The global future of energy law

Heffron, Raphael; Hussein, Halima I.; Yang, Chung-Han; Sun, Nancy

Published in:
International Energy Law Review

Publication date:
2017

Document Version
Peer reviewed version

The Global Future of Energy Law: 2017 Review

Raphael J. Heffron[*]
Jean Monnet Professor in Energy and Natural Resources Law, Queen Mary University of London, UK & Centre for Energy, Petroleum, Mineral Law & Policy, University of Dundee, UK

Halima I. Hussein
Natural Justice: Lawyers for Communities and the Environment, Kenya

Chung-Han Yang
PhD Researcher, C-EENRG, University of Cambridge, UK (and of Counsel with Dentons LLP)

Nancy Sun
Dentons LLP, Shanghai Office

1. Introduction

The energy sector produces data every year at international, national and local level. This data is increasing and is produced by a variety of stakeholders, for example energy scientists, international institutions, economists, governments etc. Annual reports are produced, however to date there is limited data in terms of future legislative challenges for the energy sector. This article provides an annual account of future legislation as a result of this new data—with a particular focus on economic data. This is the second year of this report on the global future of energy law,[1] and this analysis includes the future legal challenges globally and also specifically to two regions, Asia and Africa.[2]

This article, in examining the global future of energy law, explores very briefly what energy law as a discipline is and how this explanation will impact on the evolution of energy law. The principal section then focuses on addressing the future of energy law in light of the challenges that the 2016 and 2017 energy data predicts for 2040. From this it can be determined what the key energy law challenges are and should be if society is to move towards its low-carbon economy goal—or as it is sometimes expressed, a "decarbonised economy". The second main section focuses on the legal challenges faced by Africa and Asia based on the legal challenges identified.

The future of law and the legal profession itself have been a concern for some academics for many years.[3] The aim of this article is to highlight this analysis of the future for a growing area of legal research, namely, energy law. Indeed, there is every reason why energy lawyers (both scholars and practitioners) should consider the future of energy law. Several practitioners and scholars have already highlighted concerns about the future of energy law and this was discussed in more detail in last year's 2016 report. This article in contrast to previous literature in the area[4] takes a different perspective in that it tackles the issue more

---

[*] Author contact details: raphael.heffron@gmail.com. The views and opinions expressed in this article are those of the authors and the authors alone accept all responsibility for these and any errors. The views are based on publicly available material which includes the Executive Summary (not the full report) of the Bloomberg New Energy Finance (2016) Report, *New Energy Outlook 2016: Long-term projections of the global energy sector*.

[1] R.J. Heffron, "The Global Future of Energy Law" (2016) 7 *International Energy Law* 290.

[2] Over the coming years, Europe, South America, Latin America, North America and Australia-Asia will be added to the analysis.

[3] For a discussion on this, please see last year's 2016 article: R.J. Heffron, "The Global Future of Energy Law" (2016) 7 *International Energy Law* 290.

[4] See J.P. Tomain and Richard D. Cudahy, *Energy Law in a Nutshell*, 2nd edn (West Publishing, 2011); A. Bradbrook, "Sustainable Energy Law: The Past and the Future" (2012) 30 *Journal of Energy & Nat.*

from an external-oriented viewpoint whereas previous scholars have done so principally from an internal perspective of energy law.[5] This article aims to present a global perspective on the future of energy law and in a new departure it provides analysis specific to both Asia and Africa this year; with other regions to be included in future years. The energy sector is a vital one for economic growth and, in particular, its growing prominence is leading to a realisation of its importance in practice and in academia. It has been identified that energy is now one of the last supported research areas across the entire university.[6]

As stated in last year's article, there have been a number of articles recently published that explore what energy law is in more detail.[7] The definition of energy law advanced for the purpose of this article is the area of law concerning the management of energy resources and the rights and duties over all energy activities over each stage of energy life-cycle and at the local, national and international level.[8] In broadening the scope of this annual report in terms of energy law at national and international level, this year's report reflects on future energy law issues in Africa and Asia.

This article will not go into depth around the definition of energy law as this was covered sufficiently last year. The next two sections on Africa and Asia reflect the future energy law issues for those regions based on the 2016 Report. The penultimate section considers additional future energy law issues as a result of the recent 2017 Report.

2. The top eight legal challenges ahead to 2040: Asia and Africa

The analysis below focuses on the legal challenges ahead to 2040 in Africa and Asia; this is based on the analysis in the 2016 data and the top eight challenges to the energy sector identified by the economic data by BNEF.

I. Coal and gas prices stay low

Legal Challenge 1: there will continue to be a need to legislate for reducing CO_2 emissions from coal and gas.

Resources Law 511; J.C. Dernbach and J.R. May (eds), *Shale Gas and the Future of Energy: Law and Policy for Sustainability* (Edward Elgar, 2016); D.C. Smith, "Looking Ahead: The Top Ten Energy and Natural Resources Issues in 2015" (2015) 33 *Journal of Energy & Natural Resources Law* 1; R.J. Pierce, "The Past, Present, and Future of Energy Regulation" (2011) 31 *Utah Environmental Law Review* 291; J.P. Tomain, "'Our Generation's Sputnik Moment': Regulating Energy Innovation" (2011) 31 *Utah Environmental Law Review* 389; E.H. Comer, "The Future of Energy Law—Electricity" (2011) 31 *Utah Environmental Law Review* 429; A.J. Wildermuth, "The Next Step: The Integration of Energy Law and Environmental Law" (2011) 31 *Utah Environmental Law Review* 369; A. Johnston, "The Future Shape of EU Energy Law and Policy", in A. Arnull, C. Barnard, M. Dougan and E. Spaventa (eds), *A Constitutional Order of States?—Essays in EU Law in Honour of Alan Dashwood* (Hart Publishing, 2011); and R.J. Heffron, *Energy Law: An Introduction* (Springer, 2015).

[5] See Smith, "Looking Ahead: The Top Ten Energy and Natural Resources Issues in 2015" (2015) 33 *Journal of Energy & Natural Resources Law* 1.

[6] R.J. Heffron and D. McCauley, "The Concept of Energy Justice Across the Disciplines" (2017) 105 *Energy Policy* 658.

[7] R.J. Heffron and K. Talus, "The Evolution of Energy Law and Energy Jurisprudence: Insights for Energy Analysts and Researchers" (2016) 19 *Energy Research and Social Science* 1; and R.J. Heffron and K. Talus, "The Development of Energy Law in the 21st Century: A Paradigm Shift?" (2016) 9 *Journal of World Energy Law and Business* 189.

[8] This definition is a working definition and the author appreciates there may be some dispute around this but this is an area for future debate and research. Please see the following for a more comprehensive overview of the definition of energy law: R.J. Heffron and K. Talus, "The Evolution of Energy Law and Energy Jurisprudence: Insights for Energy Analysts and Researchers" (2016) 19 *Energy Research and Social Science* 1.

Asia

According to the International Energy Agency (IEA), Asian economic development continues to favour coal as the main source of energy (see their 2016 Report). However, by 2025 unsustainable air pollution levels will force governments to take advantage of the new wave of natural gas available, a shift that started in the West, will be increasingly adopted in the region.

The new wave of liquefied natural gas (LNG) infrastructure—which is expected to come on stream within the next two years—will make the shift from coal to natural gas more viable and more cost-effective despite the higher prices involved. For example, China has a five-year plan where it is seeking to reduce all emissions from coal-fired power and other industrial uses. This is not just CO_2 emissions but also sulphur oxides (SOx), nitrogen oxides (NOx) and particulate matter (PM). The Indian government, with the recurrent news from heavily polluted New Delhi and its terrible air situation, is moving towards understanding what coal means in terms of the health impact but remains far behind China in terms of law and policy development on this issue.

Meanwhile, Asian countries are improving technology for coal-fired plants. Although capital costs are higher, supercritical and ultra-supercritical technology can achieve higher efficiencies and significant emission reductions. For instance, Kansai Electric Power and five other utilities in Japan are cooperating to commercialise technology for burning ammonia with coal in power plants, a method that could reduce carbon dioxide emissions by at least 20%. Adding ammonia to coal would reduce coal usage as well as carbon dioxide emissions, since ammonia—which does not contain carbon—does not release CO_2 when burned. Adopting this technology at ageing plants would bring emissions in line with those of newer facilities, reducing the need for new investment. If 70 plants switch to a coal-ammonia mix, CO_2 emissions would fall by an estimated 40 million tonnes per year, equivalent to about 3% of Japan's annual total.

Africa

There is a clear conflict, in sub-saharan countries especially, between economic and social development, and the reduction of emissions from coal and gas. Government priorities are skewed towards alleviating poverty and lifting their economies to become middle-income countries by 2030, and this is evidenced by the language of the INDCs submitted in 2015 that stressed the need to take cognisance of the prevailing *national circumstances* in these countries.

In Kenya, for example, the Climate Change Act was enacted in 2016 on the backdrop of two million Kenyans affected by drought. Further, there was a call for prosecution of climate change related offences, however the National Climate Change Council which is meant to spearhead its implementation has not been enacted and neither have the regulations operationalising this law. In fact, the Kenyan Ministry of Energy's least cost power development plan 2013–2033 and subsequent expressions of interest invites bidders to construct coal power plants to be located even on, for example, the UNESCO declared World Heritage site, Lamu. This power plan and reliance on fossil fuels is built on a presumed fear of reliability of hydro, geothermal and wind as baseload electricity sources in the country.

In South Africa (and indeed the rest of Africa), where around 93% of domestic power is sourced from coal, there exists little legislation on climate change. The country relies on non-binding policies such as: the White Paper National Climate Change Response Strategy; the White Paper on the Promotion of Renewable Energy and Clean Energy Development Part One—Promotion of Renewable Energy, November 2003; and the South African National Climate Change Plan.

However, both South Africa and Kenya have resorted to instituting environmental justice suits challenging EIA licences given to the plants. On 8 March 2017, in South Africa's first climate change law suit, a North Gauteng High Court ruled in favour of environmental justice organisation, { HYPERLINK "http://cer.us7.list-manage1.com/track/click?u=254d86bd82b4cf76270ee02fd&id=b800e73d91&e=0dcabc1adb" \t "_blank" } (ELA). The High Court referred the appeal against the environmental authorisation for a new coal-fired power station back to the Minister of Environmental Affairs on the basis that its climate change impacts had not been properly considered. In November 2016, the EIA licence of the first coal-fired plant in East Africa was challenged before the Environmental Tribunal in Kenya for, inter alia, failing to account for the externalities of coal as well as its climate change impact. It is clear legal action is beginning against coal in Africa via the courts, however, further action in legislative development will be needed or indeed more clarity given to EIAs.

II. Wind and solar costs drop

With the costs of these two renewable energy sources set to drop 41% and 60% globally, the major legal hurdle is to ensure that these energy sources continue to receive some support and in particular in relation to electricity grid access. Hence, legislation is needed to: (1) continue to incentivise the industry; and (2) to ensure access to the electricity network and hence to reform the development of electricity grid networks.

Legal Challenge 2: legislation is needed to: (1) continue to incentivise the renewables industry; and (2) to ensure access for the industry to the electricity network

Asia

Many governments in the Asian region have now adopted targets to increase the proportion of electricity generation produced from renewable energy sources. On a regional level, the 2016 ASEAN Plan of Action for Energy Cooperation included a target of 23% renewable energy generation by 2025.

These targets are typically accompanied by a package of incentives to drive the necessary increase in renewable energy development, often including tax benefits and preferable tariffs.

Continued domestic consumption is spurred on by developing alternative energy sources. Of the nations covered in this report, India is expected to be near the top of the list in terms of rapid growth, while China will see a slowdown. Overall, growth in the Association of Southeast Asian Nations (ASEAN) is projected to average 4.8% in 2016 and 5.1% over the period 2017–2021. Growth will be strongest in the Philippines, Vietnam and the CLM (Cambodia, Lao PDR and Myanmar) countries.

Accompanying this growth will be a push for renewable energy sources, such as wind, solar and hydroelectric. India and China are making the largest investments in renewables, while Vietnam, Thailand, Malaysia and Lao PDR are promoting renewables, with large investments in hydropower.

Regarding grid connections and transmission infrastructure, in a number of jurisdictions in Asia a lack of transmission infrastructure and grid connections is limiting renewable development. For example, it is estimated that only half of Thailand's renewable generation sites are connected to the grid. Putting transmission infrastructure in place can be a costly exercise for renewables where, except perhaps for biomass generation, the site of the generating facility is dictated by nature and not the location of consumer demand.

Overall, as the cost of renewable energy drops and storage technology improves, and global anti-coal sentiment and political pressure increases, the shift to renewable generating capacity will continue to ramp up in the longer term.

Africa

In Africa, economic development and the least cost technologies to get there trumps renewable policies and network access that is in the pursuit of the goals of the Paris Agreement. However, in 2017 renewable energy technologies are trending towards cost competitiveness with fossil fuels and thus economic development and the deployment of renewable technology in Africa are now synergistic.

Throughout Africa, there are two key challenges which legislation must address. The first is that demand is massive. More than 640 million Africans, almost two-thirds of the continent's population, have no access to electricity, according to the African Development Bank (AfDB). The cost of meeting its (AfDB) target of universal electricity access by 2025 is $60 billion a year. However, while most governments still prioritise affordability, renewables are becoming more competitive on cost of supply. The fall in solar-generating costs from solar photovoltaic panels and storage equipment globally has led to a fall of 30% in solar costs in Kenya for instance in the past 18 months, to about eight US cents per KWh. This compares with 11 or 12 US cents for coal and up to 20 US cents for heavy fuel oil that is used when demand spikes.

The other challenge is transmission and distribution. The AfDB wants to create 130 million new connections to the grid by 2025 but states that 75 million connections to power off the grid will be needed to meet its universal access goal. How does one get efficient energy into the poorest inaccessible areas, which are often not connected to the electricity grid? The answer to this challenge is renewable energy. M-Kopa, one of sub-Saharan Africa's leading providers of off-grid, pay-as-you-go solar power systems, posits that half of all homes in sub-Saharan Africa will end up with off-grid renewable energy solutions, not because it is better for the planet but because it is far more cost-effective. The AfDB has been instrumental in providing loans to ventures that are investing in these off-grid solutions.

Whilst Kenya, Tanzania and Uganda outperformed their peers in access to energy, the *Regulatory Indicators for Sustainable Energy Report 2016* developed by the World Bank found that, on the whole, Africa has a huge energy deficit, and has one of the least developed policy environments to support energy access. Of particular concern are Ethiopia, Nigeria and Sudan—three of the most populous energy deficit countries, with a total unserved population of 116 million. And as many as 70% of Africa's least electrified nations, each with access rates below 20% of the population, have barely begun to establish an enabling environment for energy access.

Even so, some good performers have strong policy frameworks in place, such as Kenya, Uganda and Tanzania. These three countries outperformed other countries on the continent when it came to energy access, with South Africa performing well on renewable energy and energy efficiency. A closer look at these countries seems to dispute this report. In South Africa, where 73% have access to electricity, and with several policies and strategies targeting renewables investment, there is lack of political will to enact any binding legislation therein in the face of 115 years worth of possible stranded coal assets.

Industry therefore, and not legislation, has come in to address these challenges.

III. Asia–Pacific leads in investment

This region will attract almost 50% of investment by 2040 and this highlights the need for more international cooperation on international energy law and the transfer of good energy law and best-practice regulation. It also highlights the recent importance of Paris COP21 because of China's role and agreement to it.

Legal Challenge 3: further international cooperation on international energy law and the transfer of good energy law and best-practice regulation.

Asia

Going forward, the game changers for this legal challenge in Asia will be: first, the implementation of China's Belt and Road Initiative (BRI) as it can provide an impetus to Asian and Eurasian energy integration through the development of multiple and comprehensive power grid interconnections.

Second, Asia and Pacific implementation of the Paris commitments on climate change that call for adoption of energy integration options to drive profound shifts to low and zero carbon pathways. Energy connectivity itself offers a key avenue to connect renewable energy-rich areas with load centres to balance supply and demand. Modelling of power grid interconnections in North East Asia suggest that carbon emissions could be reduced by over 5% if the renewable energy share could be increased through the Asian Energy Super Ring by connecting Far East Russia's hydropower together with wind and solar from the Gobi Desert.

Third, the energy integration experience of Europe and South East Asia offers useful lessons for energy cooperation in North East Asia. The complex cross-border negotiations, differing technical standards and large investments required have resulted in a staged approach to energy integration, often commencing with bilateral trade but eventually with the possibility of fully integrated competitive energy markets.

Collective action is critical to enable a move away from fragmented approaches towards more holistic, integrated and sustainable energy development. Most of all there is need to strengthen regional energy governance mechanisms by developing an institutional arrangement such as an Asia-Pacific Energy Charter that lays out a regional legislative framework to provide private and institutional investor confidence in the long-term commitment of governments.

The availability of primary sources for generating electricity vary across the region, and the potential for operational synergy provide room for cross-border electricity trade cooperation in the region. The adoption of the South Asian Association for Regional Cooperation (SAARC) Framework Agreement for Energy Cooperation (Electricity) in November 2014 is a step towards achieving this harmonisation.

Africa

According to the IEA Report, **{** HYPERLINK "http://www.iea.org/publications/freepublications/publication/partner-country-series---boosting-the-power-sector-in-sub-saharan-africa---chinas-involvement.html" ***}***, published in 2016, Chinese companies accounted for 30% of new capacity additions in the power sector over the last five years with investments of around $13 billion between 2010 and 2015 financed largely through public lending from China. Foreign direct investments into Africa totalled $66.4 billion for a sum of 705 projects in 2015. **{** HYPERLINK "http://www.howwemadeitinafrica.com/category/countries/egypt/" **}** was the

number one destination for FDI into Africa in 2015, mostly thanks to Eni's plans to invest between $6 billion and $10 billion in the Zohr Gas Field.

Over half of all projects are based on renewable energy, mainly hydropower. Large hydropower is already a commercially viable sector in Africa, while other renewable at scale is dependent on appropriate grid infrastructure and government schemes. Major Chinese renewable energy companies in wind and solar energy have since 2009 entered Africa on a large scale. The largest such project announced so far is the Lesotho Highlands Power Project, $15 billion renewable programme backed by Chinese lenders and with Chinese wind turbine manufacturer Ming Yang providing the wind turbines. The project aims to install 6GW of wind and 4GW of pumped-storage hydro capacity in Lesotho's Maloti Mountains over the next 15 years. While it is true that Chinese industry in many cases import Chinese workers for a limited period who live in compounds on site, the general pattern is that Chinese industry in Africa is increasingly relying on and developing the skills of African employees. Transfer of best practice and institutional capacity development related to energy law has, however, not been a focus of this relationship as local content regulations have only much recently come into the equation in most African countries. To the extent that they are supporting large hydro and other renewable projects, to the upwards of 100 *other renewables* so far, it is hoped that the mere fact that they are investing in these renewable projects will stimulate this knowledge transfer and development of an African renewable energy industry.

When it comes to non-renewables, on the other hand, evidence does show that there is a negative transfer of good energy law and practice. For example, in the proposed 1050MW Lamu Coal Plant in Kenya where the Industrial and Commercial Bank of China is financing 85% of the EPC cost and where the EPC contractors are Chinese based, the emission limits applied to the project are alarmingly weak in international comparison, indeed even for China (e.g. new plant limits in China are 35, 50, 10 mg/Nm3 of SO_2, NOx and PM which are much higher than Kenyan air quality standards and IFC EHS Limits). The plant would thus be allowed to emit 5–10 times as much key air pollutants as a new coal-fired power plant in China.

IV. Electric car boom

Electric car sales are going to boom by an estimated 90 times from 2015–2040. The significance of this will be that they will increase the need for additional electricity production—estimated to increase global electricity demand by 8%) but also to ensure that there is a need for more access points for charging vehicles. Hence, new energy law is needed to meet this need for electricity and also for the distribution of access points for re-charging these vehicles (although this is more a local energy law issue).

Legal Challenge 4: ensure that legal provisions are there to incentivise new electricity production to meet growth in the use of electric cars and ensure that local energy law legislates for access points for charging vehicles.

Asia

Electric vehicles could make up 35% of new car sales in Asia by 2040, driven by a significant reduction in battery prices and a rapidly changing mindset among consumers, industry and governments. Electric cars currently make up less than 2% of the global car fleet, and any faster-than-expected growth in that percentage will materially impact oil demand and the refining business.

Demand for gasoline in Asia may peak much earlier than expected as millions of people in China and India buy electric vehicles over the next decade, threatening wrenching change for the oil industry.

Change is being prompted by policy moves in India and China, where governments are trying to rein in rampant pollution, cut oil imports, and compete for a slice of the fast-growing green car market. Policy support and stricter environmental regulations have also helped perpetuate this virtuous circle.

China's aggressive subsidisation programme, for example, based on a target of five million electric cars on the road by 2020, is expected to have a positive knock-on effect for the entire EV and lithium-ion battery ecosystem.

India is considering even more radical action, with an influential government think-tank drafting plans in support of electrifying all vehicles in the country by 2032.

Korea has plans to introduce tax incentives for EVs and HEVs, the report adds; while in India, the government last year launched a scheme called FAME—Faster Adoption and Manufacturing of Hybrid and Electric cars—that offers subsidies of up to $US2,000 per green car.

Malaysia plans to duke it out with Thailand to be Southeast Asia's marketing hub for electric vehicles. Thailand is offering automakers tax breaks for green-car production, and it has established excise-duty exemptions for vehicle buyers. But the Malaysian government's Bernama news agency reports that authorities are aiming for 100,000 EVs on the road by 2030, along with 2,000 electric buses and 125,000 charging stations.

Africa

The lack of available infrastructure as well as Africa's infamous power shortages challenge the demand for electric cars. In South Africa, the only country that actively supports this new venture has itself had a long history of load shedding. When there is not enough electricity available to meet the demand from consumers, Eskom (the country's largest producer) will interrupt supply to certain areas. This has been used by critics to challenge the viability of electric cars in South Africa.

Since 2013, the government has offered industry various incentives to promote takeup of electric cars. On the other hand, South Africa penalises aspirant electric vehicle owners with a 43% import and ad valorem tax, which puts electric mobility out of reach. Electric vehicles are also slapped with a luxury tax (because so few are sold, they remain expensive) to tax credits for local vehicle manufacturing favouring companies that make more than 50,000 cars (an impossible goal for current electric manufacturing).

In some instances policy confusion favours electric vehicles. Government does not classify electricity as a "fuel stock" for vehicles. That means electric cars do not pay a fuel tax or contribute to the road accident fund. They also do not pay the taxes levied on conventional vehicles for causing air pollution.

South Africa's INDC submitted in 2015, however, states that the country will have more than 2.9 million electric cars on the road by 2050, with Rand 6.5 trillion invested in the industry over the next four decades.

This tangled mess of legislation led the trade and industry department to draw up the Strategy for Policy Direction Promoting Green Transport Technologies in South Africa 2016–2021, better known as the green transport strategy. This gives a step-by-step path for the country to follow to get to its target of 3 million electric vehicles by 2050. With only 300 cars and 40 charging stations, the current policy framework is not conducive towards the uptake of green road transport technologies. The strategy thus recommends an interministerial committee be

put together to cut across the departmental silo effect. In order to deal with low demand and the fact that nobody is then willing to invest in charging stations, it directs that Rand 6.5 trillion in investment from places such as the environment department's green fund, should go into improving battery technology so vehicles can go further on a single charge and make building electric vehicle infrastructure more lucrative for the private sector.

These initiatives are clearly not enough as 300 electric vehicles are a mere fraction of seven million light vehicles in comparison, and the industry has taken up the glove. In December 2016, pioneers of South Africa's emerging electric vehicle industry formed a consortium—Electric Vehicle Industry Association (EVIA)—endorsed by the department of trade and industry (DTI) to accelerate the development of clean transport, stimulate investor confidence in the sector, and meet government commitments to reduce emissions. EVIA will serve as a lobby group, enabling industry to work effectively with government and researchers to stimulate the sector. EVIA and its members will help government to identify regulatory gaps and deliver on key policies such as the DTI's Industrial Policy Action Plan and the Department of Transport's draft green transport strategy.

Outside South Africa, home grown companies exist in Ghana and Uganda which suffer from a lack of charging infrastructure, however none of these initiatives have been able to answer the biggest challenge in this field, Africans cannot afford to buy electric cars. Even in South Africa, the cheapest car goes for around Rand 530,000 at current exchange rates which is beyond the means of most South Africans.

V: Cheap batteries everywhere.

The further development and wide-scale commercial viability of electricity storage in batteries is set to increase by 2040. These will not only be used for electric vehicles but also in balancing the use of renewable energy technology—in essence increasing the efficiency of renewable energy. Similar to other developments there is a need for law to incentivise the deployment of battery technology in terms of using it in association with renewable energy.

Legal Challenge 5: the law should incentivise the deployment of battery technology in terms of using it in association with renewable energy.

Asia

Energy storage is a fast-growing segment in the Asia-Pacific region. Battery energy storage is the major technology after pumped hydro storage. The key regional drivers for the demand of battery energy storage are discussed below:

The Japanese Ministry of Economy, Trade and Industry (METI) has rolled out a US $779 million incentive scheme for battery installations and energy-efficient technologies. The incentive scheme has been allocated to both residential and commercial storage, along with energy storage systems at PV power plants and grid substations. The incentive is intended to strengthen electricity grids to facilitate growing levels of renewable energy penetration. In 2014, METI also launched a US $100 million subsidy programme to incentivise the commercial and residential update of Lithium-ion batteries. Under the terms of the subsidy, METI will subsidise up to two-thirds of the capital costs of battery installations above 1 KWh, providing a maximum of US $10,000 to residential recipients and US $1 million to commercial recipients. Further support is provided for stand-alone renewable energy generation with associated battery storage. The total programme, however, is worth just under US $300,000.

China's grid regulations are increasingly being implemented in the country that supports the installation of grid-scale energy storage. The CCP Central Committee and the State Council

recently issued the “Guiding Opinions on Deepening Electricity System Reforms”. This represents the biggest reform in China’s energy sector in the past 10 years. ESS has been written into China’s Energy Development Strategy Action Plan (2014–2020) for the first time. The new reform is expected to open up the Chinese electricity markets to competition and new capital, and promote independent trading structures, promoting demand response, ancillary services, and distributed energy, within all of which energy storage can play a major role. This has spurred intense activity in developing and deploying new energy and advanced energy storage technology and has been a major boost for the industry.

South Korea is next in line for its energy storage significance. The country’s focus on energy storage was strengthened during the Jeju Island smart grid test bed project between 2009 and 2011. Currently, Korea Electric Power Company (KEPCO) is developing the largest battery energy storage system for a frequency regulation at 56MW, 20MWh. In 2016, Kokam Power has installed two nickel-based batteries 24MW/9MWh and 16MW/6MWh in this project. Kepco is planning to reduce the usage of spinning reserves and compensate using energy storage with an addition of 500MW of storage into the grid by 2017.

Africa

As access to energy is low in most rural areas of Africa which lack grid infrastructure, the use of small-scale renewables systems and in particular solar—a widely available resource across most of the continent, has made distributed renewable power one of the more sensible options for electrification. Several of these $50 solar home systems have been installed in rural parts of Tanzania, Kenya, Ethiopia, Nigeria, Uganda and Sierra Leone. Estimates put this at around 4MW and 6–8MW in Tanzania and Kenya respectively.

Even so, the growth of renewable energy battery storage in Africa is lagging behind other regions. Laws and policies have not provided incentives or solutions to explore this technology on a larger scale beyond modest solar-powered batteries for households which are needed to facilitate these off-grid solutions. In Nigeria, for instance, around 60% of the population still have no access to modern energy services. To address the issue, Nigeria aims to install 30,000MW of solar PV by 2030 as outlined in the country’s INDCs. Most of this solar target will be installed off-grid. To facilitate this, Nigeria’s Electricity Regulation Commission in October 2016 approved the draft mini-grid regulations of 2016 that gives distribution companies licences to use mini-grids to **{** HYPERLINK "http://www.pv-tech.org/news/rooftop-solar-market-to-explode-in-africa-if-chronic-issues-addressed1" **}**across the country. In 12 months, the Solar Nigeria programme installed solar electricity for 170,000 homes across Nigeria. Battery energy storage systems installed by Greenicles Solar (a private company) across Nigeria stored more than 30MWh of electricity. Other African countries have similar targets—the **{** HYPERLINK "http://www.pv-magazine.com/news/details/beitrag/cop21--african-renewable-energy-initiative-launched--300-gw-2030-target_100022277/" \l "ixzz4Ry9rkJr1Ghanaian" \t "_blank" **}** that was launched in 2015 has a 300GW target for 2030. Ghana aims to deploy around **{** HYPERLINK "http://www.pv-magazine.com/news/details/beitrag/solar-to-play-key-role-in-ghanas-us230-million-renewable-energy-program_100019480/" \l "ixzz4Ry9JrR8m" \t "_blank" **}** and invest $230 million into four solar energy project areas, including mini-grids and stand-alone solar PV systems. Similarly in South Africa, as the country moves away from coal-fired power, it is expected to add 13GW of renewable electricity generation capacity by 2025. The majority of this capacity will be from intermittent sources, such as solar and wind power, that present challenges in balancing energy supply and demand.

Non-state actors such as development agencies have stepped in to fill the void and provide solutions in this field. The{ HYPERLINK "https://www.ustda.gov/" } (USTDA) in 2016 commissioned an assessment of the feasibility and market potential of energy storage technologies in South Africa where partner institutions in the US and South Africa are working on a roadmap for the adoption of energy storage technologies through 2030. The same agency via the Power Africa initiative (a brainchild of President Obama), in April 2017 awarded US $1.1 million to Nairobi-based Xago Africa for the development of a utility-scale solar-storage farm in Kenya. North Carolina-based Alevo, a battery storage technology manufacturer, will provide technology and analytics services for the project. The plant will be among the first utility-scale battery storage installations in Sub-Saharan Africa.

VI: A limited "transition fuel" role for gas outside of the US

This is a significant finding and prediction from the BNEF data. It indicates that governments should not be focusing their policy efforts on developing new gas infrastructure and, at regional levels, new gas pipelines; and, for example, it certainly calls into question the UK government's major focus on developing shale gas.

Legal Challenge 6: governments should review and reduce potential new legislation that incentivises new gas infrastructure—there is a danger of technology lock-in to an energy source that is on the decline.

Asia

The region's total natural gas recoverable reserves amounted to 8.53 thousand million tonnes of oil equivalent, representing 5% of the global gas reserves. Top countries per proved recoverable reserves include Australia (3,471.4bcm), Indonesia (2,839bcm), Malaysia (1,169bcm), Vietnam (617bcm), Myanmar (528bcm), Brunei (276bcm) and Thailand (220bcm).

Australia has abundant supplies of both onshore and offshore conventional gas. Most of the gas is produced in the Carnarvon basin offshore Western Australia (77% of Australia's total gas production in 2015) and Victoria (16.8%). The largest production site has two of the country's largest LNG export ventures, the North West Shelf project (22.1bcm) and Gorgon LNG (21.1bcm). Consumption of natural gas in 2015 was 34.3bcm, with the largest market being Western Australia (40% of all gas consumed annually), followed by New South Wales and Victoria.

Indonesia's natural gas production has been declining since 2010 when it reached 85.7bcm. The majority of the production is found in Aceh and East Kalimantan. The country is implementing a natural gas infrastructure development plan, called the National Infrastructure Development Plan 2016, which will add six natural gas infrastructure projects between 2016 and 2018. Consumption of natural gas is predicted to grow in the country, as the power industry is planning to shift coal to the cleaner source of gas and more residential consumers will have access to the natural gas distribution networks.

Gas has also attracted a lot of interest in Asia in recent years and gas prices are currently low, which is incentivising various countries to utilise more gas for power generation. Transportation of gas can be more challenging than coal, especially where there needs to be transport across the sea, but there is increasing development of medium to small-scale LNG transportation and regasification infrastructure in various parts of Asia. This infrastructure can be expensive, though, and the benefits in terms of emissions reductions when compared with coal may be marginal.

Africa

Africa is energy scarce, and priorities of governments lie in meeting demand, ensuring energy access and poverty alleviation of its citizens. Consequently, gas exploration and production in Africa has seen continued growth, with Eastern Africa emerging as a new source of gas. Significant gas finds in excess of 127Tcf in Mozambique have created the potential for an African super player. It is expected to become the second-largest exporter of Liquefied natural gas (LNG) by 2025, as the country steps up production from 10 million tonnes per annum (Mtpa) in 2017 to an envisaged 50Mtpa. In South Africa, according to BMI Research, 2015, there were estimated proven gas reserves of 28.8bcm. With the availability of natural gas in neighbouring countries, such as Mozambique and Namibia, and the discovery of offshore gas reserves in South Africa, the gas industry in Southern Africa is undergoing rapid expansion. Future development of regional gas fields will lead to natural gas becoming a more important source for meeting South Africa's energy requirements.

Laws and policies support the exploration and production of gas to facilitate economic development. Kenya for instance has a draft (Petroleum Exploration, Development and Production) Bill of 2015 which is intended to appeal the 1986 Act and keep up with current practices in the sector. For its part, Tanzania has adopted the 2013 National Natural Gas Policy of Tanzania, and Uganda is implementing the National Oil and Gas Policy (NOGP) of 2008, which spells out principles for the management and development of oil and gas and the protection of the environment. In many African countries, gas policies are being reviewed not to curtail the sector but to increase government take, state participation, taxation regulations and local content regulations.

VII: Coal's diverging trajectories

The coal sector is another area of concern and particularly so in Western Europe, the US and even China. Similar to the legislating for gas infrastructure, it is time for new energy law in the coal sector to reflect the decline of the industry and more ambitious legislation should materialise to ensure that the clean-up of the industry is managed effectively.

Legal Challenge 7: the coal industry is in decline and new energy law is needed to ensure that the industry manages its waste problem effectively in terms of on-site waste management, waste in operation of existing facilities. New international law and cooperation are also needed.

Asia

Most Asian countries have a domestic supply or can easily and affordably access it on the seaborne market and therefore they have confidence in coal supply. Asia's demand for coal is likely to increase for years to come even though countries including China, Japan and India have agreed on steps to limit fossil-fuel pollution damaging the climate.

As Asian countries move towards implementation of the Paris Agreement, it is vitally important that its environmental imperatives are integrated with the aims of the SDGs including universal access to energy, energy security and social and economic development. With the use of coal projected to continue to grow in Asia over the coming decades, a low emission technology pathway for coal is essential.

The lifetime cost of electricity, taking into account capital construction cost, fuel costs, load factor etc, from coal is routinely less than other technologies. For instance in China, high efficiency low emissions (HELE) coal technology costs five times less when compared to some renewables. HELE coal technology is important not only for its emissions reductions benefits, but also because it is a vital first step towards carbon capture and storage (CCS).

China is taking important steps to close down smaller, inefficient power stations but it is also building large, modern and more efficient (HELE) coal-fired power plants—new regulations effectively ban subcritical (non-HELE) coal technology. Japan is also pushing ahead with new coal-fired plants based on an assumption that power growth will continue for the next 15 years.

Elsewhere in non-OECD Asia, mostly concentrated in Southeast (SE) Asia, currently older and less efficient technology (subcritical) tends to be the default choice in the region and less than half of new plants are being built using HELE technology. The challenge is particularly clear in Indonesia, Philippines, Vietnam and Bangladesh. Given that in SE Asia the IEA predicts that demand for coal will grow 4.6% year on year to 2040, this is an area we need to focus on.

Africa

There seems to be a different narrative in Africa as regards coal's role to drive industrialisation in the continent. Analysts say African nations have an estimated 35 billion tonnes of recoverable coal reserves that could supply the continent's current needs for more than a century. { HYPERLINK "http://www.washingtontimes.com/topics/tanzania/" }, with potential reserves of 5 billion tonnes of coal, is planning its first coal-fired power plant. { HYPERLINK "http://www.washingtontimes.com/topics/kenya/" } wants to build its own coal-powered plant in Lamu right next to the port, and import coal whilst it awaits production of its own mine fields further inland in Kitui, while Ghana and { HYPERLINK "http://www.washingtontimes.com/topics/nigeria/" } are eyeing expanded use of coal for electricity. Landlocked Botswana is building a 1,000-mile railway to transport coal to a port in neighboring Namibia for export to the world.

There is a prevailing assumption that concerns about coal are expressed by white expatriates and foreign non-governmental organisations in African nations. Prominent personalities in the continent seem to support this agenda. Indeed, former UN Secretary-General Kofi Annan told the Ghana News Agency in April 2017 that coal and other fossil fuels are critical at least in the short term to bridge the continent's massive energy gap. Mr Annan chaired a report ({ HYPERLINK "http://www.africaprogresspanel.org/policy-papers/lights-power-action-electrifying-africa/" \t "_blank" }) from the Africa Progress Panel on energy in March 2017 which concluded that an abrupt shift away from coal was simply not realistic for most African governments. In South Africa, where 93% of electricity is sourced from coal there exists various laws that seek to deal with coal-waste management. However, the practice is far from what is provided in law. The Department of Mineral Resources which is the regulator lacks the capacity to review the quality of environmental management plans or programmes that have to be provided by project developers; they do not implement concurrent rehabilitation of the projects; and further lack capacity to review the adequacy of financial guarantees which companies must provide.

As the global market for coal slowly declines, slimmer margins are forcing international mining companies, including majors such as BHP Billiton and Anglo American, to shed their coal assets. Anglo-American in a statement in March 2017 confirming this and stated that they have "initiated a process to exit its Eskom-tied mines". A scrutiny of documents from the Department of Mineral Resources by Climate Home revealed that a small minority of mining companies hold the majority of the country's funds for rehabilitation in South Africa. Only 60% of operating mines held sufficient rehabilitation funds in 2012/13, according to the Department of Environmental Affairs, in part because the guidelines for calculating rehabilitation funds have not been updated since { HYPERLINK

"http://www.dmr.gov.za/publications/summary/21-mineral-policy/588-guideline-document-for-the-evaluation-of-the-quantum-of-closure.html" \t "_blank" }.

However, these big miners rarely apply for, and are almost never granted, closure certificates, the documents needed to legally close a mine and pass remaining liability to the government. Instead, junior miners are left with the remnants of mines and insufficient funds to properly clean up when the resource is exhausted. Once a mine has been officially closed, the liability of that mine goes to the Department of Mineral Resources and that is not a liability they want, so they are reluctant to put an official stamp on closing mines. There have not been any major mine closures since 2011.

There seems to be token shows of ensuring clean governance as illustrated by Eskom in February 2017 which terminated six coal transport agreements, for unlawfully introducing additional trucks into the coal road transport system.

Elsewhere, such as Kenya for instance, decommissioning and environmental rehabilitation laws do not exist thus the environmental regulator would in granting an EIA licence insert a condition requiring them to give a decommissioning plan for approval, say three months prior to decommissioning.

VIII: 2°C scenario.

ENEF data suggests that by 2040, $9.2 trillion will be spent in clean energy development and that an additional $5.3 trillion will be needed in further investment in the clean energy sector. Therefore, significant new energy law that incentivises the energy industry is needed not only to encourage new investment but to ensure that investment committed to fossil fuels switches to investment in clean energy (or low-carbon) energy and the 2°C scenario is not achieved.

Legal Challenge 8: new energy law needed to incentivise the energy industry to investment in clean energy and to ensure that investment committed to fossil fuels switches to investment in clean energy (or low-carbon) energy sources.

Asia

Since the COP21 Paris climate talks concluded, India, China, Australia and other nations in this region have increasingly been turning to renewables to power their economies.

India is fast emerging as a renewables powerhouse, particularly in terms of solar photovoltaic. Under the Ministry of New and Renewable Energy, India has seen a real growth in large-scale solar farms. In 2007, the country was producing 10GW in renewable energy, today it is more than 42GW. While the country might fall short of its (very) ambitious 2022 solar target of 100GW, investments in nonhydropower sources of energy have seen consistent growth.

China remains a clear powerhouse of the renewables world, however there has been an unmistakable glut in the market resulting from excess wind turbines and solar panels. Renewables plants have become “stranded” and lie “idle” due to insufficient transmission infrastructure, leading to a period of consolidation for the sector. China is also expected to launch its National Carbon Scheme in the second half of 2017, which will be a key pilot for carbon pricing schemes around the world.

Myanmar, Pakistan and Mongolia are each well-positioned to benefit from Beijing’s “one-belt one-road” initiative over the coming decade. However, foreign investor concerns remain

in Myanmar, which is still designing a regulatory framework for its energy sector and may yet be lured by the abundant known fossil fuel and mineral reserves in its northern region. Pakistan too suffers from foreign investor concerns, however in partnership with Beijing it is seeking to add 10,400MW of electricity supply, including from large hydropower dams, to address its current "energy crisis". Mongolia has seen a shift back towards fossil fuels, although the government is coordinating research into utilising the Gobi Desert as a renewable energy generating hub.

Bipartisan agreement on Australia's renewable energy target (33,000GWh by 2020) was a result of almost a decade of protracted political debate. Despite the current Conservative Government's commitment to large-scale coal mines, wind farms (particularly in South Australia) and solar photovoltaic plants continue to come online. A looming energy "crisis" as old baseload power plants are taken offline may lead to a renewed focus on hydropower (including expanding the historic Snowy Mountains Hydro-Electric Scheme) and large-scale solar.

However, moving from fossil fuels to renewable energy is a generational change that will not be easily completed. While renewables investments continue on a large scale across the region, there is a realisation that any gains in the overall percentage contribution of renewable energy to national electricity generation will be hard-won, particularly as electricity demand continues to rise in populous jurisdictions. Some countries have reduced the scope, period or rates for subsidies (like feed-in tariffs), either because all capacity has been filled or the government is no longer willing to interfere in the renewables market, citing cost concerns (auctions have become more common as a way for the market to determine prices, rather than government-imposed rates). While renewables investment remains healthy across the region, so does investment in fossil fuels with large coal mines and plants continuing to be built, largely out of concern for security of electricity supply and the always sensitive issue of short-term electricity prices.

Africa

The trend in Africa seems to be enactment of various renewable energy policies, low power feed-in tariffs and climate change policies which are non-binding to attempt to commit countries to switch to low carbon energy sources. In effect, if renewables such as hydro, solar or wind are not readily available and cost effective to pursue, then fossil fuels are the go-to option—anything as long as it facilitates a rapid development agenda for the continent. In Kenya, for instance, whilst there exists various policies that encourage renewables investment—Least Cost Power Development Plan (LCPDP) 2015–2035 released in October 2016, INDC 2015, Rural Electrification Master Plan, the Feed-in Tariff Policy (introduced in 2008 and revised in 2010—where wind up to 40MW only enjoys the feed in tariff), National Climate Change Action Plan (NCCAP) 2013–2017, Kenya Green Economy Strategy and Implementation Plan 2016–2030, amongst others which provide various plans to take Kenya through a low carbon development pathway through expansion of wind, hydro and geothermal, the country is lucky to already have a large supply of reliable clean energy—almost 87% of domestic power is from renewables. Even so, in practice, the Ministry of Energy in the face of drought or system losses through the distribution network may change demand projections almost at will, *vide* LCPDPs to justify the development of thermal plants as reserve power including coal.

As governments are reluctant to make the switch, the gauntlet to make this switch has been taken up by ethical organisations to divest and local NGOs through public relations drives or lawsuits. In the Highveld of South Africa where Eskom's coal stations are concentrated, everyone coughs. Health sector voices have come out in support of the abandonment of extractive, polluting, unhealthy energy sources such as coal, and the shift to clean, renewable,

healthy alternatives. It is estimated that the total quantifiable economic cost of air pollution from coal-fired generation in South Africa is in the region of $2.37 billion annually.

The Rockefeller fund in July 2016 divested from oil and gas and committed $10 million to Lekela Power to promote wind and solar projects in South Africa, Egypt, Ghana and Senegal. Further, on 27 March 2017, local climate change NGOs African Climate Reality Project and { HYPERLINK "http://www.climatenetwork.org/" \t "_blank" } collaborated on an initiative to switch Johannesburg to 100% renewable energy. Earthlife Africa successfully sued the Ministry of Environmental Affairs in March 2017 for the grant of an approval of the proposed Thabametsi coal-fired power station in Limpopo which had failed to conduct a proper climate change assessment of its impacts.

In Kenya, the Climate Change Act 2016, the first Climate Change Act in an African country, in s.23 supports such future lawsuits where citizens can sue private and public entities that frustrate efforts to reduce the impacts of climate change. It then provides lenient standards to prove liability. It is enough to prove that a corporation is not doing enough to address climate change without having to also demonstrate that a person has suffered loss or injury. The consequences of liability may be costly for corporations as Kenya's Environment and Land Court has the power to order compensation for climate victims where it deems appropriate. Compliance requirements to this law will entail further costs of operation and management that could affect returns and competitiveness.

So far, punitive climate change laws and lawsuits appear to be the solution to make such a change to low carbon development pathways in Africa. As fossil fuel companies have close relationships with regulators in Africa, a legal hook that will force polluters to pay for the harm that they cause instead of enjoying profits as usual might provide incentives for such companies to switch to low-carbon solutions. Future Renewable Energy Acts as well as Feed In Tariff Acts that further provide commercial, and not small-scale, incentives to make this switch would allow Africa to slow down most of the climate change impacts that are presently felt in the continent.

3. Future legal challenges facing the energy sector for 2018

The assessment of the *Global Future of Energy Law* in this article, will again utilise the Bloomberg New Energy Finance (BNEF) team's report and analysis from 2017. All responsibility for interpretation of the data rests with the authors of this article and is independent of the BNEF Team.

As highlighted in last year's report, decision making in the energy sector and in general in relation to the majority of the economy is based around costs, benefit, revenue, profit and availability of finance. Consequently, the BNEF report was chosen because they produce a wealth of data on their view of the future of the energy sector and importantly in an unbiased way—i.e. the focus is not to steer one towards the use of any one particular energy source. This focus on the future and quality of data are the main reasons for choosing to use their annual report—*New Energy Outlook 2017*[9]—in this analysis.

A review of the 2017 data places even more importance on the eight legal challenges that were advanced last year—see Table 1 below. Notable in the BNEF 2017 Report is the more detailed data on different regions around the world. Indeed, the following BNEF observation is significant (p.4):

[9] See Bloomberg New Energy Finance, *New Energy Outlook 2017: Long-term projections of the global energy sector*, Executive Summary (June 2017). Available at: *http://www.bloomberg.com/company/new-energy-outlook/* [Accessed 26 October 2017].

> "Although the world's power sector emissions reach a peak within a decade, the rate of decline in emissions is not nearly enough for the climate. A further $5.3 trillion investment in 3.9TW of zero-carbon capacity will be needed to place the power sector on a 2°C trajectory."

This relates to our own findings from Asia and Africa that energy law is not yet developed to place countries on a path to a low-carbon economy. Is the legal system in place to incentivise and implement a $5.3 trillion investment and in zero-carbon capacity?

Table 1: The top eight legal challenges ahead to 2040 remain in the global energy sector

Legal Challenge 1: there will continue to be a need to legislate for reducing CO_2 emissions from coal and gas.
Legal Challenge 2: legislation is needed to (1) continue to incentivise the renewables industry and (2) to ensure access for the industry to the electricity network.
Legal Challenge 3: further international cooperation on international energy law and the sharing of good energy law and best-practice regulation.
Legal Challenge 4: ensure that legal provisions are there to incentivise new electricity production to meet growth in the use of electric cars and ensure that local energy law legislates for access points for charging vehicles.
Legal Challenge 5: law should incentivise the deployment of battery technology in terms of using it in association with renewable energy.
Legal Challenge 6: governments should consider reviewing and reducing potential new legislation that incentivises new gas infrastructure—there is a danger of technology lock-in to an energy source that may be on the decline.
Legal Challenge 7: the coal industry is in decline and new energy law is needed to ensure that the industry manages its waste problem effectively in terms of on-site waste management, waste in operation of existing facilities. New international law and cooperation are also needed.
Legal Challenge 8: new energy law needed to incentivise the energy industry to investment in clean energy and to ensure that investment committed to fossil fuels switches to investment in clean energy (or low-carbon) energy sources.

What is revealing in the 2017 data are the predictions of new coal projects across the world. This surely places some of the 2040 low-carbon targets beyond reach, and calls into question the 2026 global peak coal generation statistic. Indeed the data shows that India, China, Japan and South Korea will all increase their coal production alarmingly: (1) India will add 40GWs of coal in the next five years; (2) China will peak in coal use in 2026 but at a 20% higher level than today; and (3) Japan and South Korea will commission 30GW of coal in the next decade. This highlights the fundamental importance of the first *Legal Challenge*: *there will continue to be a need to legislate for reducing CO_2 emissions from coal and gas*.

Further, it is notable that energy demand is increasing (2% per year until 2040), and despite the advances in energy efficiency in many developed nations and in technology itself, energy efficiency is not really delivering an "impact" on reducing energy demand. Overall the data from 2017 continues to demonstrate that there is a need for major energy law and policy

action. Indeed, it is clear that more concerted international effort is needed and in this context the third *Legal Challenge: further international cooperation on international energy law and the sharing of good energy law and best-practice regulation*—is vital. New legal tools such as those identified in 2016—Environmental Impact Assessments (EIAs); Social Licence to Operate (SLO) and the Energy Financial Reserve Obligation (EFRO)—need to be utilised more in practice and more legal tools need to be developed; and this will be a focus of the 2018 Report.

4. Conclusion

As the world heads towards an unknown energy future it is important to consider the legal boundaries of the energy sector. More often than not energy law has been forgotten in the debate around the energy transition and climate change scenarios that list years such as 2020, 2030, 2040, 2050 and even 2050. This article in part seeks to rectify this and differs from past energy law literature on this topic that involves an inward-outward perspective. The perspective here is outward-inward, meaning that an external view on the energy sector is taken—that is from an energy data-driven perspective and utilising energy data from the Bloomberg New Energy Finance from 2016 and 2017.

From the analysis it is clear that in Asia and Africa there are many significant legal challenges for lawyers to focus on. The focus on Asia in particular is important for energy law scholars as this is where according to the BNEF data that nearly 50% of energy investment in the world until 2040 will be in India and China—almost $4 trillion. In particular, the analysis highlights that in terms of developing low-carbon economies in Asia and Africa, energy law is not yet delivering this outcome, and it is a long way from realising this outcome; in 2018, Europe and South America will be added to our analysis.

Policy-makers need to focus on the formulation of more effective energy law rather than thinking solely of economic development and increasing investment in the energy sector. It is very clear that energy law formulation is not yet going to deliver the outcomes needed for a transition to a low-carbon economy and nor is current energy law delivering "just" outcomes. As different research groups, national governments and international institutions focus on 2040 energy sector targets or 2050 targets etc, it is clear that the role of law in their analysis has received a critically low amount of attention.