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Need to lower emissions drives smart solutions

Smart infrastructure provides an opportunity to invest in clean technology, writes **Lloyd Fleming**.

The world finally began to focus on how to make the transition to a low-carbon economy during 2009. As well as becoming a mainstream political issue, major economies, particularly China and the United States, began to focus seriously on the technologies needed to bring about this transition. HSBC research published in February 2009 shows governments globally committed $US430 billion of financial stimulus to key climate-change investment schemes. Australia allocated $2.5 billion or 9 per cent of its stimulus package to environmental measures between now and 2012.

With so many agreeing on the inevitability of this transition and such largesse, it should be a golden opportunity to invest in climate-change mitigation and adaptation. But this is not always the case.

Some investors wrongly equate clean energy with speculative early stage technology. Such opportunities are subject to familiar venture capital risk, particularly failure of the technology to succeed in its own right, or its inability to compete cost-effectively with existing or alternative technologies. Investors are therefore likely to be at least wary, if not openly suspicious, of clean energy technology unless they have the understanding of – and appetite for – the risks.

However, the options for investing in clean technology are still quite considerable if you think more broadly than early stage clean technology. Clean technology is an umbrella term for technologies ranging from early stage applied research (such as biofuels from algae) right through to commercial scale deployment of proven technologies (such as wind farms).

The common characteristic of clean technologies is that they produce better environmental outcomes than existing approaches; some offer commercially sound returns. This can include zero or low-carbon electricity generation, greater energy efficiency, and reduction and reuse of waste.

But most early stage clean technologies are suitable only for niche investors as they depend on large-scale support systems, which do not now exist. For example, the promise of baseload geothermal power from South Australia is predicated on high-voltage transmission lines that are yet to be financed or built, and there are clear regulatory challenges to their construction under the current transmission rules. Apart from the technology challenges, carbon capture and storage from coal-fired

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power stations will require massive investment in pipelines to transport the waste carbon dioxide and a clearer regulatory regime for managing sequestration. While both these technologies may eventually be commercialised, investing in them today is a long-term bet on technology, infrastructure, regulation and markets.

The regulatory environment in Australia is likely to remain uncertain for some time. The carbon pollution reduction scheme, should it be implemented, will not necessarily bring through new clean technologies because of the scale of compensation to existing generators and emissions-intensive trade-exposed industries. The main beneficiaries of the renewable energy scheme have been proponents of domestic solar hot-water systems rather than renewable electricity developers. This situation is likely to prompt a major revision of the objectives and scope of the renewable energy legislation.

A much nearer investable opportunity that directly contributes to better environmental outcomes is smart infrastructure. Smart infrastructure is a re-engineering of the existing infrastructure to produce better environmental, social and economic outcomes. Smart infrastructure already exists, has proven environmental benefits, and is commercially viable today. Its applications extend across any complex network with high levels of data, such as the electricity grid, food distribution, traffic and rail systems.

One example of smart infrastructure is already being rolled out in the electricity network. Smart meters record half-hourly electricity usage and communicate that data automatically; in combination with appropriate applications and network devices, this provides for more sophisticated network management. Trials of smart meters are already under way or planned.

The benefits for customers should include the ability to manage and reduce energy use by better understanding what drives their power bill. This may mean changing behaviour or buying more energy efficient appliances. Over the longer term, smart metering should open up new opportunities for creating value through in-home applications.

Smart infrastructure has the potential to create significant business opportunities on a global scale. The need to lower emissions by using energy more wisely is central to the growing momentum of these technologies. This global phenomenon will only escalate as we restructure the energy system to address climate change.

■ *Lloyd Fleming is the managing consultant for Marchment Hill's climate response practice.*

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The world finally began to focus on how to transition to a low carbon economy during 2009. As well as becoming a mainstream political issue, major economies, particularly China and the United States began to focus seriously on the technologies needed to bring about this transition. According to HSBC research published in February 2009, governments globally committed US$430 billion of financial stimulus to key climate change investment schemes. Australia allocated $2.5 billion or 9% of its stimulus package to environmental measures between now and 2012.

With so many agreeing on the inevitability of this transition and such largesse, it should be a golden opportunity to invest in climate change mitigation and adaptation. However, this is not always the case.

Some investors wrongly equate clean energy just with speculative early stage technology. Such opportunities are subject to familiar venture capital risk, particularly failure of the technology to succeed in its own right, or its inability to compete cost-effectively with existing or alternative technologies. Investors are therefore likely to be at least wary if not openly suspicious of clean energy technology unless they have the understanding of – and appetite for – the risks.

The options for investing in clean technology are still quite considerable however if you think more broadly than early stage clean technology. Clean technology is an umbrella term for technologies ranging from early stage applied research (such as biofuels from algae) right through to commercial

scale deployment of proven technologies (such as wind farms). The common characteristic of clean technologies is that they produce better environmental outcomes than existing approaches; some offer commercially sound returns. This can include zero or low carbon electricity generation, greater energy efficiency, reduction and re-use of waste and so on.

Most early stage clean technologies are, however, only suitable for niche investors as they depend on large-scale support systems which do not currently exist. For example, the promise of baseload geothermal power from South Australia is predicated on high voltage transmission lines that are yet to be financed or built, and there are clear regulatory challenges to their construction under the current transmission rules. Apart from the technology challenges, carbon capture and storage from coal fired power stations will require massive investment in pipelines to transport the waste carbon dioxide and a clearer regulatory regime for managing sequestration.

While both these technologies may eventually be commercialised, investing in them today is a long term bet on technology, infrastructure, regulation and markets.

The regulatory environment in Australia is likely to remain uncertain for some time. The Carbon Pollution Reduction Scheme, should it be implemented, will not necessarily bring through new clean technologies because of the scale of compensation to existing generators and emissions-intensive trade-exposed industries. The main beneficiaries of the Renewable Energy Scheme have been proponents of domestic solar hot water systems rather than renewable electricity developers. This situation is likely to prompt a major revision of the objectives and scope of the Renewable Energy legislation.

A much nearer investable opportunity that directly contributes to better environmental outcomes is smart infrastructure. Smart infrastructure is a re-engineering of the existing infrastructure to produce better environmental, social and economic outcomes. Smart Infrastructure already exists, has proven environmental benefits, and is commercially viable today. Its applications extend across any complex network with high levels of data – the electricity grid, food distribution, traffic and rail systems and so on.

One example of smart infrastructure is already being rolled out in the electricity network. Smart meters record half-hourly electricity usage and communicate that data automatically; in combination with appropriate applications and network devices, this provides for more sophisticated network management. Trials of smart meters are either underway or planned in all Australian states and territories.

The benefits for customers should include the ability to manage and reduce energy use by better understanding what drives their power bill. This may mean simply changing behaviour or buying more energy-efficient appliances. Over the longer term smart metering should open up new opportunities for creating value through in-home applications. Energy management systems or tools, energy storage options to take advantage of cheaper off-peak tariffs, and incentives around new lower energy products such as LED lighting are all opportunities.

Smart meters herald the beginning of a major re-configuration of the electricity infrastructure known as the smart grid. This will involve understanding and optimising generation and use of electricity across the network to deliver a more cost-effective service with better environmental outcomes. New entrants are already emerging in this space and, just like the internet ten years ago, will threaten incumbent business models. Just dealing with the volume of meter data and improving information management will present a challenge to existing companies and provide opportunities for new businesses that can do it cheaper and smarter.

Companies in Australia are already trialling approaches to temporarily control in-home appliances like air conditioners during periods of peak demand to help balance the load or reduce network congestion (e.g. South Australia). This makes better use of the existing infrastructure and helps avoid the building of generation and network infrastructure that is used infrequently and only to meet such high demand.

Beyond home applications, energy distributors and electric vehicle (EV) manufacturers are already working out how to augment the grid for EVs. Designers, engineers, suppliers, installers and maintenance staff will all be required during this process. The introduction of EVs will require battery manufacturers and logistics, re-training of mechanics, consumer education, and the provision of new services by motoring organisations.

As a start to developing smart electricity grids, major economies around the world are mandating smart meter roll outs. The United Kingdom intends to install 46 million smart meters by 2020 and in the US President Obama allocated US$4.5 billion for up to 40 million smart meters. Victoria has already started its roll out of nearly 3 million meters, which is due for completion in 2013.

Smart infrastructure has the potential to be a major disruptive technology that will create new and significant business opportunities on a global scale. The need to lower emissions by using energy more wisely is central to the growing momentum of these technologies. This global phenomenon will only escalate as we restructure the energy system to address climate change.