



**Asia-Pacific
Economic Cooperation**

**Building Energy Codes Report
For Papua New Guinea**

APEC Energy Working Group

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Summary

Papua New Guinea is a small economy with very few strictly implemented building energy codes.

Projections of a near term shift in energy status, from a net exporter to a net importer, plus concerns over global climate change and costs of energy, generally, point to the opportunities that energy efficiency and conservation provide for Papua New Guinea. As current energy resources are being depleted, implementing energy efficient practices and investing in renewable forms of energy provide the key to a sustainable future for this and every nation.



Economy Background

Located just north of Australia and representing the eastern half of New Guinea, is the small island-economy of Papua New Guinea. In 1975, Papua New Guinea gained independence from Australia and to this day maintains a parliamentary democracy and a commonwealth realm. Queen Elizabeth II holds the position of Head of State, a largely ceremonial title in an economy where true executive power and national leadership is wielded by Prime Minister Michael Somare and cabinet members.ⁱ

Papua New Guinea has a population of over six million people; the majority is males between the ages 15-64 years old. The economy does not have a centrally focused religion and is comprised of numerous religious groups, including but not limited to Roman Catholics, Evangelical Lutherans, and Anglicans. The economy maintains a low literacy rate and unemployment reaches 80 percent in urban areas. Life expectancy and the standard of living are both relatively low.

Economic Overview

The economic status of Papua New Guinea has shifted over the past 20 years to a globally competitive, industrialized, free trade market. Subsequently, per capita GDP and income rates have risen, while the income gap (Gini Index) has widened. As of 2008, the economy maintained a per capita GDP of \$27,900, an overall unemployment rate of 4 percent, and a Gini Index of 36.2 (1997). As of 2008, the economy fell into a recession, as did many other global markets. The government has since taken measures to decrease the effects of the recession and jump-start the economy.

As a small economy, Papua New Guinea does not contribute significantly to global green house gas emissions, but has nonetheless signed and ratified the Kyoto Protocol. As a non-Annex I Party to the Kyoto Protocol, the economy is not required to maintain target figures of emissions. As of 2004, Papua New Guinea released 2.4 million tonnes of CO² emissions, equivalent to .04 tonnes of CO² emissions per capita.ⁱⁱ

Energy Assessment

Consuming approximately 0.072 Quadrillion Btu of primary energy in 2006, the economy relies on oil to meet the bulk of their energy demands.ⁱⁱⁱ Papua New Guinea produces 42,100 bbl/day (2008) of



oil, while consuming only 29,050 bbl/day (2006), and thus is a net exporter of oil.^{iv} While Papua New Guinea is currently able to export more oil than it imports, depleting oil resources and a growing demand for oil means that Papua New Guinea will no longer be a net exporter of oil. It is projected that by 2015 it will become a nation dependent on oil imports. If renewable energy sources are not developed, the economy will no longer be self-sustainable in energy production.^v Analysis of renewable energy potential indicates that solar energy would be the most efficient source of renewable energy for the island, pointing towards the southern region and offshore sites as the prime locations for such resources. In addition, energy efficiency itself can be considered a valuable resource by lowering the overall need for energy.

Climate

Papua New Guinea maintains a tropical climate with heavy amounts of rainfall. In the lowland/island areas, the mean temperature is around 27°C/80°F with uniform humidity, and in the highland areas the mean temperature hits 4°C/39°F at night and 32°C/89°F during the day, with humidity ranging from 65-80 percent.

Scope of Building Energy Codes/Standards

Papua New Guinea has adopted building codes based on those in Australia. As of May 1, 2009, Australia enacted the 2009 Building Code of Australia (BCA-2009), developed and maintained by the Australian Building Codes Board (ABCB). In Australia, this performance-based code is amended and updated annually every May 1^{stvi}. The codes cover structure, fire resistance, services, equipment, energy efficiency, and certain aspects of health and amenities. As a small island economy with a constant threat of rising water levels and earthquakes, adopting Australian building codes helps Papua New Guinea to enforce the construction of safe, structurally sound buildings and homes. Research was unable to ascertain the level to which Papua New Guinea enforces the code.

Background

Prior to the adoption of Australia's building codes, Papua New Guinea relied on the Building Act of 1971. The Act, which has since been amended in 2005 to include updated restrictions, was created to control and regulate buildings in the Papua New Guinea region, and to provide safe, hygienic structures that could withstand a certain degree of damage, such as that caused by earthquakes or fires. The Act provides that buildings must meet designated requirements, show proof of permits, and pass inspection^{vii}. Since this legislation was adopted, Papua New Guinea experienced a construction boom which began in 2005, during which the economy hosted the 'Building with Australia 2005' event. At the event, Australian builders were given the opportunity to showcase building techniques and products to the public and key stakeholders in Papua New Guinea. Land development was also encouraged at this event.^{viii}

In 2005, Papua New Guinea's building codes were labeled 'outdated' by the director of the National Disaster Centre in Papua New Guinea. After the 2005 building boom, Papua New Guinea began to adopt and implement the Australian BCA – stricter codes that could help the economy achieve a



variety of objectives including greater safety and comfort.^{ix} As noted above, since Papua New Guinea's BCA adoption is relatively new, the degree of enforcement and compliance is unknown. Sources say that implementation of codes in Papua New Guinea is currently far less stringent than that of Australia.

Technical Requirements

The energy efficiency requirements for the BCA concentrate on the building envelope and insulation, broader systems including lighting, heating, ventilating, and air conditioning (HVAC), water heating, metering, and overall building performance, operation, and maintenance^x. As noted above, the degree to which Papua New Guinea follows any of these codes, and which codes are implemented, is currently unknown.

BCAP Recommendations

Papua New Guinea has taken steps toward energy efficiency through the adoption of Australia's building codes and signing the Kyoto Protocol. Since the economy maintains a small population, and has a relatively modest standard of living, it is responsible for only a small fraction of global greenhouse gas emissions. Nonetheless, Papua New Guinea should be conscious and vigilant about the effects of greenhouse gases on their environment due to their vulnerability to the impacts of climate disruption. As of the 1980's, coastline communities in Papua New Guinea have begun noting distinct rises in seas levels, and subsequent impacts to soil and water quality. The economy is experiencing depletion of its primary energy source, oil, and needs to transition to renewable energy sources while improving energy efficiency. Adopting Australia's energy codes is an important first step for Papua New Guinea. Now codes must be effectively implemented and refined to ensure they address the climate and energy objectives of the nation.

The government has introduced the National Energy Policy Statement and Guidelines document (PNG), which outlines a vision for a future economy that will be far more energy conscious. An important means for achieving this vision is enforcement of the BCA and developing and implementing code that includes consideration of renewable energy supplies.^{xi}

In addition to energy efficient building codes, Australia maintains the Green Star program - a voluntary environmental rating scheme supported by the Green Building Council of Australia. Green Star provides a means for evaluating the environmental design and performance of buildings. Creating a similar program in Papua New Guinea or adopting Green Star itself would help meet energy efficiency goals and expand these practices in the economy.

Mandating strict energy codes is a critical step towards lowering energy consumption and reducing dependence on petroleum, but customizing Australia's building codes to better support Papua New Guinea's specific climate is also important. Papua New Guinea's climate differs greatly from Australia's, which lacks monsoon seasons and high heat indexes. The northern region of Australia maintains the greatest degree of similarity to that of Papua New Guinea in terms of temperature and humidity. By adopting climate-specific provisions, the economy will ensure more effective energy



codes. Such provisions would likely be reflected in the building envelope, air conditioning and ventilation systems, and water heating systems.

ⁱ http://en.wikipedia.org/wiki/Politics_of_Papua_New_Guinea

ⁱⁱ Human Development Reports. Papua New Guinea.

http://hdrstats.undp.org/countries/country_fact_sheets/cty_fs_PNG.html

ⁱⁱⁱ Energy Information Association. Papua New Guinea Energy Profile.

http://tonto.eia.doe.gov/country/country_energy_data.cfm?fips=PP

^{iv} CIA World Factbook.

^v APEC Energy Demand and Supply Outlook 2006.

http://74.125.95.132/search?q=cache:rt0wzkAdjmAJ:www.ieej.or.jp/aperc/2006pdf/Outlook2006//ER_Pupua_New_Guinea.pdf+papua+new+guinea+%2B+net+importer+or+oil+by+2015&cd=1&hl=en&ct=clnk&gl=us&client=firefox-a

^{vi} Australian Building Codes Board. About the Building Code. <http://www.abcb.gov.au/go/thebca/aboutbca>

^{vii} Papua New Guinea Consolidated Legislation. Building Act of 1971.

http://www.paclii.org/pg/legis/consol_act/ba197191/

^{viii} Australian Trade Commission. Opportunities build in Papua New Guinea for Australia's Construction Industry. <http://www.austrade.gov.au/Opportunities-build-in-Papua-New-Guinea-for-Australia-s-construction-industry/default.aspx>

^{ix} Questionnaire for ISDR. <http://74.125.47.132/search?q=cache:yTJ0NZnWl4J:www.unisdr.org/eng/mdgs-drr/national-reports/Papua-New-Guinea-report.pdf+Nation+Disaster+Centre+in+Papua+New+Guinea+%2B+outdated+codes&cd=1&hl=en&ct=clnk&gl=us&client=firefox-a>

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^x Id.

^{xi} Renewable Energy & Energy Efficiency Partnership. Policy DB Details: Independent State of Papua New Guinea. <http://www.reeep.org/index.php?id=9353&text=policy-db&special=viewitem&cid=71>