CONAMA2014

CONGRESO NACIONAL DEL MEDIO AMBIENTE

ST-1
RETOS Y OPORTUNIDADES PARA LA TRANSICIÓN ENERGÉTICA EN ESPAÑA

MARCO GLOBAL

Mariano Marzo Carpio (UB)

Madrid, 25 de Noviembre de 2014

THE NEXT GOLDEN STATE: A 16-PAGE SPECIAL REPORT ON AUSTRALIA

The Economist

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Obama, Bibi and peace

The costly war on cancer

How the brain drain reduces poverty

A soft landing for China

MAY 28TH–JUNE 3RD 2011 Economist.com

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$$CO2\uparrow = \left(P\ x \frac{PIB}{P} x \frac{E}{PIB} x \frac{CO2}{E} \right) - CO2\downarrow$$

$CO_2\uparrow$ = CO_2 neto antropogénico a la atmosfera

P = población mundial

PIB / P = renta per cápita global

E / PIB = intensidad energética mundial

CO_2 / E = intensidad de carbono del mix energético global

$CO_2\downarrow$= CO_2 secuestrado por medios naturales o inducidos

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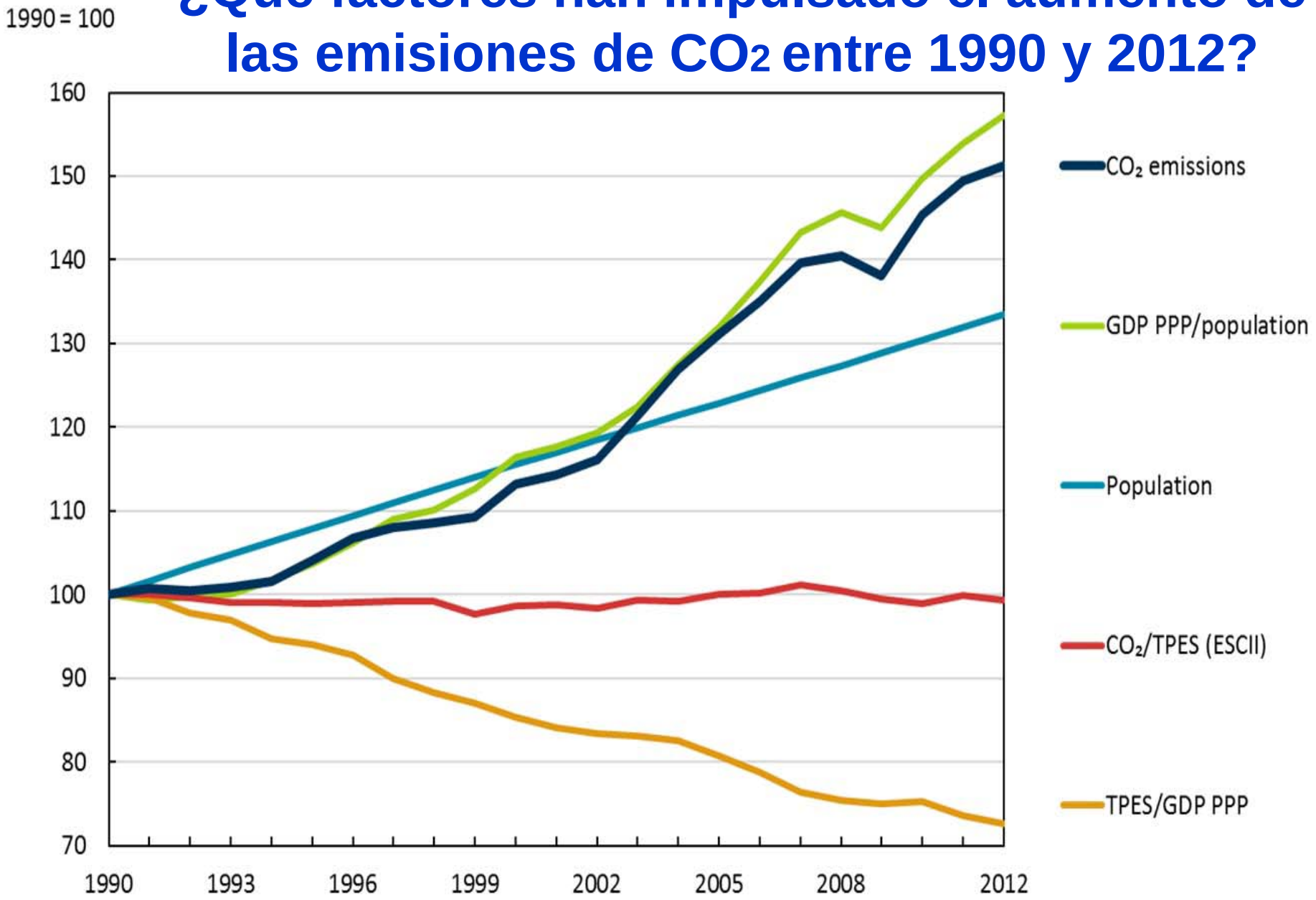
¿Qué factores han impulsado el aumento de las emisiones de CO_2 entre 1990 y 2012?



IEA Weekly Energy Snapshot 21-10-2014

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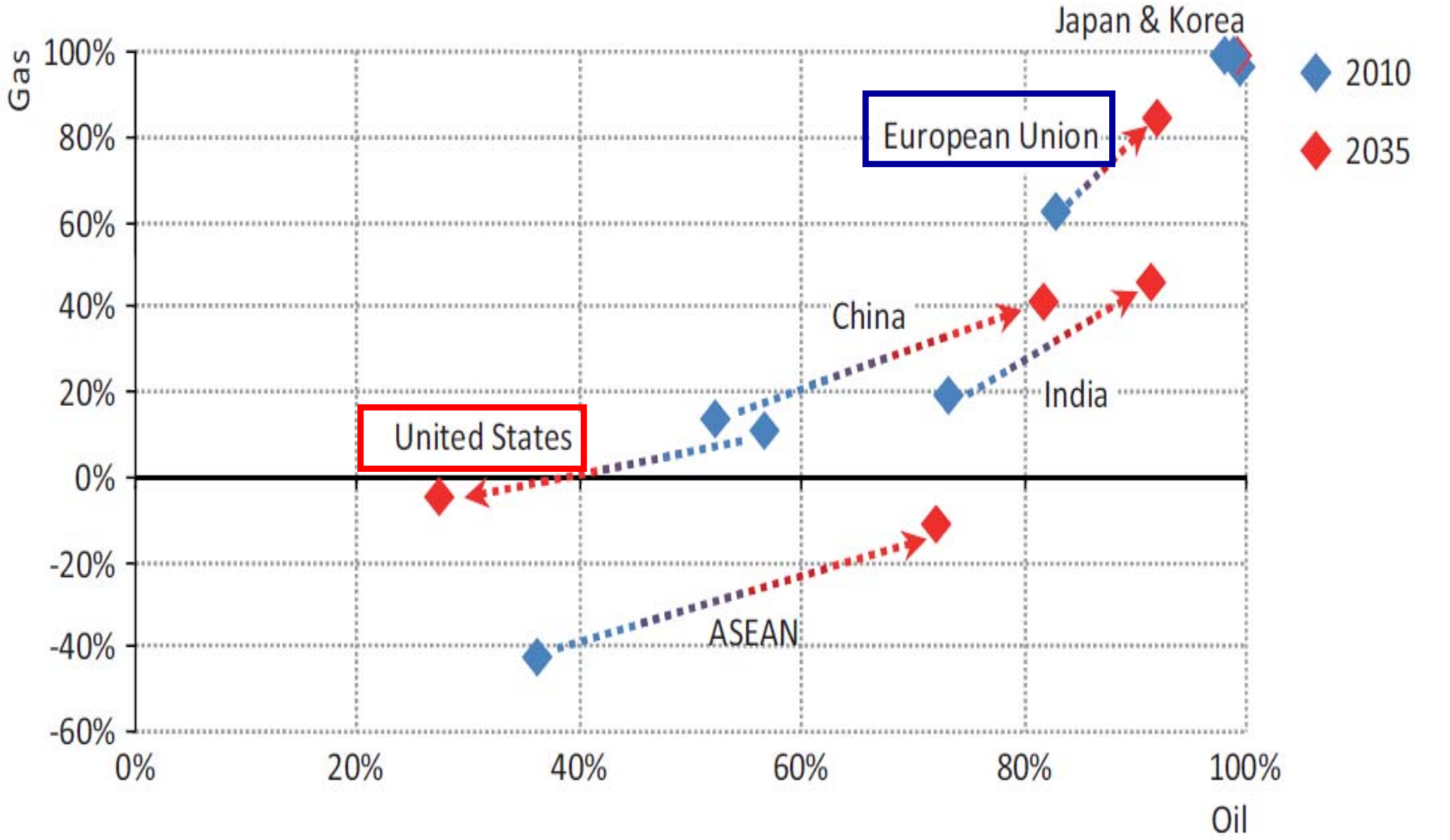
The Economist

Geopolitics

The petrostate of America

The Economist, 15-2-2014

Dependencia de las importaciones de petróleo y gas



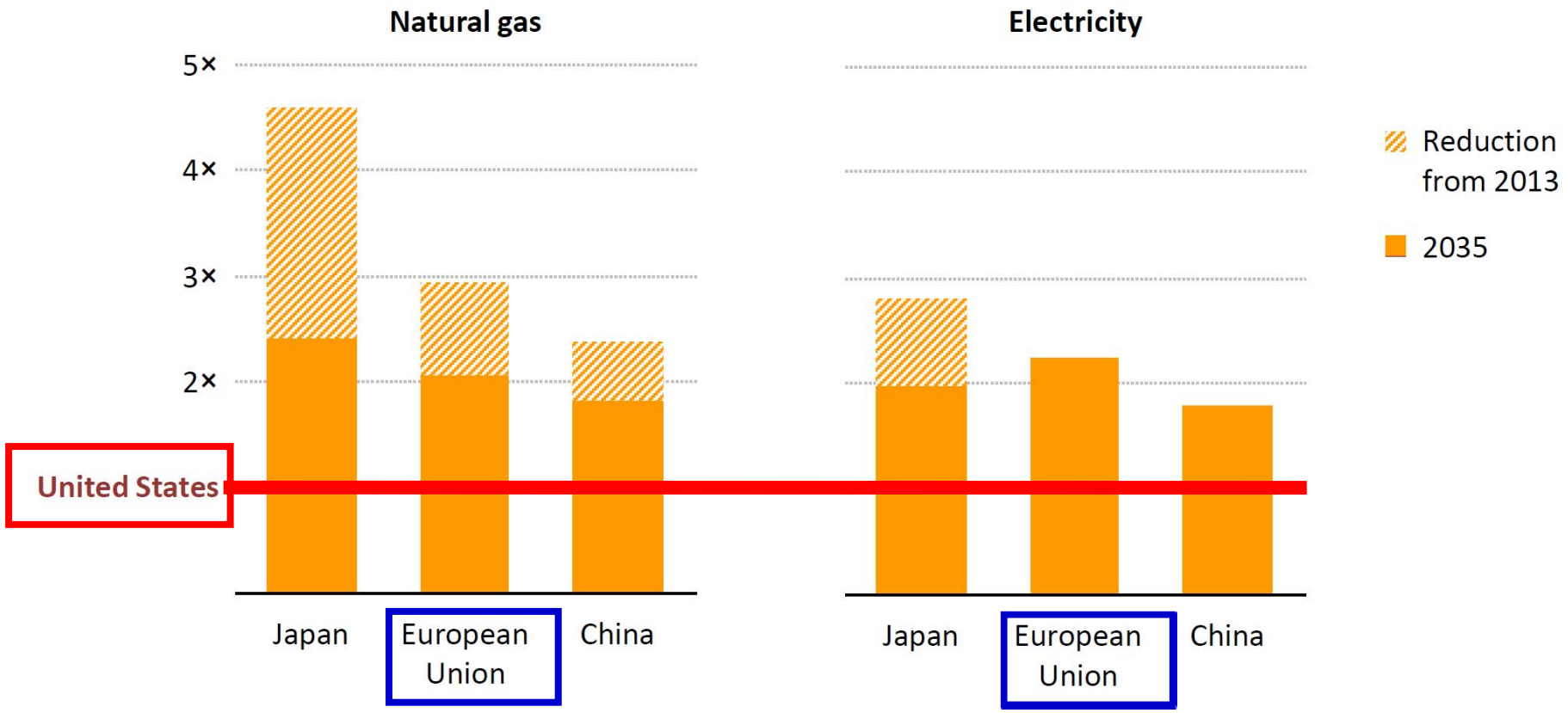
Note: Import dependency is calculated as net imports divided by primary demand for each fuel.

IEA, WEO 2013

Who has the energy to compete?

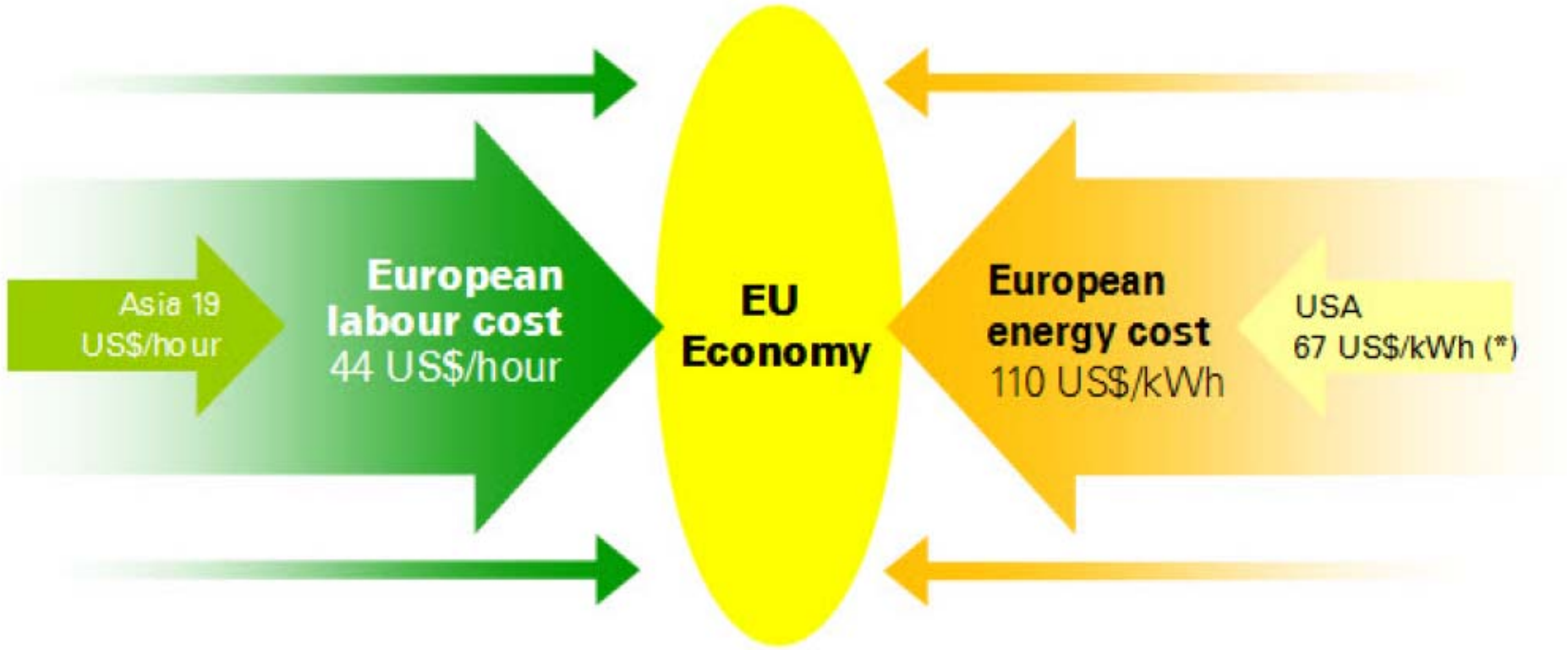
WORLD ENERGY OUTLOOK 2013

Ratio of industrial energy prices relative to the United States



Regional differences in natural gas prices narrow from today's very high levels but remain large through to 2035; electricity price differentials also persist

Impacto de los altos costes laborales y energéticos sobre la economía de la UE

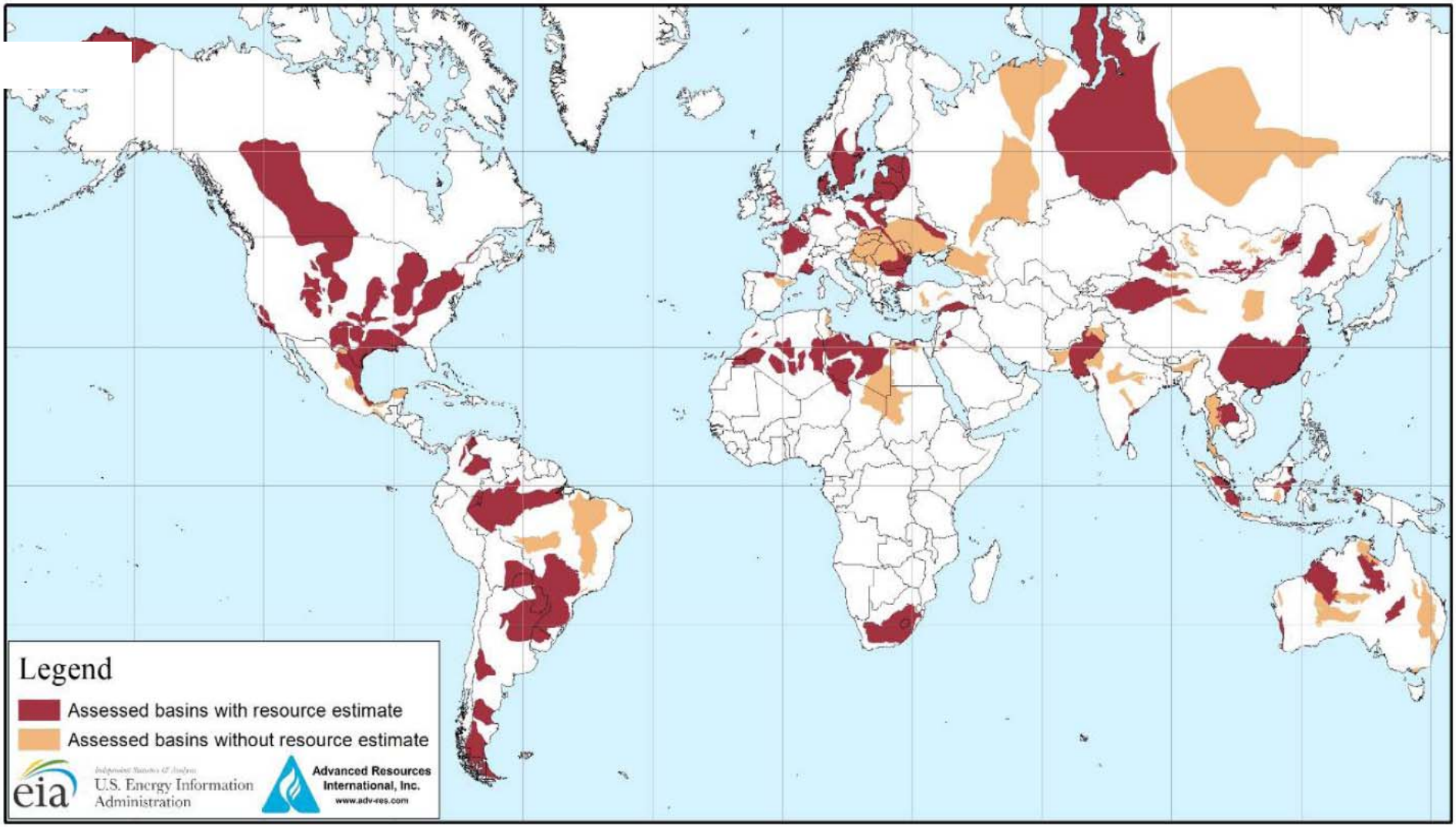


USA labour cost is $35/hour

Energy for Europe-time to reflect, I. Conn, BP Group, Managing Director, 29-XI-2013

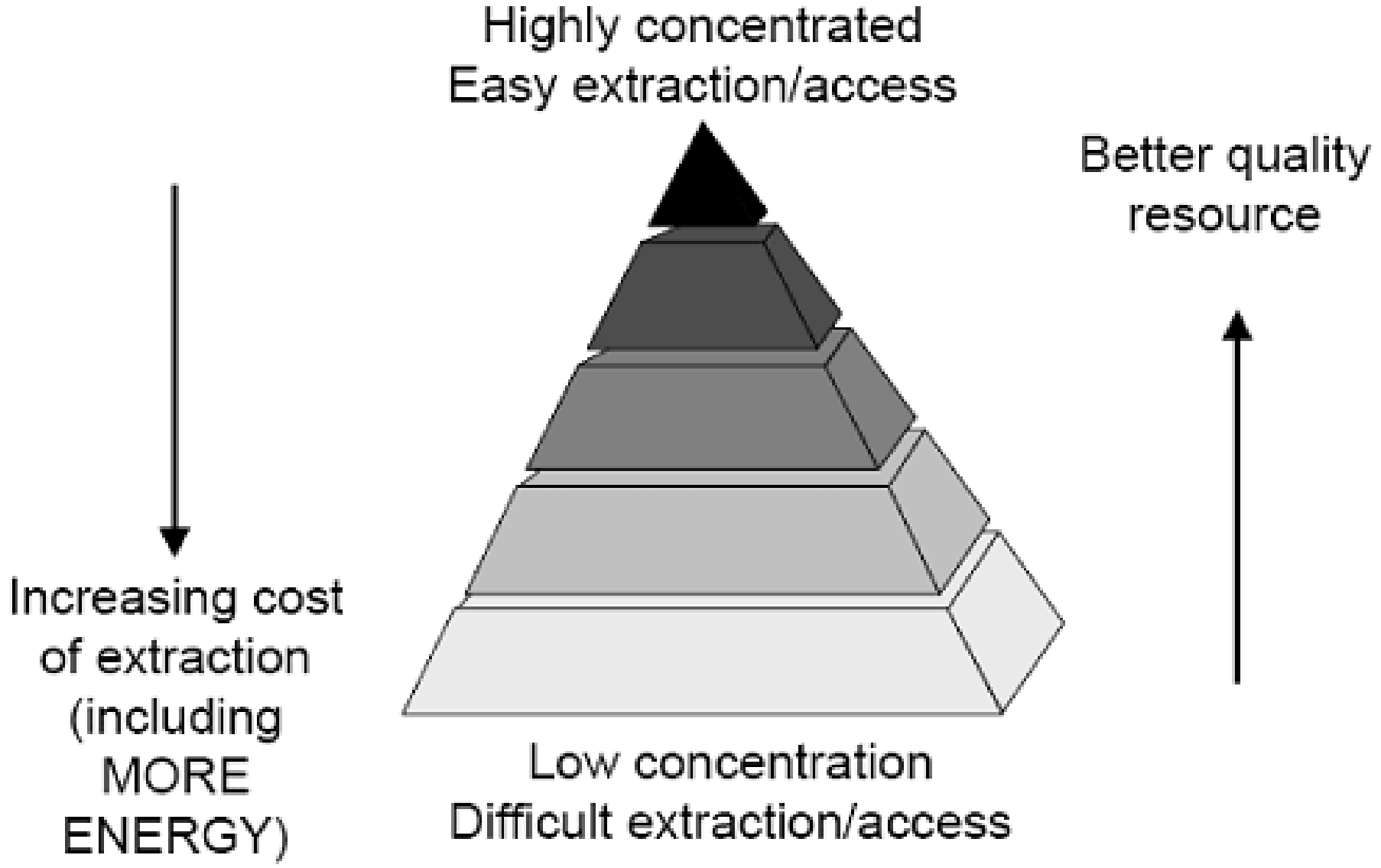
Una industria regional (EE.UU. y Canadá)
Unos recursos globales y uniformemente distribuidos

Figure 1. Map of basins with assessed shale oil and shale gas formations, as of May 2013

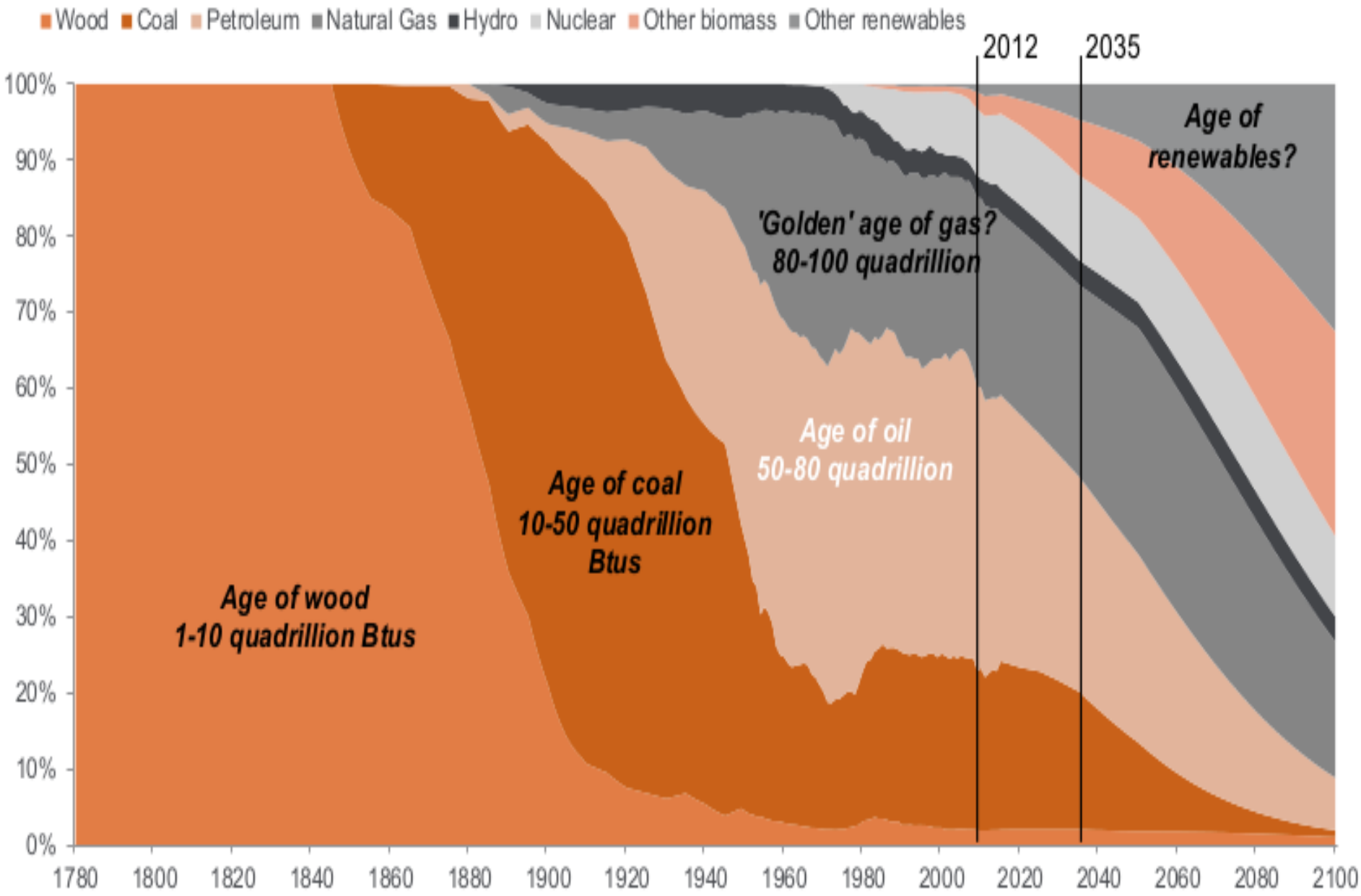


EIA, June 2013

Resource Pyramid
(for minerals)



¿Darwinismo energético o revolución?



¿Qué hacer?

Las **mejoras en eficiencia** pueden mitigar los altos costes de la energía al mismo tiempo que permiten ganar posiciones en los frentes de la seguridad de suministro y del medioambiente

Los políticos deben impulsar la competitividad energética apoyando el **desarrollo de las fuentes de suministro autóctonas, tales como las renovables maduras y competitivas, la nuclear y los hidrocarburos mas limpios (C y NC)**

Sea cual sea la composición del mix energético de un país, la existencia de unos **mercados eficientes y competitivos** pueden minimizar los costes de la energía para su economía.

Mas allá de las políticas de cada estado, es importante alcanzar un **acuerdo internacional bien diseñado en materia de cambio climático**. Este podría constituir una potente herramienta para lograr que las industrias energéticamente intensivas de los países activamente comprometidos en la reducción de emisiones de gases de efecto invernadero, como es el caso de la UE, no experimentasen una merma en su competitividad en relación a la industria de aquellos países menos comprometidos, como es el caso de los EE.UU.

"Everything that can be invented has been invented"

Charles H. Duell, Director of US Patent Office, 1899

"Who the hell wants to hear actors talk?"

Harry M. Warner, Warner-Bros. Pictures, c.1927

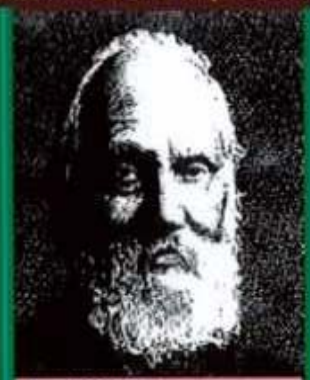
"Sensible and responsible women do not want to vote"

Grover Cleveland, 1905

"There is no likelihood man can ever tap the power of the atom"

Robert Milliken, Nobel Prize in Physics, 1923

"Heavier than air flying machines are impossible"



Lord Kelvin, President, Royal Society, c. 1895

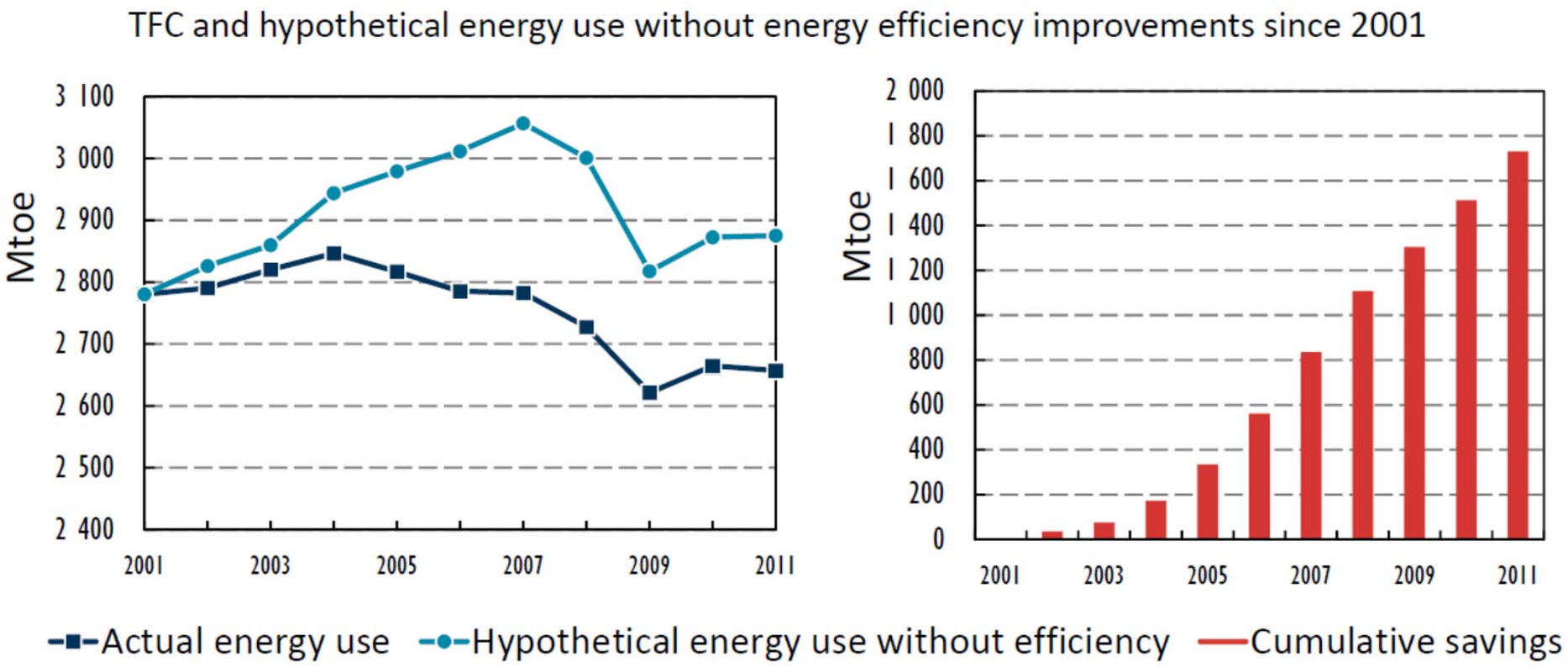
"Ruth made a big mistake when he gave up pitching"

Tris Speaker, 1921

The future isn't what it used to be.

There's no future in believing something can't be done. The future is in making it happen.

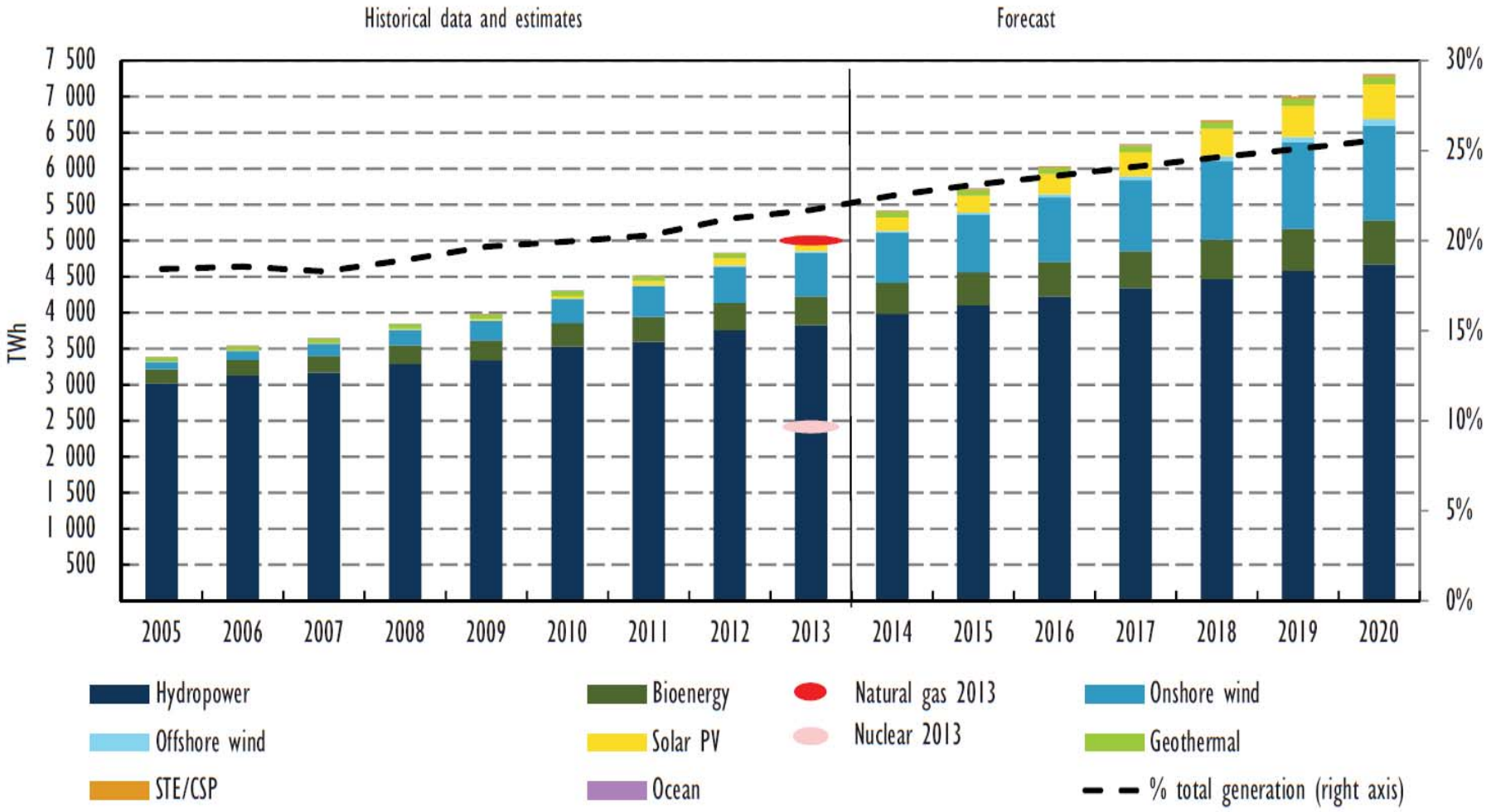
Desde el año 2001 las inversiones en eficiencia energética en 18 países de la AIE ahorraron más energía (1700 Mtep) que el consumo final anual de los Estados Unidos y Alemania



Global energy efficiency market

"an invisible powerhouse" worth at least USD 3,1x 10^{12} per year

Producción global de electricidad a partir de fuentes renovables (historia y previsiones)



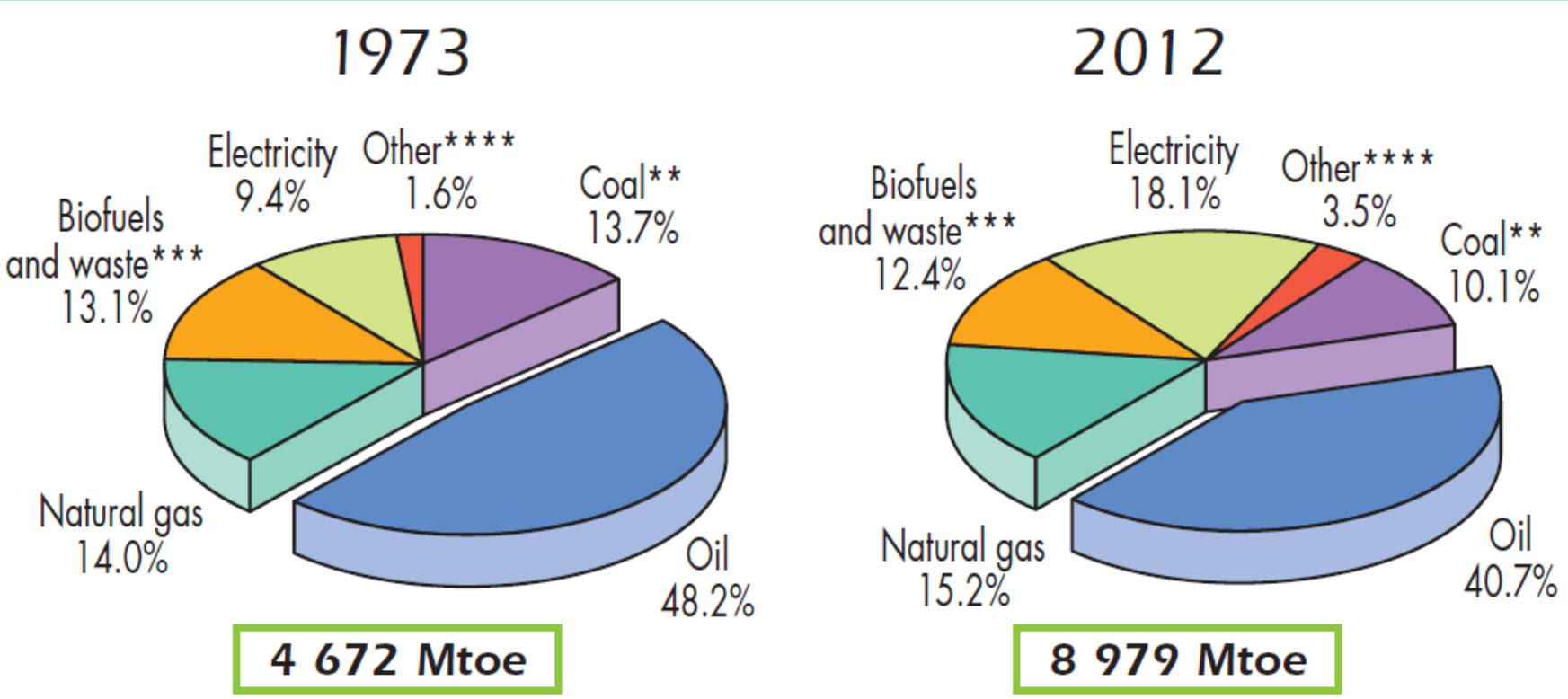
Renewable electricity to scale up by 45% from 2013-2020

TFC Mundo 1973-2012:

CF (75,9%-66%), P+G (62,2%-55,9%), Elec. (9,4%-18,1%)

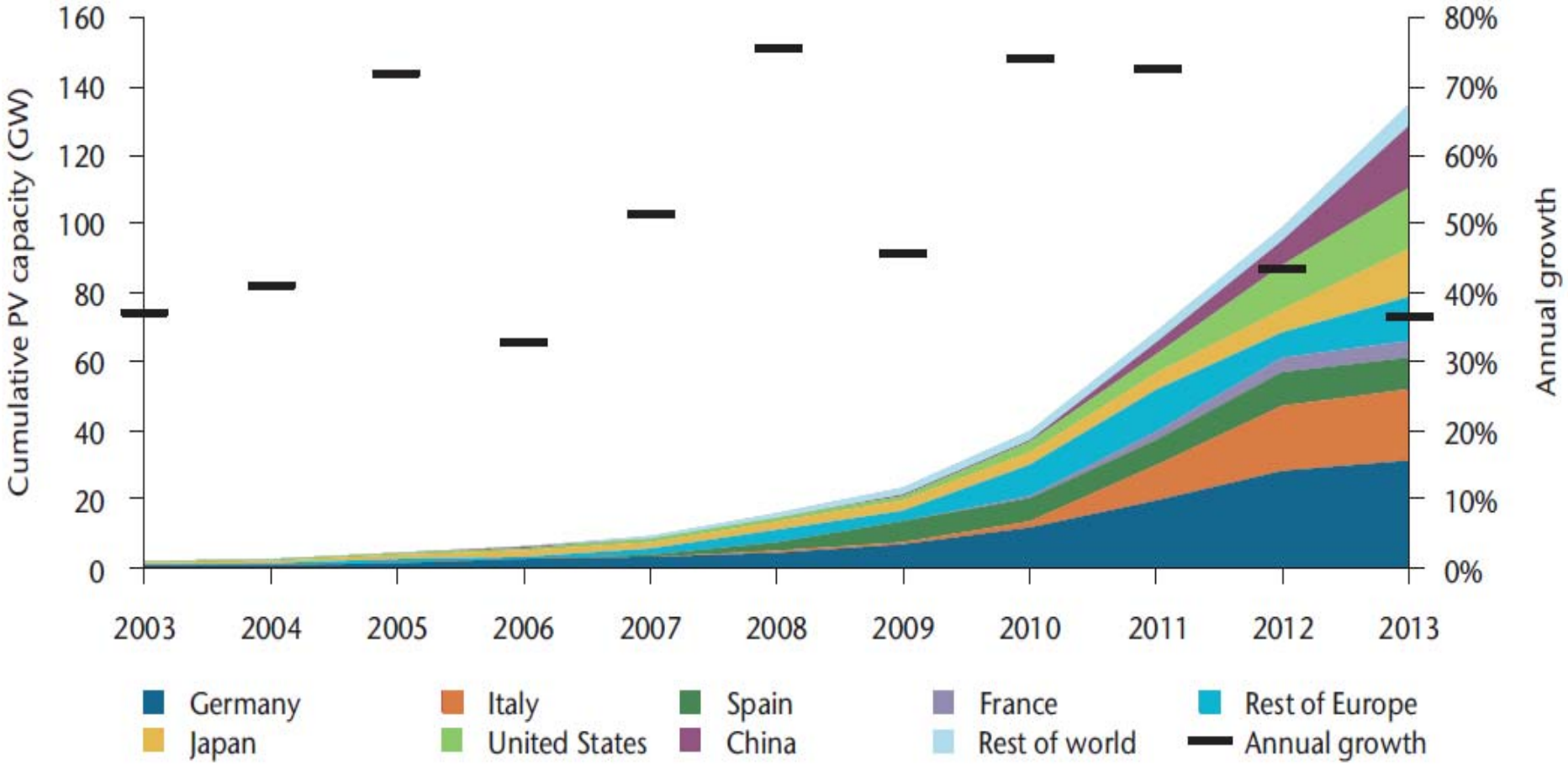
OCDE 1973-2012

CF (84,8%-70,8%), P+G (74%-67,4%), Elec. (11,5%-22,3%)



*World includes international aviation and international marine bunkers.
**In these graphs, peat and oil shale are aggregated with coal.
***Data for biofuels and waste final consumption have been estimated for a number of countries.
****Includes geothermal, solar, wind, heat, etc.

Crecimiento global mundial de la capacidad solar fotovoltaica



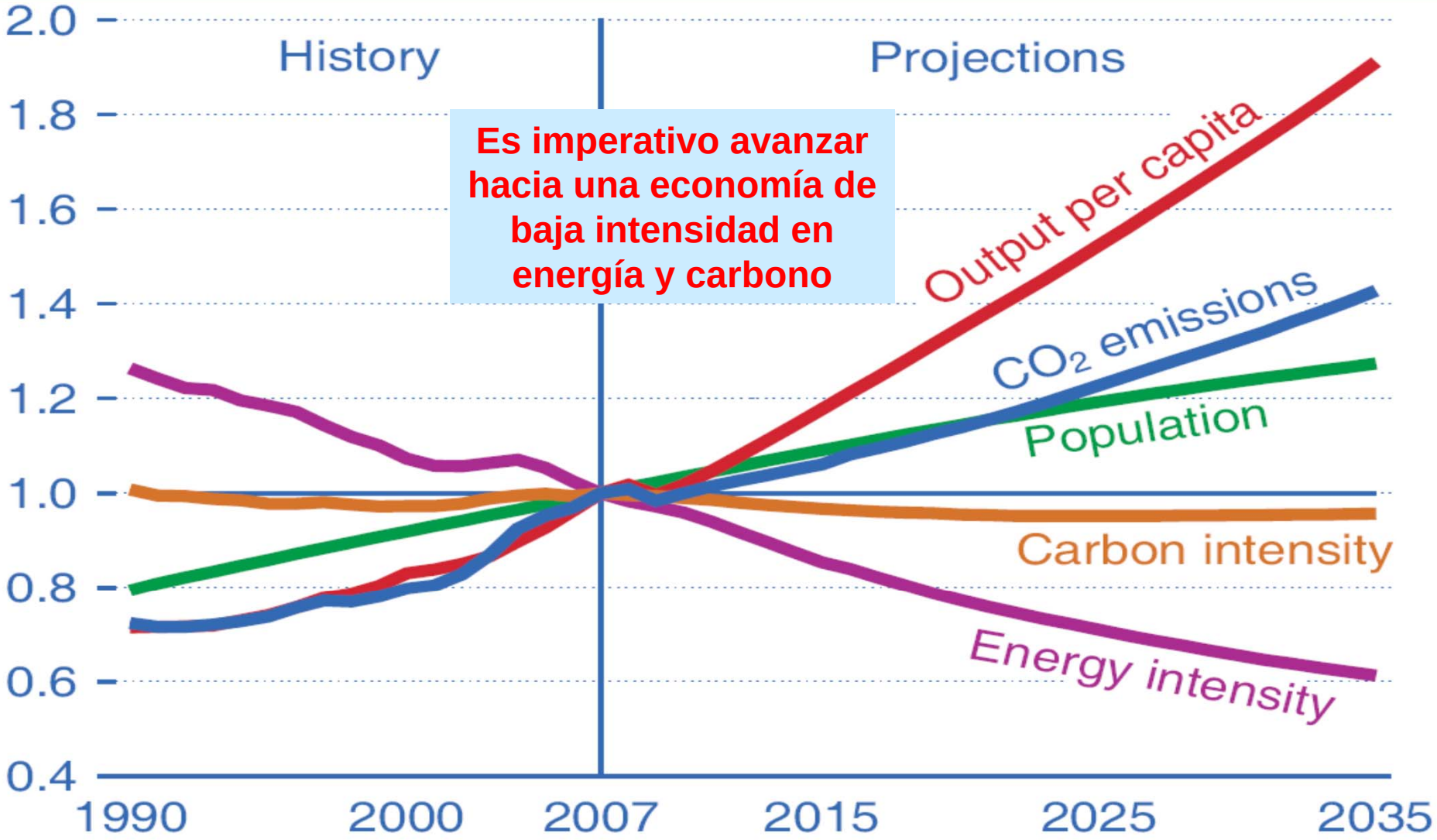
Source: Unless otherwise indicated, all tables and figures derive from IEA data and analysis.

KEY POINT: Cumulative PV capacity grew at 49%/yr on average since 2003.

El cambio climático es, en buena parte, consecuencia de un desarrollo económico y demográfico sin precedentes, posibilitado por el uso masivo de los hidrocarburos.

ES UNA DISFUNCION DEL ACTUAL MODELO SOCIOECONOMICO

2007-2035: impacto de los cuatro factores de Kaya sobre las emisiones globales de CO_2 (Índice: 2007 = 1.0)

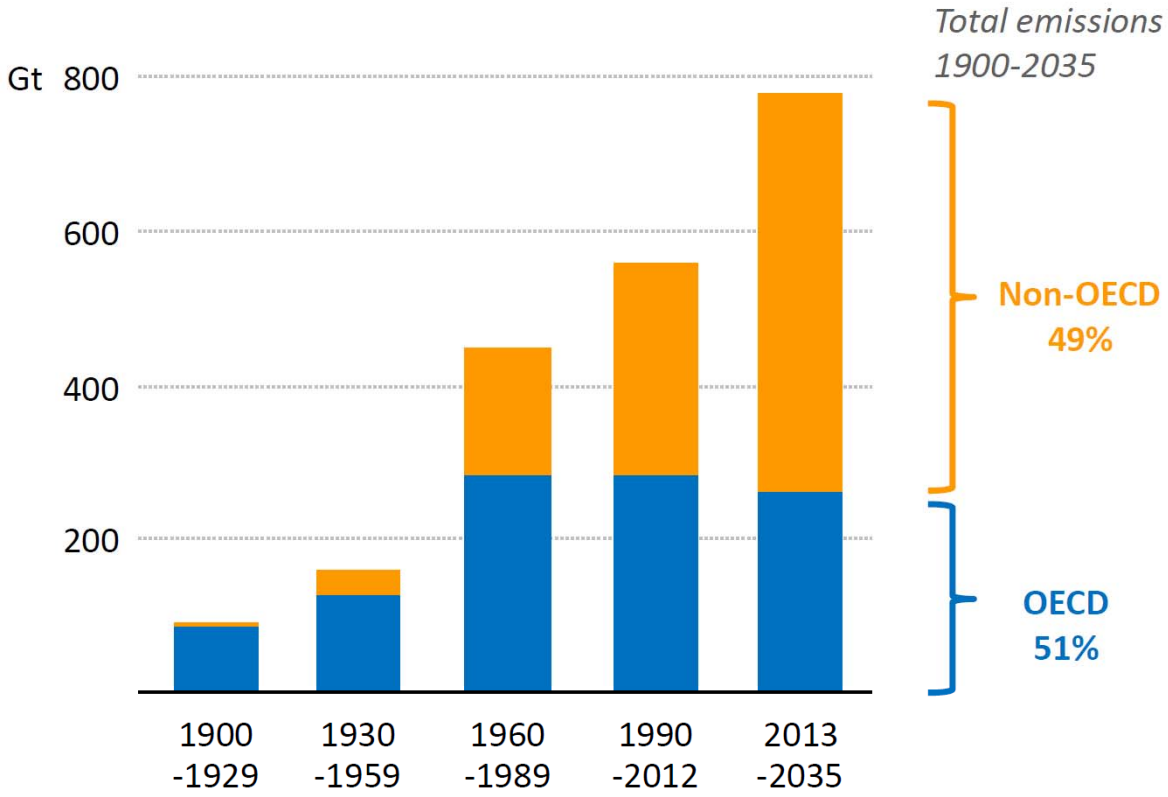


EIA, IEO 2010

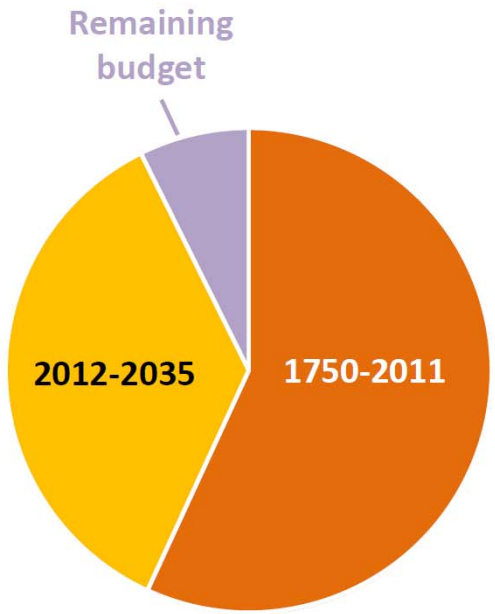
Emissions off track in the run-up to the 2015 climate summit in France

WORLD ENERGY OUTLOOK 2013

Cumulative energy-related CO_2 emissions



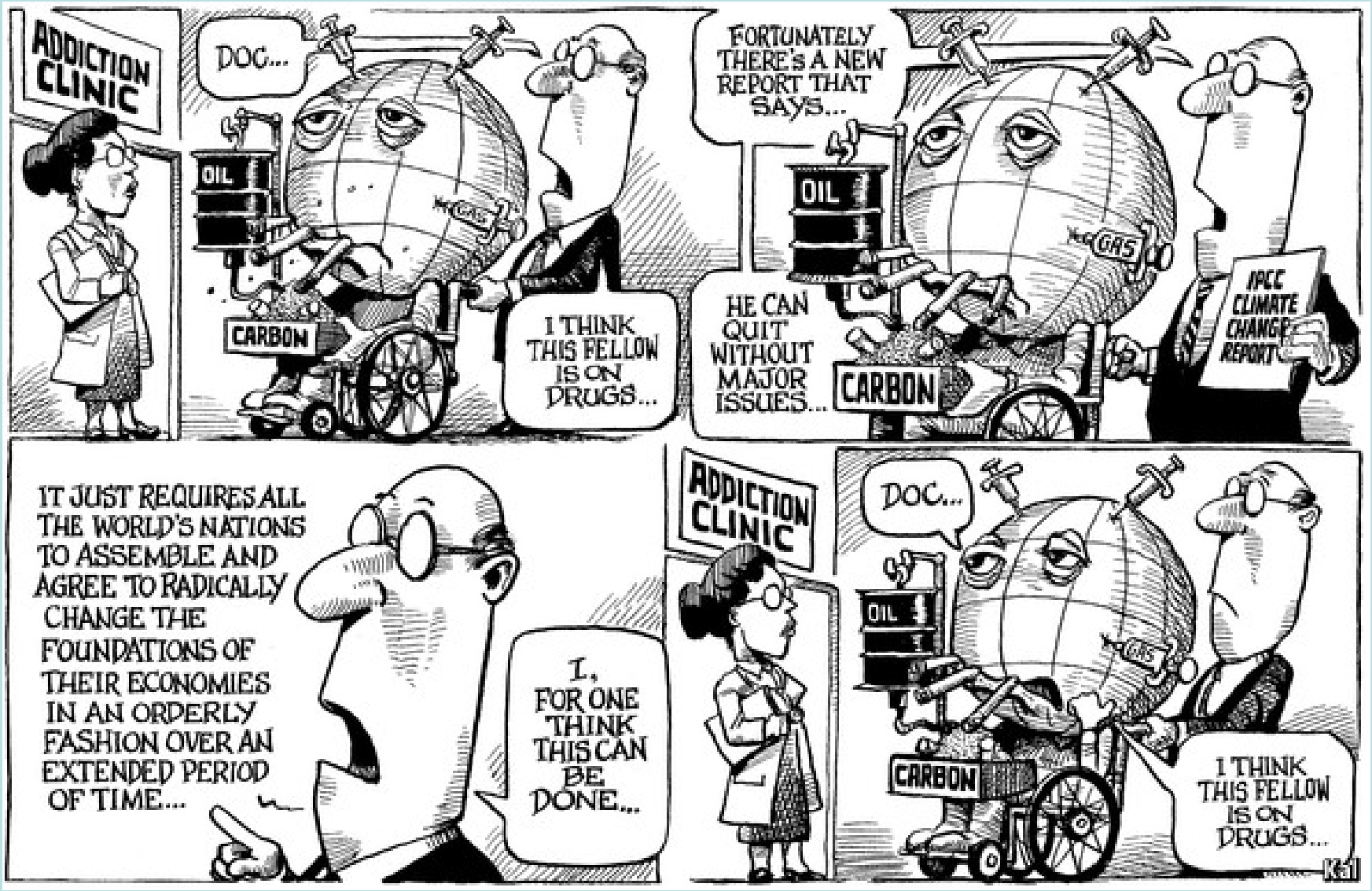
'Carbon budget' for 2 °C



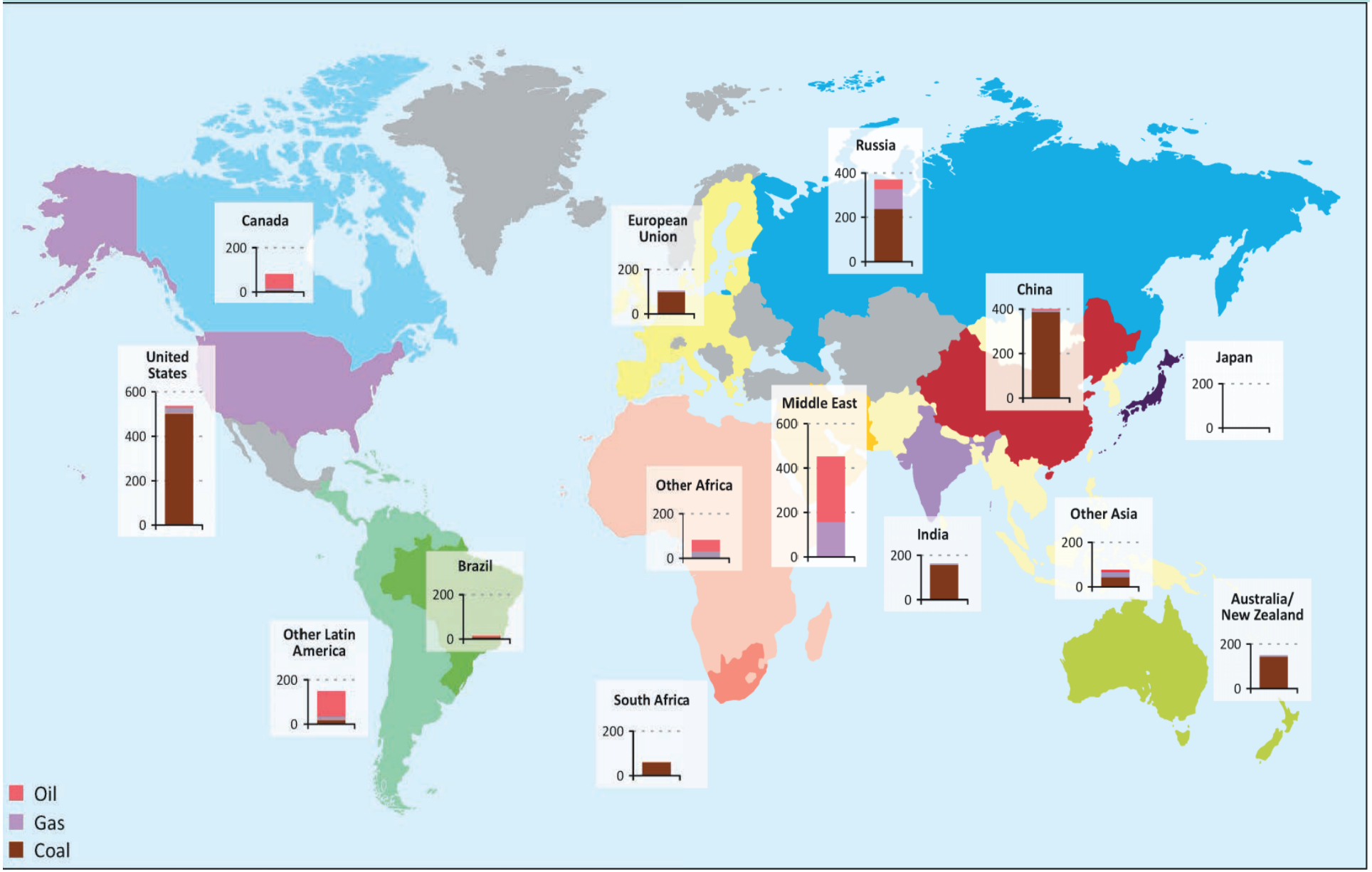
Non-OECD countries account for a rising share of emissions, although 2035 per capita levels are only half of OECD; the 2 °C 'carbon budget' is being spent much too quickly

Newsweek, 6-13 September 2004

No solo necesitamos una urgentísima revolución en el campo de la energía….



Emisiones potenciales de CO_2 de las reservas probadas de combustibles fósiles a finales de 2011 (Gt CO_2)



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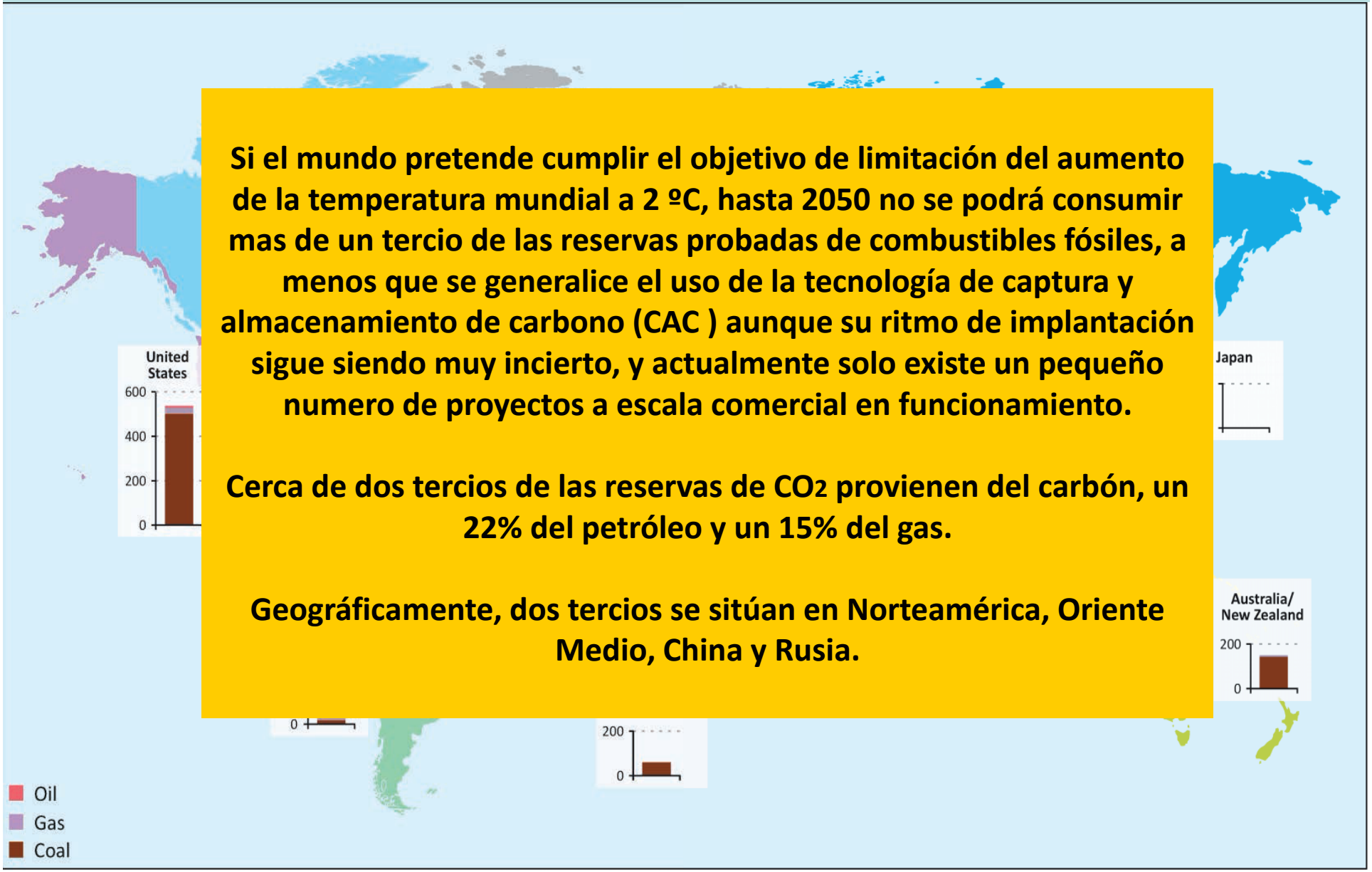


Si el mundo pretende cumplir el objetivo de limitación del aumento de la temperatura mundial a 2 ºC, hasta 2050 no se podrá consumir mas de un tercio de las reservas probadas de combustibles fósiles, a menos que se generalice el uso de la tecnología de captura y almacenamiento de carbono (CAC) aunque su ritmo de implantación sigue siendo muy incierto, y actualmente solo existe un pequeño numero de proyectos a escala comercial en funcionamiento.

Cerca de dos tercios de las reservas de CO_2 provienen del carbón, un 22% del petróleo y un 15% del gas.

Geográficamente, dos tercios se sitúan en Norteamérica, Oriente Medio, China y Rusia.

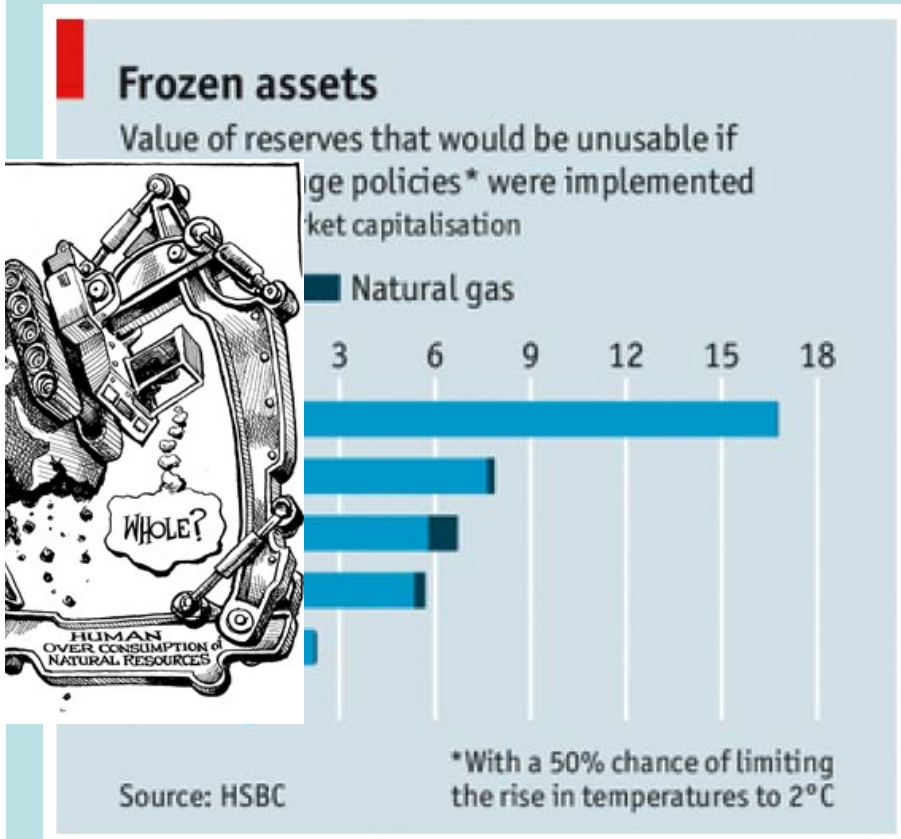
The Economist

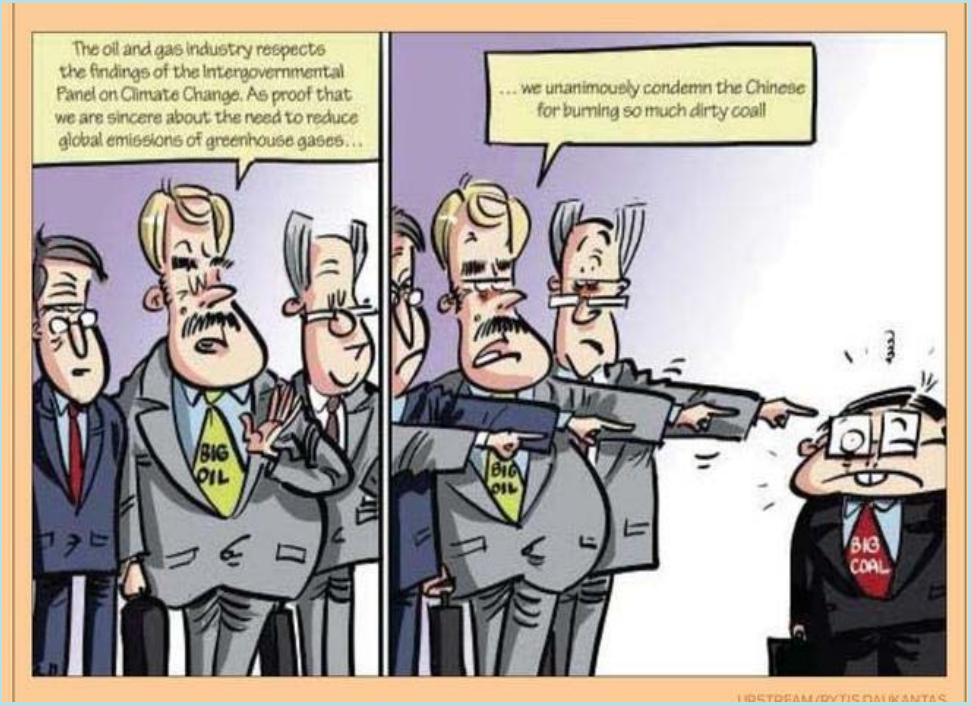
May 4th 2013

Energy firms and climate change

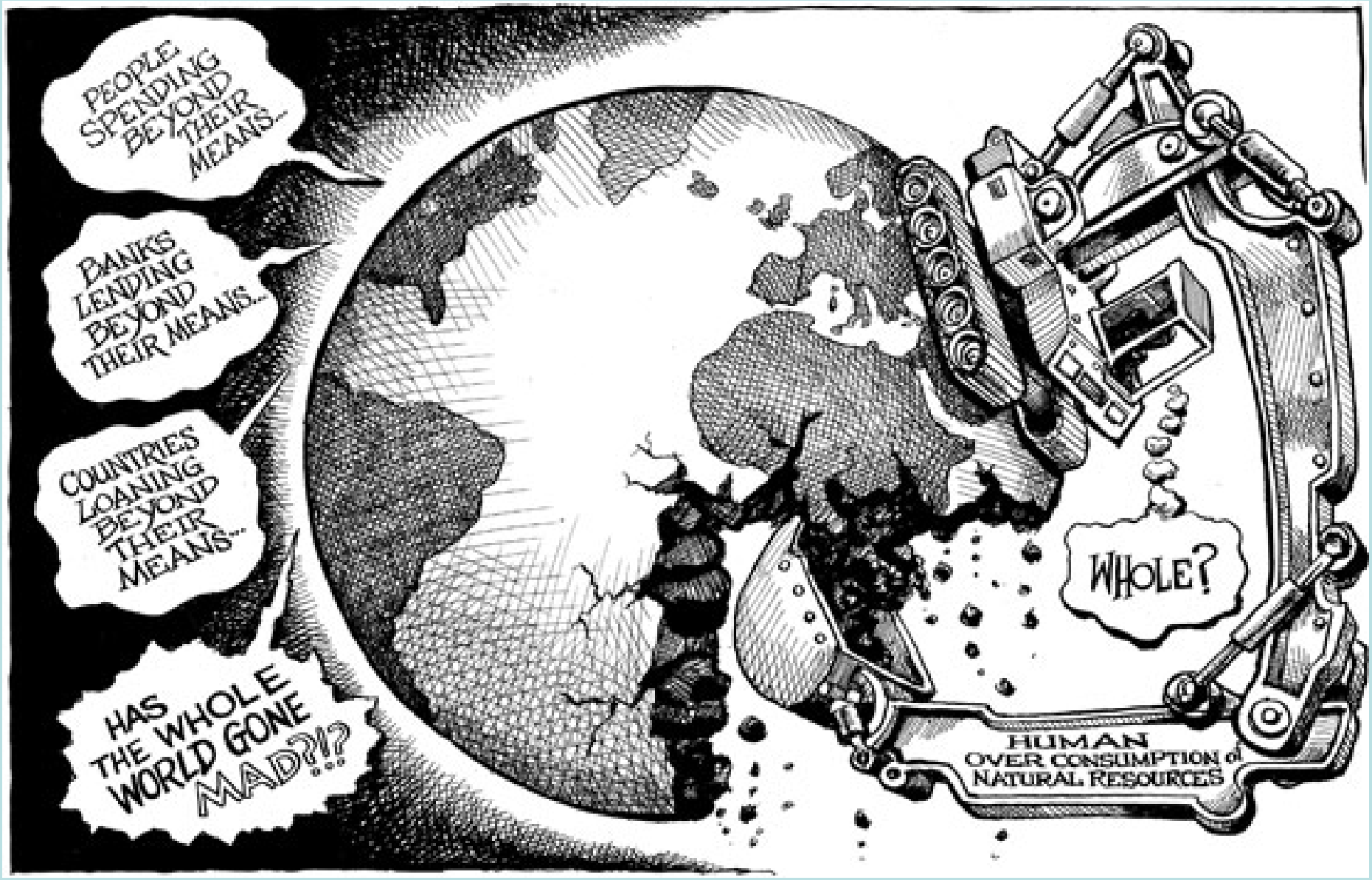
Unburnable fuel

Either governments are not serious about climate change or fossil-fuel firms are overvalued



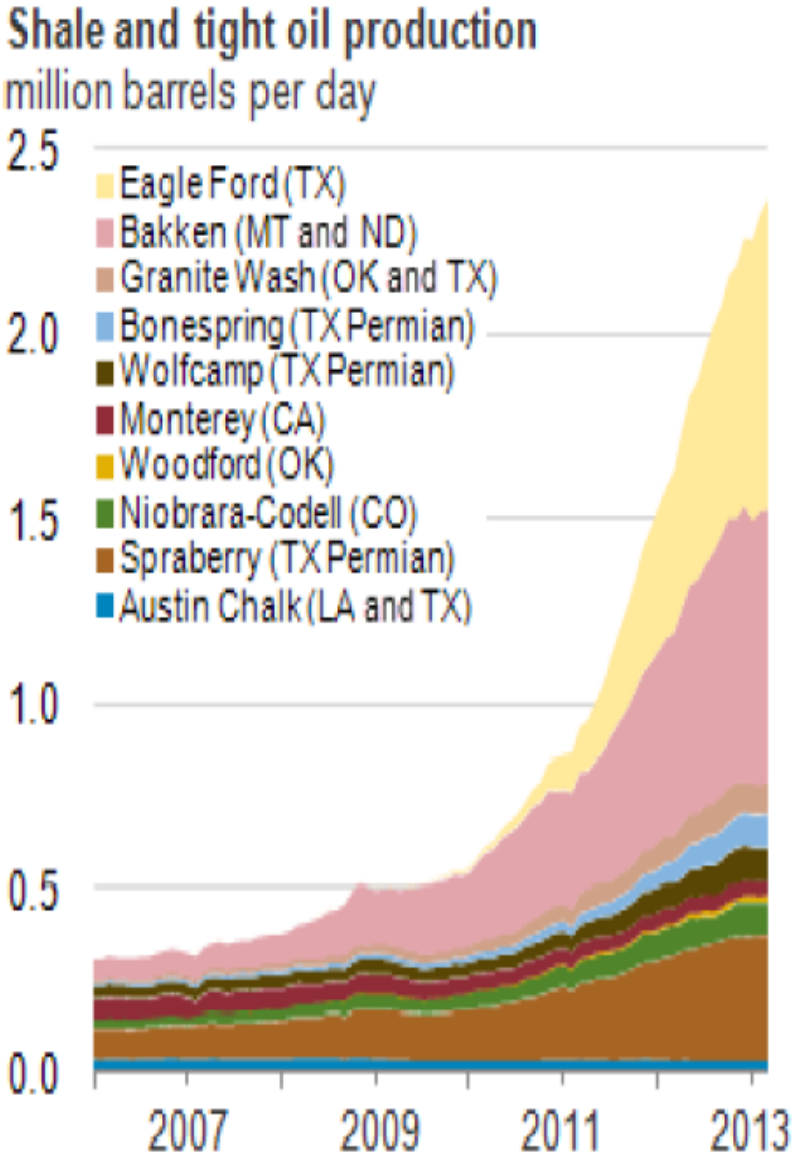


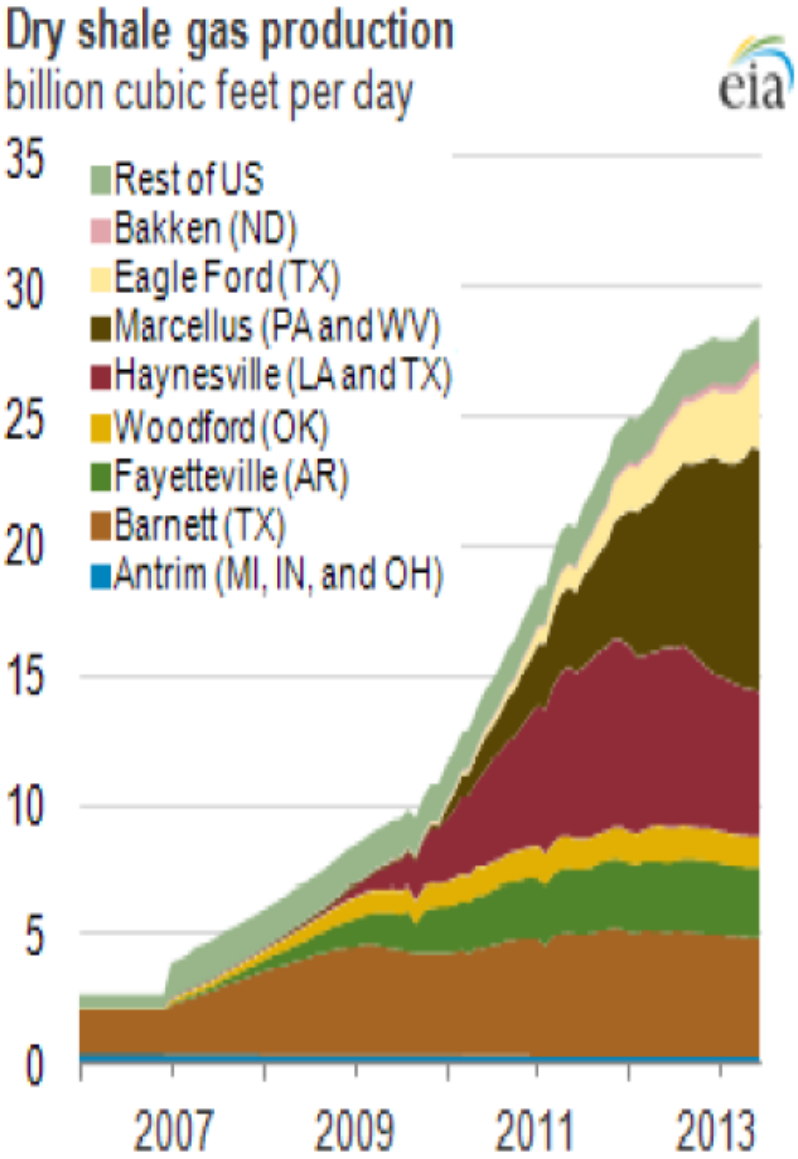
Fossil fuel divestment: the $5tn question
Petroleum Economist, 15 September 2014


PEOPLE SPENDING BEYOND THEIR MEANS...
BANKS LENDING BEYOND THEIR MEANS...
COUNTRIES LOANING BEYOND THEIR MEANS...
HAS THE WHOLE WORLD GONE MAD?!?
WHOLE?
HUMAN OVER CONSUMPTION of NATURAL RESOURCES


The Economist
Manning, Snowden and American liberty
The steep decline in Chinese executions
Behold, a pope who seems human
Omnicom and Publicis: Math Men
Art, it's a Doig's life
Yesterday's fuel
Why demand for oil will fall

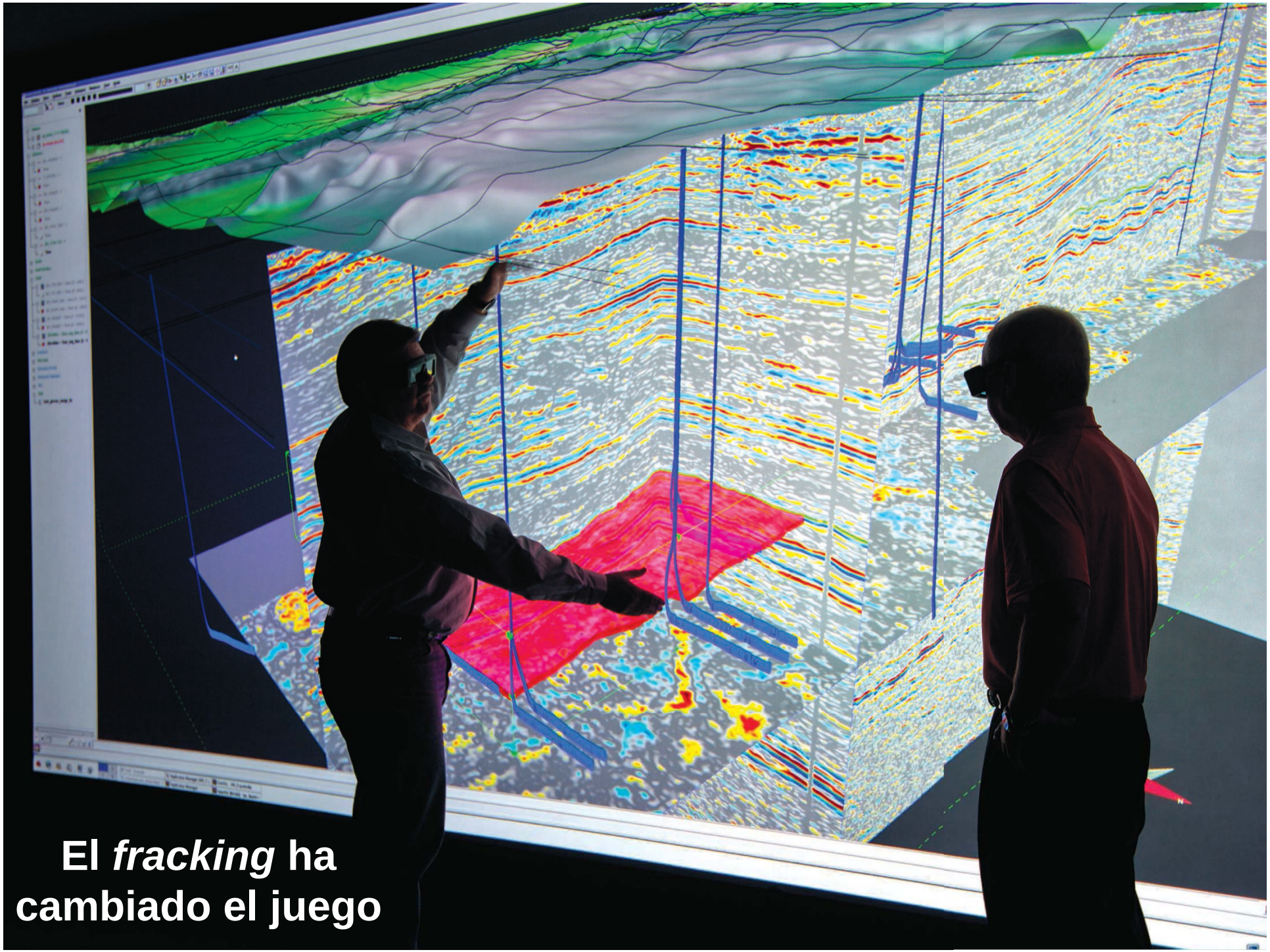
Desde 2008, algo ha cambiado en el mundo de la energía
El renacimiento de la producción de petróleo y gas en EE.UU. está redibujando el mapa energético global



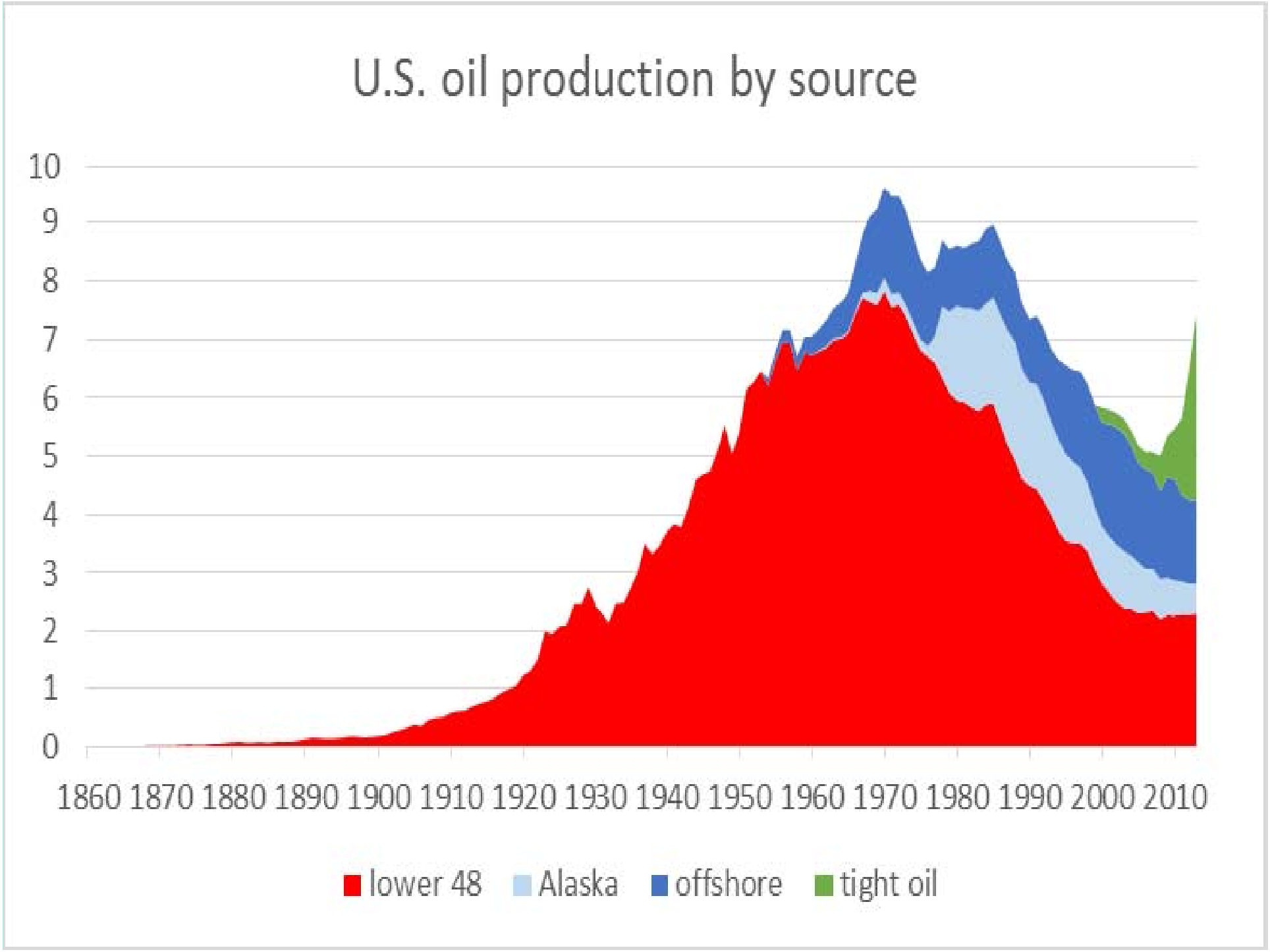


eia

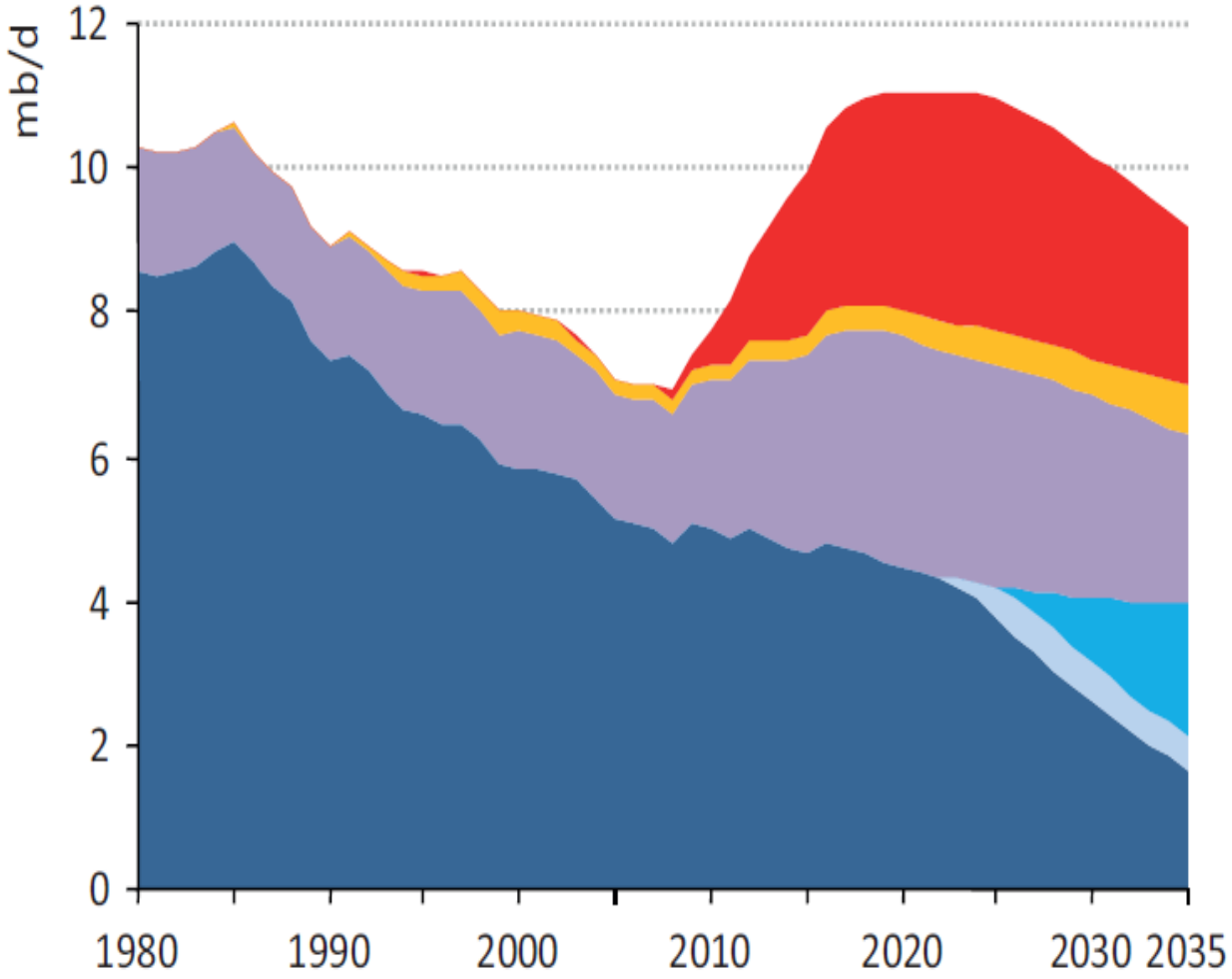
21-10-2013



El *fracking* ha cambiado el juego


U.S. oil production by source
10
9
8
7
6
5
4
3
2
1
0
1860 1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010
lower 48
Alaska
offshore
tight oil

1980-2035: producción de petróleo EE.UU.
La joroba del petróleo ligero de rocas compactas (LTO)



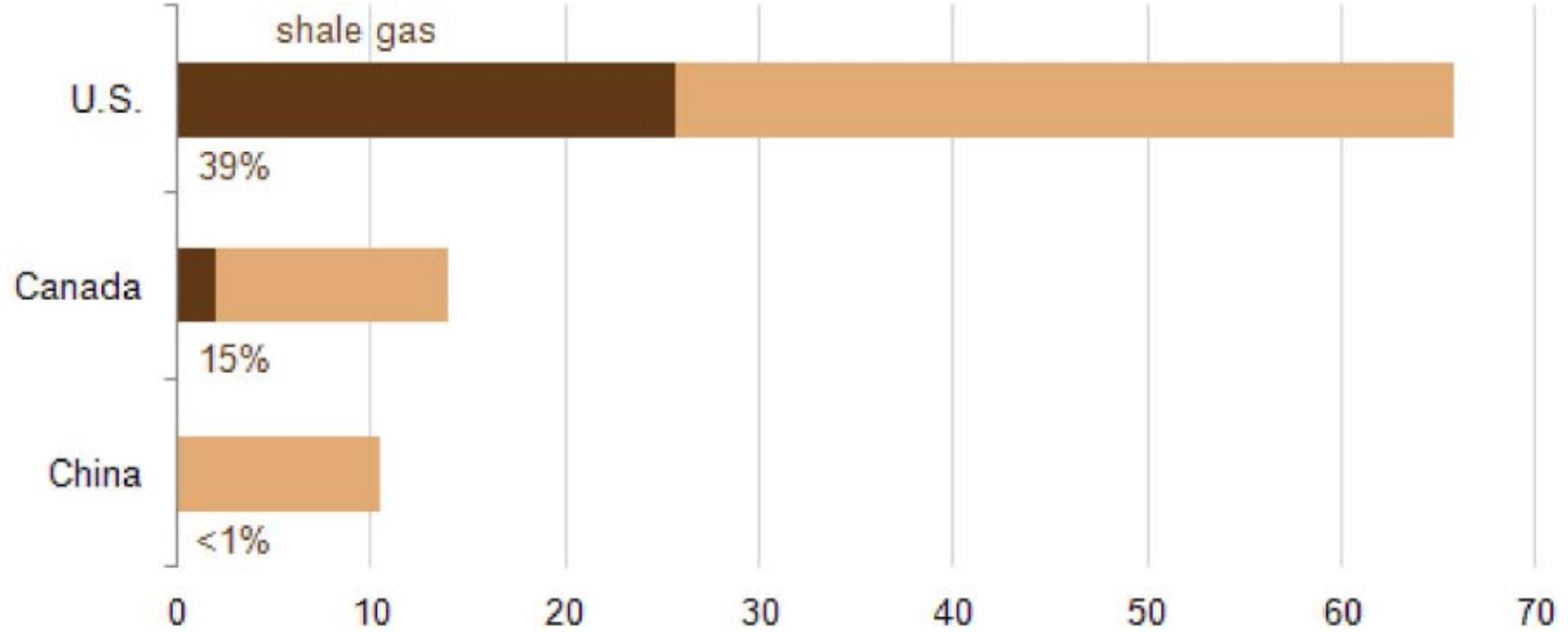
"under the right conditions" Estados Unidos se convierte hacia 2020 en el mayor productor mundial de petróleo, desplazando temporalmente, hasta mediados de la década de los veinte, a Arabia Saudí.

Note: The World Energy Model supply model starts producing yet-to-find oil after it has put all yet-to-develop fields into production. In reality, some yet-to-find fields would start production earlier than shown in the figure.

IEA. WEO 2012

Norteamérica lidera la produccíon mundial de *shale gas*

Shale gas as share of total dry natural gas production in 2012
billion cubic feet per day

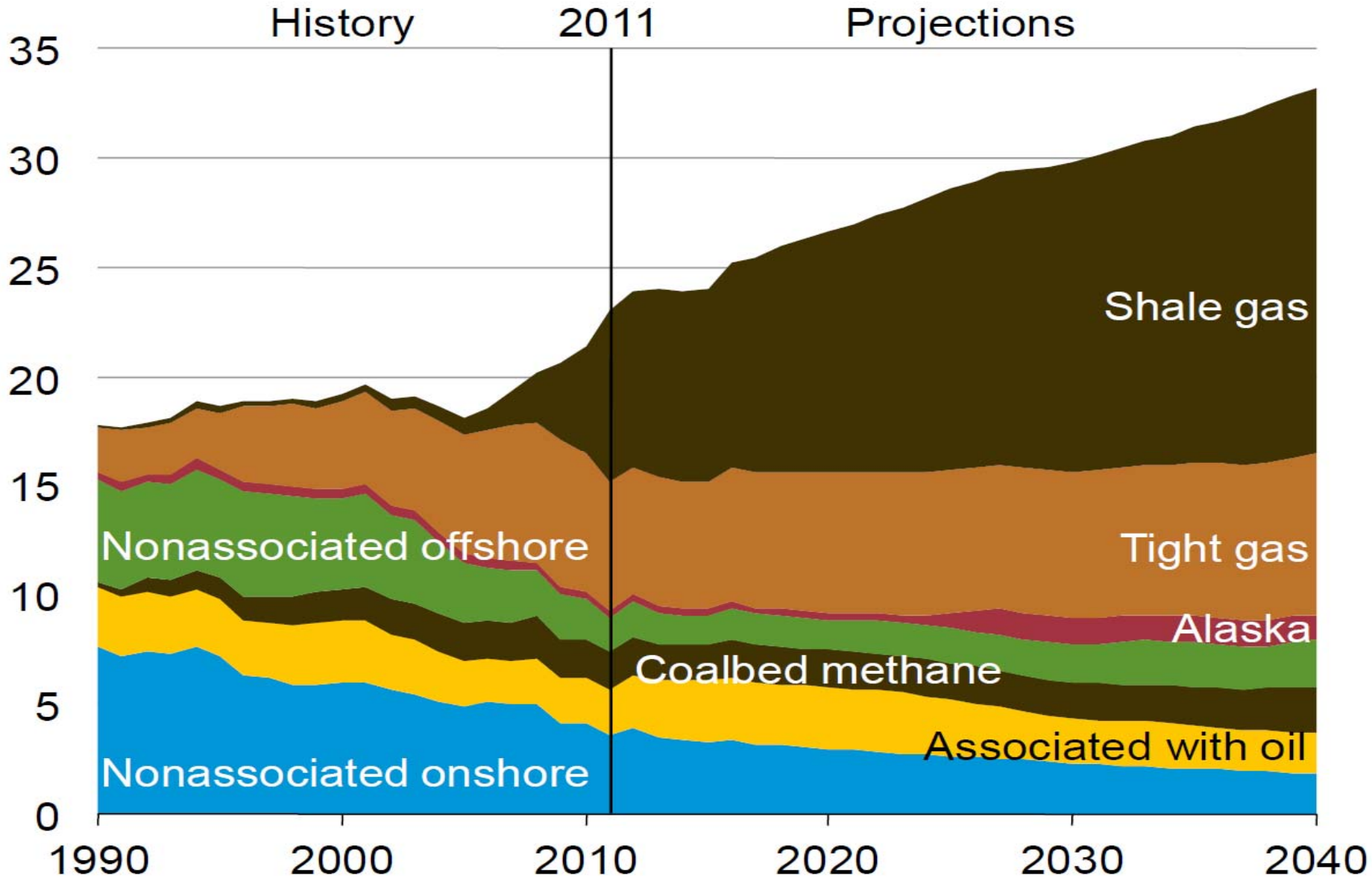


Source: U.S. Energy Information Administration, LCI Energy Insight, Canada National Energy Board, and Facts Global Energy
Note: Canadian data uses "marketable production," which is comparable to dry production.

The United States and Canada are the only major producers of commercially viable natural gas from shale formations in the world, even though about a dozen other countries have conducted exploratory test wells, according to a joint U.S. Energy Information Administration (EIA)/Advanced Resources International (ARI) study released in June. China is the only nation outside of North America that has registered commercially viable production of shale gas, although the volumes contribute less than 1% of the total natural gas production in that country. In comparison, shale gas as a share of total natural gas production in 2012 was 39% in the United States and 15% in Canada.

EIA 23-10-2013

1990-2040: producción de gas natural seco EE.UU. (tcf)
Un cambio de tendencia duradero

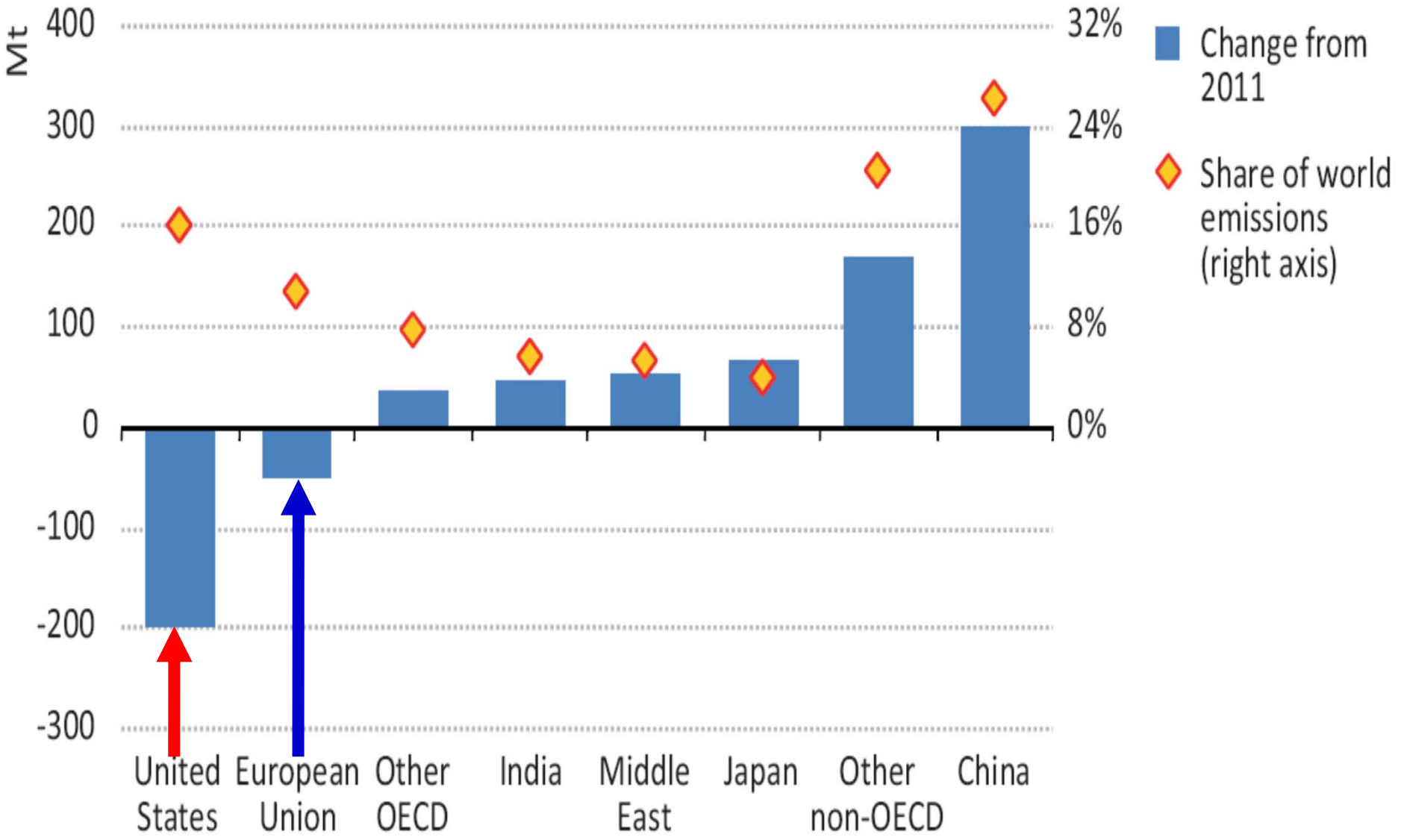


EIA, AEO 2014

How resilient is your country?

NATURE, 22-11-2012

2011-2012: emisiones de CO_2
La UE peor que los EE.UU.



Redrawing the Energy-Climate Map, IEA June 2013

Estemos preparados o no, los cambios son imparables

Disponibilidad √
Accesibilidad √
¿Aceptabilidad?

The Economist, 26-11-2011