GREENPEACE

The case against nuclear power
and the case for real solutions to energy security and climate change

When the true costs of nuclear energy are compared to the true benefits of renewable energy technologies, the choice is almost too obvious. In a world on a quest for energy security and solutions to climate change, investment in nuclear power makes little sense.

The real solutions to the energy security and climate change are available now. And nuclear power, the most dangerous and expensive source of electricity, is not in this equation. Instead, these solutions are ready to be delivered by renewable energy and energy efficiency technologies. The deployment of renewable power requires little to no fuel inputs in order to harness free and clean energy sources like the sun and wind which are widely available throughout the country.

The potential for renewable energy in the Philippines is vast and far greater than that of nuclear power or fossil fuels. Wind and solar energy plants in Ilocos Norte and Cagayan de Oro are already showing that these solutions are working. But we need more. Our renewable energy potential unfortunately remains largely untapped. And worse, instead of focusing in pouring time and investments in expanding the renewable energy sector in a big way, there are proposals to shift to nuclear, such as House Bill 4631 and Senate Bill 2665, to immediately commission the Bataan Nuclear Power Plant (BNPP), and appropriate taxpayer money for the plan.

Our policy makers should move on from promoting expensive, outdated and dangerous nuclear systems. Any effective response to energy demand in a world facing climate change involves enormous expansion in our use of renewables and a complete abandonment of nuclear power.

Nuclear fallacies exposed

What they're saying: "By 2010, the Philippines is expected to experience power shortage due to increasing demand and lack of new plants being constructed. The only way to keep up with the demand and keep the lights on is by embracing nuclear power."

The real score: The Department of Energy's demand forecasting has frequently been criticized by experts as faulty(1), projecting power shortages even with existing supply gluts. However, assuming that the DOE's forecast is accurate, if now is the time to build more power plants, then this is also the best opportunity for the Philippines to fully harness our massive renewable energy potential. With the passage of the Renewable Energy Law last year, the DOE's scenario presents an opportunity for the entry and development of new and renewable energy technologies which can strategically displace polluting power plants and rule out nuclear.

Nuclear is not an available power source in the Philippines, and, given the DOE's power forecasts, a nuclear plant will be a poor choice to meet power demand because it takes too long to build. Being modular and decentralized by nature, new renewable energy can be expanded and built much more rapidly (and operated more efficiently given the country's archipelagic character) than nuclear and conventional polluting sources.

Nuclear power will not 'keep the lights on'. Instead we'll need energy efficiency, cleaner use of fossil fuels, renewables and the shift to decentralized power stations.

(1)Philippine Electricity Demand Projections, Maitet Diokno-Pascual, 2005

What they're saying: "The BNPP can be operational by 2012."

The real score: This is only Reps. Mark Cojuangco and Mikey Arroyo's personal estimates and not based on any factual data by scientists or experts (the House of Representatives does not yet have the results of the feasibility study currently they initiated with Korea Electric Power Corp).

In fact, nuclear plants take long to build, sometimes taking a decade. Historically, no nuclear power station has ever been built on time and within budget. The Greenpeace report "The Economics of Nuclear Power" shows that, worldwide, the last ten reactors built have averaged at least 300% over budget.

In stark contrast, proven renewable energy technologies are available now, can be constructed and brought online quickly, and therefore provide immediate cuts in greenhouse gases. For example, construction time for installing a large wind turbine has fallen to only two weeks, with an associated planning period of between one to two years.

What they're saying: "Nuclear energy is cheap. Electricity from the BNPP will be cheap."

The real score: Cojuangco himself has estimated in House Bill 4631 that the rehabilitation of BNPP will cost around USD 1 billion. USD 1 billion is not cheap for a rehabilitated plant, as it is around the cost of a new power plant.

In his Bill, Rep. Cojuangco's proposes that half of the USD 1 billion for the BNPP rehab will be sourced from an additional charge to consumers by utility companies while the other half will come from loans. In short, the rehabilitation of the BNPP will be shouldered by Filipino taxpayers.

Worldwide, the cost of building a nuclear reactor is consistently two to three times higher than the nuclear industry estimates. In India, the country with the most recent experience of nuclear reactor construction, completion costs for the last 10 reactors have, on average, been 300% over budget. In Finland, the construction of a new reactor is already €1.5 billion over budget.

Despite its proponents claiming that it is cost-effective, nuclear power actually depends heavily on state subsidies and massive loans, and is actually a hidden heavy burden to citizens.

Uranium to fuel the BNPP will have to be imported as there are no uranium deposits in the Philippines, so the country's dependence on foreign fuel is increased. Uranium is further subject to large price hikes since the resource is only available to a few countries. In fact, 58% of global uranium supplies come from only three countries and its processing as fuel can only be carried out in six countries. Further, at current global nuclear capacity, known uranium resources will last only 34 years.

Because of their nature, nuclear plants also require greater safety and security considerations, from the shipment of the fuel to the operation of the plant to the storage of spent uranium. These also translate to large costs.

Decommissioning nuclear plants also cost a lot of money. In a recent estimate, the UK government calculated that cleaning up the country's ageing nuclear facilities will exceed 73 billion pounds (USD 100 billion). On top of this, the cost of building a nuclear waste dump costs around USD 29 billion.

And finally, costs for emergencies if the plant should malfunction reach unimaginable amounts. These include costs for evacuation, relocation of communities, and health costs, aside from the repair of the plant and the rehabilitation of surroundings which takes years. From previous experience of nuclear disasters, these costs amount to hundreds of billions of dollars over a period of decades. The total cost of the Chernobyl accident is estimated at € 358 billion (or PHP 21.6 trillion which is more than 17 times the Philippines' national budget for 2008).

Unfortunately, the public ends up shouldering costs such as the above. Nuclear power is therefore the most expensive source of electricity.

Renewable power generators, on the other hand, utilize the sunlight, wind, water currents, biomass and geothermal heat to produce electricity. These 'fuels' are mostly free for the taking. They have little to no fuel input and their competitive advantage remain relatively constant no matter how much the market price of oil, gas, coal and uranium changes.

What they're saying: "Nuclear energy-derived electricity is more reliable as it is not 'erratic' like renewable power sources which are dependent on weather conditions."

The real score: Advancements in design, operation and maintenance now enable RE power technologies to generate electricity more reliably than nuclear plants. Even the variability and intermittency of wind and solar resources become easier to manage the more they are deployed and interconnected. This is

because wind and solar plants help grid operators handle major outages and contingencies elsewhere in the system since they generate power in smaller increments that are less damaging than unexpected outages from large plants.

In the case of baseload capacity, geothermal, modern biomass and hydroelectric plants have long provided reliable baseload power in the same fashion as nuclear plants. Energy storage technologies now also allow wind and solar firms to operate as baseload plants. Wind turbines combined with compressed air energy storage technologies allow the capacity factor to rise above 70% making them functionally equivalent to a conventional baseload plant.

What they're saying: "Nuclear power will give us energy security."

The real score: Nuclear power generators cannot be mass produced and as such take much longer to build and are therefore exposed to escalating interest rates and inaccurate demand forecasts. Their centralization requires costly and expansive systems subject to highly uncertain projections about uranium availability, is centrally administered by a technocratic elite, and is vulnerable to the ebb and flow of international politics, and requires garrison-like security measures at multiple points of the supply chain.

RE technologies, in contrast, reduce dependence on foreign sources of fuel and therefore create a more secure fuel supply chain that minimizes exposure to economic and political changes abroad.

It decentralizes electricity supply so that an accidental or intentional outage affects a smaller amount of capacity that an outage at a larger nuclear facility.

RE improves the reliability of power generation by conserving or producing power close to the end-user and does not involve the transport, and storage of hazardous, radioactive fuel. RE can also respond more rapidly to supply and demand fluctuations because they are not subject to the volatility of global fuel markets.

Most significantly, RE technologies have enormous benefits since their use avoid air pollution, and the dangers and risks associated with nuclear power. They generate electricity without releasing CO2 and other greenhouse gasses that contribute to climate change.

What they're saying: "Even considering the Three Mile Island and Chernobyl accidents, commercial nuclear power has been and is the safest and most reliable form of electric power generation ever invented by man."

The real score: The Three Mile Island and Chernobyl disasters show the extreme danger that humanity is exposed to because of nuclear power plants. Power plants whose malfunction can cause some of the world's worst disasters can never be considered safe or reliable since in reality, accidents can never truly be discounted. Unfortunately, given the dangerous nature of nuclear power plants, any accident that happens to the plant creates immediate serious repercussions to nearby communities, as well as to their water and soil. The effects and rehabilitation usually last for decades.

The Three mile Island and Chernobyl accidents should never be downplayed. The Chernobyl disaster is perhaps one of the worst in human history. Serious radioactive contamination spread over 150,000 square kilometers in Byelorussia, Ukraine and Russia. Radioactive clouds deposited radiation thousands of kilometers away. Hundreds of thousands people had to be evacuated, and millions more were left to live in areas that were dangerous to their health and lives. Moreover, scientific studies have shown that the full consequences of the Chernobyl disaster could top a quarter of a million cancer cases and nearly 100,000 fatal cancers.

Renewable energy, on the other hand, is the cleanest, safest and most reliable form of power generation.

What they're saying: "Nuclear plants will help solve the problem of climate change."

The real score: In fact, nuclear plants threaten our ability to solve climate change.

The nuclear industry would like us to believe that nuclear power offers a much better option for generating electricity without releasing significant amounts of greenhouse gases or toxic pollution. However, nuclear power plants are not much of an improvement over conventional coal-burning power plants despite claims that nuclear is the 'clean air energy.'

Uranium mining, milling, leeching, plant construction and decommissioning all produce substantial amounts of GHG. Taking into account the carbon-equivalent emissions associated with the entire nuclear life cycle, nuclear plants contribute significantly to climate change and will contribute even more as stockpiles of high-grade uranium are depleted.

Assuming that the nuclear industry is the largest carbon-free energy source, as proponents claim, even if the industry quadruples its generating capacity, this would only reduce CO2 emissions from the energy sector by a mere 6% by 2050. Yet to achieve that, 1,300 large reactors would have to be built. That means one reactor every two weeks, starting from today to 2050, with investment costs reaching up to 10 trillion USD.

On the other hand, every single renewable power technology is less GHG-intensive than any-sized nuclear plant. The International Atomic Energy Agency (IAEA) estimates that when direct and indirect carbon emissions are included, wind and solar were found to be 50 and 7 times less intensive than coal plants. Even taking into account intermittence of wind and solar photo-voltaic, RE technologies are 2-7 times more effective on a per KWh basis than nuclear plants at fighting climate change. Every KWh of renewable power avoids the emission of more than one pound of CO2.

What they're saying: "We can have nuclear power AND renewables."

The real score: In reality going nuclear would squeeze out renewables. Any investment put in nuclear is investment taken away from renewable energy, the proven climate change solution. Nuclear energy distracts governments from taking the real global action necessary to tackle climate change and meet people's energy needs.

What they're saying: "Groups like Greenpeace don't have a solution to our energy problems."

The real score: We do, it's simple, it's cheaper and it's working in other countries, as well as in the Philippines. But renewable energy is not just building wind turbines. We can easily keep the lights on by investing in renewable energy, mandating energy efficiency technologies and standards, and shifting to decentralized energy.

The Greenpeace report 'Energy [R]evolution: A Sustainable Philippine Energy Outlook,' draws up a comprehensive energy strategy for the Philippines to show how renewable energy can become the country's energy backbone. The report show how renewable energy can provide as much as 57% of the country's energy needs by 2030, and 70% by 2050, with 'new' renewables, such as wind, biomass, geothermal and solar energy, contributing as much as 58% to the energy mix.

Greenpeace asserts that an Energy Revolution—an innovative change in the way we produce, distribute and use electricity, is the solution to combat climate change and to ensure energy security.

What they're saying: "It's okay, the radioactive waste problem is solved."

The real score: It isn't. And no real progress has been made on this matter. In fact the situation on nuclear waste is pretty much as it was in the 1980s when the BNPP was mothballed. Up to the present, there are no final repositories for the 200 thousand tons of high level nuclear waste assembled worldwide, and countries are still scrambling for solutions, none of which are long term or truly safe.

An average nuclear reactor produces 20-30 tons of highly radioactive spent fuel each year. Nuclear power expansion would increase the volume and unresolved risks of spent nuclear fuel and radioactive waste far into the distant future.

BNPP, with a capacity of around 619 MW, will produce around 12 tons of high level radioactive waste a year. Due to the extremely long half lives of some of its components, this waste will remain dangerous for thousands of years. Plutonium-239, one of the main decay products of the reactor fuel, remains dangerous for 12,000 human generations.