

The Hidden Costs of Energy: National Academy of Sciences

Study Excerpts

» Burning fossil fuels for transportation and for electricity generation costs the U.S. \$120 billion a year, primarily in health damages.

» Coal plants are the biggest source of such external, or “hidden” costs, with non-climate damages alone averaging \$62 billion annually, equivalent to 3.2 cents per kWh.

» Climate-related damages from coal power plants are estimated to range from 0.1 cents to 10 cents per kWh. All models indicate that damages caused by each ton of CO₂ will be far worse in 2030 than now.

See the NAS release and study on the Web at:

<http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12794>

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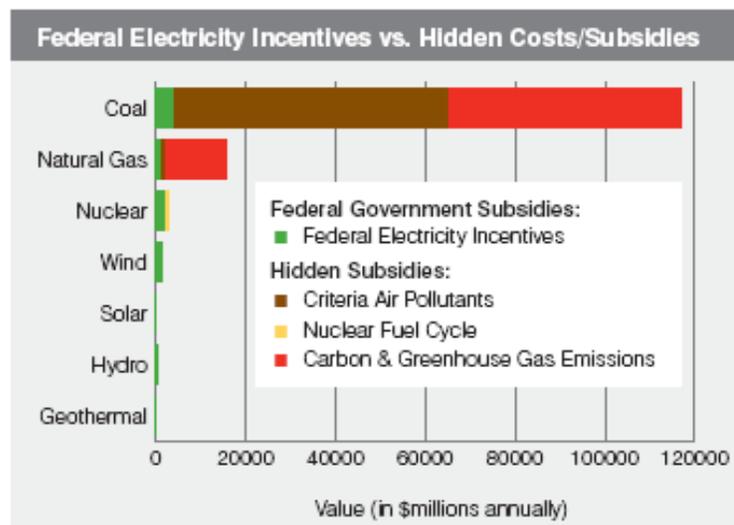
What are hidden costs?

On October 20, 2009, the National Academy of Sciences (NAS) issued an important study on the “Hidden Costs of Energy” to society. Such hidden costs, sometimes called “externalities,” include such things as lung damage, asthma and premature deaths from air pollution; birth defects from mercury fallout; damage to buildings, timber harvests and ecosystem services from acid rain. While very real, they are not reflected, or “internalized,” in market prices. In effect, they are a hidden subsidy for polluting energy sources.

Why this study?

As the NAS explains, “external effects associated with energy production and use are generally not taken into account into decision-making” and therefore, “when market failures like this occur, there may be a case for government interventions.”

The NAS notes its study ran into time and funding limitations. Even so, the study pinpoints how large these hidden costs are. The graph below for the electricity sector shows how existing government subsidies/incentives are dwarfed by the hidden costs of pollution, largely from fossil fuels.



Data Source: National Academy of Sciences and Energy Information Administration



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What does the NAS study analyze?

The study reviews the impacts of energy technologies (electricity generation, transportation, heating) and calculates the following:

- Monetized cost impacts of emissions of “criteria” (regulated) air pollutants on public health. The primary criteria pollutants examined are sulfur dioxide (SO₂), nitrogen oxides (NO_x), and particulate matter (PM).
- Monetized cost impacts of emissions of criteria air pollutants on a few non-health categories, such as grain and timber yield and buildings.
- Ranges of potential damages from climate change—the wide range of possibilities made it impossible to develop precise estimates of cost, according to NAS.

What does the NAS study not provide?

The study does not calculate or “monetize” *all* externalities, because of the complex calculations required and limitations in time and funding for the study. Mentioned but not monetized are the following:

- Impacts of climate change (the study instead provides a broad range of cost estimates)
- Impacts of criteria air pollutants on ecosystem services (for example, acid rain impacts from sulfur dioxide on forests and water habitat)
- Impacts of “hazardous” air pollutants
- Impacts from fuel mining, drilling, and transportation
- Impacts from waste (spills, water contamination, soil contamination, disposal of pollutants caught by scrubbers)
- Potential damages associated with waste from nuclear power, or operational risk
- Risks to national security, or the military cost of protecting fuel imports
- Impacts of wind and other renewable energy sources, although the NAS finds these are “small compared with those from coal and natural gas.”

Comparable studies

Country	Coal & lignite	Peat	Oil	Gas	Nuclear	Biomass	Hydro	PV	Wind
AUT				1-3		2-3	0.1		
BE	4-15			1-2	0.5				
DE	3-6		5-8	1-2	0.2	3		0.6	0.05
DK	4-7			2-3		1			0.1
ES	5-8			1-2		3-5*			0.2
FI	2-4	2-5				1			
FR	7-10		8-11	2-4	0.3	1	1		
GR	5-8		3-5	1		0-0.8	1		0.25
IE	8-8	3-4							
IT			3-6	2-3			0.3		
NL	3-4			1-2	0.7	0.5			
NO				1-2		0.2	0.2		0-0.25
PT	4-7			1-2		1-2	0.03		
SE	2-4					0.3	0-0.7		
UK	4-7		3-5	1-2	0.25	1			0.15

* : biomass co-fired with lignites
 ** : sub-total of quantifiable externalities
 (such as global warming, public health, occupational health, material damage)

A study of the European Commission on the hidden costs of electricity generation, ExternE, has findings similar to those of the NAS, with fossil fuels causing the heaviest hidden costs.

The ExternE study (<http://www.externe.info/>) looked at the external impacts, or “externalities,” of electricity generation, including on human health, on materials and crops, and from climate change. Estimates are shown at left, in EUR-cents per kWh. .