**Pros and Cons of Coal As An Energy Solution**

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Although coal is not used nowadays to heat up homes and factories, its use is wholly similar to what it has been over the generations - as fuel. Only this time, coal is used for the generation of electricity, which is then transmitted over power lines to heat up homes and factories, and in ways too several to count. Even in this nuclear age, coal accounts for 49% of all the electricity generated in the United States, and for 40% of worldwide production.

The expenditure of coal to produce electricity is a simply recent development in the history of use of coal. From the prehistoric times when early humans found that certain black rocks could burn, to the Hopi Indians during the 1300s using coal for cooking, heating and pottery, to the Industrial Revolution in the 1700s fueled by coal and steam engines, coal has been an integral part of human development over millennia.

In spite of the emergence of new technologies, coal as an energy solution is definitely an attractive proposition for the future, provided certain measures are taken to clean up the processes. We present here some of the pros and cons of coal as an energy solution:

Pros

1. Availability - The biggest benefit coal has as an energy solution is its existence. In 2006, the United States Energy Information Administration published figures of 930 billion short tons of recoverable coal reserves in the world. Of these, the United States has the maximum share of 27%.

At present levels of extraction and consumption, these should last more than 130 years. Even considering increasing rates of consumption of around 2-3% annually, the reserves should last more than half a century. Moreover, it is easier to determine their locations and extract the mineral using existing technologies than with other energy sources.

2. Price - Coal is one of the cheapest energy sources accessible. In addition to its abundance, the method for generating electricity from coal is cheaper than alternatives like nuclear and hydroelectric power. Although these alternatives may be less costly in the long run, they require huge initial investments.

3. Safety - As compared to nuclear power, thermal power or electricity generated from coal is considered much safer. Accidents at thermal plants won't cause as expansive incident as the Chernobyl disaster.

Cons

1. Acid rain - Coal has a lot of impurities like sulphur and nitrogen compounds which are released into the atmosphere on burning. In combination with water vapor, they cause acid rain that is harmful to plants and animals.

2. Global warming - Coal is a form of carbon, which on burning produces carbon dioxide (CO2). CO2 is a potent gas that, when present in the atmosphere, traps terrestrial radiation and heats up the earth in a circumstance known as global warming. This has long-term effects on weather and biodiversity.

Various steps are being taken to address these two issues. Today, with current technology, it is possible to filter out 99% of the tiny particles and remove more than 95% of the acid rain pollutants in coal. "Clean coal" technologies are here to stay.

# Nuclear Energy Pros and Cons

Last updated May 3, 2013 by [Mathias Aarre Maehlum](https://plus.google.com/107996559739279792274) [13 Comments](http://energyinformative.org/nuclear-energy-pros-and-cons/#comments)

Below you will find a nuclear energy pros and cons list, which covers the most important aspects of typical nuclear power plants.

There are 104 commercial nuclear power plants in the United States producing a whopping 806.2 TWh of electricity, in other words about 20 % of the entire electricity generation (2008). There is no doubt that the potential of nuclear energy is huge, but there are also downsides.



**Before we get further into the pros and cons list, what exactly is nuclear energy?** The basic gist is this: By separating an atom into two lighter atoms, there is a net loss of mass. This mass is not exactly lost, but rather transformed into massive amounts of energy. This is what is referred to as nuclear fission. By controlling these reactions we can harness the energy.

I’ve made a separate article going deeper into how we harness nuclear energy called [Nuclear](http://energyinformative.org/nuclear). If this is not entirely clear yet; you might want to consider reading this before you start with the pros and cons list below.

## Advantages of Nuclear Energy

#### 1. Relatively Low Costs

The initial construction costs of nuclear power plants are large. On top of this, when the power plants first have been built, we are left with the costs to enrich and process the nuclear fuel (e.g. uranium), control and get rid of nuclear waste, as well as the maintenance of the plant.  The reason this is under advantages is that nuclear energy is cost-competitive. Generating electricity in nuclear reactors is cheaper than electricity generating from oil, gas and coal, not to speak of the renewable energy sources!

#### 2. Base Load Energy

Nuclear power plants provide a stable base load of energy. This can work synergistic with renewable energy sources such as wind and solar. The electricity production from the plants can be lowered when good wind and solar resources are available and cranked up when the demand is high.

#### 3. Low Pollution

It is in most cases more beneficial, in terms of the climate crisis, to replace other energy harnessing methods we use today with nuclear power. The environmental effects of nuclear power are relatively light compared to those. However, nuclear waste is potential harmful for both humans and the environment.

#### 4. Thorium

Reports show that with the yearly fuel consumption of today’s nuclear power plants, we have enough uranium for 80 years. It is possible to fuel nuclear power plants with other fuel types than uranium. Thorium, which also is a greener alternative, has lately been given an increased amount of attention. China, Russia and India have already plans to start using thorium to fuel their reactors in the near future.

It looks like nuclear fuel is of good availability if we combine the reserves of the different types together. In other words, hopefully enough time for us to find cost-competitive greener ways of harnessing energy.

#### 5. Sustainable?

Is nuclear energy renewable or non-renewable? This is a good question. By definition, nuclear energy is not a renewable energy source. As I mentioned above, there is a limited amount of fuel for nuclear power available. On the other hand, you could argue that nuclear energy is potentially sustainable by the use of breeder reactors and fusion reactors. Nuclear fusion is the holy grail of harnessing energy. If we can learn to control atomic fusion, the same reactions as those that fuel the sun, we have practically unlimited energy. At the moment, these two methods both have serious challenges that need to be dealt with if we are to start using them on larger scale.

#### 6. High Energy Density

It is estimated the amount of energy released in a nuclear fission reaction is ten million times greater than the amount released in burning a fossil fuel atom (e.g. oil and gas). Therefore, the amount of fuel required in a nuclear power plant is much smaller compared to those of other types of power plants.

## Disadvantages of Nuclear Energy

While the advantages of using nuclear energy seem to be many, there are also plenty of negative effects of nuclear energy. The following are the most important ones:

#### 1. Accidents Happen

The radioactive waste can possess a threat to the environment and is dangerous for humans. We all remember the Chernobyl accident, where the harmful effects of nuclear radiation on humans can even be witnessed today. Estimates conclude that somewhere between 15 000 and 30 000 people lost their lifes in the Chernobyl aftermath and more than 2.5 million Ukrainians are still struggling with health problems related to nuclear waste.

Just last year, on March 18, a major nuclear crisis happenend again in Japan. While the casualties were not as high as with the Chernobyl accident, the environmental effects were disasterous.

History shows that we can never really protect us 100% against these disasters. Accidents do happen.

#### 2. Radioactive Waste

Does nuclear power cause air pollution? The nuclear power plants emit negligible amounts, if any, **carbon dioxide** into the atmosphere.  However, the processes in the nuclear fuel chain such as mining, enrichment and waste management does.