

ENERGIAS RENOVÁVEIS

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Energias renováveis

Avaliação contínua

20% resolução 4 problemas

40% teste 1

40% teste 2

Horário de atendimento

8.3.37

Quarta feira 10h-11h

(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



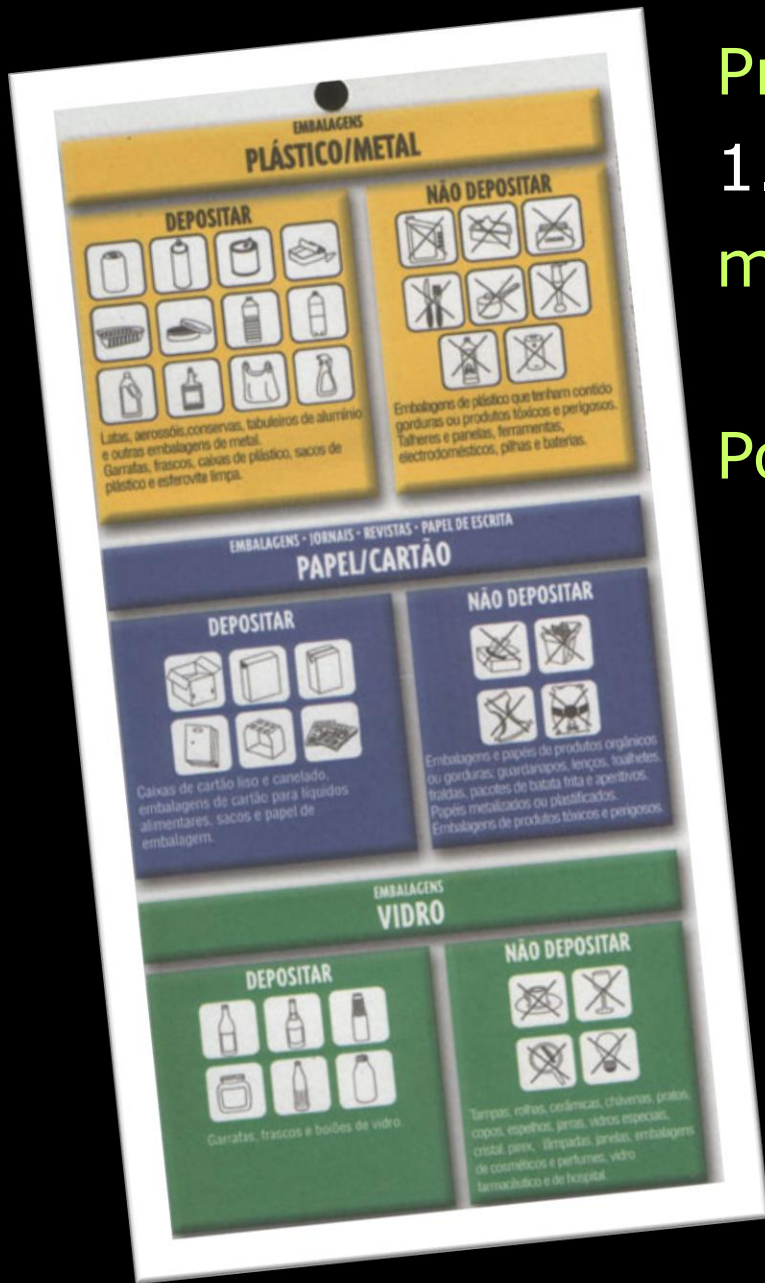
o que é nacional é bom ?

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

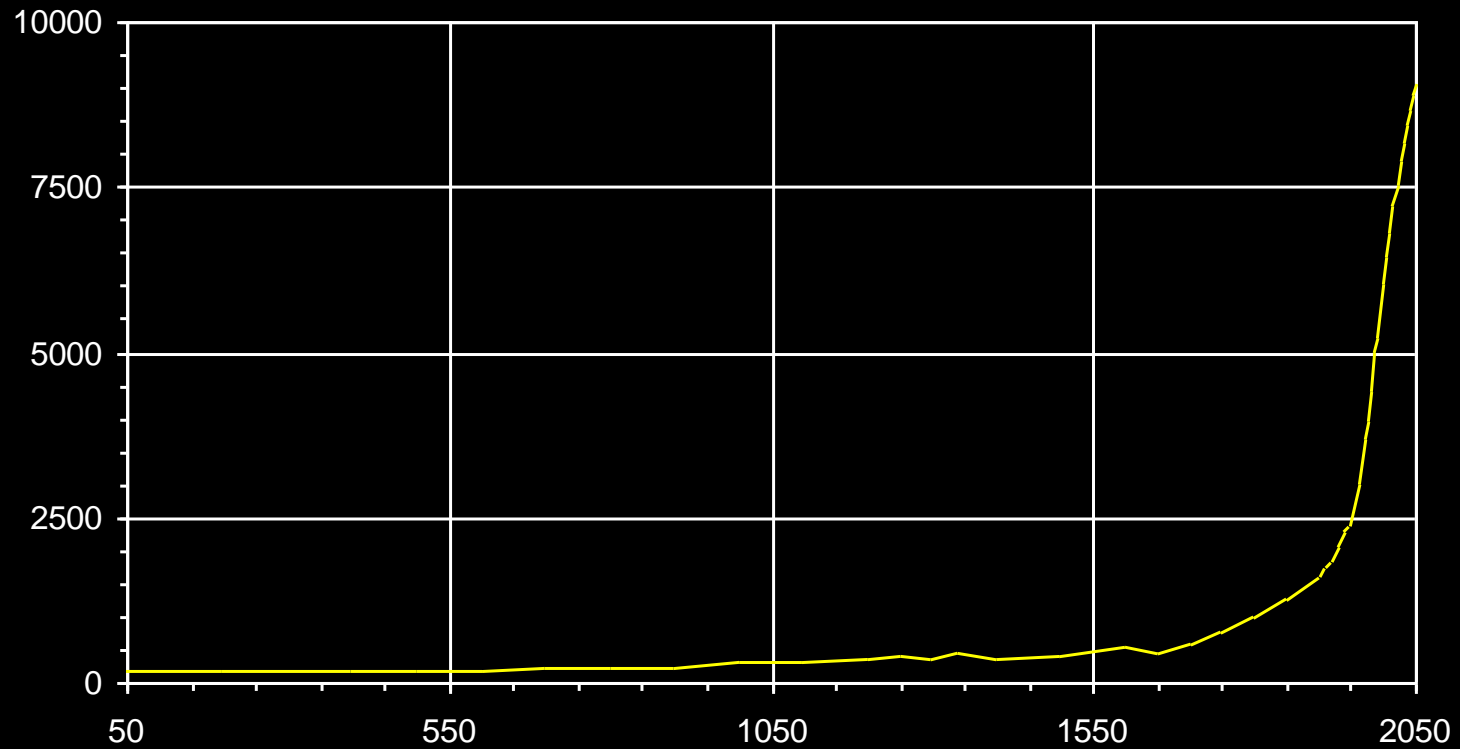
(redução de 70% em 30 anos)

porquê ?

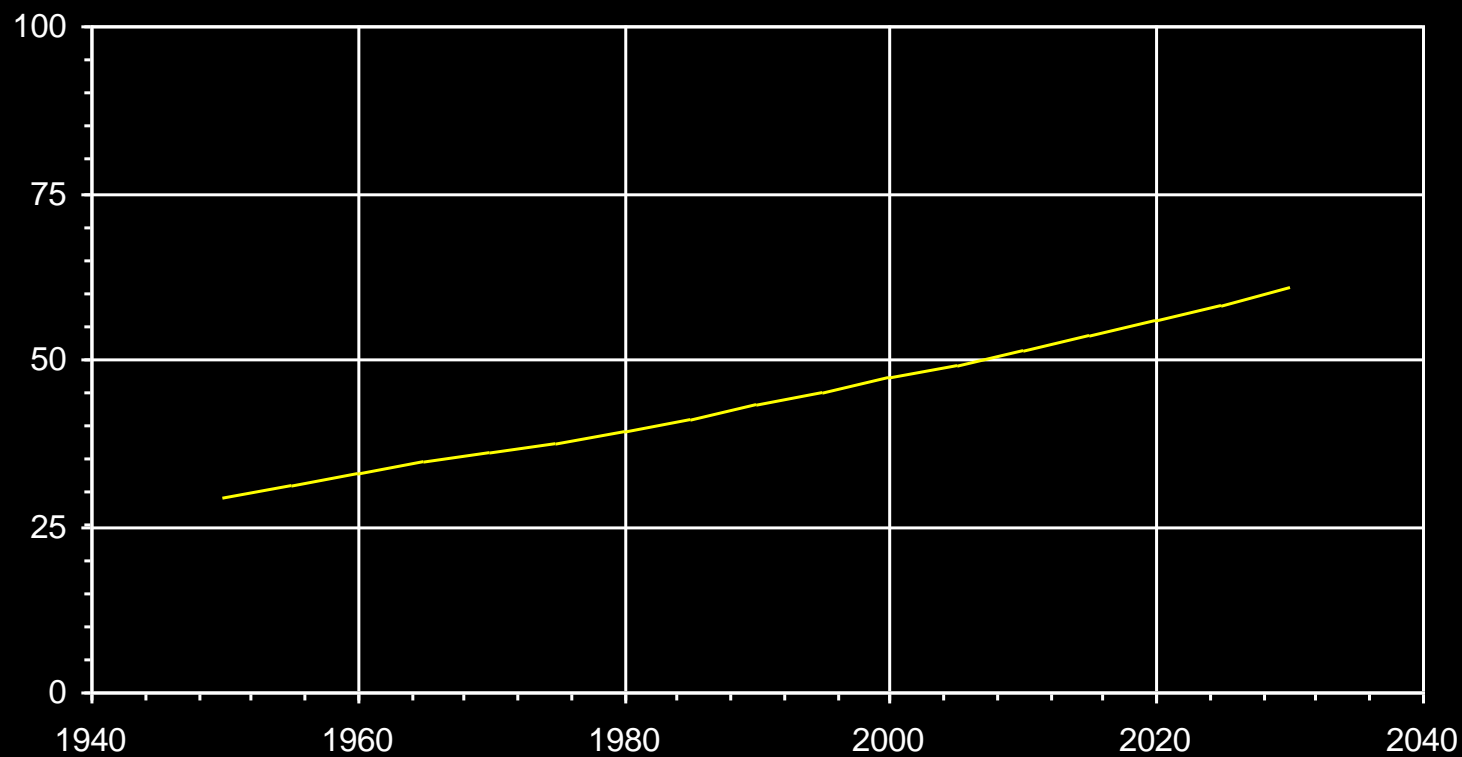
- pesca excessiva
- subida da temperatura média do mar reduz alimento



Crescimento população mundial

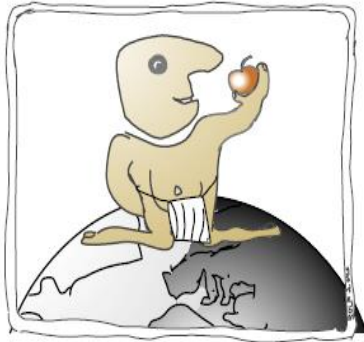
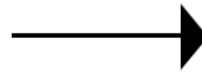


Percentagem população urbana





'Homo touristicus'

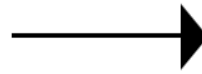


'Homo gastronomicus'

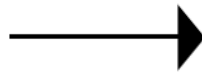




'Homo touristicus'



'Homo domesticus'

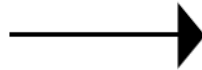




'Homo mobilis'



'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

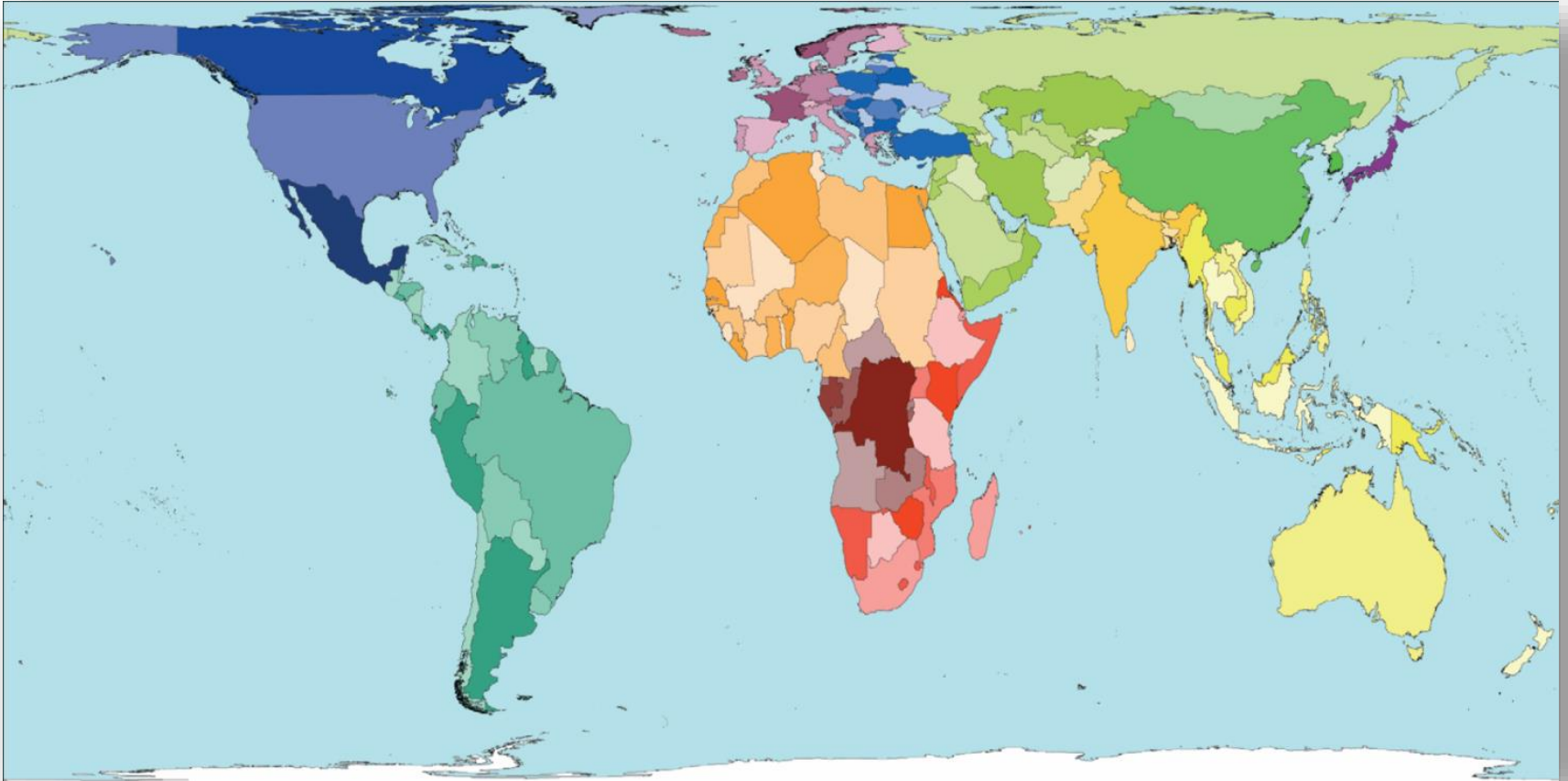
LINENS'N THINGS

MEN A HOUSE

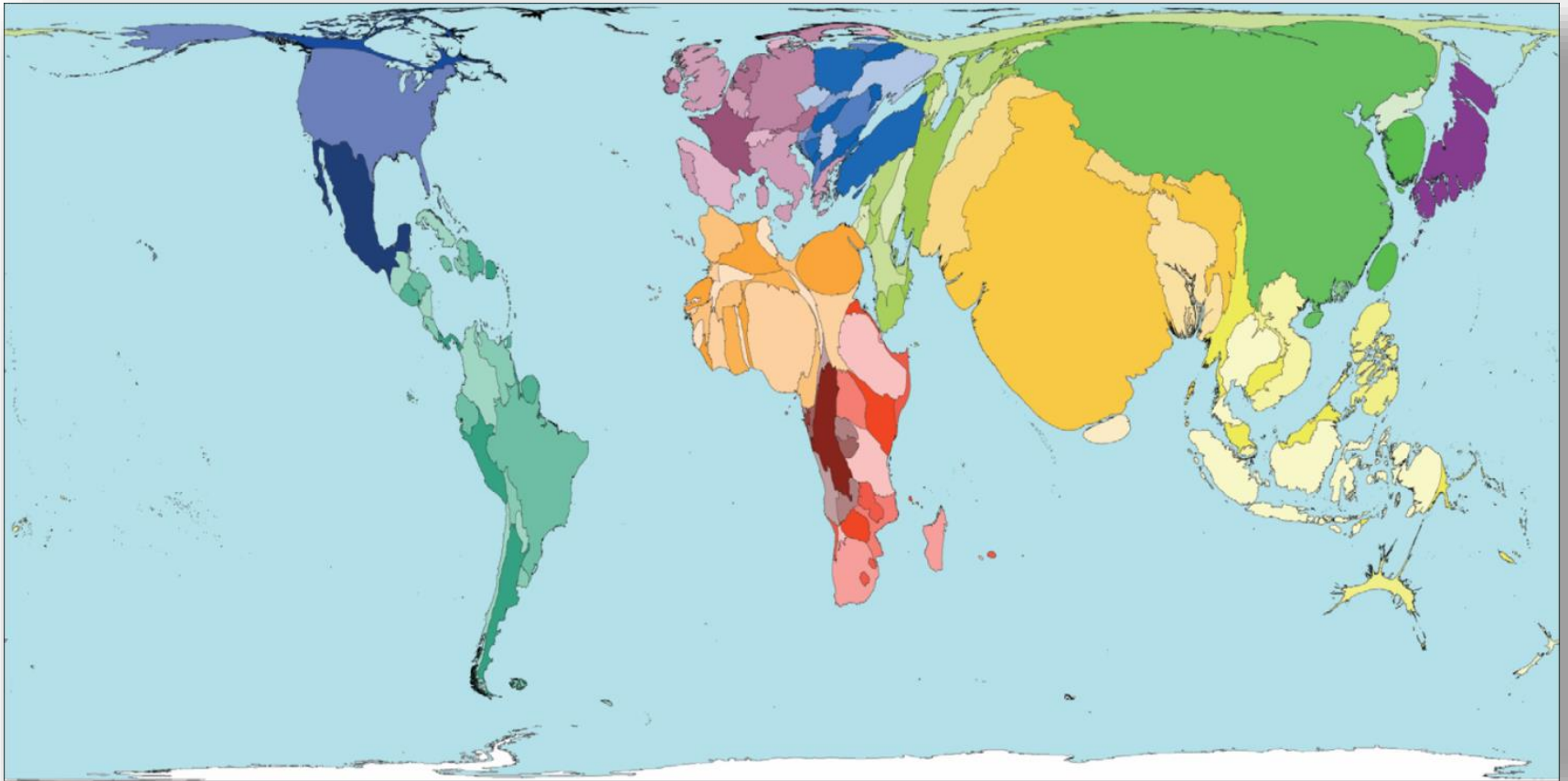
Barnes & Noble Booksellers



Mapa | área representa área



Mapa | área representa população



Mapa | área representa consumo energia

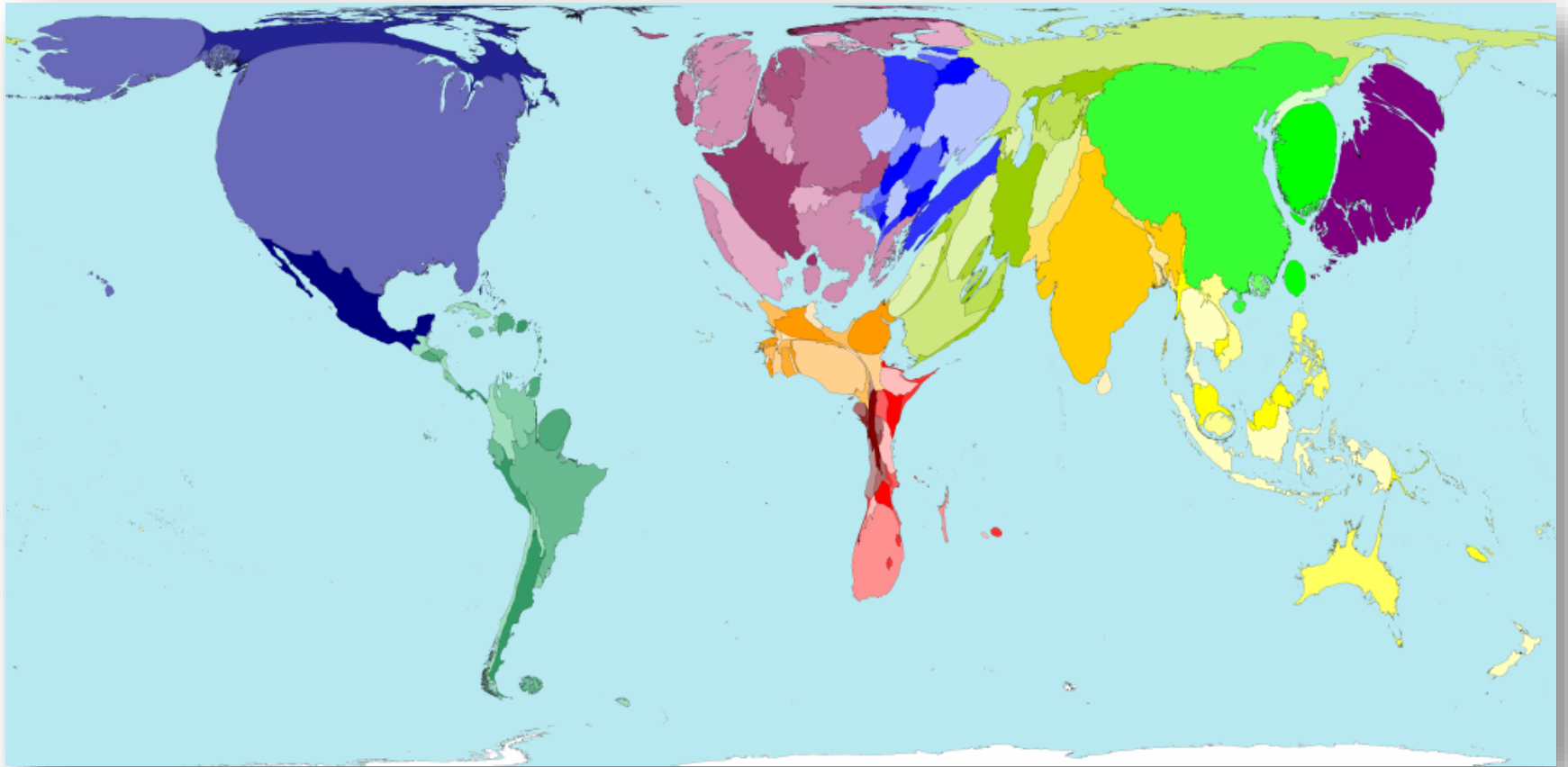
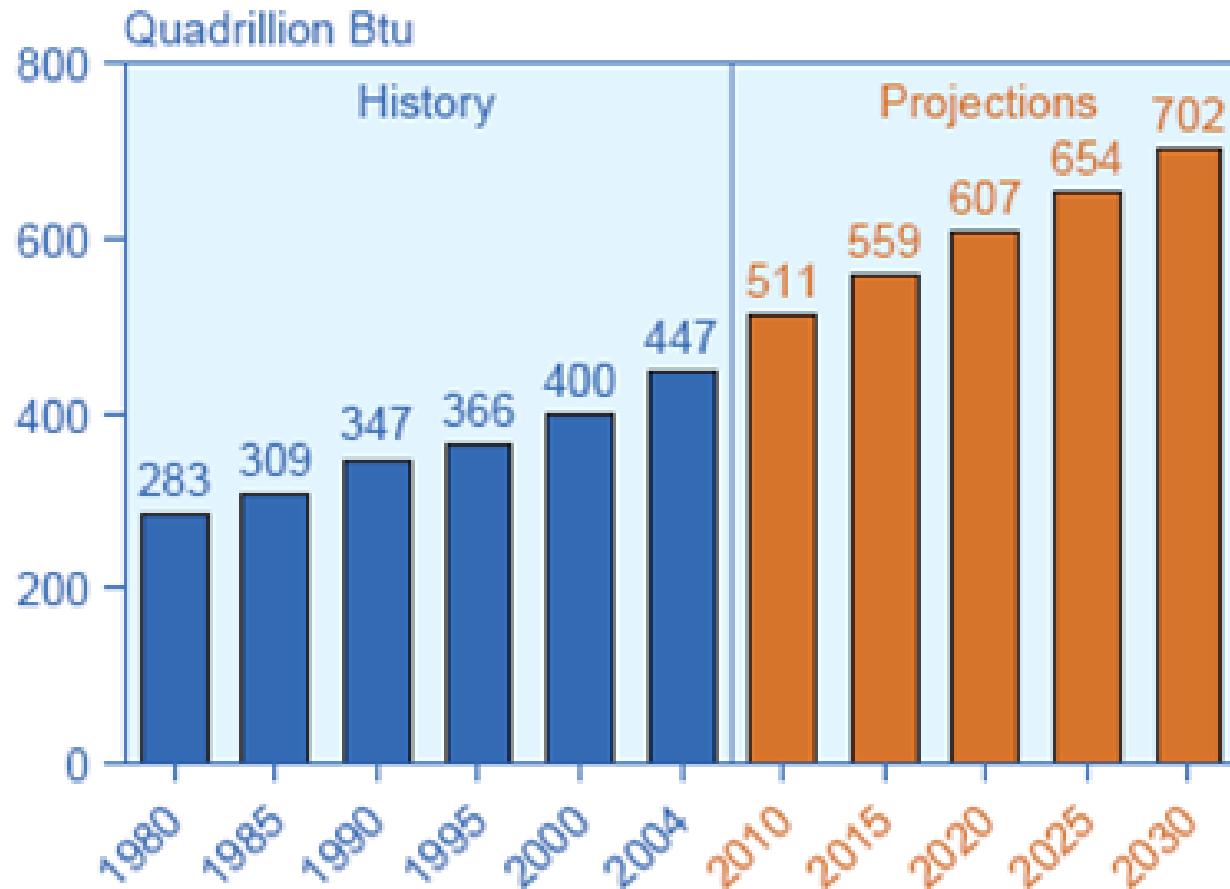
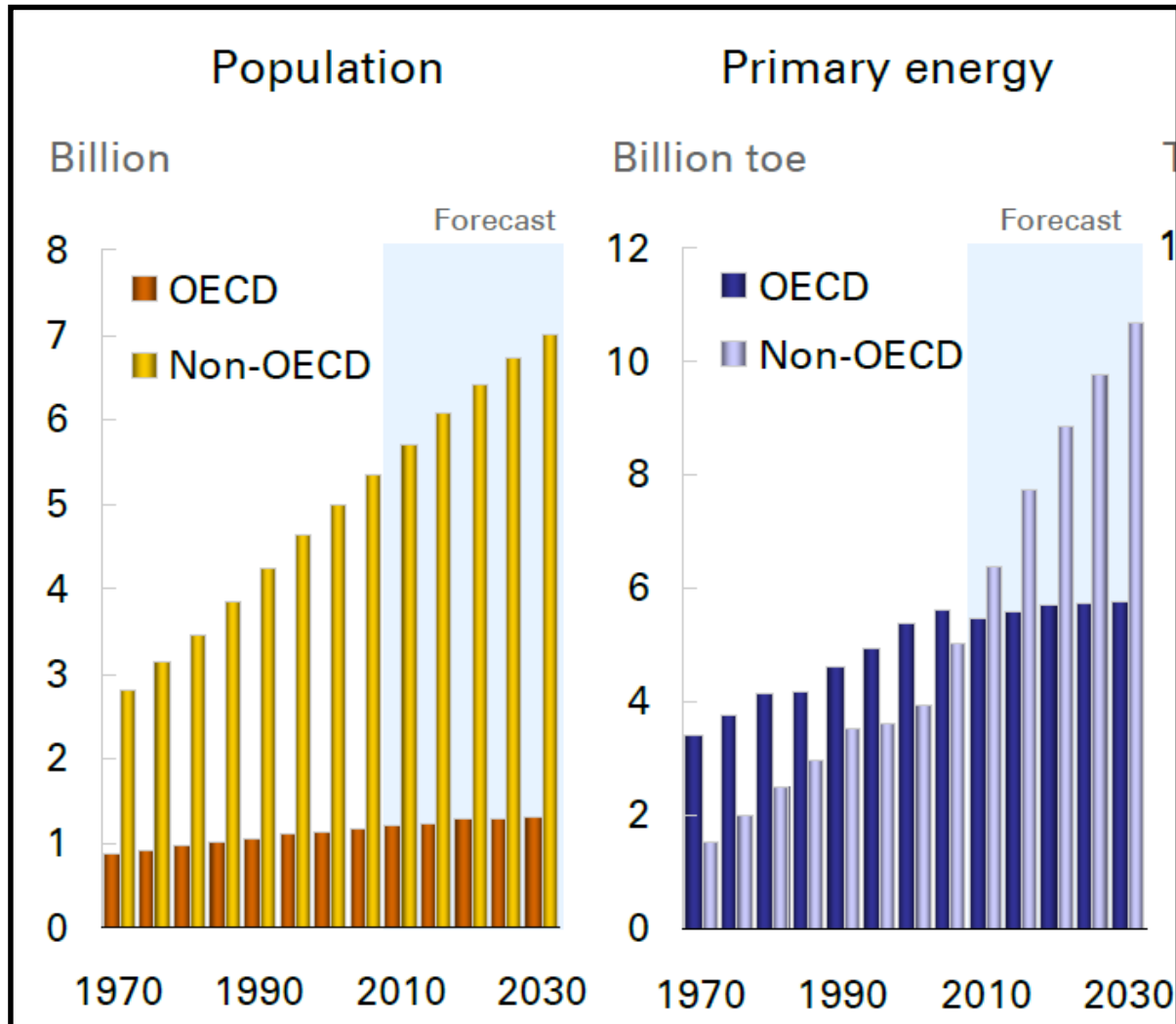


Figure 8. World Marketed Energy Consumption, 1980-2030



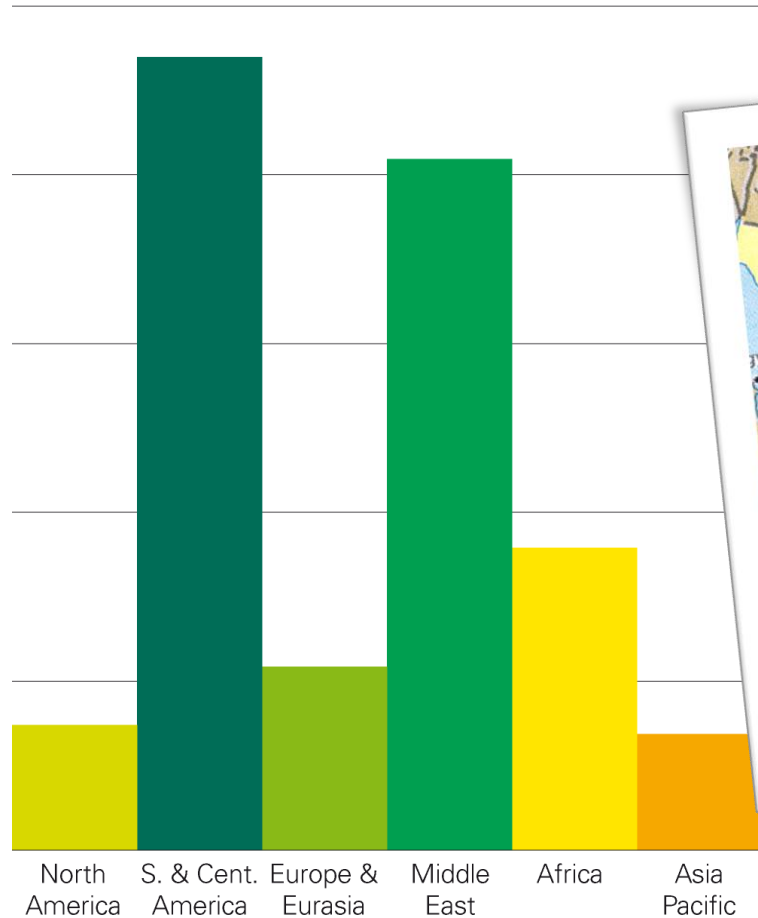
Sources: **History:** Energy Information Administration (EIA), *International Energy Annual 2004* (May-July 2006), web site www.eia.doe.gov/iea. **Projections:** EIA, *System for the Analysis of Global Energy Markets* (2007).



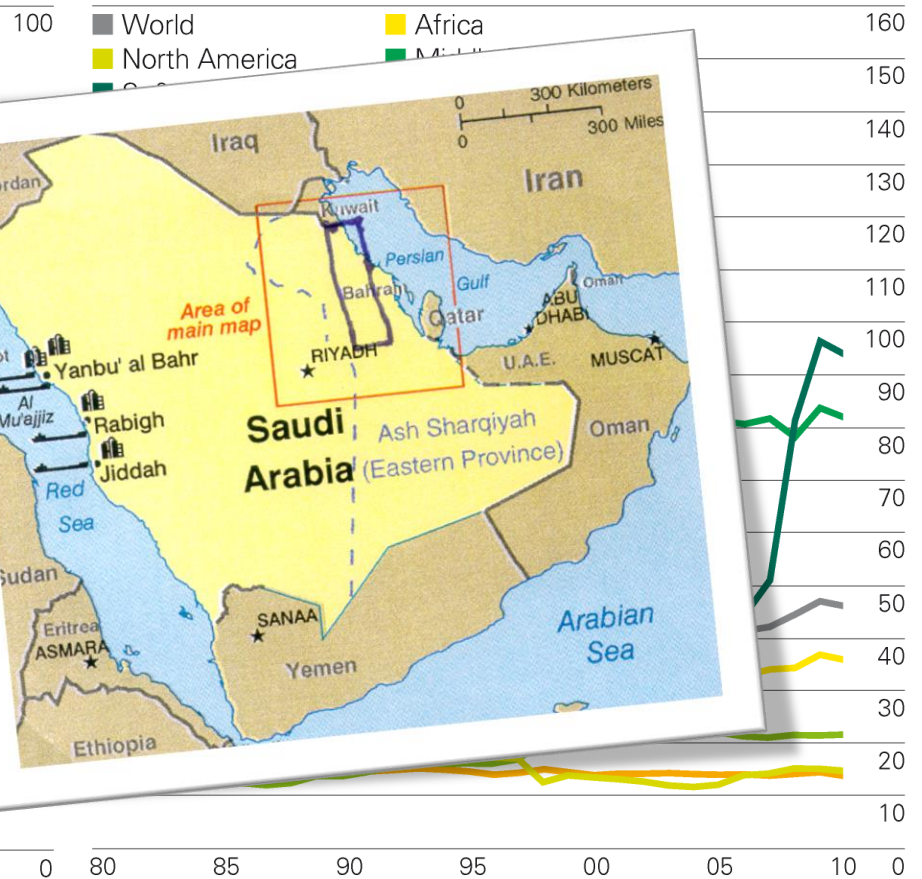


Reservas / produção

2010 by region



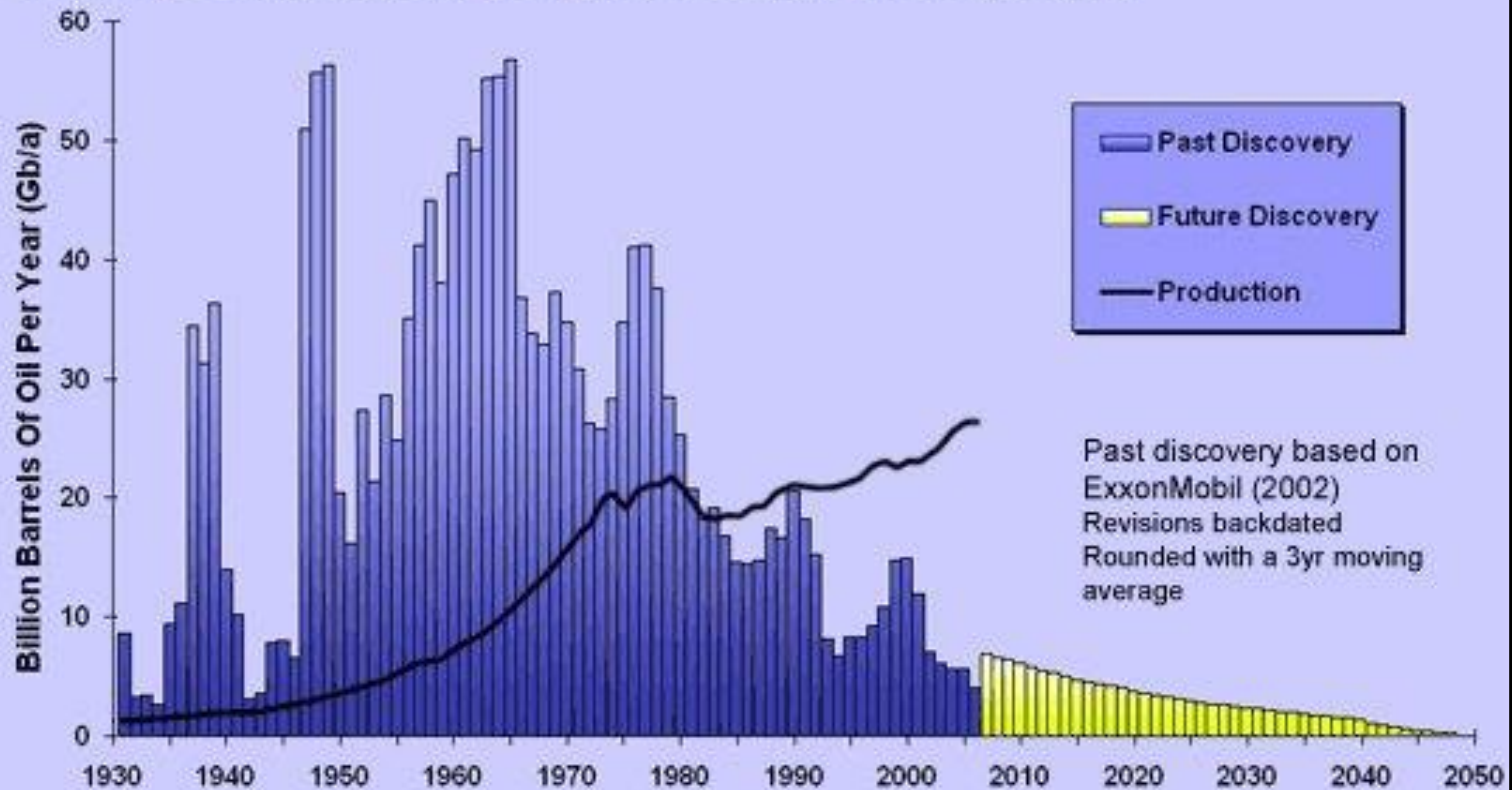
History

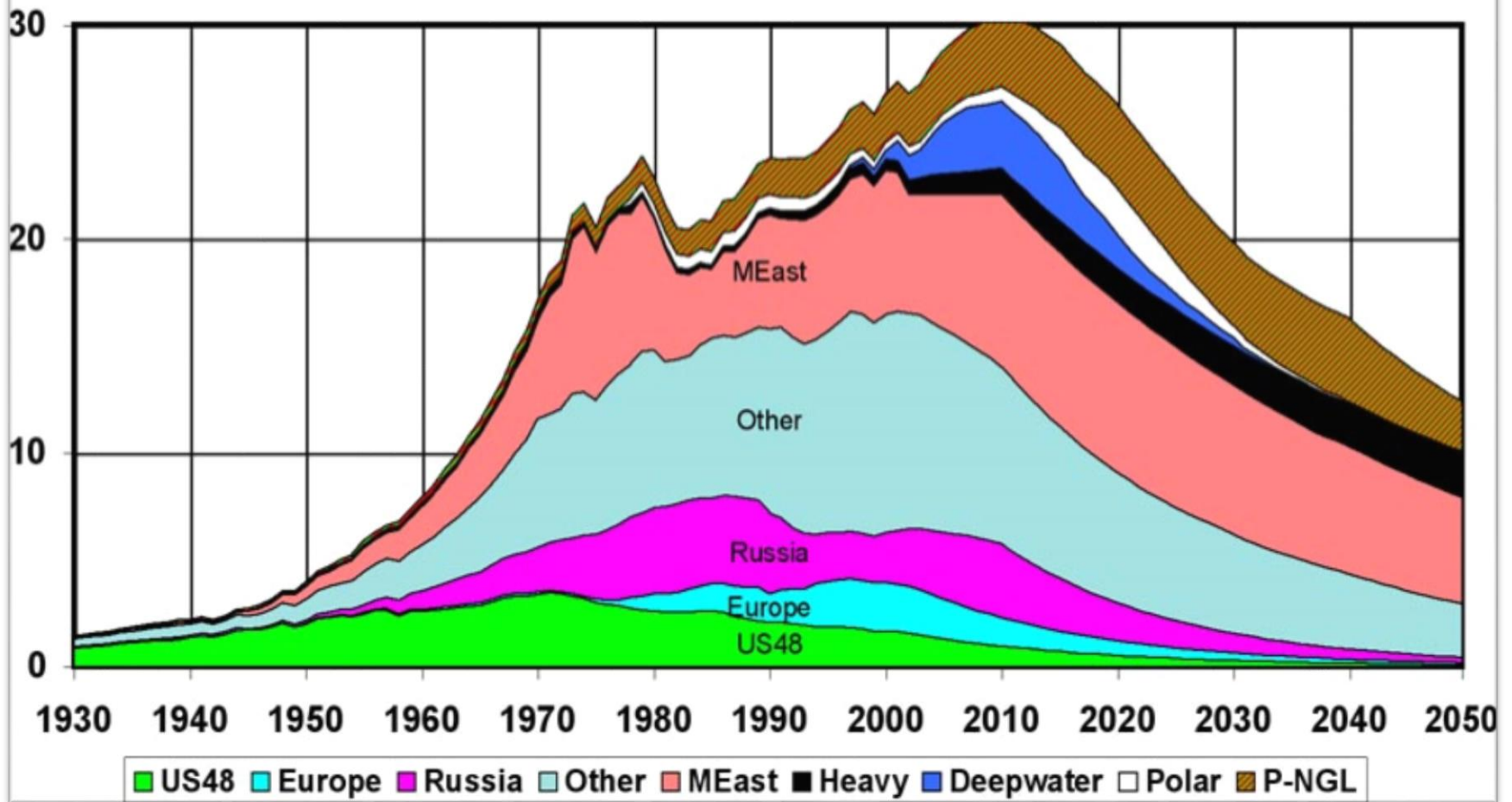


Reservas provadas representam **46 anos de produção aos níveis actuais.** 21

THE GROWING GAP

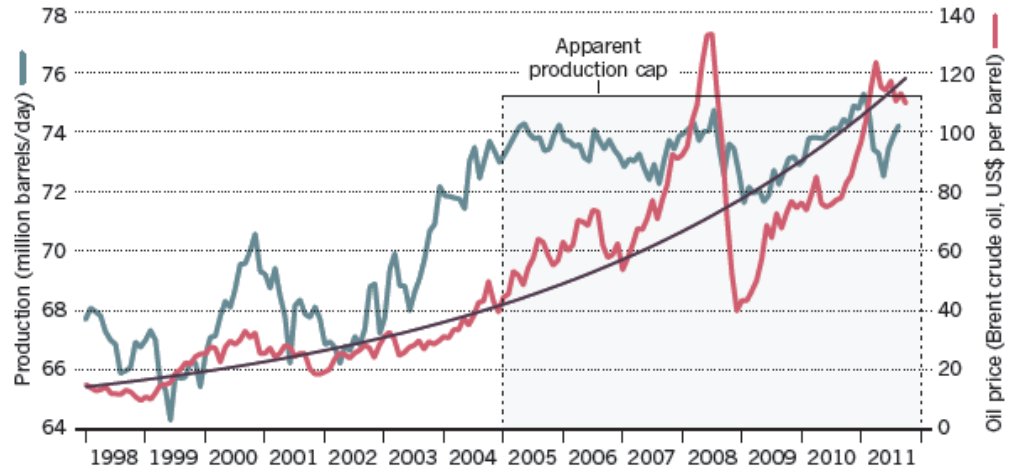
Regular Conventional Oil: Discovery & Production





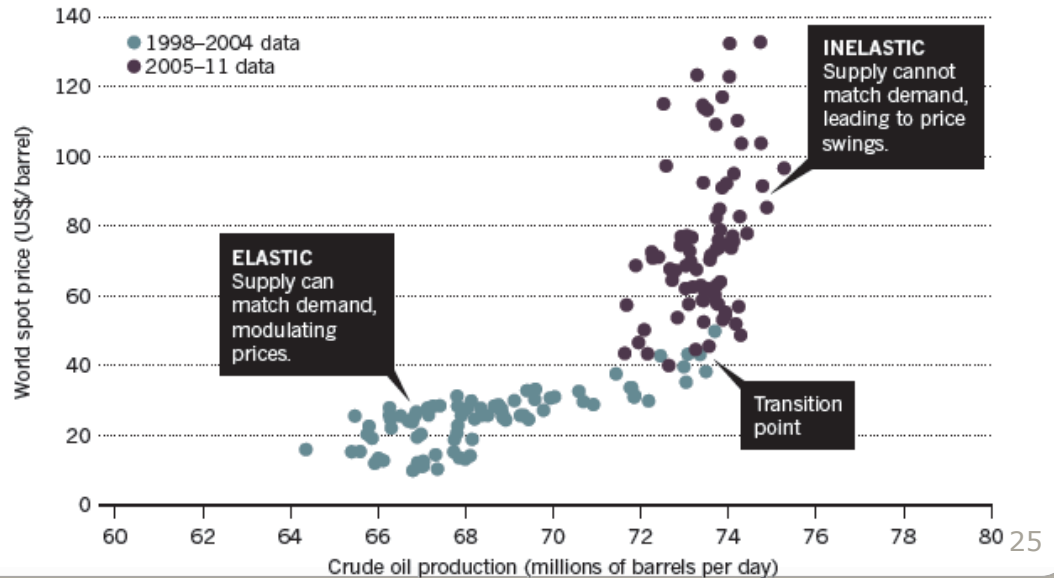
OIL PRODUCTION HITS A CEILING

Production followed demand until 2005, when it levelled off despite continued price increases. There seems to be a production 'cap' at about 75 million barrels per day.



PHASE SHIFT

The abrupt change in oil economics can be seen in this scatter plot of production versus price.





Subida de \$15/barril:

0.6-0.8% descida PIB

0.3-0.7% subida inflação

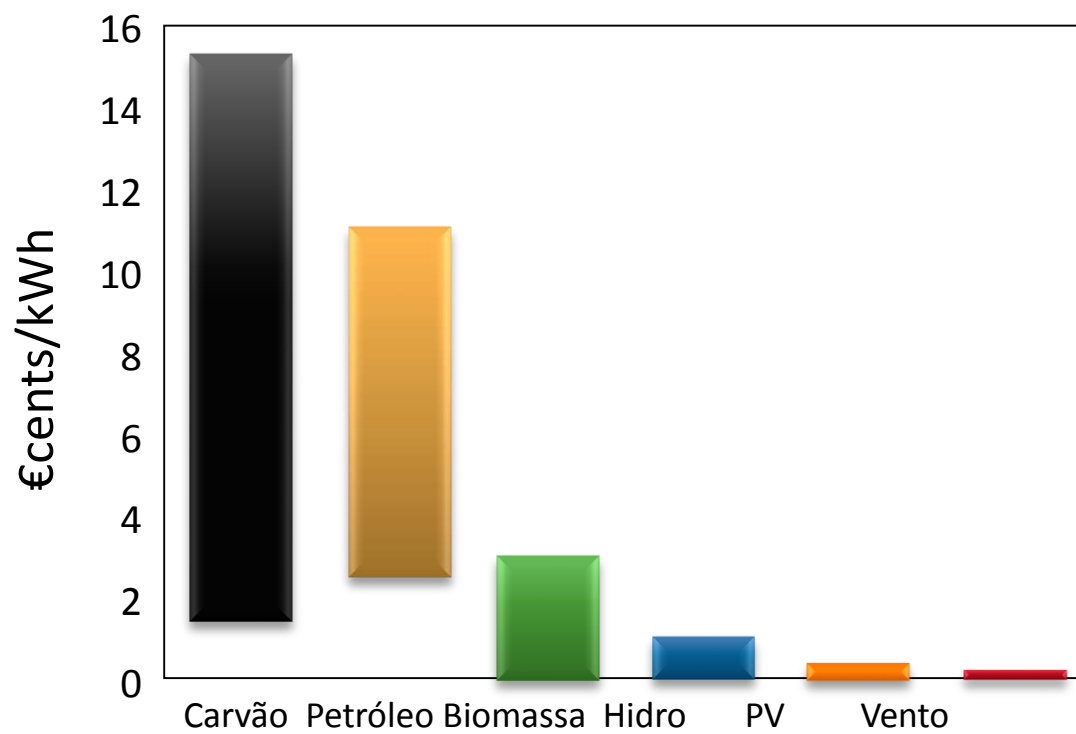
Subsídios UE (2001)

Carvão	13.0
Petróleo	8.7
Nuclear	8.2
Renováveis	5.3
Total	29.2 bn€

Subsídios EUA (histórico)

	Nuclear 1947-1961	Vento 1975-1989
Produção (bnkWh)	2.6	1.9
Subsídio (\$/kWh)	15.3	0.46
Subsídio (bn\$)	39.4	0.9
Produção 1999	727.9	3.5

Externalidades

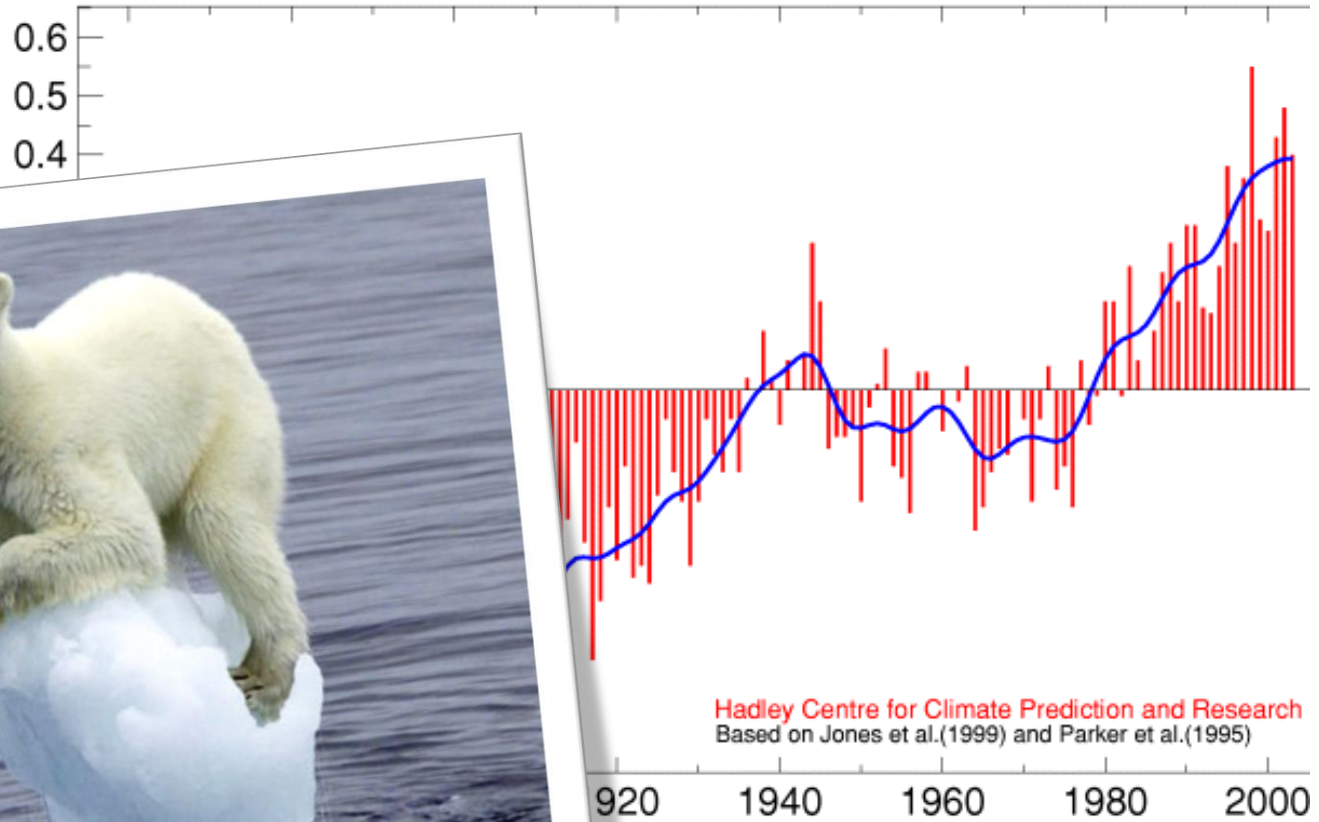








Externalidades





diariodigital

1ª PÁGINA

SOCIEDADE

POLÍTICA

MUNDO

ECONOMIA

DESPORTO

CULTURA

MULTIMÉDIA

MÚSICA



galp energia

 SUBSCREVER
NEWSLETTER

AMBIENTE

Imprimir Enviar por Email

Aquecimento global: 600 milhões com fome, 3.200 milhões com seca

O aumento médio da temperatura no planeta previsto para 2 a 3 graus Celsius levará a que entre 200 a 600 milhões de pessoas sejam afectadas pela fome em 2080, enquanto a falta de água afectará de 1,1 a 3,2 mil milhões, revela um novo estudo sobre as alterações do clima.

O texto preliminar do Painel Intergovernamental para as Alterações Climáticas só deverá ser divulgado em Abril, mas o jornal australiano The Age teve acesso a alguns dos seus dados.

O documento adianta que a escassez de água afectará sobretudo a China, Austrália e partes da Europa e Estados Unidos, enquanto que inundações litorais podem submergir cerca de 7 milhões de casas.

O Painel Intergovernamental foi criado em 1988 pela Organização Meteorológica Mundial e pelo Programa Ambiental da ONU para orientar as políticas globais sobre o aquecimento global.

O grupo deve divulgar sexta-feira em Paris um relatório prevendo que até 2100 a temperatura média do mundo estará entre 2 a 4,5 graus centígrados acima dos níveis pré-industriais, sendo que a estimativa mais provável é de 3 graus.

Este relatório deve resumir a base científica das alterações climáticas, enquanto o texto de Abril enumerará os pormenores das consequências do aquecimento e as opções para que seja possível adaptar-se-lhe.

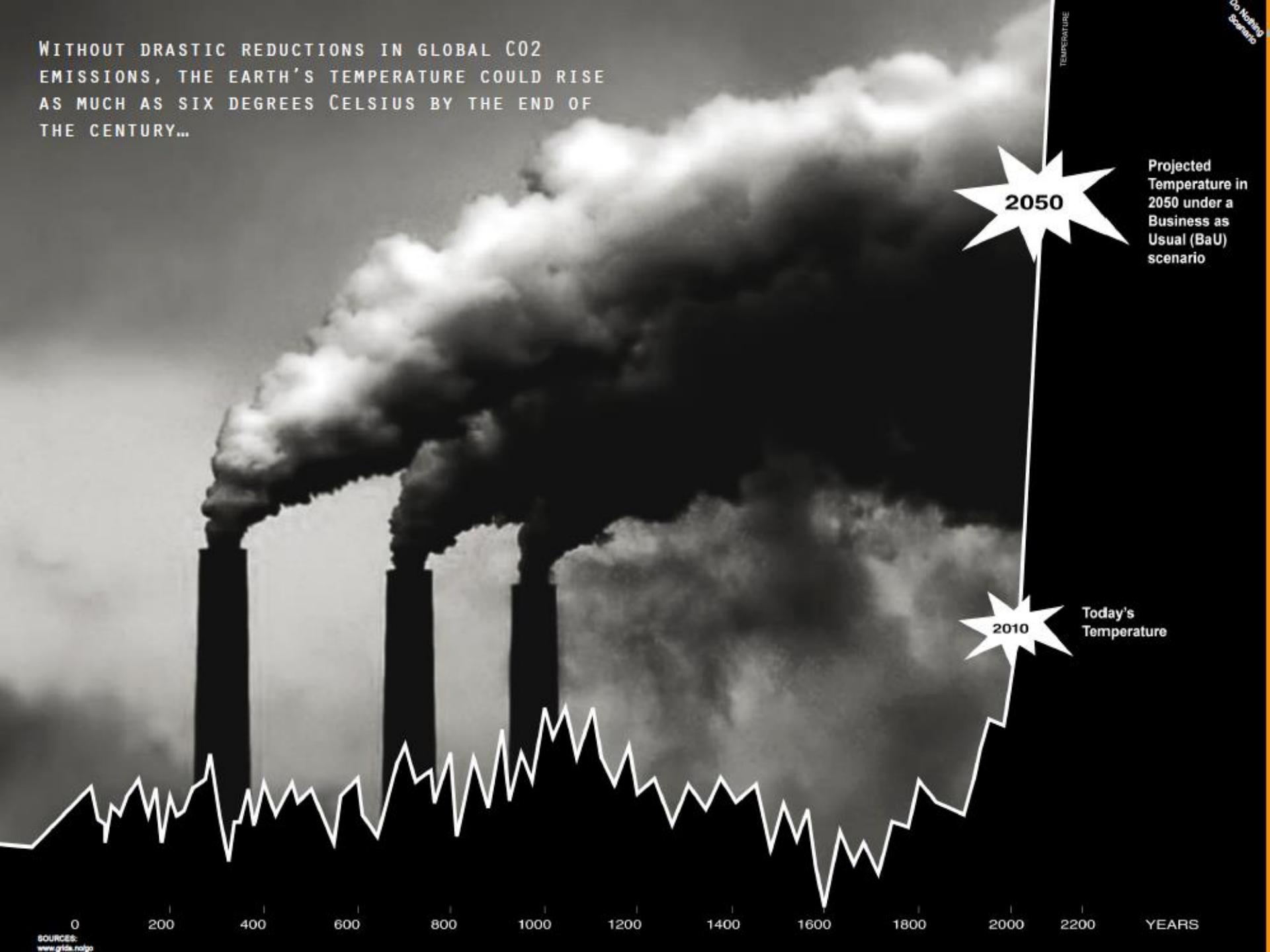
O relatório preliminar contém um capítulo inteiro sobre a Austrália, que vive actualmente a pior seca da sua história, alertando que a Grande Barreira de Recifes se tornará «funcionalmente extinta» devido à destruição dos corais.

Além disso, a neve deve desaparecer das montanhas no sudeste do país, enquanto o fluxo de água na bacia do rio Murray-Darling, principal área agrícola australiana, deve cair de 10 a 25% até 2050.

Na Europa, os glaciares deverão desaparecer dos Alpes centrais, enquanto algumas ilhas do Pacífico devem ser gravemente atingidas pela elevação dos mares e intensificação da frequência das tempestades tropicais.

30-01-2007 16:01:13

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...



'CLIMATE INCIDENTS'

© Anomalia



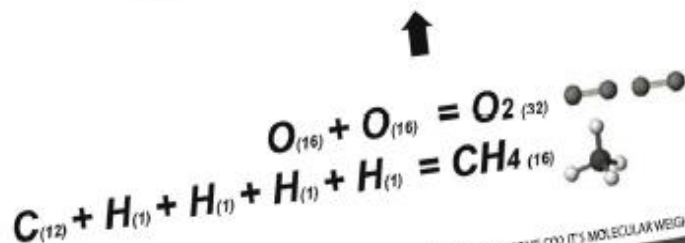
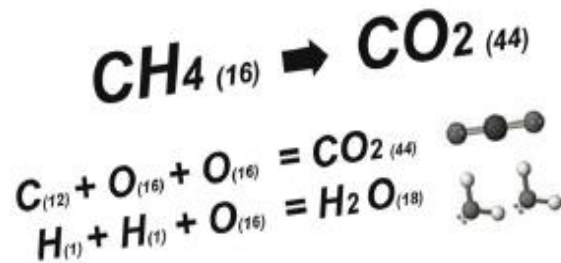
CO₂ PARADOX

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	Seelenium Se = 78.2
5	Krypton Kr = 83.84	Rubidium Rb = 85.45	Strontium Sr = 87.62	Cadmium Cd = 112.40	Indium In = 114.8	Tin Sn = 118.7	Antimony Sb = 120.7	Tellurium Te = 127.5
6	Xenon Xe = 131.3	Silver Ag = 107.88	Cadmium Cd = 112.40	Barium Ba = 137.34	Lanthanum La = 138.9	Cerium Ce = 140.25	Praseodymium Pr = 140.9	Neodymium Nd = 144.3
7					Gadolinium Gd = 157.3	Terbium Tb = 158.9	Tantalum Ta = 181.9	Tungsten W = 184.0
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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)



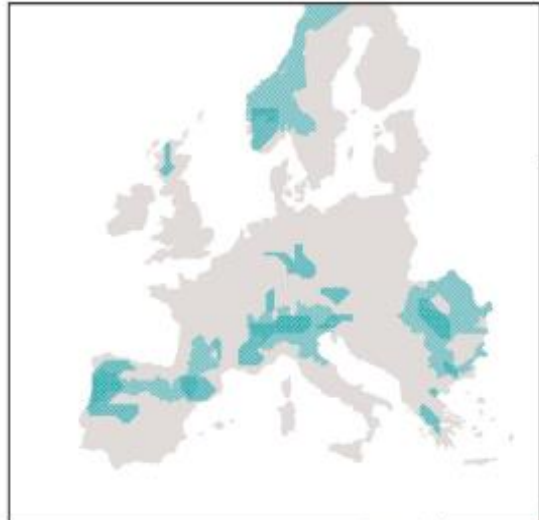
Fim do paradigma fóssil

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

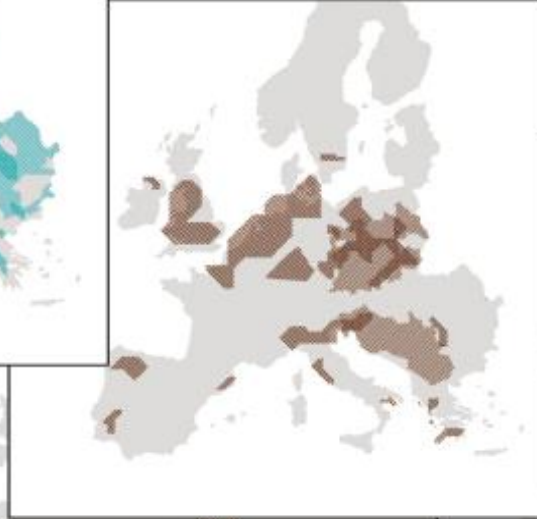


RENEWABLE ENERGY RESOURCE MAPPING

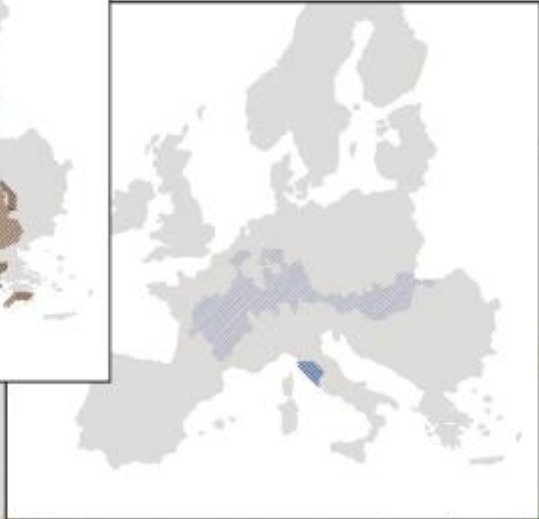
AN INTEGRATED EUROPE OFFERS A VARIETY OF GEOGRAPHIC PREDISPOSITION, AND THEREFORE A DIVERSE AREA OF HIGH POTENTIAL FOR REDRWABLE SOURCES.



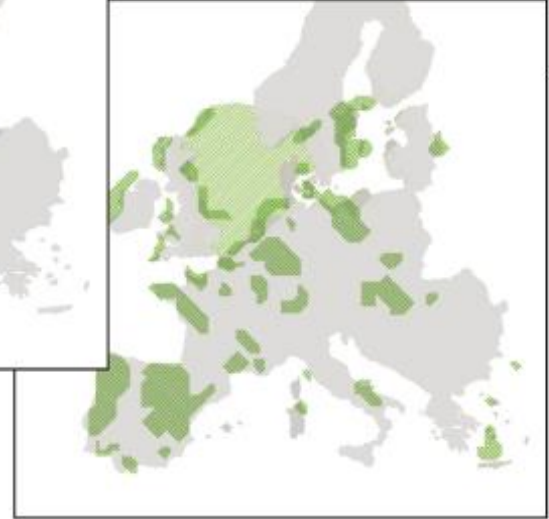
HYDROPOWER



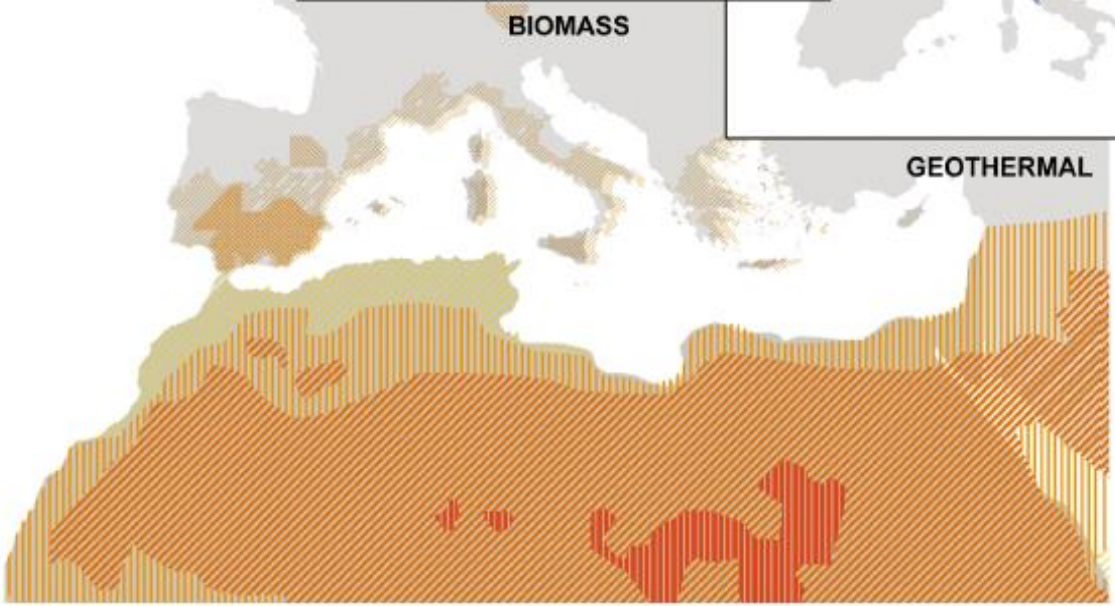
BIOMASS



GEO THERMAL



WIND ENERGY

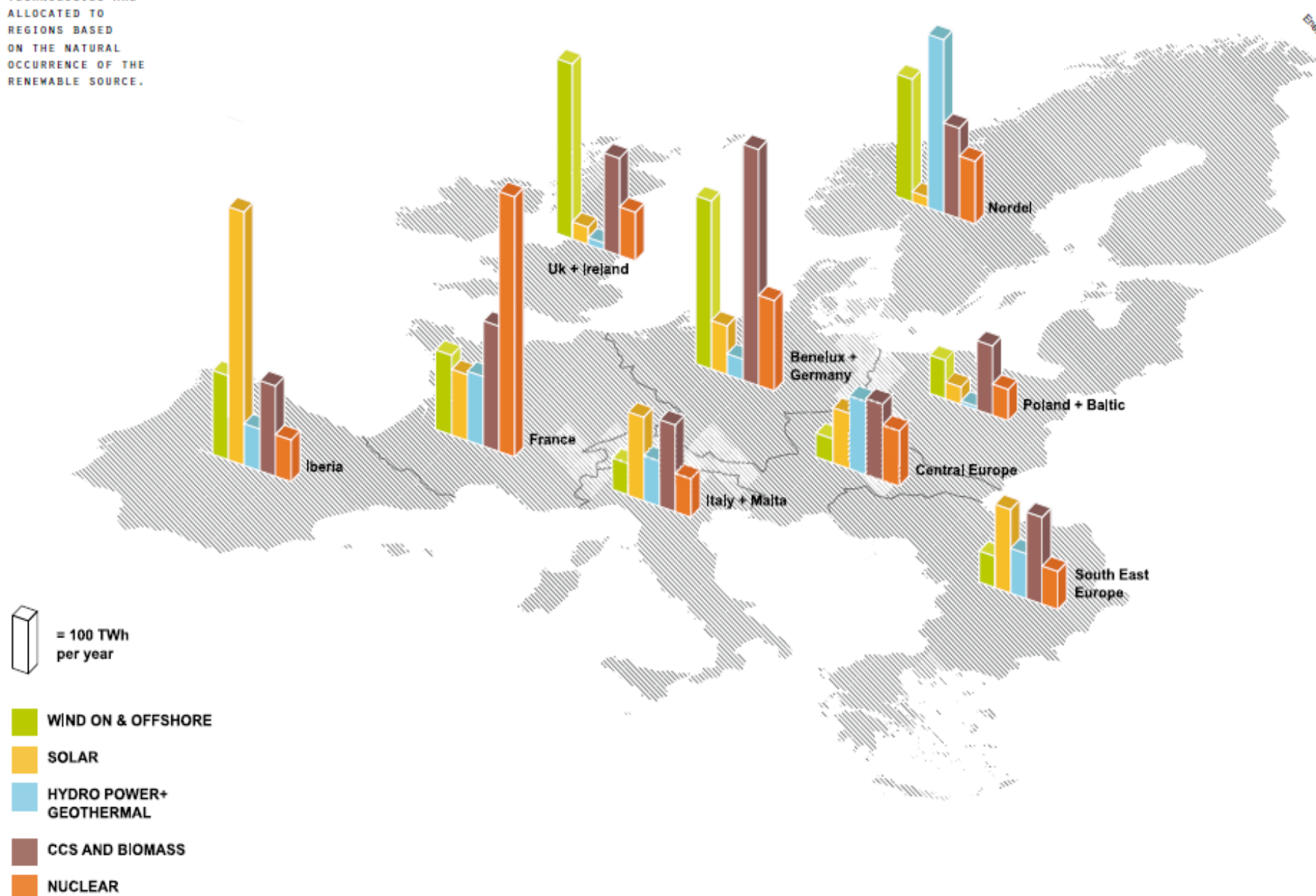


SOLAR

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.





Boundaries:

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

Map of ENEROPA

Scale 1 : 20000000



Meridian of Greenwich













ISLES OF WIND



SOLARIA





Tidal States



BIOMASSBURG



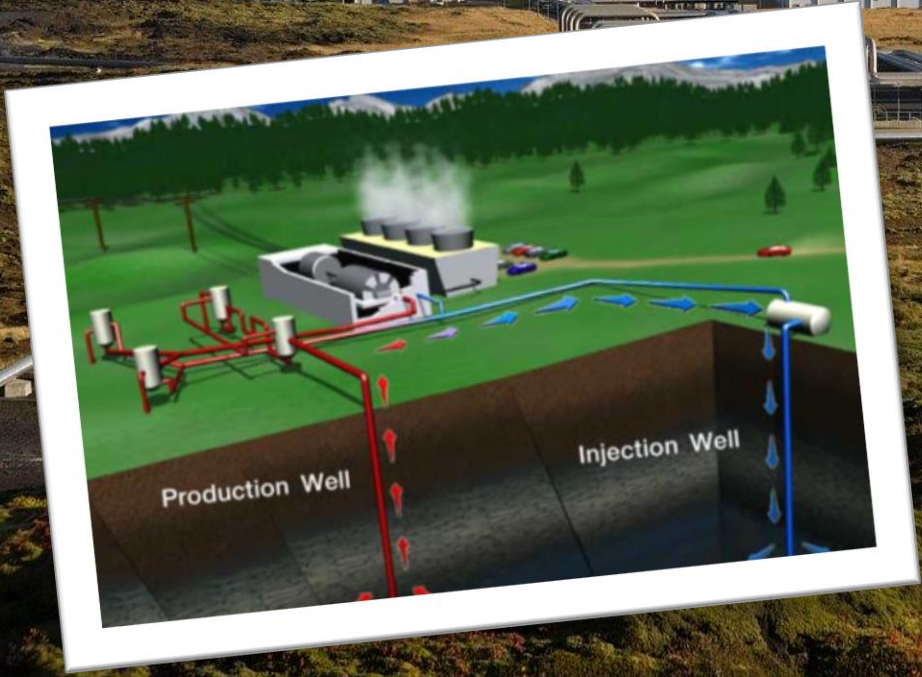
HYDROPIA



HydroPIA

ENHANCED GEOTHERMALIA





Energias renováveis

Inesgotáveis?

Verdes?

Limpas?

Gratuitas?

Acessíveis a todos?

