Fuelling the future
Energy outlook for Asia-Pacific
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Foreword

The global energy sector’s sheer scale, complex geo-politics and technology, and the value and long-term nature of investments require the industry to respond cautiously to change. The key is framing change in the context of one vitally important objective: to establish and secure an affordable energy supply to customers.

This may be easier said than done. The industry continues to respond in the short term to dramatic shifts, in both commodity prices and supply and demand, as well as changes in political sentiment, technology and the climate, among other external influences.

As a global legal practice focused on the world’s energy supply chain, we wanted to ask key Asia-Pacific based players in the sector what concerned them most about the direction the industry was heading. For example, what impact will these influences have on the region’s fuel mix? What investment activity will they drive? And what are the key impediments? To do so, we teamed up with Mergermarket to conduct a broad survey of 100 energy market participants, gauging their sentiment and using qualitative and quantitative feedback to compile this report.

The findings establish an important framework for policy and investment guidance. Among the biggest pressure points are:

- **Technology**: this will play a key, even disruptive, role in the transition to a lower carbon and more energy efficient environment. In that context, governments should support technologies’ transition to commercialisation but not look to pick “winners”.

- **A changing fuel mix**: while traditional fossil fuels will continue to play an important role in the region’s fuel mix in the shorter term – and certainly for longer than in more developed markets in Europe – those fuels are increasingly likely to be displaced by lower emissions fuel sources.

- **Reducing complex regulation**: governments need to resist the urge to over-regulate the industry in ways that would create obstacles to investment. The focus should be on simplification and harmonisation of regulatory structures where possible. With increased global competition for investment dollars, failure to do so could hinder the flow of capital and weaken energy security.

It is interesting to note the interdependency of the industry, geographically through the energy supply chain and also in framing its future. Governments will need to continue to work together to drive a global or at least regional approach to both energy security and climate issues.

It is a vibrant and exciting time for the industry and the region. The big investments made in coming years could help transform the energy landscape for Asia-Pacific.
Global demand, global opportunities

The multi-trillion dollar question

The ongoing conversation in energy markets around the world, whether at a global level or locally and in both developed and emerging markets, continues to be grounded in the need for energy security at an affordable price.

More recently, the conversation is also framed in the context of additional community expectations, notably environmental and carbon emissions concerns. This is a difficult balance for governments. Some governments in the region have struggled with the pricing of fuel itself – take for example Indonesia’s reduction in petrol and diesel subsidies – while others have struggled to balance community carbon and environmental expectations, such as the Australian government’s retreat from an emissions trading scheme and the debate over its renewable energy target. The joint announcement by the US and China setting ambitious targets to cut pollution and cap or reduce carbon emissions is a very clear example of the new context.

Over the last decade or more, there has been enormous investment in all segments of the energy supply chain and in various fuel sources (Figure 1). Significant investment is currently being made into areas as diverse as the development of new techniques for the exploration and extraction of fossil fuels, infrastructure needed to get these resources to market and technological innovation in renewable energy and energy efficiency measures.

‘The energy industry has changed considerably over the past decade, becoming more diverse and more complex. There’s certainly enough interest within each energy segment, however developing these projects is going to come down to filling the growing funding gap.’

Director of investments at a Japanese investment bank

Figure 1: Investment in global energy supply

Future investment is even more dramatic – some estimates showing US$53tr over the next three decades as emerging markets become larger energy consumers. Developing a clear picture of where the global energy industry is headed is increasingly important.¹

Traditional energy sources will continue to be important in the shorter term, but changes in energy pricing, public attitudes on energy use and, in the absence of commercialised technological solutions, emissions from the more carbon intensive fossil fuels such as coal and oil products are driving a gradual change in the global fuel mix.

Energy developments around the world

At a global level, respondents have suggested that gas-fired plants will be the prevailing source of new power generation within the next decade in Europe, North America and North Asia. However, coal-fired plants will continue to dominate the electricity supply in Central and Southeast Asia, Africa and Australia. This is consistent with both the focus on carbon emissions in Europe and increasingly in North Asia, the dramatic increase in the supply of gas in the United States, and the abundant supply and lower costs of coal in Southeast Asia, Africa and Australia.

In the oil and gas sector, respondents expect expansion and construction of regasification and processing plants in Europe and North Asia, and upstream exploration, LNG liquefaction plants, ports and processing facilities in North America, Australia and Southeast Asia. This is consistent with the distinction between the location of buyers and sellers of gas. Energy storage is a theme globally.

Respondents have also identified that additional pipelines and other energy infrastructure will be needed to transport oil and gas from their source to processing facilities and customers. Respondents noted this trend as it relates to various sub-regions in Asia-Pacific. For example, major gas transmission pipelines have and will continue to be built to move gas from Russia and other parts of Central Asia to China to transport the enormous quantities of gas to be sold to China over the next 30 years. In Southeast Asia, the conversation involves talk of an integrated energy network that would have incredible benefits for the sub-region, especially with the opening of the ASEAN Economic Community in 2015. Australia, in addition to the planned privatisation of its energy infrastructure, will see more investment in upgrading and expanding infrastructure to boost energy exports.

Respondents also agreed that there were significant investment opportunities in the renewables sector. Top sub-sectors included hydropower, wind and solar, presumably as the three most established technologies, are most likely to see growth in the two-year investment period.

Asia’s energy future

Shaking up the fuel mix

The demand for energy in Asia-Pacific is growing rapidly. Already, the region accounts for about a third of global energy consumption. At current growth rates this will increase to more than half of global energy consumption within the next 20 years.² This period will also see increasing use of a variety of fuel sources (Figure 2).

Aside from the strains this will place on the global energy market, governments in the region are also wrestling with the impact this will have on local energy markets (including fuel and energy prices and calls for domestic reservation of gas) and the potential increase in pollution levels and carbon emissions.

It is clear from the views of respondents that addressing Asia-Pacific’s energy needs will require a multifaceted approach, one that accepts the ongoing role of fossil fuels, albeit reweighting their use, but which materially expands alternative sources of energy and seeks to focus on energy efficiency and curtailed carbon emissions. Deploying new technologies to make existing conventional power cleaner, more efficient and more affordable will bolster this trend. Streamlining the regulatory burden and addressing regional integration of energy markets, supply chains and infrastructure will also be important.

Accomplishing a shift of this nature will include a significant shakeup of the current fuel mix, a process that, as recognised by respondents, is not easy, cheap or quick. It will take decades to make this transition and an enormous amount of capital.

From fossil fuel to renewables

At present, coal remains the dominant fuel for power generation across the region, particularly in China, India, Australia and ASEAN. Oil has seen the widest use in the transport sector. Both are cheap sources of energy, with abundant supply and long-tested technology. Carbon emission and other environmental concerns may challenge their future dominance in Asia-Pacific, but respondents maintain the view that both oil and coal will continue to have significant growth potential in the next five and even ten years (Figure 3).

Whether gas is the interim stage in a progression from oil and coal to renewable energy or simply another permanent player in the fuel mix will, in our view, depend on the relative pricing between coal, oil, gas and the various renewable sources. Principally driven by supply and demand for each of those commodities, future demand for the specific fuels will also be influenced by the pricing of carbon in relevant jurisdictions and other government-led initiatives and fundamentally changed by technology such as the development of hydraulic fracturing, solar or geothermal technology.

Supply of those fuels, at least those that are part of a global fuel market, will be driven not only by the availability of the relevant resources but also by the actions and support of governments.

The long-term view according to respondents is that oil, and to a larger extent coal, will not be as dominant in the future as they are today (Figure 3). That is not to say they will cease to be important. Given its low cost, coal will continue to see broad use in countries such as Indonesia, Vietnam and other emerging and frontier markets in ASEAN, where economic growth trumps environmental concerns, at least for now. However, with changes in government policy resulting from demands of the international community to act on carbon emissions, Asia-Pacific will likely follow established trends in North America and Europe over time: a natural progression to more carbon efficient forms of energy.

Shale gas will also play an important role in the 20-year outlook as innovative technologies unlock new extraction methods and raise efficiency. While a shale gas revolution
‘Investments in many countries in Asia-Pacific will continue to lean heavily on conventional energy and traditional fuel sources until costs of cleaner energy become more reasonable. This will happen as new technologies are developed and applied.’

*Singapore-based private equity investor*

In Asia-Pacific, with India and China likely to play leading roles, holds increasing potential, developments have been slower than in North America over the past decade. If a similar boom in shale gas is to be sparked, respondents note the significant investment that will be needed to boost initial momentum and maintain extraction operations going forward.

Despite the concerns arising following the Fukushima disaster in 2011 and greater uncertainty in Europe, respondents are of the view that nuclear power will play its part in Asia’s energy story. While the five-year outlook shows limited potential, over the next two decades nuclear power is likely to become an important source of energy in the region. Respondents emphasised that China, South Korea and India already have established nuclear energy programmes, all of which are expected to expand in coming decades. Respondents also commented, though, that Japan will continue to wrestle with any expansion of nuclear power for some time, as it focuses on coal, gas and renewables.

For renewable energy, as new technology and applications are rolled out, the potential energy security benefits are becoming more apparent. Breaking the current reliance on fossil fuels would not only have profound impacts on environmental improvements and access to electricity for expanding populations but also reduce reliance of energy importing countries on the global energy supply chain.

The respondents anticipate a wider use of solar and, to a lesser degree, wind power and greater opportunities for geothermal power, a response we believe will be significant in the relatively large number of seismically active nations in the region. For example, in Indonesia the first major geothermal plant is now under construction, and other countries, such as Japan and the Philippines where the resource has not yet been exploited on any significant scale, are likely to follow.

Achieving this, as noted by respondents, will take two measures: significant increases in investment and greater flexibility in government regulation. It will also require governments to be willing and able to explain the importance of these initiatives to their constituents.
Issues facing the industry

A series of external factors make Asia-Pacific’s energy industry particularly susceptible to shocks and volatility. Geo-political events such as those affecting the supply of gas to Europe continue to cause unease, while global macro-economic conditions create uncertainty. However, the most pressing issue facing the industry, by respondent expectations, was the often complex regulatory environment in countries across Asia-Pacific. Close to 35% of respondents said regulatory changes would be either the most critical or second-most critical issue facing the energy industry in the next 18 months (Figure 4).

Concerns over regulations are being driven by changes to energy policy, such as the ongoing debate in Australia around carbon emissions and the Renewable Energy Target, enhanced environmental liability both from stricter laws and major litigation (see for example the liability arising from the 2010 Gulf of Mexico spill) and permitted levels of foreign ownership, such as changes in Indonesia around resource ownership and local processing. Changes in import tariff regimes, like the recent imposition of import tariffs for thermal coal into China, and changes to occupational health and safety laws around the region, are also considerations.

In our view, these concerns are unlikely to abate any time soon. For example, as governments respond to communities that are becoming more conscious of the environmental impact of urbanisation, industrialisation, resource extraction and power generation, “energy firms will struggle to gain cost control as they face political pressure to limit their impact on the local ecology and reduce byproducts, such as pollution and other waste,” as stated by a US-based private equity investor. China’s response to air quality issues, whether by promoting renewables, encouraging the development of gas-fired power or the imposition of tariffs on imported coal (as well as energy efficiency measures), will have a direct impact on the future fuel mix there and directly affect competition for LNG. This trend is also likely to unfold in other emerging markets as economic development allows and demands those markets to move toward cleaner, more efficient sources of energy.

Interestingly, availability of finance was ranked of least concern. This issue is discussed in our feature “Financing the future of energy and the role of global capital” which explores the financing environment in Asia-Pacific.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Percentage of Respondents</th>
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<tbody>
<tr>
<td>Regulatory change</td>
<td>21% (Most critical)</td>
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<tr>
<td>Global macro-economic conditions</td>
<td>14% (Second most critical)</td>
</tr>
<tr>
<td>Geo-political events</td>
<td>10% (Most critical)</td>
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<tr>
<td>Rising costs of energy</td>
<td>10% (Second most critical)</td>
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<tr>
<td>Climate change</td>
<td>11% (Most critical)</td>
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<tr>
<td>Conflicting legal systems</td>
<td>8% (Second most critical)</td>
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<tr>
<td>Investment in infrastructure</td>
<td>6% (Most critical)</td>
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<tr>
<td>Cost controls</td>
<td>4% (Second most critical)</td>
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<tr>
<td>Keeping up to date on developments within the industry</td>
<td>5% (Most critical)</td>
</tr>
<tr>
<td>Availability of finance</td>
<td>2% (Second most critical)</td>
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A discussion on energy security in Asia-Pacific

As energy demand grows in line with economic growth, meeting Asia-Pacific’s energy needs has become one of the greater imperatives on national agendas across the region. To maintain these growth trajectories, governments are taking various approaches to securing and diversifying their fuel mixes while exploring alternatives to conventional sources of power. Norton Rose Fulbright’s Vincent Dwyer, Head of Energy for Asia-Pacific, Michael Joyce, a partner in the Sydney office, and Ben Smith, a partner in the Hong Kong office, explore trends in Asia’s energy sector and the future of energy security.
Where is the fuel mix going and what are the drivers? Specifically, how are economic and demographic changes affecting energy demand in Asia-Pacific?

VINCENT Dwyer: Rapid urbanisation and a major shift in socio-economic demographics as a larger percentage of Asia-Pacific’s population joins the middle class will be the drivers of energy demand in the decades to come. The questions that immediately arise are: Who’s going to supply it, where is it going to come from geographically, and how secure is the supply? And we also have to consider energy demand from a government and policy perspective.

Historically, there were two key criteria that policymakers would consider: energy security and energy efficiency (effectively the price of energy per unit of output). Energy pricing will always be a principal driver, and the swings in commodity (and delivery) prices, including coal, oil, oil-linked gas prices, and Henry Hub gas will be an important influence on the fuel mix in the region. But over the past decade, with increasing clarity from the United Nations through the Intergovernmental Panel on Climate Change, the carbon emissions and other environmental implications associated with each fuel source have become far more relevant, becoming the third limb in that decision making process. How relevant differs across the region, with local emphasis on carbon emissions aligning broadly with the level of economic development within each market and access to domestic supplies of fuel, principally coal. As acceptance of the carbon imperative moves forward in each country in the region, the fuel mix in those countries will change. We see that already with the expansion of LNG supply and the significant investment in renewables, evidenced also by recent announcements on carbon emissions by the Presidents of China and the US.

MICHAEL JOYCE: Diversifying the fuel mix will play a large part of energy security across Asia-Pacific, and as growing populations demand more energy and a better quality of life, this is going to put financial pressure on policymakers to meet these needs. Currently, governments realise they can’t rely on one type of fuel or one geographical source of fuel. As part of this we’re seeing a transition away from the total dominance of coal and traditional fossil fuels to wider use of gas and nuclear power.

Gas has taken up a large position as a transitional fuel source as governments across the region consider the costs of carbon and pollution. By 2030, there’s going to be a 2.5 times increase in demand for natural gas. For LNG, over 70% of global demand will come from Asia.

BEN SMITH: LNG is indeed on the agenda for many countries across the region. Aside from more established consumers of LNG, such as Japan and Korea, we’re seeing interest in places like the Philippines, Vietnam, and Bangladesh, where LNG may push out use of naptha and other high priced oil products from specific uses of energy. In Indonesia and Malaysia, consumption of significant amounts of their indigenous supplies will see a shift from LNG being simply exported to being used to transport gas within those countries and as a way of importing energy as they look to continue to use existing gas-fired power generation infrastructure.

The installation of gas transmission and distribution networks is expensive for countries that do not already have them. Small scale LNG and compressed natural gas technologies may in time enable LNG to be used instead of pipeline networks but for the moment LNG liquefaction, LNG ship building and the establishment of downstream infrastructure all come with hefty price tags, giving the industry
incumbents a significant advantage over new entrants.

Creating a sustainable future around renewables seems to be the direction many governments in Asia-Pacific are taking. How will they get there?

VINCENT DWYER: Sustainability is the desired outcome, but it doesn’t just involve renewables. The real question is how do you meet energy demand in a low carbon environment? Technological development and commercialisation, around renewables or otherwise, is a key part of the answer, although what technologies will prevail is too difficult to call.

Already, technology has been a “game changer” in the energy space. Look at the shale gas industry in North America. The technology used in hydraulic fracturing helped open new extraction techniques that have drastically reshaped the energy market there, affecting exploration and production and global prices – even geopolitics.

So what will be the game changers in Asia? Well, it will be a mix of things. On the demand side it is all about energy efficiency. On the supply side, there’s certainly significant opportunity with the known and still developing technologies in wind and solar. There are also very significant possibilities around energy storage technology, advanced grid networks, advances on ultra-supercritical coal, carbon capture and storage, enhanced oil recovery and subsea technologies, just to name a few. All these technologies and their application have to be viewed with a long-term investment horizon. The key is which of these alone or collectively will deliver, to go back to the first question raised, first energy security and then the lowest cost of delivered energy to the customer in a carbon constrained environment.

Is Asia-Pacific positioned to be a leader in clean tech? What countries have the greatest investment potential in renewable energy?

VINCENT DWYER: The desire to innovate in renewable sources is certainly there, however, it is still a risky business. If you want to participate, you have to look at the innovations and changes in the solar industry in China and in some of the research centres like Australia and Singapore. Commercialisation is the really hard part, and that depends on the strength of management experience in the region as well as the support provided, whether through grant structures, regulatory support, or otherwise. Based on the US experience, the emergence of a deeper venture capital/private equity market in Asia-Pacific can help to significantly accelerate regional innovation.

BEN SMITH: The scope for China, with its centrally planned economy, to be able to decide that it will become the leader in clean tech and to introduce policies to achieve that offers an extraordinary opportunity. If, for instance the authorities in Beijing only allowed electric vehicles on the streets at times of high air pollution rather than the current restrictions on vehicles with odd- or even-numbered license registration plates, this would provide huge stimulus to electric vehicle manufacturers, which could translate into a market leading position in the global race for cleaner transportation. Whether there is necessarily an opportunity for foreign investment is not clear at the moment: Chinese shale gas developments show that there are a number of issues that need to be worked through before foreign investors move in in a significant manner.

Japan also presents opportunities and has been a prime destination given the business environment and standards. Government
support for these projects has been strong in recent years as Japan continues to manage the future role of its nuclear power stations. Southeast Asia will also continue to see reasonable renewable support.

**What are some of the risks to investing in energy – be it natural resource projects or related infrastructure – in Asia-Pacific?**

**MICHAEL JOYCE:** Policy certainty stands as one of the greater concerns among investors. As markets evolve, government positions are changing as some embrace clean energy and move away from traditional fuel sources. In ASEAN, handling energy security has led to the possibility of integrating pipelines and energy infrastructure across the region.

For renewable energy, the key risk is sustained government support. As policymakers face other pressures, this support has become unpredictable and unsustainable. Technology and application costs need to come down before we’re likely to see large scale support again.

Energy nationalism also poses a major risk given the rising tension between open markets and nationalistic sentiment across the region. In Indonesia, where resources are a sensitive issue, policy has required higher levels of domestic ownership in resource projects.

In Myanmar, the market is opening so we’re seeing the opposite of resource nationalism as policymakers try to encourage foreign investors to help develop the domestic energy space. However, with time we could see a change in attitudes in policy, through taxes perhaps, as they try to ensure that a larger portion of offtake or production flows back into the domestic economy.

‘Sustainability is the desired outcome, but it doesn’t just involve renewables. The real question is how do you meet energy demand in a low carbon environment?’

*Vincent Dwyer, Head of Energy for Asia-Pacific*

**What does the future hold for Asian national oil companies?**

**BEN SMITH:** Over the last seven years, we’ve seen a lot of the US majors retreating from Asia-Pacific, and a large part of that has happened because they have better options with shale gas in North America. As they leave, they’re selling off interests in many of their oil and gas investments across the region.

With these asset sales, we’re seeing the local oil companies stepping in to take over these interests and develop much bigger positions in the market. In the future, we’re going to see more of this especially from Chinese, Indian, Indonesian, Singaporean, and Malaysian companies in the exploration and production industry.

We are also seeing private equity and sovereign wealth funds entering the market. The demand for large asset deals from the Chinese and other NOCs will provide an interesting exit strategy for private equity firms whose investment vehicles have acquired material portfolios of assets. Sovereign wealth funds, like Temasek, are also buying assets, but we would expect the strategy to have longer term objectives.
Low-carbon technologies and energy innovation

Transforming the fuel mix

Technological development will play an enormously important, even disruptive, role in reshaping the region’s energy sector. Even today, the options emerging are dramatic, from carbon capture and storage and enhanced oil recovery technologies through to energy storage, smart grids and more efficient renewables. More general energy efficiency technologies, such as LED street lighting, will also have a material impact on the demand side.

While government programmes have financed these projects in the past, leaping the next generation of technological hurdles will either require a pricing advantage over existing technology or significant alternate sources of funding as policymakers scale back incentives and support.

This has become a pressing issue across the energy industry, especially as large investments will be needed to scale-up low-carbon technology and raise their commercial viability. Under the IEA’s 450 Scenario, a climate change mitigation plan to reduce carbon emissions, large capital commitments will be needed to reach climate targets. At current investment rates and emission levels, investment across a range of technologies, noticeably energy efficiency technologies, will need to double by 2020, with a six-fold increase in cumulative funding needed by 2035 (Figure 5).

Respondents have suggested that the large funding gap needed to attain greater low-carbon energy use will see investment flows remain focussed on more traditional fuel sources, such as oil and gas, at least in the short term. At present, respondent preferences for technologies likely to see investment in the year ahead favoured those necessary to tap oil and gas reserves (Figure 6). Indeed, advances in oil and gas will see wider deployment of new exploration and extraction procedures, allowing the exploitation of stranded resources, for example those in the waters around Indonesia as well as China’s massive yet difficult-to-access shale gas reserves.

As the search for resources pushes up exploration and production costs, respondents said enhanced oil recovery methods would be most likely to see the strongest investment. This was followed by advanced subsea technologies and unconventional extraction methods.

According to these respondents, applying these technologies is becoming increasingly necessary as oil companies try to raise productivity. This is especially true of national oil companies across Asia-Pacific that are stepping up operations and their presence in the region, both tasks that will require them to maintain a competitive edge over international energy companies.

While respondents emphasised investment in advances geared toward oil and gas, qualitative feedback showed similar support for significant technological development in the power and distribution sectors as well as energy efficiency technologies. Reshaping the load curve and “shaving the peak” technologies, such as energy storage,
and distributed generation, to name a few, will significantly impact traditional generators and network businesses, particularly those exposed to short-term market pricing of electricity or gas.

Clearly, investment opportunities will be significant.

It is also interesting to see respondents’ views on the most effective means of reducing carbon emissions in the economy (Figure 7). The emerging technology of carbon capture and storage (carbon sequestration) was positively viewed, although either imposition of a carbon tax or a cap and trade scheme are considered the most important policy frameworks to achieve a mandated carbon outcome.
Considerations for M&A

Rather than developing these energy technologies through internal, and often costly, R&D programmes, respondents anticipate the world’s energy companies and investors to transform their balance sheets and add new, innovative departments to their supply chains and operations through mergers and acquisitions (M&A). Indeed, as economic conditions improve and energy corporations become more willing to use cash to grow through acquisitions, almost nine out of ten respondents anticipate an increase in energy M&A over the next 12 months (Figure 8). These expectations follow global and regional M&A activity that has seen deals in the energy sector gradually increase in recent years (Figure 9).

Deals to acquire alternative energy companies will be a main feature of future activity, especially as innovation and development create attractive targets for investment. Since 2012, alternative energy deals have accounted for one in five energy transactions globally. In Asia-Pacific, similar activity accounted for one in three deals (Figure 10).

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4 The term “alternative energy” refers to companies that produce energy from sources other than traditional fossil fuels. Examples include solar, wind, hydro, and nuclear energy.
Addressing investment in renewable energy, the director of M&A at an American energy corporation said that modernisation of new methods of generating power – from harvesting solar energy to harnessing hydro power – would drive activity. This will happen as medium-sized corporations consolidate and as international energy companies begin to shift into clean tech. Other respondents argued that only higher levels of investment and more rigorous R&D would yield any substantial progress.

Respondents also said M&A would be used to acquire resource reserves and oil fields, moves that helped boost deal values for the oil and gas sub-sector, which accounted for 50% of transaction values. For energy companies based in Asia-Pacific, recent years have seen China’s national oil giants venturing abroad to secure oil fields, including China National Petroleum Corporation’s US$5bn acquisition in 2013 of a stake in the Kashagan oilfield, located in Kazakhstan. In Japan, trading houses have made a number of significant investments into North American shale gas and LNG as they explore new sources for flexible and stable energy supply.

Acquisitions and development of energy infrastructure, such as pipelines, needed to access, recover and transport these reserves are thought to be another area likely to see significant activity, particularly as some of the large international oil companies look to release capital from their balance sheet. Privatisation of energy infrastructure, such as transmission and distribution networks in various States in Australia, will also drive deal volumes. Deals involving power generation and transmission accounted for approximately 38% of energy deals over the past three years.

Figure 10: Asia-Pacific energy M&A by sub-sector (2012-Q3 2014)

* Represents percent of deal value for M&A investment in Asia-Pacific.
** Represents percent of deal volume for M&A investment in Asia-Pacific.

Source: Mergermarket
Regulatory concerns

Barriers to entry

Investing in energy and resources remains a heavily regulated process. Three in four respondents said regulatory issues would likely be a significant impediment to companies looking to conduct energy deals, either through M&A or project development in Asia-Pacific (Figure 11).

Government scrutiny over these investments is heavily influenced by national security and resource sovereignty concerns. This is particularly true when a foreign investor is involved. Another often-cited reason for regulatory barriers was increased environmental concerns in the region, either through a desire to protect natural landscapes or to curb carbon emissions.

Recent decisions in the US, for example around the Deepwater Horizon oil spill in the Gulf of Mexico in 2010, have caused energy companies to look again at their environmental liability, particularly where their assets are being operated by a third party. Governments have also introduced increased liability, some strict liability, for those scenarios.

“Considering the recent emphasis on combating pollution and the sometimes negative impact the energy sector can have on the environment, regulatory issues will continue to be a burden on corporations and investors in the industry,” said the head of finance at an Indian energy corporation.

‘The effect of regulation on the energy industry in Asia-Pacific will be a governing theme in the short- and long-term outlook.’

US-based private equity investor

Figure 11: Do you believe regulatory issues are likely to be a significant impediment to energy deals (M&A or new project development) in Asia-Pacific in the next 12 months?

35% of respondents said regulatory change was the most or second-most pressing issue facing the industry, as cited in Figure 4
Resource regulation: Oil and gas

Regulation in the oil and gas industry in India and China is expected to create the greatest impediments to investment in those countries (Figure 12). In general, respondents noted that both the Chinese and Indian regulatory environments add significant complexity to foreign investment due to a number of barriers and limits on foreign investors.

While some parts of the Indian oil and gas market remain dominated by state-owned companies, a gradual reduction in government stakes in these companies is encouraging a more open and competitive market. Although major state-owned companies retain a strong degree of control over the sector, there has been some increased liberalisation in this subsector in an effort to attract private investment. In contrast, the coal sector remains difficult for private investment.

In China, complex structures in the traditionally SOE-dominated oil and gas sector have limited investment by private investors. Foreign investors in China typically undergo careful government scrutiny and require a local partner, which when teamed with a complex approvals process and restrictions on how production is sold can create uncertainty. Changes in the industry are unfolding, albeit slowly, as several of the power companies are themselves directly seeking offshore investment and foreign investors engage (through joint ventures) in China’s shale gas industry, despite setbacks in exploration and extraction.

Singapore’s small scale but heavy reliance on fossil fuels means there is considerable government involvement within the oil and gas sector to ensure energy needs and power generation targets are met. Conversely, the city-state also was ranked as having the least impediments to investment, due to established business practices, regulatory regimes and overall transparency. Singapore’s strategy of ensuring security of supply by establishing itself as an oil trading and refining hub has now been replicated with its LNG terminal, a good example of using trade to achieve geo-political security.
Resource regulation: Power and renewable energy

Countries such as Pakistan, India and Bangladesh topped the list of respondent expectations as having the highest impediments for investment in power generation and renewable energy projects (Figure 13). While investing in the power sector, including in new geothermal and conventional power, remains reasonably attractive, high barriers to entry in the energy infrastructure sector limit the opportunities available. Respondents also felt that access to the local market remains difficult in China.

Lower impediments were seen in Singapore, Japan and India, especially in relation to renewable energy projects. In Japan, the government “realises the importance of renewable energy and is taking measures to increase its use and applicability. Regulatory barriers are being lowered and taxes have been reduced so that renewable energy becomes an attractive proposition for investors,” said the partner at a Japanese private equity firm.

The managing director of a Singapore-based private equity firm echoed these remarks. “Renewable energy is the next big market and is becoming a core component of national energy agendas as governments strive to meet increasing energy requirements. I think we’re going to see regulations begin to ease in the coming years to encourage investment in renewables” the managing director said.

In power generation across ASEAN, there is also evidence of a move towards a liberalisation of energy markets. Progress towards a free and open investment energy market can be seen to varying degrees. Singapore’s open energy investment market demonstrates what can be achieved following the sale of state energy assets; in Vietnam, measures to create a more competitive power market and to re-balance the dominance of the state owned companies in the power sector are under consideration, while Cambodia, Laos, Vietnam and Myanmar are all at an earlier stage of development.

Figure 13: How significant an impediment to investment in the power and renewable sector is the regulatory environment in the following countries (top 6)?

1 (low impediment) 2 3 4 5 (high impediment)

Pakistan

India

Bangladesh

China

Vietnam

Thailand

Resource regulation: Power and renewable energy

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Investment expectations

Funding for new projects

Favourable conditions for securing financing present a promising outlook for investment in energy deals, a point where most respondents remain enthusiastic. A US-based investment banker reinforces this view, saying “the financial climate across the region is improving and we can therefore release more capital into the market while simultaneously helping businesses increase their capacity. In turn, this will allow them to increase their performance.” As noted previously in Figure 4 on page 11, the availability of financing was the least likely issue facing energy investments in Asia-Pacific based on a short-term outlook.

Indeed, this availability of financing in tandem with relatively stable economic conditions and growing demand for resources have made it an attractive proposition to pursue new projects across the region. Noting these positive developments, close to nine out of 10 respondents said new projects would be part of their investment strategy going forward (Figure 14).

Aside from capital injections into alternative energy initiatives, respondents also pointed to infrastructure as an area having significant investment opportunity. While such infrastructure is already sufficient in several countries, advances in technology and a transition to smart grids means older networks will require extensive upgrades. As the director of finance at an Australian energy company says “higher consumption in the region will strain existing networks, requiring ‘smart technology’ to be deployed across the region.” The privatisation of government owned infrastructure assets in Australia will also drive significant transaction flow in 2015.

Finance structures

Not surprisingly in the context of greenfield assets, close to half of respondents said project finance would be the primary source of funding for their energy related M&A or new project development in the next two years (Figure 15). The large scale nature of energy projects and level of investment required often call for multiple funding sponsors, making project finance the logical choice.

“Through project finance we can set up a separate legal entity so that project risk can be mitigated and allocated to the parties...
that can best control, understand and manage the risks involved. Also project finance allows tax benefits to be allocated to entities that can make better use of them, which is very important for us,” said the vice president of finance at an Indian energy corporation.

A private equity investor from Hong Kong noted that project finance was preferable as it helped maximise returns, reduce liabilities and monetise tax financing opportunities. “Project financing helps in mitigating risks for us. We have some large scale projects in progress and when financing these projects, project finance was the most feasible option in raising capital,” the investor said.

Smaller scale projects, as respondents note, can usually be funded through corporate finance or with cash from the balance sheet. These approaches provided greater control over the projects and growth strategy.

One in three respondents said these two funding methods would be used to finance their energy projects in the next 12 months.

Despite these results, we would expect the Export Credit Agencies and Development Finance Institutions (such as the World Bank, the Asian Development Bank and in time the newly announced and Chinese-sponsored Asian Infrastructure Bank), including in particular those from North Asia, to continue to play a significant role in the financing of new energy projects in the region. They have been crucial to the recent financing of major energy projects and will continue to bring liquidity and tenor to the market.

Figure 16: Which sectors will the following investor groups focus on in the next 12 months (top three sectors for each group)?

<table>
<thead>
<tr>
<th>Sector</th>
<th>State-owned enterprise</th>
<th>National oil companies</th>
<th>International oil companies</th>
<th>Industry corporates</th>
<th>Sovereign, pension, and superannuation funds</th>
<th>Private equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coal seam gas</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shale gas</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conventional gas</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diesel</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
<td>Oil</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
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<tr>
<td>Nuclear</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solar</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
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</tr>
<tr>
<td>Geothermal</td>
<td>✓</td>
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<td></td>
<td>✓</td>
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</tbody>
</table>
Investor groups

Somewhat unsurprisingly, Asia’s energy sector continues to be dominated by state-owned enterprises and international energy companies. In our analysis, respondents noted that the oil and gas industry would usually see engagement in energy deals from either national oil companies based in Asia or international oil corporations (Figure 16). These corporations have the financial resources, and perhaps more importantly the expertise and experience, necessary to fund, manage and navigate the complexities of energy projects and vast power networks, respondents noted.

As national oil companies across the region come under pressure from their governments to maximise production, these companies are increasingly turning to private investors and their affiliated start-ups to assist with resource exploration and extraction. This was the case with US-based private equity firm Blackstone and its startup Tamarind Energy, which was recently approached by national oil companies in Southeast Asia to enter into partnerships to help tap previously exploited oil fields.

In recent years, as international oil companies began offloading oil and gas assets across the region, private equity investors and specialist funds have acquired a variety of assets, with deal values completing an upward trajectory since 2012 (Figure 17). These transactions have centred around US-based oil companies divesting assets in Southeast Asia, a trend that is likely to continue as these companies sell overseas assets to focus on developing their shale gas operations in the domestic market.

In the year ahead, respondents expect private equity firms to focus on investment into clean energy, including geothermal, wind and solar power. These expectations run counter to a trend earlier in 2014, when private equity firms began a massive retreat from the over-hyped renewable energy sector when expected returns failed to materialise. However, as deal figures show, investment in renewable energy has remained strong in terms of buyouts over the past two years (Figure 18). Fundraising for specialist funds could see a rebound later this year, although funds are likely to target more developed markets than emerging markets and potentially invest in more familiar territory within the energy space.
Capital for energy projects in Asia-Pacific can be found in a variety of investors and lender groups. However, unlike Europe or North America, the diversity of the Asian market means securing financing can be challenging, requiring a creative approach for potential investors. Norton Rose Fulbright’s Simon Currie, Global Head of Energy, Stephen Begley, a partner with the Singapore office, and Chris Redden, a partner with the Sydney office, discuss the financing environment in Asia-Pacific.
How are energy deals and investments being financed in Asia, and what options are available?

STEPHEN BEGLEY: I think Asia is slightly behind the curve in terms of financing options. The region very much continues to be dependent on debt-based funding. This may be partly because local banks haven’t faced some of the liquidity issues that you have seen elsewhere. What we are seeing at the moment is local banks who even five years ago were not taking participation in loans are now arranging loans of very sizeable tickets.

SIMON CURRIE: There’s a fundamental change going on globally. In the US and Canada we have seen long-dated financing being provided by the pension funds and life insurance companies. This type of funding is now being seen in other markets, including Asia. It is being driven by a combination of factors, including the chase for yield because of the historically low returns from government and corporate bonds and better understanding of the risk profile of the energy sector. In Asia this helps widen the pool of funding available for energy projects and complements the very active commercial bank market and equity and debt capital markets.

CHRIS REDDEN: It really depends on what the project is and what stage it is at. There’s going to be a marked difference depending on whether the project is at a development stage or operation/production stage. If you’ve got a greenfield development of an energy project, then your financing options are more limited. As opposed to other global markets, the lack of a strong project bond market in Asia at present limits the financing options. However, as investors in project bonds from outside Asia chase returns and see opportunities in Asia this may change and open the door to a deep source of liquidity for funding Asian energy projects. At present, for greenfield energy projects, the options are pretty much limited to traditional bank debt and ECA/DFI finance. Once you are past the completion stage and have had a solid operating/producing period then the funding sources open up considerably, although debt based funding remains the main source of funding at present.

What are the impediments to the full range of those funding sources that are now available in Asia-Pacific?

SIMON CURRIE: Australia has been the most active market in terms of accessing innovative financing for energy (and infrastructure) projects but this hasn’t yet been replicated across the region. I believe that Japan is now starting to look at more active management of deposits and institutions are looking to provide equity and debt funding for energy projects.

Malaysia and Thailand are two of the markets where we are seeing a lot of innovation. There are significant levels of local liquidity and they have very strong banks like Siam Commercial Bank in Thailand and CIMB in Malaysia. In Malaysia we have seen multi-billion dollar energy projects financed by sukuks, one of the most popular Islamic finance structures. This opens up another financing route for sponsors and allows them to tap into the appetite from local investors for Islami-compliant funding. A recent example is the financing of the 3B IPP in Malaysia, where the sponsors are 1MHD and Mitsui.

In other markets like Indonesia and the Philippines we are seeing higher levels of local liquidity on the equity and debt side but often debt tenors are shorter than is preferable when financing assets like power plants. This often pushes sponsors to look at ECA-supported financing where long tenors may be available.

CHRIS REDDEN: When it comes to Asia-Pacific, you have to keep in mind the degree of diversity across the region. There are different regulatory regimes, different laws, 

‘I’m a great believer that PPP creates discipline around cost control and risk allocation; if you move to a traditional public sector procurement model you often lose this discipline.’

Simon Currie, Global Head of Energy
different cultural aspects and different political systems. A lot of it comes down to the risk appetite of capital providers and perhaps their understanding of and comfort with the different jurisdictional issues.

It is generally the perceived risk allocated to a particular project, sponsor or jurisdiction that may prevent alternative sources of capital outside of the traditional funding sources being available to fund energy projects and investments in Asia-Pacific. Having said that, we are now seeing different sources of capital funding a range of energy deals and investments across the region including private equity, sukuk and strong domestic banks. This can only be positive for the future funding needs in the Asian energy sector.

**How is project financing being used in Asia-Pacific? What about public private partnerships (PPP) – and what are the related challenges?**

**STEPHEN BEGLEY:** Project finance is being used in a fairly traditional manner across the energy sector in Asia. However, in recent years there have been a few stand-out developments:

There are a number of new players who previously had only taken participations in project finance loans but are now arranging deals. We’re seeing this from a number of Malaysian banks.

The export credit agencies and development banks, Asia Development Bank for example, are becoming more and more critical to the success of a number of these projects within emerging Asia, and they are having more of an impact on the way these projects are structured.

Myanmar is quickly drawing attention as it continues to open up. The country requires significant levels of project finance to help develop infrastructure in a number of sectors, including energy. This is going to be a challenge as lenders are still getting comfortable with the legal and regulatory frameworks in Myanmar.

Project finance in the power sector in Asia-Pacific is still dominated by the power purchase agreement model, but merchant markets are developing in Singapore and the Philippines, among other countries. This has required a degree of adjustment amongst the project finance lenders to accept the sort of risks associated with financing a power station operating in a merchant market.

**SIMON CURRIE:** Many of PPP’s defining structures have emerged from Australia and the country still stands as one of the most active PPP markets globally. I think PPP use is just beginning to see interest in Indonesia. It’s one of the most interesting markets because of its population and abundant resources.

I’m a great believer that PPP creates discipline around cost control and risk allocation; if you move to a traditional public sector procurement model you often lose this discipline.

**What advantages do private equity firms bring to the table aside from capital in energy deals?**

**SIMON CURRIE:** In oil and gas at the moment, private equity is an incredibly strong capital provider. Large oil and gas companies much like the large mining companies are all under pressure to strengthen their balance sheets and focus on more profitable areas. We have seen a lot of private equity firms coming in to pick up pipeline, terminal and storage projects. This is only the beginning. The major houses haven’t really focused on energy in the past, but now firms like KKR, First Reserve and Blackstone are entering the market as they recognise the region’s growth potential.

**STEPHEN BEGLEY:** Private equity firms bring international expertise as they tend to operate across multiple jurisdictions. High level firms and specialist funds tend to complement their capital commitments with industry knowledge, an incredible value add especially when investing in the energy space. Private equity investors sometimes can be more aggressive depending on the role they are taking in the project or deal. They enable certain riskier projects to go ahead, but it depends on the underlying nature of the project and whether their funding enables these projects to become bankable.
Asia country and sub-region profiles

A revolution for gas and technology

Given the challenging nature of its extraction, shale gas has so far fallen far short of expectations in providing a cleaner alternative to coal, causing concern among policymakers in China as to how they will manage the country’s immense pollution problem. With hopes of harnessing a shale gas revolution similar to that enjoyed by North America temporarily dashed, China’s energy mix will continue to be dominated by coal. Hydropower could see greater use as record power generation from the Three Gorges dam and newer projects begin to displace other energy sources.

Despite ample local reserves and the low costs needed to utilise coal, China’s desire to diversify its energy mix has led to a “dash for gas and a focus on technology.” In particular, the last two years have seen Chinese companies explore gas opportunities and increasingly try to secure gas supplies from around the world. These are yet to deliver results, but going forward, we expect to see gas form a larger part of the energy mix.

China’s energy policy finds itself squeezed between the need to address air quality and carbon issues with the need to produce enormous amounts of cheap power and maintain employment levels – all of which is achieved by the coal sector. Recent changes have included tariffs on imported coal that will impact the amount of coal imported from countries such as Australia, subject in that case to the details of their newly signed free-trade agreement.

The recent US-China joint announcement on Climate Change and Clean Energy Cooperation is “part of the long-range effort to achieve the deep decarbonisation of the global economy over time.”

For foreign investors, key opportunities are in solar and smaller projects in hydropower, gas and wind. The remaining sources of power are dominated by state-owned enterprises making it difficult for private investors to penetrate.

Technology will be key to the future in China. With the US, China has publicly committed to pursue innovative technologies, whether carbon capture and storage, renewable technologies and smart grids, and linking energy and water policies.

China: Which sub-sectors will see the greatest growth in investment in the next two years?

<table>
<thead>
<tr>
<th>Conventional power</th>
<th>Renewable energy</th>
<th>Oil and gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission, distribution, and network</td>
<td>Hydro</td>
<td>Exploration and production</td>
</tr>
<tr>
<td>Coal fired</td>
<td>Solar photovoltaic</td>
<td>Oil, gas, and product pipelines, terminals and storage facilities</td>
</tr>
<tr>
<td>Wind (onshore)</td>
<td></td>
<td>Refining, transportation, and marketing of petroleum products</td>
</tr>
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</table>

The White House Office of the Press Secretary, Nov 11, 2014.
India: Which sub-sectors will see the greatest growth in investment in the next two years?

**Clean tech and energy liberalisation**

India’s economic growth and energy needs are rising in tandem, but the country is under increasing pressure to secure stable energy supplies for electricity generation. Huge demand for power and an overloaded, aged infrastructure often result in frequent and prolonged power outages. Fuel supply is also challenging: despite its significant natural resources, India is increasingly dependent on imports (particularly coal) to fuel its electricity generation.

India’s power sector is reliant on coal as its primary fuel source, followed by hydro, natural gas and other renewables. Much of India’s coal reserves remain inaccessible, prompting India to take steps to diversify its energy mix.

An increasing focus on renewables – prompted and supported by some attractive feed-in tariffs - has seen growing investor interest in hydropower, solar and wind projects. This development is, however, state driven rather than nation-wide. Environmental concerns and international pressure to cut emissions have also contributed to the development of India’s renewables sector.

In common with global energy markets, technological advances are expected to have wide ranging consequences for the Indian energy market. In time, new technology will allow access to currently-inaccessible fossil fuels, and this will be used to unlock stranded power plants. LNG is becoming more economically viable; there is already considerable interest in LNG since India commenced LNG imports in 2004. State owned gas distributor GAIL (India) Ltd has, for example, recently signed a substantial long term contract for the import of LNG from the US. India’s Ultra Mega Power Projects, based on supercritical technology, will revolutionise the provision of power in India – although the difficulties in developing these projects have been many and various – and go some way towards India’s ultimate aspiration of achieving energy self-sufficiency.

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India: Which sub-sectors will see the greatest growth in investment in the next two years?

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Oil fired</td>
<td>Hydro</td>
<td>Gas processing and gathering facilities</td>
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</tr>
</tbody>
</table>
Energy integration

In this diverse region, energy needs are projected to increase significantly in a symbiotic relationship with economic growth amongst ASEAN’s emerging and advanced economies. Recognition of the importance of energy integration amongst countries in the region has contributed to progress made by ASEAN members towards regional economic integration and the launch of the ASEAN Economic Community in 2015.

The ambitious cross border Trans-Asia Gas Pipeline (TAGP) project is evidence of ASEAN efforts to promote connectivity – in the form of a transmission network – across the region. The difficulties inherent in developing cross border projects of this scale, in countries with varying degrees of sophistication and regulation, are significant, but progress is being made. Around 3,000km of bilateral pipelines are in place, with plans to develop a network that includes 4,500 km of multilateral connections.

Similarly, the ASEAN Power Grid (APG) is another initiative to promote regional connectivity. The APG will address the imbalance between ASEAN countries with surplus power generation capacity and those with a deficit. The objective of the APG is to interconnect the national power grids of the 10 ASEAN member states. In September 2014, the “Lao PDR, Thailand, Malaysia and Singapore Power Integration Project” was announced in which the four ASEAN countries are embarking on a pilot study. The study will assess the technical viability of cross-border power trade of up to 100MW from Lao PDR to Singapore through existing inter-connections, as well as the policy, regulatory, legal and commercial issues which affect cross-border electricity movement. To realise the APG objective, the ASEAN nations will need to further harmonise regulation, technical standards and systems.

Understanding the interdependence of the energy needs, aspirations and policies of Asian and global economies is key to understanding the regional energy market. China’s proposed ban on lower quality thermal coal imports – for environmental reasons – is thought likely to have a negative impact on Indonesia’s (and Australia’s) coal export markets. An abundance of wind, water and sun, as well as a desire to reduce the region’s reliance on coal, has seen countries in the region look to develop alternative fuel sources for power generation.

In the Philippines, the geothermal sector is increasingly active, and a number of wind projects have recently received planning approval. Indonesia, which is host to 40 percent of the world’s geothermal reserves, finally achieved financial close on the 330MW Sarulla power project, the world’s biggest geothermal power plant to date. In Thailand, the solar power sector is rapidly emerging to compete with wind in the renewable sector. Laos has long been an exporter of hydropower to neighbouring countries. In Myanmar, the considerable potential for hydropower projects is attracting investors, particularly given that its gas production is largely committed to Thailand under long term supply contracts.
Southeast Asia: Which sub-sectors will see the greatest growth in investment in the next two years?

- **Renewable energy**
  - Hydro: Philippines, Laos, Cambodia, Thailand, Myanmar, Vietnam, Indonesia, Singapore, Malaysia
  - Waste to energy: Singapore
  - Bio energy: Myanmar, Philippines, Vietnam, Indonesia, Malaysia
  - LNG plants and facilities: Myanmar

- **Oil and gas**
  - Oil and gas pipelines, terminals, and storage facilities: Thailand, Cambodia, Vietnam, Malaysia, Philippines
  - Refining, transportation and marketing of petroleum products: Myanmar, Laos, Malaysia, Singapore, Vietnam, Philippines, Indonesia
  - Petrochemical plants and facilities: Philippines, Thailand, Singapore

- **Conventional power**
  - Oil fired: Myanmar, Laos, Thailand, Cambodia
  - Gas fired: Vietnam, Malaysia, Singapore, Indonesia
  - Coal fired: Thailand, Vietnam, Cambodia, Indonesia
  - Transmission, distribution and network: Myanmar, Philippines, Malaysia, Singapore
  - Gas processing and gathering facilities: Laos, Myanmar, Singapore
  - Exploration and production: Vietnam, Thailand, Indonesia, Singapore
  - LNG plants and facilities: Myanmar
  - Bio energy: Myanmar, Philippines, Vietnam, Indonesia, Malaysia
  - Hydro: Philippines, Laos, Cambodia, Thailand, Myanmar, Vietnam, Indonesia, Singapore, Malaysia
  - Waste to energy: Singapore
  - Geothermal: Cambodia, Laos, Thailand
  - Waste to energy: Singapore

- **Asia country and sub-region profiles**
In the wake of the Fukushima disaster in 2011, Japan’s fleet of nuclear power plants was temporarily shut down pending safety checks. Until safety concerns are addressed and public support becomes more favorable, the majority of Japan’s reactors are likely to remain dormant in the short to medium term, forcing the country to rely on costly energy imports.

Japan has traditionally relied on oil from the Middle East and coal from Australia and Indonesia to meet most of the domestic energy demand. The shortfall in generation capacity arising from the withdrawal of nuclear power has been made up by coal-, oil-, and gas-fired generation. While a costly energy source, LNG is also coming into wider use. LNG is cleaner than coal and has allowed Japan to diversify its energy dependence. Japan imports the majority of its LNG from Australia, Malaysia, Indonesia, and Qatar, but since Fukushima Japan has imported spot cargoes from most sources including as far as the Snøhvit project in Norway. Exports in the future are likely to come from the US and Canada. For these reasons, respondents said LNG and other oil and gas sub-sectors would form a large part of the investment into Japan’s energy sector in the next two years.

Limited proliferation of renewable energy in Japan has also left space for investment. Currently, the country has experimented with deploying offshore wind power systems along its coast, an initiative that has failed to produce desired results due to operating costs, site size constraints, output instability, noise and safety issues and environmental factors. For this reason, and as noted by respondents, solar power, bio-energy and geothermal sources of clean energy may be preferable options. Japan has seen particularly extensive investment in solar energy to date as a result of favorable feed-in tariffs.

Due to the design of the Japanese Feed-in-Tariff (FIT) scheme it was relatively easy to receive relevant FIT approvals for new solar projects in Japan. This has resulted in a large number of applications for FIT approval and grid connections since the beginning of the scheme in 2012. The large number of approvals in the first two years has recently caused many utilities capacity...
issues; as a result, five utility companies announced in October 2014 suspension of approvals for new grid connections. In addition to the utility suspensions, the Japanese Ministry of Economy, Trade and Industry is also reviewing and re-evaluating the future shape of the FIT scheme. This is likely to cause significant grid connection delays in the short term.

The government is also monitoring the potential for promoting geothermal power as the next major focus for renewable energy under the Japanese FIT scheme. Recent media reports indicate that more than 60 sites around the country are currently being considered by businesses and officials as possible locations for plants. Japan is one of the world’s most seismically active nations and its geothermal resources are estimated to be able to generate as much as 23 million kilowatts of energy. Only as little as two per cent of Japan’s potential geothermal power generation is currently being used. Local communities are becoming more supportive and one of the utilities which announced suspension of its approval process for new grid connections has confirmed recommencement of its grid connections approval process for geo-thermal projects.
The power of the wind and sun

As one of Asia’s advanced economies, South Korea is also one of the region’s largest energy consumers. The country relies almost entirely on external supplies to meet its energy demands. Among global importers, the country is one of the primary importers of LNG, coal, and oil and other liquids. This reliance has left the country exposed to increases in import costs and fluctuations in the market.

To break its dependence on external energy sources, the South Korean government announced in July 2014 an ambitious US$1.9bn stimulus plan to boost the country’s clean energy market. The programme will focus on developing the domestic solar power market and wind power generation, raising solar and wind use from current levels of 2.7% and 2.2% to 14.1% and 18.2% by 2035, respectively, according to government reports. Declining manufacturing and power generation costs means both forms of renewable energy are becoming more cost-effective.

Whilst there is a greater focus on renewables, South Korea’s oil and gas companies, noted as experienced and trusted players in global exploration and production despite a lack of domestic reserves, are actively exploring drilling and extraction opportunities abroad. In recent years, the Korean government has implemented tax incentive programmes to encourage private exploration and production.
A future in LNG

LNG is breathing new life into the emerging Pacific nation of Papua New Guinea. With the discovery of natural gas, activity has increased over the last half dozen years as national governments, international funds and international oil corporations scramble to bridge ties and tap into the country’s natural resources wealth. A new LNG project valued at US$19bn and managed by Exxon Mobil began shipping gas in May 2014, a development that will provide much needed cash to the country and its people.

Unlike many of its neighbours in Asia, Papua New Guinea is still relatively unexplored, making it an attractive proposition to foreign investors. In addition to Exxon Mobil and Papua New Guinea’s largest energy company Oil Search, major international energy companies have already arrived in the country including Total, CNOOC, Sinopec, Shell, Santos, Talisman, SK Energy, IX Nippon, among others. A lack of infrastructure outside the capital, Port Moresby, has posed a serious challenge to production, transportation and communication. Likewise, political and security issues create a layer of risk that investors will have to consider before commencing expensive exploration and production efforts.

The coming year will see continued investment and development as energy corporations from Europe, North America and Asia including China set their sights on Papua New Guinea. As such, respondents said oil and gas infrastructure and LNG plants and facilities would be a centrepiece of investment in the country in the short term.

Papua New Guinea: Which sub-sectors will see the greatest growth in investment in the next two years?

<table>
<thead>
<tr>
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<td>Exploration and production</td>
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<tr>
<td></td>
<td>Hydro</td>
<td>Oil, gas, and product pipelines, terminals and storage facilities</td>
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<td></td>
<td>Bio-energy</td>
<td>LNG plants and facilities</td>
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Global energy exporter

Rich in hydrocarbons, Australia has a long history as an energy exporter with low domestic energy costs and significant private sector investment throughout the energy mix. For many years, Australia has exported coal to markets in north Asia and globally. It is now in the middle of a dramatic expansion of its LNG exports to those same markets. Much of the expansion of those exports is off the back of the development of major conventional gas fields in the north west of Australia and major unconventional coal seam gas opportunities in the eastern States. Shale gas is at an earlier stage of development. Respondents also noted this trend, highlighting these areas as potential fields for investment in the short term if Australia is to remain at the forefront of LNG innovation.

Australia has had a varied experience with renewable energy and the pricing of carbon. Initially, the country was an early adopter of renewable energy support mechanisms, with one of the world’s first emissions trading schemes at a State level in New South Wales, the establishment of specific support for renewable energy through the Mandatory Renewable Energy Target Scheme (RET Scheme) and the adoption of initially a “fixed price” emissions trading scheme. While there was initially a rapid development of innovative renewable energy investments, more recent regulatory uncertainty over the RET Scheme, the repeal of the emissions trading scheme (replaced with a scheme focused on direct government funding of carbon reduction initiatives) and
the general decline in electricity demand over the last few years, has significantly limited the expansion of larger scale renewable projects there.

While these developments will have a deep impact on the industry, respondents noted that clean energy will still play an important role in Australia’s energy future, with existing hydropower generation and new wind and increasingly solar power, together with energy efficiency and other direct government action, likely to be the key means of managing carbon issues in the years ahead.

Respondents have confirmed that the principal transactional activity in Australia over the next few years will be around energy infrastructure (both its privatisation by various State governments and in the rationalisation of ownership of infrastructure associated with the gas sector (in particular LNG sector)). This has attracted a broader range of investors into the sector with large local and offshore sovereign, pension and superannuation funds looking to invest in Australia’s regulated assets.

Australia, then, is in a curious position: as a supplier taking advantage of the global shifts to lower carbon emission fuels through its very significant LNG plays, while still supporting the ongoing demand for coal from developed and developing markets. At the same time, its domestic narrative is struggling with increasing domestic delivered energy costs (substantially due to increased network costs and the internationalisation of domestic gas prices), flat or declining demand (in part due to energy efficiency initiatives), low wholesale electricity prices and limited new conventional generation investment for some time. How the increased energy cost narrative develops will depend significantly on its political leadership, balancing the attractiveness of abundant and inexpensive black and brown coal reserves and increasingly more expensive gas with carbon imperatives. Technology will be a key solution to this in the medium term. In the meantime, significant private investment in energy infrastructure (including the privatisation of various grid networks in New South Wales and Queensland) and the privatisation of coal fired generation capacity in Queensland will drive transactions through the next two years.
Methodology

From June to August 2014, Norton Rose Fulbright commissioned Remark, the research and publications division of Mergermarket, to survey 100 practitioners in the global energy market. These respondents were asked a series of questions on industry trends and expectations. Respondents came from various backgrounds at energy corporations, private equity firms, investment banks, sovereign wealth funds, or financial institutions. They were also based across the globe and had varying levels of experience in cross-border and domestic deal making.
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