IMPROVING ENERGY EFFICIENCY IN INDONESIAN BUILT ENVIRONMENT: A NEED FOR LEGAL ADJUSTMENTS

Ajar Buditama

email: buditama@windowslive.com

ABSTRACT

This article analyses the recent green building movement in Indonesia, particularly energy efficiency as a key aspect of green building. Aspects of the application of energy efficiency and its related regulations in the Indonesian built environment are identified and discussed. It also examines legal loopholes of several regulations on energy conservation in relation to encouraging the development of green buildings in Indonesia. Using Australia's experiences in developing its green buildings, this article compares and contrasts the two countries' approaches to supporting green building constructions and their efforts to minimise energy use in buildings. Australia's practices in green building constructions are probably useful for Indonesia to draw lessons and inspirations for adjusting its present regulations on green building and energy efficiency.

Keyword: energy efficiency, green building, Australia, Indonesia, climate change

INTRODUCTION

Buildings consumed 40% of all main types of energies produced globally and discharged a tremendous amount of greenhouse gas ('GHG') emissions.[1] Buildings' emissions during their operational phase were accounted for one-third of total global GHG emissions.[2] Green buildings–the construction of buildings designed to minimise energy use–have developed in recent decades to reduce negative consequences of buildings' energy consumption to the environment. Therefore, as for its energy efficiency features, green building may also be considered as sustainable building or high-performance building.[3]

* All translations are by the author, except where otherwise indicated.

[1] UNEP-SBCI, 'Buildings and Climate Change: Summary for Decision-Makers' (Research Report, United Nations Environment Programme, 2009) 3 <http://www.unep.org/sbci/pdfs/SBCI-BCCSummary.pdf>.

[2] Oswaldo Lucon et al, 'Buildings' in Ottmar Edenhofer (et al) (ed), *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* (Cambridge University Press, 2014) 677.

[3] See, eg, Robert Enker, '5 Star Energy Efficient Housing - Building Regulation Delivers Sustainability Outcomes' (2007) 5 *Australian Journal of Multi-Disciplinary Engineering* 75, 75–6; Mahsa Karimpour et al, 'Impact of Climate Change on the Design of Energy Efficient Residential Building Envelopes' (2015) 87 *Energy & Buildings* 142, 142–3; Hazem Elotefy et al, 'Energy-Efficient Tall Buildings Design Strategies: A Holistic Approach' (2015) 74 *Energy Procedia* 1358, 1359.

Some scholars asserted that the efficient use of energy is the most important character of green buildings.[4] This school of thought posited that if buildings did not use energy efficiently, it would be hard to claim that they are truly green and environmentally sound.

This article analyses whether Indonesian stock laws on energy efficiency in the building sector are sufficient to foster the implementation of green building. It then compares Australian legislation concerning energy efficiency in the country's built environment. It uses some examples of the application of both legislations on energy efficiency and green building in Jakarta and Queensland. A recent study suggested that although situated in different climatic regions, both regions have several similarities in their climate characteristic.[5] Having connexions in climate types, cities in Queensland probably have the same considerations as Jakarta on their energy efficiency measures for its building sector.

This article is organised as follows. Part I is an introductory section of the article. Part II provides rationales for the recent green building movement in Australia and Indonesia. It then analyses the relationship between energy efficiency and green buildings. Part III discusses the application of energy efficiency in the Indonesian built environment. It also examines several legal loopholes of existing regulations on energy conservation in relation to encouraging the development of green buildings in Indonesia. Part IV assesses green buildings and their implementation in Australia that could provide some useful inspirations to foster the development of green buildings in Indonesia. Part V analyses the applicability of Australian laws and their implementing regulations on energy efficiency in the Australian built environment to support energy conservation in the Indonesian legal framework for green building. This article concludes that the existing energy-efficient instruments in the Indonesian built environment are insufficient to encourage the country's green building development. Therefore, it needs several legal adjustments. Australia's legislations and their implementing regulations on building energy efficiency probably provide promising avenues to reform energy efficiency features of green building laws in Indonesia.

THE NEXUS BETWEEN ENERGY EFFICIENCY AND GREEN BUILDING

This part divides into three sections; first, rationales for energy efficiency in buildings; secondly, drivers of energy efficiency measures; thirdly, energy efficiency as one of the important aspects of green buildings.

A Rationales for Energy Efficiency Measures in Buildings

Climate change is a major reason for applying energy efficiency in the construction and building sector. It is widely known that construction activities are resource intensive.[6] A recent study suggested that building and construction sector account for approximately one-fifth

[4] See eg, J Cullen Howe, 'Overview of Green Buildings' in J Cullen Howe and Michael Gerrard (eds), *The law of green buildings: regulatory and legal issues in design, construction, operations, and financing* (American Bar Association, Section of Environment, Energy, and Resources, 2010) 4.; Alexis Karolides, 'Green Building Approaches' , *Green Building: Project Planning and Cost Estimating.* (Wiley, 3rd ed, 2010) 7–9.

[5] MC Peel, BL Finlayson and TA McMahon, 'Updated World Map of the Köppen-Geiger Climate Classification' (2007) 4 *Hydrology and Earth System Sciences Discussions* 439, 448, 473.

[6] Patrick TI Lam et al, 'Factors Affecting the Implementation of Green Specifications in Construction' (2010) 91 *Journal of Environmental Management* 654, 654–61.

of global energy use per annum.[7] In Australia[8] and Indonesia,[9] construction activities are one of the major sources of GHG emissions.

In its operational phase a building during releases a significant amount of indirect emissions sourced from the use of electricity and their heat production. United Nations Environment Programme has predicted that if no global efforts were made to deal with the rise of carbon emissions in the building sector, GHG emissions from buildings would be more than double in the next two decades as a result of the exponential growth of construction industries and the inefficiencies of building constructions globally.[10] Similarly, International Energy Agency has suggested that improving energy efficiency in the built environment is a part of the global policy framework to reduce the impact of GHG emissions in a cost-effective manner and to lower the impact of pollutant emitted by buildings to the environment.[11]

Besides climate change issues and GHG reduction measures, reasons for constructing energy-efficient buildings are various benefits that resulted in their operational use. First, from an environmental perspective, green buildings could improve biodiversity in an urban area and protect the ecosystem, for example, through sustainable land use practices and efficient uses of building roofs.[12] A study also found that had the application of an Australian rating system in buildings–Green Star Australia, the rate of energy saving in buildings achieved more than 60% compared to typical Australian buildings.[13] The implementation of the Green Star has also reduced more GHG emissions compared to Australian 'standard practice' buildings.[14] After Australia had applied the rating system in 2011, the relative savings of tonnes carbon dioxide equivalent

[7] Peter SP Wong et al, 'Can Energy Efficiency Rating and Carbon Accounting Foster Greener Building Design Decision? An Empirical Study' (2015) 87 *Building and Environment* 255, 255.
[8] Ibid 256.
[9] Usep Surahman, Osamu Higashi and Tetsu Kubota, 'Embodied Energy and CO^2 Emissions of Building Materials for Residential Buildings in Jakarta and Bandung, Indonesia', *Sustainable Habitat for Developing Societies–Choosing the Way Forward* (CEPT University, 2014) 5–7.
[10] United Nations Environment Programme (UNEP), 'Buildings and Climate Change: Summary for Decision-Makers' (Assessment Report, UNEP SBCI (Sustainable Buildings and Climate Initiative), 2009) 3 <http://www.unep.org/sbci/pdfs/SBCI-BCCSummary.pdf>. See also 'Summary for Policymakers' in *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.* (2014) 7–8.
[11] International Energy Agency (IEA), 'Energy Efficiency Market Report 2015: Market Trends and Medium-Term Prospects' (Market Report II-2015, International Energy Agency (IEA)) 106 <http://www.iea.org/publications/freepublications/publication/MediumTermEnergyefficiencyMarketReport2015.pdf>.
[12] Alexandre Henry and Nathalie Frascaria-Lacoste, 'Comparing Green Structures Using Life Cycle Assessment: A Potential Risk for Urban Biodiversity Homogenization?' (2012) 17 *The International Journal of Life Cycle Assessment* 949, 949–50; F Bianchini and K Hewage, 'How "Green" Are the Green Roofs? Lifecycle Analysis of Green Roof Materials' (2012) 48 *Building and Environment* 57, 57–9.
[13] Green Building Council Australia, 'The Value of Green Star: A Decade of Environmental Benefits' (Progress Report 194, Green Building Council Australia, May 2013) 3–4 <http://www.gbca.org.au/uploads/194/34754/The_Value_of_Green_Star_A_Decade_of_Environmental_Benefits.pdf>.
[14] A standard practice building is a building that has been built in accordance with the Australian National Construction Code ('NCC'). See Ibid 14.

perannum ('CO_2 *e*') levelled at around 45 to 60%.[15]

Secondly, from economic perspective, a recent study suggested that green buildings have potential to save electricity consumption to more than 30% compared to conventional buildings.[16] However, some criticisms arose, in particular relating to the economic benefits of green building. Those criticisms chiefly concern about the higher upfront costs of a green building construction compared to a conventional one. A research report conducted by Davis Langdon suggested that constructing a green building would require a higher upfront cost than a typical building.[17] For example, in the Australian Green Star rating system, to achieve 5 Star and 6 Star Rating, requires additional upfront construction costs of 4% and 10% percent respectively.[18]

A similar situation also occurs in Indonesia. Constructing green buildings in Indonesia requires the additional initial costs approximately 8% higher than the typical building construction costs.[19] However, these initial incurred costs arising from efforts to going green may not be that high, if they were compared to the significant increase in energy price per annum[20] and the costs of carbon trading globally.[21] Therefore, it can be argued that the potential of costs saving during the buildings' operation and maintenance life cycle would help to balance the upfront costs required in constructing green buildings.

B Drivers of Energy Efficiency Measures in Buildings

Indonesia has been recently implemented green buildings concept most notably in the past five years ago. The key drivers for applying the concept are the Government of Indonesia's ('GOI') climate change strategies. The GOI has set unconditional target to reduce carbon emissions by 29% below business-as-usual ('BAU') baselines by 2030, based on unilateral actions.[22] The emission level is expected to undergo a further reduction to

[15] Ibid 14–5. See further Colin A Booth and Susanne M Charlesworth, 'The Benefits of Green Infrastructure in Towns and Cities' in Colin A Booth et al (eds), *Solutions for Climate Change Challenges in the Built Environment* (Wiley, 1st ed, 2011) 468, 488–9.

[16] Jian Zuo and Zhen-Yu Zhao, 'Green Building Research–current Status and Future Agenda: A Review' (2014) 30 *Renewable and Sustainable Energy Reviews* 271, 275. See also Green Building Council Australia, 'The Business Case for Green Building' (Business Report E2013, Green Building Council Australia, 2013) 40, 42 <http://www.gbca.org.au/uploads/63/34623/Evolution_2013_Business_Case_for_Green_Building.pdf>.

[17] Davis Langdon, 'The Cost and Benefit of Achieving Green Buildings' (Info Data, Davis Langton Institute) 3 <http://www.aecom.com/deployedfiles/Internet/Geographies/Australia-New%20Zealand/PCC%20General%20content/InfoData_Green_Buildings.pdf>.

[18] Ibid 5; Zuo and Zhao, above n 19, 275.

[19] Bagoes Wiryomartono, 'Green Building' and Sustainable Development Policy in Indonesia since 2004' (2015) 6 *International Journal of Sustainable Building Technology and Urban Development* 82, 84.

[20] International Energy Agency (IEA), 'World Energy Outlook 2014' (Executive Summary OECD-IEA-2014, International Energy Agency (IEA), 2014) 2–3 <http://www.iea.org/textbase/npsum/weo2014sum.pdf>.

[21] Matthew Smith, *The Real Cost of Carbon: Trading Permits Won't Be Cheap Forever* Business Review Weekly <http://www.brw.com.au/p/business/the_real_cost_forever_carbon_trading_bQz7HNf9qf1M9ypxNqlTqM>; The World Bank, *Carbon Pricing Is Expanding: Initiatives Now Valued at Nearly $50 Billion* (26 May 2015) Climate Change Feature Story <http://www.worldbank.org/en/news/feature/2015/05/26/carbon-pricing-initiatives-nearly-50-billion>.

[22] UNFCCC Secretariat, *NDC Registry (Interim)* (November 2016) First Nationally Determined Contribution Republic of Indonesia 2 <http://www4.unfccc.int/ndcregistry/PublishedDocuments/Indonesia%20First/First%20NDC%20Indonesia_submitted%20to%20UNFCCC%20Set_November%20%202016.pdf>.

41% below BAU with adequate international financial assistance.[23]

Conforming to the target, the Green Building Council Indonesia ('GBCI')—the founder of the Indonesian green building certification system—suggests that the emissions reduction target is a promising opportunity for developing green buildings market.[24] To date, initiatives to construct energy-efficient buildings mostly have been occurring in the capital city of some provinces, for example in Jakarta and Bandung, in which supportive legal instruments for green building construction are available.[25]

Similar to Indonesia, the main driver of the development of green buildings in Australia is climate change adaptation strategies and GHG emissions reduction measures. Under the Paris Climate Change Agreement, the Australian Government in its first Intended Nationally Determined Contribution to a new Climate Change Agreement pledges to reduce GHG emissions by 26% to 28% below 2005 by 2030.[26] To keep the target on track, the Australian Government introduced legislation to reduce buildings' emissions. The Commonwealth government enacted an important legislation on energy efficiency strategies in the built environment named *Building Energy Efficiency Disclosure Act 2010* (Cth) ('BEEDA'), later amended by *Building Energy Efficiency Disclosure Amendment Act 2015* (Cth). The Act and its implementing regulation, and the government policies concerning on Australian energy efficiency in the country's built environment will be analysed later.

C Energy Efficiency as A Key Feature of Green Building

Energy efficiency features in construction regulations have been universally acknowledged as a functional and a cost-efficient way to reduce energy waste in the commercial and residential built environment.[27] Recognising the benefits arising from energy-efficient buildings,[28] Australia and Indonesia have implemented energy efficiency strategies in their green buildings rating system.

Indonesia lays energy efficiency as one of the benchmarking criteria on its GREENSHIP—the country's certification system on green buildings. Such a criterion has the highest mark among all the criteria.[29] The GOI has also enacted several important pieces of legislation to promote energy efficiency in the construction sector, namely *2002 Building Law*, *2007 Energy Law*, and *2009 Electricity Law*, and their related subordinate legislation. In Australia, the BEEDA and its amendment play important

[23] UNFCCC Secretariat, above n 22, 2.
[24] Adiwoso, *Green Buildings in Indonesia* (13 September 2013) Asia Green Buildings <http://www.asiagreenbuildings.com/7055/green-buildings-in-indonesia-green-building-council-indonesia-naning-adiwoso/>.
[25] See, eg, *Peraturan Gubernur Provinsi Jakarta No. 38 Tahun 2012 tentang Bangunan Hijau* [Jakarta Governor Regulation No 38 of 2012 on Green Building (Indonesia), *Peraturan Walikota Bandung No. 1023 Tahun 2012 tentang Bangunan Gedung Hijau* [Bandung Mayor Regulation No 1023 of 2016 on Green Building (Indonesia)]
[26] Climate Change Authority, 'Australia's Intended Nationally Determined Contribution to a New Climate Change Agreement' 1–3 <http://www4.unfccc.int/ndcregistry/PublishedDocuments/Australia%20First/Australias%20Intended%20Nationally%20Determined%20Contribution%20to%20a%20new%20Climate%20Change%20Agreement%20-%20August%202015.pdf>.
[27] Rachel Young, 'Global Approaches: A Comparison of Building Energy Codes in 15 Countries', *The Next Generation: Reaching for High Energy Savings* (American Council for an Energy-Efficient Economy, 2014) 351 <http://aceee.org/files/proceedings/2014/data/papers/3-606.pdf>.
[28] See nn 16-8 and accompanying text.
[29] Green Building Council Indonesia, 'GREENSHIP Rating Tools for Existing Building Version 1.0' 3.

roles in fostering the implementation of green energy in the Australian built environment. Regulatory framework concerning energy efficiency in both countries will be outlined in the next part.

ENERGY EFFICIENCY AND GREEN BUILDING IN INDONESIA

This part analyses energy efficiency in the Indonesian built environment. First, it assesses facts and issues that related to the development of green buildings. This article uses Jakarta as an example because it has enacted local laws on green building. Secondly, this part analyses relevant regulations and enabling policies for encouraging the implementation of energy efficiency on the Indonesian built environment. It also discusses the extent of effectiveness of these regulations and policies and identifies legal adjustments that are necessary to encourage the implementation of energy efficiency on the Indonesian building sector.

A Electricity Needs in the Indonesian Built Environment

The increase in electricity demand in Indonesia is inevitable when linked to the country's economic growth. Indonesia has a strong causal relationship between its electricity demand and its economic growth.[30] Industrial and commercial sector dominated the percentage of electricity share in 2012.[31] Arguably in the long term, positioning the two sectors in question as the main driver of the country's economic growth, it is necessary to support its aim to be a developed country. This section outlines several factual issues relating to energy saving in Indonesian buildings.

In the commercial sector, the need for electricity dominated the Indonesian total final energy demand in 2012. It constituted approximately 78% of the total energy consumption in 2012, and it is estimated to increase to approximately 88% in 2035.[32] The growth in energy demand is due to the rapid developments of energy-intensive commercial buildings, such as hotels, office buildings, schools, and multi-purpose buildings. For example, Jakarta and the satellite cities, such as Bogor, Depok, Tangerang, and Bekasi, have built up almost in total 13,000,000 square meters (m^2) of commercial building spaces.[33] These cities have also constructed more than 120,000 apartment units.[34] Most of these buildings do not incorporate energy efficiency measures.[35] They also use electricity for air conditioning ('AC') and lighting inefficiently. Similarly, the residential sector is accounted for a significant share of final electricity consumption in Indonesia, with 30% of the total energy demand in 2012.[36] Besides consuming a significant amount of power, the sector has a very rapid development.

The biggest share of electricity consumption in Indonesia's buildings goes to AC, which represents 47% and 65% of annual energy bills in office and hotel buildings respectively.[37] A large amount of electricity consumption in AC systems is due to architecture planning in Indonesia,

[30] NA Utama et al, 'Indonesian Building Codes and Its Influence on Future Electricity Demand' (2011) 2 Journal of Sustainable Energy & Environment 21, 21.

[31] Agus Sugiyono et al (eds), *Indonesia Energy Outlook 2014: Energy Development in Supporting Fuel Substitution Program* (Center for Energy Resources Development Technology, Agency for the Assesment and Application of Technology) 20.

[32] Ibid 59.

[33] Stephan Blocks et al, 'Market Study on Clean Technology in Indonesia' (Market Analysis Report 59101, Switzerland Global Enterprise, March 2014) 9–10 <http://www.s-ge.com/de/filefield-private/files/59101/field_blog_public_files/65082>.

[34] Ibid 9.

[35] Ibid.

[36] Sugiyono et al, above n 33, 22.

[37] Blocks et al, above n 35, 9–10; Utama et al, above n 32, 21.

which needs to manage the temperature and the humidity level to achieve a comfortable and satisfactory level in a built environment. In Jakarta, the average outdoor temperature is between 27.7 and 30 degrees Celsius ('ºC') with average humidity between 70% and 90%.[38] Installation and operation of AC in buildings situated in Jakarta area are necessary to maintain building occupants' comfort level of 26.5ºC and humidity level between 60% and 70% for a working environment.[39]

In fact, the comforts level in Jakarta is higher than international standard for thermal conditions for human occupancy—the American Society of Heating, Refrigerating, and Air-Conditioning Engineer ('ASHRAE'). The ASHRAE recommends that the standard of a comfort room temperature is 24ºC.[40] Many Indonesian mechanical and electrical building consultants use the standard as a reference for to set average indoor temperature in Indonesian buildings. Karyono's research found that the ASHRAE standard is too high compare to the comfort level of indoor temperature in typical Indonesian buildings.[41] Thus, it can make buildings' occupant feel uncomfortable cold.[42] More importantly, if the temperature were set at that level, it would consume a significant amount of energy.

B Regulatory Framework to Develop Green Buildings in Indonesia

This section analyses relevant laws and regulations concerning on energy efficiency in the Indonesian built environment. The analysis of these laws and regulations in question begin with energy efficiency framework in Indonesia, then green buildings laws and their subordinate regulation.

1 *An Overview of the Indonesian Energy Efficiency Framework*

The Indonesian energy efficiency framework is divided into two layers—the national and the local level. Legal instruments at both levels provide a legal basis for key measures of energy efficiency, and for the utilisation of renewable energy resources to generate electricity in Indonesian buildings.

2007 Energy Law

At the national level, *2007 Energy Law* plays a significant role regarding energy efficiency strategies in the built environment. It correlates with supply and use of renewables. It requires the central government and the local governments (provincial and municipal level) as well as

[38] *Badan Pengelola Lingkungan Hidup Daerah Jakarta* [Environmental Management Agency Jakarta], '*Status Lingkungan Hidup Daerah Provinsi Daerah Khusus Ibukota Jakarta Tahun 2014* [Environmental Status of the Jakarta Province]' (Annual Report, *Badan Pengelola Lingkungan Hidup Daerah Jakarta* [Environmental Management Agency Jakarta], 20 March 2014) II–1 <http://bplhd.jakarta.go.id/SLHD2015/pdf/Buku%20I/Buku%20I%20SLHD%202014.pdf>.

[39] Tri Harso Karyono, 'Penelitian Kenyamanan Termis di Jakarta Sebagai Acuan Suhu Nyaman Manusia Indonesia [Research on Thermal Comfort in Jakarta as a Reference for Human Comfortable Temperature Indonesia' (2004) 29 *Dimensi Teknik Arsitektur [Dimensi Architectural Engineering]* 24, 27.

[40] Ibid; Wiryomartono, above n 22, 83. The ASHRAE standard is widely used in the United States of America ('USA') and Australia. See especially American Society of Heating, Refrigerating, and Air-Conditioning Engineer, 'ASHRAE Standard: Thermal Environmental Conditions for Human Occupancy' 22 <http://www.almasesepahan.com/fh/download/ASHRAE_Thermal_Comfort_Standard.pdf>.

[41] Karyono, above n 41, 27.

[42] Ibid.

private sectors to provide[43] and to encourage the use of renewables.[44]

At the local level, Jakarta has implemented several measures to reduce electricity consumption in its built environment. The Jakarta Government mandated reductions in the electricity consumption in its government buildings under *Jakarta Governor Regulation No 156 of 2012 on Electricity and Water Savings*.[45] After the Jakarta Government had implemented the regulation in 2013, the city achieved a reduction in its energy bills of 4%.[46]

Under *2007 Energy Law*, the GOI provides facilities and incentives for private sectors that promote supply and use of renewables for a particular period until they reach their intended economic value.[47] Accordingly, the Law may support the market for green building developments in Indonesia, notably for the installation of rooftop photovoltaic ('PV') panels and for the use of landfill gases to generate supply for electricity in commercial and residential buildings.

Concerning measures for conserving energy use, *2007 Energy Law* stipulates that the national energy conservation shall be the responsibility of the central government, the local governments, and private sectors.[48] The law encourages the Indonesian building sectors to use energy-saving appliances and providing facilities and incentives of their uses.[49] Conversely, when they do not carry out energy conservation measures, the GOI may impose disincentives.[50]

Subordinate regulation of *2007 Energy Law—2009 Energy Conservation Regulation*—prescribes extensively for actions that can be classified into incentives and disincentives. It is a guide for the central government and local governments to implement energy efficiency measures in the Indonesian built setting. It also sets a benchmark for energy consumption of the Indonesian building sector at 6,000 Million tonnes of oil equivalent ('Mtoe') per year to apply energy conservation measures.[51] Those who consume energy similar to or exceed than the benchmark set by the regulation shall apply management energy conservation measures, such as conducting a periodic energy audit and a review of its energy conservation measures.[52]

2009 Energy Conservation Regulation is also synergistic with the national GHG emissions abatement strategies prescribed through *Presidential Regulation No 61 of 2011 on the National Action Plan for GHG Emission Reduction*. In the national action plan, the GOI establishes a multiyear partnership program with private entities to reduce GHG emissions from 2010 to 2020 and sets the target for emissions reduction

[43] *Undang-Undang No. 30 Tahun 2007 tentang Energi* [Law No 30 of 2007 on Energy ('the 2007 Energy Law')] (Indonesia) art 20 s 4 [the Indonesia Investment Coordinating Board trans].
[44] *2007 Energy Law* (Indonesia) art 21 s 2, 5 [the Indonesia Investment Coordinating Board trans].
[45] *Peraturan Gubernur Provinsi Jakarta No. 156 Tahun 2012 tentang Pengematan Listrik dan Air* [Jakarta Governor Regulation Number 156 of 2012 on Electricity and Water Savings] (Indonesia) ch 3.
[46] Lenny Trista Tambun, *Lakukan Hemat Energi, Tagihan Listrik DKI Turun 4 Persen [Electricity Bills at Jakarta Down to 4 Per Cent After Saving Energy]* (28 February 2013) Megapolitan Public Service <http://www.beritasatu.com/megapolitan/99475-lakukan-hemat-energi-tagihan-listrik-dki-turun-4-persen.html>.
[47] *2007 Energy Law* (Indonesia) art 20 s 5 [the Indonesia Investment Coordinating Board trans].
[48] *2007 Energy Law* (Indonesia) art 25 s 1 [the Indonesia Investment Coordinating Board trans].
[49] *2007 Energy Law* (Indonesia) art 25 s 1 [the Indonesia Investment Coordinating Board trans].
[50] *2007 Energy Law* (Indonesia) art 25 s 1 [the Indonesia Investment Coordinating Board trans].
[51] *Peraturan Pemerintah No 70 Tahun 2009 tentang Konservasi Energi* [Government Regulation No 70 of 2009 on Energy Conservation ('2009 Energy Conservation Regulation')] (Indonesia) art 12 s 2.
[52] *2009 Energy Conservation Regulation* (Indonesia) art 12 s 2.

throughout the period of 2.11 metric tonnes of carbon dioxide equivalent ('$MTCO_2e$'). [53]

2009 Electricity Law

2009 Electricity Law also supports the implementation of energy efficiency in the Indonesian built environment. According to the law, commercial activities conducted by building owners regarding electricity provision for their building purpose are guaranteed by the law.[54] Thus, this provision gives legal certainty to install rooftop solar PV panels to generate electricity to fulfil the demand of electricity in Indonesian buildings.

In the long-term, the use of rooftop solar panel has a potential to reduce building's electricity bills. The GOI supports the installation of solar panels by establishing a feed-in tariff for electricity generated from solar plants through the issuance of *Minister of Energy and Mineral Resources Regulation No 19 of 2016 on Purchase Power by the State Electricity Company from Solar Photovoltaic* ('MEMR No 19 of 2016').

The regulation introduces a new fixed feed-in-tariffs scheme that include connection costs from the solar power plants to State Electricity Company's ('PLN') grid which vary depending on the location of the power plants.[55] It prescribes a detailed process for the appointment of a power plant developer to construct and operate PV power plants and obliges the assigned developer to sign a Power Purchase Agreement with PLN to ensure the developer sells the electricity generated from its plant to PLN.[56] Although *MEMR No 19 of 2016* provides feed-in-tariffs and a strict electricity-purchasing mechanism for solar power plant developers, technical issues relating to installation of the plants which may affect the implementation of the location-based feed-in-tariffs, such as overshadowing,[57] have yet been resolved.

Besides *MEMR No 19 of 2016,* from the building owners' perspective, by installing rooftop PV panels and generating electricity from the solar plants, building owners potentially gain more benefits, since the subordinate legislation of *2009 Electricity Law* gives an opportunity to sell the excess of electricity generated from rooftop solar plants to other electricity supplier companies.[58]

Lacking Building Emissions Disclosure Mechanisms

The achievement of the emissions reduction target under the national plan needs to be maintained. Having considered that climate change as one of the important key drivers in the Indonesian green building, energy consumption in buildings needs to be translated into CO_2 emissions reduction. Some scholars argued that one of the possible approaches to monitoring emission reduction target in a built environment is emissions disclosure.[59]

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[53] *Peraturan Presiden No. 61 Tahun 2011 tentang Rencana Aksi Nasional Pengurangan Gas Rumah Kaca* [Presidential Regulation No. 61 of 2011 on the National Action Plan for GHG Emission Reduction] (Indonesia) app 4 p11 [the Forest Climate Centre trans].

[54] *Undang-Undang No 30 Tahun 2009 tentang Ketenagalistrikan* [Law No 30 of 2009 on Electricity] (Indonesia) arts 12, 13 [Ali Budiarjo, Nugroho Reksodiputro-Counsellors at Law trans].

[55] *MEMR No. 19 of 2016*, arts 5, 6.

[56] *MEMR No. 19 of 2016*, pt V.

[57] See eg, Jon Kellett, 'More than a Roof Over Our Head: Can Planning Safeguard Rooftop Resources?' (2011) 29(1) *Urban Policy & Research* 23, 26.

[58] *Peraturan Pemerintah No. 14 Tahun 2012 tentang Kegiatan Usah Penyediaan Tenaga Listrik* [Government Regulation No. 14 of 2012 on Electricity Supplying Activities] (Indonesia) art 31.

[59] See eg, Joshua Prentice, 'Energy Efficiency or Energy Wasted? The Record of Australian and Swedish Law to Improve Energy Efficiency in the Buildings Sector' (2013) 30 *Environmental & Planning Law Journal* 236, 237; 'How Buildings Will Save the World: Using Building Energy Regulation and Energy Use Disclosure Requirements to Target Greenhouse Gas Emissions' (2015) 66 *Hastings Law Journal* 519, 548–554; Karen Palmer and Margaret Walls, 'Can

However, to date, laws or regulations that require building sector to disclose building's emissions have yet been established.

Requiring a building owner to disclose their energy saving achievement to the public might create a favourable market for green building and renewable energy in Indonesia. Such requirement might be possible to attract potential buyers or tenants by promoting energy-saving features of the building, which lead to reduction their annual electricity bills. Previous studies have proven that energy disclosure requirement can encourage the implementation of energy efficiency on the built environment.[60] In addition to that advantage, energy disclosure may help the GOI to maintain public accountability of the government's programs regarding energy efficiency in the built environment. The Australian BEEDA may become a source of legal adjustments regarding energy disclosure in Indonesian buildings.

2 *The Indonesian Green Buildings Framework.*

The regulatory framework for green buildings in Indonesia is relatively new. The primary key driver of legislation in Indonesian green buildings is climate change. Reduction of GHG emissions in buildings is one of supporting measures to the National Action Plan for GHG Emission Reduction.[61]

Indonesia in the last six years issued various legal instruments to promote the implementation of green building. These instruments covered essential elements of green building, such as building life cycle and sustainable environment.[62] A recent one was published in May 2015. The Minister of Public Works and Housing of Indonesia issued a regulation ('MPWH Regulation No. 2 of 2015') that sets out the application of green building in new and existing buildings.[63] The minister regulation encourages the implementation of energy efficiency and the reduction of GHG emissions in the Indonesian construction sector. There were adoptions of green building regulations by local governments at the provincial and the municipal level and the Indonesian financial institutions' authority that ensued from the introduction of the minister regulation.[64] At a local

Benchmarking and Disclosure Laws Provide Incentives for Energy Efficiency Improvements in Buildings?' (Discussion Paper RFF DP 1 5-09, Resources for the Future, March 2015) 3–13; Karen Palmer and Margaret Walls, 'Does Information Provision Shrink the Energy Efficiency Gap? A Cross-City Comparison of Commercial Building Benchmarking and Disclosure Laws' (Discussion Paper RFF DP 15-12, Resources for the Future, April 2015) 4–12.

[60] Several experiences of energy disclosure policies from Australia's experiences, see, eg Lily M Mitchell, 'Green Star and NABERS: Learning from the Australian Experience with Green Building Rating Tools' in Ranjan K Bose (ed), *Energy Efficient Cities: Assessment Tools and Benchmarking Practices* (World Bank Publications, 1st ed, 2010) 93, 109–110. From the US's experiences, see, eg Constantine E Kontokosta, 'Energy Disclosure, Market Behaviour, and the Building Data Ecosystem' (2013) 1295 *Annals of the New York Academy of Sciences* 34, 41–2; Palmer and Walls, 'Can Benchmarking and Disclosure Laws Provide Incentives for Energy Efficiency Improvements in Buildings?', above n 56, 14–20.

[61] See above n 55 and accompanying text.

[62] Jian Zuo and Zhen-Yu Zhao, 'Green Building Research–current Status and Future Agenda: A Review' (2014) 30 *Renewable and Sustainable Energy Reviews* 271, 272.

[63] *Peraturan Menteri Pekerjaan Umum dan Perumahan Rakyat No. 02/PRT/M/2015 tentang Bangunan Gedung Hijau* [Minister of Public Work and Housing Regulation No. 2 of 2015 on Green Buildings ('MPWH Regulation No. 2 of 2015'] (Indonesia).

[64] See, eg. *Peraturan Wali Kota Bandung No. 1023 tahun 2016 tentang Bangunan Gedung Hijau* [Bandung Mayor Regulation Number 1023 of 2016 on Green Building]; Otoritas Jasa Keuangan [Financial Service Authority], 'Buku Pedoman Pembiayaan Proyek Bangunan Gedung Hijau Untuk Lembaga Jasa Keuangan 2015 [Guidebooks on Financing Green Building for Financial Institutions 2015]'.

level, the Jakarta Government has adopted *Jakarta Governor Regulation No 38 of 2012 on Green Building* ('2012 Governor Jakarta Regulation on Green Building'), which set out the mandatory implementation for green building on new and existing buildings, but with greater emphasis on the new buildings.[65] Similarly, in 2016 the Bandung mayor issued *Bandung Mayor Regulation No 1023 of 2016 on Green Building*.

The minister regulation and the local government regulations are synergistic and complement each other. *MPWH Regulation No 2 of 2015* has mixed stringency. It has three types of implementation of green building including mandatory, voluntary, and recommended.[66] It encompasses other types of structures, which are not regulated by the local regulation ones.[67] However, on the view of the effectiveness of a government regulation, the Jakarta Governor regulation may be stronger than *MPWH Regulation No. 2 of 2015*. *2012 Governor Jakarta Regulation on Green Building* requires developers and owners of certain sizes of buildings[68] to implement the green building provisions; otherwise, their building permit and their building function worthiness certificate[69] would not be issued.[70]

From the viewpoint of regulatory making theories, the Jakarta Governor regulation may be regarded as a command and control ('C and C') regulation. It imposes administrative sanctions to ensure compliance.[71] However, a C and C regulation has several disadvantages regarding noncompliance, including achievement of standard-setting and enforcement,[72] of the mandatory implementation of green building requirements set by the Governor regulation. To address these problems, incentive-based regulatory regime—as set in *MPWH Regulation No 2 of 2015*—may be a feasible solution.[73] The regulation does not impose any sanctions for non-compliance. Instead, it gives incentives for those who fulfil green building requirements.[74] It prescribes the setting for green buildings on what can and cannot be

[65] *Jakarta Governor Regulation No 38 of 2012 on Green Building* (Indonesia) chs 2,3.
[66] *MPWH Regulation No. 2 of 2015* (Indonesia) art 5 s 2.
[67] See above n 68 and accompanying text.
[68] The Jakarta Green building regulation manages the developments of office buildings, shopping centres, and apartments of more than 50,000 m^2 in total area, hotels and health facilities no more than 20,000 m^2, and educational facilities of more than 10,000 m^2. See *Jakarta Governor Regulation No 38 of 2012 on Green Building* (Indonesia) art 3 s 3.
[69] Function worthiness certificate ('SLF') is a certificate granted by the Local Government of the buildings that have been completed and have met the eligibility requirements (administrative and technical) on the basis the results of the feasibility of building functions. See *MPWH Regulation No. 2 of 2015* (Indonesia) art 1 s 13; *Jakarta Governor Regulation No 38 of 2012 on Green Building* (Indonesia) art 1 s 10; Email from the GBCI Secretariat to the writer, 'The Linkage between the GREENSHIP Certification System and the MPWH Regulation No. 2 of 2015', 30 October 2015.
[70] *Jakarta Governor Regulation No 38 of 2012 on Green Building* (Indonesia) art 50.
[71] The essence of command and control regulation is to pursue policy objective and to exercise an authority's influence by imposing a certain degree of standards backed by sanctions. See Robert Baldwin, 'Regulation: After Command and Control' in Donald Harris and Keith Hawkins (eds), *The Human Face of Law: Essays in Honour of Donald Harris* (Oxford University Press, 1 st ed, 1997) 65, 66. See further Robert Baldwin, Martin Cave and Martin Lodge, *Understanding Regulation: Theory, Strategy, and Practice* (Oxford University Press, 2012) pt 2 ch 7 'Regulatory Strategies'.
[72] Baldwin, Cave and Lodge, above n 74, 109–110.
[73] For a comparative study between command and control and incentive-based regime regulations, see Winston Harrington and Richard D Morgenstern, 'Economic Incentives Versus Command and Control: What's the Best Approach for Solving Environmental Problems?' in Gerald R Visgilio and Diana M Whitelaw (eds), *Acid in the Environment* (Springer US, 2007) 233, 233–40.
[74] *MPWH Regulation No. 2 of 2015* (Indonesia) ch 8.

done. Thus, it may fall into the category of administrative regulation.[75]

Besides the Minister regulation and the Governor regulation, *2002 Building Law* including its subordinate legislations, building codes, and standards are also pertinent to support green building development. Although *2002 Building Law* does not explicitly mandate green features of a building, it sets out several provisions regarding energy efficiency in AC and lighting systems. The law prescribes that the installation of these systems is necessary to fulfil building occupants' health and comfort requirements, and such installation shall consider building energy savings principles.[76] The implementing regulation of the law and building codes and standards will be examined in turn.

The subordinate legislation of the primary law—*2005 Government Regulation on Building*—mandates the same as *2002 Building Law* regarding energy efficiency features on Indonesian buildings. The regulation specifies energy efficiency components in a building that consist of building materials, and ventilation, AC, and artificial lighting systems.[77] Failure to comply with the Act and the regulations may result in punishments, administrative sanctions, detentions, and/or fines.[78] For example, if a building owner failed to fulfil all building technical requirements, the local government would revoke the owner's certificate of proper building function and would impose fines maximum 10% of the total value of the building.[79]

Indonesian building codes and standards ('SNI') contain no specific instruments on green building. As of 2011, the National Standardisation Agency of Indonesia ('the BSN') has established energy efficiency standards for residential and commercial building, especially, energy conservation standard for building envelopes, AC systems, indoor lighting systems, and energy audit procedure for a building.[80] The standards also provide a set recommendation of 'productivity, comfort, and cost effectiveness' in a built environment.[81]

The implementation of green building regulations in Indonesia is also supported by a third party monitoring and an accreditation system conducted by the GBCI. The GBCI has established a voluntary-based certification scheme on Indonesian green buildings, so-called GREENSHIP. They altogether perform as enabling instruments to support green building development in Indonesia. Although the instruments in question incorporate energy efficiency features, to date, only a few buildings in Indonesia have been officially certified as a green

[75] The nature of the *MPWH Regulation No. 2 of 2015* is comparable to regulatory forms adopted in energy sectors and environmental sector. See further Patricia Park, *International Law for Energy and the Environment, Second Edition* (CRC Press, 1 st ed, 2013) 33.

[76] *Undang-Undang No. 28 Tahun 2002 tentang Bangunan Gedung* [Law No. 28 of 2002 on Buildings] (Indonesia) ch 4 paras 3,4 [the Better Work Indonesia-ILO trans].

[77] *Peraturan Pemerintah No. 36 Tahun 2005 tentang Bangunan Gedung* [Government Regulations No. 36 of 2005 on Buildings] (Indonesia) ch 4 paras 3,4 [the Better Work Indonesia-ILO trans].

[78] *Law No 28 of 2002 on Buildings* (Indonesia) ch 8 arts 44-7 [the Better Work Indonesia-ILO trans]; Government Regulations No. 36 of 2002 on Buildings] (Indonesia) ch 7 divs 1-3 [the Better Work Indonesia-ILO trans].

[79] *Law No. 28 of 2002 on Buildings* art 45.

[80] International Business Publication, *Indonesia Energy Policy, Laws and Regulation Handbook Volume 1 Strategic Information and Basic Laws* (International Business Publication, 2015) 166; Andriah Feby Misna, 'Energy Efficiency of Buildings in Indonesia', *Capacity Building and Construction Transformation in Emerging Economies* (International Energy Agency, 2014) 11 <https://www.iea.org/media/workshops/2014/buildingwebinars/webinar2/3_BuildingsinIndonesia.pdf>

[81] International Business Publication, above n 65, 166–7.

building.[82] There are 14 buildings in Jakarta that have obtained the GREENSHIP certificates,[83] and 140 buildings are currently awaiting the certification process conducted by the GBCI.[84] These achievements would assist the implementation of green building regulations and support the Jakarta Government initiatives to foster the development of green buildings. The Government has set a target of 300 buildings to comply with green building regulation by 2020 as set in *2012 Governor Jakarta Regulation on Green Buildings*.[85]

ENERGY EFFICIENCY AND GREEN BUILDING IN AUSTRALIA

This part examines the Australian framework for energy efficiency in the built environment. The framework is then detailed into the Australian laws on building energy efficiency disclosure, the Building Code of Australia ('BCA'), and the rating systems. The assessment of Australian energy efficiency and green buildings in this part is not an exhaustive list. It focuses on energy efficiency features in Australian green buildings that might apply to address the problem of lacking building emissions disclosure measures in the Indonesian construction sector.

A Overview of Australian Legislations on Building Energy Efficiency

This section provides an overview of the legal frameworks for building energy efficiency. It assesses the BEEDA and its amendment, and the national energy disclosure program for commercial buildings. For residential buildings, this section uses an example from the Queensland government's experience in regulating energy-efficient housings.

1 *The National Legal Framework and the Commercial Building Disclosure Program*

The main aim of Australian legislation on energy efficiency in the building sector is to promote energy-efficient buildings through the mandatory disclosure information of building's energy performance. The BEEDA and its amendment are the centrepieces of Australian legislation regarding on energy efficiency in the building sector. The compulsory disclosure model in the BEEDA is a set obligation to disclose energy efficiency information of large-scale commercial buildings with net-lettable-area ('NLA') 2,000 m^2 or more when they are offered or advertised for sale, lease, sublease.[86]

The BEEDA and its amendment apply rigorous assessments for the purposes of applying building energy efficiency certificates. These Acts require an accredited assessor under the supervision of an auditor to evaluate building's energy performance by assessing building energy efficiency

[82] Green Building Council Indonesia, *On Registration* (1 January 2017) <http://www.gbcindonesia.org/greenship/2012-08-02-03-21-25/on-registration>.

[83] Tri Wahyuni, *Jakarta Hanya Punya 14 Gedung Ramah Lingkungan [Jakarta Only Has 14 Green Buildings]* (22 October 2015) CNN Indonesia <http://www.cnnindonesia.com/gaya-hidup/20151022154528-277-86675/jakarta-hanya-punya-14-gedung-ramah-lingkungan/>. Email from the GBCI Secretariat to the writer, 'The Number of GREENSHIP Certificates', 29 October 2015.

[84] Rivki Maulana, *140 Gedung Antre Untuk Dapat Predikat Bangunan Hijau [140 Buildings Are Awaiting the Green Building Status* (22 October 2015) Property E-Paper <http://properti.bisnis.com/read/20151022/276/484982/140-gedung-antre-untuk-dapat-predikat-bangunan-hijau>.

[85] Pandita, 'The Green Building Regulation Jakarta', *Paper Presented at 14th Climate Technology Initiative Workshop* (2013) 15, 15 <http://climatetech.net/wordpress/wp-content/uploads/2013/10/14thWorkshopDay2_10_Pandita_Green-building-regulation-in-Jakarta.pdf>.

[86] *Building Energy Efficiency Disclosure Act 2010 (Cth)* ss 10–1; *Building Energy Efficiency Disclosure (Disclosure Affected Buildings) Determination 2015 (Cth)* cls 4–5.

ratings and performing lighting energy efficiency assessments.[87] Ensued these assessments, a Building Energy Efficiency Certificate ('BEEC'), which is valid for twelve months, is granted by an issuing authority.[88] A BEEC includes a performance-based star rating—National Australian Built Environment Rating System ('NABERS').[89] The NABERS benchmarks is based upon actual building's energy performance ranging from building's operational energy use to water efficiency.[90]

The BEEDA applies exemptions for certain types of buildings because the Act needs to measure the actual energy performance of a building. It exempts new or majority refurbished buildings and short-term leased (or subject to a lease less than twelve months) buildings.[91] The BEEDA applies civil penalties for those who fail to comply with the act. [92]

The implementation of the BEEDA and its amendment is supported by the national program for building energy efficiency. To date, the program specifies only in commercial buildings, called, the Commercial Building Disclosure ('CBD') Program.[93] Similar to the national laws on building energy disclosure, the program obliges building sellers and lessors of commercial office spaces of 2,000 square metres ('sqm') or more to disclose their offices' energy performance to prospective buyers and tenants and obtain a BEEC.[94] Two primary purposes of the disclosure energy efficiency information are to provide clear information about energy efficiency rating and GHG emissions of commercial buildings and to create a more informed commercial property market prior sale or lease.

The CBD Program showed satisfactory results after the Commonwealth government had introduced it in 2010. A review by ACIL Allen in 2015 indicated that the program had been successfully changed the mindset of building owners, operators, and tenants in relation to energy efficiency in commercial buildings.[95] The scope the review is the suitability of the CBD program, its effectiveness, its interaction with related national energy efficiency programs, its benefit to date and further benefits, and options for the funding of the CBD program. One of important findings in building energy efficiency is that the benefits of the program include a reduction in commercial building end-use energy use of 10,020 terajoules (TJ) and GHG emissions reduction of 2,051 kilotonnes of CO_2e within the period 2010-2013.[96]

The benefits that accrue from the successful results of the CBD program do not portray the whole picture of end-use energy consumption and GHG emissions reduction of Australian commercial buildings. It is due to the CBD Program is absent of programs and requirements for

[87] *Building Energy Efficiency Disclosure Act 2010* (Cth) pt 3 divs 1–3, as repealed by *Building Energy Efficiency Disclosure Amendment Act 2015* (Cth) sch 1 pt 1 items 37, 41, 44.
[88] Ibid sch 1 pt 1 items 15, 55.
[89] Ibid s 13(4).
[90] Office of Environment and Heritage, *Fact Sheet 2: How Is NABERS Being Used?* (September 2014) How NABERS works 1–2 <http://www.nabers.gov.au/public/WebPages/ContentStandard.aspx?module=10&template=3&id=5&include=HowNabersWorks.htm&side=factsheets.htm>; Mitchell, above n 60, 104–7.
[91] *Building Energy Efficiency Disclosure (Disclosure Affected Buildings) Determination 2015 (Cth)* ss 5–6.
[92] *Building Energy Efficiency Disclosure Act 2010 (Cth)* ss 49–51.
[93] See further Australian Government Department of Industry, Innovation and Science, *Overview of the Program* (29 September 2015) CBD - Commercial Building Disclosure <http://cbd.gov.au/overview-of-the-program>.
[94] Australian Government Department of the Environment and Energy, 'Disclosure-Affected Buildings' 1–2 <http://cbd.gov.au/files/Guidance%20Note%20-%20Disclosure%20Affected%20Buildings_1.pdf>.
[95] Acil Allen Consulting, 'Commercial Building Disclosures-Program Review' (Final Report to Department of Industry and Science, 2015) 2,4.
[96] Ibid 2.

emissions reduction in smaller office buildings with floor areas less than 2,000 sqm. It would be advisable if the program lowered the threshold for mandatory building emissions disclosure from 2,000 sqm to 1,000 sqm, since those small buildings located in the many suburban and regional areas across Australia.

2 *Energy Efficiency in Residential Buildings Sector*

In regards to residential buildings, energy efficiency measures for those buildings have been implemented by most state and territory governments. A state or territory government may extend the obligation to disclose energy efficiency in residential buildings, because the BEEDA and its amendment do not limit a law of a state or territory imposing a disclosure obligation in relation to the sale, lease, or sublease a residential building.[97] The Council of Australian Government ('COAG') outlined in the National Strategy on Energy Efficiency 2009 mandatory disclosure of residential building energy performance and GHG emissions prior to selling or leasing, and phased in the disclosure obligation in 2011.[98]

In late 2009, the Queensland State Government introduced mandatory disclosure of environmental and sustainability features of dwellings for sale or lease, through *Building and Other Legislation Amendment Bill 2009* (Qld). The Bill then came into effect on 1 January 2010 and required all residential sellers and landlords to provide a complete declaration of their sustainability features of their dwellings–named Sustainability Declaration–included residential building energy consumption.[99] However, the requirement of the Sustainability Declaration was not successful and the provisions compelling sustainability declarations was repealed in 2013. A study undertaken in 2012 prior to the repeal of the provisions found two important findings: first, seller and landlord awareness of the need to provide a complete sustainability declaration was very poor[100]; secondly, most of the house buyers did not consider the declaration to be a relevant factor in their house purchase decision-making.[101] Therefore, the disclosure of sustainability information may not relevant to the purchase decision of buyers.

Although the sustainability disclosure requirement was abolished in Queensland, building energy efficiency requirements are still necessary for dwellings. The State legislation on energy efficiency for residential buildings has a different level of compliance depending on the house design and its facilities.[102] The Queensland framework for energy-efficient housing may provide an example. The Queensland Development Code ('QDC') provides a flexibility scheme to achieve compliance with the 6-star housing standard.[103] For example, to measure thermal performance in a house, designers need to decide the most suitable climatic standard, either provided by the BCA or the QDC.[104] The QDC also encompasses other local energy-efficient

[97] *Building Energy Efficiency Disclosure Act 2010 (Cth)* pt 1 s7.
[98] Council of Australian Governments, 'National Strategy on Energy Efficiency' 26.
[99] *Building and Other Legislation Amendment Bill 2009* (Qld) cl 29.
[100] Lyndall Bryant and Chris Eves, {"citationID":"NZVqXdZo","properties":{"formattedCitation":"{\\rtf Lyndall Bryant and Chris Eves, \\uc0\\u8216{}Home Sustainability*Property Management* 29, 48.
[101] Ibid 37, 44.
[102] Queensland Government, 'Queensland Development Code Mandatory Part 4.1 - Sustainable Buildings Guideline' 4 <http://www.hpw.qld.gov.au/SiteCollectionDocuments/qdc-4-1-sustainable-buildings-guideline.pdf>.
[103] Ibid.
[104] Ibid 15.

features that are not covered by the BCA. For instance, it covers a broader local climatic classification compared to the BCA as the national construction code.[105] Therefore, assessments of residential building energy efficiency in Queensland via the QDC are probably more accurate than the national ones.

B The Building Code of Australia

The Australian Building Code Board ('ABCB') administers the National Construction Code ('NCC') on behalf the Commonwealth government and state and territory governments. Under the Intergovernmental Agreement, the NCC—including the BCA and plumbing code—is mandatory for all building work performed in Australia and will prevail over any conflicting codes and regulations.[106]

The BCA is enforced throughout states and territories in Australia by diverse primary and secondary legislations. For example pertaining to building work, *Building Act 1975* (Qld) stipulates that a building work is deemed to comply with the BCA or the QDC 'only if it complies with all relevant performance requirements under the code'.[107] *Building Act 1975* (Qld) prohibits a person from occupying or using a building that fails to comply with the provisions of BCA that relevant for that building class.[108] Hence, *Building Act 1975* (Qld) shows that achievement of energy efficiency in the building sector is also possible by adhering building code requirements.

There is no a separate set of the mandatory green building code in Australia.[109] Regulations concerning on energy efficiency and water efficiency are embodied under the section J of the *National Construction Code (NCC)*. States and territories have also developed additional or adjustment to augment the NCC to be more suitable in their local context. For example, the Queensland Government has established the QDC to ensure the implementation of energy-efficient measures to its buildings.[110] The state and territories governments also incorporate the BCA into their planning and development approval process.[111]

C The Rating System

Two rating systems that are applicable for assessing energy efficiency performance in Australian buildings are the NABERS and the Green Star. The BEEDA implements the NABERS star-rating system from a series of a standard developed using national building performance data.[112]

Besides monitoring energy performance of buildings, the NABERS also can be used to track building's GHG reduction performance. A previous study from a climate change authority in Australia found that those buildings that used the accredited NABERS rating saved approximately 149,000 tonnes of GHG emissions every year.[113] However,

[105] Ibid 14.
[106] Oswald Chong and Sylvana Ricciarini, 'APEC Building Codes, Regulations and Standards - View' (Technical Report APEC Project M CTI 02/2012A - SCSC, Asia Pacific Economic Cooperation Secretariat, August 2013) 35.
[107] *Building Act 1975 (Qld)* s 14(2).
[108] *Building Act 1975 (Qld) s 115(1).* For the list of other examples in the other states and territories, see Julian Bailey, *Construction Law* (Informa Law, 1 st ed, 2011) 1229.
[109] Chong and Ricciarini, above n 94, 42.
[110] Department of Housing and Public Work Queensland Government, *Queensland Development Code Parts Referenced in Legislation (Mandatory Parts)* (1 September 2015) Current Parts 2 <http://www.hpw.qld.gov.au/construction/BuildingPlumbing/Building/BuildingLawsCodes/QueenslandDevelopmentCode/Pages/QueenslandDevelopmentCodeCurrentParts.aspx>.
[111] Bailey, above n 96, 1229.
[112] Prentice, above n 56, 241.
[113] DECCW (Department of Environment, Climate Change and Water, Government of NSW),

compared to other international best practices, such as the U.S. Green Star, the NABERS is arguably below than these best practices for measuring energy performance in commercial buildings.[114] The study of these best practices is beyond the scope of this article.

The Green Star takes a different approach to the NABERS to benchmark energy efficiency in Australian building. It assesses the design and as-built of a commercial building. There is a perception that to obtain the Green Star is harder than the NABERS, because of impracticalities of the Green Star. It takes time and is costly to obtain necessary supporting information required to achieve a high Green Star rating, notably, in as-built tools, which show 'on-site changes to the original construction documents'.[115] Initiatives of a building owner to earn a high Green Star Rating also possibly reduce the value of its property, such as, reduction in night time lighting and minimizing the number of spaces for car parking.[116] Amid those less-feasible approaches and the incurring cost to obtain the rating, it probably means that the Green Star rating would be predominantly used in developed countries. In contrast, obtaining a NABERS rating is probably more rapid and cheaper, since the rating mainly focuses upon an actual building's energy performance for twelve months.

OPPORTUNITIES TO ADOPT AUSTRALIA'S EXPERIENCES IN ENERGY EFFICIENCY INITIATIVES

This part begins with analysing some opportunities and constraints to adopting energy efficiency measures in Indonesian built environment. It then assesses possibilities of legal adjustments in the current Indonesian framework of green building with reference to Australia's experience.

A Potential for Energy Savings in the Indonesian Built Environment

Considering the significant amount of electricity consumption in Indonesian built environment, Indonesia needs an effective approach for saving energy in its built environment. There are some potentials for energy savings. Asian Development Bank ('ADB') acknowledges that Indonesia has substantial energy saving potentials through the utilisation of advanced technologies.[117] The ADB estimates that residential and commercial sector have energy saving potentials of 8.5 Mtoe result from the substitution of energy-intensive appliances, including AC and lighting, with efficient ones.[118]

It also has been suggested that the application of more efficient AC systems and lighting solutions, final energy use of commercial buildings could be shrunk by 35% to 40%.[119] Further energy savings potential also exist in the building envelope, particularly wall and windows. Buildings' electricity consumption also could be reduced by 8% to 10% by installing shading applications to lower the impact of outer heat inside the building.[120]

'NABERS Statistics' (DECCW, June 2009) 2; Mitchell, above n 60, 109–110.

[114] Prentice, above n 56, 241; Mitchell, above n 60, 110–11.

[115] Mitchell, above n 60, 112; GBCA (Green Building Council Australia), 'Green Star - As Built Guidelines' 2–15. For the definition of 'as-built' and its use, see AIA (American Institute of Architects), 'Terminology: As-Built Drawings, Record Drawings, Measured Drawings' 1–2.

[116] Mitchell, above n 60, 113.

[117] Asia-Pacific Economic Cooperation and Asian Development Bank, *Energy Outlook for Asia and the Pacific* (Asian Development Bank, 1st ed, 2013) 327.

[118] Ibid 328.

[119] Blocks et al, above n 35, 9–10.

[120] Ibid 10. For a recent empirical study related to potential energy savings through the application of design alternatives on residential buildings in Indonesia see Andre Setiawan et al, 'The Effects of Envelope Design Alternatives on the Energy

Considering the potential of energy savings in Indonesian built environment needs some supports to strengthen the market of energy-efficient building, the GOI has supported the market for energy efficiency by enacting several minister regulations on energy saving appliances. For example, AC and refrigerator systems,[121] and self-ballasted lamps.[122] The ADB regarded these key measures as the adoption of minimum efficiency performance standards ('MEPS').[123] However, influences of such regulations on the improvement of energy efficiency market and encouragement to developers and builders to construct have yet been proved, because both regulations have been being enacted for one year.

The GOI also adopted an important green building regulation that established descriptions, benchmarks, and certification program for green buildings in the country through *MPWH Regulation No 2 of 2015*.[124] The regulation and the Indonesian MEPS for AC systems and lighting solutions support the implementation of energy-efficient building codes that has been established by BSN since 2011.[125] The Ministry of Energy and Mineral Resources estimated that the potential energy savings that could be generated by the application of these energy-efficient building codes on commercial buildings are approximately between 5% and 16%.[126]

B Opportunities for Adopting Australian Energy Efficiency Measures in Indonesian Built Environment

This section discusses the applicability of the BEEDA and the BCA for Indonesia. Australian legislation on building energy efficiency that requires mandatory disclose information about building's energy performance probably feasible to be adopted in Indonesian construction industry. To date, Indonesia does not have a powerful instrument regarding energy efficiency disclosure of commercial and residential buildings. It can be argued that imposing such obligations to disclose energy efficiency in Indonesia may encourage the implementation of green buildings.[127]

Energy disclosure in commercial buildings is necessary for Indonesia in the short-term. A recent survey by the Colliers International suggested that despite Indonesia currently has a slowing economy growth as a result of the increasing US dollar against several local countries in the Asia Pacific, the growth of construction sector, is predicted to remain high.[128] Notably, the development of high-

Consumption of Residential Houses in Indonesia' (2015) 8 *Energies* 2788, 2795–2800.

[121] *Peraturan Menteri Energi dan Sumber Daya Mineral No. 7 Tahun 2015 tentang Penerapan Standar Kinerja Energi Minimum dan Pencantuman Label Tanda Hemat Energi Untuk Piranti Pengkondisi Udara* [Minister of Energy and Mineral Resources Regulation No. 7 of 2015 on Minimum Energy Efficiency Performance Standard and Energy Efficiency Labelling for Air Conditioning ('MEMR Regulation No. 7 of 2015'] (Indonesia).

[122] *Peraturan Menteri Energi dan Sumber Daya Mineral No. 18 Tahun 2014 tentang Pembubuhan Label Tanda Hemat Energi untuk Lampu Swaballast* [Minister of Energy and Mineral Resources Regulation No. 18 of 2014 on Energy Efficiency Labelling for Self-Ballasted Lamp ('MEMR Regulation No. 18 of 2014'] (Indonesia).

[123] Asian Development Bank, 'Proposed Programmatic Approach and Policy-Based Loans for Subprogram 1 Republic of Indonesia: Sustainable and Inclusive Energy Program' (Report and Recommendation of the President to the Board of Directors 49043-001, 1 September 2015) app 4, 24 <http://www.adb.org/sites/default/files/project-document/175058/49043-001-rrp.pdf>.

[124] MPHW Regulation No. 2 of 2015, pts II—III, VIII.

[125] See above nn 65-6 and accompanying text.

[126] Asian Development Bank, above n 111, app 4, 25.

[127] See above n 60 and accompanying text.

[128] Colliers International, 'Jakarta Property Market Report: First Quarter 2015' (Research and Forecast Report 1 Q1 2015, Colliers International, 2 May 2015) 2 <http://www.colliers.com/-/media/files/marketresearch/apac/indonesia/jkt-1q2015-r1.pdf?la=en-GB>.

rise office buildings and residential buildings in Jakarta that dominated the growth in the first quarter of 2015.[129]

Emissions from Indonesian residential building sector are also an emerging issue. Emissions from this sector are predicted to increase due to rapid development in residential buildings.[130] The APEC also predicted that energy demand in the residential sector in 2025 would increase three times of the 2010 level significantly.[131] Thus, disregarding the energy consumption performance of residential building will have a significant impact of the national energy efficiency actions in Indonesian buildings.

Indonesia has a limited number of building codes and standard concerning on energy efficiency.[132] Australia's experiences regarding the management of the BCA and the QDC may provide a feasible solution for improving Indonesian building codes. The way in which the BCA and the QDC incorporated into the planning process is similar to Indonesia. Indonesian building code and standard ('SNI') are incorporated in the issuance of a building permit or an approval of building development, and related permissions to perform building work. Such an approach to which the Indonesian building code and the SNI are given effect is uniform at the national and the local level.[133] Typically at the local level, enactment of a local regulation concerning on building embodies some provisions on a referral to the Indonesian building code. The central government gives flexibility to local governments to adjust Indonesian building code and standard to their local context and formulate their local regulations based on that adjustment.[134]

To date, 44% of local governments in Indonesia have local regulations on their building.[135] Nevertheless, most of these regulations have yet incorporated energy efficiency provisions. Therefore, it would be difficult to apply energy efficiency initiatives nationally if the local governments did not effectively incorporate these clauses into their local regulations.

To embody energy efficiency standards into local regulation, an approach by the Queensland Government may be applicable for Indonesia. The Queensland government, by virtue of *Building Act 1975 (Qld)*, can determine compliance of building work with the BCA or the QDC through three approaches. First, the building work complies with the relevant acceptable solution for the performance criterion sets out in the BCA or the QDC.[136] Secondly, the building work complies with the relevant performance requirement formulated through an alternative solution

[129] Ibid.
[130] See above n 38 and accompanying text.
[131] APEC (Asia-Pacific Economic Cooperation), 'Peer Review on Energy Efficiency in Indonesia' (Report for the APEC Energy Working Group EWG43, APEC, 13 February 2012) 64 <http://www.ewg.apec.org/documents/EWG43_12-b%20PREE%20Indonesia%20report%20_20120213.pdf>.
[132] See above nn 65-6 and accompanying text.
[133] *Government Regulations No. 36 of 2005 on Buildings (*Indonesia) arts 8, 14-15, 64 [the Better Work Indonesia-ILO trans]. For an example of the incorporation of Indonesian building code into a local regulation see eg, *Peraturan Daerah Provinsi Jakarta Nomor 7 Tahun 2010 tentang Bangunan Gedung* [Local Regulation of Jakarta No. 7 of 2010 on Buildings] (Indonesia) arts 13, 15.
[134] *Government Regulations No. 36 of 2005 on Buildings (*Indonesia) arts 105, 109 [the Better Work Indonesia-ILO trans].
[135] Direktorat Jenderal Cipta Karya [Directorate General of Housing, Building, Planning, and Urban Development], *Peta Status Peraturan Daerah Tentang Bangunan Gedung Di Indonesia [Map of the Status of Establishment of Local Regulation Concerning on Building in Indonesia]* (2013) Situs Informasi dan Database Perda Bangunan Gedung dan Implementasinya [Information and Database Website of Local Regulation on Building Code and Its Implementation] <http://www.perdabg.com/web_perda-bg/2_c-peta.html>.
[136] *Building Act 1975 (Qld)* s 14(4)(a).

that complies with the performance criterion under the BCA or the QDC.[137] Thirdly, the building work complies with the combination of the first and the second approach.[138]

It also has been suggested in *Stariha v. Queensland Building Consulting Group Ltd* (2007) QPEC 110 that a building work, instead of complying with the BCA, 'must also comply with each part of the QDC […] to the extent that part applies to the work'.[139] That approach may provide an alternative compliance strategy with the minimum requirement of the building code as set by the Indonesian central government in the Indonesian building code and the SNI and at the same time incorporate energy efficiency initiatives into a local regulation.

C Legal Adjustments in Energy Efficiency Framework in Indonesia

To realise opportunities on adoption Australian initiatives regarding energy efficiency in the building sector, Indonesia arguably needs some legal adjustments. These changes may be divided into two actions. First, a change in the establishment of the national framework for energy disclosure in commercial and residential buildings. Second, adjustments regarding the establishment of building energy codes to support green building movements in Indonesia.

Establishment of a national scheme for disclosing energy efficiency performance of commercial buildings may be divided into two terms, in the short-term and the long-term. Amendments the provisions of the existing administrative regulation of Indonesian green buildings, namely the *MPWH Regulation No 2 of 2015*, to include requirements for disclosure energy performance is likely to be feasible in the short-term.

Adjustments in the minister regulation may contain prescriptive requirements for commercial and residential buildings to disclose their energy saving performances annually and incentive and disincentive schemes for building owners. The achievement of energy efficiency disclosure can be transformed into a rating system, like the NABERS. The GBCI may incorporate building energy efficiency requirements into the GREENSHIP. Alternatively, the GOI may establish an energy efficiency certificate which contains a rating system for energy efficient-building like the BEEC.

The administrator of the GREENSHIP and the GBCI, and the Ministry of Public Works and Housing should publish the result of energy efficiency disclosure widely. Therefore, building owners could then compare the outcome before the energy efficiency disclosure initiated with their annual energy bills before the initiative put in place. It may also attract potential buyers or tenants when they can see the potential energy savings, and promote a green lease strategy in Indonesia.[140]

In the long-term, the establishment of a national platform for commercial and residential buildings energy efficiency disclosure and then propose the disclosure scheme into a bill could be an effective solution. Establishing a set of building energy code could also be a feasible solution for energy efficiency in Indonesian built environment. It has been suggested that a set of building energy code could be a functional tool to manage energy efficiency of commercial and

[137] *Building Act 1975 (Qld)* s 14(a)(b).
[138] *Building Act 1975 (Qld)* s 14(4)(c).
[139] *Stariha v. Queensland Building Consulting Group Ltd* (2007) QPEC 110 [25], [30] (Griffin SC DCJ).
[140] COAG (Council of Australian Governments), 'The Green Lease Handbook' 7–19 <https://www.gbca.org.au/gbc_scripts/js/tiny_mce/plugins/filemanager/Green-Lease-Handbook-20120907-PDF.pdf>.

residential buildings as other countries have experienced.[141] The existing energy efficiency standards[142] may complement the energy building code. At the same time, the GOI may establish a mandatory regulatory framework that necessary to ensure obedience to the building energy code. The GOI may implement the mandatory building energy code on a local level, like in Jakarta, then expand it to the countrywide. The implementation of the building energy code should be limited at provincial level only and not expanded until municipal level to maintain the degree of consistency with the national instruments.

CONCLUSION

As this article has demonstrated, the current energy efficient framework in Indonesian building sector is insufficient to encourage green building movements in Indonesia. Australian regulatory framework concerning on energy efficiency in its building sector is applicable for Indonesian context. The framework at the both level, the Commonwealth and the state or the territory level, may provide viable avenues to improve energy efficiency in Indonesian buildings.

The BEEDA may provide a practical experience to encourage the implementation of energy efficiency performance disclosure of Indonesian commercial and residential buildings. It can be a reference to propound a legal adjustment of the existing energy efficiency framework and to establish a national scheme for Indonesian building energy efficiency disclosure. The GOI may also refer to the way in which the BCA and the QDC operate in the Queensland built environment to reform the Indonesian building code and the local building regulations.

[141] APEC (Asia-Pacific Economic Cooperation), above n 119, 52–3.
[142] See above subsection 'The Indonesian Energy Efficiency Framework'.

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