

ENERGIAS RENOVÁVEIS

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Energias renováveis

Avaliação contínua

50% resolução (4 melhores de 5 problemas)

50% ensaio (entregar na 1ª data de exame)

Horário de atendimento

Segunda feira 11-12h

(marcação mcbrito@fc.ul.pt)

Próxima aula: energia solar | recurso

154 000 000 000 litros de água engarrafada por ano
transporte intercontinental de garrafas
2 700 000 toneladas de plástico para garrafas de água
= 1 500 000 barris petróleo
plástico biodegradável → 1000 anos se enterrado

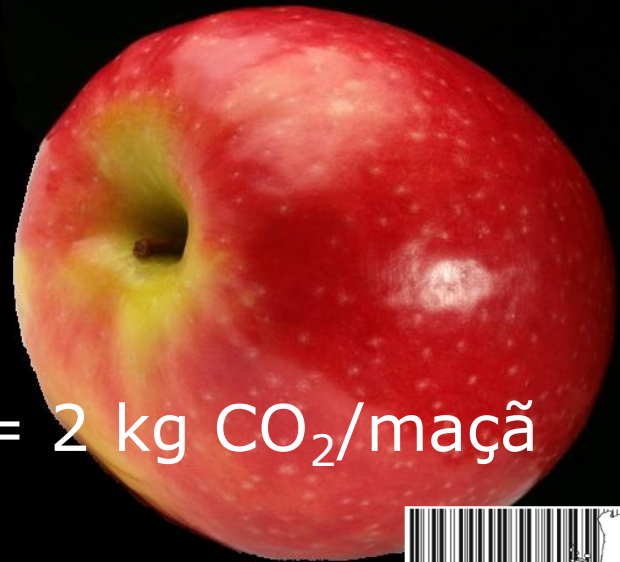


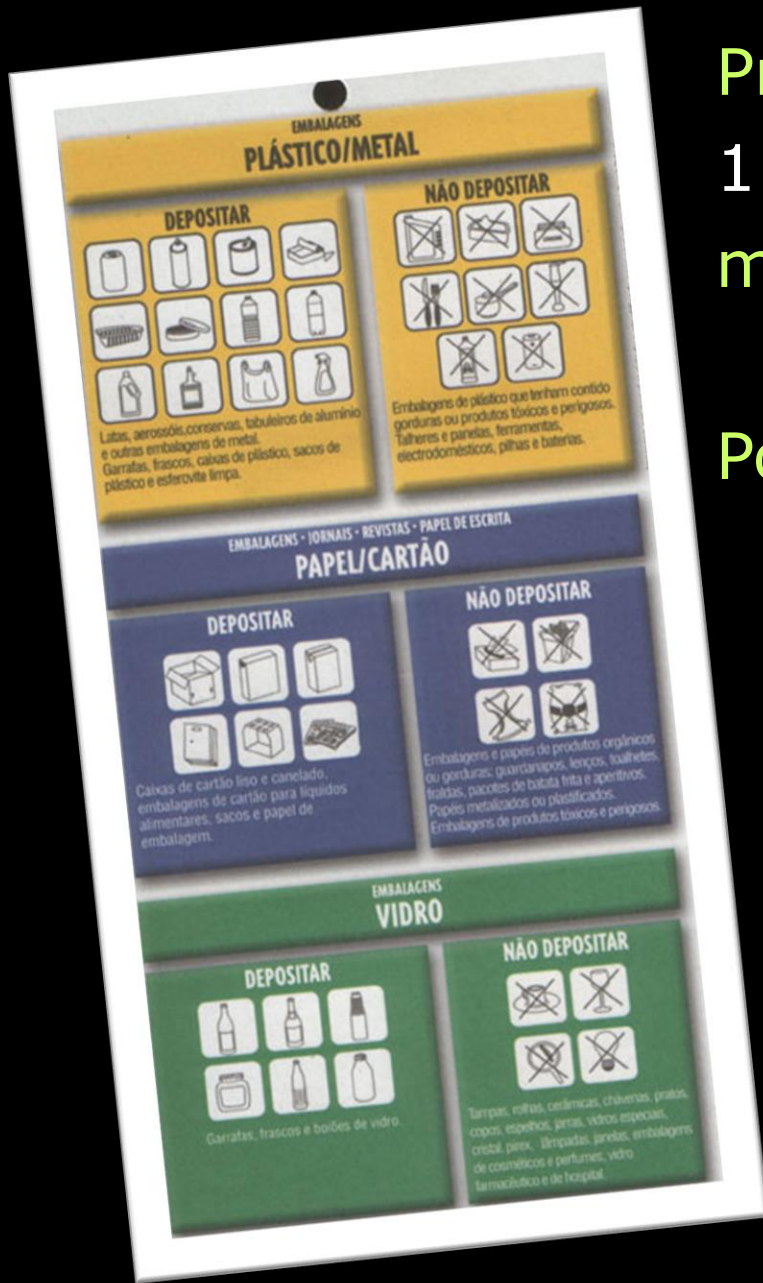
o que é nacional é bom ?

Argentina → Lisboa = 8000 km = 2 kg CO₂/maçã

fruta fora de época

fertilizantes, pesticidas, conservação, transportes...





Produção de lixo em Portugal:
1.2 kg/pessoa
menos de 20% é reciclado

Política dos 3R's:

Reduzir

Reutilizar

Reciclar

bacalhau em extinção ?

1970 → 3 100 000 toneladas

2002 → 890 000 toneladas

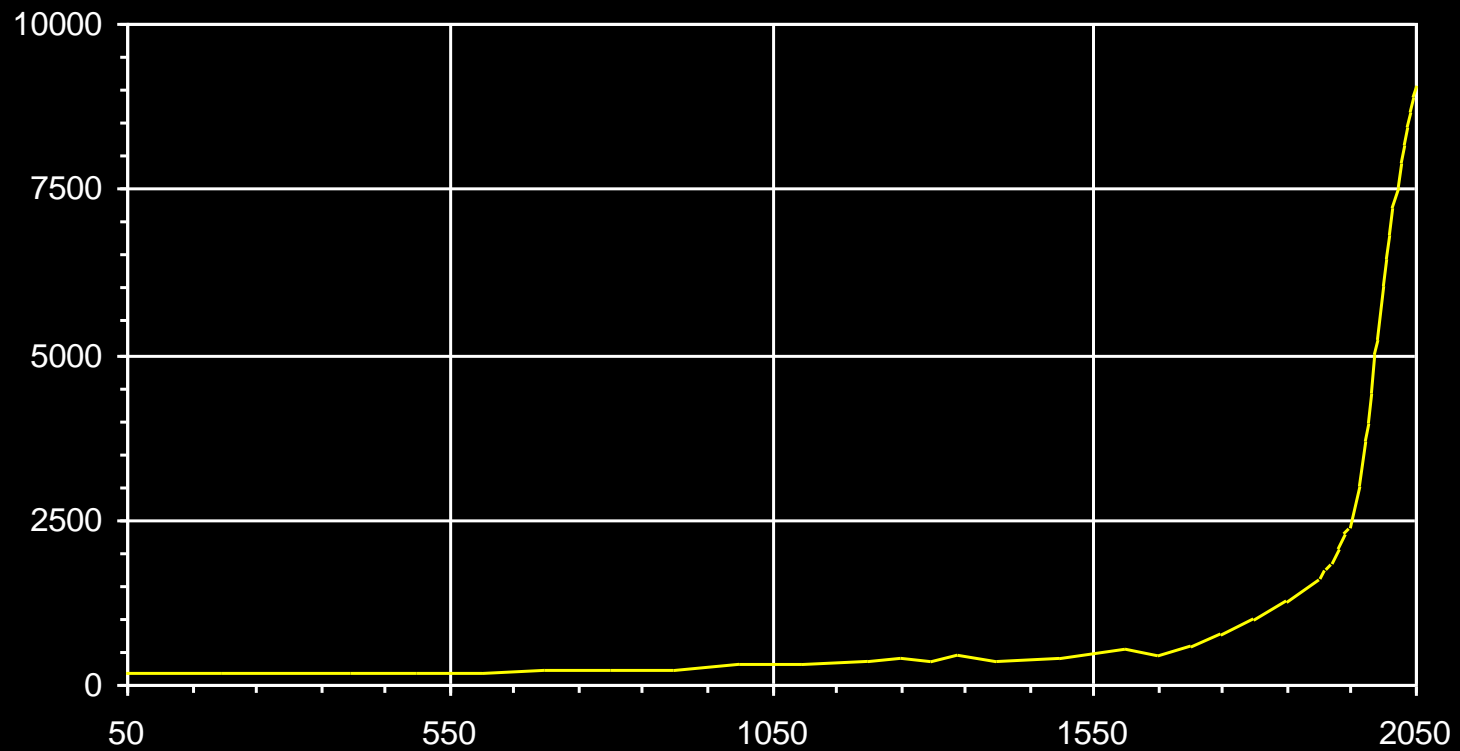
(redução de 70% em 30 anos)

porquê ?

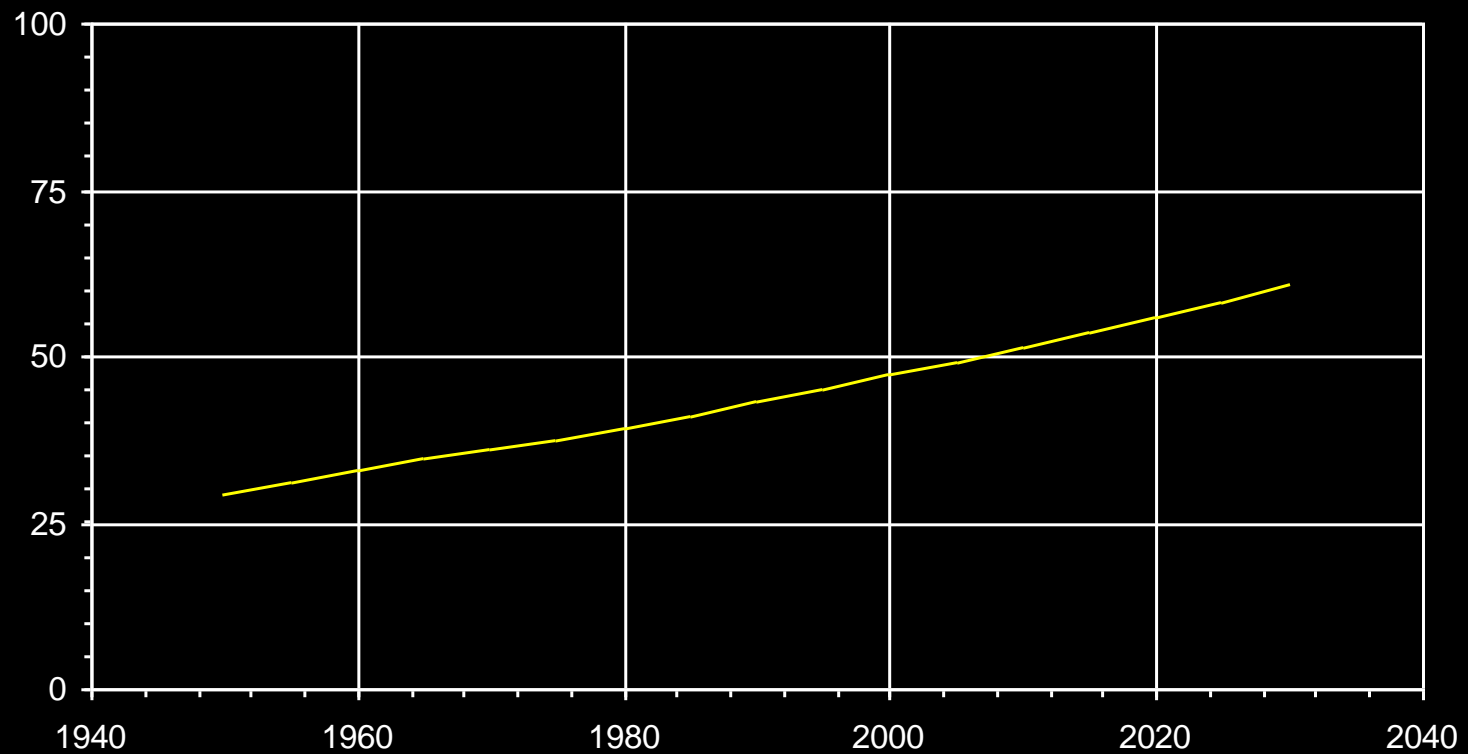
- pesca excessiva
- subida da temperatura média do mar reduz alimento



Crescimento população mundial

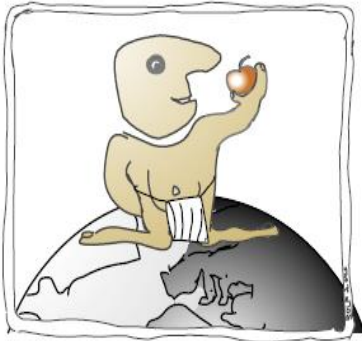
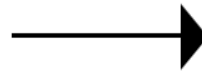


Percentagem população urbana





'Homo touristicus'

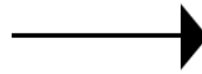


'Homo gastronomicus'

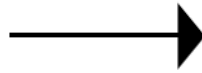




'Homo touristicus'

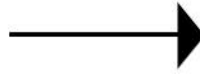


'Homo domesticus'

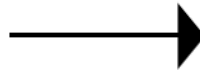




'Homo mobilis'



'Homo domesticus'





influenza, n. 1. An epidemic of stress, overwork, waste and indebtedness caused by the pursuit of the American Dream. 2. An unsustainable addiction to economic growth.

FIRST AMERICAN TITLE

KJ-97

Holiday Inn SELECT

DOUBLE TREE HOTEL

THE Pavilions NORTH

Sam Ash

FRIDAYS

Chick-fil-A

BEST BUY

SPORTS AUTHORITY

Q101

Pe 7 Cabare N

San Pedro Crossing

CIRCUIT CITY

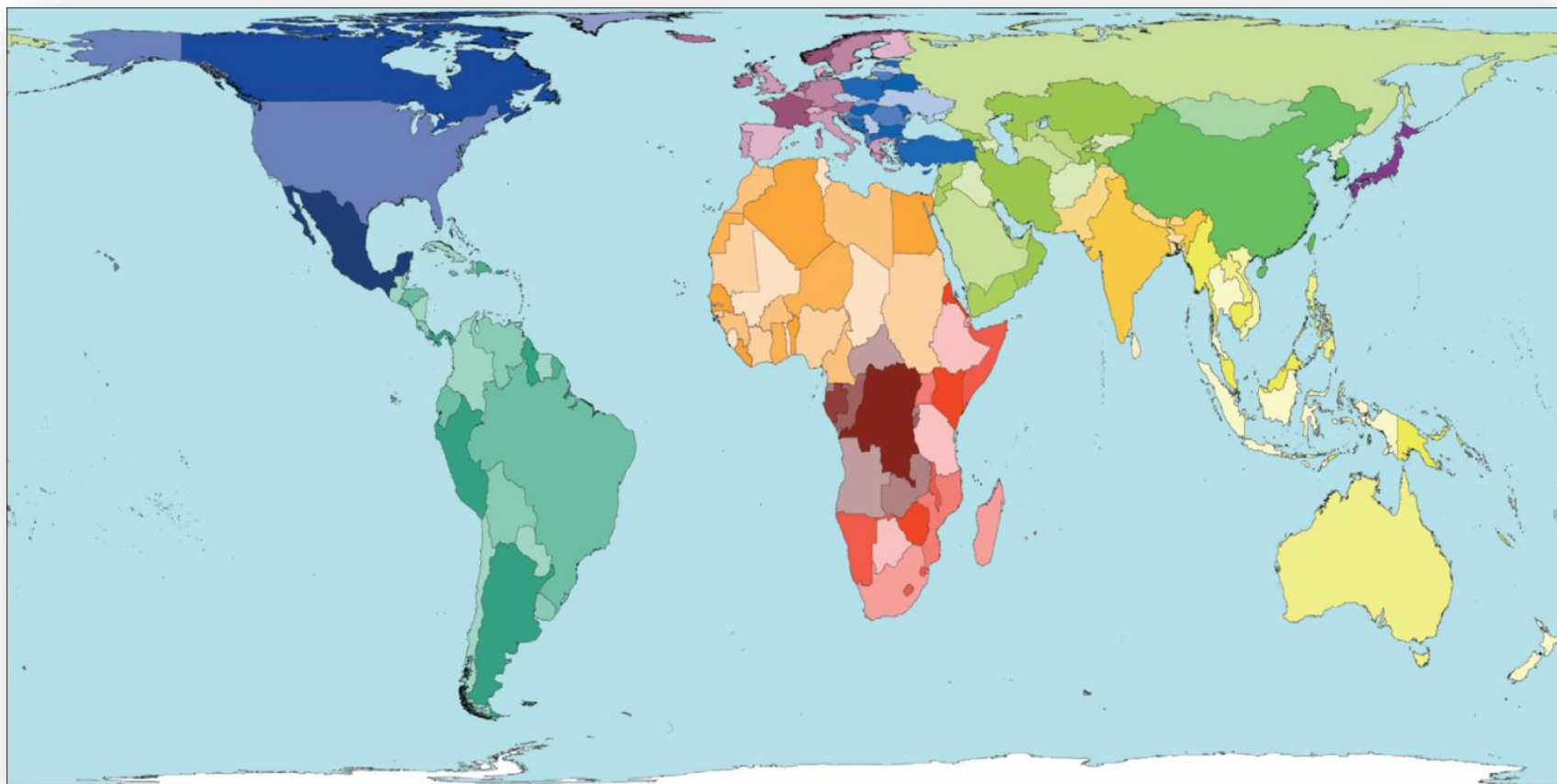
LINENS'N THINGS

MEN A HOUSE

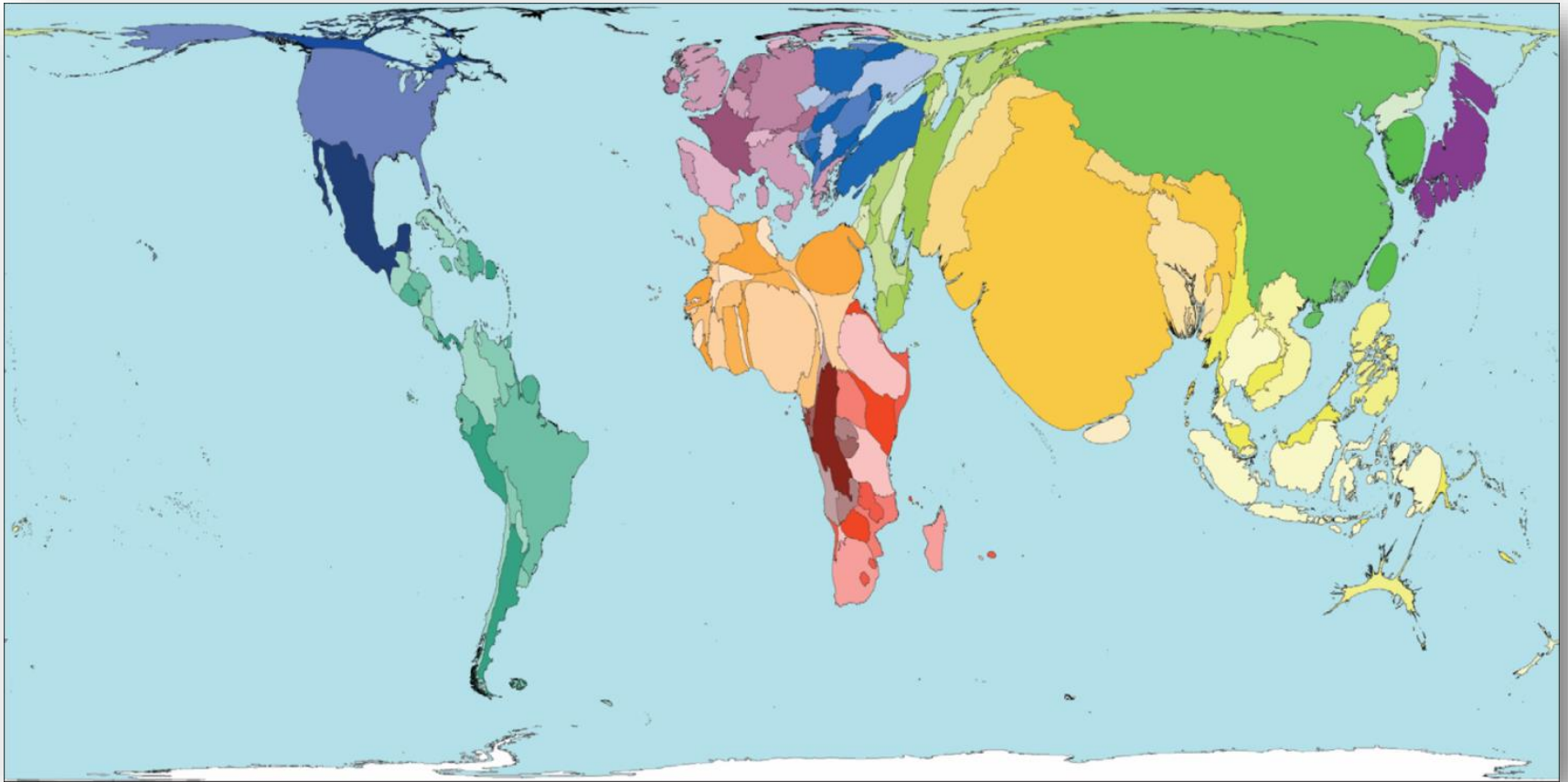
Barnes & Noble Booksellers



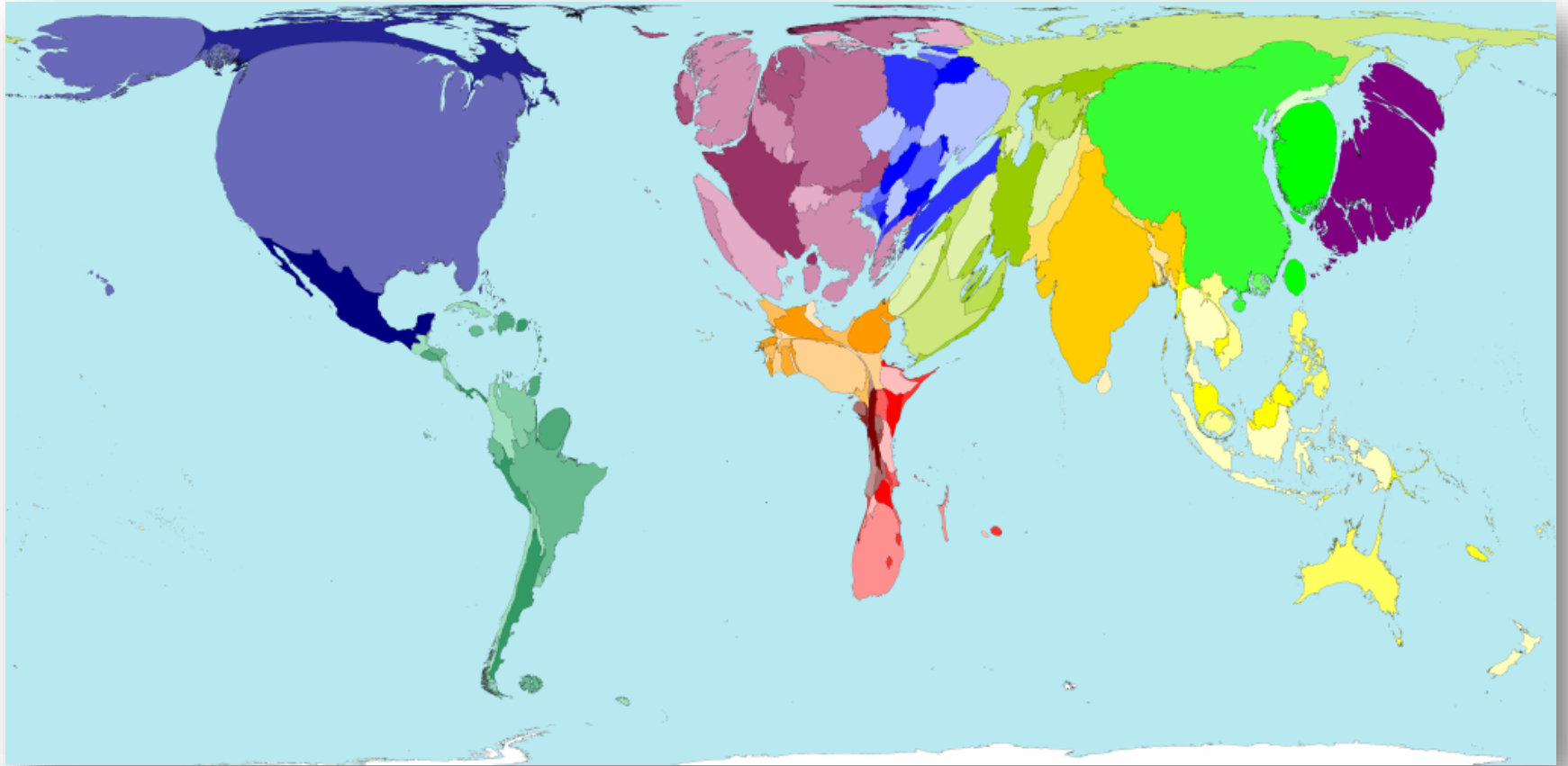
Mapa | área representa área



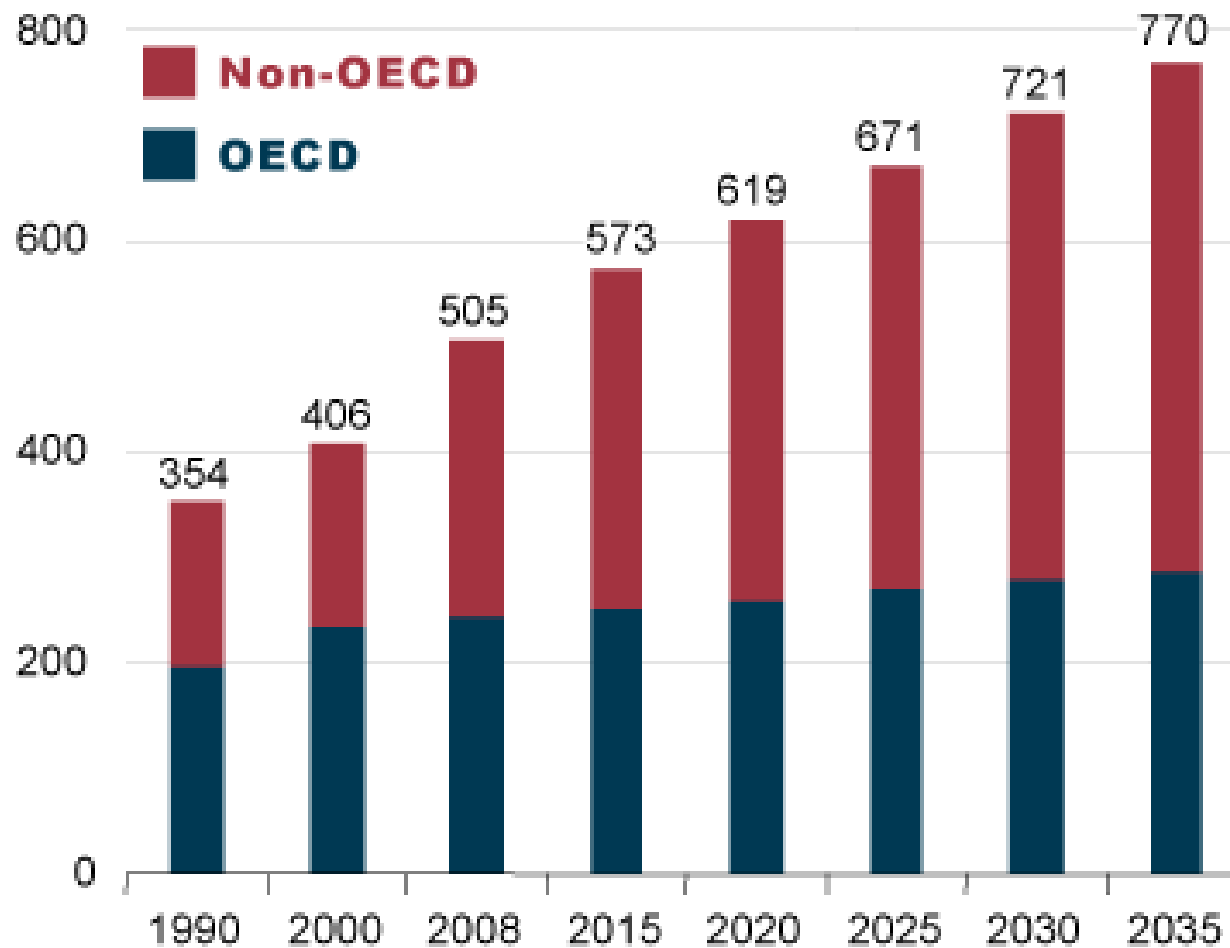
Mapa | área representa população



Mapa | área representa consumo energia

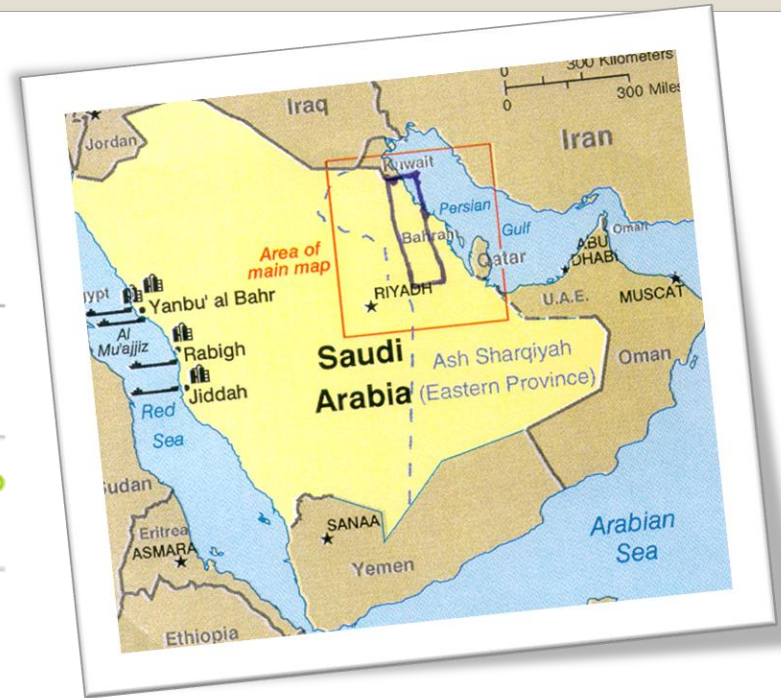
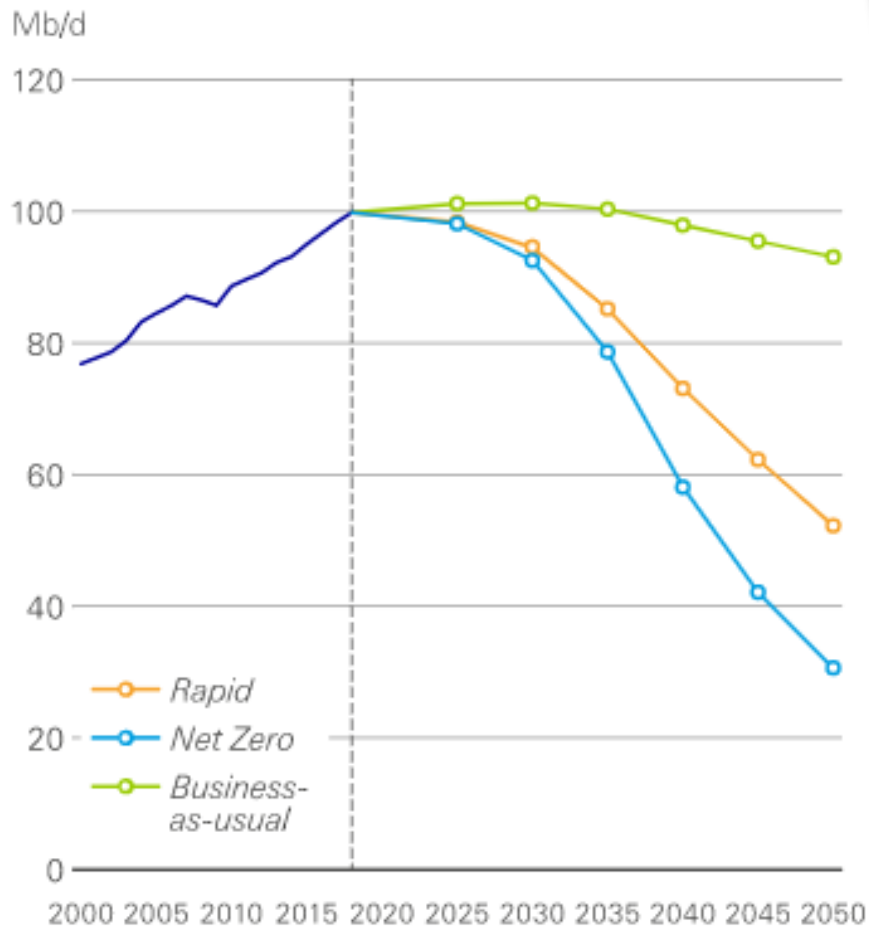


World energy consumption, 1990-2035 (quadrillion Btu)





Reservas / produção



Reservas provadas representam **46 anos de produção aos níveis actuais.** 20



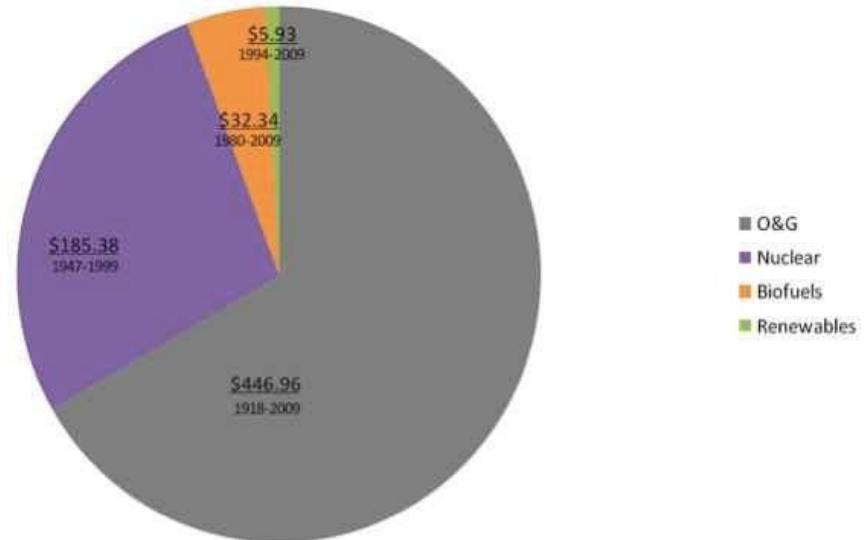
Subida de \$15/barril:

0.6-0.8% descida PIB

0.3-0.7% subida inflação

Federal Subsidies Have Favored Fossil Fuels

Cumulative Historical Federal Subsidies
2010\$, billions



Source: *What Would Jefferson Do?*
DBL Investors, September 2011

Externalidades

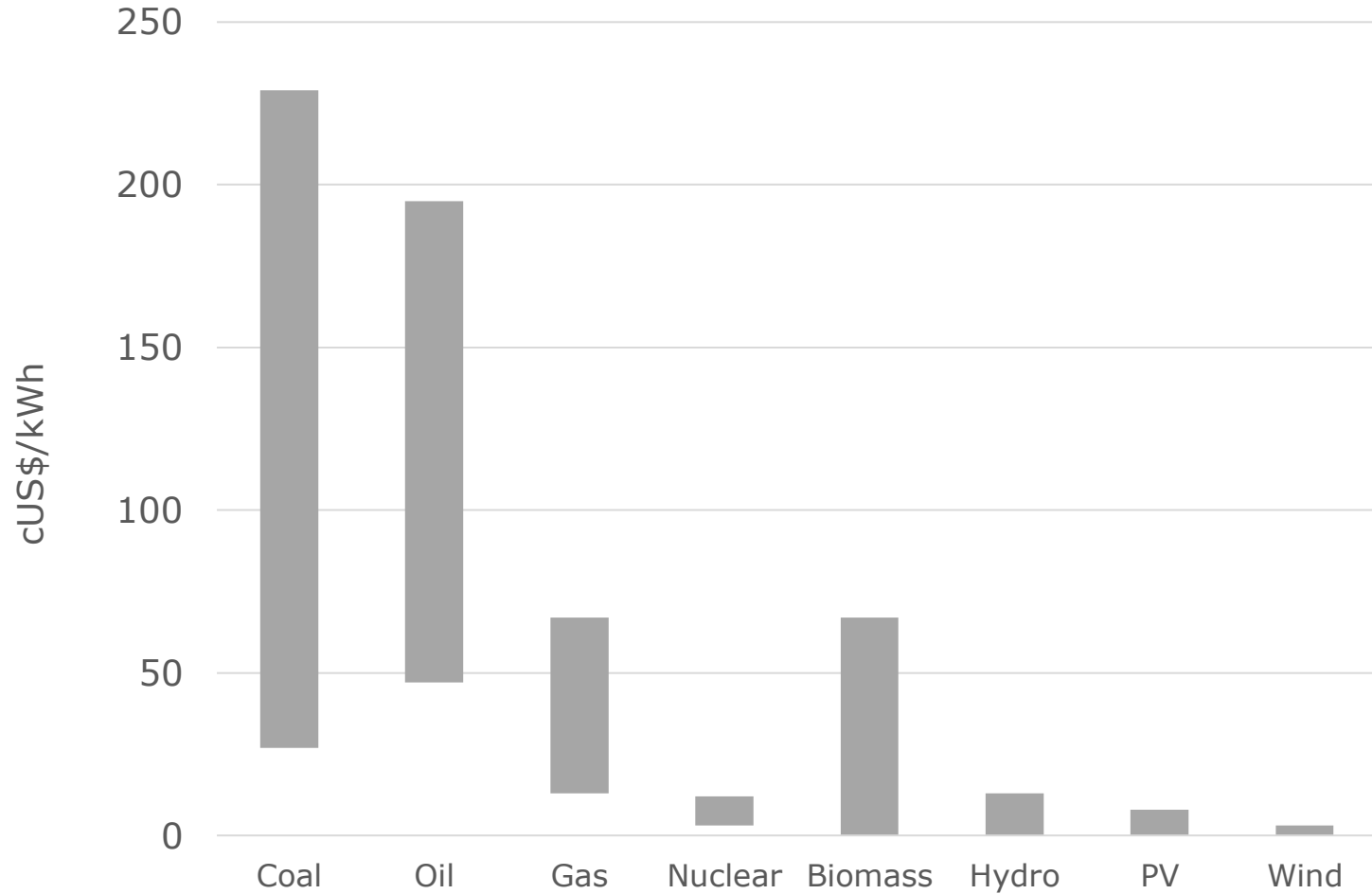
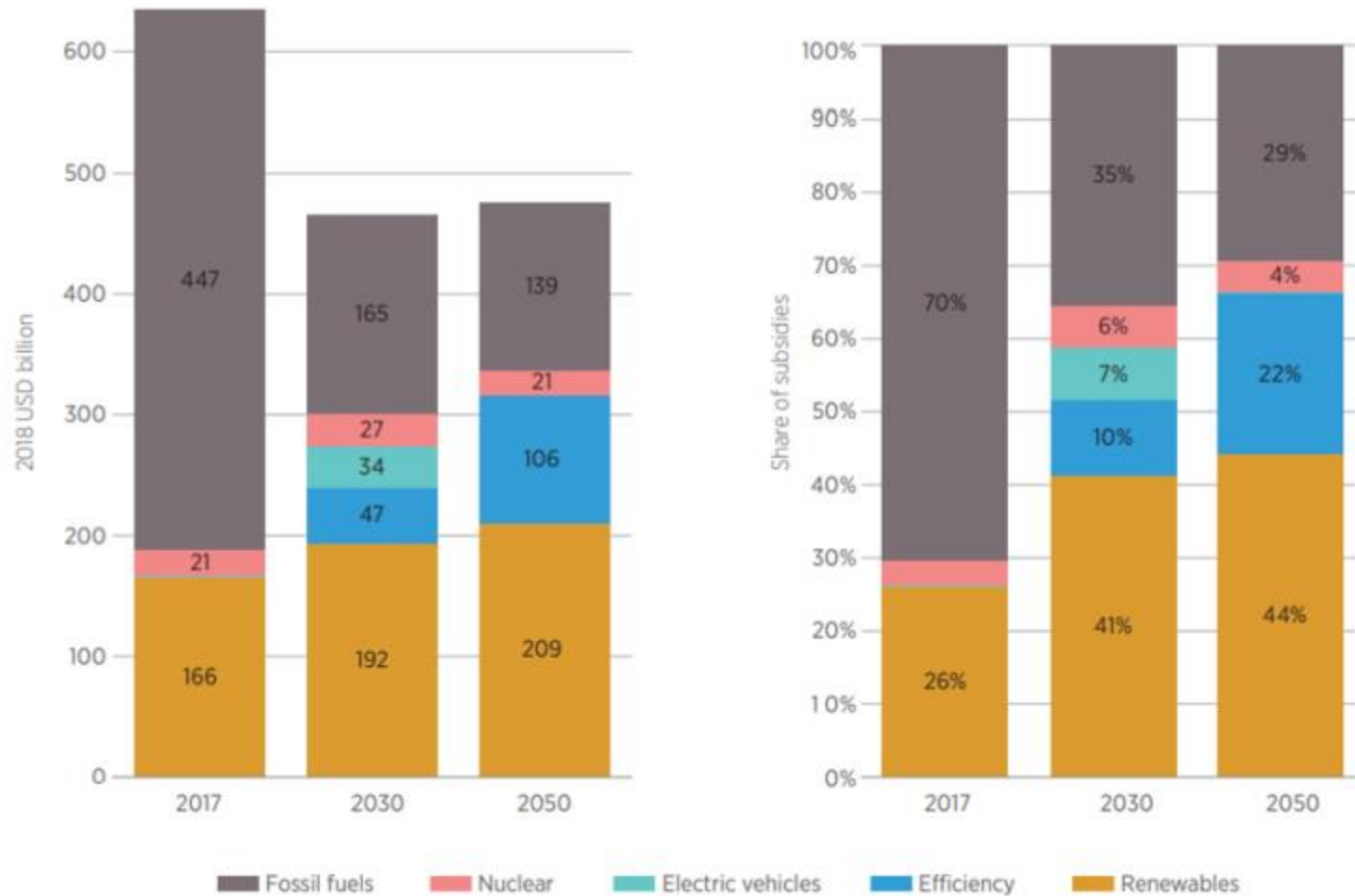


Figure S-2: Energy sector subsidies by source excluding climate and health costs in the REmap Case, 2017, 2030 and 2050

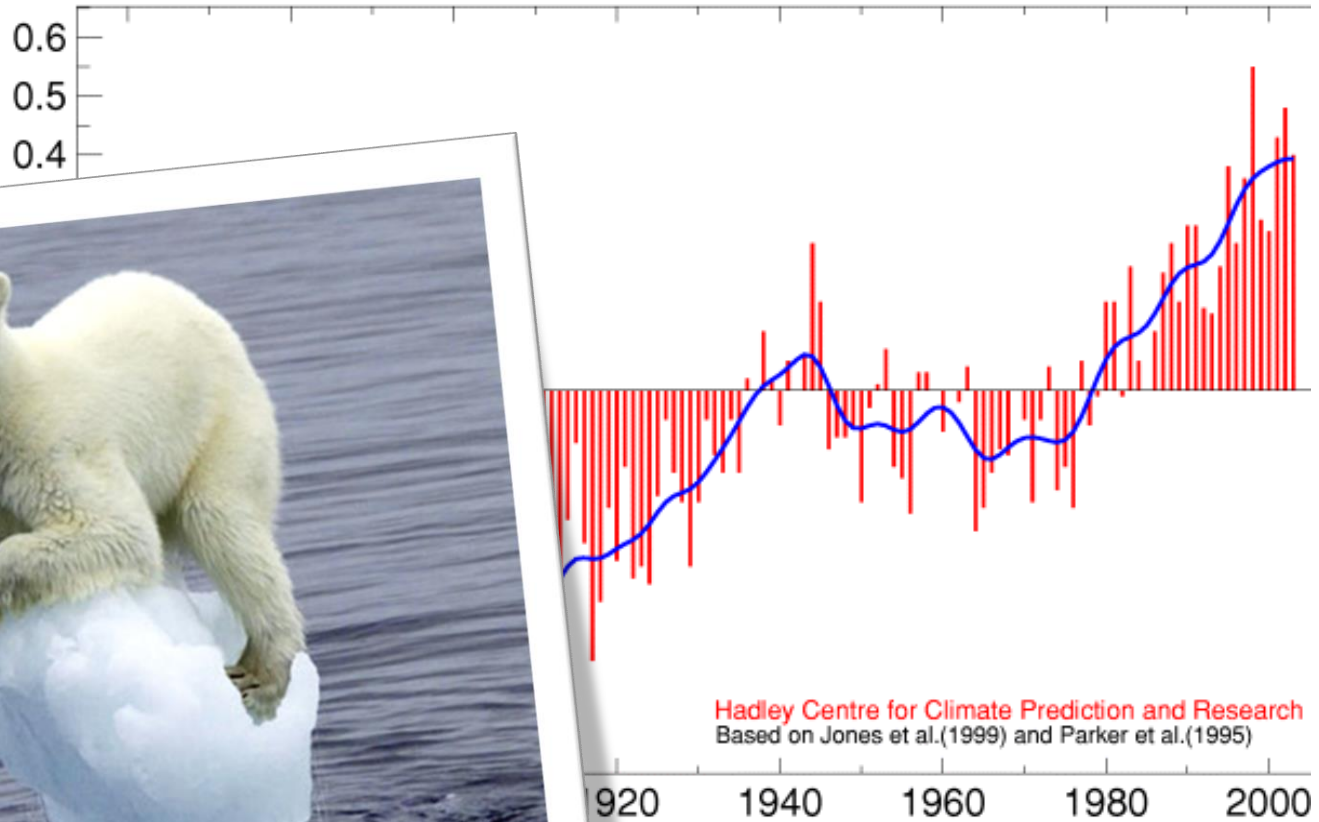








Externalidades



Cai neve em Portugal e os gregos vão à praia: o que se está a passar? Aquecimento do Ártico, ventos e as alterações climáticas explicam



ASSINAR

LOJA



VISÃO

SE7E

SAÚDE

VERDE

EXAME

EXAME INFORMÁTICA

JÚNIOR

JL

VISOÃO VERDE

25.01.2021 às 09h45



LUÍS RIBEIRO

Alterações climáticas: as aves estão a fugir para norte – e não só



9 PELO PREÇO DE 1

PACK 9 REVISTAS | 2 MESES | €9,90/MÊS

SAIBA MAIS



FLORESTA

Alterações climáticas afectam a extensão e o risco de incêndios na Europa

Portugal, Espanha e Polónia foram os países que registaram mais incêndios na UE em 2019, mas foi a Roménia, com 73 444 hectares arditos, que sofreu maiores danos em áreas protegidas. O relatório anual do Centro Comum de Investigação da Comissão Europeia aponta o dedo: as alterações climáticas continuam a afectar a extensão e a gravidade do risco de incêndios na Europa.

Teresa Silveira

6 de Novembro de 2020, 17:04

🔔 Receber notificações

78



▶ Ouvir em Direto

AQUECIMENTO GLOBAL

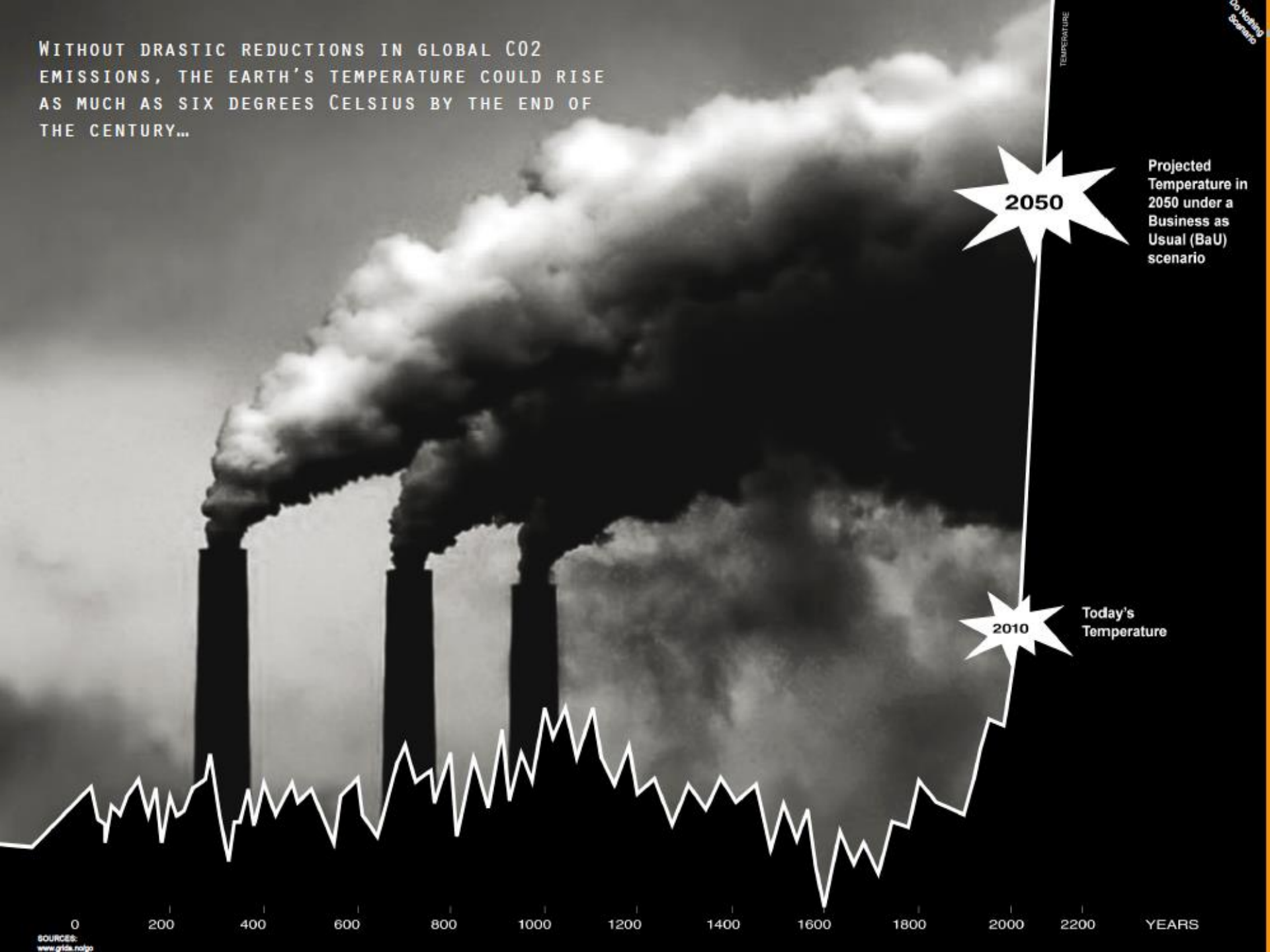
Sado com maior seca de há 25 anos. "Alterações climáticas estão a atacar severamente a zona"

O alto Sado enfrenta o mais grave problema de seca em Portugal, num momento em que o último índice da seca meteorológica do IPMA indica que Portugal continental manteve-se no final de agosto em situação de seca moderada, e pontualmente severa no Baixo Alentejo e no Algarve.

A photograph of a white wall with a small window at the top center. The wall is covered in red graffiti that reads "I DON'T BELIEVE IN GLOBAL WARMING". The bottom of the wall meets a body of water, which reflects the red text. The overall scene is outdoors, possibly on a boat or a pier.

I DON'T BELIEVE IN
GLOBAL WARMING

WITHOUT DRASTIC REDUCTIONS IN GLOBAL CO2 EMISSIONS, THE EARTH'S TEMPERATURE COULD RISE AS MUCH AS SIX DEGREES CELSIUS BY THE END OF THE CENTURY...



Do Nothing Scenario

TEMPERATURE

2050

Projected Temperature in 2050 under a Business as Usual (BaU) scenario

2010

Today's Temperature

0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 YEARS

SOURCES:
www.globe.no/po

'CLIMATE INCIDENTS'

© Anomalie



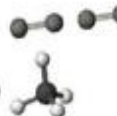
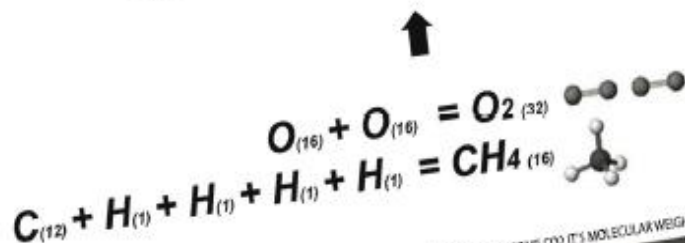
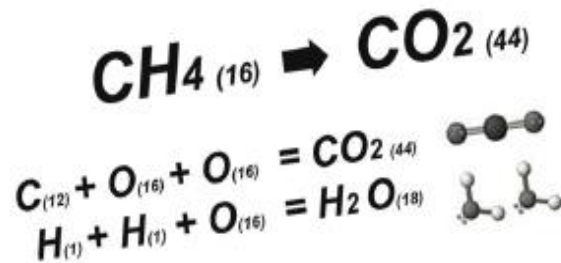
CO₂ PARADOX

FOR EVERY BARREL OF OIL WE BURN THREE TIMES THE QUANTITY OF CO₂ IS BEING PRODUCED. THIS MEANS OUR ACTUAL CARBON FOOTPRINT IS ALMOST THREE TIMES THE SIZE OF OUR OIL CONSUMPTION FOOTPRINT!

502kg
(CARBON DIOXIDE EQUIVALENT)
CO₂ (44)



160kg
(BARRELS OF OIL EQUIVALENT)
C_(n)H_{2(n)} (14)



(A SIMPLE HYDROCARBON REACTION TO ILLUSTRATE WHAT HAPPENS WHEN 1 CARBON MOLECULE BONDS WITH 2 OXYGEN MOLECULES TO BECOME CO₂ ITS MOLECULAR WEIGHT)

PERIODIC ARRANGEMENT OF THE ELEMENTS — MENDELEJEFF'S

| GROUP | GROUP I | GROUP II | GROUP III | GROUP IV | GROUP V | GROUP VI | GROUP VII | GROUP VIII |
|-------|-----------------------|------------------------|--------------------------------------|-------------------------|--------------------------|-----------------------------------|-------------------------|-------------------------|
| | R ₂ O | RO | R ₂ O ₃ | RH ₄ | RO ₂ | RH ₂ | RO ₃ | RH ₃ |
| 1 | Hydrogen H = 1.008 | | | Boron B = 11.0 | Carbon C = 12.00 | Nitrogen N = 14.01 | Oxygen O = 16.00 | Fluorine F = 19.0 |
| 2 | Helium He = 4.00 | Lithium Li = 6.94 | Beryllium (Beryllium) Be = 9.1 | Aluminum Al = 27.1 | Silicon Si = 28.3 | Phosphorus P = 31.04 | Sulphur S = 32.06 | Chlorine Cl = 35.46 |
| 3 | Neon Ne = 20.2 | Sodium Na = 23.00 | Magnesium Mg = 24.32 | Scandium Sc = 44.1 | Titanium Ti = 48.1 | Vanadium V = 51.0 | Chromium Cr = 52.0 | Manganese Mn = 54.93 |
| 4 | Argon Ar = 39.88 | Potassium K = 39.10 | Calcium Ca = 40.07 | Zinc Zn = 65.37 | Gallium Ga = 69.8 | Germanium Ge = 72.5 | Arsenic As = 74.96 | Selenium Se = 78.2 |
| 5 | Krypton Kr = 83.84 | Rubidium Rb = 85.45 | Strontium Sr = 87.63 | Yttrium Yt = 88.7 | Zirconium Zr = 90.6 | Niobium (Niobium) Nb = 92.9 | Molybdenum Mo = 95.9 | Bromine Br = 79.92 |
| 6 | Xenon Xe = 131.3 | Silver Ag = 107.88 | Cadmium Cd = 112.40 | Iodine I = 126.9 | Tin Sn = 118.7 | Antimony Sb = 120.7 | Tellurium Te = 127.5 | Ruthenium Ru = 101.1 |
| 7 | Radium Ra = 226 | Cesium Cs = 132.91 | Barium Ba = 137.34 | Lanthanum La = 138.9 | Cerium Ce = 140.25 | Praseodymium Pr = 140.9 | Neodymium Nd = 144.3 | Rhodium Rh = 102.9 |
| 8 | Francium Fr = 223 | Francium Fr = 223 | Francium Fr = 223 | Actinium Ac = 227 | Protactinium Pa = 231 | Tantalum Ta = 181.9 | Tungsten W = 183.8 | Rhenium Re = 186.2 |
| 9 | Radium Ra = 226 | Radium Ra = 226 | Radium Ra = 226 | Actinium Ac = 227 | Actinium Ac = 227 | Actinium Ac = 227 | Actinium Ac = 227 | Actinium Ac = 227 |
| 10 | Radium Ra = 226 | Radium Ra = 226 | Radium Ra = 226 | Actinium Ac = 227 | Actinium Ac = 227 | Actinium Ac = 227 | Actinium Ac = 227 | Actinium Ac = 227 |

Note: Hydrocarbons exist in many forms but the principle remains the same. In this example the reaction is in the simplest form of hydrocarbon: Methane (CH₄)



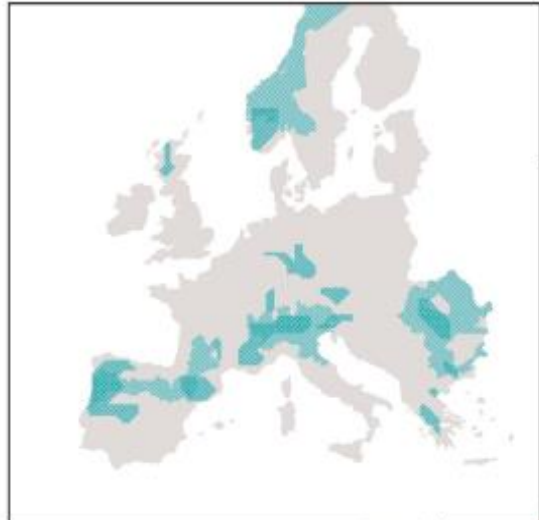
Fim do paradigma fóssil

- reservas limitadas
- aumento consumo
 - aumento custo
- impacto ambiental

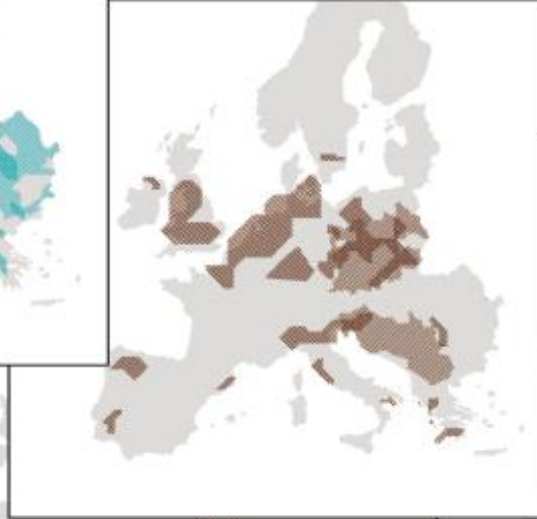


RENEWABLE ENERGY RESOURCE MAPPING

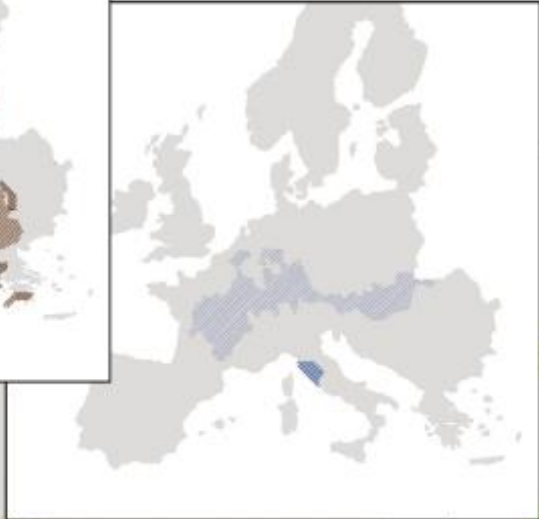
AN INTEGRATED EUROPE OFFERS A VARIETY OF GEOGRAPHIC PREDISPOSITION, AND THEREFORE A DIVERSE AREA OF HIGH POTENTIAL FOR REDRWABLE SOURCES.



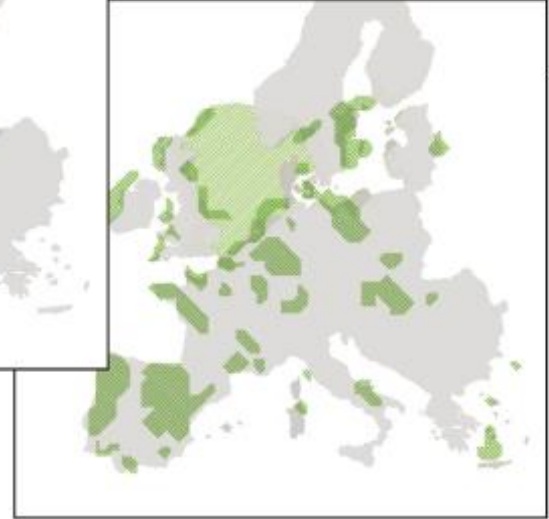
HYDROPOWER



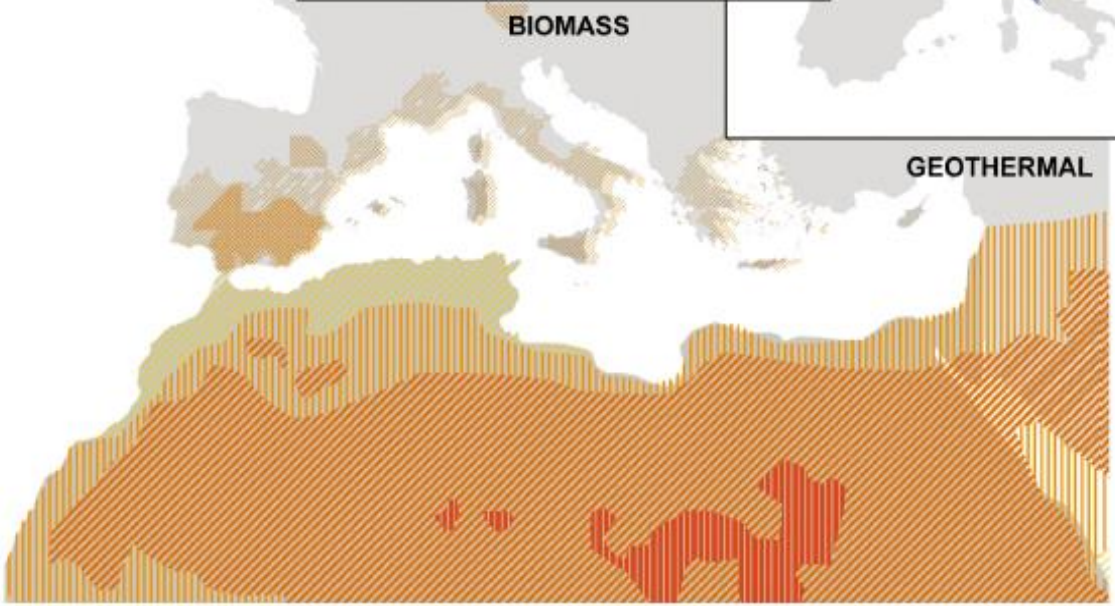
BIOMASS



GEO THERMAL



WIND ENERGY

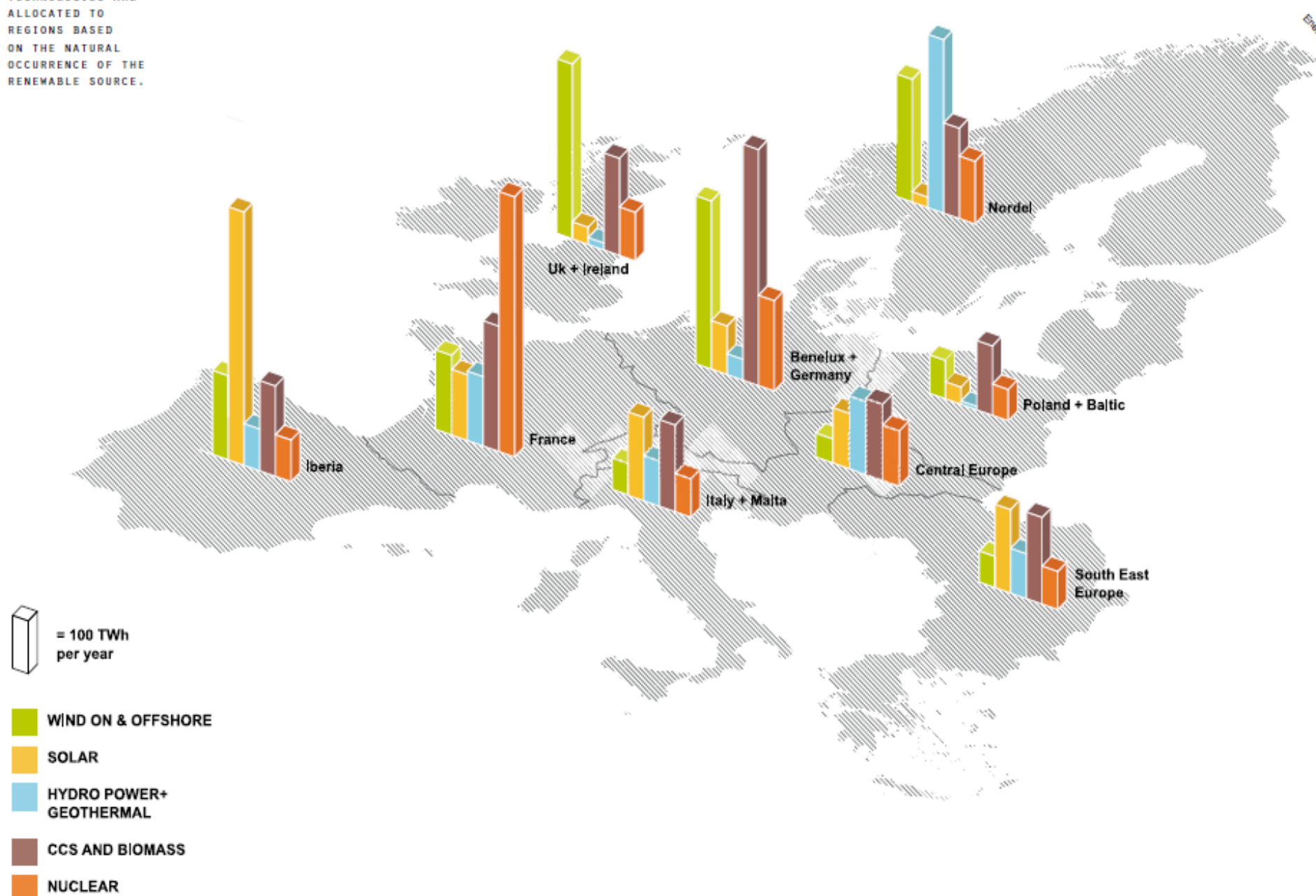


SOLAR

Forms of Re

ENERGY RESOURCES IN 2050 (HIGH RES PATHWAY)

RENEWABLE TECHNOLOGIES ARE ALLOCATED TO REGIONS BASED ON THE NATURAL OCCURRENCE OF THE RENEWABLE SOURCE.





Map of ENEROPA

- Boundaries:*
- Biomassburg*
 - C.C.S.R. (Carbon Capture & Storage Republic)*
 - Enhanced Geothermalia*
 - Geothermalia*
 - Hydropia*
 - Isles of Wind*
 - Solaria*
 - Tidal States*
 - Irania*

Scale 1 : 20000000

Meridian of Greenwich













ISLES OF WIND



Isles of Wind

SOLARIA





Tidal States



BIOMASSBURG



BIOMASSBURG

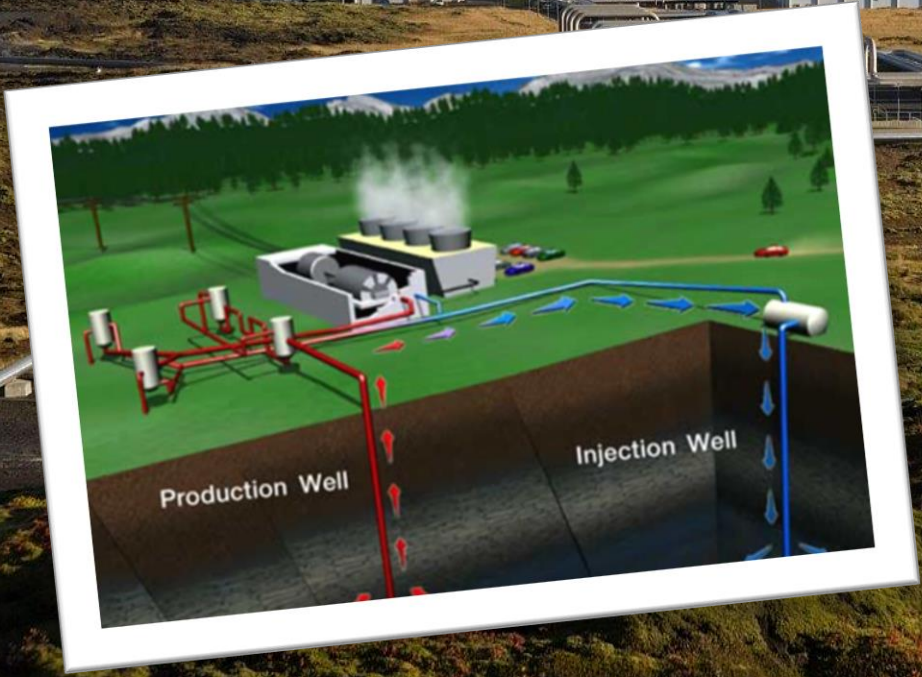
HYDROPIA



HydroPIA

ENHANCED GEOTHERMALIA





Energias renováveis

Inesgotáveis?

Verdes?

Limpas?

Gratuitas?

Acessíveis a todos?

