THE LANTAU GROUP
strategy & economic consulting

Lantau Pique

April 2013

In this edition

In this edition of Lantau Pique, the first in a series on value, we argue that effective energy policy is about aligning perceptions of opportunities with the underlying societal value drivers those opportunities represent, not about out-guessing the future.

The authors:

Mike Thomas
mthomas@lantaugroup.com
+852 9226 2513

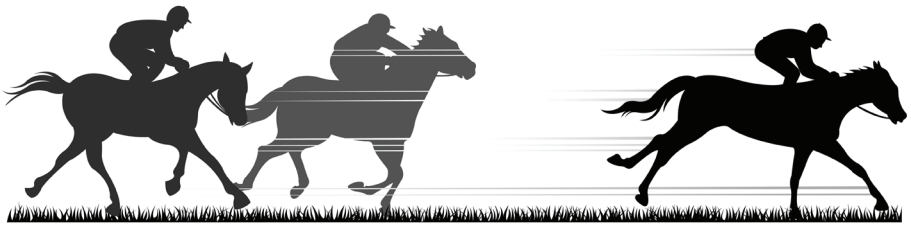
Thanks to colleagues James Doig, Tom Parkinson, Neil Semple, and Liutong Zhang, and to my wife, Elizabeth Pennie Thomas, for insightful comments.

Of Horses, Prisms, and Values

If I go to the Happy Valley Race Course run by the Hong Kong Jockey Club to bet heavily on my favourite horse, few would suggest that my bet was financially sound, though I may disagree. I may think I am making a well-researched decision.

My success however depends not only on what I do, but also on how what I do compares to what everyone else does – as the odds on my horse reflect our collective activities. I need to take such dynamics into account. A bet on a horse is akin to any investment in an uncertain market. My success also depends on my understanding of this particular "market". I need to know that the odds are stacked against me. In the 2011/12 financial year, the Hong Kong Jockey Club returned only 82% of customer bets as payouts of various sorts. So while I think I am placing a good bet – and making a good decision – we bettors, as a group, are pursuing strategies that consistently yield negative financial value.

Now, am I *that* sure about my proposed "investment"? And so it is with energy sector decisions. What I don't see or don't understand can lead me astray.



Targeting Good Decisions, Not Fuel Mix

In recent years several Asian countries have explored the concept of setting future fuel mix targets due to the challenges posed by rising fuel costs, and mounting environmental pressures. Hong Kong, for example, is currently evaluating its future fuel mix. At an earlier stage, Hong Kong suggested that its future fuel mix should fall in line with specific proportions: 50% nuclear, 40% natural gas and 10% coal.

Such approaches are surprising and concerning. It is costs, not fuels, we should care about. Not just hard "dollar" costs – but all costs, including those that reflect adverse impacts on environmental sustainability and energy security. Underlying fuel choices may correlate highly with some of these costs, but the fuels themselves are merely proxies. The fuel mix is a result – an output, not an input – of a prudent assessment of the full range of costs, benefits and risks involved. Whenever we focus on fuel mix targets, we are failing to address the real problem.

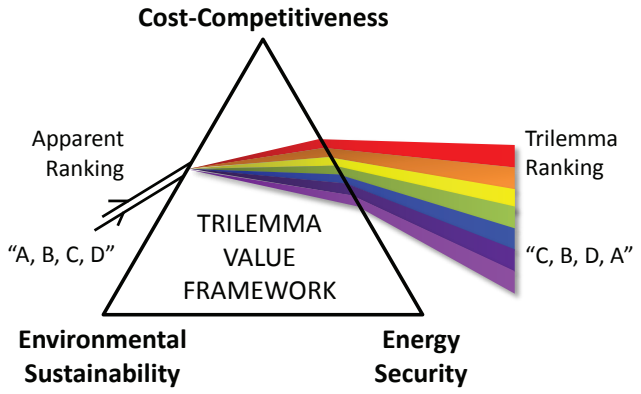
Energy policy is ultimately about value. Real value…value that reflects exactly what we care about to the best of our ability to express it. After all, as the saying goes, if you don't focus on what you want, you inevitably wind up getting something else.

Defining Value

To create value you must, of course, know what value is. Value is complex and nuanced. For example, one option may be less expensive than another, but also more polluting or less secure. How much value should be imputed to reduced emissions or that elusive concept of improved energy security?

Some countries talk of applying a value framework that includes concepts of environmental sustainability and energy security along with reducing costs or being efficient. Such a trilemma is a useful start – it at least recognizes the challenge of integrating different sources of value and the need to determine what those are – but few countries have taken the crucial next step to define how to apply such a trilemma value framework in practice.

Figure 1: Using the trilemma framework to evaluate options



The trilemma framework requires that you identify all sources of value, cost and risk. Identifying and quantifying all these sources is hard to do, as there can be many, so you have to pay attention. Determine what is important and how important it is and why and on what basis.

- Don't just set arbitrary environmental standards, but rather set values based on health impacts, loss of amenity, and used up resources.
- Don't pursue renewable energy just because it's renewable, but rather view renewable energy in terms of its energy value, lack of carbon emissions, disconnection from global fuel prices, contribution to the local economy and its cost in terms of the need for increased ancillary services; and especially
- Don't toss about the word "diversity" as if it has magical powers to justify complicated and expensive projects in the name of energy security.

Break energy security into its constituent parts: physical energy security and economic energy security. Focus on what each part means, and what it is worth, and why. Then, finally, evaluate decisions accordingly.

Align Perspectives with Trilemma Value

Of course, no investor or project sponsor is going to want to apply some strange trilemma value framework to a project unless that framework aligns with commercially realisable sources of value. So the next big step is to sort out how to make the trilemma framework relevant to those who actually make decisions and either invest money or confer approval on projects.

Unfortunately, the world is full of mismatched value propositions. A project that is high value to an investor can be low value to society if the project transfers material risks of environmental detriment or reduced energy security to others without compensation. Conversely, a project that creates broad societal benefits may nonetheless be ignored if no investor can commercialise enough of the benefits to justify the investment.

A project may qualify for a valuable tariff even though it is located behind a grid constraint and cannot reliably generate when needed, as has been the case for much wind capacity built hastily in northern China. A project may appear to have a lower cost than another, but higher operating risks, such as a power station built using parts of uncertain origin or composition. Or perhaps a technology is touted as having attained "grid parity", but it turns out to produce electricity predominately in low value periods – such as a wind farm that generates most of its output at night – suggesting the need to relook at the definition of "parity".

A project may appear attractive because of an incorrectly calculated value, such as a capacity market that sets too high a value on new capacity, attracting investors more than happy to build capacity that is not yet needed. Or perhaps, a project must be chosen from amongst options that have similar costs but different cost structures, and thus different risk exposures should things change in the future, especially relative fuel prices, which have changed dramatically several times in the last few decades. Or maybe it is a question of whether the apparent discount offered by a take-or-pay contract is sufficient to justify giving up future flexibility. In each case, perceptions of value depend on awareness of all relevant impacts and the application of an appropriate analytical methodology.

Whereas it might be sexy to contemplate grand energy policy statements, it's the day-to-day focus and attention to details – aligning perceptions of value between decision makers and society – that drive real value.

Respecting the Value of Flexibility

Ultimately, good energy policy has more to do with the decision-making platform – processes, values, methodologies, and perceptions – than any specific project. Once a large project has some momentum, it tends to take on a life of its own. If the underlying decision and evaluation framework and processes are not robust, phony value can be too easily imagined, and real value can be too easily lost along the way.

Malaysia is approaching commercial operation of its innovative floating LNG receiving terminal at Melaka. The option existed prior to construction to choose to defer the investment by a year or more. The benefits of doing so include the possibility of improved technology or lower cost in the future, the opportunity to take advantage of new market information and, of course, the financial cost savings during the deferral period. The costs of deferral are those associated with not having access to the terminal's capabilities and with the possibility that certain other costs may increase in the interim.

What makes the Malaysian terminal a useful paradigm for a discussion of value is that Malaysia already sells natural gas to Singapore, which has an LNG terminal of its own. As a result, the costs to Malaysia of deferring its own terminal would have been less than if Malaysia had no backstop supply. In principle, market-based mechanisms could be developed to allow Malaysia and Singapore to trade natural gas. For example, extra LNG cargoes could be brought into Singapore in exchange for reducing gas sent to Singapore from Malaysia. The impact on Malaysia would be the same as if the LNG cargo had been delivered to Melaka.

The commitment to the Melaka terminal was presumably predicated partly on expected LNG volumes needed to offset Malaysia's own depleting gas supplies. Indeed, in 2011, when determining what to do with power stations covered by soon-to-be expiring PPAs, the broad intention was to shift to LNG to replace depleting natural gas and support industry growth. And, so, tenders for several thousand megawatts of gas-fired CCGT capacity were initially planned for the coming years.

Figure 2: Relative Coal and Oil Price "Windows"

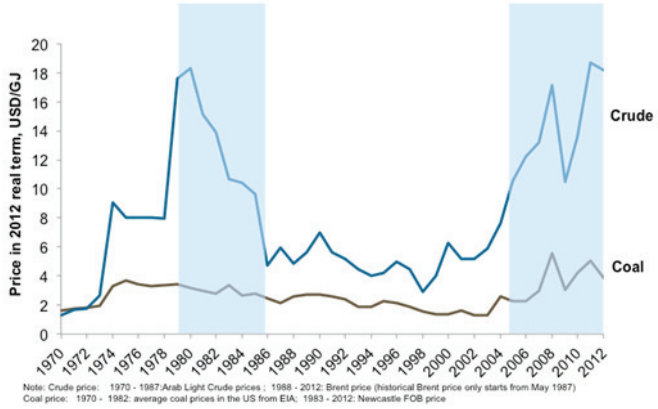


Figure 2 shows the relationship over time of oil prices, which have long formed the basis for LNG prices in Asia, and coal prices. In recent years, coal has been enjoying a strong period of relative economic performance compared to oil-linked natural gas prices. At some point economic reality reared its head. The capacity tender processes eventually proceeded, but with specifications changed to target coal-fired capacity.

As the increasing and persistent misalignment between coal and oil-linked natural gas prices hit home, pressure for more volumes of LNG through the Melaka terminal probably diminished, making deferral of the terminal even more likely to have been optimal.

The other angle is, of course, the question of environmental sustainability. Within the trilemma framework the emissions from coal-fired generation would need to be valued explicitly relative to those from gas-fired generation. Fortunately, emission control technology now exists to reduce most of the relevant emissions differentials between a modern gas-fired power station and a modern coal-fired power station – with the exception of carbon. It follows, therefore, that an important trilemma-related risk arises from the absence of a greenhouse gas policy framework in most Asian countries. Developing a robust and well-accepted greenhouse gas policy framework is no small challenge. But ignoring tough challenges does not usually make them go away.

In a previous Lantau Pique, we observed that given current natural gas and coal prices, the act of choosing gas-fired generation in Asia over coal-fired generation in Asia is analogous to accepting the imposition of the highest carbon tax in the world, by far. It would be much less expensive to combine coal-fired generation in Asia and carbon credit purchases from any of several carbon markets globally, rather than utilizing Asian LNG for more than peaking generation, at present. Such arbitrage opportunities are not currently all exploitable, but they scream out for attention. Asian countries would clearly benefit from more flexible approaches to LNG contracting and carbon credit market access, most especially as gas markets are relatively compartmentalized, globally, with very different prices prevailing in North America, Europe and Asia. Making such opportunities reality will require bolder policies that eschew the same old country-by-country "commitments" that then get allocated to sectors as targets only to be achieved at high cost. Until then, decisions taken, particularly around commitments to use natural gas, have the potential to be both expensive and worse for the environment than what could have been achieved.

Eliminating Arbitrary Constraints

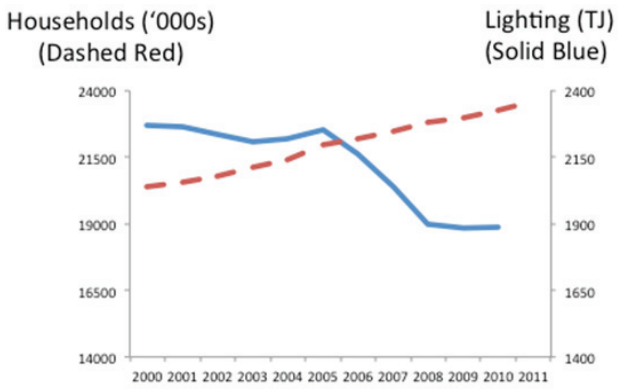
Good energy policy, which incorporates all aspects of the energy trilemma value framework, abhors arbitrary constraints.

Setting fuel mix targets is like telling someone to get from point A to point B, but only by taking one particular route. Perhaps today that route seems best. But, add some random traffic; the occasional accident or obstruction; the possibility that you would have preferred to take another route for an errand along the way; or the fact that you just learned of a better, faster, route; and pretty soon that earlier commitment to take the same route every day becomes a burden. A given route has some value, but the flexibility to decide how, when and why to vary that route is also valuable. By focussing only on the value of the specific route, you miss the value of flexibility.

Another example involves pressure to set arbitrary energy efficiency targets to limit electricity demand growth. Enhancing energy efficiency through behavioural change and technology improvement is clearly an important source of value. Predicting such change and improvement requires a sound analytical foundation. And even then, predictions can be wrong for a host of perfectly good reasons.

Few would have predicted a decade ago, that Hong Kong would be using nearly 17 percent less electricity in lighting in 2010 than in 2000, despite a growth in households of about 15 percent over that period[1].

Figure 3: Electricity used for lighting in Hong Kong



Furthermore, not all increases in the use of electricity imply a reduction in overall energy efficiency. Electricity can be used to displace other forms of energy (and vice versa). Blindly adopting efficiency targets without robust analytical support can yield regulations that increase total costs without producing equivalent value.

Another kind of constraint arises when the decision-process is overly narrow or restrictive or where innovation is not rewarded. A decision can seem good, but only because the decision-maker had no thought, incentive or ability to consider something even better. In contrast, shale gas development exemplified how decentralized market-based mechanisms without arbitrary constraints fostered innovation. It took over ten thousand different investors making independent decisions to create the North American shale gas revolution. Not every sector, country or decision has the prerequisites in place to support such intense competitive pressure, but the worry that narrowly made decisions can miss something is real[2].

Indeed, in working with a client attempting to expand the market for high-efficiency reciprocating engines, it quickly became evident that the traditional regulatory approval process was limiting innovation by focussing on the same relatively modest and narrow set of traditional power supply technologies. Breaking into the "club" controlled by a monopoly utility or a less-than-progressive regulator can be a real challenge for new technologies. Regulators, incumbent utilities, planners, and officials do not necessarily want their lives made more difficult – even when it has the potential to create significant value for society as a whole. Making sure planning and approval functions are sufficiently resourced and incentivised should always be a key focus.

Looking Forward

Ultimately, our advice is simpler to give than to follow, as hard-won advice often is:

- Target making good decisions, rather than betting on a specific fuel mix or technology investment;
- Define sources of value robustly by making sure that concepts like environmental sustainability and energy security or fuel diversity are given actionable and specific meaning related to their real impact on value;
- Eliminate policy constraints that unnecessarily limit the range of technology, fuel and other alternatives;
- Promote the use of appropriate valuation methodologies or ensure robust incentives to account for uncertainty and the value of flexibility in investment decisions over time; and
- Be prepared to commit the resources to introduce the changes necessary to achieve these things in a timely and consistent manner.

We look forward to exploring some of these latter concepts further in a future Lantau Pique on TLG's version of the Trilemma Value Framework.

It is a bad plan that admits of no modification

Publilius Syrus (~100 BC)

1 http://www.censtatd.gov.hk/hkstat/sub/sp150.jsp?subjectID=15&tableID=005&ID=0&productType=8

2 The US shale gas revolution has out-paced analytically sound consideration of environmental impacts, with the result that the news reflects much knee-jerk response and emotional negativity. Only a strong commitment to process and analysis has any chance to hold-up, over time, to such fiercely arbitrary pressures. The reality is that many of these issues are complex and the cost of both missed opportunity and overlooked detriment can be high.