



JAMAICA ENVIRONMENT TRUST

FACT SHEET ON COAL AS A SOURCE OF ENERGY FOR JAMAICA



BACKGROUND

At a press conference on 28 July 2016, the Jamaican Government announced the sale of the old Alpart bauxite plant at Nain in St. Elizabeth to Jiuquan Iron & Steel (Group) Company Limited (JISCO) as well as a US\$2 billion investment in an industrial zone, powered by a 1000MW coal-fired plant, creating 3,000 jobs. The project would include bauxite mines, an aluminum refinery, a local electricity network, rolling wire mills and “other enterprises”. Since then, the Government of Jamaica has not spoken further on the matter, except to say that no final decision has been taken.

This simple brief on the public health and environmental impacts of coal as an energy source was prepared by the Jamaica Environment Trust (JET) as a public service.

WHAT ARE THE MAIN IMPACTS OF COAL-FIRED PLANTS ON PUBLIC HEALTH AND THE ENVIRONMENT?
CAN THESE IMPACTS BE MITIGATED?

Activity	Impacts	Mitigation
Coal mining	Destruction of land, fresh water supplies, biological diversity	Cannot be eliminated. Coal mining remains a dirty and hazardous industry
Transport	Emissions from additional energy use for road, rail and sea transport	Depends on type of transport, proximity of the source of coal
Electricity Generation		
Emissions: Particulates (PM) Soot	Respiratory illnesses in humans, especially children and the elderly, cardiovascular disease, haze	Can be reduced by 99% by using fabric filters/electrostatic precipitators (ESPs)
Emissions: Sulphur Dioxide (SO ₂)	Asthma attacks in humans, combines with water vapour to form acid rain – which harms buildings, crops, surface water and soil	Can be reduced by 90-98% by using flue gas desulfurization.
Emissions: Oxides of Nitrogen (NO _x) causing smog	Respiratory illnesses in humans, especially children and the elderly	Can be reduced by 50%-70% using low-NO _x boilers or selective catalytic reduction
Emissions: Mercury (Hg)	Associated with irreversible IQ deficits, brain damage	Can be reduced by 90% using injected activated carbon and baghouses
Emissions: Lead	Associated with irreversible IQ deficits, brain damage	Can be reduced by 90% using injected activated carbon and baghouses
Emissions: Arsenic	Impacts to surface water, resulting in increased risk of cancers if drunk by humans and animals	Can be reduced by 90% using injected activated carbon and baghouses
Emissions: Carbon Dioxide (CO ₂)	Main greenhouse gas causing global climate change	Cannot be eliminated cost-effectively. There are efforts underway to develop ways of capturing and storing carbon underground, but these are very expensive and not suitable for Jamaica which is predominantly limestone.
Fugitive dust	Respiratory illnesses in humans, especially children and the elderly	Can be controlled by use of enclosures and 100% utilization of fly ash
Use of large volumes of water for cooling purposes	Depletion of surface or ground water If sea water is used, degradation of marine resources	Can be minimized by using dry-cooled systems
Waste Products		
Coal ash (contains heavy metals)	Living next to coal ash storage increases risks of cancer in humans; threatens surface and ground water supplies	Reuse of the ash in cement plants

WHAT IS “CLEAN” COAL?

The term “clean coal” is used to describe coal plants which use all of the above technologies to reduce the impacts of emissions from coal plants on human health and the environment. These new plants require extremely sophisticated technology, management and rely on state-of-the-art environmental monitoring systems. Jamaica’s National Energy Policy 2009 identifies the weak enforcement powers of regulatory agencies in its SWOT analysis. Carbon dioxide emissions (the main greenhouse gas) cannot be cost effectively eliminated at this stage. “Clean” coal is NEVER “cheap” coal.

HOW BIG IS A 1000MW COAL PLANT?

Huge. Jamaica’s entire current generating capacity is about 850MW.

WILL IT BREACH JAMAICA’S COMMITMENTS UNDER THE PARIS AGREEMENT ON CLIMATE OR OTHER POLICY DOCUMENTS?

Yes, it is highly likely that constructing this plant will breach Jamaica’s Intended Nationally Determined Contributions (INDCs) under the Paris Agreement on climate change. Assuming continuous operation, a modern coal-fired plant emits 762 kilograms of carbon dioxide (CO₂) per megawatt-hour of electricity generated, if there is no CO₂ capture. This plant alone would emit roughly 6.7 million tons of CO₂ per year, just over half of our 2025 target under the Paris Agreement on Climate Change, which we signed on Earth Day 2016. Meeting our INDCs to global emissions under this Agreement would become virtually impossible.

The 2009 National Energy Policy calls for 5% petcoke/coal, so this very large plant would not conform with government policy.

From the Planning Institute of Jamaica’s Vision 2030: *“We will diversify our energy supply, and increase use of renewable energy. We will coordinate decision-making between the bauxite and alumina industry and the public electricity supply to resolve the fundamental medium-term fuel choice between coal and natural gas to replace dependence on petroleum, based on economic and environmental considerations. At the same time, we will become more efficient in our use of energy throughout our economy and society. Over the long term, we will take advantage of emerging technologies that will reduce our dependence on fossil fuels permanently.”*

WHAT ARE THE ENERGY OPTIONS FOR JAMAICA?

Renewables (solar and wind)

The very best option is the use of renewables (solar and wind) which avoids all of the damages associated with the use of coal or natural gas. From an economic standpoint that looks at level-playing-field costs (cost of building and operating the energy project divided by the lifetime amount of electricity produced in kilowatt hours) solar and wind are becoming the most economic options because of technological advances that are reducing the costs of materials. Moreover, once construction is complete, the ‘fuel’ source (sunshine or wind) is free and available locally, building energy independence. Those in favor of the coal option will attack the use of renewables on the basis that they are intermittent sources of energy but recent technological advances in energy storage are overcoming the problem of intermittency of solar wind, allowing them to supply baseload power. Numerous case studies on both regional and global scales have determined that renewable energy, if properly implemented, can provide baseload power. For a list of these case studies, see:

<http://www.skepticalscience.com/print.php?r=374>

Natural Gas

Natural gas emits almost no SO₂, half of the NO_x and roughly 40% of CO₂ on a lifecycle basis when used for electricity generation. Emissions of particulates and mercury are virtually eliminated. There are no impacts from coal mining, although there are concerns now about the impacts of hydraulic fracturing (fracking) and increases in methane emissions (also a powerful greenhouse gas) from leaks. Impacts of NO_x and impacts to fresh and seawater are similar to coal plants. From an economic standpoint, widespread use of fracking has led to be a global oversupply of natural gas, reducing the cost of this option. Infrastructure investments in the Caribbean will allow greater and more economical use of natural gas. Oil prices dropped by almost 50 percent between mid-2014 to mid-2015, reducing energy import costs around the Caribbean. Despite this drop, alternative fossil fuels, including natural gas, are still cheaper than oil products in many markets. Jamaica has already begun to use natural gas as its transitional fuel on the way to a carbon free future and JET supports this approach.

Energy Efficiency and Conservation

Energy conservation and efficiency is Goal 1 of Jamaica's National Energy Policy 2009-2030. The SWOT analysis in the Policy describes the following weaknesses:

- Low refinery utilization factor
- Electricity system experiences high heat rate (low generation efficiency)
- High technical and non-technical electricity system losses
- Inefficient energy use in production and consumption across all sectors
- Low level of adaptation of new energy technologies
- Energy inefficiencies in alumina sector
- Low levels of public action on energy conservation

Increasing energy efficiency and conservation in Jamaica would bring immediate and low cost benefits to the energy sector.

CONCLUSION

Whatever option Jamaica chooses for adding 1000 MW of power to its energy capacity, it is a choice we will be locked into for decades. Therefore, a thorough consideration of energy options is a matter of urgency. If Jamaica chooses the coal option and is then subject to a global regime of a stiff Carbon Tax (which is almost certain to come someday in order to avoid catastrophic climate change), Jamaica will be stuck paying for a choice it could have avoided. A robust consideration of which path Jamaica chooses CANNOT be done by a party with a vested interest in the coal option – it must be done by engineers and economists with a comprehensive, up-to-date understanding of the technological advances in renewables that are enabling solar and wind to become reliable and cost-effective suppliers of base-load power.

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