

CLC LECTURE

# A New Model for Municipal Delivery

2 June 2017



Several city councils in the UK are experimenting with a new model for municipal services delivery. They are forming comprehensive partnerships with private players such as ENGIE, with much longer contracts, more services bundled together, and output-based over input-based targets. What are the pros and cons of this new model? Mark Harris and Amit Pathare from ENGIE will be in Singapore for this CLC Lecture, to explain this novel way that cities can think about outsourcing their services.

## Lecture Segment

Elgin Toh  
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Today we have with us, Mr Mark Harris and Mr Amit Pathare, from ENGIE. Mr Harris is Business Unit Lead for the Services Division of ENGIE UK [United Kingdom] & Ireland. He has spent the last 15 years in business development and operational delivery within the local government and utility services outsourcing sector. Currently, he is managing the sector within the ENGIE UK business that provides total facilities management and project delivery services for power stations and corporate estates.

Mr Pathare is Group Director of New Solutions and Director for the Key Programme for Cities in ENGIE. He has been an energy and utilities

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sector executive for the last 20 years and has held management positions within the ENGIE Group over the last nine years. He's an advocate for steering ENGIE's activities into new geographies, technologies and business domains.

The format for today is that Mr Pathare will speak first, and he will set the context on some of the global trends that ENGIE is seeing in cities and in the outsourcing sector. And he will be followed by Mr Harris who will go into the nuts and bolts of ENGIE's contracting model in UK cities. And then, we will end off with a Q&A [question and answer] session, which will be moderated by Mr Yip Hon Weng, who is Senior Director of Policy and Planning with the Municipal Service Office within the Ministry of National Development. So without further ado, I will hand the time over to Mr Pathare. (Applause).

Amit Pathare  
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Let me just start by introducing the company itself. So, you may have heard of the Suez Canal, right? Okay, so, well there you go. So, ENGIE is a company that has really started out in many diverse forms: one of these forms was indeed as the financier and the builder, the constructor of the Suez Canal from which we got our name—one part of our name at least. And so, that was one of the biggest engineering projects of the 19th century. Then gradually over the 20th century, we started merging with several different entities from France, so there's GDF or Gaz de France, which is the French gas utility. We had several Belgian utilities as well like Electrabel, that slowly started adding to the family. And gradually, the company started expanding in Europe, as well as beyond Europe. So now, if you see where ENGIE stands today, it's pretty much a global company. So when GDF and Suez merged in 2008, it was called GDF Suez.

And last year, we rebranded to say ENGIE; ENGIE being very close the word "energy". So, we are present across more than 70 countries and we are present in several different domains which start with energy, but which go beyond energy. For instance in the field of energy, we have power generation over 100 gigawatts, or a 100,000 megawatts of power

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generation capacity spread across different technologies. So [that's] including [not only] the usual historical thermal technologies, but also all forms of renewable—and I mean, in renewables, it's all different sub-technologies of solar, of wind, onshore and offshore, biomass, geothermal. So, we are pretty much a technologically diversified company. We're pretty much a geographical diversified company as well, and what I'll come to eventually is [that] we're pretty much business-model diversified as well. So that's on the power side.

On the gas side as well, we cover all gas activities starting from exploration and production all the way towards LNG [liquefied natural gas] and gas sales. [On] the E&P [Exploration & Production] arm of gas, we have recently announced a sale to a different company, so we are gradually exiting the exploration and production business; we're exiting other carbon-intensive businesses as well, including coal, and including some of the dirtiest forms of power generation. So gradually, ENGIE is moving towards cleaner forms.

Singapore is a microcosm of ENGIE's totality because our businesses in Singapore are also...well, I'll say, ENGIE is a well-kept secret in Singapore. We own different businesses, including a stake in Senoko [Energy], a huge services business with over 1,500 people. We have LNG businesses, we have an ENGIE R&D Lab which develops very interesting pilots across different renewable technologies and energy storage. And we have ENGIE Solar, which used to be called Solardirect.

So, there is a whole bunch of services there. Now, we are increasingly moving into district cooling, into energy efficiency, and what I will come to—our business in cities.

## Businesses: Carbon-Intensive to Renewable

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So, what is propelling this change from carbon-intensive forms of business towards the more renewable forms? It's three main drivers, or what we call the three Ds: decarbonisation, decentralisation and

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digitalisation. So, decarbonisation is indeed the move from carbon-intensive towards the more renewable technologies. Decentralisation means that you no longer have a preponderance of large centralised power plants or large gas installations. You effectively operate in a more distributed form, so a lot of the renewable technologies are deployed in [a] more decentralised fashion—so [it is] closer to the customer. And digitalisation is also a means towards more and more digital solutions; both as part of our historical legacy businesses, but also increasingly in the new businesses that ENGIE brings. So collectively, it can be said that ENGIE is an architect of the energy transition. In fact, we go even beyond the transition, we like to refer to it as an **energy revolution**. And that's precisely what we are headed in.

So, I've already mentioned the slides, so it's power production, global infrastructure, and customer solutions. And now, in our customer solutions, there [are] different kinds of solutions. So, you may have heard of the moniker B-to-C, [business-to-consumer] that's business solutions for consumers; you may have heard of B-to-B [business-to-business], that's business solutions for businesses; and now, there's an added form which is B-to-T that's business solutions for cities and territories. So what we've realised is that in addition to selling to businesses and to individual consumers, we also inhabit very complex ecosystems—ecosystems with multiple stakeholders, with governments...which comprise governments, which comprise local real estate developers, which comprise local businesses.

And when you look at an ecosystem like a city or like a military base or like an island, what you're dealing with is multiple kinds of solutions. And therefore, to manage this complex ecosystem, we also [have to] gear our business[es] in this form towards what is B-to-T—business solutions for cities and territories—to cater to very complex ecosystems. And that's the part of the company that I represent.

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So, I've been with the group for nearly nine years and I have lived the energy transition myself. So starting [from] joining the group when we dealt with mainly large, centralised power generation units, and now living this move increasingly towards renewables, towards distributed energy, towards green mobility like electric vehicles, natural-gas vehicles and all of these new businesses that ENGIE has—and recently over the last year-and-a-half, as the Head of the Cities Programme, and I'll explain a little bit about that.

## Climate Change & Sustainability: Beginning From the Cities

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Why cities? [We focus on] cities because the world is getting increasingly urbanised. Cities comprise just two percent of the world area but they comprise 50% and now increasingly...in the next 15 to 20 years, they will end up having anywhere between 60 and 70% of the world's population. They are 75% plus of the world's energy consumption, and 80% of the world's greenhouse gases. So, if you want to tackle climate change, if you want to tackle sustainability, then cities or urban areas are the best way to begin.

So, if you speak from the perspective of a city, what helps create a better city? Now, a city may have different kinds of challenges: a city has an energy challenge, it has a mobility challenge, it has a challenge on security, on public lighting, et cetera. But you can't see these challenges as isolated domains. What you want to do is see these challenges collectively in an integrated fashion. And to manage these challenges in an integrated fashion requires two levers: A—the lever of connectivity, and B—the lever of smart governance. So that's something we do.

So, if you look at it from the perspective of a citizen, the perspective of an end-user or customer of the city. A city effectively needs to...or from the perspective of a mayor or administrator of a city. So, if I reframe this in their terms, what you want is a city that is secure and resilient; you

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want a city that benefits from fluid and green mobility; a city that has an enjoyable environment, that is locally attractive, both from a lifestyle perspective as well as from a job creation perspective; and which creates all of this in a very affordable fashion.

So, I think Singapore is one of the most advanced places which actually exemplify and personalise this aspiration. And that's why it's a huge honour for me to be in front of you over here—because it's the obvious benchmark for several cities around the world. So if you look at it from all these angles in what makes a city a desirable city. Now, different cities brand themselves in different ways. So Singapore may have one way of branding itself, but then some cities refer to their penchant for sustainability, some cities like to speak of their inclusiveness. So, the way they create opportunities for education, healthcare, job creation, across all population strata [may differ]. Some cities refer to themselves in terms of attractive cities or happy cities. Others may refer to their business potential—so being efficient and productive, and so on and so forth.

Now, it's not one or the other; typically, cities combine these different aspects. And therefore, when we start analysing a city, we analyse each city from all these aspects at two levels. So, you see the concentric circles there? The circle on the inside reflects the readiness of the infrastructure of a city: how good is this infrastructure, be it for energy or for mobility and so on. And the other layer reflects the level of the efficiency with which this infrastructure is managed: how efficient are the services that you deliver to maintain and manage this infrastructure? And normally when we begin engaging a city, we try to access the city together with our city partners on both these levels—on the level of infrastructure and on the level of services.

So, for instance in the sub[unclear] case, once we have done the assessments, then we identify the key gaps in the city. And then based on the city, the city establishes its needs, its priorities. And therefore in

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line with the city's ambitions, we identify which are the gaps that city needs to prioritise. So, you see several white spaces on this hypothetical map, and then there are some spaces which have a border that is bold in there. So these are the areas, which for example, would reflect the city's priorities. So then our job is to identify the projects that match these priorities, and then to see what the city wants to focus on. Now, ENGIE is not capable of managing all of these different domains.

So we look at it really from a city's perspective, even before we think of our own opportunities. So first, it always starts with the city, understanding the main gaps, understanding therefore, the projects that can be prioritised—and then assessing what role ENGIE has to play in partnering with the city. And that's effectively what we want to do: we want to partner with the city.

So if I think of ENGIE Services, now ENGIE supports the city at three different levels. The first level is that of the infrastructure itself. So I mentioned ENGIE having businesses in power generation. But then, we run energy plants and energy networks. We run district heating and cooling networks and so [we have] over 300 district heating and cooling networks around the world. We build public lighting infrastructure and increasingly [we are] moving towards more sustainable forms of lighting like LED [light emitting diode], and we also put in place security and safety systems. So that's the level of infrastructure.

Then the next is the level of services. And in services, ENGIE offers [and] provides a lot of energy services, but also in building management in green mobility and so on.

The final layer is that of the digital solutions. And for ENGIE, digital isn't a goal in itself, but digital is a means of making sure that the CapEx [capital expenditure] that you've invested in an infrastructure is optimised, and the services that are delivered in the city are also delivered in the most efficient fashion. So digital or what goes towards

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making a city smart is not just a catch phrase; it has a real intent which is to serve the infrastructure and the services of the city. So, I could talk about it but instead of talking, I'd rather show you some used cases which can give you a better flavour of how these digital solutions are put to the service of the city.

So before I start with a short video, a quick recap of ENGIE's activities in cities. So, we have 5,000 plus charging stations for electric and LNG vehicles. We help reduce city's average energy consumption by over 30%, so with our energy efficiency business, we manage over a million lighting points in different cities across the world, we manage 55 transport networks which are equipped with our systems. We have over 20,000 megawatts of renewables, and that number is **growing** over time. And as I mentioned, we have over 200 district cooling and heating networks operating across 13 countries. We have recently won [a] one billion plus [dollar] deal for managing the district heating and cooling networks in Ohio State University, which is one of the biggest campuses in the world, with over 100,000 people. So, it's effectively like a small city: 60,000 students, 40,000 staff and a lot more. And so on, the list goes on. And we do [*sic did*] this in over 70 countries in the world. So ENGIE already has a global presence and what I would like to do now is to take you through a short video.

## Modelling Cities: Geo-Locational Layers

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This is a specific city on Swiss border in France, called Mulhouse. So, you can see here that the outer rim of the city, so you've got the basic blocks. However, in the centre of the city, you want to model with a lot higher granularity. So now we start seeing actual roofs and materials and texture at a level of granularity of up to one to five centimetres. So, this is essential for certain use cases.

Once we have this information, then you can begin modelling different aspects of the city. For instance, in the city, you can model the noise pollution, hour-by-hour, day-by-day, by having sensors spread all over



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the city. And once we have this noise pollution monitored, you can track it either at the level of the city or at the level of specific neighbourhoods. Once you have these models, then you can also track what are the main causal factors behind the noise, and then put in solutions to manage this noise. So, solutions may either be CapEx or OpEx [operational expenditure].

Similarly, [we have also done so] for air pollution. For instance, you can see that the bulk of the air pollution over here is caused not by industrial activity in this specific case, but by traffic congestion. And so, it's the result of cars operating in first or second gear and what you want to do is make the traffic more fluid, operate in third and fourth gear for a greater percentage of the time—which means you can put in a CapEx solution, like an intelligent traffic management system or put an OpEx solution, like just having more cops on the street to divert the traffic. And so once you have this, you can then simulate what the **impact** of your solutions will be and show the improvement that you can have as a result of these solutions.

So, this is an example of energy losses from the facades of the buildings. Now because you know [what] the materials that are used on buildings [are]—stone, brick, and so on—you can really map the coefficient, for example, of losses, and get the information.

For Paris, there's a slightly different view, so it's a regular street map, street view. But on top of that, there's a layer of data that you see. So once you have this layer of data, imagine you're a real estate developer. Now, you want to track what is the **actual experience of living** in any of the apartments at different heights in different locations. And there, you can map the incidence of electromagnetic radiation, the noise pollution, the air quality, the blue-sky that you can see from any given flat. So, you can really model **the experience that you have of life** in each apartment, which is highly valuable for real estate developers. You can track the wind speeds at different heights as well.

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Another example is in Senegal. And here, we did an instance of modelling of Dakar, the capital. And here, this is an example of the modelling of connectivity at different points in the city. So what is the level of radio connectivity, and therefore how good is the signal that you will get at different points in the city? Alternatively, you can also look at the solar insulation. So now, because you have all the houses and the buildings modelled with the exact angle of incidence of the sun rays on the roof, you can calculate with high precision the number of kilowatt hours that can be generated for a day per month, per year, on a seasonal basis—all through the city. So you can imagine, if you want to say, “I want to map up all the government buildings and put solar panels on all the government buildings, how much energy can I generate?” Or “I have a plan to have solar panels on 30% of all residential roofs,” so it helps you model in this way and it can help you also differentiate this modelling by the different zones in the city. So it can embed that level of intelligence as well.

Another example is that of the future of train lines. So ENGIE has won the contract to build the railway system to the new airport in Dakar. And here, once we have this information, then you can also use it for multiple cases. For instance, you can use it to model the number of minutes that is taken to reach the closest station, from different points in the city. So it helps you map the level of accessibility of the stations; it helps you map the level of connectivity that you enjoy at different stations, as well. And so, you can get a nice variegated view of the city.

I mentioned Ohio State University and here, ENGIE has a 50-year deal—that’s five-zero, a 50-year deal starting with the district heating and cooling networks in the city. So what we wanted to do was...so what I am showing you is not just a simulated map. It’s a map that is sitting with a lot of analytical data behind it, which is then used to model the evolution of the campus over a period of time. So in red, we have the district heating network, in blue you have the district cooling network. You can also see visually, the level of luminosity of the street lighting,

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and what happens when the regular lights are replaced by LED lights. So we can show **visually** the impact of having energy-efficient lights and you can model the energy consumption at different points in the campus.

Similarly, we can do the modelling of the impact of introducing electric vehicles, as well as CNG-based [compressed natural gas] vehicles in the campus. So effectively, you are modelling the different drivers of electricity consumption, including for instance, the growth of foliage over the campus. So, the amount of foliage has an impact of the heat-island effect, which has an impact on the peak energy consumption. So, we can model in different ways.

This is a very interesting piece of modelling for the city of San Jose in California. And there...so this is for a client who's keen on introducing autonomous or driverless vehicles in the whole city of San Jose. But this requires a 5G level of connectivity, because you want a very strong network with high bandwidth and low latency. And to model at a 5G level, you want to make sure that every cubic centimetre of air in each of the streets in the city is capable of having a 5G level of connectivity. And that requires a high level of precision in terms of modelling the facades of the buildings, in terms of modelling the foliage, in terms of modelling **any item** of street furniture at the level of granularity of up to one centimetre—so it's a much more sophisticated camera than the one used in Google Street Views because it captures a lot more information.

In Rio, we have multiple businesses so we manage, for instance, the public lighting. There once you have these public lights, the streetlights, you can have sensors on the streetlights which can compile **a lot** more information, and this can be aggregated so [that] very street lamp also acts as a source for the information. Along with street lamps, you can also have the entire security system. So ENGIE has a whole range of CCTV [close circuit television] cameras spread across the city of Rio. And each CCTV camera is mapped out in a way that you can maximise the reach of the cameras, while minimising the CapEx spend. So, the ingress

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of these cameras is optimised, and with the cameras, you can track two things: you can track both the level of security as well as the vehicular congestion. So, as what we have in our control centres is [a] double view: it's a view of the real-time view of the traffic, that can be overlaid on the model, on the 3-D model of the city. And it can help you capture the incidence of traffic and it can then also help you model or simulate the evolution of traffic once you put your traffic management solutions in place.

We [also] capture all sorts of information on criminality, on traffic congestion and so on, and when we engage with the city, it helps us design outcome-based contracts; which is, we can help you reduce criminality by X percent, we can help you manage traffic congestion by X percent, we can help improve air quality by Y percent, we can help you...and so on.

So, this really paves the way towards a more intelligent management of a city and towards outcome-based contracts in a city. And that's something that Mark, my colleague, will speak about in his talk as well. An example of that is of the planning of buildings and you can see the whole plan of when, which buildings will be built which ones will be demolished, which ones will be adapted—and you can track the information and the impact it has on energy efficiency, on the energy consumption in the city; and the same for electric vehicles as well.

So that's an overall view of our services. So, thank you very much.

Mark Harris  
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So I'm just going to talk a little about the way that UK is structured, because it is structured differently to that of Singapore, and therefore, it sets a bit of context. I will talk a little bit about how the outsourcing models in the UK evolved—and it's evolved probably into a more mature state than certainly most parts of Europe, and other parts of the world. So it's certainly something that is quite interesting to a lot of places, not just yourselves here in Singapore. And I'm also going to spend a bit of time talking about our actual experiences from an ENGIE perspective,

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and share with you some of the contracts that we're running and some of the scope of services, just to give you a feeling of the out[comes]of the possible. And then lastly, we are going to talk a little bit about how you might apply it in Singapore because there are some fundamental differences between the way we do it in the UK and the way that you manage your local services here in Singapore, and quite clearly, to adopt this model would need some change and as ever, that change takes time.

Just a very quick run through, the way the UK is structured. So in the UK, very much like yourselves, we have elected officials. I think the main difference between the UK and Singapore is that in the UK, the way the UK local government is structured [is that] it allows for cross-party representation in the council. My understanding of Singapore is that when you have an election, your town council [and] all the councillors come from one party—whatever that party might be; where in the UK, it's possible to have a mix. And very much like our central government, one party can have the majority in parliament and therefore have almost total control over the council, or it may be the largest party, but not have an overall majority and therefore need the support of other political parties. So I think that's the fundamental difference.

And I think the other bit that's quite fundamentally different is the...if you look on the right-hand side here, in the UK, you have a number of permanently employed officials—what we call Council Officers in the UK. So, these people actually work for the council irrespective of which party is in power. So when you have an election, these people don't get replaced. And they are structured very much like a private company, as much as you have Chief Executive Officer [CEO] who would ostensibly report to the leader of council. But that Chief Executive Officer's job would be to run the council, or the services of the council very much like a business. And then that individual will have a board of directors who would be responsible for a range of services; and below those would be a number of what we would call Council Officers, people that would

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execute the works. And then below that, then you would have either directly employed people delivering the services, or you would have some form of outsourcing.

And in terms of the cycle of change where in Singapore, you have, as I understand it, five-yearly cycle—albeit from the conversation that we had yesterday, it appears that sometimes, councils will go in the fourth year—but you typically have a five-year cycle. In the UK, it's a four-year cycle. But every two years, half of the elective officials are up for re-election. So every two years, the local government gets into a cycle of 50% of the Council Officers are either voted in or voted out, depending on the mood of the people that live in that area.

So I just want to talk a little a bit about that decision-making process. So when you've got that two-tiered structure, ideas or policies come from three routes in the UK. They either come from the elected officials who have decided that this is something that they'd like to do, or they've seen another council do that, or they've seen another part of the world do that. Council Officers, so quite often, you'll find that the Council Officers who are permanently employed might go to the politicians and say, "I have a thought, I have a suggestion, on how we could structure our services." And while the Council Officers can't make that decision, what they can do is to bring that thought process to the attention of the elected officials.

And then the third bit is something that the central government actually insists that a local council will do, and that might be around raising the amount that the councils can raise—council taxes, which I think is a similar thing to your service charge. To be fair, central government interference in local government is pretty remote, so it doesn't happen very often. So the main tool [in] decision-making here [are] our elected officials and the Council Officers.

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So, let's assume that they've come up with a proposal and once the ideas come about, then it's the job of the Council Officers to actually draw that up in detail. They would then bring that back to the council for political approval, and depending on how big a decision that is, it might well be made by the Cabinet or it might well be made by the full council. So, in the UK, local government will create a cabinet of some 10 or 15 councillors, who will have the majority of the decision-making [power]. But if it's a big decision, it will go up full council—which means that you've got cross-party representation. And that will be something that would be enshrined in the constitution in each of the councils.

And then another cross-checking balance that the UK has is they have something called Scrutiny Committees. So it's quite...even when the councillors made the decision, irrespective of who made the decision—even if it's the leader of the council, it is the subject and can be the subject of calling by the Scrutiny Committee for a review. And **that** is represented by a cross-party political process. So the idea of that is to [have a] check-and-balance to make sure that nothing too radical goes through without full approval.

And assuming that that's the case, then the project in the UK, certainly for the time that UK remains in Europe—you know, post-Brexit, who's to know what we do—but currently, any local government or central government contract that's going to be procured has to go into what we call the OJEU, which is the Official Journal of the European Union. So that means that any organisation anywhere in Europe can apply to participate in that procurement process. I think the reality of life is, in the UK, majority of it is UK companies; in France, majority would be French companies; in Holland, majority would be Dutch companies, you know. But it **is** a level-playing field if people want to throw their hat in the ring, so to speak.

And then having gone through the procurement process, the implementation of whatever project or policy that the councils have

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agreed on, will be actually the responsibility of the Council Officers. So, the politicians will monitor it, but it is the Council Officers who will deliver that.

So, if you look at the UK outsourcing model, then this is something that we certainly talked a bit about yesterday at the previous seminar, was that the UK has been outsourcing for 30 to 40 years now. And if you look around the 1980s, it was a very simple, single outsourcing soft FM [facility and maintenance], very easy low-level, one-dimension[al] outsourcing. And then you came into the 1990s, and it became a bit more complex, in terms [of how] we started to bring asset management into play, we started to bring more complex contract management models in.

And then when we go into the early 2000s, for the time ever, we had come up with the model called the acronym is PFI which stands for Private Finance Initiative. So [for] the first time ever, the UK actually said...or the UK central government said, "We got ageing assets across the whole of the UK whether it be schools, hospitals, highways, any other form of public buildings." And this was their way of leveraging out private investment into public-sector owned buildings. And that involved a whole new sort of generation of more complex outsourcing decisions.

And then if you take us through to 2010, then you start to see more complex deals. And where we are today, you're looking at workplace change management, sustainable workspace[s], and management of intelligent buildings. If you come back to Amit's presentation around the buildings, what you are starting to see is that it's not **just** from outsourcing a service that's how you clean up a building or your maintain my building, you're into **actually how do you transform the management of that building while you are maintaining it.**



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So we look at the trends and we won't spend too much on this, but if you look at the trends—if you see the top right-hand corner here, this shows you the trend of the number of organisations that were looking to outsource and the type of outsourcing which they were looking to [have] between 2014 and 2016. So I think that in the context that [sic of] town councils within the UK, but also here in Singapore, you could quite clearly see it on the estates FM piece that there is a significant jump in the intent to outsource that type of service.

I think the other interesting thing on this slide is if you look at finance and human resources and procurement, there was a significant leap—particularly in finance around outsourcing that. And certainly when we get in little bit later, we can talk about one of the projects that we're doing which actually involves.... And that's what we call, in the UK, BPO which is Business Process Outsourcing, and that's quite a significant step forward from where Singapore currently is. But that's the route that UK has taken.

Then I think if you look at the left-hand diagram, it shows the split between the types of deals which have been outsourced. So the blue represents single service—so that would be one service you've outsourced and if you look at it, it's been pretty consistent over the last five or six years. But the interesting thing is the difference between the green and the orange bars. So the green bar represents what we call bundle services, so these will be services that would be outsourced to one service provider, which would actually not necessarily be related, but be a range of services. It might be estate maintenance, it might be highways maintenance, it might be management of parks. And the orange ones are about integrated services. This is where we're starting to look at: what if we outsourced the number of services that are integrated, then that starts to bring into play a far more integrated approach from service providers' perspectives? It starts to create efficiencies, cost-savings, and transformational change—which is one of the things that drives UK market at the moment.

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So, this is one of the slides I'm not going to spend too much time on. But if you look at that, you can see [the] market drivers. So again, there's a whole range of complex market drivers that actually start to inform the decision in the UK now. And again, this will be available and I'm more than happy to take questions on it. But you can see at a glance that we are into quite a complex range of services that drive those decisions. And again, I'm not going to spend too much time on these but if you take the context of the UK, you can see that the austerities...you might or might not be aware, is a big political drivers in the UK. And just one sound bite there is between 2010 [and] 2016, "Local authorities funding from central government will actually fall by over 35% in real terms." And that means local authorities [will] have to find some means of replacing that funding or some means of delivering the same level of service for 35% less.

And then you can go through older population[s], which everyone knows is worldwide challenge for everybody. The grand population of the UK...diverse population in the UK is very ethnically diverse and continues to be so. Hence, the current debate around Brexit and immigration et cetera. Environmental issues is a worldwide pressure that we've all got, and technology is starting to take a pace—so automating people's access to services and support functions. And again devolution. What we're having [and] seeing in the UK is adjoining authorities actually joining up together to deliver certain range of services. And again, that's something that within the 12 or 16 town councils you've got in Singapore—something that's worth some thought. And Amit talked about care of [sic for] the elderly, economic growth, the drivers for growth, and service models and mobility. So I'll move on from that.

## Drivers in Decision-Making: Outsourcing

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So I think this is the bit I want to spend a little bit of time [on]. So what drives a council in the UK to make that decision about outsourcing? So, if you turn the clock back to the early days, it was about cost reduction. It was about actually, "Can I deliver the same service for less money?"

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Then I think as it's evolved, it's become, "Well okay, let's look at the quality element of that." So, am I going to get more quality for the same amount of money? If I pay someone the same amount of money, am I going to get more services—which actually means I have a more positive impact on the people that pay the taxes locally in the councils.

And then we move into sustainability. I think there are two arms to sustainability: the obvious one [is] around the green—carbon reduction and the green environment. But I think the other thing about sustainability is actually longevity of assets. So again in the UK, we started to think around buying a lamp that costs you around 10 dollars which has a burn life of three years, as opposed to buying a lamp that costs 14 dollars that gives you a burn life of 10 to 15 years—and the LED revolutions is one of those typical examples of cost against so of life. So that started to become very much a part of the sustainability calculation. And carbon reduction, as we all know, is a major challenge for the whole of the world. And then the need to transform, I think, as you saw that reduction in funding from central government, now [there is] the need for councils to transform their services to find more cost-effective ways and more efficient ways to deliver the services—and also to transform the services that they deliver now, as our population is ageing [regarding] how we provide welfare facilities, et cetera.

So, what's the main feature of the UK outsourcing model? [So, it is] the bundle services—putting a range of services into [one], rather than just outsourcing one particular delivery model. [There are] a number of advantages for the councils on that one. The councils were going to adopt what we call a thin client, which means a management team didn't have to be particularly big, because it's effectively bundling a whole range of services and asking its service providers to deliver those. So it has one single point of contact for the delivery of all those, and managing the contract.

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[They also] coordinate with helpdesk, so the range of services go to one number. And quite clearly though, that helpdesk team needs to be well trained—but you can reduce numbers and people and create some cost effectiveness there. Reducing FM managing cost: again typically, in the local government in the UK, traditionally, you would have almost a siloed mentality of different managers to manage different streams of delivery. [So instead, we're] bringing all that under one umbrella and having one point of contact. Multi-skilling again [is] starting from a service provider's perspective to actually look at the resources they're deploying, and making sure that they are trained to do more than one job such that you [can] start to create a far more responsive service—be it make it more flexible but from a geographical perspective and also in terms of being able to turn people out when you need to.

And also reducing client procurement cost [is crucial]. So what you quite often see in the UK is not withstanding the range of services that they outsource to a service provider, they also ask the service provider to do all of the procurement on their behalf. We would typically call that what we call managed budgets, where we are actually buying all sorts of things for the council so that they can actually strip out all of their cost around procurement, and make it the responsibility of the service provider.

One of the big challenges, I think, from a Singaporean perspective is to get the best out of this model. Your term contract needs to be more than the five-year election cycle that you currently have. And so typically in the UK, it's 10-plus years—typically in the UK, it's 10 with an option to extend for a further five. And one of the debates and questions that we've had is around, "Well, how does this change in administration deal with that?" And the contract terms and commercial terms need to reflect that. But what that does, is it allows a service provider to [have] big investments, invested in technology. So, a service provider has a 10-year cycle with which it sort of recovers its money. And so therefore, you're likely to see far more investment, and far more innovation and

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thought—innovative thoughts and suggestions and proposals come forward under a 10-year deal than you would under a five.

More investment in people, again, in the UK and I can't speak for the labour market in Singapore. But in the UK, to come and go and see someone's 10 years' [worth of] work is pretty appealing in the UK these days. So again, if you've got a 10-year deal, you're more likely to keep your staff, you're more likely to be able to invest in training of new apprentices, graduates—so you're not only ensuring the longevity in delivery of the services, you're also creating employment within the local area.

And it also improves staff retention in the UK. If you've got a five-year deal, when you are getting to year four, a lot of your staff will start to think about where their next job is coming from and you do tend to see...you get a bit of what we call churn rate—we start to lose people in the backend of a contract. So again, that has an impact on the services quite...you know, someone that's been doing the job and knows the job leaves you at four years into a five-year deal and for that last year, you got to find resources to deliver that.

The other big piece, and I'll talk a little bit as the next slide is about [how] we moved from what we call an input-based contract to an output- or outcome-based one. And I'll talk a little bit on that in the next slide. And then the other bit is risk transfer. So within all of these, one of the things that councils can do is actually move the risk: so typically one that I think, in terms of Singapore is you can move the risk of cost and materials to the service provider. So the way it's currently managed in Singapore as I understand it, you typically appoint a managing agent, and the managing agent manages the business arrangements on your behalf. But the cost is the cost, and the council takes that cost.

Now, in this sort of model, you can actually tie a service provider into a guaranteed income stream irrespective... and the classic one I always

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use is lighting in an estate. So if [within] one month, 10 lights pop, you change them; and then next month, 20 lights pop, you're paying twice the amount to have your lights changed. In this sort of deal, the service provider would take that risk. So, there are some real benefits about certainty there.

And apologies to those of you that know this, I don't want to be teaching my granny to suck eggs so to speak—but [let me talk about] the difference between input and output spec[ification]. And the most simple one I could think of was lights again. So, in an input-spec type approach, you typically would say to your managing agent or to your sub-contractor, "Well, you need to inspect the lights once a month, and if there are any lights [that] are not on, then you need to change them," and so you're actually describing when they do it and what they do when they do that. An output-spec changes to saying, "Well, it's your responsibility to make sure that 100 percent of the lights are in light 95 percent of the time." And then quite clearly, it then becomes the service provider's responsibility to make sure that they meet that. And then what you'd have around that is what we call a KPI—key performance indicator—which would actually, in the event that we fail to deliver that as a service provider, then there's a financial penalty.

And I think the other thing in the UK [is that] we've moved towards what we call outcomes specifications. So this is actually what's the outcome of your efforts. And the two examples here are of a job that I was managing for a while called the North East Lincolnshire Regeneration Partnership. So, one of the outcomes here is that we've been measured by the amount of new jobs that we create in the area. So, we have economic regeneration and in with investment responsibility—which we're measured by. But actually, the direct result of that would be is that we create jobs, so the outcome is that we create jobs. If we don't create jobs, then we pay a penalty.

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Another one is about reduction in serious road-traffic accidents. So we had a responsibility in that contract for not only managing the highways, but also the highway design and highway safety. And one of the outcomes is if we do that properly, then we will reduce the amount of serious road-traffic accidents. And if we don't, we face a financial penalty.

[Let's talk about] the benefits for the council in this model. So first and foremost, is to provide value for money for the citizens of the council area. Your councillors represent the people within the council boundary, and everything that they do should be destined and driven to create value. It has to be structured to meet the ends of the council. So, every council that comes in has an objective, has a thought—and that will change over time. But at the point of time when doing it, you need to think about the structure, what are the aims and therefore your deal needs to reflect that.

It needs to be accountable and measured. Quite clearly, you're handing over an awful lot of responsibility to somebody else to manage those services on your behalf. So, you've got to have a means of making them accountable, you've got to have a means of measuring them against specific service standards—and you've got to be happy that those are accurate.

You're looking for flexible and responsive services. So quite clearly, part of the bundle services' attraction is the service provider [which] will structure itself to be very responsive to whatever happens—and also [to] the unforeseen circumstances. So in the UK, as an example, we've been quite prone to flooding over the last five to 10 years. Weather patterns are changing, and certainly when I was at North East Lincolnshire council, we had a very high tide and half of the town was flooded and we had to respond to that. Now that wasn't something that we planned for.

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The other thing is it releases strategic capacity and accounts. So quite often, accounts have got people that are capable far more than what they are doing—but they're actually tied down managing pretty basic services and on occasion that can quite easily be outsourced. So, it releases that thinking power and that capacity to do other things that the council might want to do. It also, and going back to Amit's presentation, it taps into the resources of a larger organisation. So you start off with a range of services, but that organisation then sort of starts to say, "Well, actually, we could take this on, we could take that on," and that actually might be to the benefit to the council.

And that leads us into innovation and continuous improvement. Quite often in the UK outsourcing deal, the requirements to find innovation continues to be a measure—and therefore it's not just a bit of a few token words in the bid, it's an absolute requirement that they deliver that. Investment options, we've touched on that already, it allows you to invest and also transfer risk.

### Drawbacks on Outsourcing: Consideration

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So, the drawbacks. So quite clearly, it sounds all very good, so why wouldn't you all be doing it? So there has to be some drawbacks, isn't there? And I think one of the major obstacles is the cost of delivering one of these deals. In the UK, typically, it might take as much as two years to deliver a deal like this. So, there is a cost that has to be accounted for, and accounts has to be happy that it will recover the cost of procuring the deal in whatever savings that it sees over a five- or a 10-year period.

And resource capacity, again, we're entering into quite a complex commercial world. And quite clearly within that, not all councils have got the resources in terms of legal, commercial, technical [aspects] to do the deal. So there has to be a view of how they deliver that, whether they engage external consultants, but there's a cost associated with that.



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Long-term commitment, councils are making commitment on handing these services over to a third party for a period of time. And again, [when] we come back to the Singapore model, I think that one of the challenges that we need to think about. And there's a loss of control, there's a piece about, "Well, actually I'm handing this over and I'm not going to have control over it for 10 years," you know, how do you all feel about that?

So [there are] things that the council needs to consider. I think the really important one is how does it feel culturally? Quite clearly, there's a political element—does it meet the politics of the council, the leader in the council in that point of time? And again, if you take the UK, that would also be subject to decision and discussion with all the parties. And ideologically, does it fit? So certain councils in the UK might have a real aversion to outsourcing their welfare care, as an example. So the structure of the deal has got to be something that suits the council.

Can the council afford to complete the transaction? As I said, it's a 12- to 24-month period. Resources, we talked about. Does the council have the resources—or if it doesn't, where will it get it from? Is the council happy that it has it got the appropriate service level measures in place? How is it going to measure this deal? How is it going to make sure that having bought the deal, that the service provider is actually going to deliver what it's undertaking to deliver?

And this I think is a really important piece—flexibility. We've had lots of debates about when you get to a change in the administration cycle, what happens? The deal has to be flexible enough that actually you can amend it and change it to suit the needs. So over a 10-year period, the council's objective **will** change, the political nature of the council is **likely** to change. So, it needs to be flexible. And is the transfer of risk appropriate? Are you shedding enough of the risk you carry currently to a service provider to make it worthwhile?

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When the council makes a decision, who it's going to go with, when it looks at its service providers, the two or three or four that bid for it, do they have the resources and commitment to invest? Can they deliver those service enhancements? Does the service provider have a critical mass and a proven track record? Have they done this before? Can they actually demonstrate they've done it? And do you think they are going to show flexibility in collaboration? I know that [this] is a bit of a leap of faith, but it's a really, really important part; **there needs to be trust between the two parties to make this work.**

I'm not going to talk too much about this slide because it's quite a complex one, but I think the point I'd make is that: if you look sort of third and fourth level down [to] negotiate in a committed dialogue, they're both forms of procurement that are typical in outsourcing deal. And the reason they are typically used is because the structure allows both parties to have an open conversation around the technicalities of it. So quite clearly, the complexity of these deals brings in some fairly detailed technical thoughts—both in terms of the technical delivery and also the commercial arrangements around that. And in the UK, the negotiating competitive dialogue are the two that are the most frequently used for this type of procurement.

And as a matter of interest, the framework agreement piece which is the last one there, is something that is very typically used in central government. So, you go through all that hard negotiation upfront, then you become a framework contractor which means that it shortens the procurement process for central government that might be procuring, you know, numbers of these services. Local councils are only going to procure something like this once or twice in their 10- to 15-year life cycle, I would have thought.

So just to flick through, and I'll flick over that slide just to give you a flavour of some of the...So, North East Lincolnshire is a regeneration partnership that we have with...So North East Lincolnshire is a council

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on the east coast of England. It was a 10 plus five-year deal initially. It's currently 12 plus three; we've had a two-year extension as part of some of the work we did there. And it deals with four main areas of delivery: Facilities and asset management, so that's not only the management of facilities but also the strategic assessment management of the councils. One of our output requirements on that contract was to actually get rid of the council's [offices]—the council had 27 offices and they wanted to actually merge it to four. So, we went through the process of logistics of refurbishing the offices, moving people around and then actually disposing of the vacant properties.

Highways and transport, we've actually touched on a little bit early on, we've got responsibility for not only maintenance of the highways, but also the design. As an example, we built a kilometre-long road to bypass one of the towns in the region.

Economic and physical regeneration and planning, this is about imminent investments, which brings me back to point earlier around that creation of jobs. And the other interesting point is that we had a number of architects that came across to us. So there, we typically design and project manage the building of public-sector buildings such as local primary schools, libraries, leisure centres and that sort of thing.

So just to give you a flavour of what the architects have done, there's a picture of...the one at the top right hand is an office block. That used to be a council-owned car park, and there was legal firm locally that gave an undertaking to take that building for 15 years. And the council funded the building of that office block, and we designed it and project managed the build of it. And on the left-hand corner, that's a brand new leisure centre that we designed and built within the region, which is structured to be a competitive standard. So that gives you a flavour of some of the things.

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North Tyneside. So, this is our first of what we call BPO—business process outsourcing. So for North Tyneside, we don't deliver any frontline services in as much as FM or any sort of asset or highways. We manage their back office, we manage their finance, we manage their IT, we also deal with the revenue collection. So, the service charge that you typically see in Singapore, we call council tax in the UK. We're responsible for collecting the council tax for the council; we're also responsible for managing the Revenue and Benefits Office. So, for people that are the low end of the scale that actually get benefits from the state, we pay the benefits out, and we took a number of commitments around that.

Cheshire West and Chester [Council] is a joint venture. This in the UK, there was what they call an LABV [local asset back vehicle] which is an asset backed vehicle, which allows councils to become a business. So we're in joint venture with the council here. What it allows us to do is actually sell the services that the council delivers to third parties which typically is something that legally the councils are not allowed to do in the UK.

Wakefield is our latest one, and I think that is the first time that we've had the sale of energy as a fundamental part of it. So coming back to Amit's point around how you can leave the services in—that wasn't really originally in the deal but as we negotiate the deal through, the inclusion of energy services became a fundamental part of the contract.

## Bringing the idea to Singapore

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So coming to Singapore: I think quite clearly, the UK model is completely different to [*sic* from] Singapore. It has been a 30 to 40 years journey. And so, some questions that I sort of challenged when we did the slide yesterday and things to consider is: from a Singaporean perspective, how do you deal with the change, well essentially a change of administration each five-yearly election? I think that's something of great concern locally in as much as well, if you get a complete change in

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administration, how do they deal with the fact that the previous administration's commitment is something that politically, they are not keen on? So I think that's a big hurdle to be discussed and debated.

Boundary shifts, again, as I understand it. So in UK, the boundaries are pretty static. I understand here that one election to the other, depending on the mix of your councillors that have been elected, you do on occasions see boundary shifts. So quite clearly, that might actually introduce the fact that you bring assets in or you take assets out of what was previously the deal.

Scope of responsibilities. So quite clearly, the split in Singapore between what the town councils manage and what the statutory boards manage is different to the UK. A lot of what sits in the local government's remit in the UK is currently under the control of statutory bodies. So, is there a possible link between town councils and the statutory boards? Which I fully acknowledge will bring all sorts of political debate into play, but [that is] certainly something to be considered. Because by doing that, you can create a far more bundled deal and greater economy of scale.

The resource to bid that, this is a new thing and if you were to do it in Singapore, it would take additional resources to that than the councils have probably got currently, I suspect. Now, whether or not there's a bundle piece to create a team, typically in the UK, you'd find certainly even commercial firms become expert at outsourcing and tend to move from one council to another. It might be something to consider.

And can you create economies of scale by joining up with neighbouring town councils? Again, might be very sensitive, I suspect—probably will. But to be fair, 20 years ago, it was very sensitive in the UK but necessity has driven us to do that.

So just final slide—opportunities. I think opportunities [include] to enhance service levels, getting more than you're currently able to afford

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or deliver in the time that you are there. You get structural improvement plans with milestones and so, you can get your service provider to commit to giving you specific deliverables over a period of time. It gives you a mechanism drive, transformational change—which you probably don't have the opportunity to consider within your five-yearly cycle currently. It creates economies of scale, [which] means you can either buy the same service for less, or buy more services for the same price. And it means that [in] the long-term deal, the big service provider will come in and will be prepared to invest in assets locally.

So, I'm just going to leave you with two quotes if I may. This one from Bill Gates. Bill Gates said, "We always overestimate the changes that will occur in the next two years and underestimate the change that will occur in the next 10. Don't let yourself be loved [sic] into inaction." Lulled into inaction, sorry—not loved into action. And then the other is from the Director General of the Facilities Management Association of the UK who said, "The market leader [is] able to provide the client efficiencies gains above mere outsourcing. Innovation is becoming key, but that requires scale."

Thank you very much for listening. (Applause).

## Panel and Q&A Segment

Mark Thomas  
01:00:10

**My question actually, taking away from town councils, is more to you, Amit. I suppose that it's sort of apt that you're talking today, given what happened in America with President Trump pulling the US out of the Paris Climate Change. I just wonder, with the sorts of things you show that your company's leading and the thoughts on energy innovations that are happening around the world, whether it is in fact as significant as maybe people might have thought, that the US is pulling itself out? And I'd just appreciate your views on that.**

Amit Pathare

01:00:35

In terms of what Mr Trump has said, well, we really don't agree with his stance. Now on a substantive basis, I don't...my personal view is that I don't think it will amount to much because there are several economic trends in all the technologies that he is speaking about—which really override any political decisions. For instance, when you speak of coal, now coal is becoming increasingly uneconomical when compared to new technologies, including solar.

Plus, in relation to the economics of coal, there is also the aspect of the water intensity of several thermal-generation choices. So, they are heavily water intensive for cooling purposes and therefore, if you are looking at places like India or China, then the big challenge in [the] coming years is going to be water. So therefore, from that perspective as well, it's not just the carbon footprint but also the water footprint that we need to be cognizant of—in order to determine our energy choices going into the future. And that's also where renewables heavily score over thermal technologies, including nuclear.

When it comes...I think the challenge is therefore not so much related to the policies around climate change and so on, because the rest of the world is pretty united and it has a fundamental underpinning to that question. The challenge will be in terms of the level of trust that is needed in order to manage several of the decisions across a **whole host** of other issues. I mean we've got several geo-political issues that we're confronted with—climate change is one of them, but there's also terrorism, there's also just plain economics and business opportunities; there's the aspect of migration. There are several different aspects that governments have to collaborate on, have to cooperate on—and the underpinning to that is that of **trust**. So, if you are engaging in a way where you see fit to renege on political agreements that have been framed with a lot of negotiation, with decades of negotiation, and then when you see, say Angela Merkel, for instance make a statement that the US position cannot any longer be trusted—I think that for me, is one of the biggest collateral damages coming from Trump's stand.

AUD1  
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Mark, just now you have shared [about the] long-term contract which [was] adopted in UK. Now in our local context, many of our contracts are mostly on a short-term basis—two or three years. I think there are a lot of advantages for [*sic* of] long-term contracts. **But I just wonder, how do you address some of the concerns in a long-term contract?** For example, you may not be able—or rather the vendor may not be able to foresee the changes in the next 10 years. And if they were to commit and price it, should the situation change or circumstances change, it's either the vendor may not be...will be in a position that [*sic* where] they may not be able to cope with the cost increase; or on the other hand, the councils may be in a disadvantaged position—that means it's the difficulties in adjusting to the changes. How to you address this aspect of it? Thank you.

Mark Harris  
01:04:15

Yeah, I think it's a really good question. And it's certainly something that we've discussed quite a lot over the last three or four days since I've been here? And I think I'll take you back to the flexibility. So, if you take the UK model as it currently stands—and certainly I'll explain if you get back to North East Lincolnshire as an example, we've been there now for, I think we're in our sixth or seventh year. And we have had situations where the council had pulled some of the services back; they had a change in circumstances. Part of the regeneration part was not working quite as effectively as both parties had thought it would. The council took that back in and reengaged it and reabsorbed it into the council.

At the same time, a year or so later, supply of energy—something that we've done with the council, so that's additional service. So I think the bit that's absolutely critical is making sure that the deal has the ability to be flex[ible], to meet the changing needs as you go forward. And quite clearly, this is a very difficult thing to do at the start. But trust—you have to have a partner that you know when you go to that partner and say, "Things have changed, the landscape's changed, either through micro or macro-economics and therefore, I need to have a conversation around that." And I think that's the piece where I think the challenge is actually getting the right advice from the council's perspective to make



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sure that your legal and commercial advice structures a deal that gives you the ability to come back.

And also, from the service provider's perspective [it is important] to have that conversation, say, "We think that we can do with shaping this deal slightly differently." So I think unlike the sort of contracts that you probably currently led which are three to five years, which are very structured, very rigid and probably have no change or no accommodation for change—this sort of deal needs to have the ability to flex. Because quite clearly, life will change and it will be either a change in the political party, possibly in terms of election time, or you know, change in what central government choose to do in terms of how it decides to run Singapore. That can have a knock-on effect. Or simply, economics. So, I think that's the crux. I know it sounds like it's not a particularly structured response as much as it is. The devil's in the details as they always say, in the contract. But the major thing is that you make sure that you get that flexibility built in.

And one of the things that we did discuss is that quite often, you can foresee, but you can't absolutely know. We can look forward and think, well actually, there are four or five things that are possibly on the horizon. And if you've got a little bit of clarity about that, you can actually have those as specifics within the contract that says, "Should you come to that, this is the specific course of action." So I think sometimes, we all get a little bit scared of what might change. But if we look back the ways, we can actually be pretty confident that the change over the five-, 10-year period, major change that might want you to change it, the commercial deal, might be no more than three or four areas that you might want to enshrine as specific area of attention.

Amit Pathare  
01:07:27

I think it's interesting to see that two very different questions have ended up with very similar answers. It comes back to **transparency and trust** that you want to engage in. And without that, you can't have any kind of sustainability, either at the municipal level or at a large-scale geopolitical level.

Yip Hon Weng  
01:07:47

I'll push the point a bit further about this flexibility. I think what we are trying to do here in Singapore in terms of contracting, is **dealing with new concepts such as spiral contracting**. I agree with you, that requires a lot of trust, because it transfers the risk from the contracting party and so on and so forth. **Maybe are there any lessons that you think we can learn from in terms of how we can apply some of these concepts? Having a contract where we need not state everything upfront but to have some conditions upfront and then let it run for a period of time, and then after a while, certain conditions come in and then we take on the contract for the next stage.**

Mark Harris  
01:08:30

Yeah, I think you can do it two ways. I think you could do the deal where you only hand over a range of your services for two years, and almost have like a hockey stick approach that says, "Well okay, we'll have some checks and balances and some real key deliverables within that first two or three years. And that gives you the option. [It is] very much like if you take the UK 10-plus-five approach. They're quite clearly at the 10-year period, if the council is not getting what it wants, it can walk away from the deal, and it is not duty bound to give you the five-year extension.

So maybe one of the things you might [want to] look at in a Singaporean model is actually something that has a break that's earlier, against a range of services—but obviously with a guarantee that if at that point, you've delivered what you expect to be delivered, that you might then migrate to give further services over. And so, I think that's one way of doing it.

I think the other way is agreeing [with] some really strong termination—and it sounds terrible that we're talking about termination in the context of sort of trying to convince you to do that. But quite clearly, the councils have to protect themselves from a service provider when the service goes completely wrong. And I think that's where the strong part, the commercial piece is [important], well okay, what are the checks and balances, and what is the recourse around termination should you choose to do that? And quite clearly, I think the major impact on that

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would have, from a service provider's perspective is actually how much the service provider is prepared to commit. And that becomes a risky analysis in terms of the service provider.

And I think if you go back into the procurement models that I touched on in terms of the negotiated and the competitive dialogue, it's in those forums that those things get explored. So, I think the challenge is, or the frightening thing is that you think you've got to come up with those upfront. And I don't think that's the case. I think that if you use those two procurement models to their fullest, you can have a very open conversation that together you work out what the technical deliverables are with the commercials around that. And you do that such that both parties, should they get to sign the deal, actually go there with complete eyes open.

Maria Boey  
01:10:47

It's very interesting, your whole range of work. But there's a specific question I would like to ask. It's about the trees. Because we do have trees that are quite old, but not as old as those in England, I believe. **Do you have arborists who have to look after trees in terms of the maintenance of it? And how often you have to do it, so that we can see where to learn from you.** My second question is about technology, **in terms of productivity and to reduce manpower as well as high technology that we can use because we are looking at designers coming in to work with the planners and all, so that they can solve some problems before the maintenance come[s] in and you have to solve your problem[s].**

Mark Harris  
01:11:34

Okay, so thank you. So then about the trees, [that] is a very interesting one and very emotive in the UK as you probably...very cleverly outlined it. So within the UK, we have a thing called the Tree Preservation Order. So, if the tree gets beyond a certain...the council will actually survey all of its trees and place the Tree Preservation Order against those trees that it wants to preserve. The reality of life is that at some point, like all of us, the tree gets to an age where actually, it might have been there 18, 19-hundred years and it becomes a danger from our [unclear] perspective—either the roots undermine someone's property and the property is in danger of falling down, or it's just old. And it would be fair

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to say that when the council decides to chop those trees down, then people chain themselves to the trees and all sorts of things and so.

But in terms of protection, the Tree Preservation Order is the first line of protection. And normally, there is going to be a tree cull of any description, there'd be an awful lot of consultation. But the reality of life is when trees get to a certain age, at some point, you have to deal with them. And that's always a sensitive [topic], as I suspect you've probably experienced in Singapore as well. Yup, yeah.

In terms of...in relation to technology, so if you take the architectural side of things which you're talking about: we have. And picking on some of the models that Amit was showing, is we do a lot of 3-D modelling now and so there's a lot of upfront modelling that we're doing, that sort of 3-D walkthroughs that you can do. And quite clearly, the driver for a new building in the UK, and I suspect that you're probably ahead of UK here because I've gone around Singapore, I can see how developed it is. It's only new-built or refurbishment of existing building is very much driven by the need to create sustainable energy, sustainable solutions.

So, in the UK one of the things that the business...we just acquired a business that deals with a refurbishment social housing, which is a world away from our origins as being an energy provider. But the reason we've done that [is] it fits in with our local government piece about the refurbishment of social housing care, and actually putting innovative equipment in it that actually reduces the amount of energy these properties need to consume. Whereas in Singapore, it's about the air-conditioning; in the UK, it's about heating—[it is] very rare that we'd ever even think about air-conditioning in the case of UK. If anybody has ever worked or lived in UK, you can probably attest to that.

So, I think that the whole driver is, and our Chief Executive in the UK who's a Suez man, who has been with ENGIE Suez for more years than I care to remember—his mantra is around [how] it's not about selling

01:14:23

people energy, it's about selling people energy conservation. And there's a very distinctive difference around the way we approach. So, it's probably not answering your question in absolute detail but in everything we do is around how we [can] make something more sustainable environment and we're using all of the tools.

Another innovation that we've introduced in North Tyneside in terms of...which is slightly off...but not to some extent linked, is we've got computer robotics. So, a lot of the stuff we're doing now is introducing computer robotics, so that's actually taken an awful lot of the manual handling of all the asset data and all of the engineering data, asset management data, highways data. And so, we're starting to do that. And on one side, I am talking about taking the ability of people to...this computer will do the same job as three people and it's an issue of the fact that we're taking people's jobs away. What we **are** doing is [to] create a more efficient service delivery, which means we can deploy those three individuals into something that will create value for the council.

Oh sorry, my apologies. Productivity, so yeah—my brain can only hold about two questions at once, so apologies for that.

Productivity is a very interesting one in terms of where we plan the works. So one of the things that we can do is...and if you bring that back into the bundled services thing, it's around ensuring that you plan the work that we are not criss-crossing. Geographically, we're not having people driving—in an eight-hour day, they spend three hours driving. So there's a big emphasis on work planning. Now, except that reactive maintenance doesn't necessarily lend itself to work planning; but again, typically within the UK outsourcing model, we would have a time period to respond to a reactive maintenance job. Obviously, if it's an emergency job, then we're out there within an hour.

01:16:19

But again, we employ quite a lot of asset management deployment models to maximise the amount of time that we deploy somebody rather than having them driving back and forth. And interestingly, our congestion is far worse than Singapore, believe it or not, I can tell you that from experience. I think the robotics piece is another bit that drives that, so we're releasing people from the day-to-day machinations of doing that and actually deploying them on more important things.

And then the innovation and the investment piece starts to come into that. So, it's about buying equipment and upgrading assets with equipment that needs less maintenance or is more easy to access. We were having a conversation last night about refurbishing properties in and around Singapore and putting new AC [air-conditioning] units in it and how you do that and making sure that it's accessible. So I think all those things go into planning. I think the real key for us is upfront planning—never leaping into it without thinking about how we're going to do it. And always revisiting that process and so on. How can we improve it? Where can we shave a bit more off, and how can we make it more efficient?

Yip Hon Weng  
01:17:25

**Is ENGIE doing more like the predictive front, to predict something before it happens?** Because I think on our end, for maintenance, this is an area of work where the Singapore Government is really looking into, to see. For instance, how do I prevent the next lift from breaking down rather than going through this reactive maintenance schedule.

Amit Pathare  
01:17:50

I can give you two examples of that. The first example, for instance, is using LPWAN networks. So LPWAN is Low-Power, Wide-Area Networks for predictive maintenance. So, one of our research labs called Silergy is right now assessing the usability of sensors in our existing power plants, and these sensors are connected with the LPWAN network in order to improve the efficiency of the predictive maintenance of the different equipments in the power plant. So that's one example which can be easily applied to absolutely anything else, not just to a power plant, any large industrial installation or even a big residential complex including

01:18:33

equipments and lifts and et cetera, so everything else. So that's one of this example.

A second example of using predictive analytics is in the space of security. For instance, ENGIE has a big business in security where we provide the physical infrastructure for security, like CCTV cameras. But we also then have...we also run the command control centres to manage the output from these cameras. Now in addition to that, we also have a partnership with IBM [International Business Machines] and IBM here brings some of their most advanced analytics.

Like for instance, the Watson supercomputer. And there, this is deployed in terms of recognising patterns of activity in different context[s]. So let's say you are at a big football match, and there is a chance of riots emerging from that match. So what IBM does is ENGIE provides the usual cameras—these cameras capture a lot of information. IBM's job is to capture then, the patterns. And once these patterns are identified, it is put through these machine-learning models which basically learn how to identify the relevant patterns as you go along; and then once these patterns are identified, then ENGIE can effectively make a human call on which of these patterns you are seeing are likely to result in an incident that requires prevention. So [this is] just a wonderful example of a combination of machine learning coupled with human intelligence. And this is how a bunch of distributed assets together with the right level of analytics can support predictive decision-making.

If I extend that a bit more widely: so let's say when you have different assets spread all over a city, the assets may be your CCTV cameras, the assets may be your public lighting, the assets may be your district heating and cooling networks. So regardless of what it is, the assets allow you [to obtain] an added layer of information by attaching sensors and devices to them. So, once you have these sensors and devices all over the city, then you can start making more intelligent decisions by

01:21:07

creating for the used cases, for how to measure city in a more efficient fashion.

So, for instance when you have information coming from your waste bins, that okay, it's over 80% used, so why don't you go and empty it rather than... So, it's more intelligent decision making at the city level, at the municipal level to make sure that you are managing your processes in a more efficient fashion. Or in several countries, you see the instance of the electric utility company coming one day to dig up your roads; then the next week, the telephone utility comes in and digs the same roads; and the next week, it's the water utility so on. So you find several municipal departments operating in silos. But now, if you have the right level of information flowing at the geo-locational level, you can plan more intelligently and therefore predict or avoid the kinds of issues that happen everyday in silo-ed environments.

[Transcript ends at 01:22:07]



## LECTURE INFORMATION

### TITLE

A New Model for Municipal Delivery

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