A EVOLUÇÃO DO MERCADO DE HIDROGÊNIO VERDE

H2V NO BRASIL

19 de setembro
9h às 14h

Evento Híbrido

Presencial
Instituto de Engenharia
Av. Dr. Dante Pazzanese, 120

Online
Youtube do Instituto

Foto: Divulgação EDP

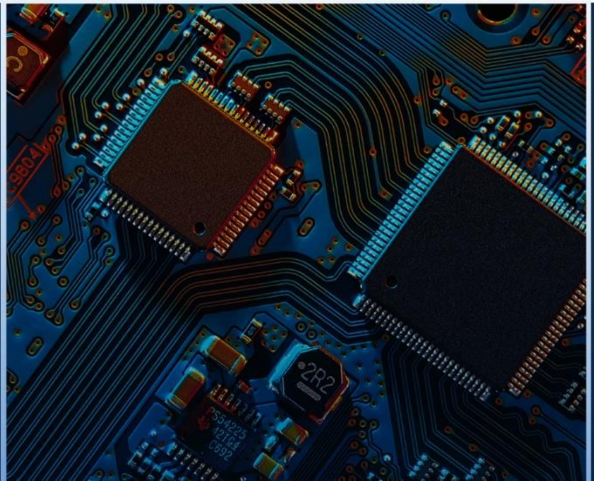
Palestrante
Valter Luiz Knihs

Realização: INSTITUTO DE ENGENHARIA | Patrocínio Especial: CONFEA | Patrocínio Ouro: WEG | Patrocínio Prata: PORTO DO AÇU | Apoio institucional: ABEE-SP, ABEEólica, abemi, ABINC, 10 anos ABSOLAR, CREA-SP, SAE BRASIL

Painel 3: Industrias no Setor Hidrogênio Verde

Driving efficiency and sustainability

WEG



VALTER LUIZ KNIHS

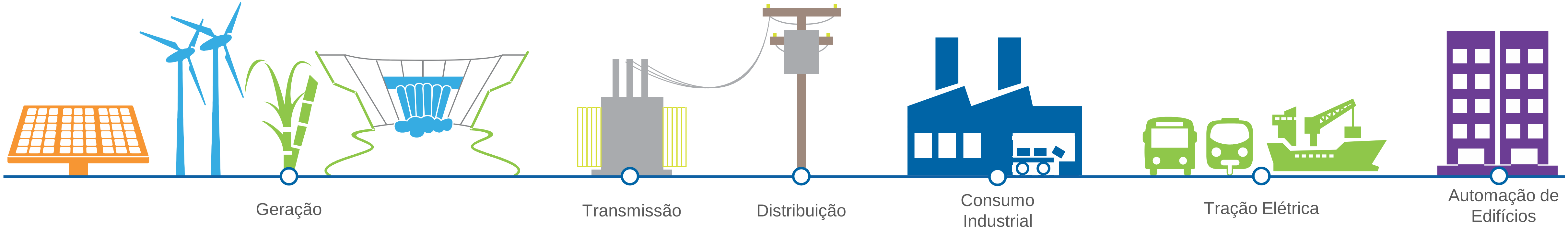
Diretor Ind & Sistemas & eMobility

WEG

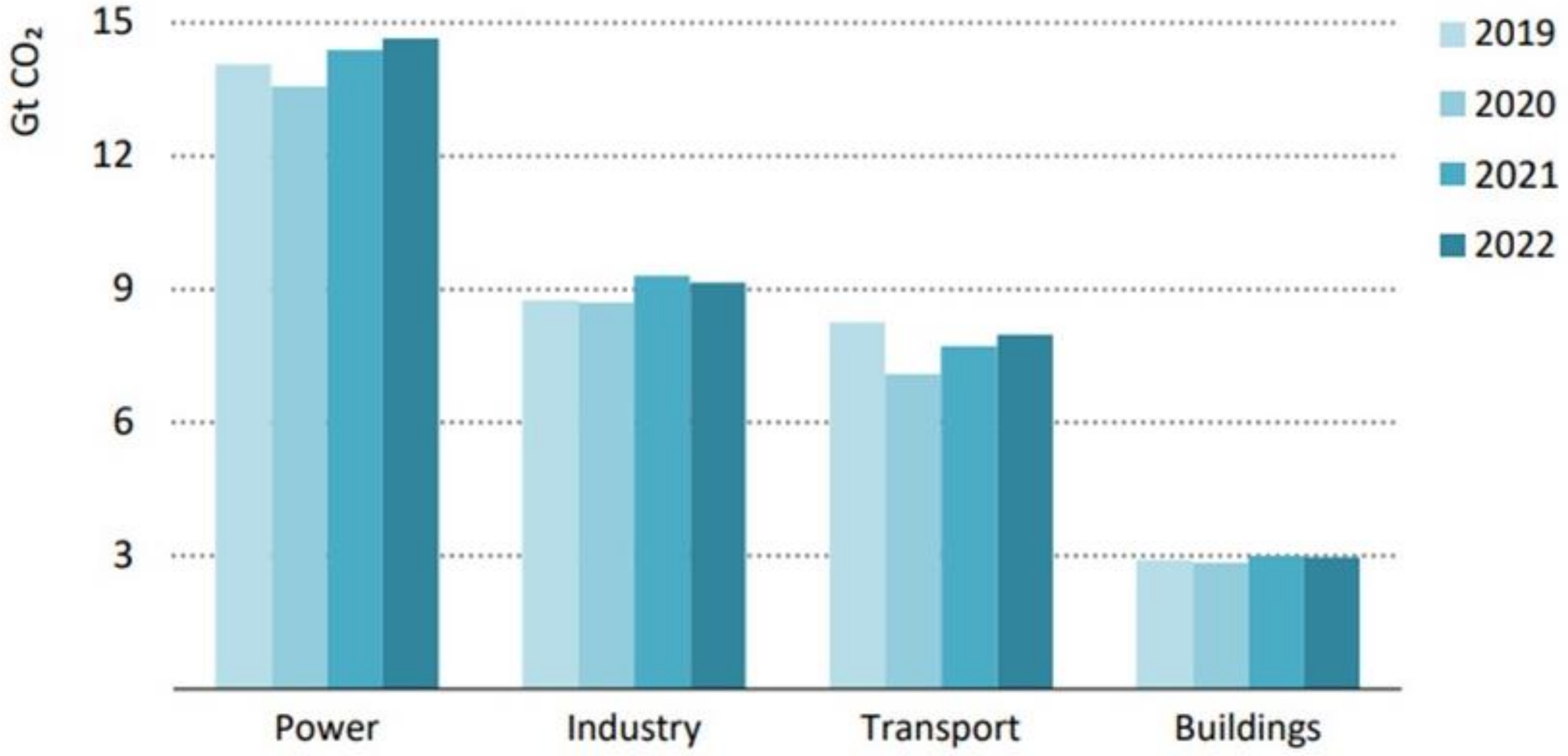
Setembro / 2023

Nossos Negócios e Business Units

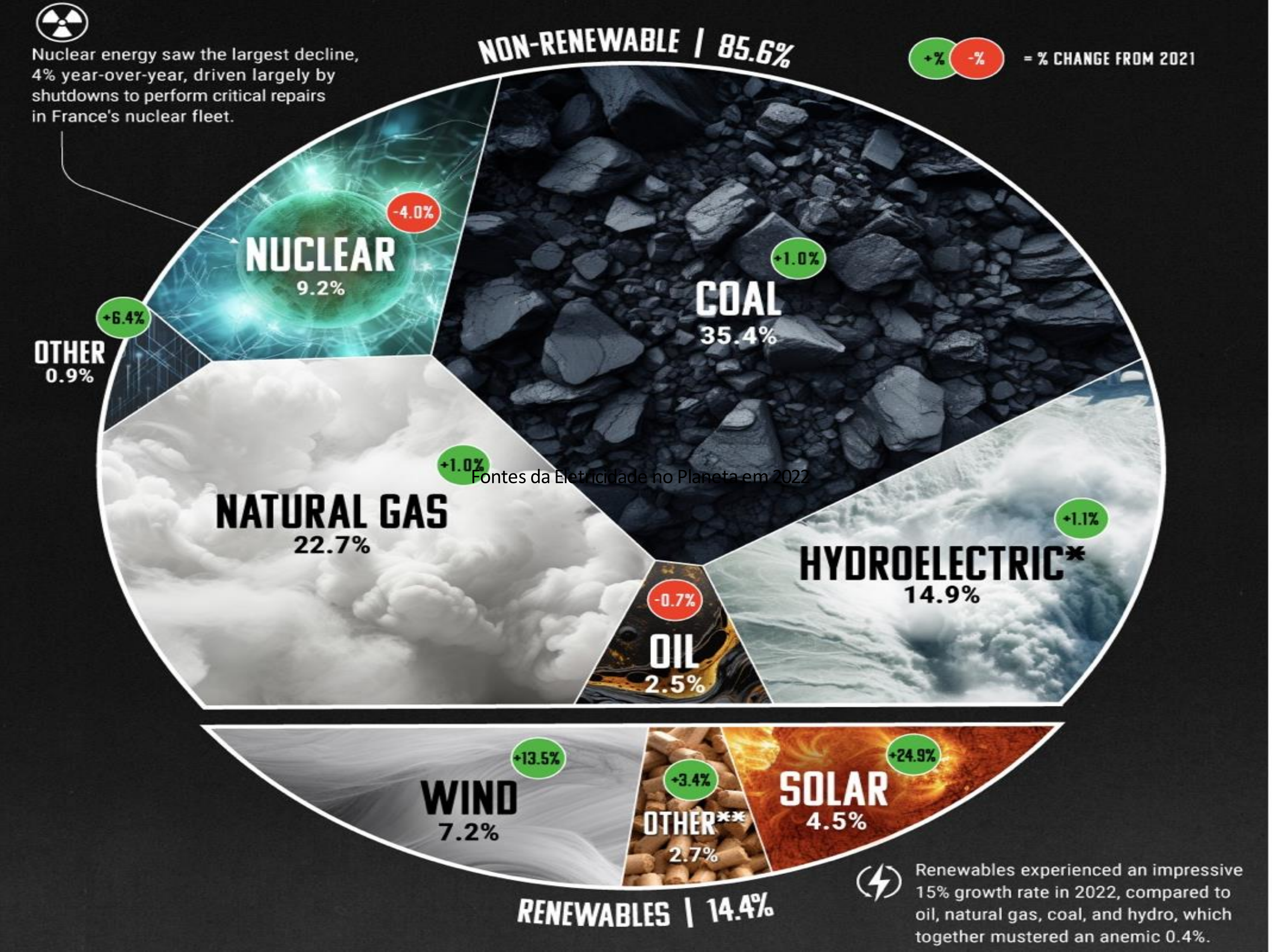
DE PONTA A PONTA - SOLUÇÃO GLOBAL EM ELETRIFICAÇÃO E AUTOMAÇÃO PARA INDUSTRIAS E SISTEMAS



Global CO_2 emissions by sector, 2019-2022

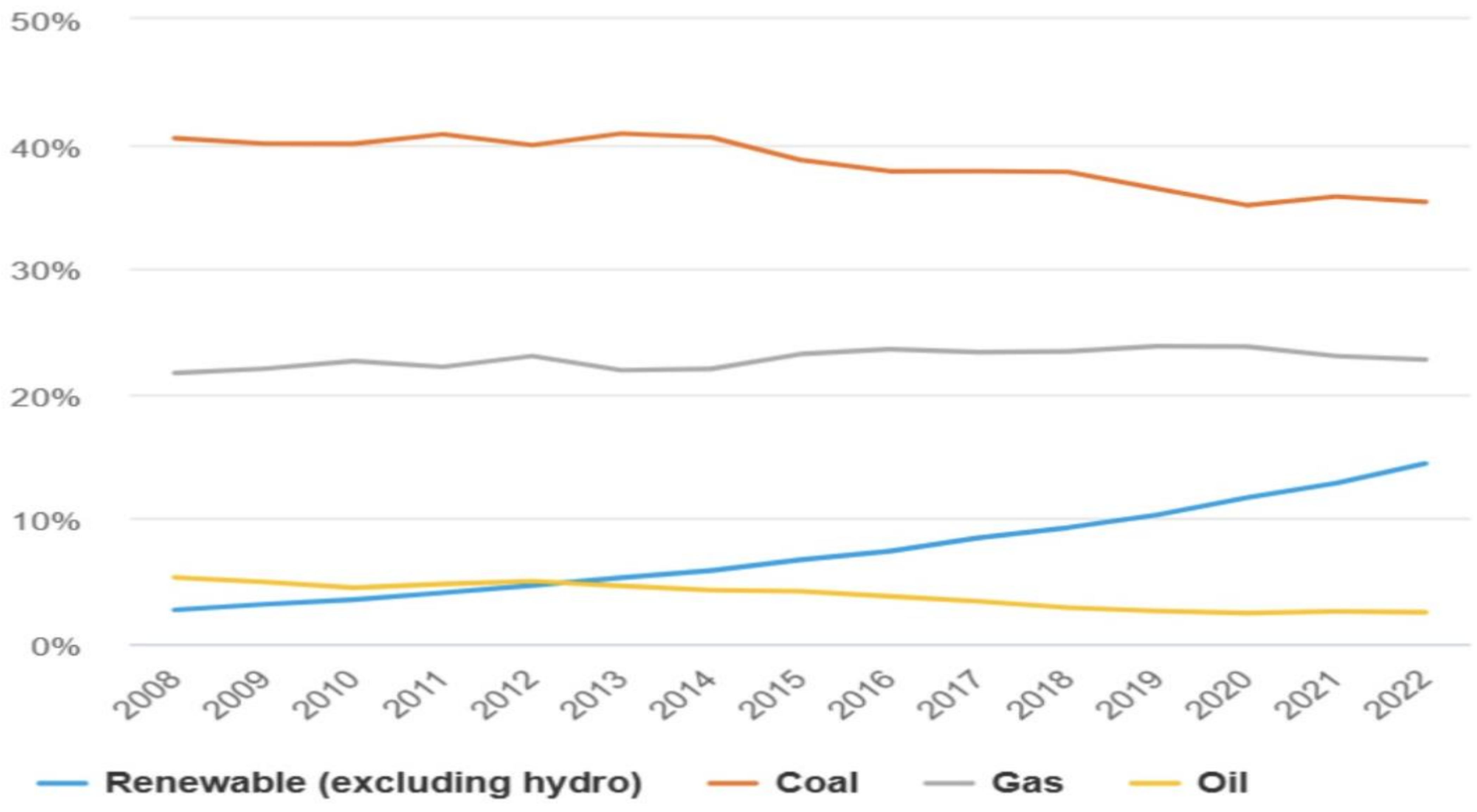


Note: Transport includes international bunkers.



Fontes da Eletricidade no Planeta em 2022

Power by Fuel : Terra Electricity 2022



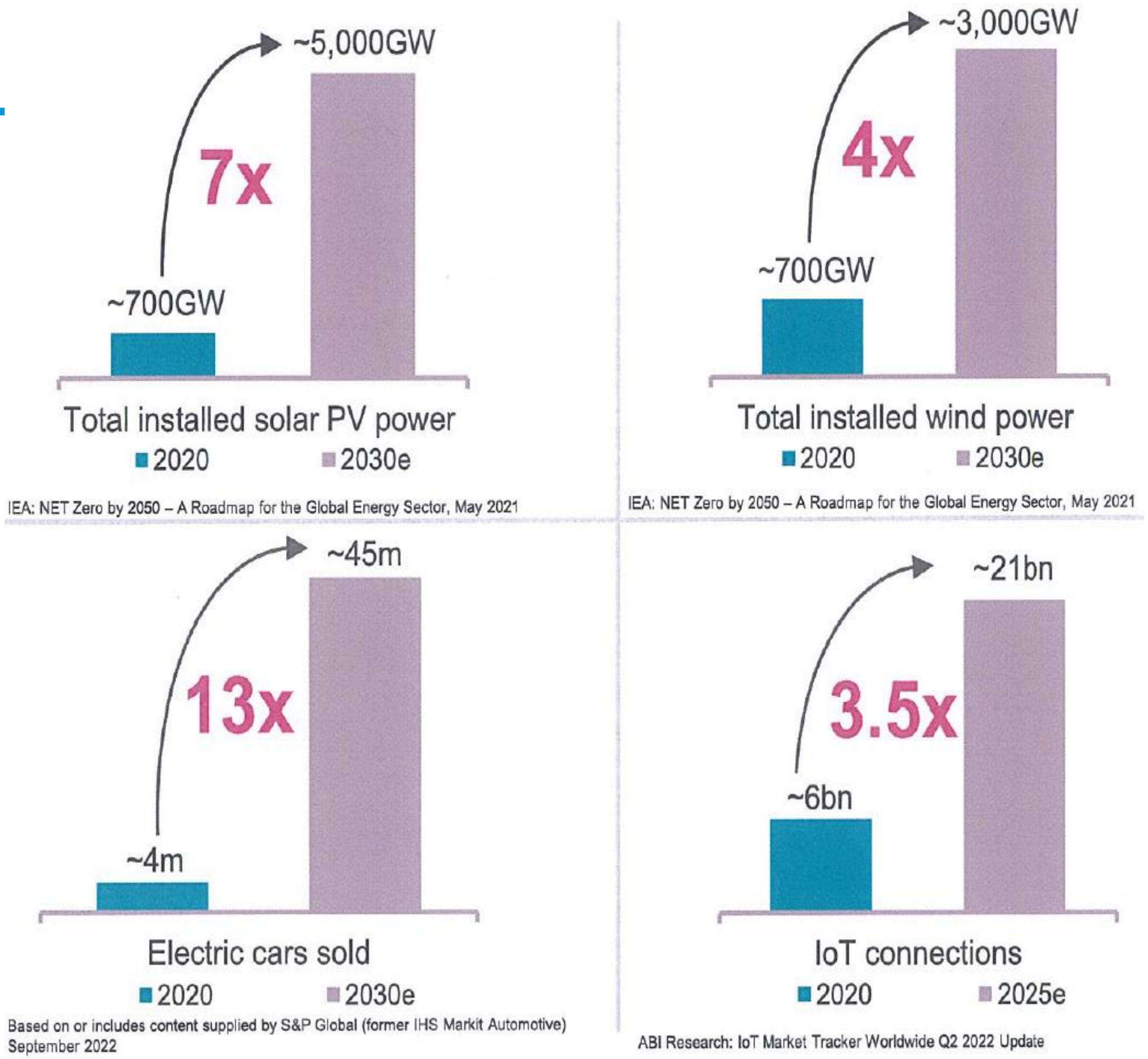
Source: Energy Institute

29.165,20 TWh

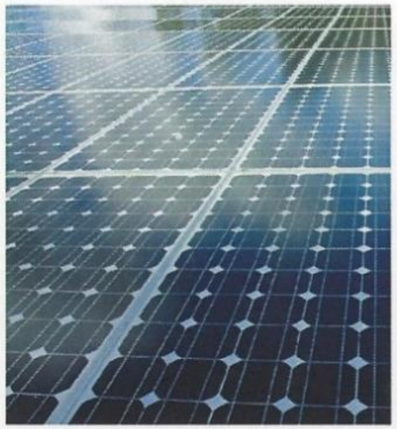
Desafios desse planeta:

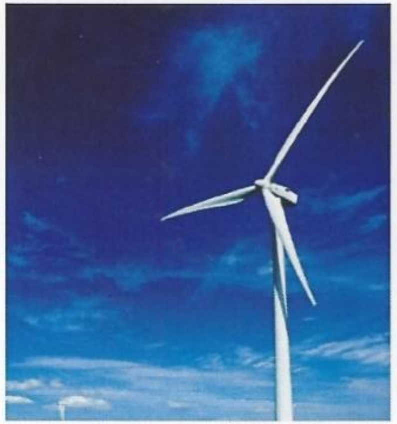
- **~50%** aumento do consumo de energia até 2050
- **2,5m** (até) elevação do nível do mar, ameaçando >600 cidades até 2100
- **3x** crescimento global da demanda de energia elétrica até 2050
- **+90%** das reduções de emissões no NZE derivam das tecnologias de baixo carbono
- **-100%** eliminação do uso de carvão na produção global de energia até 2050
- **+95%** participação de renováveis na geração de energia em 2050
- **Net Zero** setor de energia até 2050

Forte crescimento:



Convergência de MEGA Trends Disruptivas





Renováveis


OFF-GRID OPERATION
100kW/215kWh
FERNANDO DE NORONHA – PE, BR

CRITICAL MISSION MICROGRID – ROCKET LAUNCHBASE

1MW/1MWh
ALCÂNTARA - MA


Tecnologia Brasileira a Serviço da Sustentabilidade
ELETRA
Torino
DualBus
Elétrico Puro / Elétrico Híbrido


EMBRAER
WEG
PR-ZXW


E-DELIVERY
PROT 001


Defesa
Aérea & Naval
Foto: Guilherme Wiltgen
www.defesaaereanaval.com.br

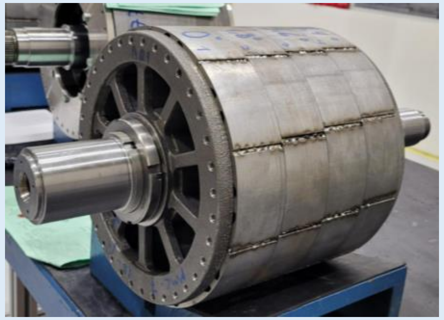

tv Brasil

Charging stations

Batteries

Inverters

Motors



ACELERAMOS A MOBILIDADE ELÉTRICA COM SOLUÇÕES COMPLETAS

- Linha automotiva de powertrain - motores e inversores
- Comandos eletrônicos auxiliares
- Packs de Baterias de Lítio
- Estações de recarga
- Todos produtos desenvolvidos e produzidos no Brasil

Soluções para todos os segmentos de ônibus urbanos e rodoviários. Desde micros até biarticulados

WEG BESS Product Portfolio

From residential to multimegawatt solutions: ONE STOP SHOP FOR BESS

BIW610

30kW - 300kW
Ideal for C&I

BIW750

300kW - xxMW
Use in shelter or weather

BLOCK BIW750 IEC

2,4 - 3,6MW
Liquid cooling

SKID BESS BIW750

BLOCK BIW 2,4 - 3,6MW with Transformer and Integrated MV Cubicles

LITHIUM BATTERIES

48kWh - 372kWh
per Sheltered Rack

372kWh
At the time liquid cooling

Up to 3MWh per container

INTEGRATED SOLUTIONS

C&I
From: 30kW/48kWh
To: 300kW/300kWh
Standardized

Utility and Engineers
From: 300kW/300kWh
To: MultimegaWatt

BESS Mobile
From:35kW/48kWh
To: 2MW/2MWh

WEG
ELETRIC
MOBILITY

WEMOB®


WEMOB


WEG
VEM DF
ABDI
GDF
Veículo Elétrico Compartilhado
PTI

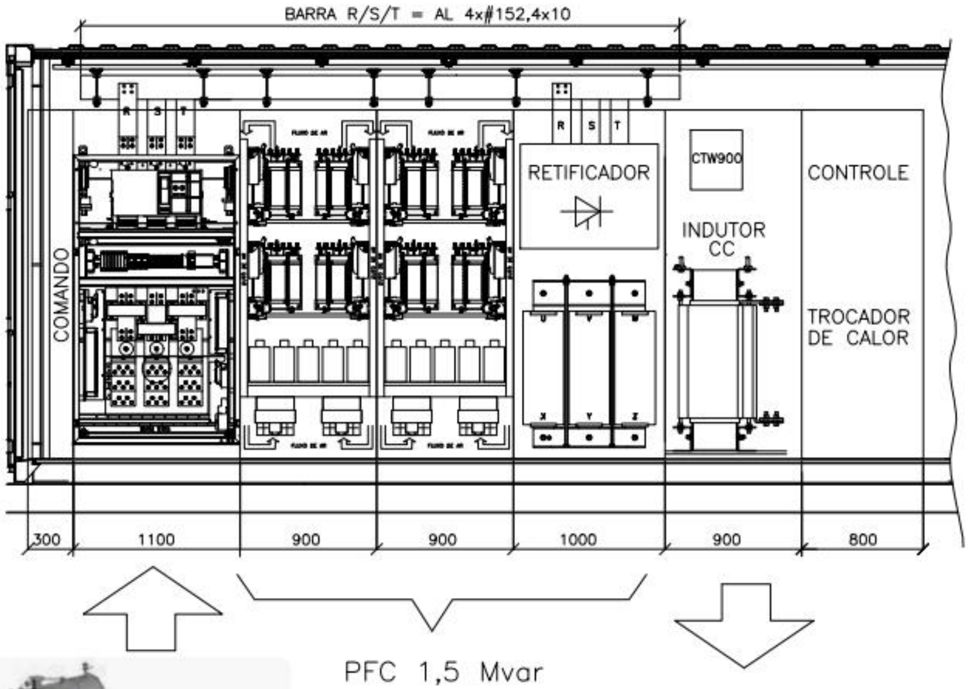

WEG
WEMOB
1441 E
RNunes
100% elétrica

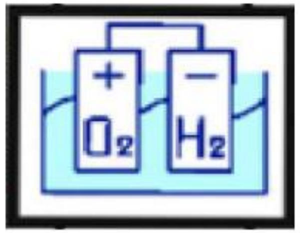

WEMOB
500

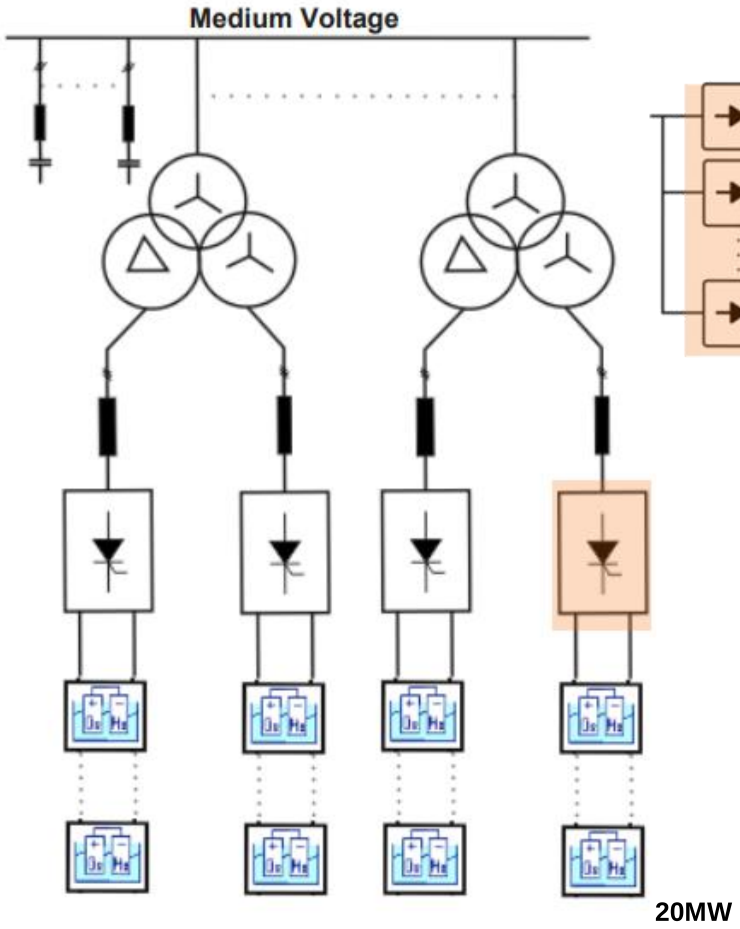

RECTIFYING SYSTEM FOR HYDROGEN POWER PLANT
WEG
Hidrogênio Verde
Desenvolvimento de Roadmap e Projeto Piloto de H2 no Complexo Termelétrico do Pecém
Hytron PS
Hidrogênio Verde
1.5MW
PECEM COMPLEX, CE - BRAZIL

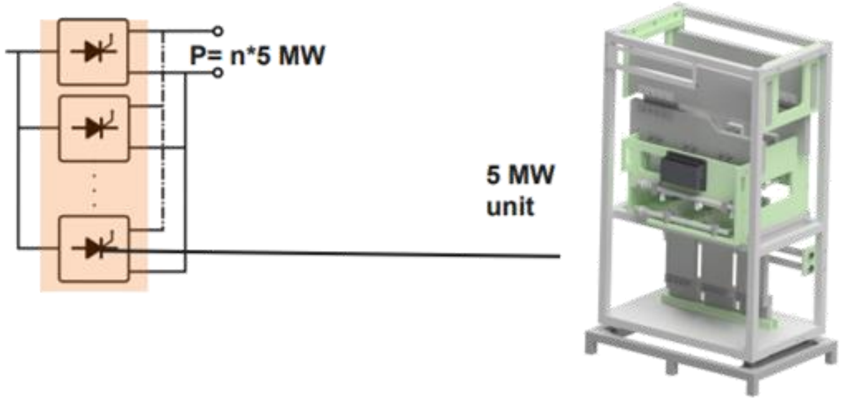

HytronPS
Hidrogênio Verde

1 CONTAINER = MegaRETIFICADOR DE 20MW

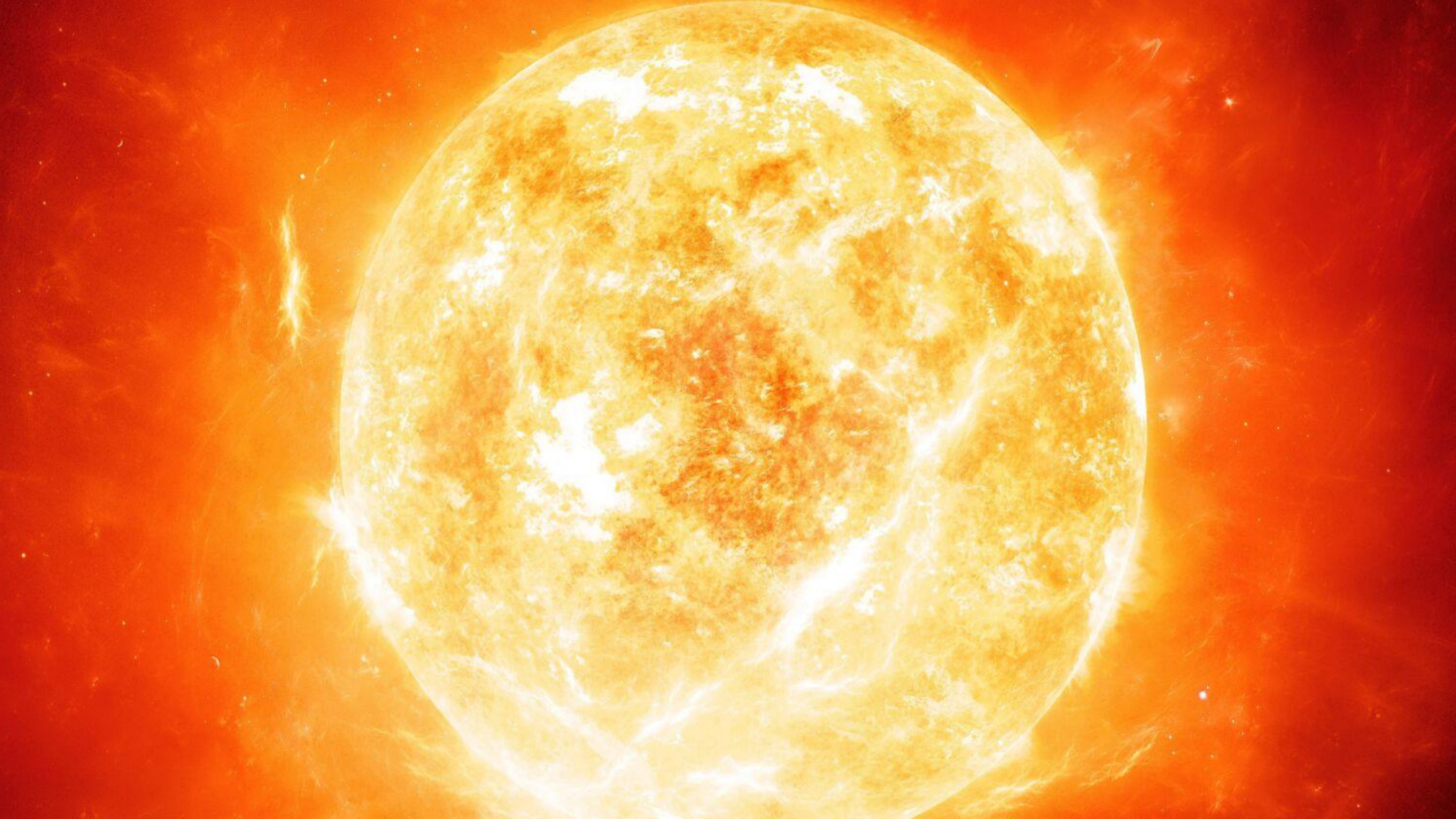








✓ Até 20MW em 1 Container

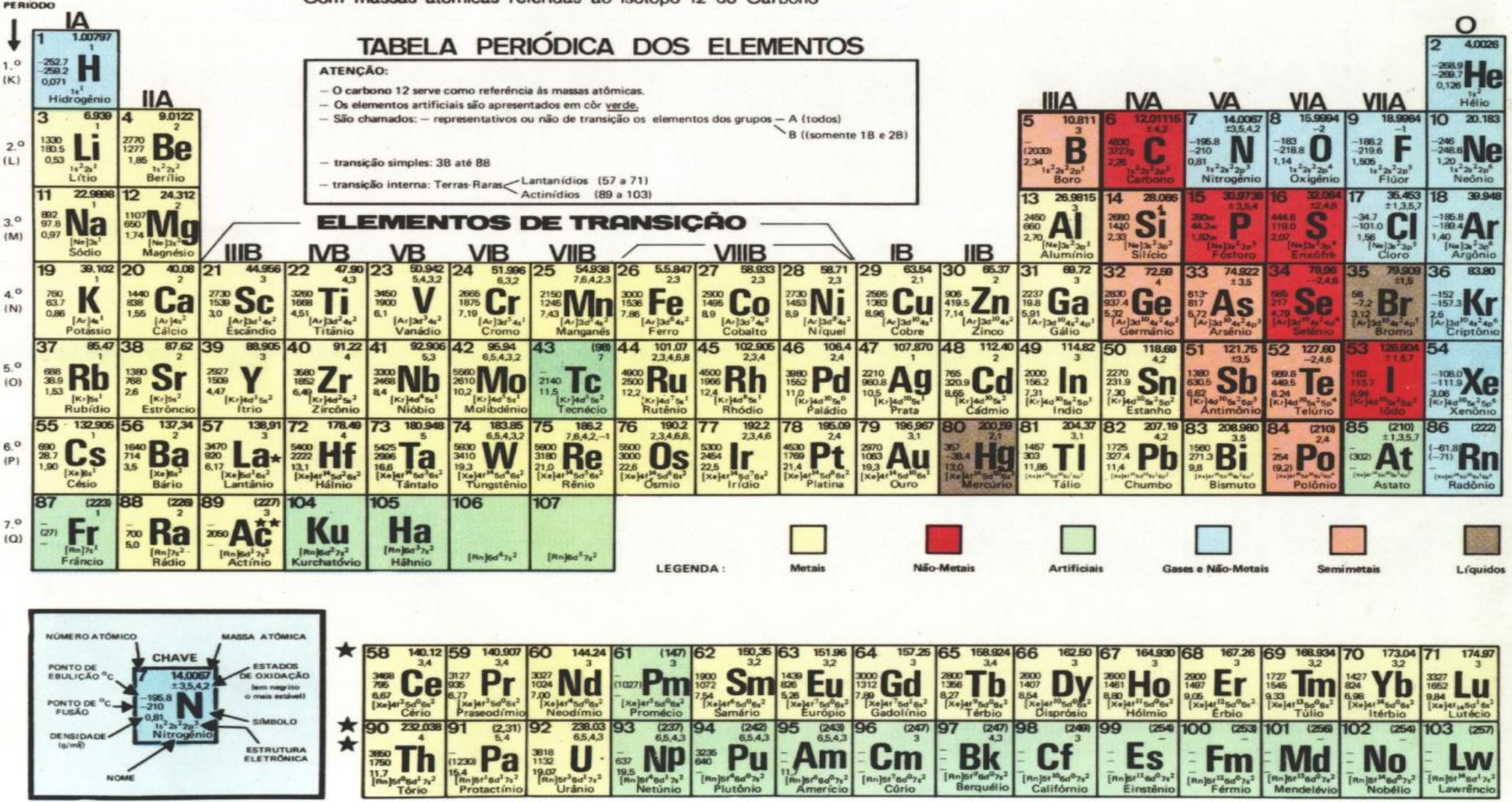


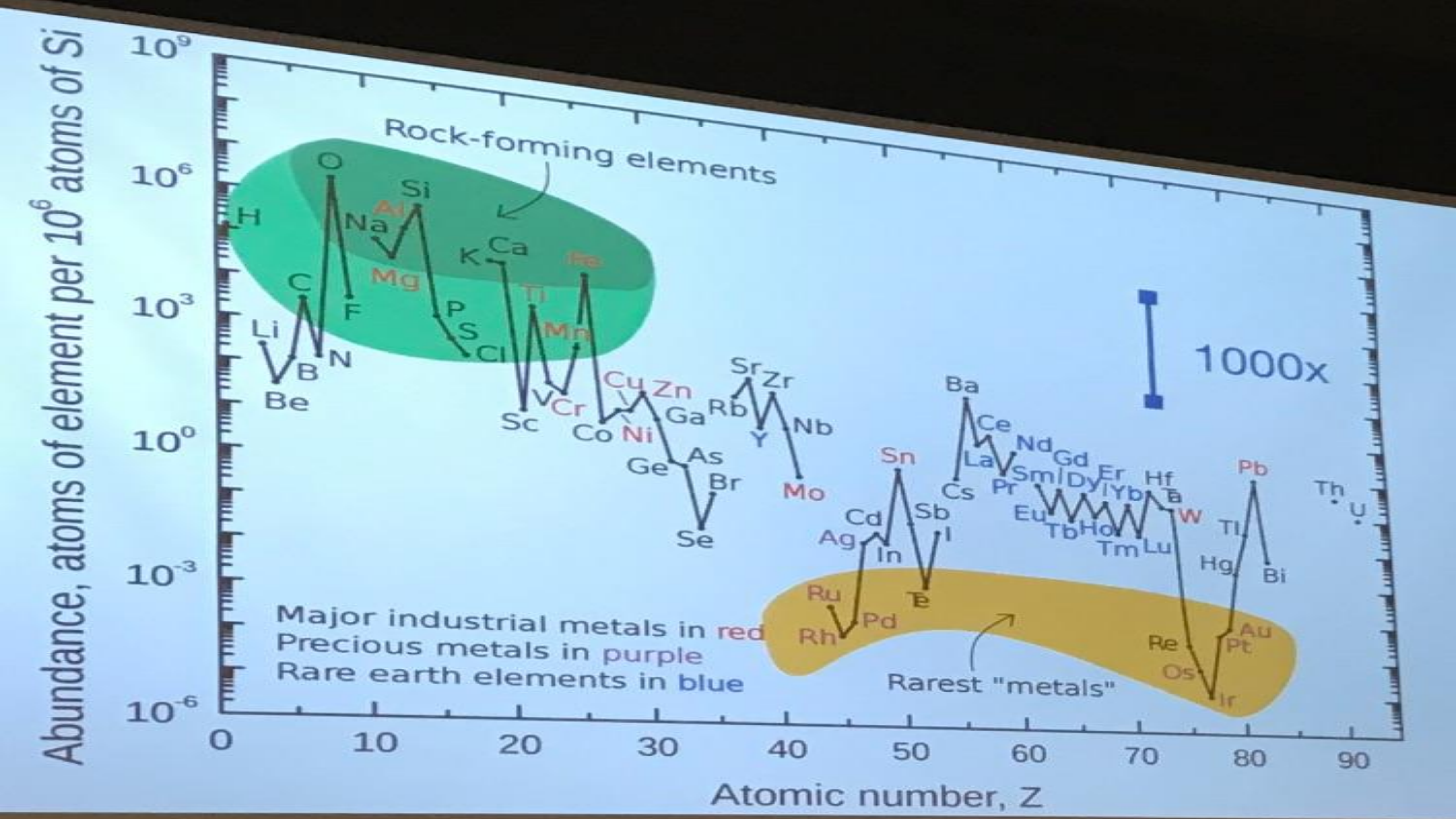
Thank You !
Muito Obrigado!

Valter Luiz Knihs
Diretor de Sistemas Industriais & eMobility
Fone: 55 47 3276-5222
- vknihs@weg.net

CLASSIFICAÇÃO PERIÓDICA DOS ELEMENTOS.

Com massas atômicas referidas ao isótopo 12 do Carbono





Abundance, atoms of element per 10^6 atoms of Si
Atomic number, Z
Rock-forming elements
1000x
Major industrial metals in red
Precious metals in purple
Rare earth elements in blue
Rarest "metals"
H
Li
Be
B
C
N
O
F
Na
Mg
Al
Si
P
S
Cl
K
Ca
Sc
Ti
V
Cr
Mn
Fe
Co
Ni
Cu
Zn
Ga
Ge
As
Se
Br
Rb
Sr
Y
Zr
Nb
Mo
Ru
Rh
Pd
Ag
Cd
In
Sn
Sb
Te
I
Cs
Ba
La
Ce
Pr
Nd
Sm
Eu
Gd
Tb
Dy
Ho
Er
Tm
Yb
Lu
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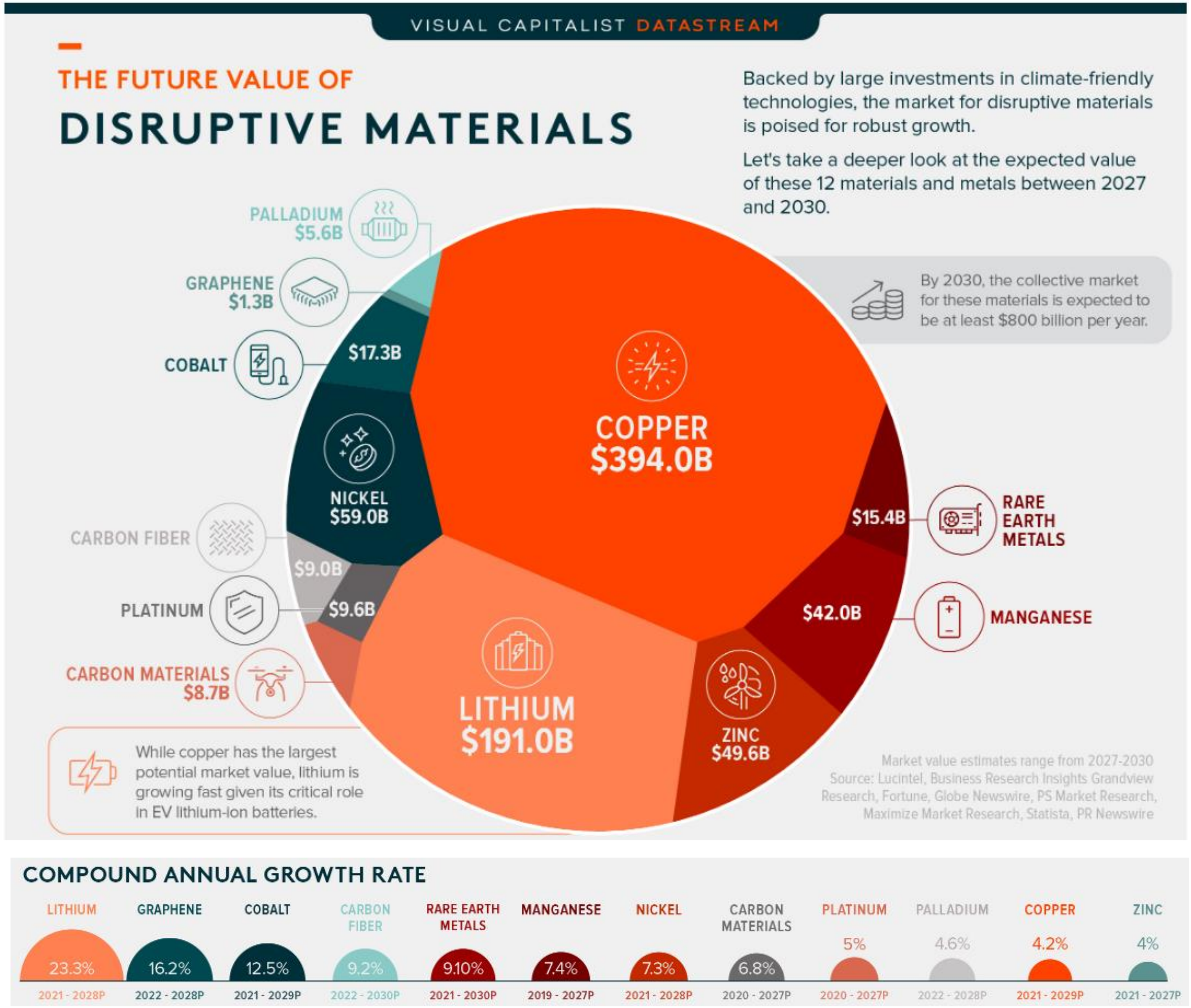
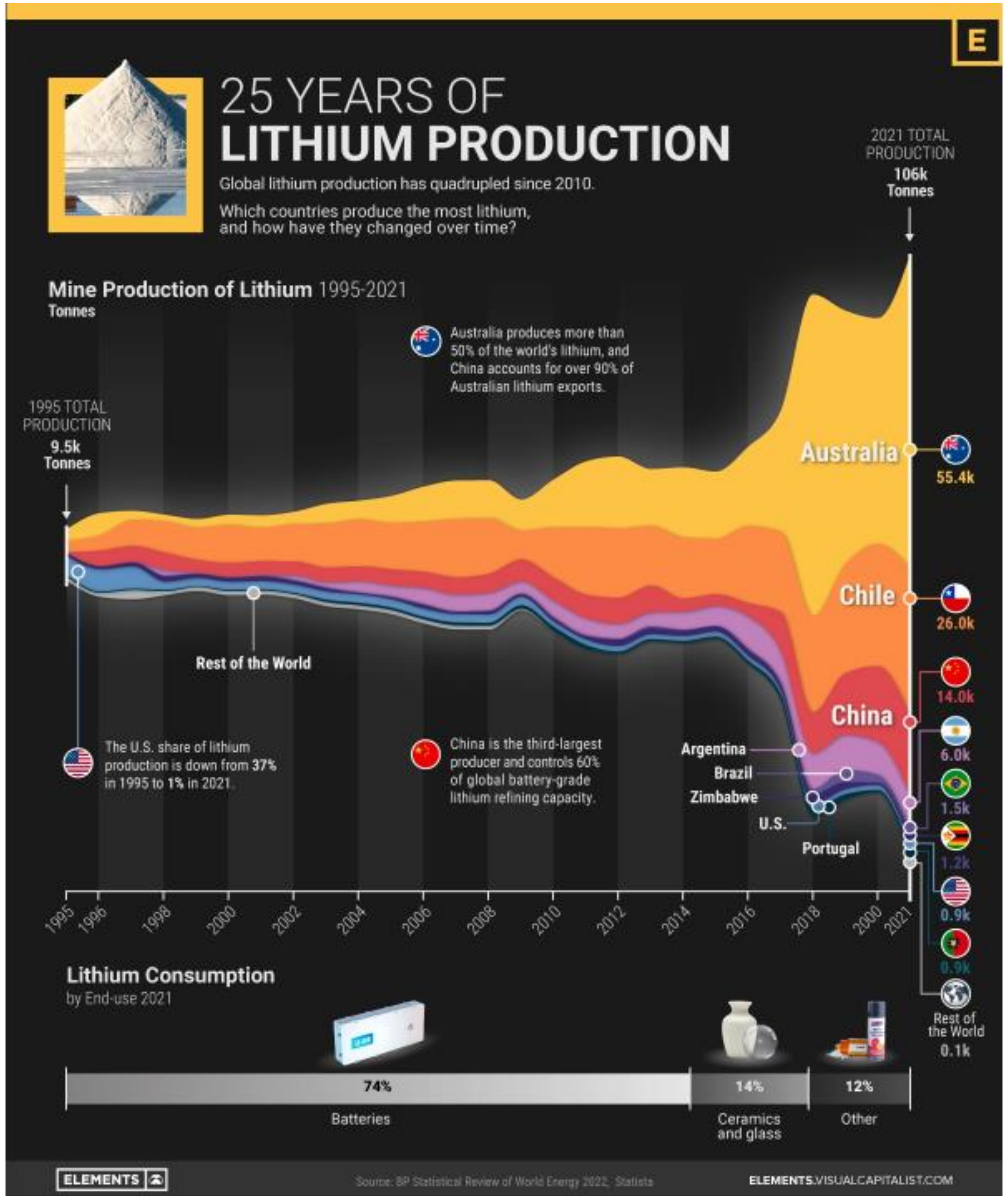

VISUAL CAPITALIST DATASTREAM
THE FUTURE VALUE OF
DISRUPTIVE MATERIALS
Backed by large investments in climate-friendly technologies, the market for disruptive materials is poised for robust growth.
Let's take a deeper look at the expected value of these 12 materials and metals between 2027 and 2030.
By 2030, the collective market for these materials is expected to be at least $800 billion per year.
PALLADIUM $5.6B
GRAPHENE $1.3B
COBALT
$17.3B
NICKEL $59.0B
CARBON FIBER
$9.0B
PLATINUM
$9.6B
CARBON MATERIALS $8.7B
COPPER $394.0B
LITHIUM $191.0B
ZINC $49.6B
$42.0B
MANGANESE
$15.4B
RARE EARTH METALS
While copper has the largest potential market value, lithium is growing fast given its critical role in EV lithium-ion batteries.
Market value estimates range from 2027-2030
Source: Lucintel, Business Research Insights Grandview Research, Fortune, Globe Newswire, PS Market Research, Maximize Market Research, Statista, PR Newswire
COMPOUND ANNUAL GROWTH RATE
LITHIUM 23.3% 2021 - 2028P
GRAPHENE 16.2% 2022 - 2028P
COBALT 12.5% 2021 - 2029P
CARBON FIBER 9.2% 2022 - 2030P
RARE EARTH METALS 9.10% 2021 - 2030P
MANGANESE 7.4% 2019 - 2027P
NICKEL 7.3% 2021 - 2028P
CARBON MATERIALS 6.8% 2020 - 2027P
PLATINUM 5% 2020 - 2027P
PALLADIUM 4.6% 2022 - 2028P
COPPER 4.2% 2021 - 2029P
ZINC 4% 2021 - 2027P

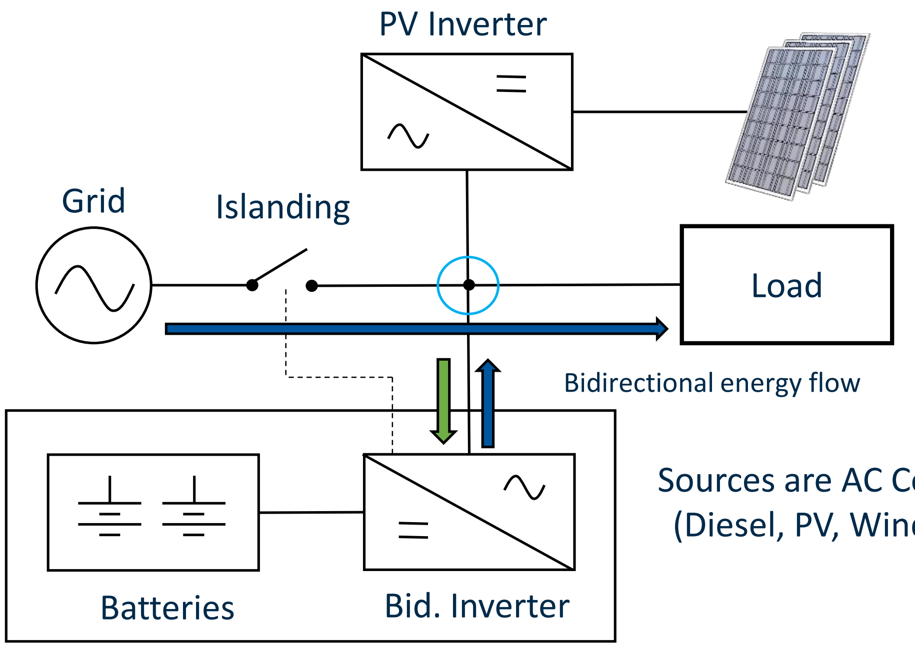

25 YEARS OF
LITHIUM PRODUCTION
Global lithium production has quadrupled since 2010.
Which countries produce the most lithium, and how have they changed over time?
2021 TOTAL PRODUCTION
106k Tonnes
Mine Production of Lithium 1995-2021
Tonnes
1995 TOTAL PRODUCTION
9.5k Tonnes
Australia produces more than 50% of the world's lithium, and China accounts for over 90% of Australian lithium exports.
Australia 55.4k
Chile 26.0k
China 14.0k
Argentina 6.0k
Brazil 1.5k
Zimbabwe 1.2k
U.S. 0.9k
Portugal 0.9k
Rest of the World 0.1k
The U.S. share of lithium production is down from 37% in 1995 to 1% in 2021.
China is the third-largest producer and controls 60% of global battery-grade lithium refining capacity.
1995 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018 2020 2021
Lithium Consumption
by End-use 2021
74% Batteries
14% Ceramics and glass
12% Other
ELEMENTS
Source: BP Statistical Review of World Energy 2022, Statista
ELEMENTS.VISUALCAPITALIST.COM

A jóia verde escondida: BRASIL

The country has an abundance of renewable energy sources, including hydro, biomass, wind, and solar. Wind and solar will likely become the main sources of electricity Generation in the country, potentially reaching 47% of total installed capacity by 2040, with na additional potential market of USD 5 billion and USD 11 billion in 2023 and 2040, respectively. Brazil's competitiveness in renewable energy can also give it an advantage in the production of green hydrogen (GH2), since the cost of renewable is 70% of the production cost of GH2. Brazil can become one of the major global GH2 producers because of the low cost derived from its natural resources and its clean and integrated power grid, which reduces the need for capital investment (capex).

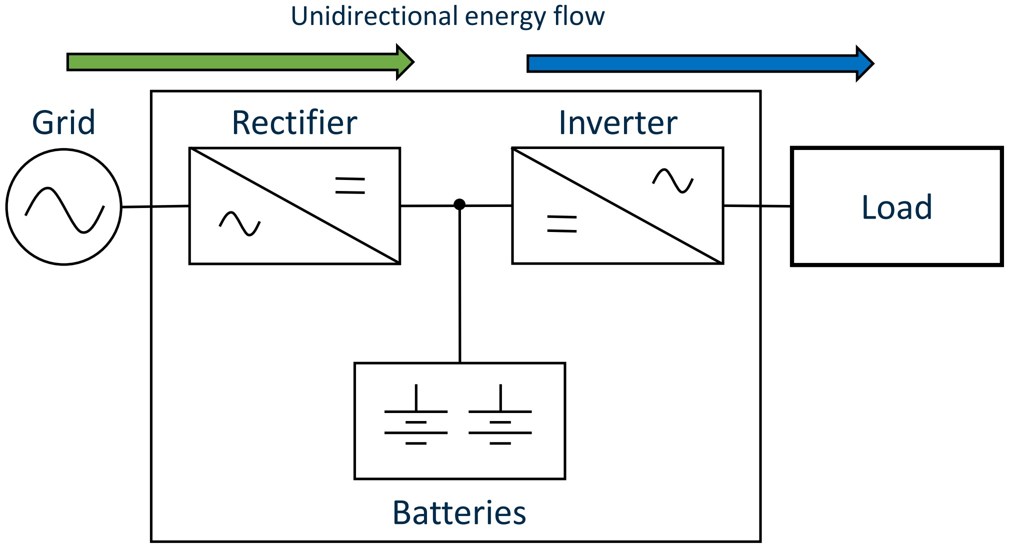
TOPOLOGIES

BESS



Sources are AC Coupled (Diesel, PV, Wind, H2)

UPS (Double Conversion)



NO TRANSFER TIME