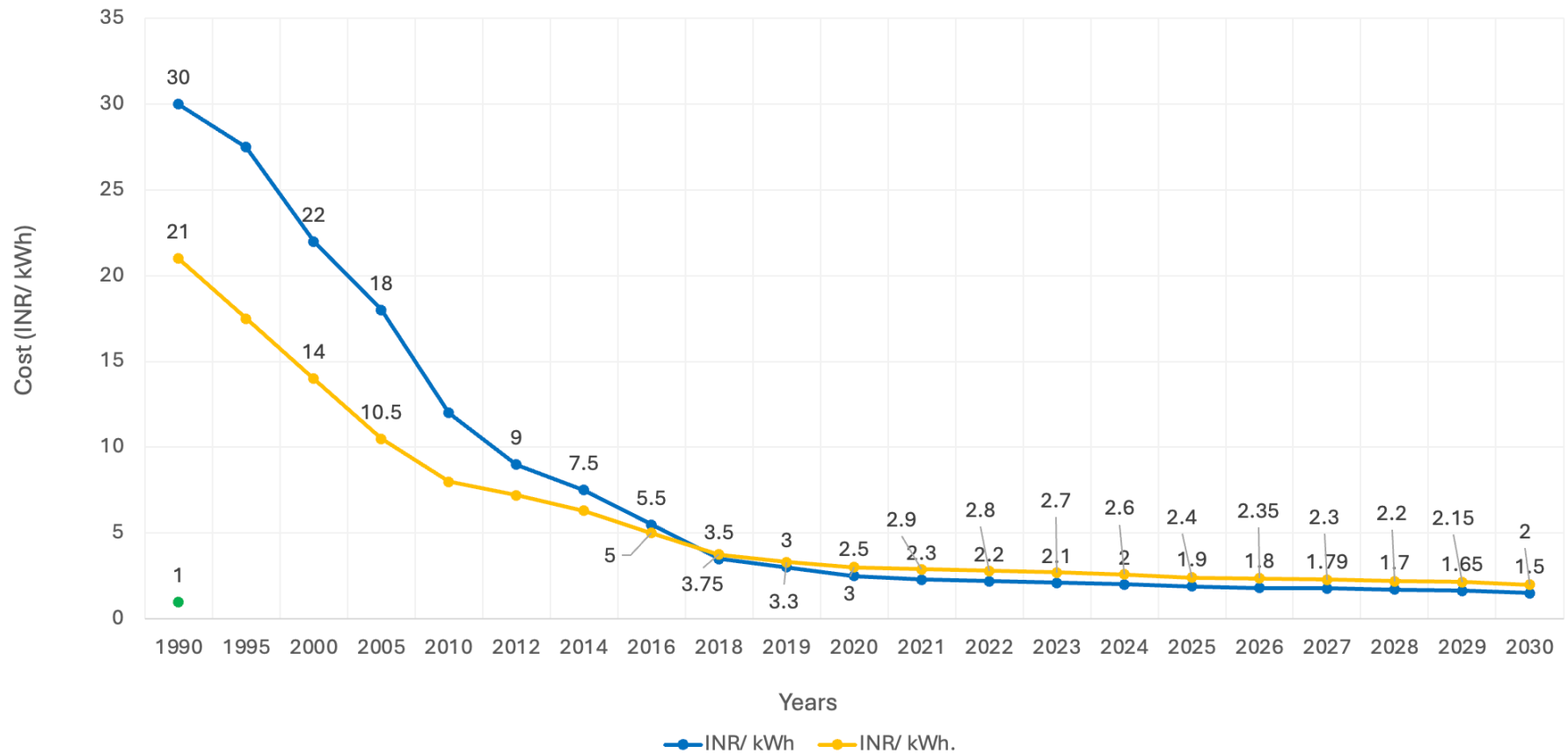
CO₂ Thermal reduction with Biomass: TGA-MS



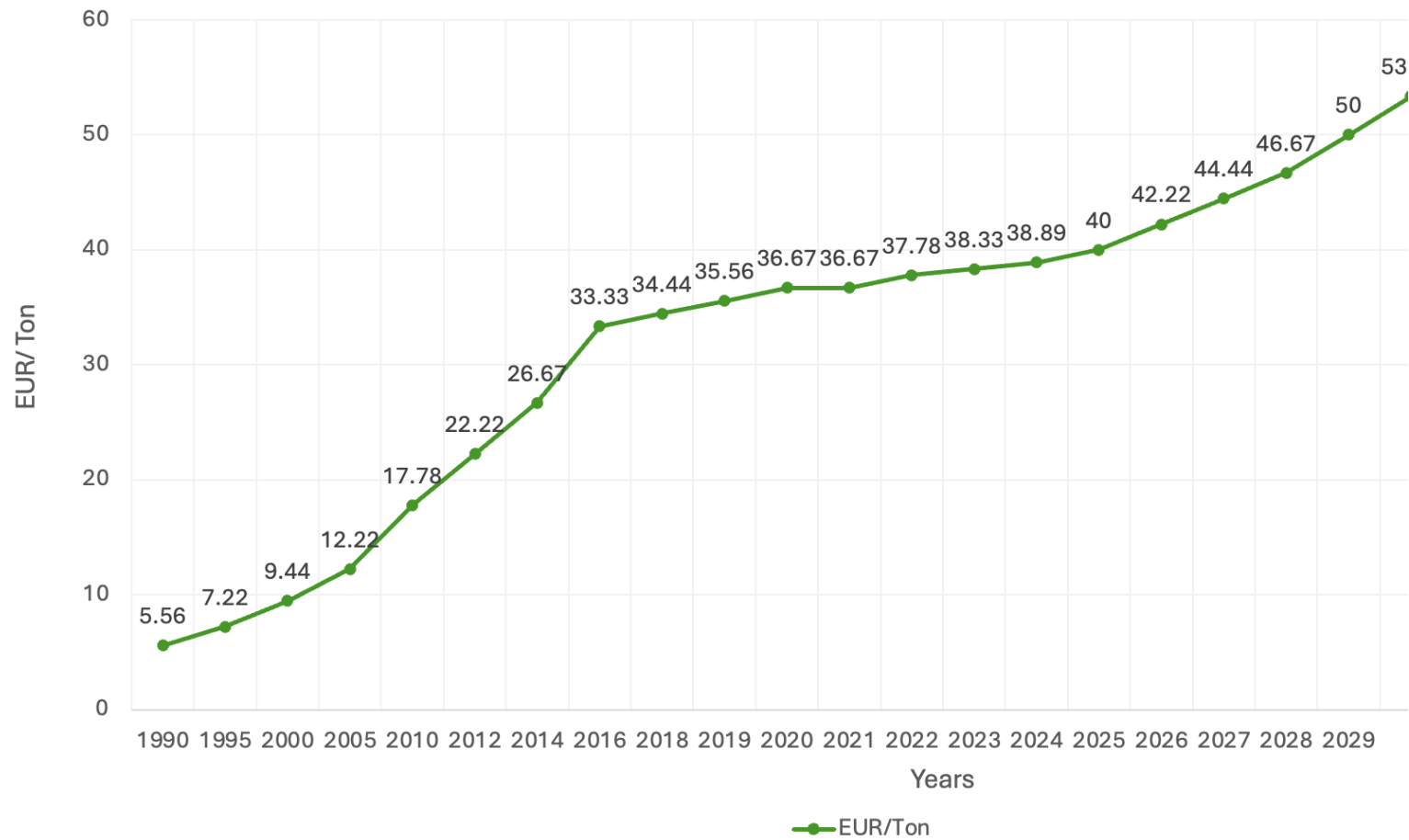
- ☐ 2: Hydrogen
- ☐ 17: Ammonia
- ☐ 28: Carbon monoxide
- ☐ 34: Hydrogen sulfide
- ☐ 44: Carbon dioxide
- ☐ 12: Methane



Renewable Energy costs in India (1990-2030)



Cost of Biomass in India (1990-2030)





Mr. Vivek Verma
Managing Director

Spray Engineering Devices Limited (SED)
India

vivek.verma@sprayengineering.com

Manufacturing Insights- Production Machineries



Laser Cutting



CNC Plasma Cutting
Machine



Seam Welding



Drilling Machine



Shell Rolling Machine



TIG Welding Machine



Grinding Machine



Welding

Dalmia Bharat Sugar and Industries
Ltd., U.P., India

First Boiler-less plant in India



Design, Engineering, Supply, Erection and Commissioning
of Boiler Free MVR based system for **170 m³/day** Grain
based Distillery.
50% overall steam reduction and **100% elimination of
cooling tower, dryer**

**Ecotech Jaggery Plant, Assam,
India**

**Boiler-
less**



**Plant
capacity
500 TCD**

**MVR based
Sugarcane
processing
plant**



Hans Heritage Jaggery Plant, Shamli, U.P., India

Boiler-
less



**Plant
capacity
250 TCD**

**MVR based
Sugarcane
processing
plant**

**SEDL's Jaggery plant, Bidar,
Karnataka, India**

**Boiler-
less**



**Plant
capacity
500 TCD**

**MVR based
Sugarcane
processing
plant**

**Mornisa Bioorganics Pvt. Ltd., Maharashtra,
India**

**Boiler-
less**

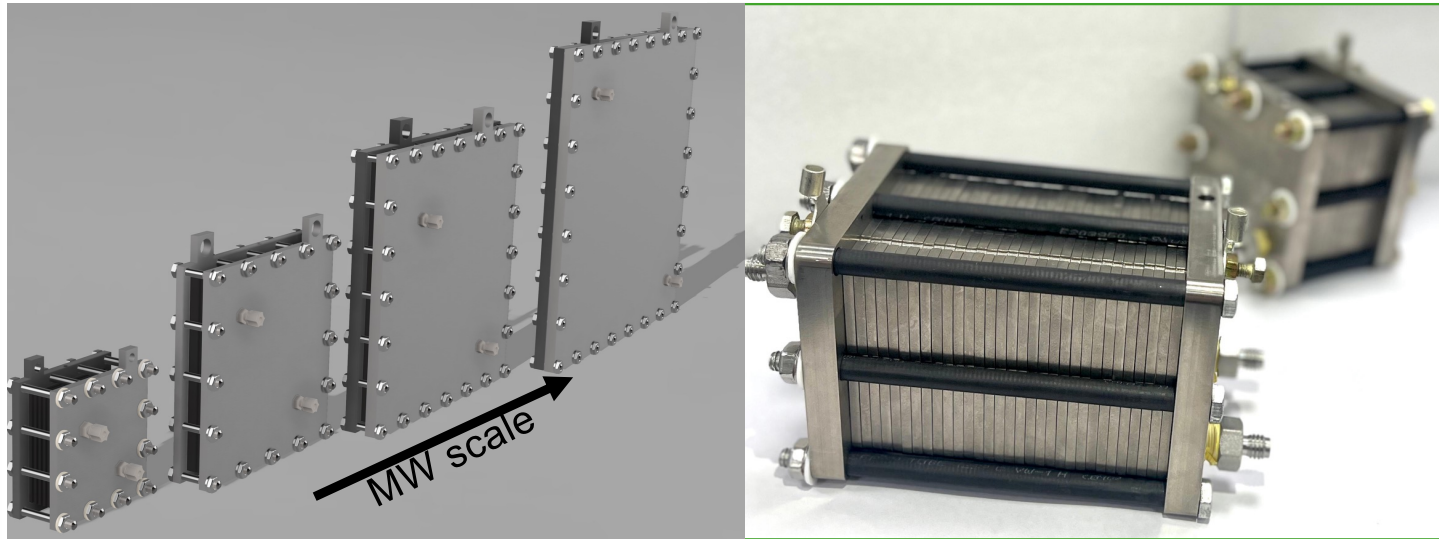


**Plant
capacity
500 TCD**

**MVR based
Sugarcane
processing
plant**

Motivation

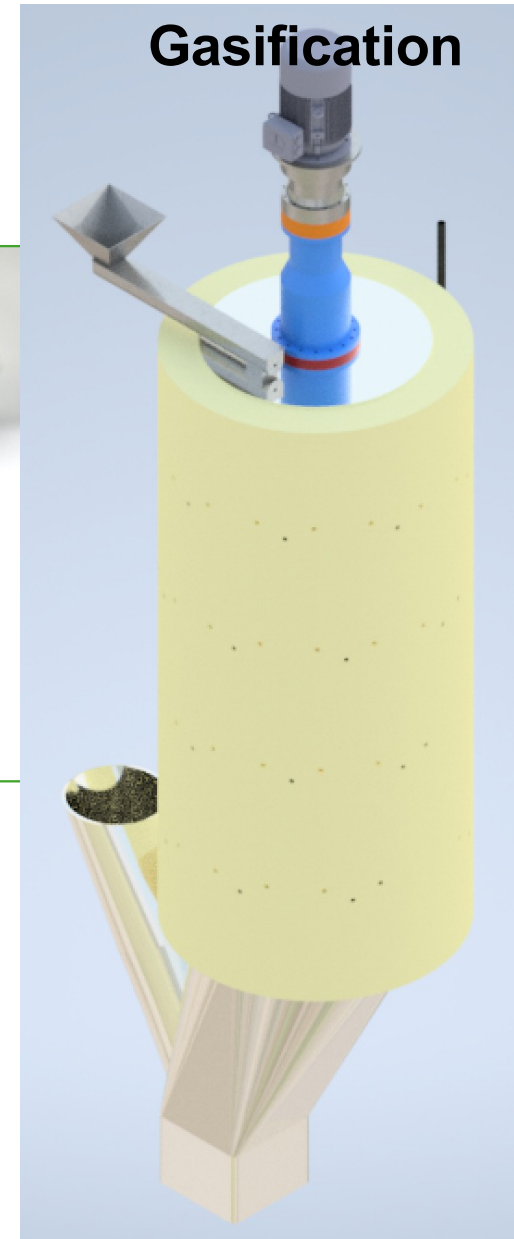
Hydrogen Electrolyzers for Biofuel industries



Portable Torrefaction systems



Gasification





60 kg/h
Oxy-Blown Pressurized
Fluidized Bed Gasification
(PFBG) Pilot Plant Facility:



20 kg/h
Air-Blown (PFBG)
Pilot Plant Facility:



Dr. Prakash D Chavan
Chief Scientist & HORG
CSIR-CIMFR




BEST

Bioenergy and
Sustainable Technologies



 Bundesministerium
Arbeit und Wirtschaft

 Bundesministerium
Klimaschutz, Umwelt,
Energie, Mobilität,
Innovation und Technologie



 Für die
Stadt Wien





SYNGAS PLATFORM VIENNA

A **research hub** featuring a Waste2Value process chain: 1 MW **DFB gasification** + 250 kW **Fischer-Tropsch** synthesis demo

A connected **laboratory** supplied **with real syngas** for gas cleaning and upgrading

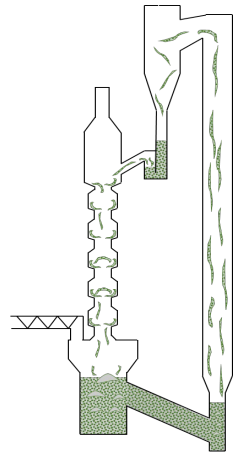
Syngas Platform Vienna: experimental equipment



Dual fluidized bed (DFB) gasification:

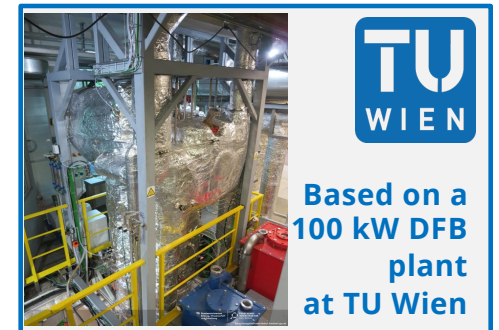
1 MW demonstration-scale plant for long-term campaigns of multiple weeks continuous operation

Advanced DFB gasification (aDFB) reactor design upscaled from 100 kW



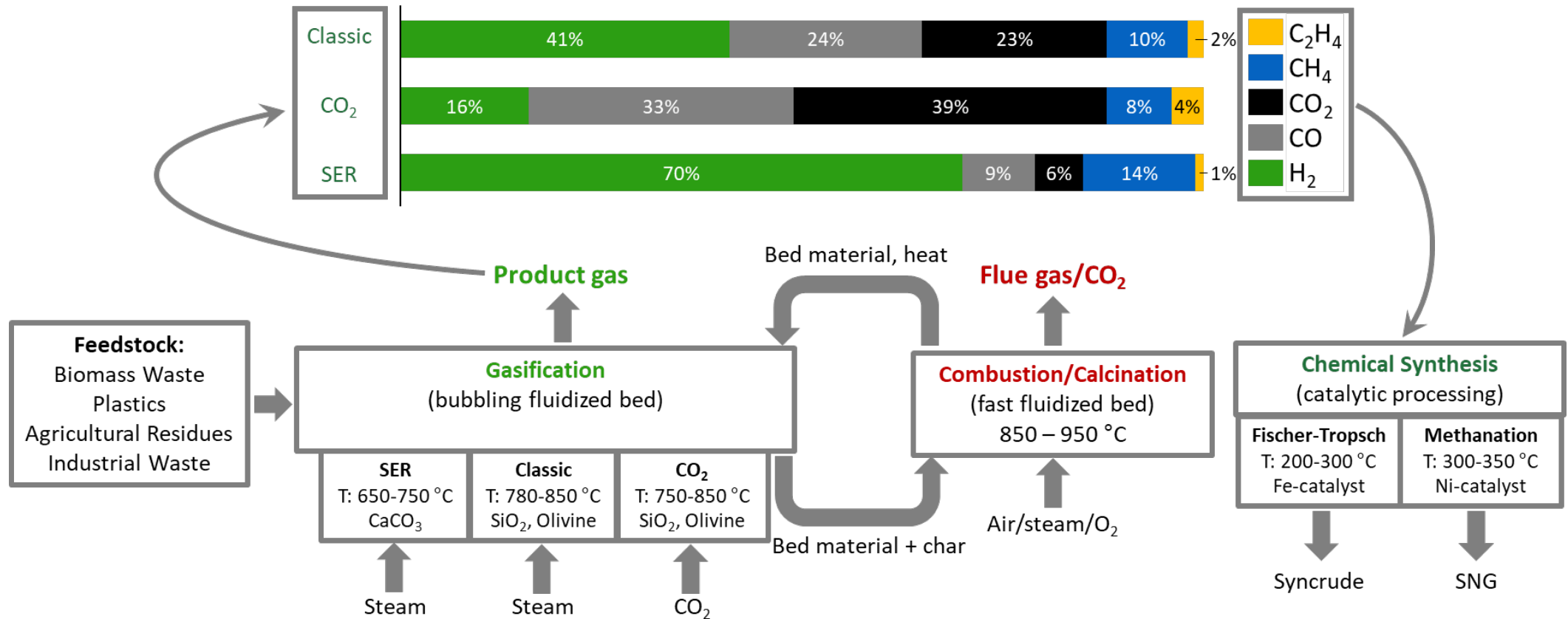
Typical syngas composition

H_2	CO	CO_2	CH_4	C_2H_4
41%	24%	23%	10%	

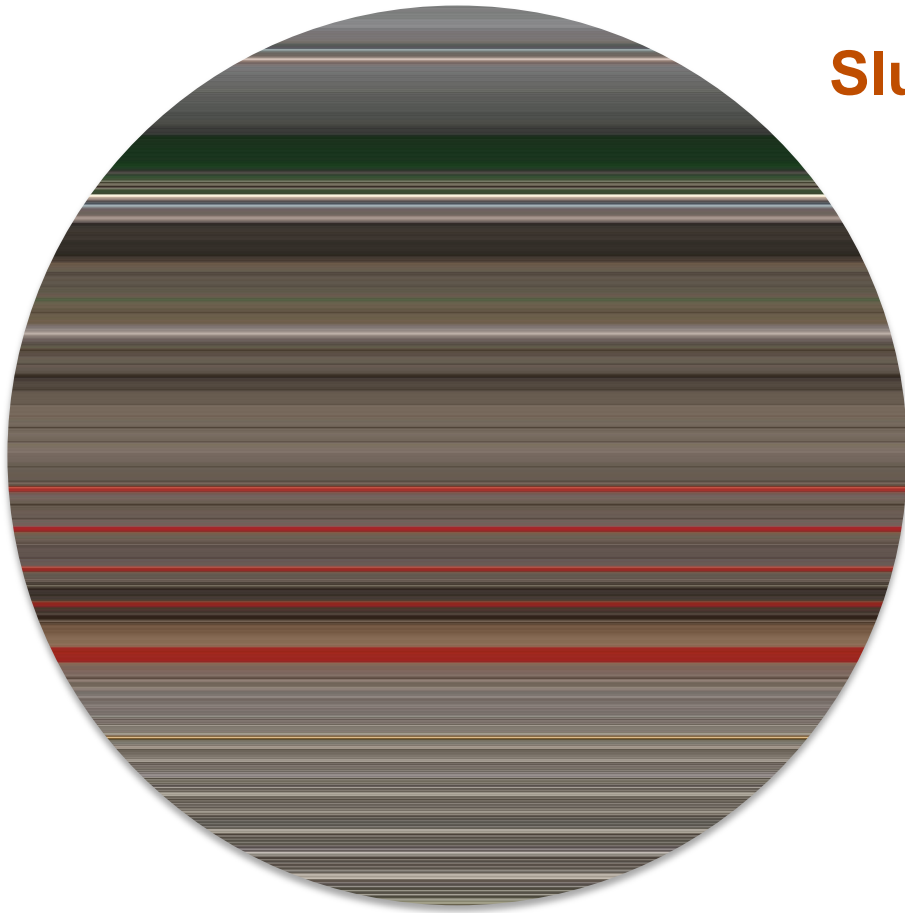




DFB Operation Overview



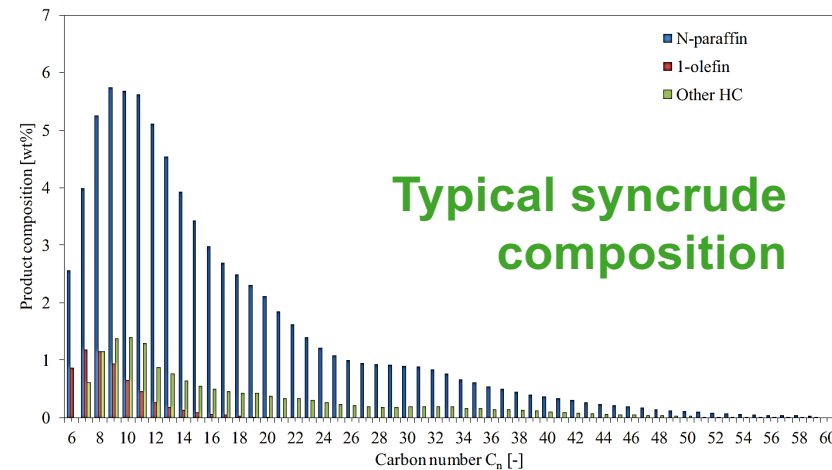
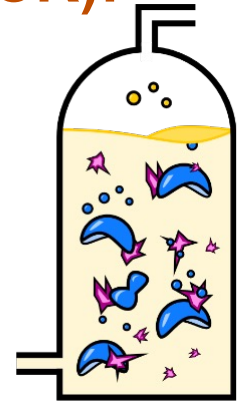
Syngas Platform Vienna: experimental equipment



Slurry-Bubble-Column-Reactor (SBCR):

250 kW pilot-scale Fischer-Tropsch plant for long-term campaigns of multiple weeks continuous operation

Gas cleaning includes hot filtration, a quench, solvent scrubbers, activated carbon filters and ZnO filters



Syngas Platform Vienna: experimental equipment



Test-rigs for gas cleaning and upgrading

Lab-scale Fischer-Tropsch
Aqueous phase reforming
Temperature swing adsorption
Gas storage system
Syngas fermentation (planned)
...and more to come....

**All lab-scale test-rigs can be supplied with
real product gas from the 1 MW DFB
gasification demo-plant!**

Research Partners



Contact



Thomas Karl Hannl

Senior Researcher | Syngas Platform Technologies

thomas.hannl@best-research.eu

T +43 5 02378-9357

