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GERMAN SOLAR
ASSOCIATION

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Ensuring EU RED II compliant Power Supply for Green Hydrogen Projects

Ronald Upmann

September 11, 2023, Johannesburg

AHK
Deutsche Industrie- und Handels-
kammer für das südliche Afrika
Southern African-German Chamber
of Commerce and Industry

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The German Solar Association (BSW)

TASK	To represent the solar industry in Germany in the photovoltaic, thermal and storage sector
VISION	A sustainable global energy supply provided by solar (renewable) energy
ACTIVITIES	Lobbying, political advice, public relations, market observation, standardization
EXPERIENCE	Active in the solar energy sector for 43 years
REPRESENTS	More than 1.000 companies – manufacturers, suppliers, wholesalers, installers and other companies active in the solar and storage business from all over the world
HEADQUARTER	Berlin, Germany

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Selected BSW success stories

- **Solar PV capacity installed in Germany**
  - 67,5 GW as of 2022
  - 2023: Germany is well on track to break the 10GW sound barrier (current path: 11/12 GW!) for installed capacity in one year for the first time
- **Number of PV systems installed**
  - 2,85 million systems at the end of Q1/2023
  - Approx. 380 new Solar PV systems added in 2022 alone
- **Selected recent BSW policy consulting highlights**
  - Increased feed-in tariffs
  - Increased auction volumes in tenders
  - Liberalization of self-consumption
  - Tax exemptions for Solar PV installations (including PV leasing models)
  - “Solar strategy” consultation with German Government
  - Various initiatives to bring back Solar PV manufacturing at a large scale to Germany and Europe

BSW CEO Carsten Körnig (Picture centre) with German Federal Minister for Economy and Climate Action Dr. Robert Habeck (left) after discussions about the „Solar Strategy“.

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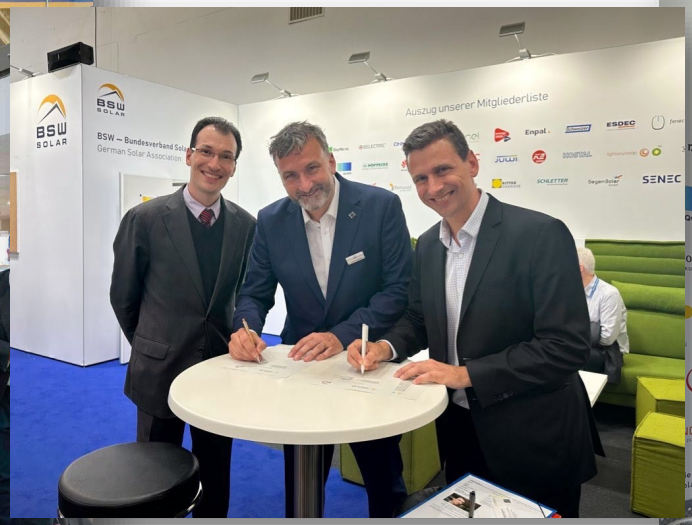
BSW meets the world: Intersolar Europe – a record-breaking fair …



Pictures from this June in Munich: BSW was an integral part of the largest Intersolar trade fair ever held.

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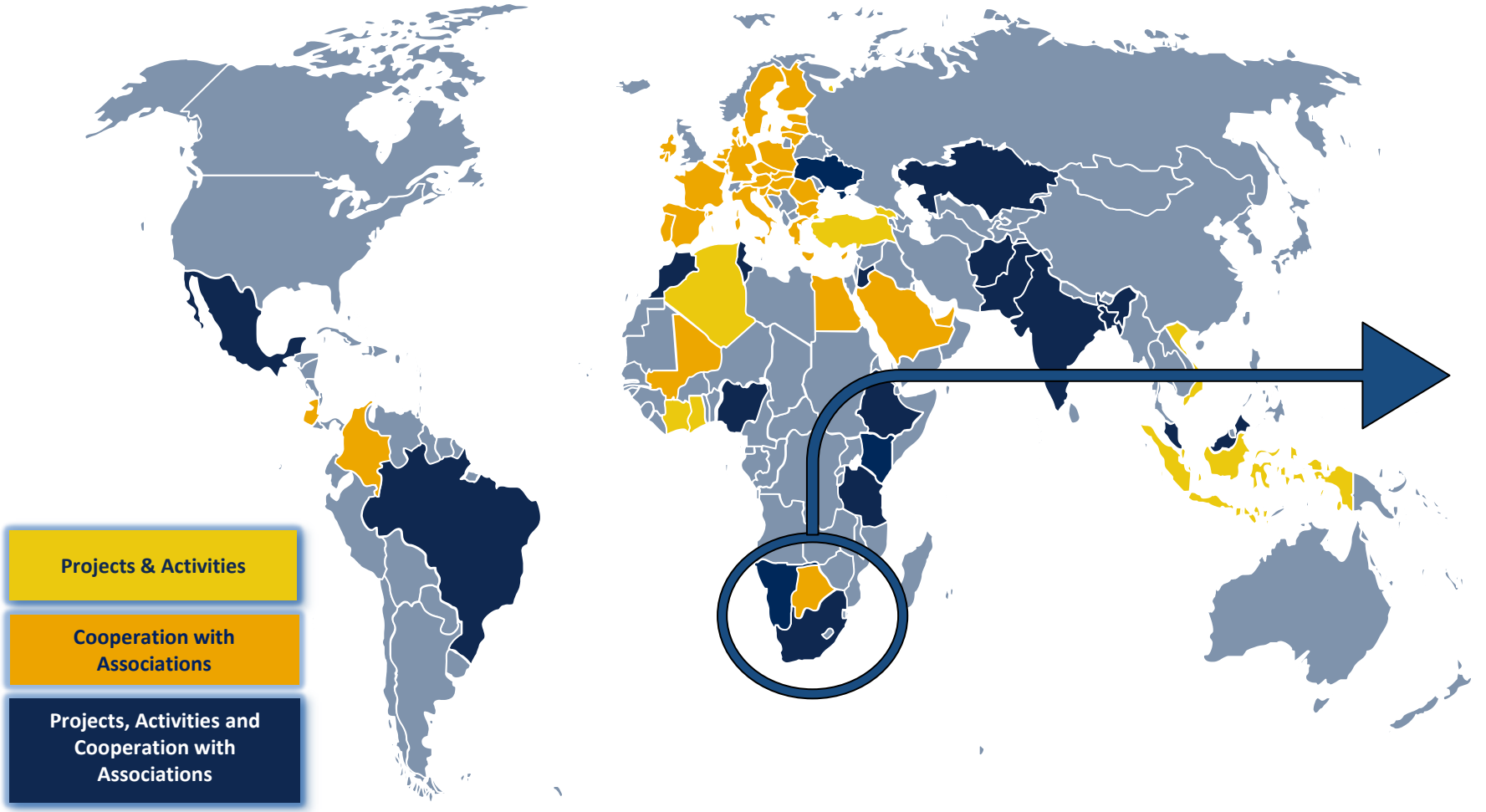
At home in Germany, active in the world …



Partnerships & projects with

SAPVIA

REIAoN
Renewable Energy Industry Association of Namibia
www.reiaon.com.na

since 2016

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BSW‘s activities in Southern Africa

From left to right: Paulus Mulunga, Secretary REIAoN, Ronald Upmann, Project Manager BSW, Dr Rethabile Melamu, CEO SAPVIA at the Intersolar Europe 2023 in Munich

Activities & Projects in South Africa:

- Implementation of the PV GreenCard Quality Assurance concept together with SAPVIA funded by GIZ in 2016/2017
- MoU and strategy workshop, on-going exchange and matchmaking activities with SAPVIA from 2017
- „Solar Payback“ project to support SHIP in South Africa together with SANEDI, AHK Southern Africa & others funded by the International Climate Initiative programme

Activities & Projects in Namibia:

- Capacity building and knowledge transfer for REIAoN funded by GIZ‘s Green People Energy programme 2021-2023

Solar Payback

PVGreenCard™
Promoting safe quality Solar PV installations

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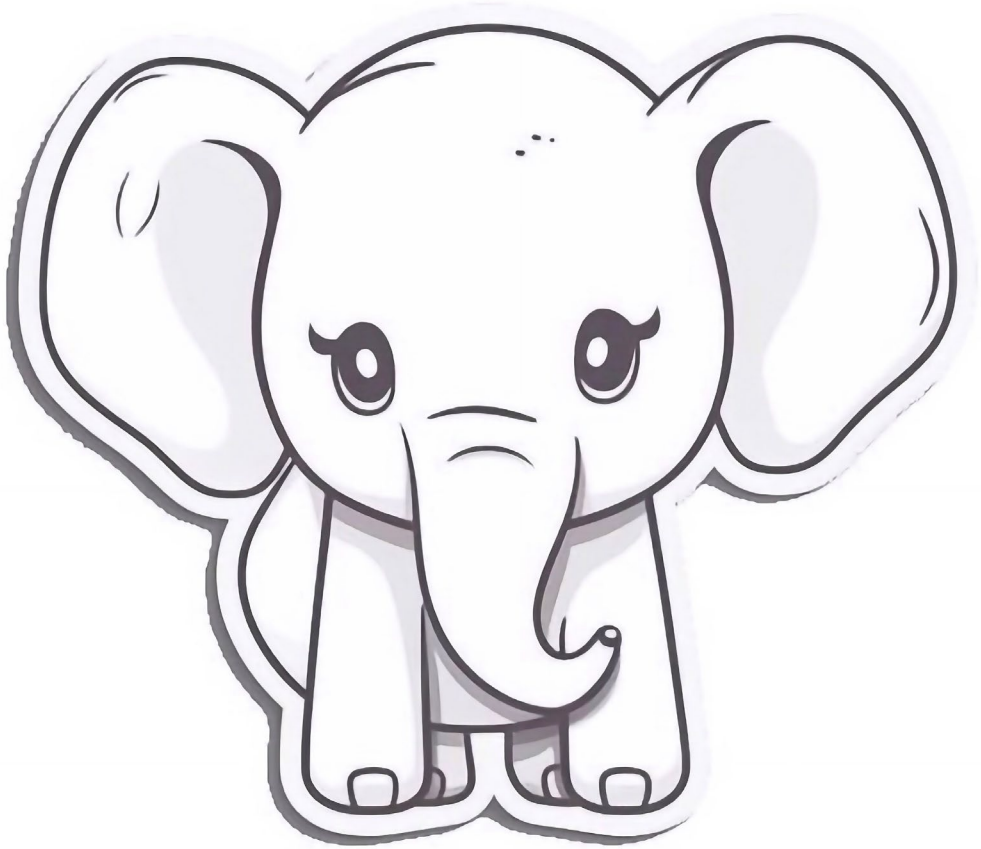
The „white elephant“ in the room …



Source: Adobe Stock

H_2

Green hydrogen is the "white elephant" in the room whenever it comes to the energy transition because ...

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Why Green Hydrogen is so important for the energy transition

- Fluctuating RE need storage capacities
- More fluctuating RE need even more storage capacities
- Green Hydrogen (mainly its derivates) can be distributed over long distances
- Green Hydrogen is the first choice, wherever the more efficient battery technology is not advisable and whenever high efficiency does not play a key role (for example in times of high RE production and low demand)
- Green Hydrogen can create a full new economy with various business models and opportunities

Source: Press photo

„Green Hydrogen is the champagne of the energy transition.“

Prof Claudia Kemfert, Energy Economist, DIW

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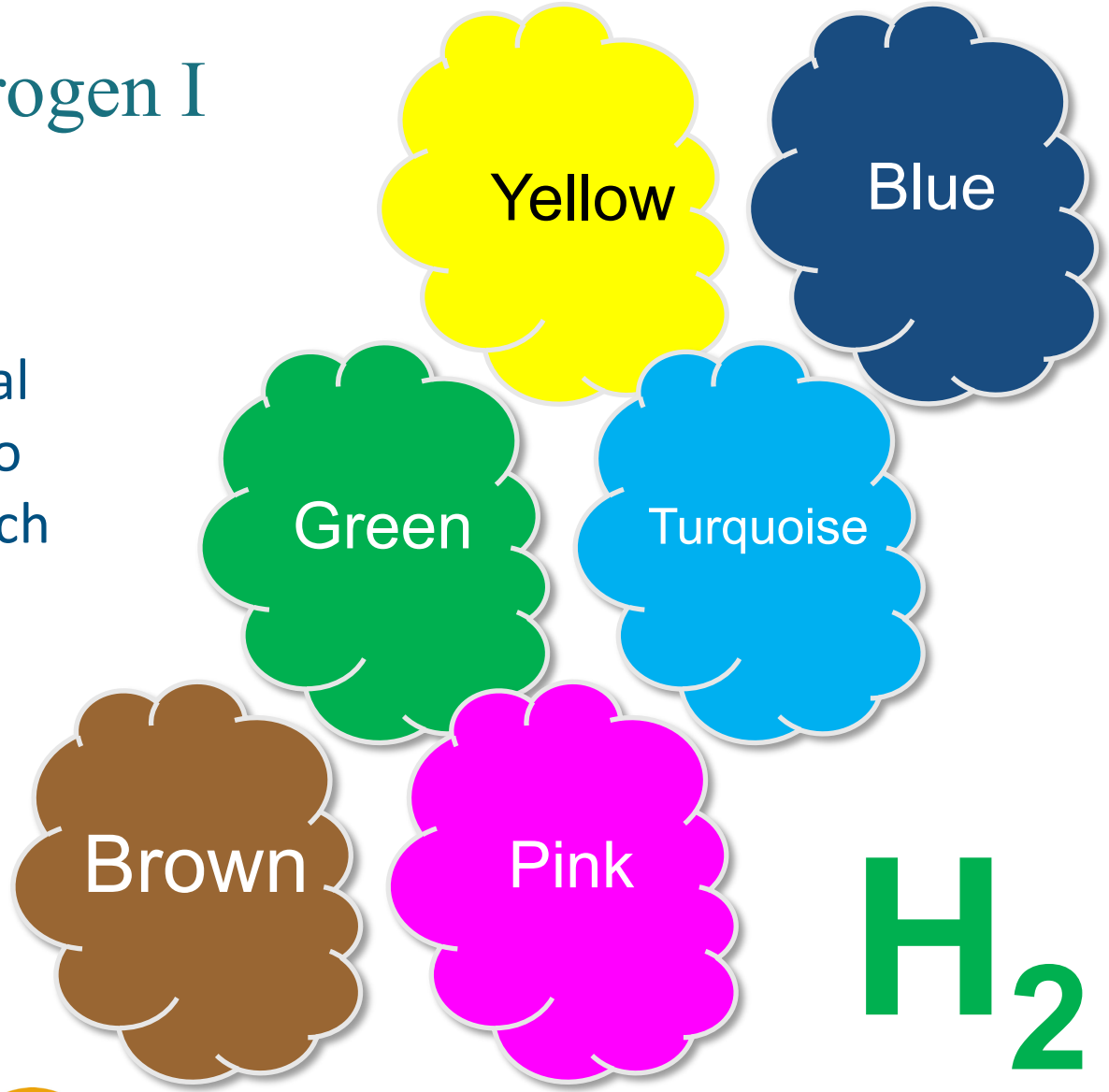
A difficult theory of colors: Hydrogen I

- Blue: H2 coming from natural gas (incl. carbon capture and storage)
- Yellow: Hydrogen produced with normal grid electricity (and then, of course, also representing the energy mix used in each case)
- Turquoise: Natural Gas with pyrolysis (capture of solid carbon)
- Brown (black): Hydrogen from ignite or hard coal
- Pink: H2 generated with nuclear power



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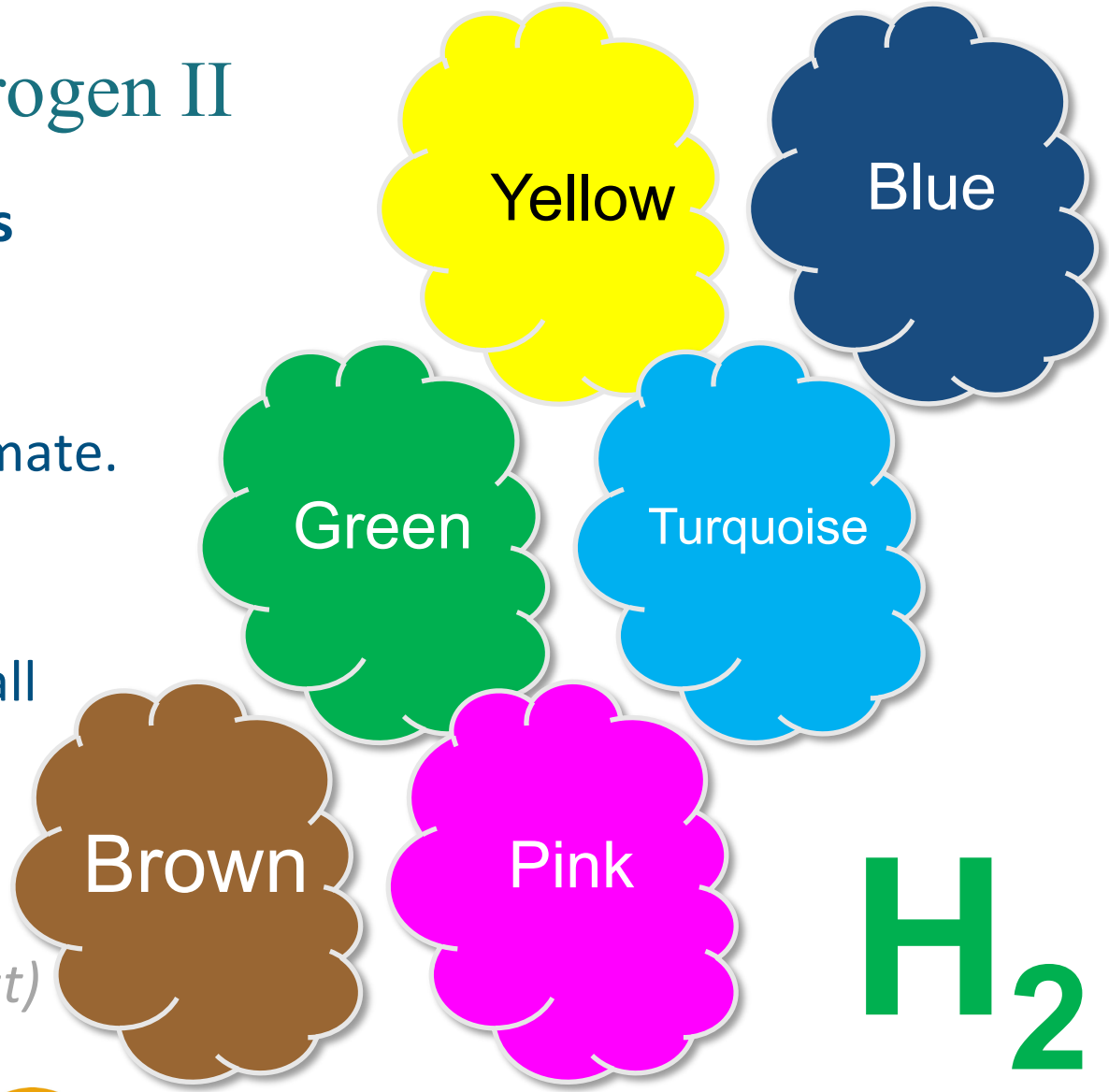
A difficult theory of colors: Hydrogen II

- **Conclusion: It is the origin that matters**
- Only green hydrogen (i.e. hydrogen produced from renewable energies via electrolysis) can help us protect the climate.
- Last but not least and speaking of the German “National Hydrogen Strategy” (NWS), green hydrogen is the focus of all activities, only as a bridge, other sources for electrolysis are politically acceptable

(Please note: Other color definitions do exist)



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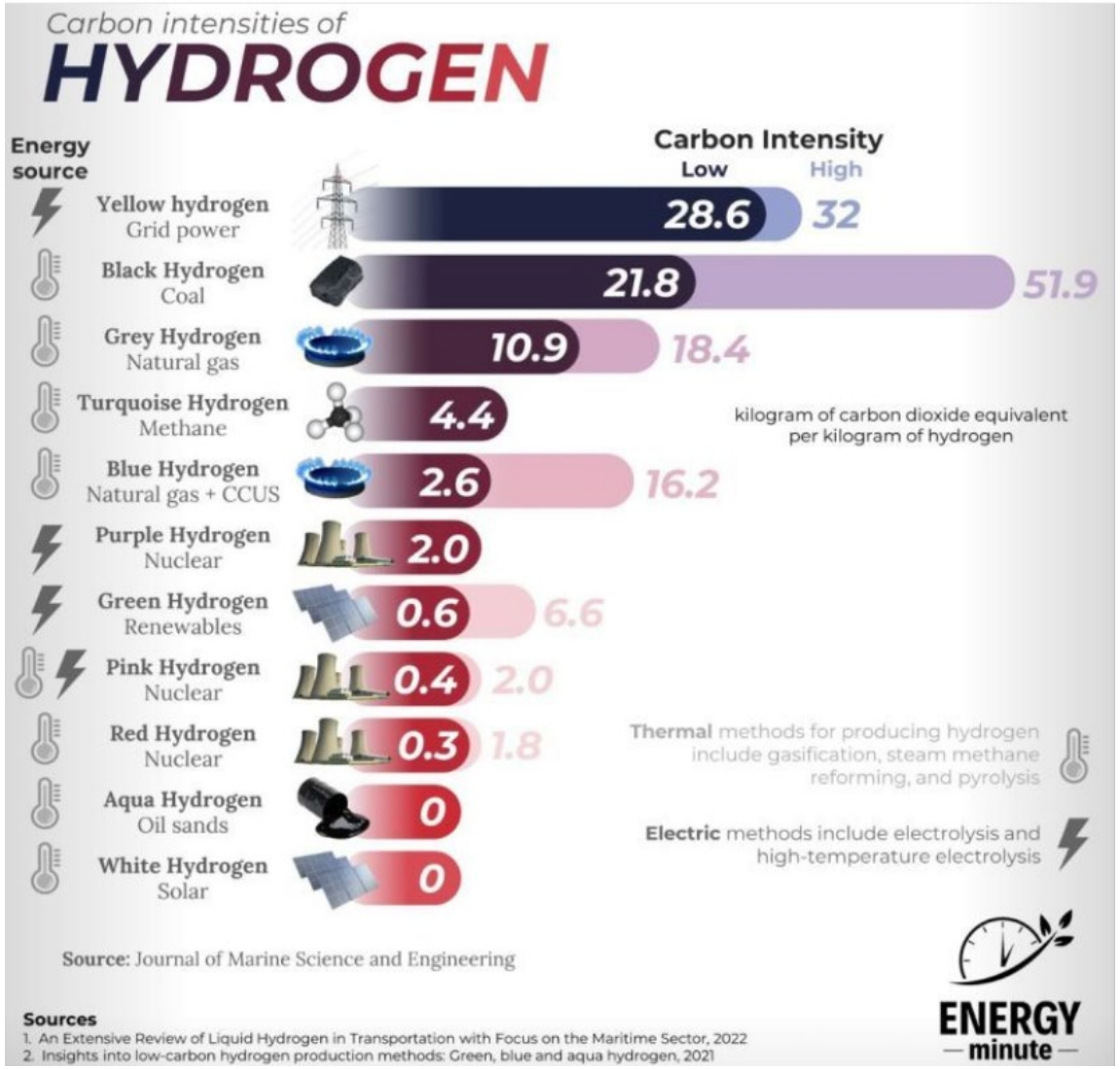
From multicolored to green: Reducing hydrogens carbon footprint

In the end, and as quickly as possible, the use of hydrogen must be limited to hydrogen produced as exclusively as possible from renewable sources.



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German and European policy update on Green Hydrogen – National level (Germany)

- Green hydrogen is increasingly playing a key role in political efforts in Germany regarding green hydrogen. These are laid down in the National Hydrogen Strategy (NWS) (2020) and an update of the strategy that has just been published (Cover screenshot right):
    - Finding I: Overall demand 2030 **95 and 130 TWh**
    - Finding II: Germany needs more H2 generation capacity than previously thought, government now aims for **10 GW** capacity in 2030 (previously 5 GW)
    - This **will only fill parts of the gap**, rest needs to be **imported** from Europe and abroad
    - **Import strategy** to be developed
    - Full legislative framework to be developed as well

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German and European policy update on Green Hydrogen – European level (EU)

EU regulation (RED II, Delegated act of the EU Commission on "renewable fuels of non-biological origin (RFNBOs)) defines conditions under which hydgrogen is considered to be “green”

Important criteria for project developers and investors

Delegated act refers to the mobility sector in principle, but it will address other sectors in future, too.

As (almost) always: EU law will be “translated” to national law in European member countries such as Germany.

So, what does it mean detail?

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German and European policy update on Green Hydrogen – European level (EU) II

Variants for meeting the requirements for RE purchase in green hydrogen projects:

Source: Adobe Stock

Direct RE supply:

(No grid connection of the RE/Solar PV plant)

- Additionality

Grid-connected RE supply:

- High RE-share in the area (90%)
- Low-emission
- Time correlation
- Geographical correlation
- Additionality „plus“ (grid-conected RE supply with PPA)

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German and European policy update on Green Hydrogen – European level (EU) III

Additionality

- Commission of the RE plant maximum 36 month before electrolyzer
- Upgrade of electrolyzer 36 month after commission is allowed

Additionality „plus“

- No subsidiaries for the RE plant (CAPEX or OPEX)
- Additionality and Additionality „plus“ are valid from 2038 on, if Commission of the electrolyzer before 2028

Time correlation

- RE production and consumption (electrolysis) in the same calendar month (and in the same hour from 2030 on!)
- OR: electricity price max. 20 EUR/MWh or less than 0,36 times the price of a ETS certificate

Geographical correlation

- RE plant and electrolyzer are in the same „bid zone“ or in connected zones with equal or lower electricity price
- EU member countries are allowed to define additional geographical criteria

Source: Stiftung Umweltenergierecht, BEE

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German and European policy update on Green Hydrogen – European level (EU) IV

Important points from RE association‘s perspective:

- Criteria of time correlation are not as strict as in earlier draft versions
- Disappointing: Old Solar PV plants with expired feed-in tariffs („Ü20“) still cannot be used for green hydrogen production with regards to time correlation
- Further definition of geographical criteria has been delegated to EU member countries
- New "18g variant" refers in particular to France and Sweden, with high shares of nuclear power. The variant does not allow direct use of nuclear power (conclusion of RE PPA necessary), but comes at the expense of RE expansion.
- "Relaxed" transition periods for additionality and temporal correlation, with the transitional provision for additionality now limited to the end of 2037.
- What the "corresponding application" of the regulations to imported hydrogen means remains open to date.

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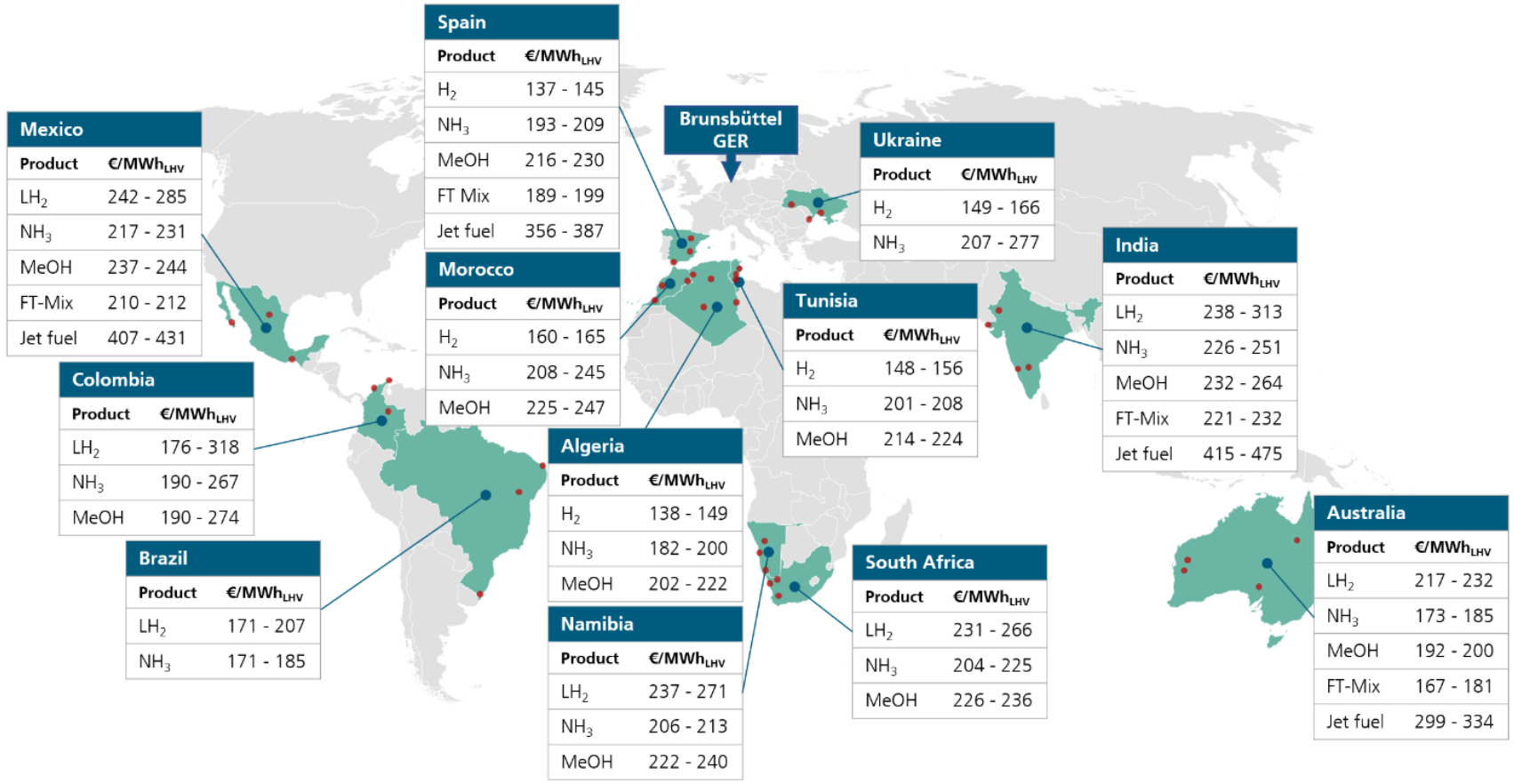
Import of Green Hydrogen – potential and a (rough) look on the ecomomy side



Preferable regions for the import of Green Hydrogen, Ammonia, Methanol – South Africa and Namibia are good options. Study with estimated costs in 2030.

Source: Fraunhofer ISE / H2Global, 09/2023

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Green Hydrogen will set up a whole new energy storage value chain full of business opportunities

Source: Naturstrom AG

Green electricity generation
- Wind, Solar PV, Bioenergy

Electrolysis
- Electrolyzers, service providers,

Storage
- Tanks, caves, silages

Transport and distribution
- Pipelines, ships, trucks

Applications
- Generators
- Industry
- Heating solutions
- Transport

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A quick look at the practice – Green Hydrogen projects and announcements in Germany

- Estimations and prospects are „giga“, projects are not so „giga“ (so far):
  - 5,4 million jobs in the European Green Hydrogen economy expected by 2050*
  - 800 billion Euro annual turnover related to Green Hydrogen in Europe by 2050*
  - 9 billion Euro will be invested by the German Government to fascilitate Green Hydrogen partnerships and the ramp-up of Green Hydrogen projects*
- Project announcements in Germany to date (examples):
  - ThyssenKrupp: 5 GW
  - H-Tec: 5 GW
  - Sunfire (photo right): 1 GW
  - Enapter: 0.3 GW

Source: Sunfire / PR

*) BMWK, National Hydrogen Strategy (NWS)

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Solar PV is the perfect partner for electrolyzers

- Depreciated solar parks with expired subsidies, but still good yields (regulation pending!)
- Electricity from solar parks that would otherwise have to be regulated because it is not in demand in the grid (peak shaving).
- Solar farms built specifically for the production of Green Hydrogen (preferably in the Earth's "Sun Belt", but not only).

Source: BSW / Upmann

85 MWp solar park „Finow“ northeast of Berlin, commissioned in 2010, expiry of feed-in tariff in 2030, Green hydrogen production from 2031?

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