



MATERIA NOVA

Materials
R&D Center

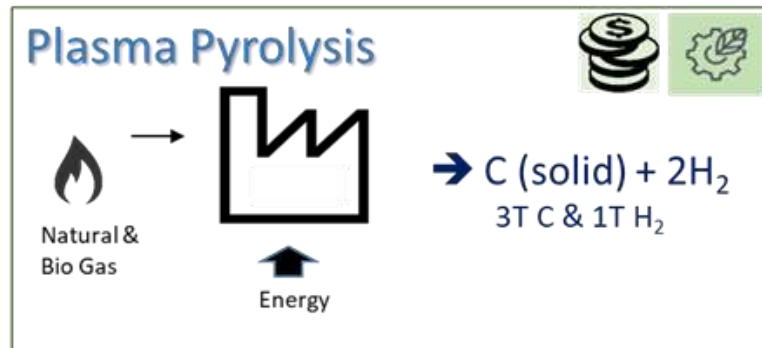
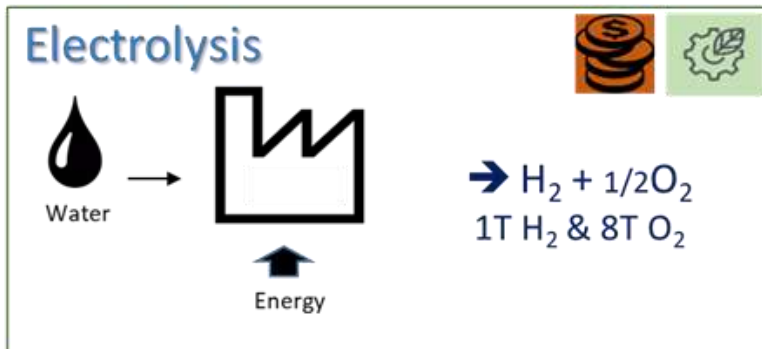
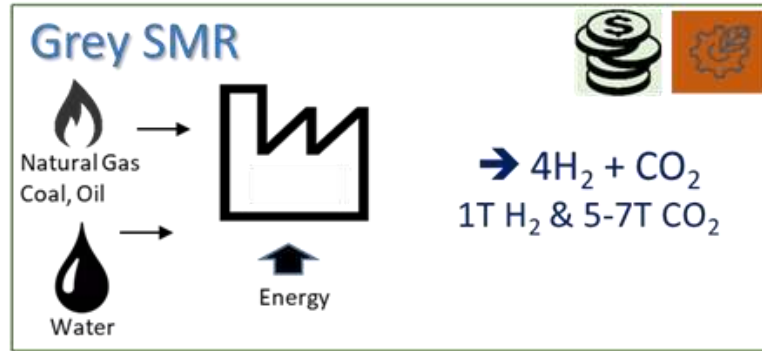
UMONS
Innovation Center

Hybrid Plasma Technology for Clean Hydrogen Production

Prepared by Frédéric Haase

Mons Wednesday, 29th September 2021

Hydrogen production in a nutshell



Plasma Pyrolysis Process provides serious advantages versus grey SMR and Electrolysis

- ✓ 2 to 4 times less energy required than SMR or Electrolysis
- ✓ ZERO CO_2 with green energy
- ✓ < 3€/Kg (with Carbon Valorisation)
- ✓ Highest H_2 production per gr of feedstock

Clean & cost-effective H₂ with Hybrid Plasma CH₄ Pyrolysis

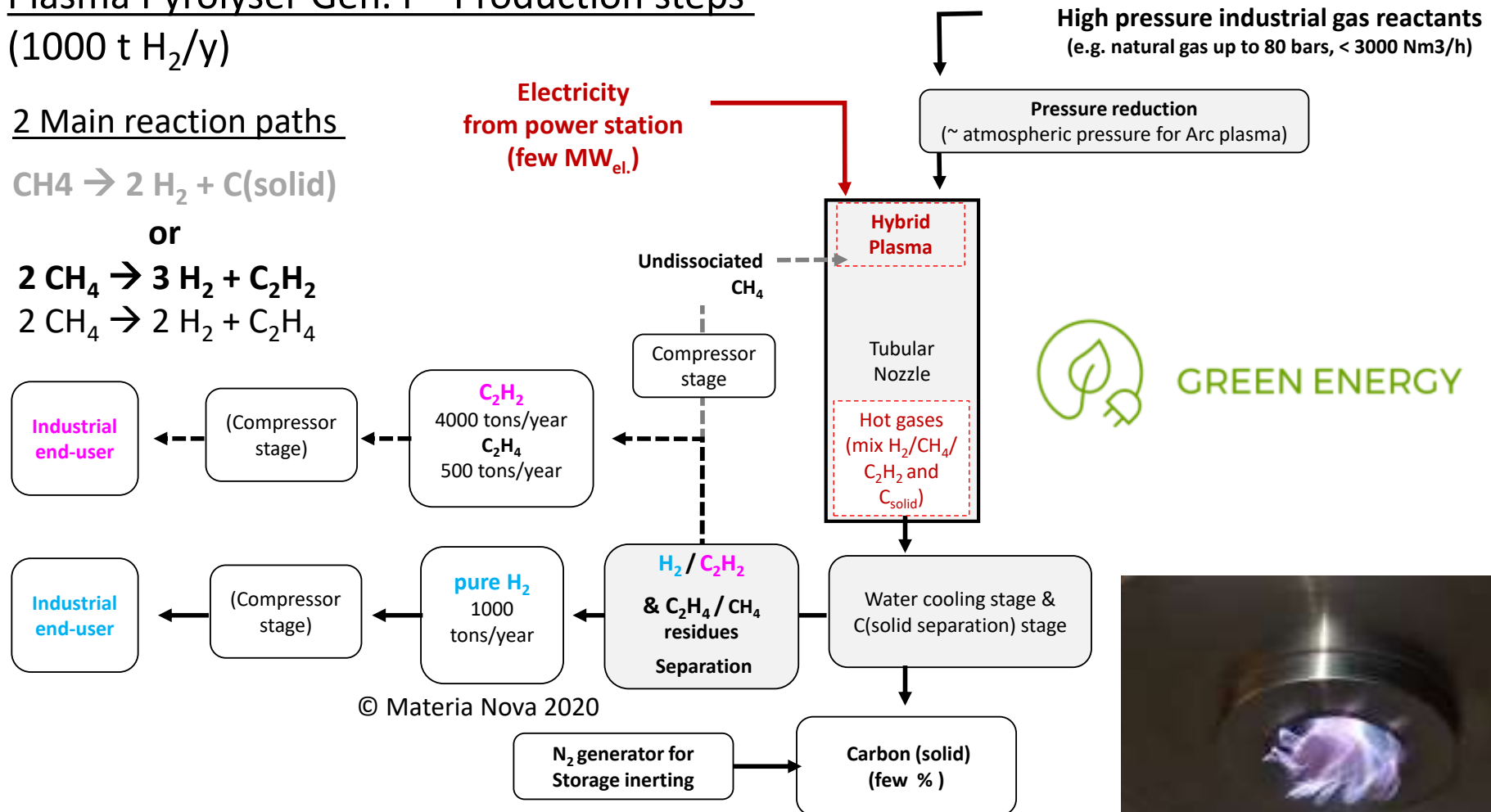
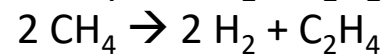
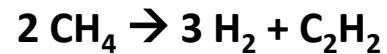
Plasma Pyrolyser Gen. I – Production steps

(1000 t H₂/y)

2 Main reaction paths



or



GREEN ENERGY



Hybrid Plasma CH₄ Pyrolysis

Materia Nova's Patent Application



ENERGY TRANSITION



Targets with new generations of reactors designs :

- Reactor adapted to several kind of Hybrid Plasma (new Geometric design)
- Low cost catalyst or no catalyst
- Switchable reactor (Gen.2)
- Liquid metal reactor evolution (Gen. 3)
- Higher conversion efficiencies with Plasma method (80%)
- Good energy-efficiency & Thermal management
- Components with longer lifetime
- Improved carbon management
- Reactor adapted to higher pressures

Freedom to operate

- No blocking patents found

What is Materia Nova looking for ?

What has Materia Nova done for ?

The created entity is dedicated to:

- ✓ the valorization and commercial deployment of the plasma pyrolysis technology ;
- ✓ IP management related to plasma pyrolysis (licensing, etc.)
- ✓ Contracting with stakeholders (companies, public authorities, investors, subcontractors, etc.)
- ✓ in the very short term, finance a first three hydrogen producing container unit for Belgium, Switzerland and Germany (seed funding about 15 to 20 M€)

Conclusion

Conclusions

- ✓ The production of H₂ by plasma pyrolysis of methane is the only one that is both, competitive and environmentally friendly;
- ✓ Materia Nova has unique technical expertise and IP in this field;
- ✓ Materia Nova has solid partners for the industrialization of this technology, both for large industrial projects and for smaller, more local projects.
- ✓ Materia Nova is looking for an investor to consolidate its technological leadership and deploy large-scale production of H₂ (globally and locally) by plasma pyrolysis.

A close-up photograph of a hand holding a white puzzle piece. The hand is positioned on the left side of the frame, with the thumb and index finger gripping the piece. The puzzle piece is white and has a complex, interlocking shape. The background is dark and out of focus, showing other puzzle pieces. The overall image is circular in shape, with the top-left corner cut off by the white background of the slide.

How to arrange the pieces
to make them
a success for everyone?

Thank you !

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