POWER, WATER AND THE GRID: THE REALITIES OF UTILITY INTENSIVE INVESTMENT IN PENINSULAR MALAYSIA

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Peninsular Malaysia is attracting a new generation of large-scale investments. Hyperscale data centres are proliferating in Johor and Selangor, and semiconductor manufacturers continue to expand across Penang, Kedah and the Northern Corridor. These projects are expanding the country's industrial and digital infrastructure, bringing significant capital and creating new opportunities for economic growth.

But these investments also bring demands that are very different from those of many conventional industrial projects.

A utility-intensive facility does not simply require a suitable site. It requires substantial and reliable supplies of electricity and water, often over decades. It may require new substations, transmission connections, water infrastructure and other supporting facilities before it can therefore be as important to the viability of a project as the land on which it is built.

This is changing the way utility-intensive investments need to be considered.

For investors and developers, securing access to power and water is increasingly a fundamental part of site selection, project structuring and long-term risk management. A connection may be available, but will it be available when the project needs it? How will the cost of the network expansion be allocated? What happens if supply is interrupted or curtailed? And what level of physical and contractual protection is required when the facility itself is subject to demanding commitments to its customers and lenders?

For governments and the States that host these developments, there is another set of questions. Significant investments can bring capital, infrastructure and economic activity, but they can also place substantial demands on scarce resources and public infrastructure. The question is therefore not simply how much investment a project brings, but what value it creates for the wider economy and the communities in which it operates.

These considerations do not diminish the importance of attracting investment. Rather, they point to a more complex reality: as utility-intensive projects become larger and more resource-dependent, the interests of investors, utilities, governments and communities become increasingly interconnected.

Understanding that reality – and the legal and regulatory framework that sits behind it – is becoming an essential part of developing utility-intensive facilities in Peninsular Malaysia.

The Site Is More Than Land

For investors, the first lesson is perhaps the simplest: a site is no longer just a piece of land.

Land, location and connectivity remain important. So do incentives, logistics and access to labour. But for a utility-intensive facility, the attractiveness of a site may ultimately turn on something that is not visible from the site itself – the capacity and resilience of the infrastructure around it.

Electricity illustrates the point.

The question is not merely whether the grid reaches the site. A developer needs to understand how much capacity can be made available, when that capacity can be delivered, what network reinforcement may be required and how the arrangement will accommodate future expansion. A connection that is technically possible but cannot be delivered within the project's development programme may be of little practical value.

Malaysia has responded to this challenge with initiatives intended to accelerate the delivery of power infrastructure to major developments. The Green Lane Pathway, for example, is designed to run key elements of the connection process in parallel, with the objective of reducing what historically could be a lengthy connection period. For large investors working on an aggressive construction timetable, that can make a material difference.

The Corporate Renewable Energy Supply Scheme, or CRESS, addresses a different part of the equation. It gives eligible corporate consumers a route to procure renewable electricity from third-party generators through the existing grid. For businesses with significant sustainability commitments, that can be an important component of their overall energy strategy.

But neither mechanism removes the fundamental issue.

A connection is not the same thing as certainty of supply.

That distinction matters greatly to a data centre or other facility whose own customers may expect exceptionally high levels of availability. The operator may have promised continuity of service to its customers, while the utility framework may not provide an equivalent level of protection for the consequences of an interruption.

That is where the legal and commercial realities begin to intersect.

When The Utility Fails, Where Does The Risk Go?

This is one of the less obvious issues for a first-time investor.

It is tempting to think of the utility agreements as the place where the risk of an interruption is dealt with. In practice, the position can be complicated.

The Electricity Supply Act 1990 gives the licensee statutory protection in certain circumstances where electricity supply is reduced or interrupted. The *Water Services Industry Act 2006* contains comparable protections on the water side. Standard utility arrangements may also limit the losses for which the utility can be held responsible.

The significance of these provisions is not so much the statutory language itself. It is the mismatch they can create further down the contractual chain.

A hyperscale operator may have contractual obligations to its customers to keep its facilities operating with very little interruption. If a failure in the electricity supply causes the facility to go offline, the operator may therefore face claims or other financial consequences from its customers, as well as potential consequences under its financing arrangements. Yet the operator may have limited ability to recover those losses from the utility responsible for supplying the electricity.

The risk has not disappeared. It has simply moved.

For a project of this nature, the consequences can extend well beyond the immediate cost of an outage. They can affect how the project is financed, the extent to which the facility needs to be equipped with backup systems and other measures to minimise the impact of an interruption, and the protections the operator seeks in its contracts with customers. They may also change the way an investor evaluates a site in the first place: a location with an apparently attractive utility connection may be less attractive if the terms of that connection leave the project exposed to risks it cannot readily manage.

This is why the legal analysis cannot sensibly be separated from the engineering and commercial analysis. If the utility contract does not provide sufficient protection against an interruption in supply, the developer may need to build that protection into the facility itself – for example, through backup power, alternative sources of water or other measures designed to keep the facility operating when the primary supply is disrupted.

That may mean dual-circuit power connections, separate substations, battery storage or on-site generation. On the water side, it may mean storage, recycling or alternative sources.

In other words, what cannot be secured contractually may have to be secured physically.

Water Is A Different Kind Of Constraint

Water presents a different challenge.

The regulatory framework reflects the division between federal and State responsibilities. The Water Services Industry Act 2006 and the SPAN Act 2006 govern the regulated water services framework, including treated water and public sewerage, while raw water resources remain within State authority.

For a developer, that distinction is more than constitutional architecture.

It can determine who the developer needs to deal with, what approvals may be required and whether an apparently straightforward water requirement involves several different regulatory and institutional arrangements.

A facility's water requirements will also depend on how it is designed. Cooling technology, water efficiency, recycling and treatment can all affect the volume of water required. That makes water strategy partly a question of engineering, but it also makes it a question of site selection.

The questions need to be addressed early: where is the water coming from, and how secure is that source?

The question becomes more important where a project contemplates direct abstraction of raw water. The developer may then need to navigate State-level requirements alongside the federal regime governing treated water and public water services.
There is a wider consideration too.

Water is not simply another commodity waiting to be allocated to the highest-value industrial use. Rivers, catchments and groundwater support households, agriculture, existing industries and future development. The allocation of water to major utility-intensive facility therefore sits within a much larger system.

The strengthening of Malaysia's water pollution regime under the Water Services Industry (Amendment) Act 2024 is a reminder of this wider concern. The law now provides for substantially higher penalties for certain forms of contamination, reflecting the importance of protecting water resources and supply systems.

For developers, the practical lesson is straightforward. Water should be considered at the same time as land and electricity, not after them.

The questions are familiar but important: Is the source sufficient? Is it sustainable? What happens if it is disrupted? How much storage is required? How much can be recycled? Is there a credible alternative?

These questions may influence the design of the facility long before the first foundations are laid.

Someone Has To Pay For The Infrastructure

There is another reality that can be obscured by the headline value of an investment.

A large facility does not arrive at an empty site with all the infrastructure it needs already waiting for it. A new development may require substations, transmission connections, water mains, treatment capacity or other network reinforcement.

That infrastructure has to be funded.

The commercial arrangements used to support it can have significant consequences for the investor. Take-or-pay mechanisms, for example, can require a customer to commit to a minimum level of consumption, with a payment becoming due even where actual usage falls below that level.

For a project that will be developed in phases, this matters.

A data-centre development or hyperscale campus may ultimately require substantial capacity, but its demand may build over several years. A long-term commitment based on ultimate requirements can therefore create a significant financial burden during the early years of operation.

This is not necessarily an unreasonable allocation of risk. The utility may have incurred substantial capital expenditure specifically to serve the project and needs some certainty of recovery.

But it does mean the developer needs to understand the commitment as part of the project's economics, rather than treating it as a contractual detail to be negotiated after the investment decision has been made.

The same question arises with network expansion.

If a new transmission line or water infrastructure is required because of the project, who pays for it? If the project is delayed, scaled back or never reaches its projected demand, who carries the resulting risk?

These are questions that should be visible in the financial model. They can also affect the attractiveness of one site over another. A site with a slightly higher land cost may prove more economical if the surrounding infrastructure is already available. Conversely, a seemingly attractive site may become considerably less attractive once the cost and timing of utility infrastructure are properly understood.

The Other Side Of The Equation

Up to this point, the discussion has largely been from the investor's perspective.

That is understandable. Without reliable power and water, the project cannot operate. But there is another side to the equation.

For the State in which a utility-intensive facility is located, a major investment can bring obvious benefits. There may be substantial capital expenditure, construction activity, tax revenues, new infrastructure and wider economic activity.

But there may also be significant demands.

The project may consume large quantities of electricity and water. New infrastructure may have to be developed to support it. Land that might otherwise have been used for another purpose is committed for the long-term.

And once the facility is operational, the number of permanent jobs may be relatively modest compared with the size of the capital investment. This raises a question that is becoming increasingly relevant as utility-intensive investments grow in scale:

Is the value of an investment adequately captured by the amount of money invested in it? The answer will depend on the nature of the project.

A data centre, for example, may not be a major employer in the conventional sense, but it can support digital infrastructure, connectivity, technology services and a wider ecosystem of businesses. A semiconductor facility may have a very different employment and supply-chain profile.

The point is not to rank one form of investment above the another. It is that capital expenditure is only one measure of economic value.

There may be good reason for a State to look more closely at what sits behind the headline investment number: local procurement, supplier development, skills and training, technology transfer; infrastructure, tax revenues and the extent to which local businesses and communities participate in the economic activity generated by the project.

This is not necessarily about imposing additional obligations on investors. It is about understanding the investment in its full context.

For governments, the question is becoming not simply whether a project can be accommodated, but whether the resources committed to it produce the wider economic value that the State is seeking.

For investors, understanding that perspective early may be equally important.

The Bargain Has To Work Both Ways

The conversation, however, cannot be one-sided. If a State expects a major investment to generate wider economic value, the investor will reasonably expect the State to provide a sufficiently certain environment in which the investment can succeed.

That means clarity around land and approvals, but also confidence that the power and water infrastructure will be delivered within the required timeframe. It means understanding how tariffs and infrastructure costs will be allocated. It means knowing what happens when the system is under stress.

For the investor, certainty has a value. A project may be commercially attractive on paper, but the economics can change materially if a grid connection is delayed, if water capacity cannot be secured, if infrastructure costs are higher than anticipated or if the operator is exposed to losses for which it has no effective recourse.

The same is true for the relevant utility provider. The utility provider cannot be expected to absorb every risk associated with a customer's business model. Where substantial infrastructure has been built to serve a particular customer, the utility provider needs reasonable certainty that its investment will be recovered.

The objective, therefore, is not to eliminate risk. It is to understand where the risk belongs and to allocate it to the party best placed to manage it. That is ultimately what good project structuring is about.

When The Contract Cannot Absorb The Risk, The Project Must Be Designed To Withstand It

Long-term utility contracts cannot solve every problem. There will be event that are outside the reasonable control of the parties: grid emergencies, curtailment, regional transmission failures, contamination, equipment failure and other events that may interrupt supply.

The legal protections available to the utility providers make it particularly important for a utility-intensive facility to consider what happens if the contractual remedy is limited.

The answer may be to build greater resilience into the facility itself. For electricity, that may involve dual-circuit connections, connections to separate substations, battery storage and on-site generation. The appropriate configuration will depend on the facility and the level of availability required, but the principle is straightforward: the more critical the supply, the less sensible it is to rely on a single point of failure. There is greater need for reliable backup arrangements.

Water requires its own approach. On-site storage, recycling and more efficient cooling technologies can reduce dependence on external supply. Where feasible, alternative sources may provide another layer of protection.

These measures come at a cost. But the cost of resilience needs to be considered alongside the cost of failure – including lost revenue, customer claims, financing consequences and reputational damage.

There is also a timing issue. It is considerably easier to incorporate resilience into the design of a facility than to retrofit it after commissioning. Decisions on power redundancy, water storage and recycling therefore belong in the development phase, when they can still be properly engineered and priced.

The Risk Does Not Disappear. It Moves.

The same principle applies to contractual structure. A utility interruption may begin as a problem between the utility and the developer. But the financial consequences may ultimately fall elsewhere. The developer may have financing obligations. It may have entered into master services agreements with cloud tenants. Those customers may themselves have stringent service-level requirements.

If the upstream utility agreement provides limited recourse, but the downstream customer agreement imposes significant liability for an outage, the developer can find itself carrying a risk it is unable to pass through. This is why the utility contract should never be considered in isolation.

Take-or-pay commitments, deficiency payments, curtailment provisions and force majeure clauses need to be considered alongside the obligations assumed downstream, where possible, the contractual treatment of events such as grid curtailment, load shedding, regional transmission failures or upstream water contamination should be considered carefully.

The same applies to CRESS arrangements. Renewable procurement may support a corporate sustainability strategy, but the physical electricity still travels through a grid that remains subject to its own operational constraints. The commercial structure therefore needs to take account of the relationship between renewable supply, grid access, firming capacity and applicable charges.

The important point is not that every risk can be negotiated away. It cannot. It is that the risk should be visible. A project is much easier to finance and operate when the parties understand what happens if something goes wrong, rather than discovering the allocation of risk only after interruption has occurred.

Before The Ground Is Broken

The most consequential decisions in a utility-intensive project are often made before construction begins. By the time the project has been designed, financed and contracted, many of the important choices will already have been made.

Where is the project located? How much power and water will it require? When will that capacity be needed? What infrastructure must be built? Who will pay for it? What happens if supply is interrupted? What level of backup and resilience is appropriate? And what does the host State expect from the investment?

None of these questions sits comfortably within a single discipline. They involve engineering, finance, commercial strategy, regulation and contract. That is precisely why they need to be considered together.

A project that looks attractive from a land or investment-incentive perspective may look rather different once the full cost of securing and protecting its utility supply is taken into account. Equally, a project that appears demanding from the perspective of resource consumption may create substantial wider economic value when its supply chain, skills development and infrastructure impact are properly understood.

The earlier those questions are asked, the more room there is to make sensible choices.

Looking Beyond The Connection

Peninsular Malaysia has good reason to remain ambitious about attracting utility-intensive investment. The country has built a strong proposition for data centres, semiconductors and other advanced industries, and the regulatory and infrastructure environment continues to evolve in response to growing demand.

But the realities of these investments extend beyond the connection point. Power and water can determine where a project can be built, when it can become operational and what it will cost. The terms on which those utilities are supplied can determine where financial risk ultimately sits. And the resources required to support the project inevitably have implications beyond the project itself.

That is where the conversation between investors and governments is likely to become more interesting.

Investors need certainty. Utilities need sustainable economics. Governments need to make responsible decisions about scarce resources and infrastructure. Communities, ultimately, will want to understand what the investment means for the places in which they live and work.

There is no single formula that will reconcile all of those interests. But there is value in recognising that they are connected. For an investor, power and water should therefore be considered long before the facility is ready to switch on. They belong in the site-selection process, the financial model, the engineering design and the contract negotiations.

For governments, the question is broader: not simply whether an investment can be accommodated, but whether the resources committed to it are likely to produce enduring value.

And perhaps that is the most important reality of all.

The connection may make the project possible. But it is everything that comes before – and everything that comes after – that determines whether the investment succeeds.

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