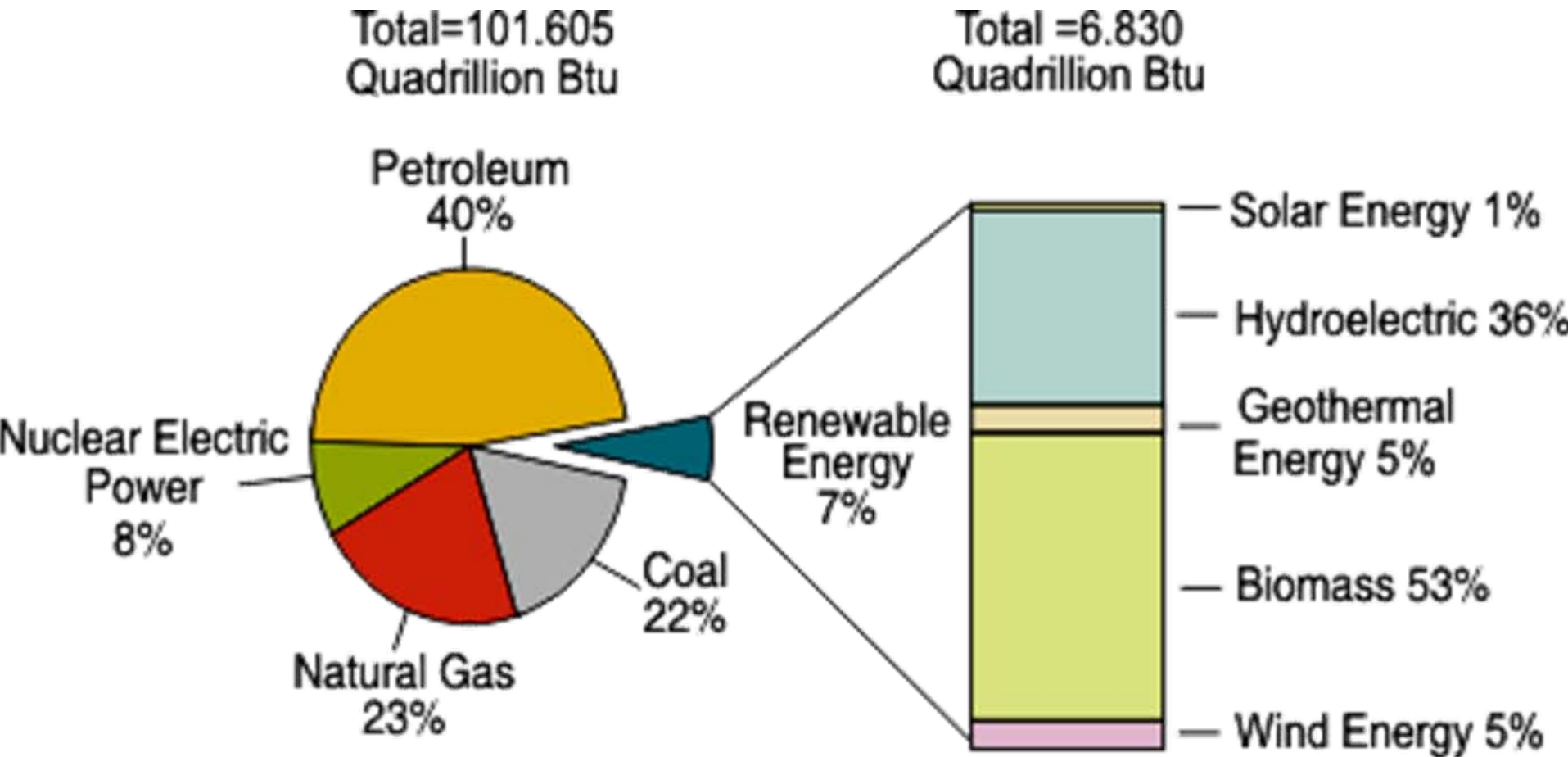


Renewable futures?



Nick Gogerty

Energy Consumption US today



Note: Sum of components may not equal 100 percent due to independent rounding.

Source: EIA, *Renewable Energy Consumption and Electricity Preliminary 2007 Statistics*, Table 1: U.S. Energy Consumption by Energy Source, 2003-2007 (May 2008).

Why oil?



- Cheap
- 1,700 Kwhs/barrel
- 1 gallon of
Gas=33.6kwhr
H²=3.5 kwhr*
- Easy to transport
- Existing infrastructure

*3,000 PSI

Who Has The Oil?

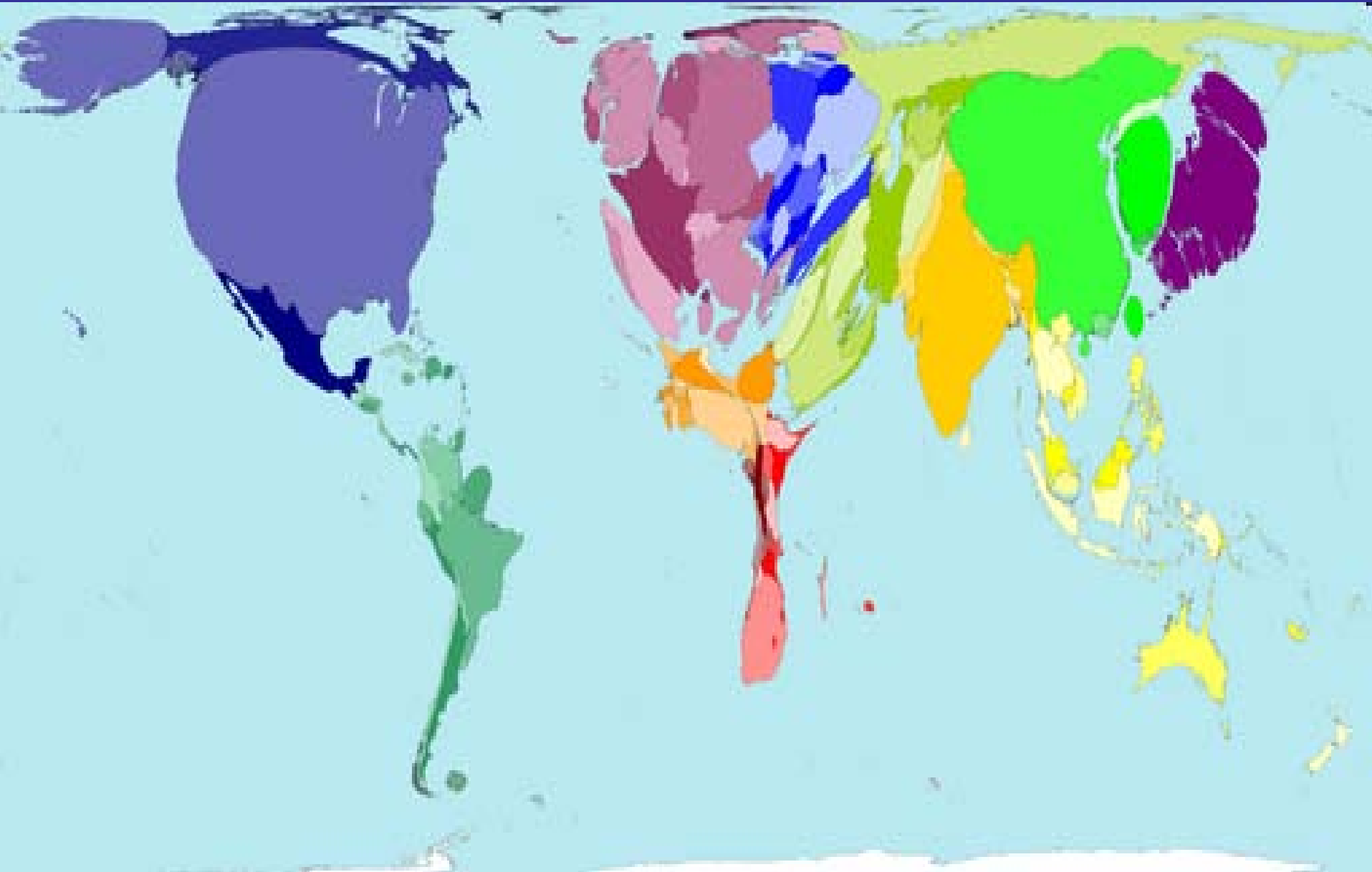


World Reserves of Oil	
	Billions of barrels
1. Saudi Arabia	264.2
2. Iran	137.5
3. Iraq	115.0
4. Kuwait	101.5
5. United Arab Emirates	97.8
6. Venezuela	79.7
7. Russian Federation	74.4
8. Kazakhstan	39.6
9. Libya	39.1
10. Nigeria	35.9
11. USA	29.3
12. Canada	16.5
13. China	16.0
14. Qatar	15.2
15. Mexico	13.7

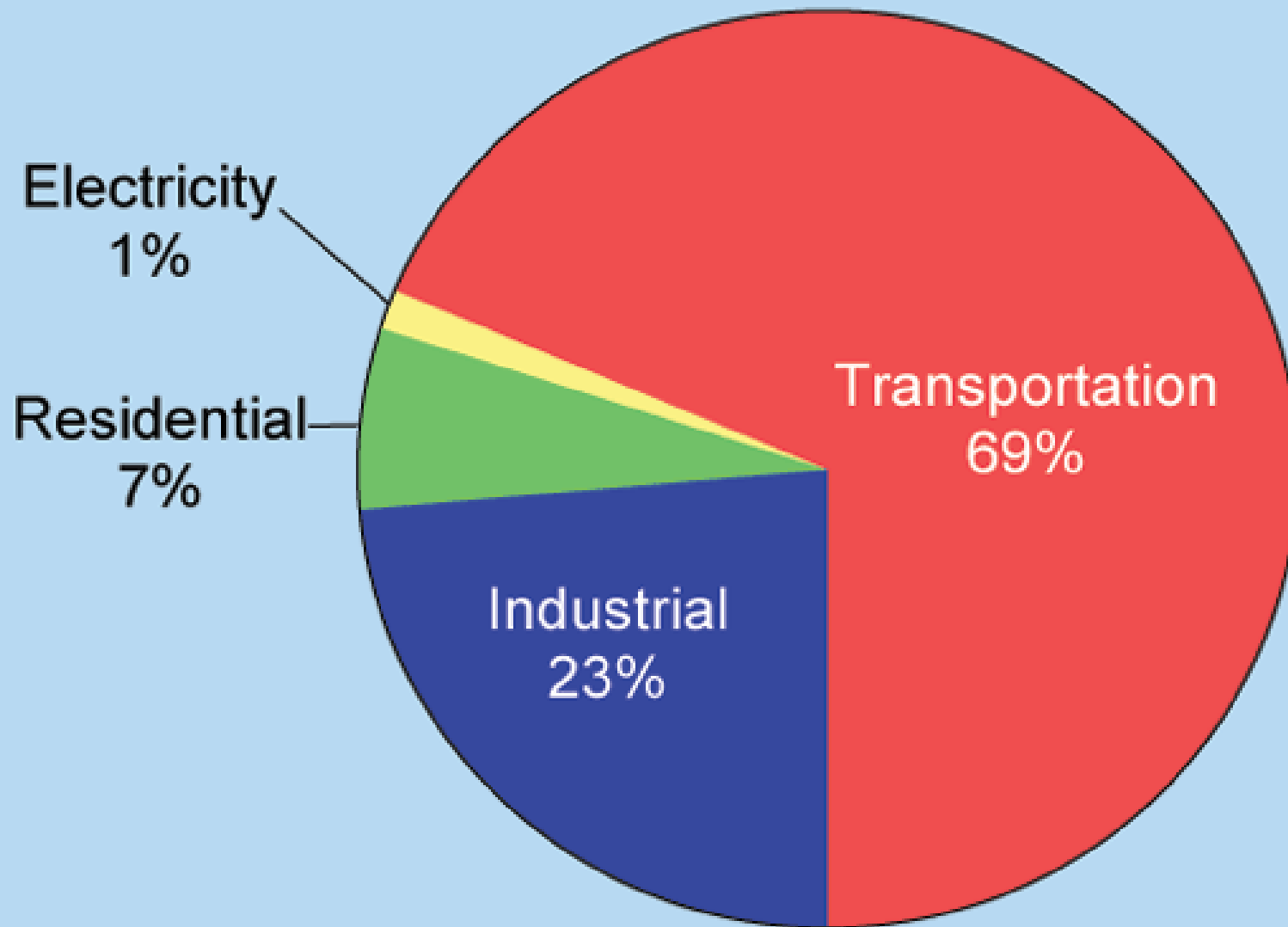
* Estimated Canadian reserves exclude difficult-to-extract oil sands. When oil sands are included, the Energy Information Administration Source: BP Statistical Review - World Energy Report 2005

Adapted from Environmental Action chart

Who wants energy? www.worldmapper.org/



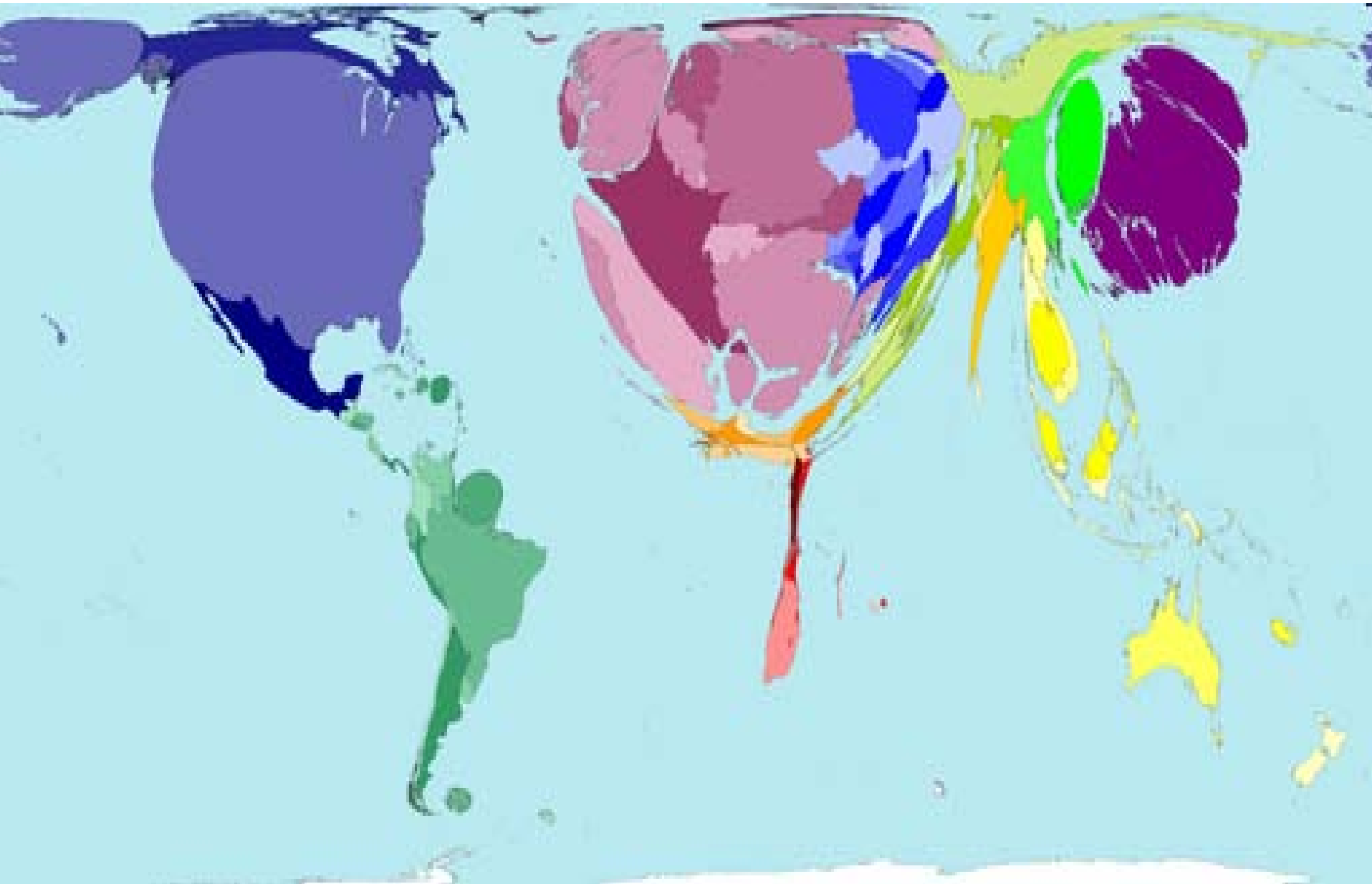
U.S. Oil Use By Sector



Data are for 2005.

Source: Energy Information Administration, *Annual Energy Outlook 2005*

590m cars in the world



ULTRA-CAPACITORS



**I WANT TO
BELIEVE**

Unlikely
transport
future fuels

Hydrogen

Low density

Poor infrastructure

Bio-Fuels

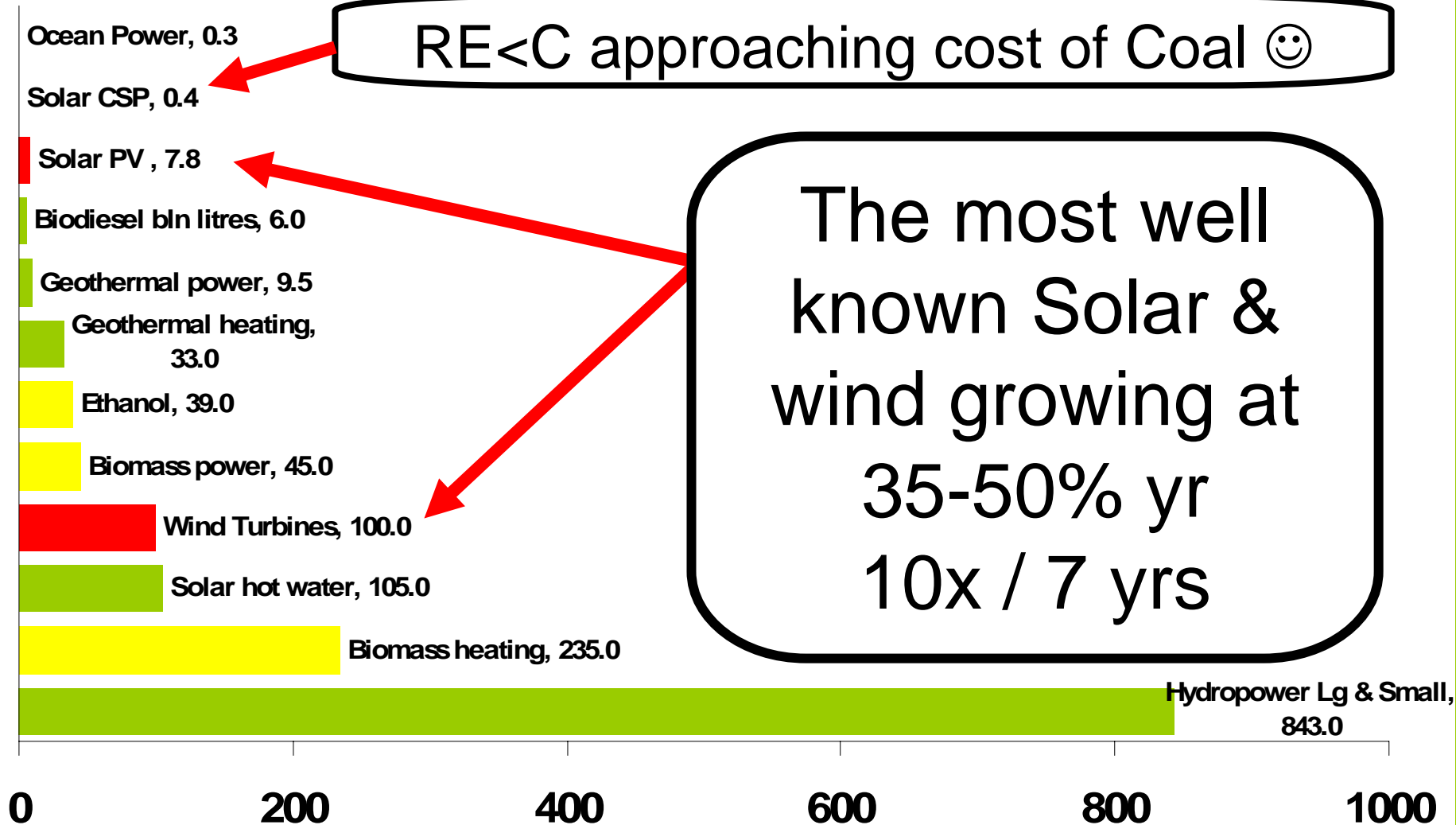
For the most poor
energy dynamics

Today's renewable power

Renewable energy GW equivalent globally

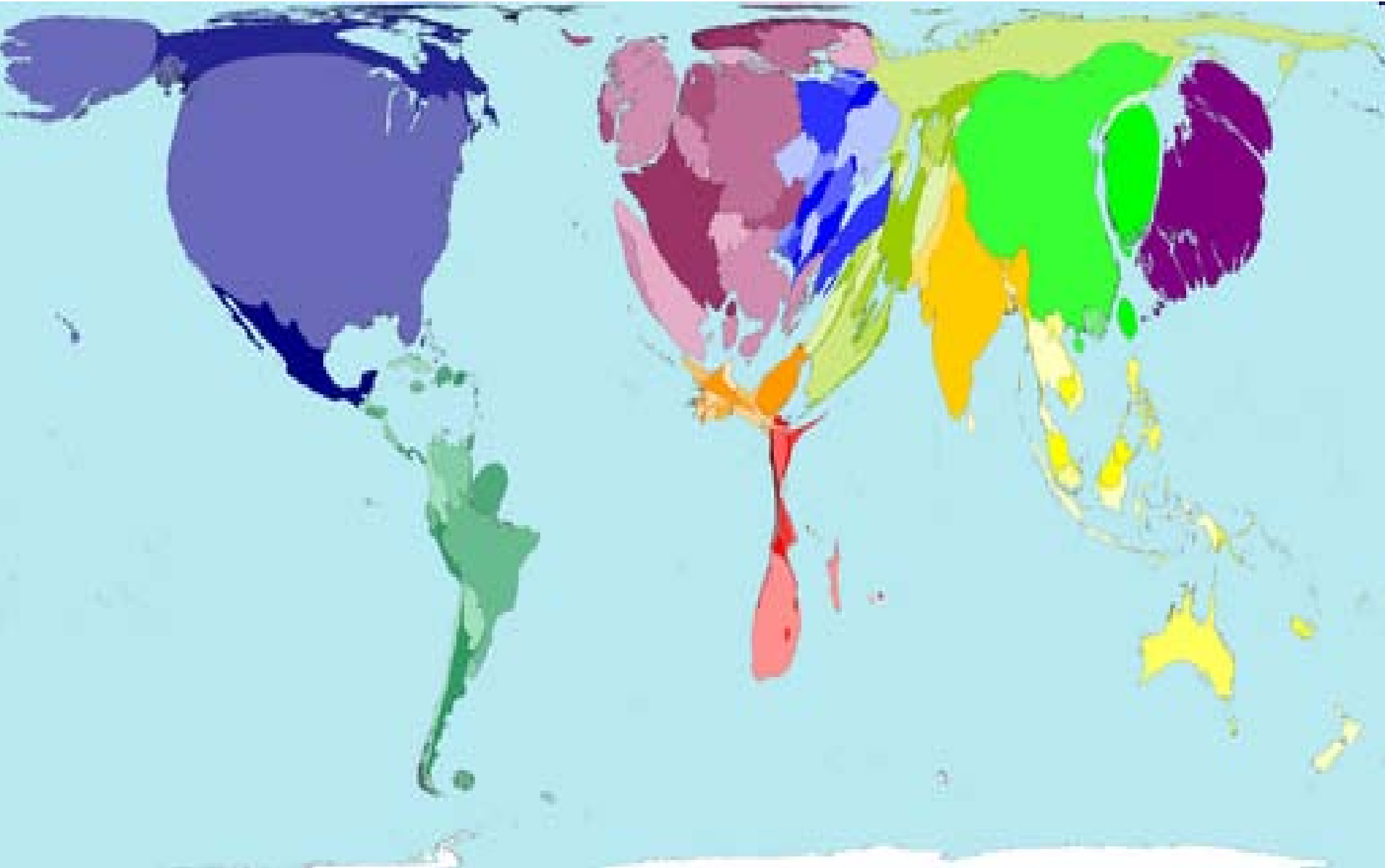
RE < C approaching cost of Coal 😊

The most well known Solar & wind growing at 35-50% yr
10x / 7 yrs



\$3 trillion year Electricity generation

www.worldmapper.org

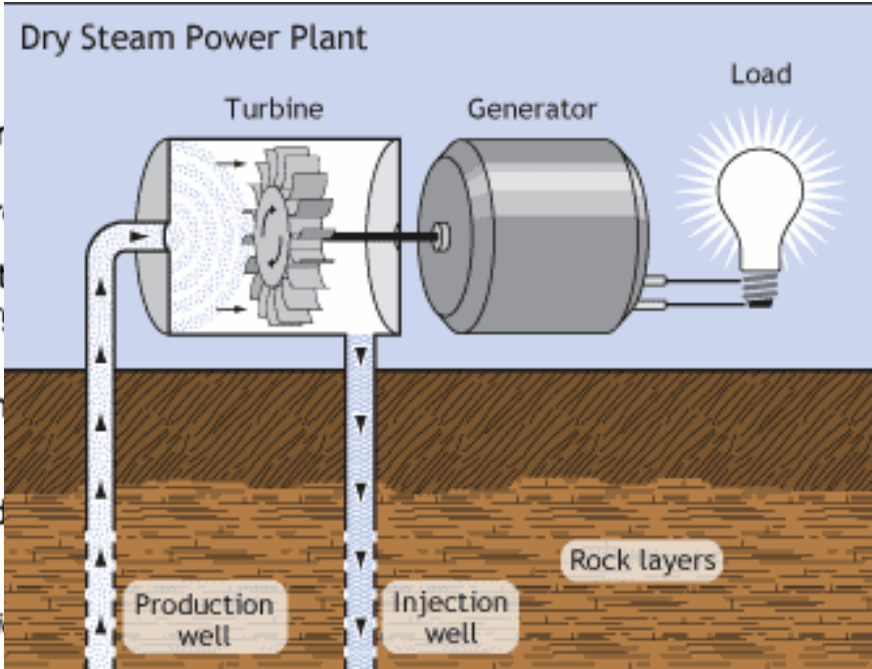
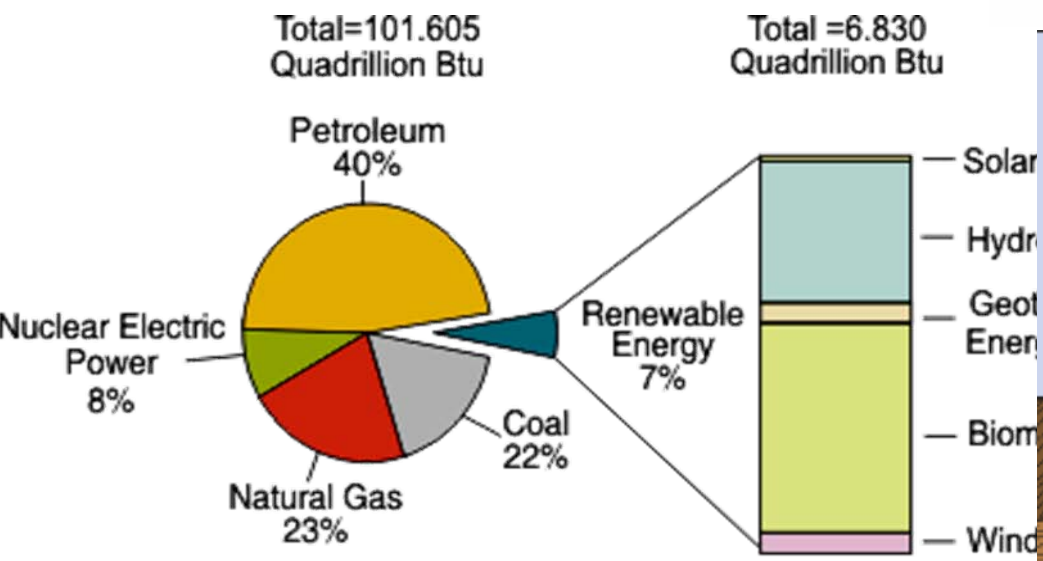
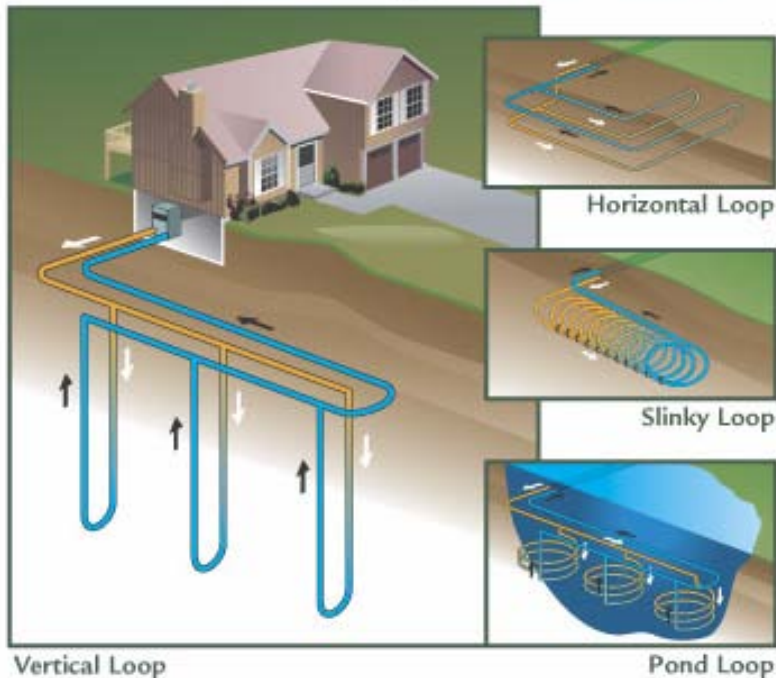


Wind cheap 30% availability



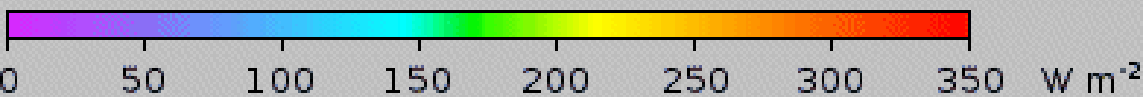
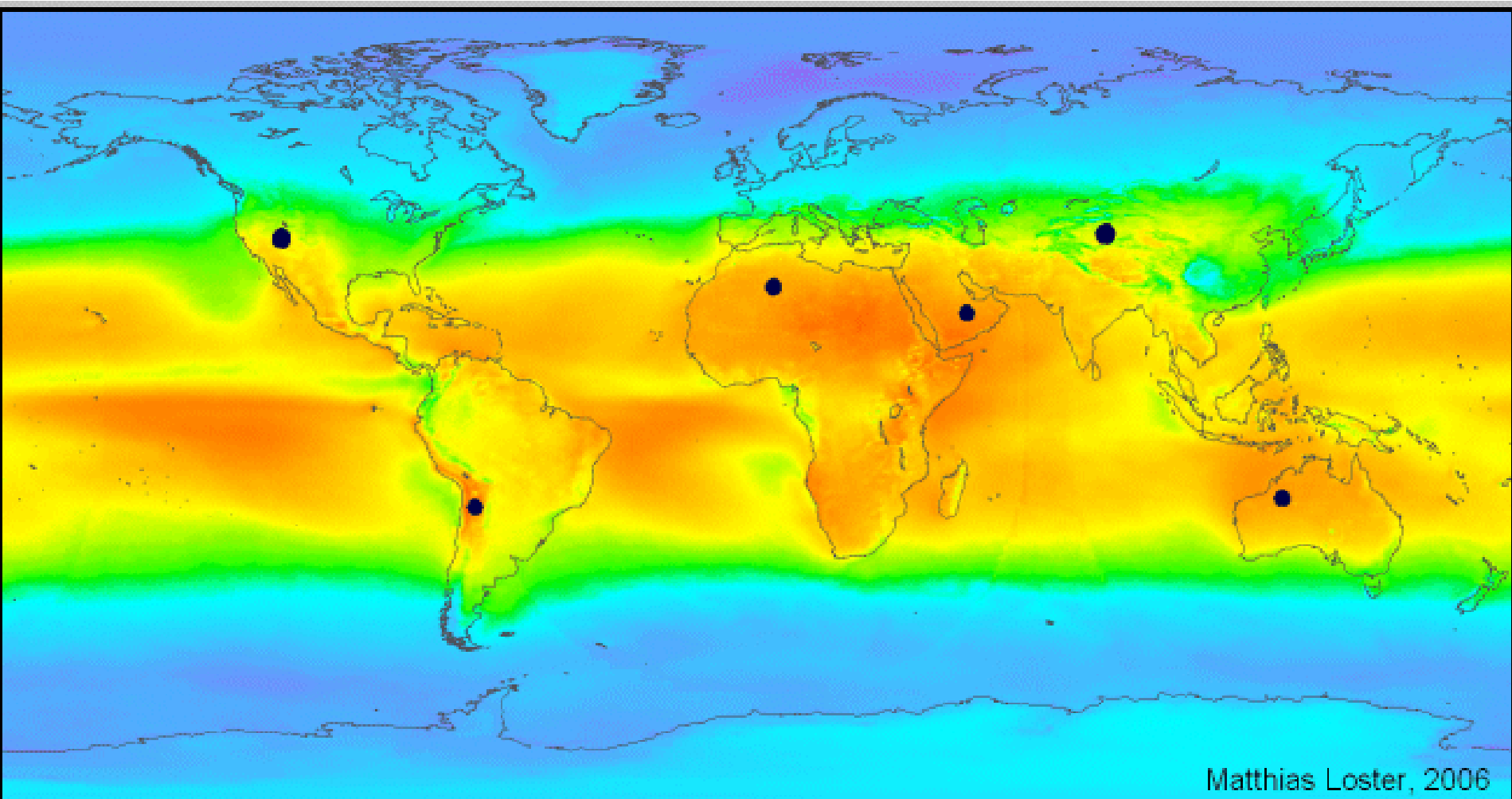
Geothermal Energy for the Home

Geothermal
Home heat
Electricity
+98% availability
Cheap



Note: Sum of components may not equal 100 percent due to independent rounding.
Source: EIA, *Renewable Energy Consumption and Electricity Preliminary 2007 Statistics*
Energy Consumption by Energy Source, 2003-2007 (May 2008).

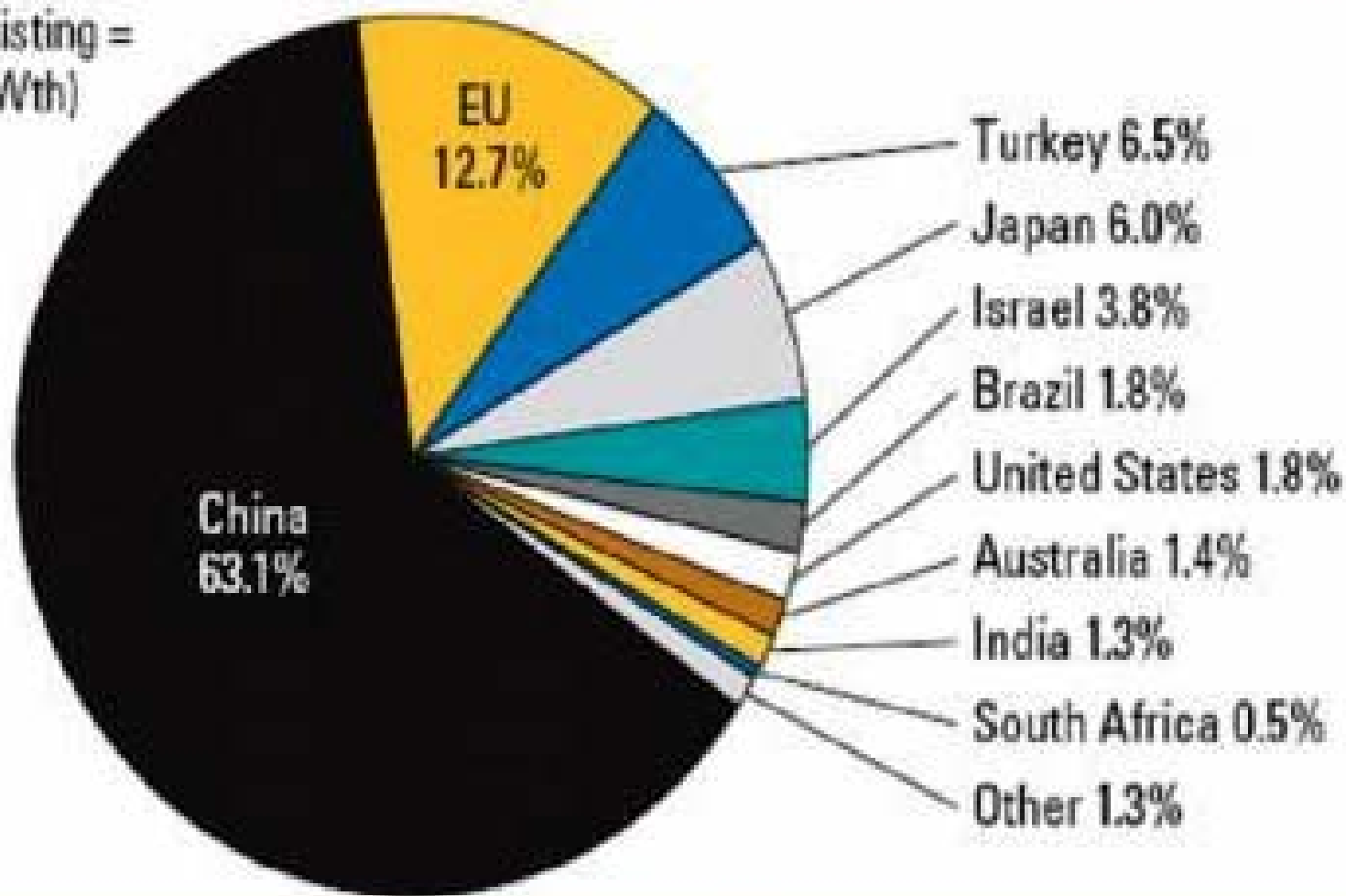
Insolation (where the sun shines)
Guess who the “big countries are”



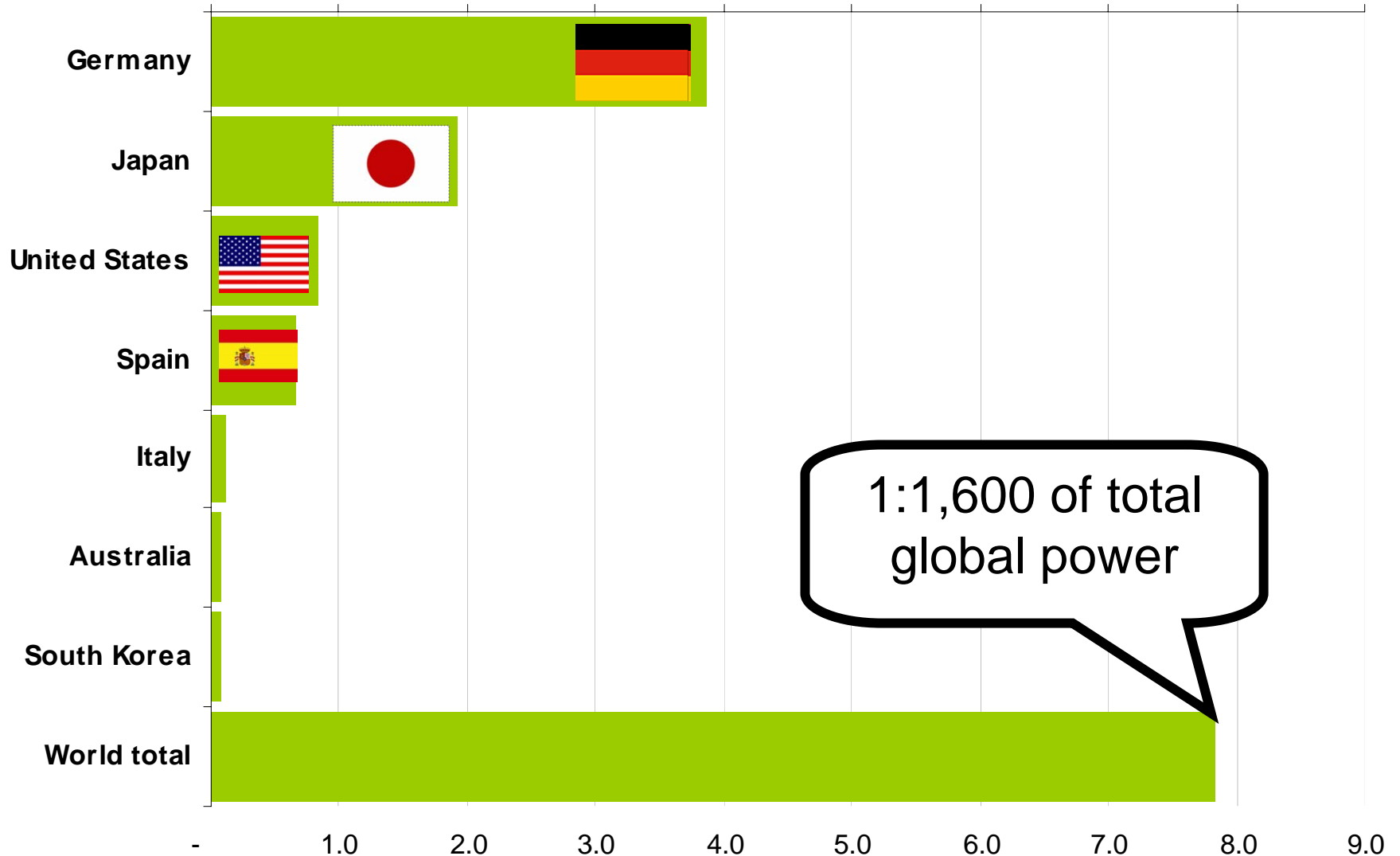
$\Sigma \bullet = 18 \text{ TWe}$

Figure 6. Solar Hot Water/ Heating Capacity Existing in 2005

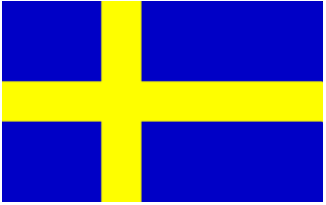
(total existing = 88 GWth)



World solar PV installations 2007 measured in Gigawatts



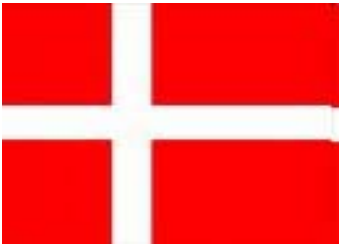
Policy & Potential



Sweden is shooting for 60% renewables by 2020.



Estimates have shown that the UK could have a 100% wind supply due to geography



Denmark already gets 20% of its electricity from Wind.



This country just signed a deal for 15% of power 120mw of wind. Can you name it?

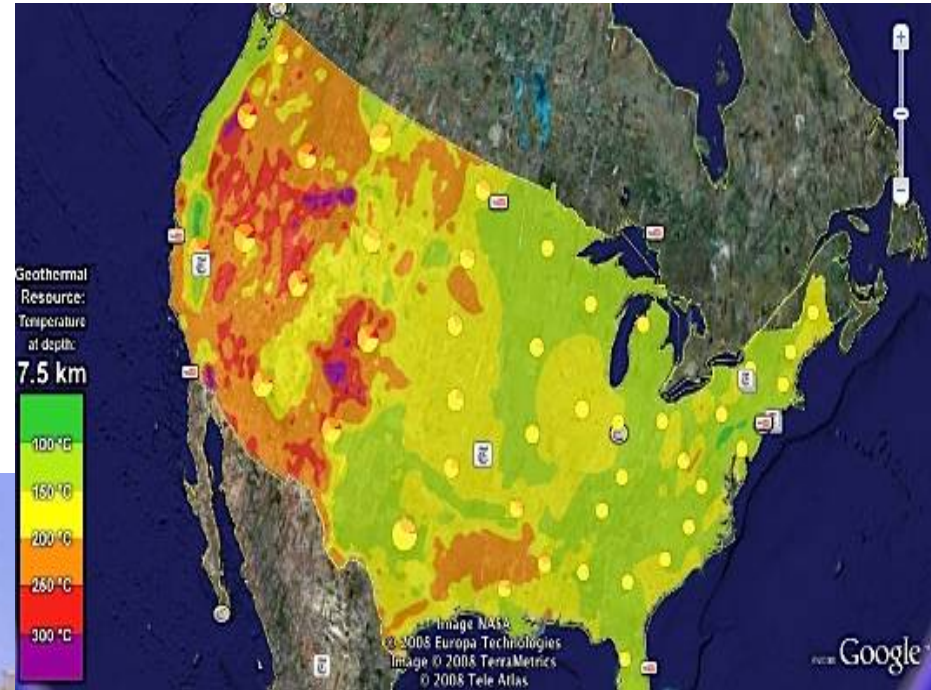
Global issue & opportunity

- Renewables = 3.4% of global power generation. (Figures exclude large hydropower, which is 15%.)
- The largest component capacity is **wind**, grew by 28% worldwide in 2007 to 95 GW
- The fastest growing technology in the world is **grid-connected solar photovoltaics (PV)**, with 50% yr increases in capacity 2006 2007
- **solar heat collectors** hot water 50m households
- **Biomass and geothermal energy** are commonly employed for power & heating, + 2m ground-source heat pumps used in 30 countries for heating and cooling
- **Developing countries** have more than 40% of existing renewable capacity, + 70% of existing solar hot water capacity, and 45% of biofuels production

Transmission Bottleneck=
\$1-1.5 trillion US opportunity

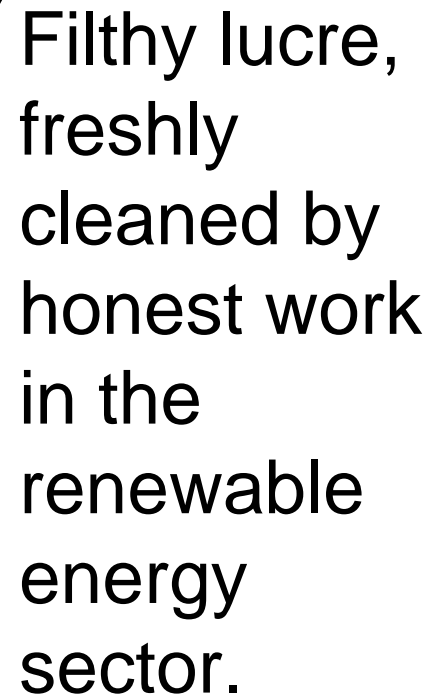


Who are you doing this for?



Renewable energy manufacturing, operations, & maintenance +2.4m jobs globally in 2006

Energy is a \$6 trillion business

A black-outlined speech bubble with a tail pointing towards the bottom right. The text inside is left-aligned and reads: "Filthy lucre, freshly cleaned by honest work in the renewable energy sector."

Filthy lucre,
freshly
cleaned by
honest work
in the
renewable
energy
sector.

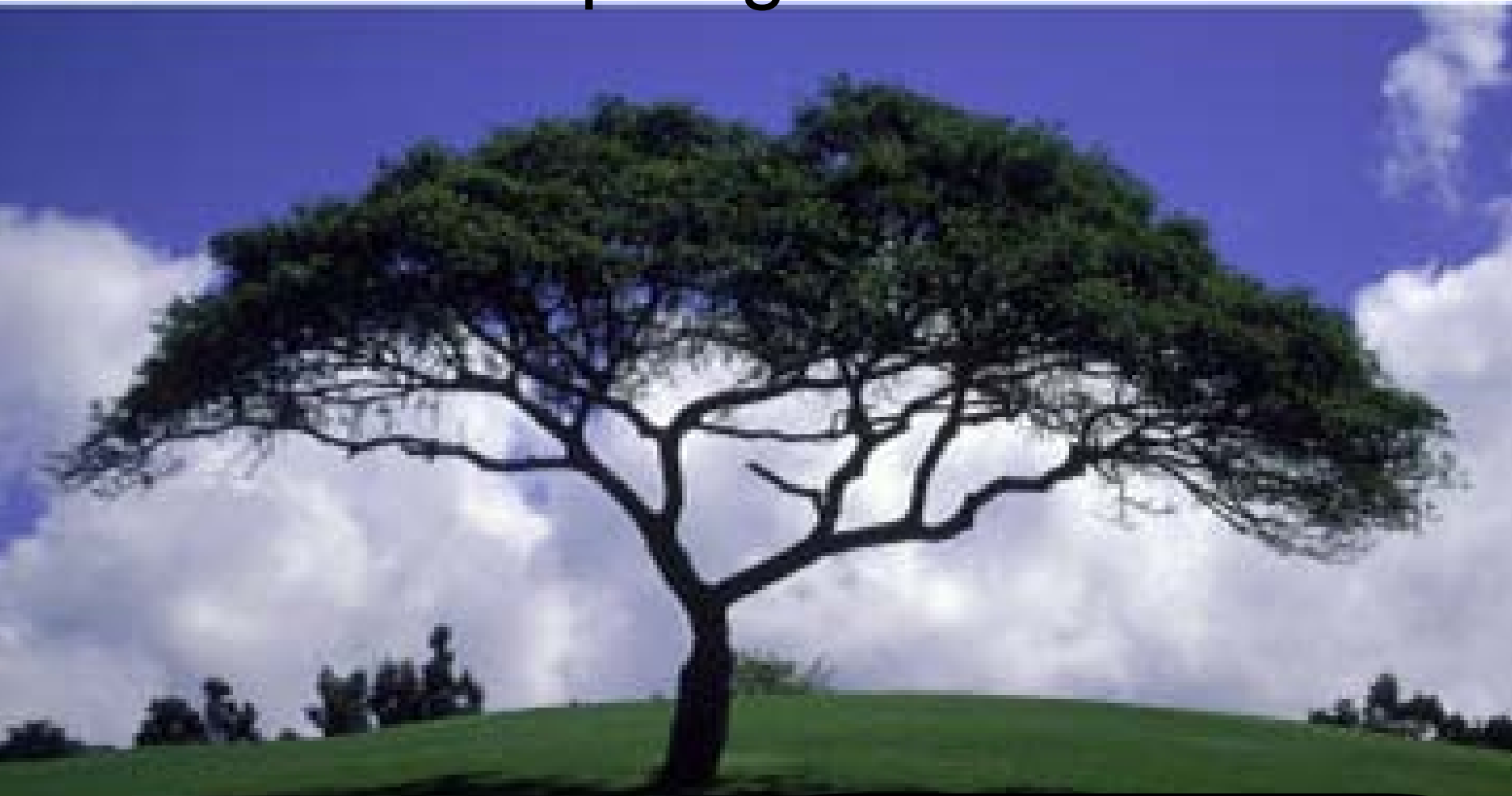
Job! You don't have to be #1

Try being in the top 10% for 6 things



You will be 1 in 1,000,000m people with a unique skills set.
Don't be afraid to chase experience vs. money your life will richer

Anthropologist wisdom



A small group of thoughtful people can change the world. Indeed, it's the only thing that ever has.

[Margaret Mead](#)

If you try really hard, you may one day become the sort of person who plants a tree so that someone you will never meet can sit in the shade. African Proverb
Nick@Gogerty.com