
Ano Internacional das Ciências Básicas para o Desenvolvimento Sustentável
Adelino Galvão
CQE
Química Estrutural
TÉCNICO LISBOA
unesco
IYBSSD2022
Sociedade Portuguesa de Química

1


Escola Industrial e Comercial de Tomar
Escola Secundária de Jácome Ratton

2

IYBSSD-2022

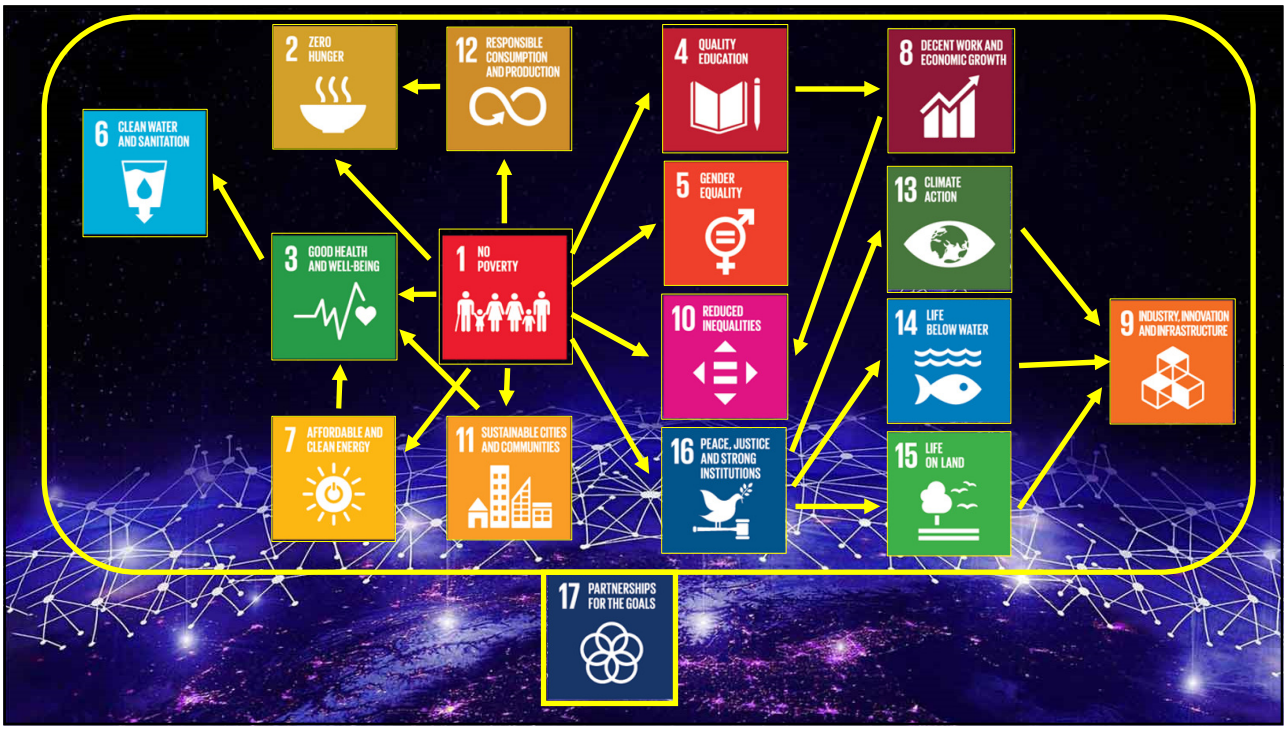
United Nations Educational, Scientific and Cultural Organization

IYBSSD2022 International Year Basic Sciences for Sustainable Development

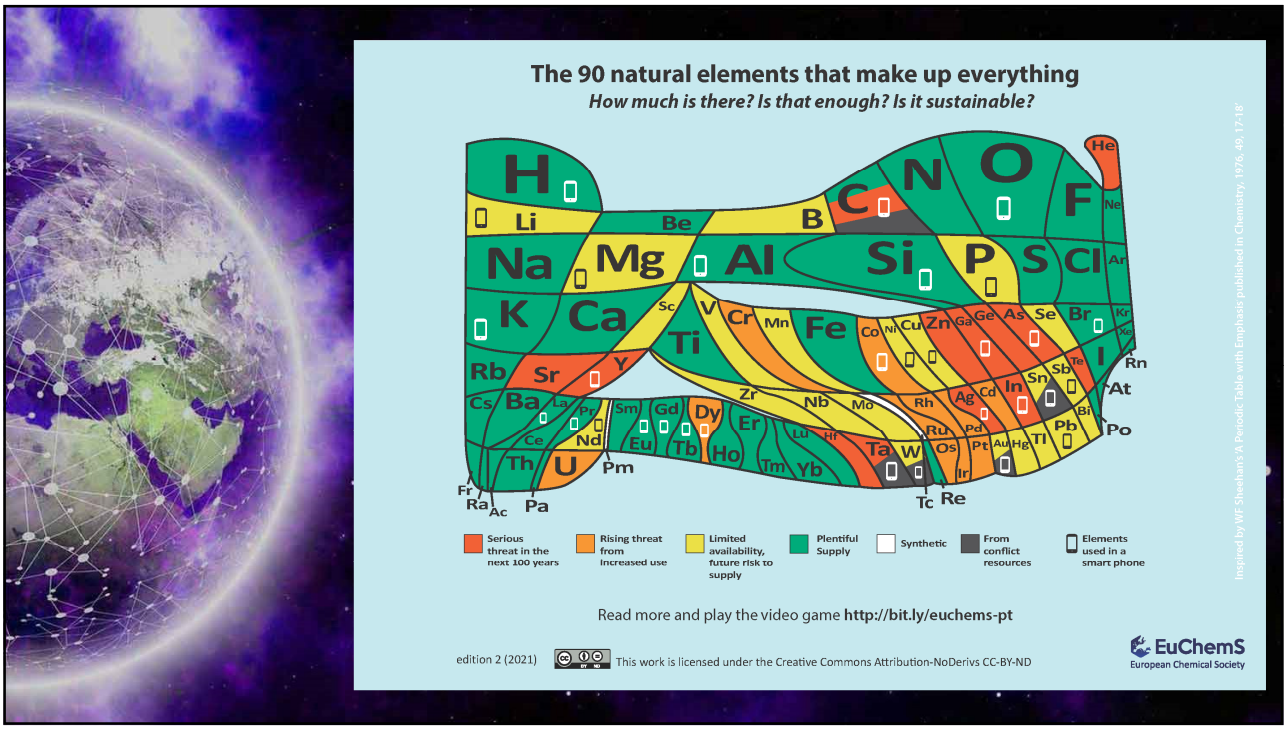
- A 2 de dezembro de 2021 a Assembleia Geral das Nações Unidas declarou o ano de 2022 como sendo o Ano Internacional das Ciências Básicas para o Desenvolvimento Sustentável (AICBDS).
- As celebrações decorrerão entre 8 de julho de 2022 e 30 de junho de 2023.
- Em setembro de 2015 a Assembleia Geral das Nações Unidas aprovou a AGENDA_2030 e os 17 princípios do Desenvolvimento Sustentável.

3

4


1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS

5


The 90 natural elements that make up everything
How much is there? Is that enough? Is it sustainable?
Serious threat in the next 100 years
Rising threat from increased use
Limited availability, future risk to supply
Plentiful Supply
Synthetic
From conflict resources
Elements used in a smart phone
Read more and play the video game http://bit.ly/euchems-pt
edition 2 (2021)
This work is licensed under the Creative Commons Attribution-NoDerivs CC-BY-ND
EuChemS
European Chemical Society
Inspired by WF Sheehan's A Periodic Table with Emphasis published in Chemistry, 1976, 49, 17-18

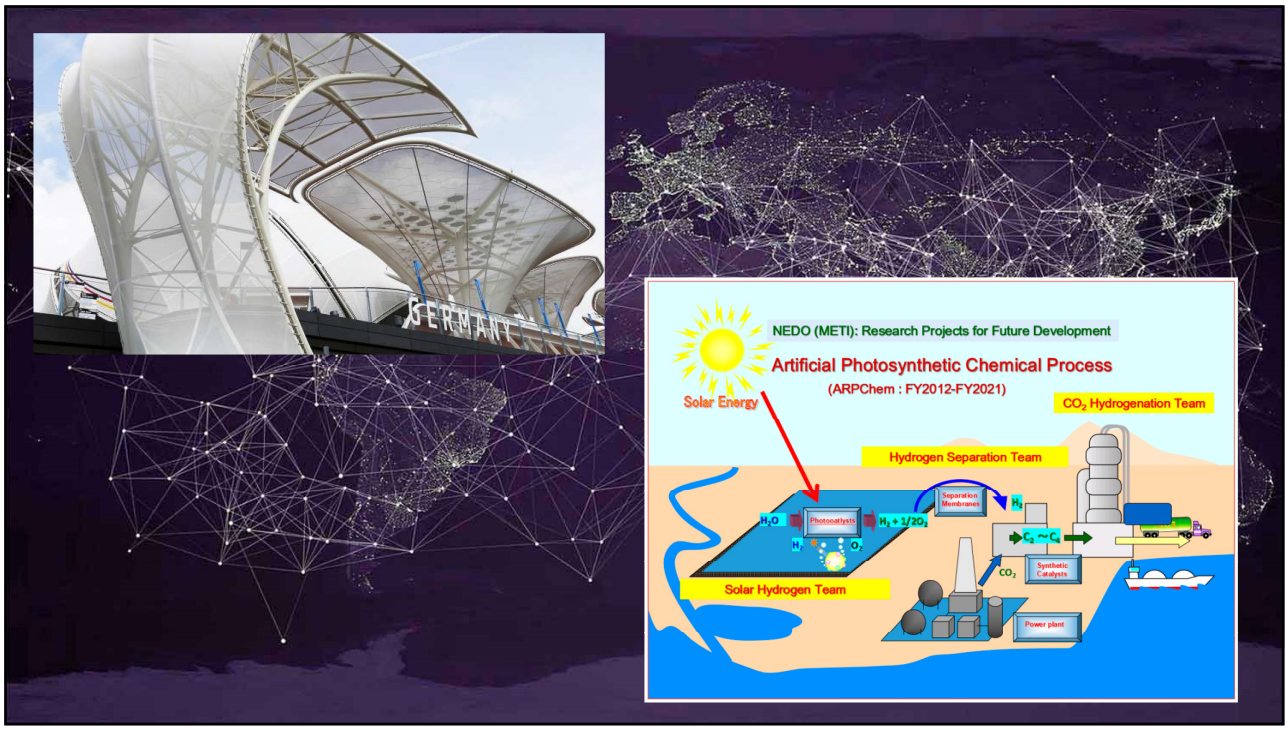
6


3 GOOD HEALTH AND WELL-BEING
Desafios na Saúde
10 REDUCED INEQUALITIES
EBOLA
VACCINE
COVID-19
Portugal Mundo Noticiários Desporto Futuro Programas Mais Vistas
Ouvir em Direto
RADIOLOGIA
"Podemos ter de parar as ressonâncias magnéticas." Preço do hélio aumentou 500%
O alerta tem vindo a crescer nos últimos anos, à medida que o mundo vai percebendo que o hélio é mesmo um gás finito, não renovável e por isso mesmo cada vez mais caro. Pode ser usado na indústria militar, aeroespacial, mas a principal utilização civil é nos equipamentos de ressonância magnética, exames essenciais à prática da medicina.

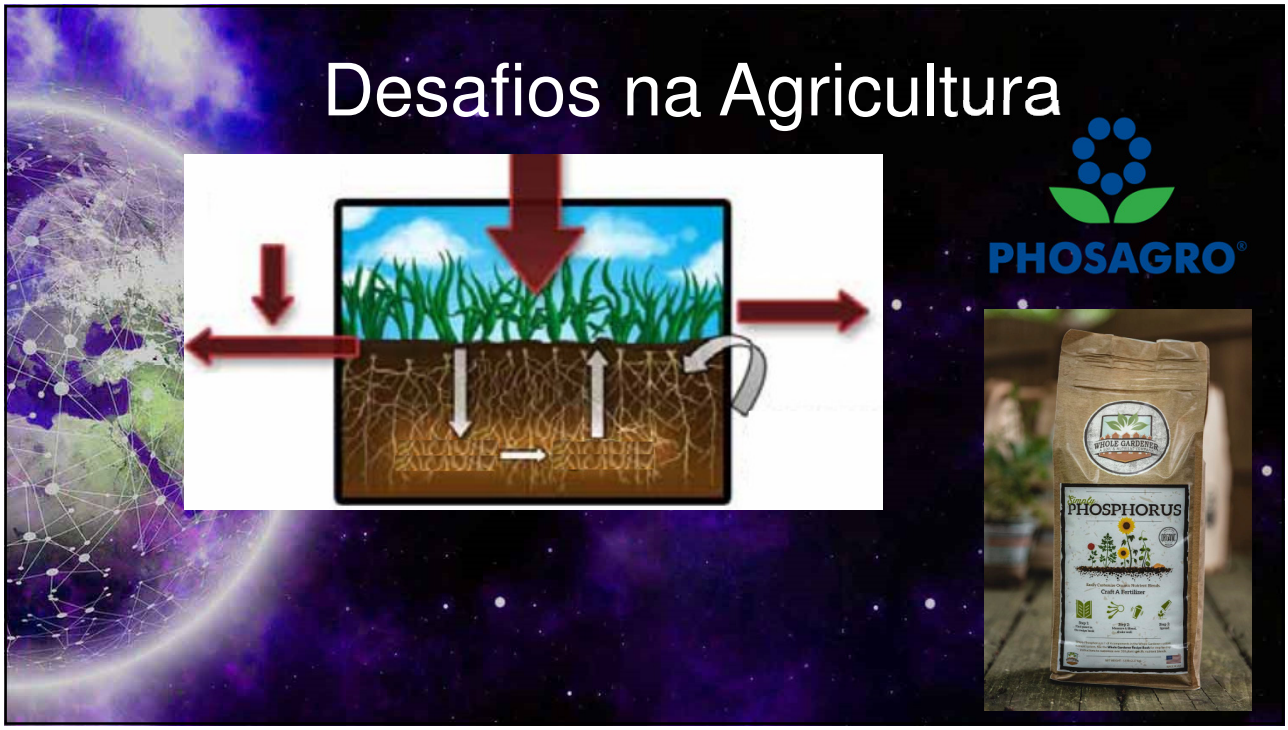
7


9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
11 SUSTAINABLE CITIES AND COMMUNITIES
13 CLIMATE ACTION
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
What could the production and use of solar fuels look like?
Sunlight is used to split water into hydrogen and oxygen
Sunlight is used to produce carbon-based fuels from water and carbon dioxide. A source of carbon dioxide could be a coal-burning power station fitted with carbon capture technology
Hydrogen is used as a transport fuel
Hydrogen and simple carbon-based fuels are used as raw materials (feedstocks) by many industries
New technologies
Existing technologies
Solar fuels
Hydrogen (H_2)
Carbon-based fuels such as methane (CH_4), carbon monoxide (CO) and methanol (CH_3OH)
• Fertilizer
• Plastics
• Pharmaceuticals
• Synthetic fuels for transport
© Royal Society of Chemistry
Desafios Energéticos
7 AFFORDABLE AND CLEAN ENERGY

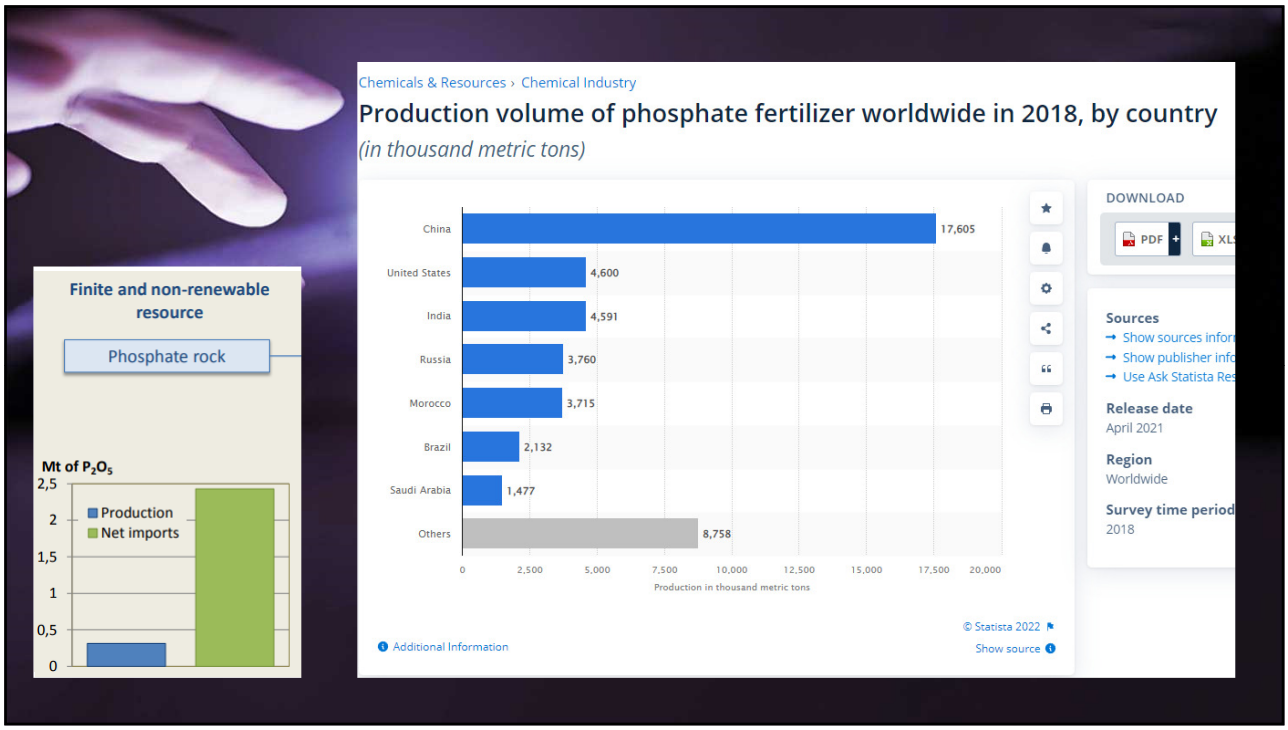
8


NEDO (METI): Research Projects for Future Development
Artificial Photosynthetic Chemical Process
(ARPChem : FY2012-FY2021)
Solar Energy
CO_2 Hydrogenation Team
Hydrogen Separation Team
Solar Hydrogen Team
Photocatalysts
Separation Membranes
Synthetic Catalysts
Power plant

9


Desafios na Agricultura
PHOSAGRO
PHOSPHORUS

10



11

Química Verde

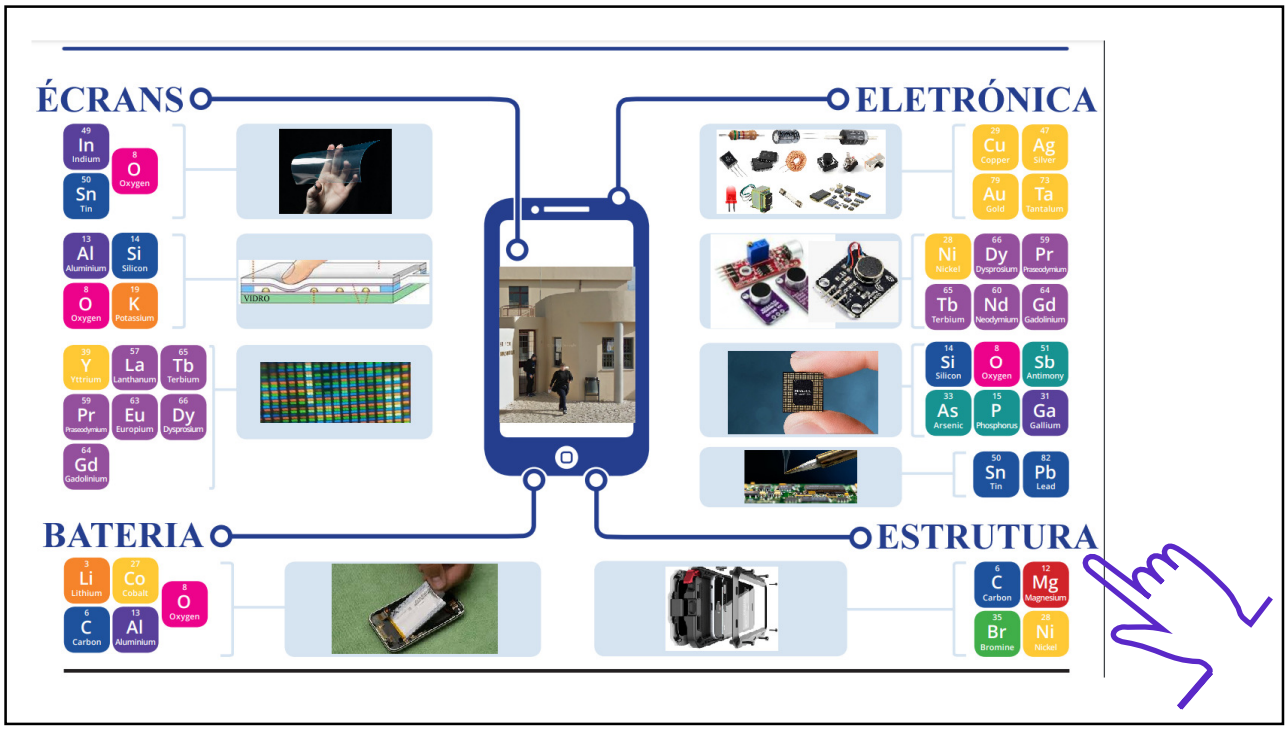
The Sandestin GE Principles

1. Engineer processes and products holistically, use systems analysis, and integrate environmental impact assessment tools.
2. Conserve and improve natural ecosystems while protecting human health and well-being
3. Use life-cycle thinking in all engineering activities
4. Ensure that all material and energy inputs and outputs are as inherently safe and benign as possible
5. Minimize depletion of natural resources
6. Strive to prevent waste
7. Develop and apply engineering solutions, while being cognizant of local geography, aspirations, and cultures
8. Create engineering solutions beyond current or dominant technologies; improve, innovate and invent (technologies) to achieve sustainability
9. Actively engage communities and stakeholders in development of engineering solutions

Green Engineering: Defining the Principles, Engineering Conferences International, Sandestin, FL, USA, May 17-22, 2003.

department of chemical engineering

12

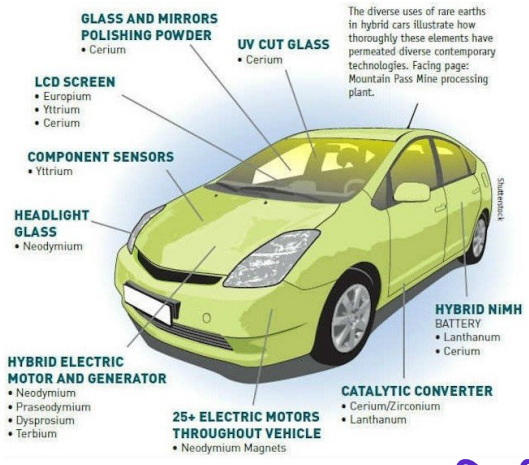

ÉCRANS
ELETRÓNICA
BATERIA
ESTRUTURA
In Indium
O Oxygen
Sn Tin
Al Aluminium
Si Silicon
O Oxygen
K Potassium
Y Yttrium
La Lanthanum
Tb Terbium
Pr Praseodymium
Eu Europium
Dy Dysprosium
Gd Gadolinium
Cu Copper
Ag Silver
Au Gold
Ta Tantalum
Ni Nickel
Dy Dysprosium
Pr Praseodymium
Tb Terbium
Nd Neodymium
Gd Gadolinium
Si Silicon
O Oxygen
Sb Antimony
As Arsenic
P Phosphorus
Ga Gallium
Sn Tin
Pb Lead
Li Lithium
Co Cobalt
O Oxygen
C Carbon
Al Aluminium
C Carbon
Mg Magnesium
Br Bromine
Ni Nickel

13


Minerais de Conflito

14

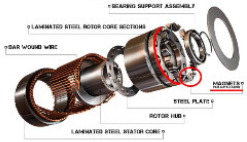
Ligas metálicas avançdas NdPr



The diverse uses of rare earths in hybrid cars illustrate how thoroughly these elements have permeated diverse contemporary technologies. Facing page: Mountain Pass Mine processing plant.

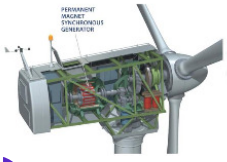
Permanent Magnets

1kg of NdPr



Wind Turbines

Up to 150kg of NdPr per MW



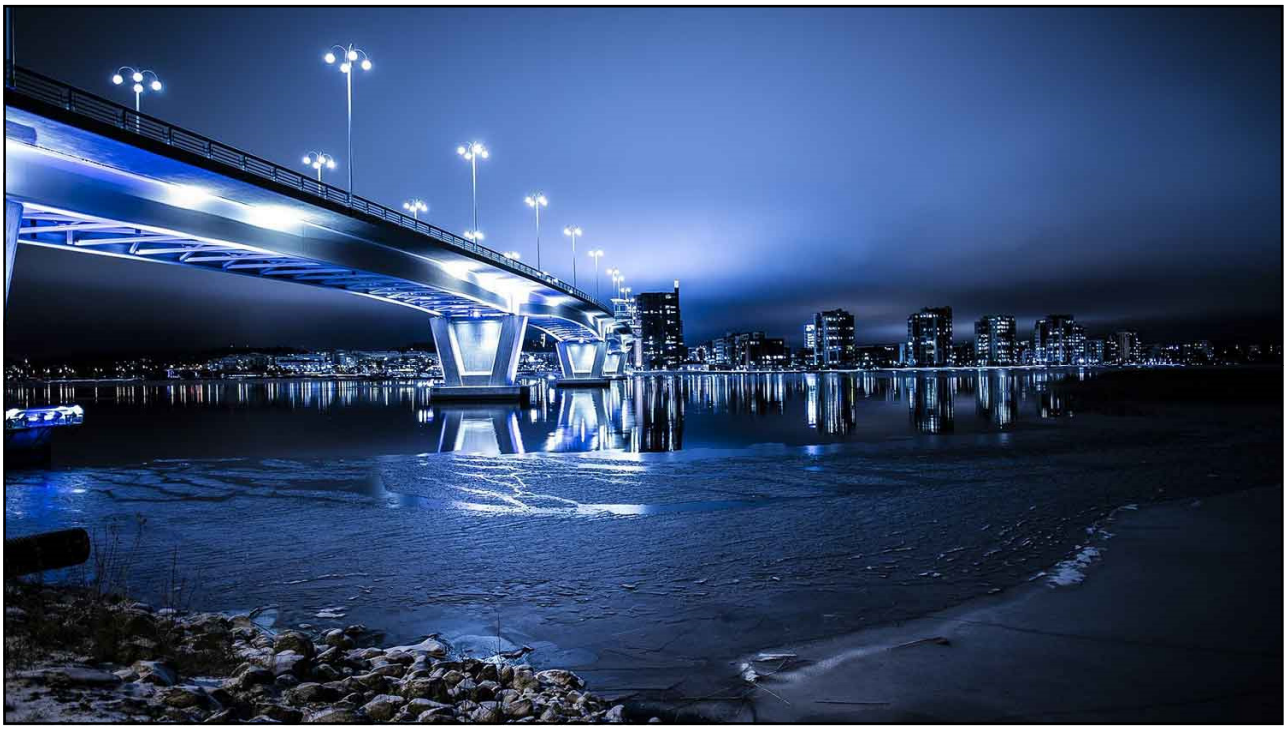
Electric Vehicles

41 million by 2040 each containing 1.7kg of NdPr

Electric Bicycles

30 million in 2017 each containing 0.1kg of NdPr

15



16


Obrigado
Bom ano letivo