

**ENS**

**Bigfoot Lexington:  
Social Aspects of  
Greenhouse Gas Production**

**Lexington:**

**'Carbon footprint' is largest (per capita) in nation!**



**Lexington, which touts itself as the Horse Capital of the World, now has a less appealing nickname: Bigfoot.**

**A first-of-its-kind study of the carbon footprints of the nation's 100 largest metropolitan areas being released by the Brookings Institution on Thursday puts Lexington at No. 100 -- the worst of them all.**

Posted on Thu, May. 29, 2008

By Andy Mead

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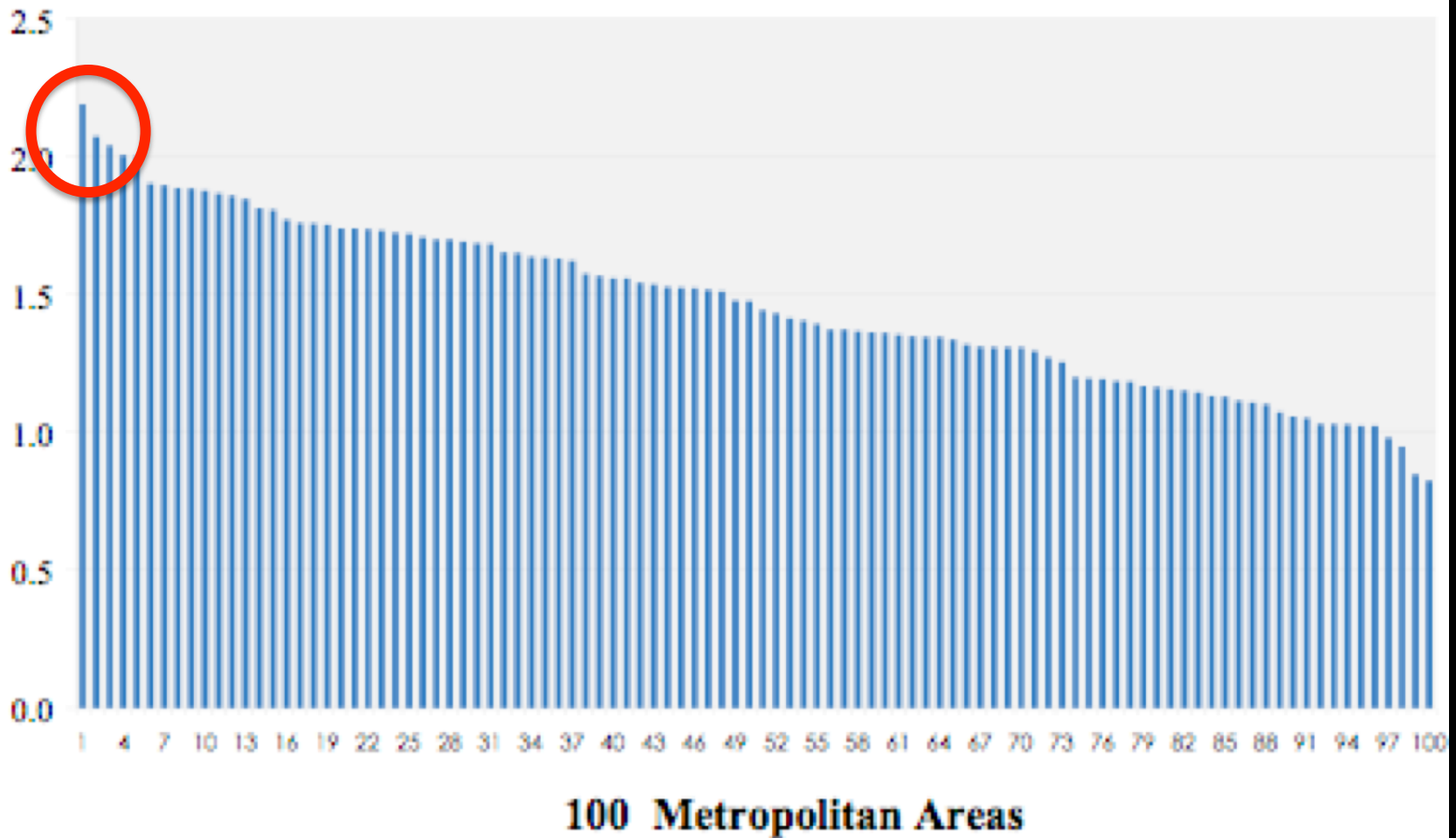
**Lexington: 91st-largest metro area, #1 per capita CO2 polluter**

**This study: "a partial footprint" considers only residential buildings and transportation.**

what do we mean by a footprint?

Residential Per Capita Footprints for 100 Metro areas

**Figure 5. 2005 Carbon Emissions Ranked by Metro Area  
(metric tons/person)**



## Residential Use,

Why does Lexington rise to near the top of CO2 emitted per person, without appearing in the top chart of energy consumed per person?

### Highest and Lowest Emitting Metro Areas Based on Per Capita Carbon Emissions

Year 2000	Carbon/ person	Year 2005	Carbon/ person
<b>Lowest Emitters:</b>		<b>Lowest Emitters:</b>	
Honolulu, HI	1.230	Honolulu, HI	1.356
New York-Northern New Jersey-Long Island, NY-NJ-PA	1.388	Los Angeles-Long Beach-Santa Ana, CA	1.413
Los Angeles-Long Beach-Santa Ana, CA	1.408	Portland-Vancouver-Beaverton, OR-WA	1.446
Portland-Vancouver-Beaverton, OR-WA	1.519	New York-Northern New Jersey-Long Island, NY-NJ-PA	1.495
<b>Highest Emitters:</b>		<b>Highest Emitters:</b>	
Harrisburg-Carlisle, PA	3.252	Louisville, KY-IN	3.233
Oklahoma City, OK	3.282	Toledo, OH	3.240
Toledo, OH	3.344	Cincinnati-Middletown, OH-KY-IN	3.281
Lexington-Fayette, KY	3.480	Indianapolis, IN	3.364
Indianapolis, IN	3.552	Lexington-Fayette, KY	3.455

## Drivers of Lexington's high CO2 per person emissions:

Traffic. Metropolitan sprawl + little use of public transportation

- Truck and other traffic on the **interstate highways intersect** here.

Residential: High consumption of dirty energy.

- Lexington's **hot** summers *and* **cold** winters
- residents use furnaces or air conditioners almost year-round.
- energy comes from burning **coal**, a high-carbon fuel.

Inefficient homes.

- building standards in Kentucky (and Southeast US) place minimal importance on energy efficiency.
- Single-family homes in a Lexington subdivision use more energy than, say, Baltimore rowhouses with shared walls.

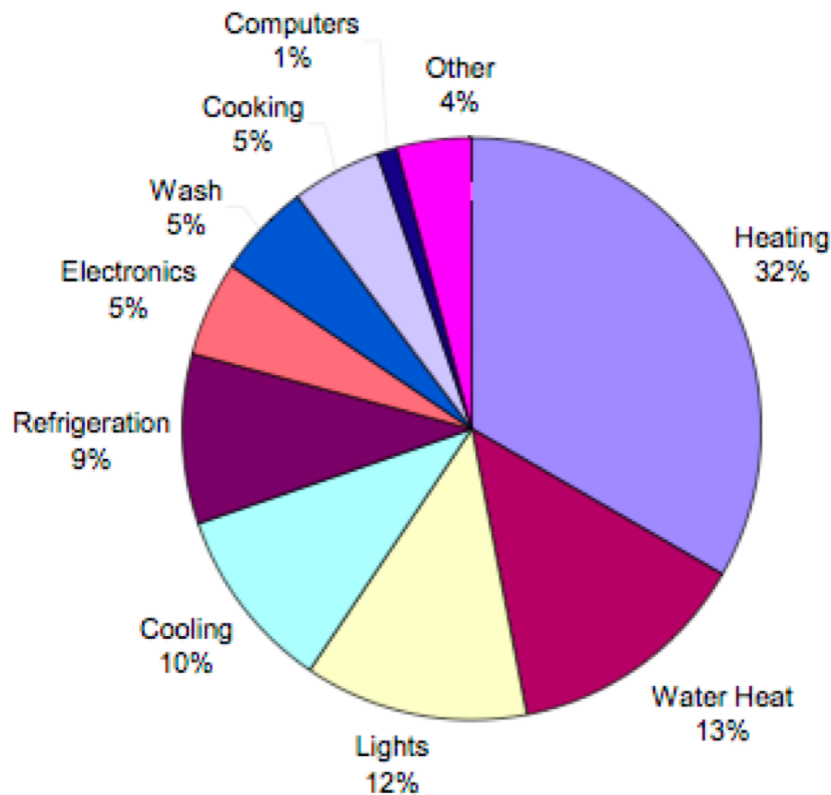
Lack "a conservation ethic": not just an issue of **cheap electricity = waste**

- Oregon, Washington and Idaho have relatively cheap energy, yet waste less despite low costs.

# National Stats: **USEAGE**

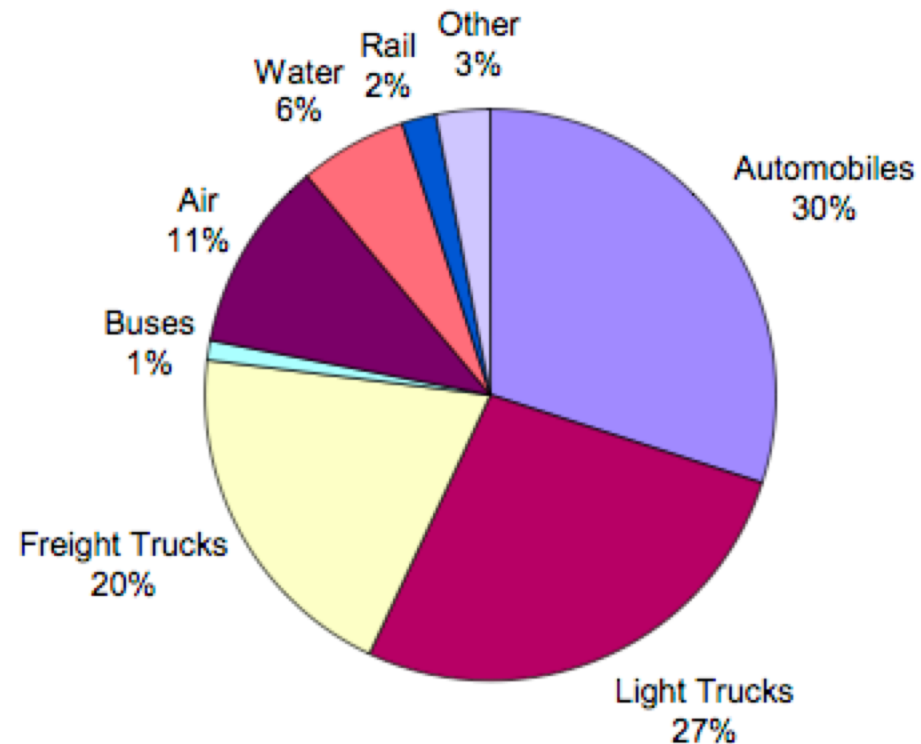
Transportation responsible for one-third of 534 million metric tons CO2 emissions 2005.

## Residential



Source: Energy Information Administration

## Transport



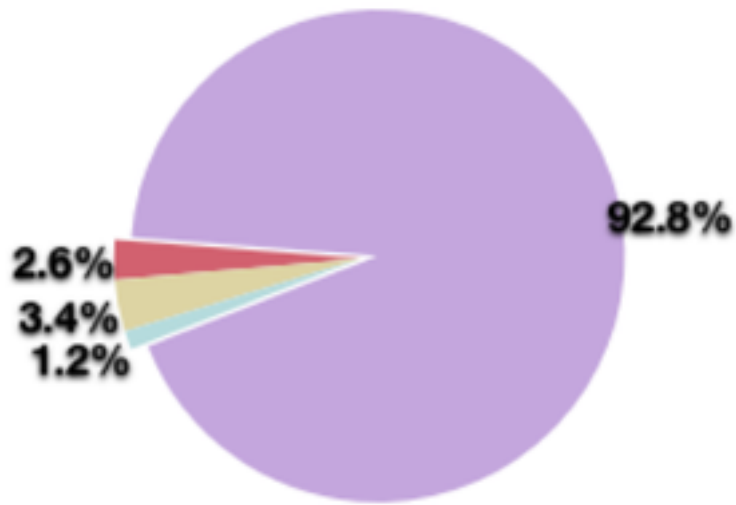
Source: Energy Information Administration

# Electricity USE

KY

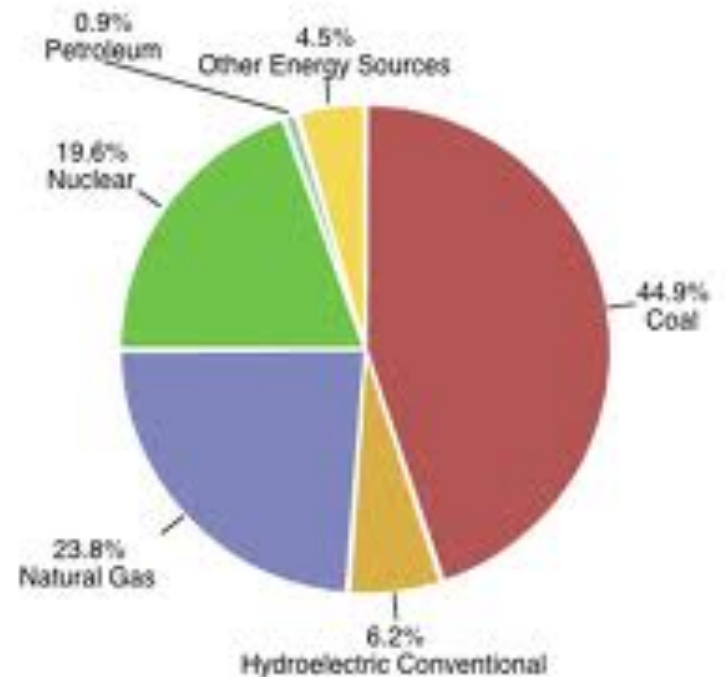
## Kentucky's Electricity Source By Fuel Type

U.S. Department of Energy, EIA Statistics 2007



Coal Natural Gas Petroleum Hydroelectric

USA



Note: Totals may not equal sum of components because of independent rounding.



## **Study recommends federal and local policy changes:**

### **Federal**

- **promoting transportation choices,**
- **rewarding local and state governments for reducing driving**
- **requiring that homes for sale include the costs of heating and cooling.**

### **state and local governments:**

- **tightening building codes to produce more efficient homes**
- **strengthening planning and zoning regulations so less forest and farmland is converted into subdivisions.**
- **encourage Infill**

**City voters approved a tax to increase LexTran bus service in 2004,  
more emphasis on bike lanes**

# What's happening at **UK?**...

## Coal for scholarships?

### University Of Kentucky Adds "Coal" To The New Basketball Dorm's Name For \$7 Million Donation



 Campus News Banner

#### **UK Will Not Mine Robinson Forest**

Contact: [Ralph Derickson](#)

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After hearing a detailed report on the value of both the forest land and the coal reserves in the forest, which is located in Breathitt, Knott and Perry counties, UK President Lee T. Todd Jr. told board members he has "no interest in pursuing mining of coal reserves in the main block of Robinson Forest, but I am strongly committed to preserving the Robinson Scholars program."

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LEXINGTON, Ky. (Sept. 16, 2003) -- The University of Kentucky will not allow coal mining in the nearly 10,000 contiguous acres of the [E.O. Robinson Forest](#) in Eastern Kentucky, it was reported at today's [Board of Trustees meeting](#).

After hearing a detailed report on the value of both the forest land and the coal reserves in the forest, which is located in Breathitt, Knott and Perry counties, UK President Lee T. Todd Jr. told board members he has "no interest in pursuing mining of coal reserves in the main block of Robinson Forest, but I am strongly committed to preserving the Robinson Scholars program."

"Coal Pot" was  
inspired by  
Anatsui's time  
as a visiting  
artist at UK



## The Question of Coal

Kentucky electricity production is dependent upon coal  
What are the environmental costs of coal?

Besides CO<sub>2</sub>, what are the other aspects of coal that contribute to a large footprint?

Appalachia today is witnessing the one of the greatest anthropogenic landscape modifications in global history:

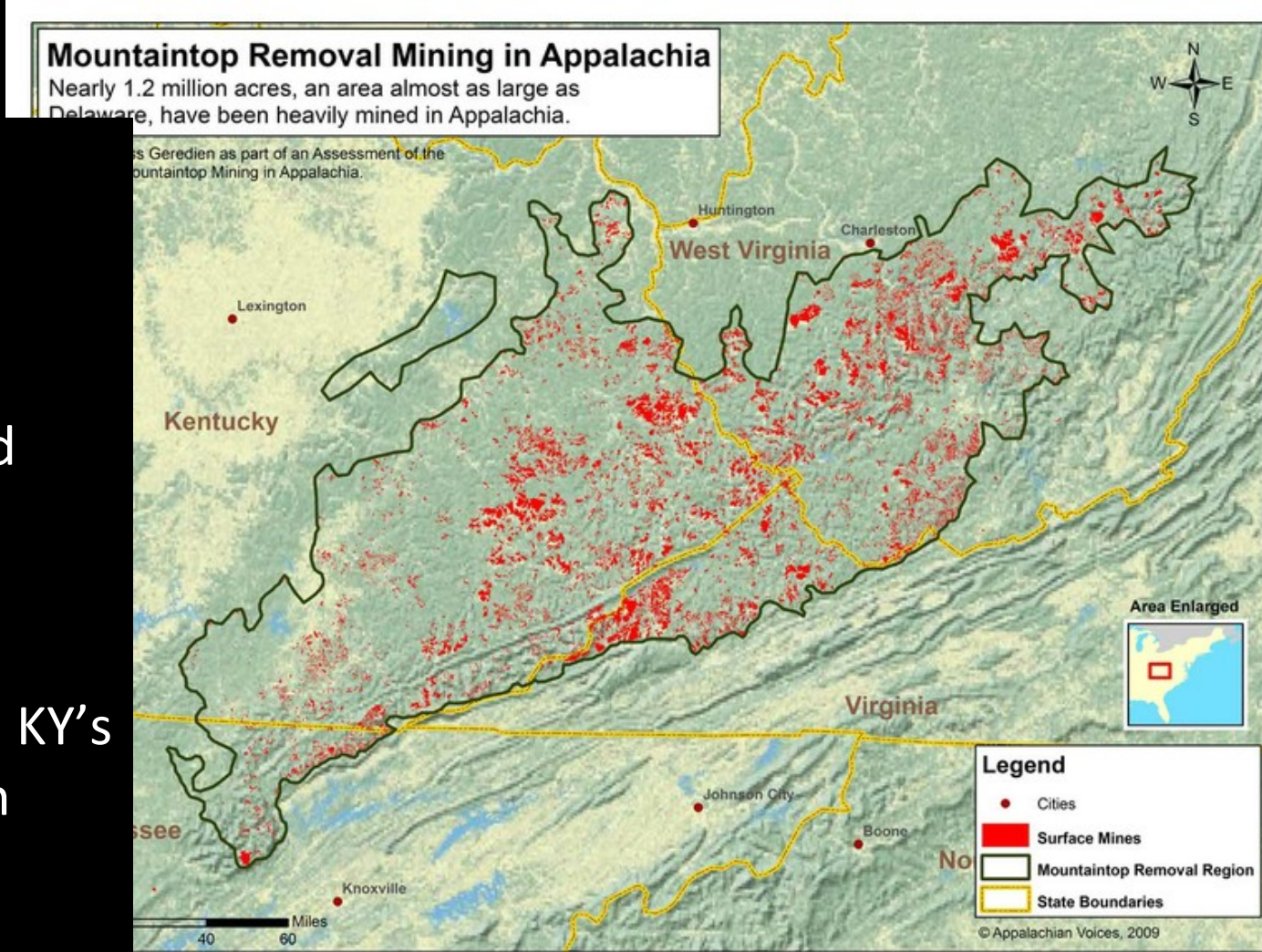
**THE OTHER CARBON FOOTPRINT (NOT CO2): Mountaintop Removal Mining:**

**(MTR overall)** 500 sites in Kentucky, Virginia, West Virginia, and Tennessee,

- Stripping 1.2 million acres, burying 2,000 miles of streams.

**Kentucky,**

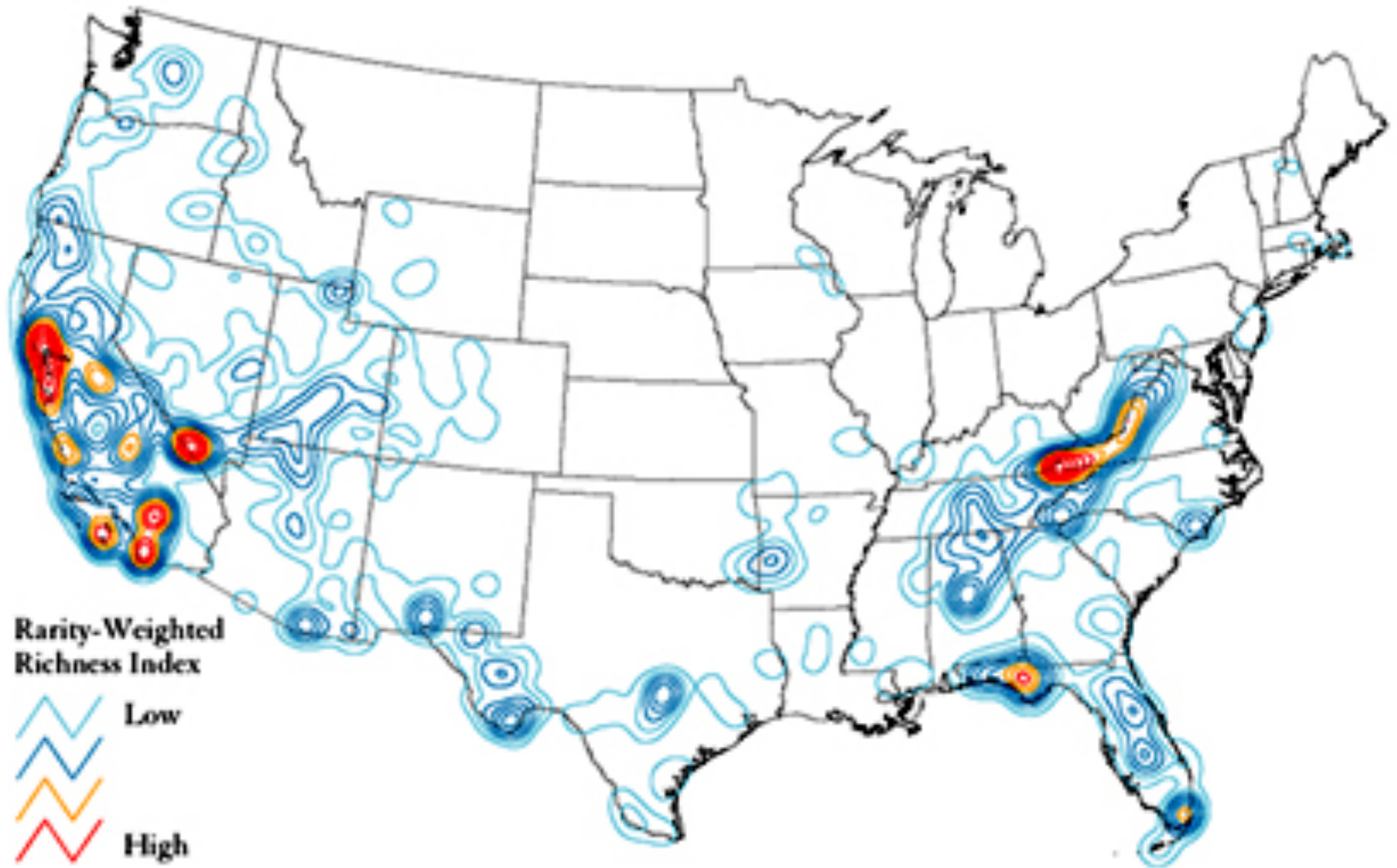
- 293 MTR sites,
- 574,000 acres
- 1,400 miles streams damaged or destroyed,
- 2,500 miles streams polluted
- 'ridge reduction': KY's highest mountain (Black Mountain) getting a trim.





Appalachia: a  
National Sacrifice?

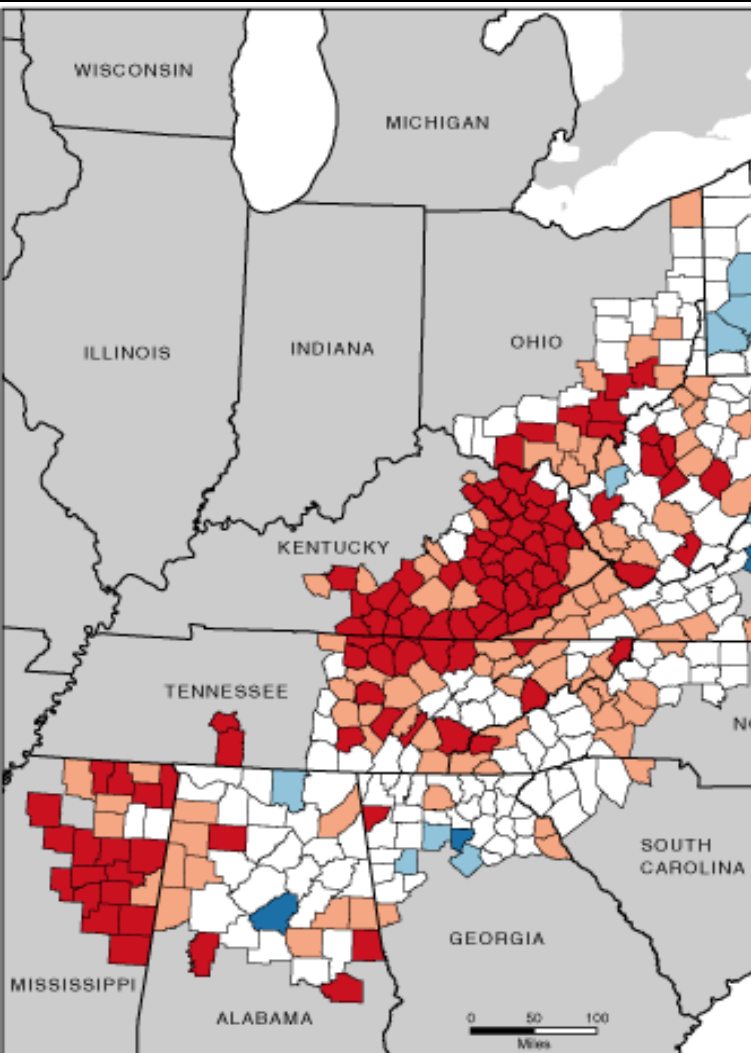
Appalachia is a biodiversity hotspot with perhaps the world's greatest temperate zone landscape level biodiversity.



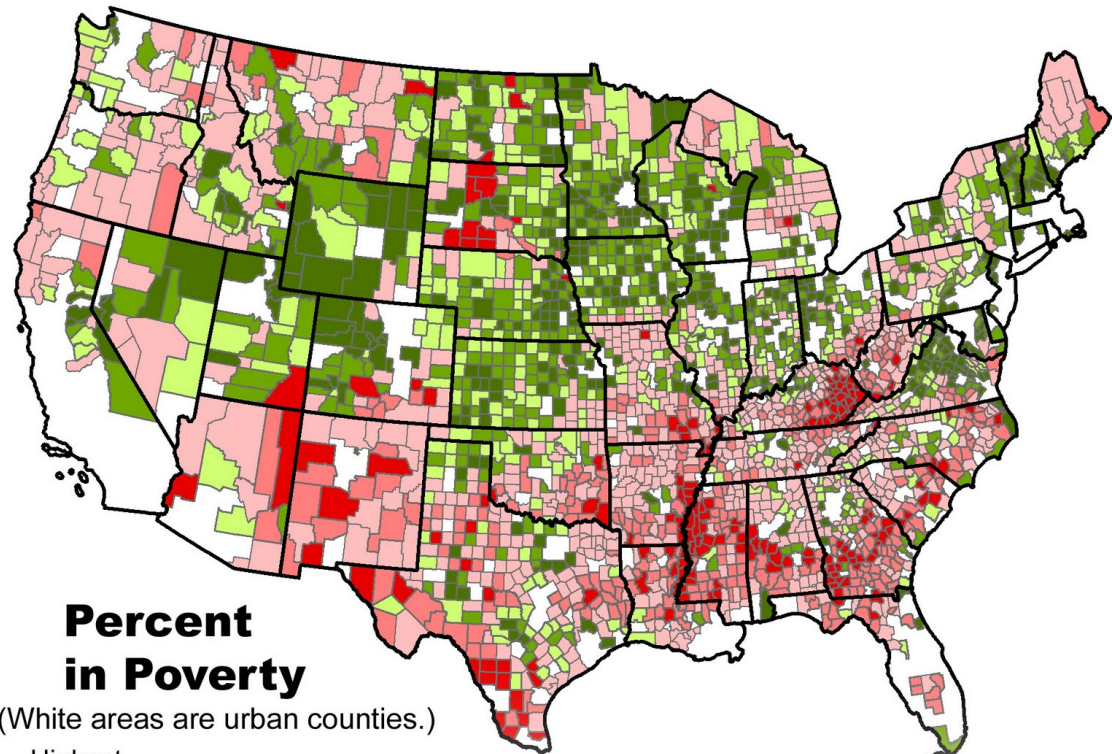
Source: Precious Heritage (2000) © TNC, NatureServe

# Poverty Rates Remain High despite years of mining employment

## A question of environmental justice?



# Poverty in Rural America, 2008



## Percent in Poverty

(White areas are urban counties.)

Highest  
Ziebach County, SD  
54.4%

National Average  
13.2%

Lowest  
Los Alamos County, NM 3.1%



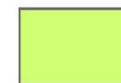
54.4% to 25%



25% to 20%



20% to 14.3%



14.2% to 12.2%



12.1% to 10%



10% to 3.1%



**Mohs Hardness Scale**

1. Talc	6. Microcline Steel tool
2. Gypsum Fingernail	7. Quartz
3. Calcite Copper coin	8. Topaz
4. Fluorite	9. Corundum
5. Apatite Knife-Glass	10. Diamond

**Reclamation:  
KY, southern Appalachia less  
robust than 'northern  
Appalachia, e.g., Pennsylvania**

**KY  
Burn soil**

**PA  
save and replace  
soil**



Politics of Coal, a big deal at UK  
Friends of Coal:



**ASHLEY**  
MAKES A LIVING  
REMOVING HER  
**TOP**

**WHY CAN'T**  
**COAL MINERS?**

Global politics

## North-South dispute

### Environmental Justice linked to Economic Justice by Vandana Shiva: director of the Research Foundation for Science and Ecology, India:

1. “the threat to the atmospheric commons has been building over centuries, mainly because of industrial activity in the North...[yet] the North refuses to assume extra responsibility for cleaning up the atmosphere. No wonder the Third World cries foul when it is asked to share the costs.”
2. The Third World calls for an "ecological democracy" - the worst polluters should pay the highest price for cleaning the environment

**In other words**, Industrializing countries are Reluctant to Sign because...

a. Emission controls will restrict their economic future

**Example:** China's huge supply of soft coal – wants to use this coal to fuel industrialization

b. They feel the responsibility does not lie with them

## Shiva's Arguments:

**The North is not only Responsible for Polluting... The North is the driving force behind industrialization in the Global South**

1. Many Factories owned by 'Northern' companies
2. Global northerners consume the items produced by Global Southern industry
3. The World Bank, a Global Northern financial institution, has pressed the Global South to build coal-fired plants
4. The Debt Burden – money owed to the Global North – limits expenditures on environmentally-friendly technologies
5. Corruption: In many countries, corrupt autocratic rulers supported by the Global North pursue environmentally-destructive policies

## Shiva's 2<sup>nd</sup> Argument (from 5 listed above...):

Who really is responsible for Developing nation CO2 emissions?

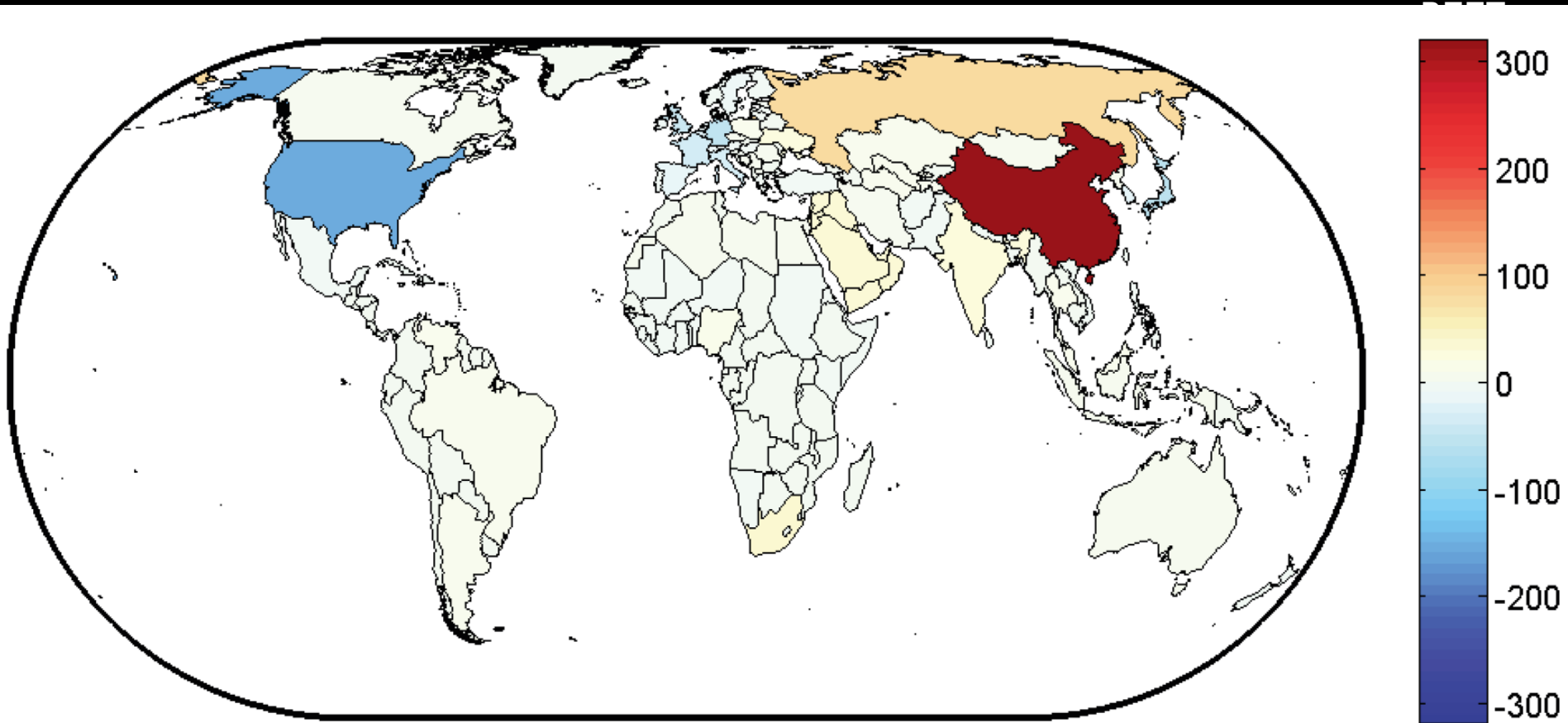
# Balance of Emissions Embodied in Trade (BEET)

**Warm colors** → Net **exporters** of embodied carbon

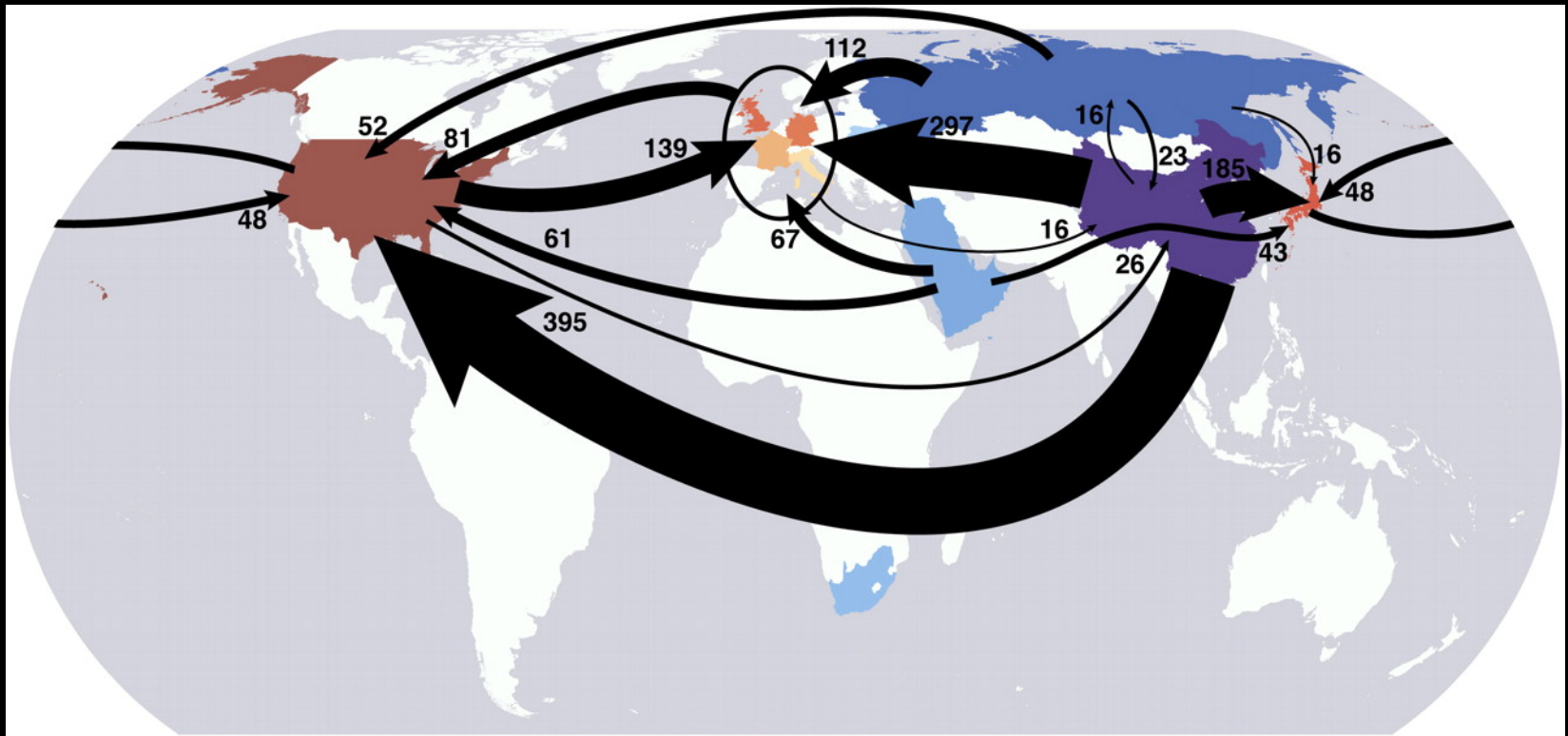
**Cold colors** → Net **importers** of embodied carbon

Year 2004

MtC



**Example:** Largest interregional fluxes of emissions embodied in trade (Mt CO<sub>2</sub> y<sup>-1</sup>) from dominant net exporting countries (blue) to the dominant net importing countries (red).

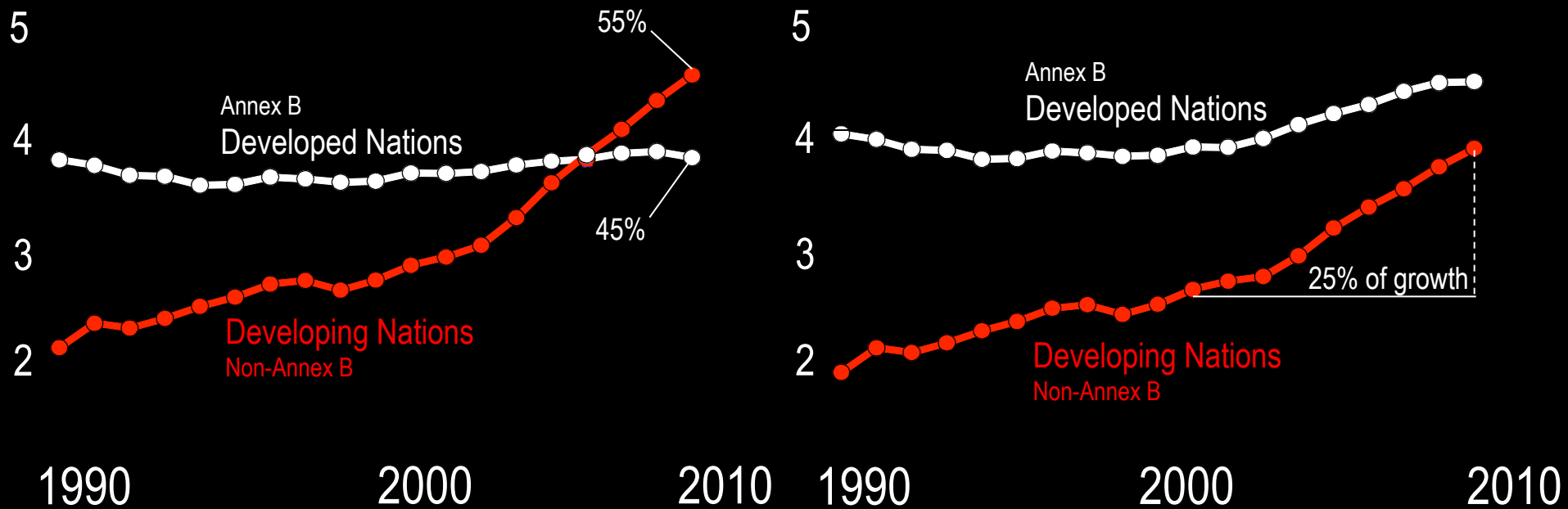


Davis S J , and Caldeira K PNAS 2010;107:5687-5692

PNAS

# Transport of Embodied Emissions

CO<sub>2</sub> emissions (PgC y<sup>-1</sup>)



**Shiva's 3<sup>rd</sup> argument:** The World Bank, a Global Northern financial institution, has pressed the Global South to build coal-fired plants

Since 1994, international public financial institutions (such as the World Bank) have provided more than \$37 Billion to build 88 coal-fired power plants in the developing world

—from, Environmental Defense Fund's Report on Coal, Climate, and International Public Finance





## **Shiva's Conclusion:**

**"If the North is really serious about coming to grips with global warming - whether caused by higher levels of fossil-fuel use or faster rates of deforestation - then debt and unequal trade must be tackled first. Both are reflections of the deep rift between rich and poor which frustrates our search for environmentally sustainable development."**

## Second Kyoto Dispute: European Union versus the US:

- i. EU more energy efficient than the US, thus EU meets climate requirements with greater ease.
- ii. Nonetheless, the EU does have several internal debates over global warming:
  - Nuclear power generation versus Renewables and Conservation
  - Balancing Carbon emissions on a per country basis
    - 20% **reduction** in Germany
    - versus carbon *increases* in Portugal, Greece, Spain

**TABLE 1 Energy Use in 2005—Per Capita and Per Dollar of GDP**

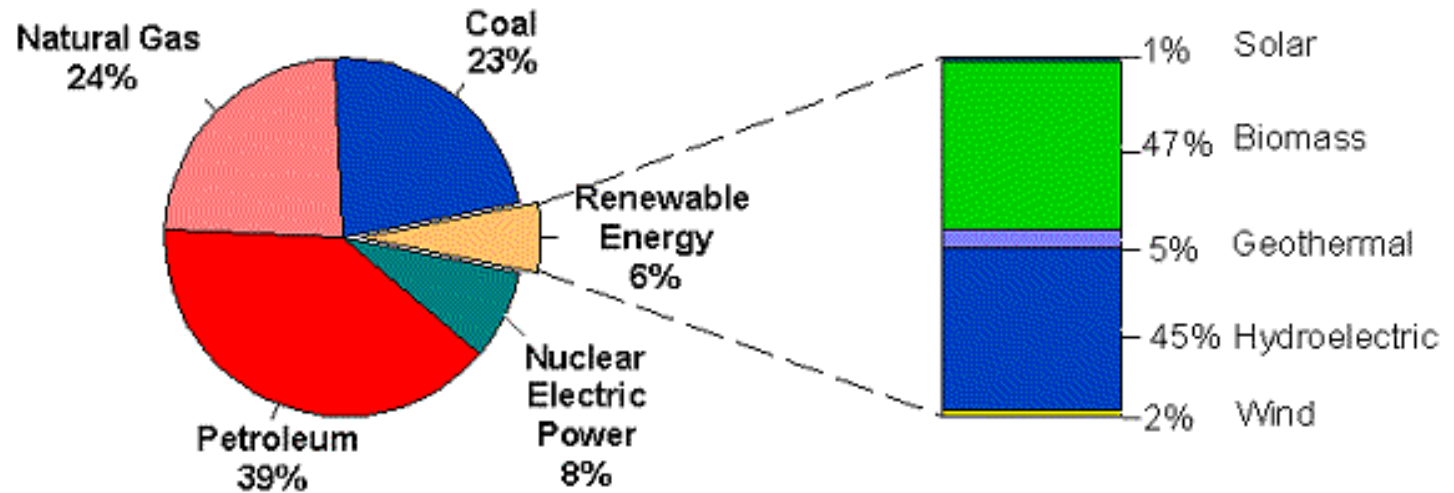
	BTU per person (million BTUs)	BTU per dollar of GDP
United States	340	9,113
Japan	177	4,519
Denmark	153	4,845
France	182	7,994
Germany	176	7,396

Source: EIA, 2009b,c.

US

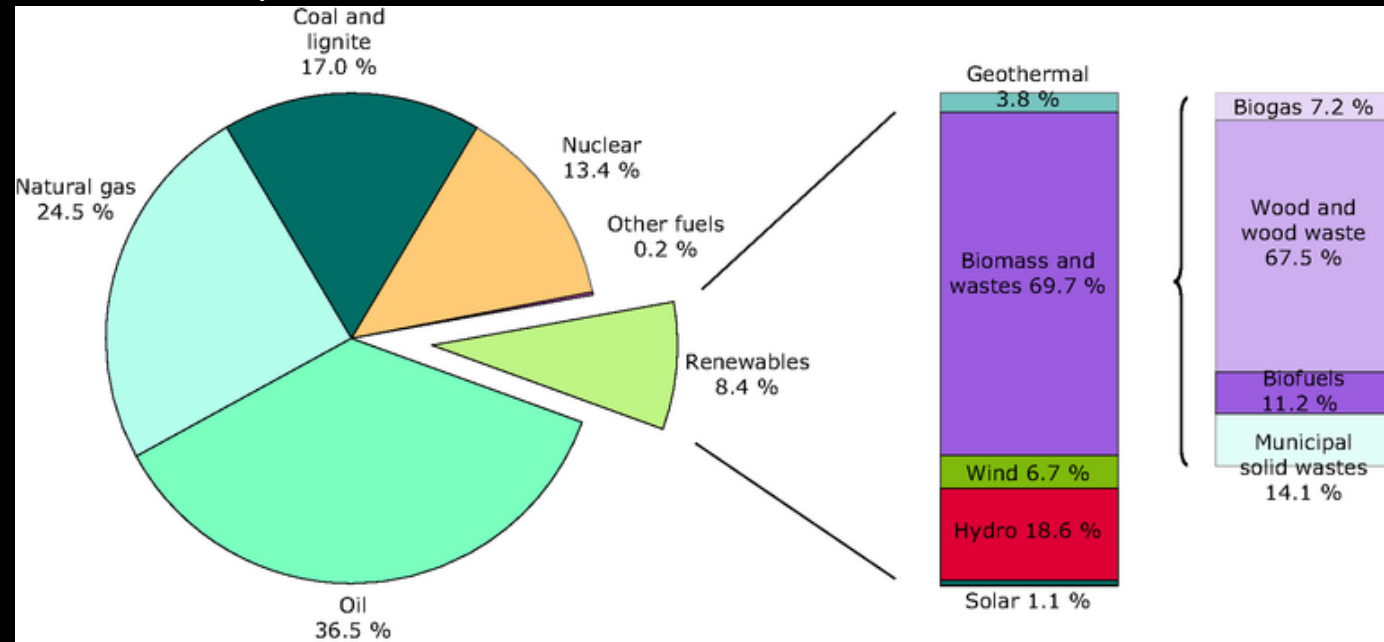
Total = 97.551 Quadrillion Btu

Total = 5.881 Quadrillion Btu



Not so much difference in composition...what other differences?

EU

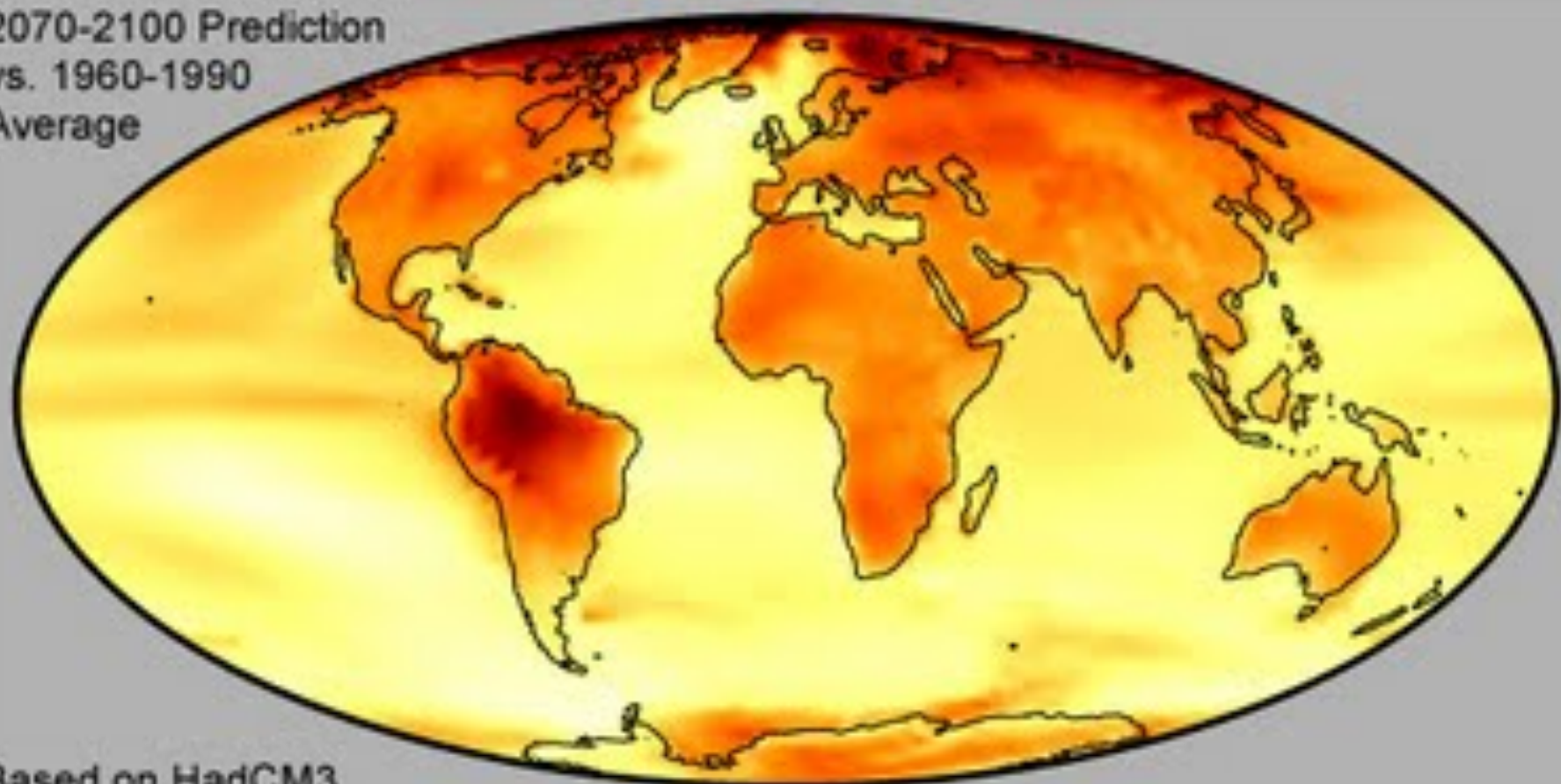


# Let's Summarize

1. Efforts to do something about CO<sub>2</sub> production, the most important greenhouse gas, are at a standstill
2. Recent climate talks have not resulted in any sort of comprehensive agreement
  - The US in particular is caught between climate deniers and the political power of CO<sub>2</sub>-based extractive industries
  - North-South cooperation is hampered by differences over who is to blame, and who should pay the cost for CO<sub>2</sub> reductions
  - The US, the EU, and Japan are at odds because the latter are doing much more to reduce CO<sub>2</sub> emissions while the US does nothing at all
3. Questions of measurement also play a role, since the question of responsibility depends, for instance, on where emissions are 'charged'. For instance, who should be charged with reducing (balancing) emissions embedded in trade (BEET)?

# Global Warming Predictions

2070-2100 Prediction  
vs. 1960-1990  
Average



Based on HadCM3





*World's Fastest Mobile Home (96 mph) (1992) Richard Misrach*

<http://www.edelmangallery.com/misrach.htm>

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## **Global Context and Discourse about Environmental Exposures:**

**Human life *assessed as* worth less in Global South (low income) countries**

**Global Southern countries 'under-polluted' relative to Global North (more industrialized) countries**

### **Example 1**

**Lawrence Summers Memo (as head economist of World Bank):**

- 1. cost of health-impairing pollution lowest where wages lowest**
- 2. Impact of contamination less in 'under-polluted' areas**
- 3. Poor countries willing to pay price due to income elasticity of demand for clean environment**



## **Example 2**

**Global Climate Row: how are human life and basic necessities valued?**

**United Nations Report valued:**

- **1990s: UN's Intergovernmental Panel on Climate Change (IPCC), Geneva, values the lives of people in rich nations up to fifteen times higher than those in poor countries.**
- **North American or European worth \$1.5 million**  
**Citizen of 'low-income' country worth \$100,000**
- **Food crops of poor countries valued less**
- **David Pearce of University College, London**  
**"We won't be revising it, and we have no intention of apologising for our work. This is a matter of scientific correctness versus political correctness."**