

Innovative Revenues for Infrastructure

IRI Guidelines
Commercial Value Capture

Annexes

The World Bank Group
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Annexes:

Annex 1: Worked Examples

Annex 2: International Case Studies on CVC

Annex 3: External Resources on CVC Opportunities in Infrastructure Projects

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Annex 1: Worked Examples

Introduction to Worked Examples

The Worked Examples are provided to demonstrate to practitioners how the Guidelines can be applied to projects. The Worked Examples are hypothetical project business cases and include hypothetical financial assessments with key project information.

Worked Examples were selected to cover diverse sectors, including sectors which have proven CVC concepts and sectors which are relatively new to CVC. They were selected to cover different types of CVC opportunities. While the Worked Examples are hypothetical and entirely fictitious, they are drawn from real-world projects to demonstrate practical challenges and concrete CVC opportunities.

Assumptions made in the hypothetical financial assessment in each Worked Example are based on statistical data and the consultant's estimations from experience in similar projects around the world and are prepared strictly for capacity building purpose. Any similarity to any existing or planned projects is coincidental. It should neither be used for any decision making nor applied to any real or planned projects, without taking into account the specificities of the project being assessed. To avoid any misunderstandings or any adverse influences that this report may have on an actual real project, all names and locations have been anonymized to ensure that the capacity building value of the report is not undermined.

Overview of Worked Examples

| No. | Project | Sector | Core Services/ Public Service Delivery | CVC Opportunities |
|-----|----------------------------|------------------|--|---|
| 1. | Wastewater treatment plant | Urban Management | Wastewater treatment | Water reclamation, carbon credits |
| 2. | Urban transit | Transport | Urban mobility | Commercial space, advertising and marketing, infrastructure sharing |
| 3. | Public hospital | Health | Public health services | Revenue from improved medical services and commercial space |
| 4. | Affordable housing | Housing | Low-income and middle-income housing | High-quality amenity services, development of office space on nearby land |
| 5. | Waste recycling | Urban Management | Solid waste management | Sustainable road construction |

The structure of the Worked Examples will be as follows: First, the content of the Worked Examples will be provided, and brief project scope introduced. The first section of the Worked Example will demonstrate how the first Guidelines on policy, legal and institutional readiness can be applied. The second section will demonstrate how the second Guidelines on preparing a project to maximize CVC opportunities can be applied.

As developing CVC activities will incur additional cost, the Project Owner should consider if this additional cost will outweigh the additional revenue generate from CVC.

Net revenue from CVC is thus hypothetically assumed to be *total revenue stream from CVC throughout the project life minus additional CVC-related expenses throughout the project life*. In the hypothetical financial assessment, potential net revenue contribution of CVC is calculated as a % of net revenue from CVC to total required revenue. For simplification, it is assumed that total required revenue is the total revenue required to make the project financially viable or to make the project's return exceed the hurdle rate.

The hypothetical financial assessment only aims to conceptually show a potential revenue structure in the scenario with and without CVC and its potential to help reduce or close the funding gaps.

Worked Example 1: Wastewater Treatment Plant

With growing populations and rapid urbanisation, an estimated 380 billion cubic meters of wastewater is generated annually worldwide and it is a growing concern for developing economies.¹ Wastewater generation is expected to increase by 24% by 2030 and 51% by 2050.¹ The need for improved sanitation and increased wastewater treatment coverage is vital. Despite growing demand for wastewater services, investment in wastewater has been lacking due to operational and financial constraints with low wastewater tariffs.

In some developing countries, the construction of wastewater treatment plants (WWTPs) usually relies on overseas development assistance while cashflows from the projects exert a significant burden on local governments, as such facilities usually generate low tariffs. Local governments are likely to be interested in mobilizing private investment in the wastewater sector to achieve wider coverage and expansion, to meet their respective UN SDG goals. Local governments can consider various financial mechanisms to improve the attractiveness of the project.

This Worked Example looks at a hypothetical case in wastewater treatment facility in a developing country.

Project scope: A local government is planning to develop a centralized WWTP in the capital city as a PPP. The local government will procure the private party through a bidding process. Wastewater from households in the coverage area will be treated in the WWTP with the treated water being discarded in the surrounding environment such as rivers and streams. Some wastewater will be sold as reclaimed water to industrial users.

Identifying CVC opportunities in WWTP:

Core services: The project will provide wastewater treatment services to the public.

Commercial potential and demand: The project is located in the southern area of the capital city with high economic growth and rapidly increasing wastewater. Industrial users in the area face water supply shortages which causes disruption in the manufacturing process. Hence, there is demand for reclaimed water among industrial users. Additionally, the sludge produced from wastewater treatment can be turned into compost or RDF (Refuse-Derived Fuel) for commercial purposes, as well as capturing methane for energy production and carbon credit generation.

Beneficiary and stakeholder needs mapping

| Groups | Description | Need | CVC Opportunities | Revenue Streams |
|---------------------|---|--|---|-------------------------------------|
| Users | Households benefiting from treated wastewater | Access to sanitation | N/A (core revenue) | Wastewater tariff |
| | Water users (Industrial) | Affordable and reliable water supply | Sale of reclaimed water to industrial users (Instead of discarding treated water into rivers) | Revenue from water reclamation |
| Stakeholders | Corporations wanting to reduce their carbon emissions | Buy carbon credits to reduce their carbon footprints | The project can reduce carbon emissions through methane capture | Revenue from selling carbon credits |

Note: 1. Additional CVC revenues that can be explored for WWTP project include sale of biogas and electricity, sale of phosphorus as fertilisers and sale of biosolids as compost. 2. Besides CVC revenue, there are IRI opportunities such as betterment levies and development fees which involves collecting taxes and charges by the local government.

Assessing the policy, legal, institutional readiness in the country

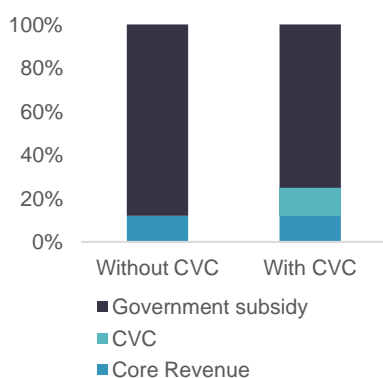
¹ United Nations University, *Valuable Energy, Nutrients, and Water Lost in World's Fast-Rising Wastewater Streams*, February 2020

| Areas | Assessment |
|--------------------------------|---|
| Policy and planning | <ul style="list-style-type: none"> CVC is a still a new concept, but government is willing to consider CVC mechanism to address financial constraint of WWTP investment. |
| Legal framework | <ul style="list-style-type: none"> Current legal framework for PPPs is still nascent. However, government provides the flexibility to negotiate terms and conditions to make the project commercially viable. |
| Institutional readiness | <ul style="list-style-type: none"> Project Owner has limited technical capacity to consider CVC and institutional set up for wastewater is complex which affects the policy and implementation support required for CVC. |

Technical design: The identified CVC opportunities can be seamlessly integrated in the project design.

Commercial feasibility: Based on a hypothetical financial assessment, the user fee will come from a wastewater tariff paid by households. As shown in the table below, the user fee is only 12% of total revenue required to exceed the hurdle rate in the hypothetical financial assessment. This might appear quite low but it is a typical scenario given the low appetite to charge wastewater tariffs. CVC in the form of asset use optimization and leveraging climate finance will add 13% of total revenue required. The remaining 75% of required total revenue will be paid by the local government as subsidy.

| Revenue Category | Revenue Item | Expense Items | Net Revenue as % of Total Revenue ² |
|-----------------------------------|----------------------------------|--|--|
| A. Core Revenue | | | |
| User Fee | • Wastewater tariff | • Development cost for WWTP, interceptor sewer • O&M cost | 12% |
| | • Connection fees | • Additional development cost for extended sewerage network • Additional O&M cost | |
| B. CVC | | | |
| Asset use optimization | • Revenue from water reclamation | • Additional development cost for water supply network • Additional O&M cost | 3% |
| Leveraging climate finance | • Carbon credit | • Certification related costs | 10% |
| C. Government subsidy | | | |
| Government subsidy | • Government subsidy | N/A | 75% |



Implementation: This project including CVC concept will be implemented through a PPP mechanism. Local government has the authority to procure the project through the PPP mechanism.

Risks: Price of reclaimed water needs to be competitive with piped water supply or this could create demand and revenue risk. Carbon price fluctuation can affect revenue forecast. Operational risks regarding the standard of reclaimed water and separation of pipelines for treated and piped water supply needs to be part of performance standard agreed in the contract.

² The Worked Examples is hypothetical project business cases and include hypothetical financial assessments with key project information.

Worked Example 2: Urban Transit

Large cities in developing countries typically lack effective public transport service with high dependency on cars. As a result, traffic congestion and long travel hours commonly affect a city's liveability and lead to productivity loss. In 2022, 56% of the world's population lived in urban areas.³ It is predicted that 68% of all people will live in cities by 2050.⁴ Urban rail transit can help improve connectivity, reduce traffic congestion, improve air quality, and enhance economic development in urban areas.

Central and local governments plan to increase investment in urban rail transit but they face several challenges including large investments, limited budgets, design and construction delays, and cost overruns. Governments are considering various solutions to implement urban transit projects such as mobilizing private investment, increasing non-fare revenue and transit-oriented development.

This Worked Example looks at a hypothetical case in urban transit project in a developing country, to be developed as a PPP.

Project scope: The project is a secondary mass transit system to support passengers in the eastern part of the city. The route will act as the feeder line to connect passengers with the main urban transit route and other secondary routes to alleviate traffic congestion in urban areas. The project is owned by the local government. Given the need for large investment and the limited budget of the local government, the project is proposed to be developed as PPP.

Identifying CVC opportunities in urban transit:

Core services: The project will provide urban transit service and improved connectivity to the public.

Commercial potential and demand: The project is located in an area of the capital city with growing economic activities and rapid expansion of residential and commercial areas. However, with several commercial centres along the route, commercial activities in the project will face strong competition.

Beneficiary and stakeholder needs mapping

| Groups | Description | Need | CVC Opportunities | Revenue Streams |
|----------------------|--|---|--|-----------------|
| Users | Commuters who use the transit system | Improved connectivity, shorter travel time | N/A (core revenue) | Fare revenue |
| | Commuters who use the transit system | Enhanced convenience | Retail, banking, leisure, entertainment, food and beverages, advertising, office space, rooftop solar, co-located utilities (fibre cables, power, etc) | Rental fee |
| | Commuters who use the transit system | Seamless multi-modal connectivity | Park and ride | Carpark fee |
| Beneficiaries | Residents living around the stations | Access to facilities and amenities | Retail, banking, parking, transportation fee, leisure, entertainment, food, and beverages. | Rental fee |
| Stakeholders | Nearby commercial buildings (shopping malls, office buildings) | Seamless connection with the stations to increase traffic | The project will provide seamless physical connection between commercial buildings and stations. | Connection fee |

³ World Bank, *Urban Development*, October 2022

⁴ United Nations, 68% of the world population projected to live in urban areas by 2050, says UN, May 2018

| Groups | Description | Need | CVC Opportunities | Revenue Streams |
|--------|---|---------------------------------------|---|-----------------------|
| | Firms that want to reach target customers to advertise their products | Access to high-footfall traffic areas | The project will provide advertisement space on the interior and exterior of trains, station, depot, railway pillars. | Advertisement revenue |

Assessing the policy, legal, institutional readiness in the country

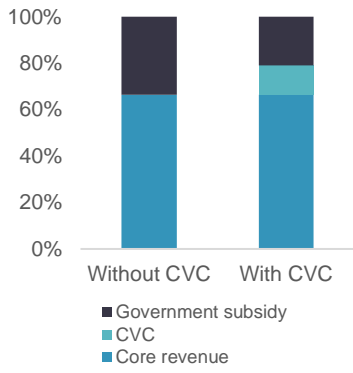
| Areas | Assessment | Results |
|--------------------------------|--|---|
| Policy and planning | <ul style="list-style-type: none"> Clear policy direction from Ministry of Finance (MOF) for line agencies to maximize commercial opportunities in project and strong public support for CVC in urban transit projects. Project Owner has limited implementation support to address institutional and legal barrier involving cross-agency coordination. | <p>Medium opportunity: Policy, legal and institutional frameworks are adequate and allow for CVC to be considered in the project. Some changes can be made for smoother implementation of the project.</p> <p>Next Step: 1. Identify and analyse CVC in feasibility study. 2. Requested planning agencies to provide implementation support and increase technical capacity of Project Owner.</p> |
| Legal framework | <ul style="list-style-type: none"> Clear legal framework to implement PPP. Legal barrier related to the use of public land belonging to different authorities for potential CVC opportunity in the project. | |
| Institutional readiness | <ul style="list-style-type: none"> Project Owner has some experience with PPP but requires third-party support on implementation. Project Owner has contractual authority to implement CVC through PPP. | |

Technical design: The CVC opportunities are integrated in the project design such as station area, train tracks and depot. However, additional CVC opportunities can be considered if nearby areas belonging to different government agencies are allowed to be used for the project.

Commercial feasibility: Based on a hypothetical assessment, the user fee will come from fare revenue paid by commuters. As shown in the table below, user fees are 66% of total revenue required to exceed the hurdle rate in the hypothetical financial assessment. CVC opportunities have been further analysed and CVC in the form of commercial use of project space and infrastructure sharing will add 13% of the total revenue required. This has already considered additional capital and operating expenses required to perform CVC activities. The split between fare and non-fare revenue is in line with what is observed in urban transit projects where the share of non-fare revenue is around 10-20% of fare revenue depending on each project's characteristics. The remaining 21% of total revenue required will be paid by the local government as subsidy.

| Revenue Category | Revenue Items | Expense Items | Net Revenue as % of Total Revenue ⁵ |
|--|--|--|--|
| A. Core Revenue | | | |
| User fee | Fare revenue | <ul style="list-style-type: none"> Development cost for all facilities O&M cost | 66% |
| B. CVC | | | |
| Commercial use of project space | Rental fee of commercial space and Carpark fee | <ul style="list-style-type: none"> Marginal O&M cost Additional construction cost in station and depot | 1% |
| | Advertisement | Additional O&M cost in station, around train, pillar | 11% |
| Infrastructure sharing | Connection fee | Additional admin cost for stations with extended skywalk | 1% |
| C. Government subsidy | | | |
| Government subsidy | Government Subsidy | N/A | 21% |

⁵ The Worked Examples is hypothetical project business cases and include hypothetical financial assessments with key project information.



Implementation: This project including CVC concept will be implemented through a PPP mechanism. The private party will build and operate the core and non-core services with the local government providing a construction subsidy to the project.

Risks: Demand risk from core-services and competition from nearby rail stations, such as shops, restaurants, and shopping mall, can pose CVC market risk.

Worked Example 3: Public Hospital

Developing countries face a wide range of complex healthcare challenges spurred by changing demographics, a growing burden of chronic disease, rising healthcare costs, more informed patients, and rapidly changing healthcare technologies. Healthcare systems are increasingly strained and struggling with how to expand access and deliver high-quality healthcare services – all while controlling costs.

Additional investment in health will be needed in developing countries where healthcare infrastructure remains inadequate, and facilities lack access to the necessary management skills and patient care workforce to address the growing demands of caring for their population. Governments are looking for ways to mobilize and encourage private investment in delivery of public health services.

This Worked Example looks at a hypothetical case in a developing country which involves the integration of a public and private hospital in the public hospital area.

Project Scope: The project will expand additional beds in the same area as the existing public hospital, to a similar capacity as the existing hospital. The new hospital will be developed as a co-located and co-branded hospital through a joint venture (JV) between the public hospital and private sector. Only 10% of bed capacity will be reserved for patients who are charged subsidised public healthcare prices, while the rest will be charged market prices (in excess of what is reimbursed by social health insurance).

The private sector is responsible for financing, constructing, operating and managing the new medical center. The public hospital is responsible for sharing land, brand name of public hospital, patients, equipment, medical staff as well as managing and operating professional activities. Both the private and public sectors will be responsible for medical examinations and treatment.

Identifying CVC opportunities in public hospital:

Core services: The project will provide public health care services to the general population.

Commercial potential and demand: The project is located in one of the most populous provinces in the country with high medical demand. There is a growing demand for faster and higher quality services from the middle-income population and commercial services from a large number of hospital staff. The hospital can mobilize revenues from private healthcare, office space for specialist clinics, advanced imagery facilities, parking and retail services provided to patients and hospital staffs of these various facilities.

Beneficiary and stakeholder needs mapping: The mapping is shown in table below.

| Groups | Description | Need | CVC Opportunities | Revenue Streams |
|---------------------|----------------------|---|---|--|
| Users | Patients | Regular health care services | N/A (core revenue) | Public health service fee covered by health insurance |
| | High-income patients | Improved health care services (similar to private hospital) | Higher medical service fee | Higher health service fee from high-income patients |
| Stakeholders | Hospital staff | Access to facilities and amenities | Retail (pharmacy, supplemental), food and beverages, convenience store | Rental fee from commercial space |
| | New hospital | Access to equipment, staff, utilities | Existing hospital can share staff, equipment, laboratory, imaging and other utility services. | Medical equipment fee, lab service fee, profit sharing |

Assessing the policy, legal, institutional readiness in the country

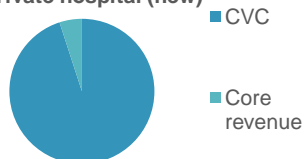
| Areas | Assessment | Level |
|--------------------------------|--|--|
| Policy and planning | <ul style="list-style-type: none"> There is clear policy direction to mobilize private funding for hospital facility investment at all levels. | High opportunity: Policy, legal and institutional frameworks are supportive and allow for CVC to be considered in the project. Next step: 1. Identify and analyse CVC in feasibility stage. |
| Legal framework | <ul style="list-style-type: none"> There is existing legal framework to allow private participation in the provision of health services under various modalities. | |
| Institutional readiness | <ul style="list-style-type: none"> Project Owner and players in the sector have extensive experience partnering with the private sector to deliver private health services under different commercial structures. | |

Technical design: There are CVC opportunities for both the new and existing hospitals. For the new hospital, CVC opportunities are integrated in the project design to introduce modern facilities and commercial activities. The new hospital can be designed to allow for sharing infrastructure (lab, utilities, medical staff) with the existing hospital which will provide additional revenue for the existing hospital.

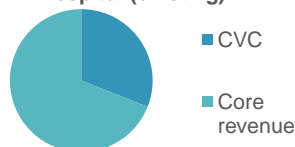
Commercial feasibility: Based on a hypothetical assessment, the core revenue which is the user fee will come from medical service fee at mandated prices covered by public health insurance. As shown in the table below, the core revenue is 5% of total revenue required as the project is designed to primarily serve affluent groups and only allocate 10% of capacity to provide public health care services. As the new hospital will mainly cater to higher-income groups, it is aimed to be fully funded by commercial revenue. CVC will be in the form of commercial core services, commercial use of project space and infrastructure sharing, which will add 95% of total revenue required. The high share of revenue from commercial health care services provision is generally observed given higher revenue per patient in private hospital compared to public hospital.

| Revenue Category | Revenue Item | Expense Items | Net Revenue as % of Total Revenue ⁶ |
|---|---|--|--|
| A. Core Revenue | | | |
| User fee | Medical service fee at mandated public health care price (10% of beds) | <ul style="list-style-type: none"> Development cost of new hospital O&M cost | 5% |
| B. CVC | | | |
| Commercial core services | Higher medical service fee (in excess of mandated public health care price) | <ul style="list-style-type: none"> Development cost of new hospital O&M cost | 90% |
| Commercial use of physical space | Rental fee from commercial space | <ul style="list-style-type: none"> Development cost of commercial space O&M cost | 5% |

Revenue composition of private hospital (new)



Revenue composition of public hospital (existing)



Implementation: This project including CVC will be implemented through a joint venture scheme. A new JV will be established to invest in the new hospital with the private investor holding the majority share and the public hospital holding minority share. The public hospital's contribution will be in the form of land value, branding and medical staff. The public hospital is legally allowed to set up a new company with a private company.

Risks: The focus on high-income patients and sharing of resources (e.g., skilled doctors) with the private hospital may dilute the quality of core services, i.e. the public health objectives of the existing hospital.

⁶ The Worked Examples is hypothetical project business cases and include hypothetical financial assessments with key project information.

Worked Example 4: Affordable Housing

According to the World Bank, 1.6 billion people around the world are expected to be affected by the global housing shortage by 2025.⁷ In most countries, the cost of housing has grown faster than income.⁸ Having access to quality affordable housing is essential to decrease poverty, provide equal opportunities and guarantee sustainable growth.

Although there is high demand for housing in many countries, low-income households cannot afford to buy houses with high urban land prices while commercial developers focus on serving the more profitable higher-income market. The government faces the challenge of providing affordable housing for lower- and middle-income groups as public investment is constrained. Governments are looking for innovative mechanisms to fund affordable housing including increasing private participation in the sector.

This Worked Example looks at a hypothetical affordable housing project in a developing country which is proposed to be developed as PPP with strong commercial elements.

Project scope: The project is located in a satellite city of the commercial center with growing economic activity and housing demand. The project consists of two residential complexes where one complex includes one-bedroom housing units (targeting low-income groups) and the other complex has two-bedroom housing units with parking facilities (targeting middle-income groups). In addition, the project includes key community infrastructure services and premium amenities like healthcare centre, primary school, shopping complex, banks and public institutions such as post offices.

Identifying CVC opportunities in affordable housing:

Core services: The project will provide affordable housing for low- and middle-income groups.

Commercial potential and demand: As the project is located in a planned satellite city near the capital city with growing economic activities, there is a strong demand for both housing and related amenities.

Beneficiary and stakeholder needs mapping

| Groups | Description | Need | CVC Opportunities | Revenue Streams |
|---------------------|--|--|---|----------------------------------|
| User | Low- and middle-income households | Housing in new satellite city with easy access to jobs/amenities | N/A (core revenue) | Sale of affordable housing units |
| | Low- and middle-income households living in the project | Access to facilities and amenities | Healthcare centre, shopping complex, primary school, fitness club, entertainment centre, car parking, | Rental fee of commercial space |
| | Low- and middle-income households living in the project | Access to basic infrastructure | Post office, drinking water supply, roads, street lighting | Rental fee and utilities fee |
| Stakeholders | Residents living in satellite city and nearby capital city | Access to facilities and amenities | Healthcare centre, shopping complex, primary school, fitness clubs, entertainment centre, car parking | Rental fee of commercial space |
| | IT corporations looking to expand operations in new city | Office space for IT industry | Development of office space for the IT industry near the project area | Rental fee of office space |

Note: The project can include additional CVC revenue such as selling solar energy, water recycling, and solid waste recycling.

Assessing the policy, legal, institutional readiness in the country

⁷ World Economic Forum, *What has caused the global housing crisis - and how can we fix it?*, Jun 2022

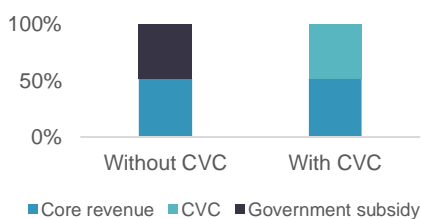
⁸ International Monetary Fund (IMF), *Housing Prices Continue to Soar in Many Countries Around the World*, October 2021

| Areas | Assessment | Level |
|--------------------------------|---|---|
| Policy and planning | <ul style="list-style-type: none"> There is a clear policy direction to consider PPP and CVC in affordable housing projects in the country. There is strong public support for CVC in housing projects which meet the needs of urban residents. | High opportunity: Policy, legal and institutional frameworks are supportive and allow for CVC to be considered in the project. Next Step: Identify and analyse CVC in feasibility study. |
| Legal framework | <ul style="list-style-type: none"> Legal framework allows local government to set up a new state-owned entity to oversee the project and enter into PPP contract with the private sector. | |
| Institutional readiness | <ul style="list-style-type: none"> A new state-owned entity can recruit personnel with commercial experiences to oversee the project. | |

Technical design: The residential units and the public infrastructure/amenities are designed and planned together to integrate commercial activities and core services in the early planning stages to provide a holistic user experience. A separate piece of land outside the project area is allocated to the private developer to develop office space for the IT industry, a driving force in the new satellite city, as part of the contract to provide additional incentives to the private developer.

Commercial feasibility: Based on a hypothetical financial assessment, the core revenue is the user fee which will come from sale of affordable housing units for low- and middle-income households. As shown in the table below, core revenue is 52% of total revenue required. So, 48% of total revenue is required to exceed hurdle rate in the hypothetical financial assessment. Typically, renting a high-end space can yield significantly greater financial benefits compared to other costs, often surpassing 20% to 100% of what people spend on a more affordable space. Analysis of the project's CVC potential finds that CVC in the form of commercial use of physical space, infrastructure sharing and development of a nearby IT office project on an additional piece of land will add 48% of total revenue required so government subsidy will not be required for the project.

| Revenue Category | Revenue Item | Expense Items | Net Revenue as % of Total Revenue ⁹ |
|---|---|--|--|
| A. Core Revenue | | | |
| User fee | Sale of affordable housing units | <ul style="list-style-type: none"> Construction cost of residential units Marketing and selling expenses | 52% |
| B. CVC | | | |
| Commercial use of physical space | Rental fees of commercial space providing amenity services to residents and non-residents | <ul style="list-style-type: none"> Land preparation cost for amenities/commercial zone | 8% |
| Infrastructure sharing | Rental fees of public infrastructure (post office) | <ul style="list-style-type: none"> Land preparation cost | 2% |
| | Carpark fee | <ul style="list-style-type: none"> Construction cost for parking lot O&M cost | 1% |
| | Utilities fees | <ul style="list-style-type: none"> Construction cost for utilities O&M cost | 2% |
| Others | Rental fee from high-end IT office space development | <ul style="list-style-type: none"> Construction cost for separate office project O&M cost | 35% |



Implementation: This project including the CVC concept will be implemented through a PPP mechanism. A state-owned entity will be set up to manage the infrastructure development and select the private sector developer under PPP procurement.

Risks: Risk that the private developer will develop the more commercially attractive element of the project first (IT office space) while postponing the development of the project's less profitable element (affordable housing). This can be

mitigated through putting in place contractual terms so that both projects are developed in parallel.

⁹ The Worked Examples is hypothetical project business cases and include hypothetical financial assessments with key project information.

Worked Example 5: Waste Recycling

Driven by rapid urbanization and growing populations, 353 million tonnes of plastic waste was generated in 2019.¹⁰ Only 9% of the plastic waste is recycled while 50% was landfilled, 22% was disposed in the environment and 19% was incinerated. Therefore, solid waste management is important for the protection of public health, safety and environmental quality. Even though awareness of waste management is increasing, local governments face obstacles such as affordability, scarce urban land for landfill and other challenges associated with the development and maintenance of an adequate waste collection and disposal infrastructure.

This Worked Example looks at a hypothetical plastic recycling project in a developing country which is a collaboration between the public and private sectors.

Project scope: With a goal to increase waste recycling and advance a circular economy, local government, private sector, and communities joined together to develop an environmentally friendly plastic road-building project. The project will reuse plastic waste and reduce plastic waste ending up in the ocean, which is a critical environmental problem. The result of the project will be a highly resistant plastic waste road that is more durable and stronger than typical roads.

Identifying CVC opportunities in waste recycling:

Core services: The project will help reduce the amount of waste going to landfill and the tipping fee paid by the local government.

Commercial potential and demand: There is strong demand for innovative solutions and CVC opportunities to reduce and recycle waste and find potential end uses for plastic that are socially and environmentally sustainable. There is also strong demand for government to save costs and reduce public spending on solid waste management, including tipping fees and landfill requirements, as land near urban centres becomes increasingly costly and scarce¹¹.

Beneficiary and stakeholder needs mapping

| Groups | Description | Need | CVC Opportunities | Saving |
|---------------------|--|---|--|---|
| Users | Households benefiting from better solid waste management | Reduce pollution related to plastic waste | N/A (core revenue) | Reduced cost relating to waste management |
| Stakeholders | Government seeking to reduce solid waste management cost | Reduce budget on tipping fee | Increase recycle rate, sale of recycled waste, find other innovative commercial use for recyclable waste | Reduced amount of waste going to landfill resulting in reduction in budget for tipping fees |
| Stakeholders | Transport agency/local government which need to spend significant budget on road pavement annually | Find more cost-effective solutions to road construction | The government can reduce plastic waste by using plastic waste in paving road. | Lower cost of road pavement resulting in reduced budget on road construction |

Assessing the policy, legal, institutional readiness in the country

| Areas | Assessment | Level |
|----------------------------|--|--|
| Policy and planning | <ul style="list-style-type: none"> Government sets clear and ambitious national target and roadmap to reduce waste. The government is open to innovative ideas with private sector collaboration to achieve the target. | High opportunity: Policy, legal and institutional frameworks are supportive and allow for CVC to be considered in the project. |
| Legal framework | <ul style="list-style-type: none"> The legal framework on solid waste management and plastic waste management has been introduced. Government provides flexibility in the legal framework to implement innovative solutions to support plastic waste management. | |

¹⁰ The Organisation for Economic Co-operation and Development (OECD), *Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options*, February 2022

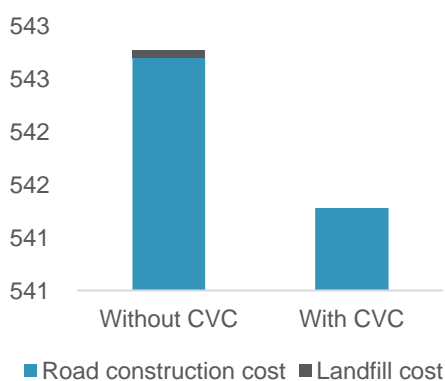
¹¹ <https://corporate.dow.com/en-us/seek-together/rethinking-waste.html>

| Areas | Assessment | Level |
|--------------------------------|---|--|
| Institutional readiness | <ul style="list-style-type: none"> The private sector has a strong role to play to introduce CVC in waste recycling as technology owner. | Identify and analyse CVC in feasibility study. |

Technical design: Additional facilities related to waste sorting, recycling, and processing of plastic waste are needed to collect plastic waste that can be used for paving roads. Plastic waste needs to be mixed with asphalt in a mixer belonging to a private company. For each road, the amount of plastic required for the physical road space will need to be designed at the planning stage.

Commercial feasibility: Based on a hypothetical financial assessment, CVC will result in cost saving in tipping fee for the local government from the reduced amount of waste that needs to be transferred to landfill. From the perspective of the government agency responsible for road construction, the use of plastics in paving roads can lead to lower road construction budgets as the life of the plastic road doubles that of roads paved by typical bitumen and upgrading/repaving costs are not required for plastic paved road. In addition, there could be additional benefits from reducing environmental costs from direct leakage of post-consumer waste plastics into the environment.¹²

| Revenue Category | Revenue Item | Expense Items | Net Cost Saving ¹³ |
|----------------------------------|---|---|--|
| A. Core Services - Saving | | | |
| User fee | Saving in tipping fee from reduced waste | <ul style="list-style-type: none"> No additional capex or O&M | <ul style="list-style-type: none"> Saving of USD20 per ton in avoided tipping fee |
| B. CVC – Saving | | | |
| Asset use optimisation | Saving from using plastic to pave road instead of bitumen | <ul style="list-style-type: none"> Construction cost for paving road using plastic waste | <ul style="list-style-type: none"> Saving of USD788 per kilometre in avoided road pavement cost |



Implementation: The CVC is piloted through a partnership between a private company or technology owner and the local government, waste collectors and local communities.

Risks: Government needs to set the standard requirements to ensure the road paving quality and carefully assess the negative environmental impacts of plastic roads such as the release of microplastics, photo-degradation and the release of fumes if heated beyond recommended temperatures.

¹² The Organisation for Economic Co-operation and Development (OECD), *Global Plastics Outlook: Economic Drivers, Environmental Impacts and Policy Options*, February 2022

¹³ The Worked Examples is hypothetical project business cases and include hypothetical financial assessments with key project information.

Annex 2: International CVC Case Studies

The table below provides the list of the 15 international case studies with references to source materials.

| No. | Examples | Source |
|-----|--|--|
| 1. | Advertising and marketing in high-footfall public areas | https://www.smrt.com.sg/Portals/0/PDFs/Annual%20Reports/SMRT-Group%20Review%202022_2023.pdf https://ppp.worldbank.org/public-private-partnership/advertising-and-marketing-high-footfall-public-areas |
| 2. | Naming rights in stations and city icons | https://www.rta.ae/wpsv5/links/NamingRights/intro.html https://ppp.worldbank.org/public-private-partnership/naming-rights-stations-and-city-icons |
| 3. | Commercial uses of virtual spaces: SP Digital, Singapore | https://govinsider.asia/transformation/how-singapore-is-powering-its-sustainable-energy-vision-sau-sheong-chang-sp-digital/ https://ppp.worldbank.org/public-private-partnership/library/sp-digital-company-overview |
| 4. | Commercial uses of physical places and virtual spaces created on the back of public infrastructure: Changi Airport, Singapore | https://www.changiairport.com/content/dam/cacorp/publications/Annual%20Reports/2020/CAG%20AR201920_Corporate%20Information.pdf https://ppp.worldbank.org/public-private-partnership/library/jewel-changi-airport |
| 5. | Commercial uses of physical spaces created on the back of public infrastructure: Retail in Northwestern Hospital, Chicago | https://knowledge-leader.colliers.com/editor/retail-dimensions-health-care-part-ii-retail-health-care-setting/ https://ppp.worldbank.org/public-private-partnership/library/retail-dimensions-health-care-part-ii-retail-health-care-setting |
| 6. | Commercial uses of physical places and virtual spaces created on the back of public infrastructure: Pilot Courier Hubs and Lockers in Residential Areas, Singapore | https://www.ura.gov.sg/Corporate/Event/Courier-Hub-Pilot https://ppp.worldbank.org/public-private-partnership/library/singapore-s-courier-hub-pilot |
| 7. | Control of real estate development rights to enhance value: Jurong Innovation District, Singapore | https://www.jtc.gov.sg/about-jtc/news-and-stories/feature-stories/5-things-you-should-know-about-jurong-innovation-district https://ppp.worldbank.org/public-private-partnership/library/5-things-you-should-know-about-jurong-innovation-district-singapore-s-advanced-manufacturing-hub |
| 8. | Infrastructure sharing: Telecom Infrastructure Sharing in Thailand | https://www.telecomasia.net/content/ais-dtac-sign-long-term-tower-sharing-deal/ https://ppp.worldbank.org/public-private-partnership/library/ais-dtac-sign-long-term-tower-sharing-deal |
| 9. | Infrastructure sharing: Utility Tunnel in GIFT City, India | https://giftsez.com/utility-tunnel.aspx https://ppp.worldbank.org/public-private-partnership/library/implementation-access-control-system-utility-tunnel-phase-2-gift-city-dta-and-sez-area |
| 10. | Leveraging climate opportunities: Sembcorp Tengoh Floating Solar Farm | https://www.sembcorp.com/en/media/media-releases/energy/2021/july/sembcorp-and-pub-officially-open-the-sembcorp-tengoh-floating-solar-farm/ https://ppp.worldbank.org/public-private-partnership/library/tengoh-reservoir-floating-solar-farm-officially-opens-big-step-towards-environmental-sustainability |
| 11. | Leveraging climate opportunities: SolarNova Rooftop solar program, Singapore | https://www.hdb.gov.sg/about-us/our-role/smart-and-sustainable-living/solarnova-page https://ppp.worldbank.org/public-private-partnership/library/whole-government-coordination-accelerate-solar-deployment |
| 12. | Leveraging climate opportunities: EV charging infrastructure, India | https://energy.economictimes.indiatimes.com/news/power/india-has-made-the-right-move-on-charging-infrastructure-for-electric-vehicles/83803723 https://www.niti.gov.in/sites/default/files/2021-08/HandbookforEVChargingInfrastructureImplementation081221.pdf |
| 13. | Usage of facilities during off-hours or off-seasons: Events in Wembley Stadium, UK | https://www.theticketingbusiness.com/2020/02/27/wembley-stadium-reports-successful-year-concerts-2019/ https://ppp.worldbank.org/public-private-partnership/library/wembley-stadium-reports-successful-year-concerts-2019 |
| 14. | Repurposing or adaptive reusing of old assets: St. James Power Station, Singapore | https://vulcanpost.com/783522/dyson-hq-st-james-power-station-singapore/ |

| No. | Examples | Source |
|-----|---|--|
| | | https://ppp.worldbank.org/public-private-partnership/repurposing-or-adaptive-reusing-old-assets |
| 15. | Zone Betterment: Betterment Levy for Hyderabad Outer Ring Road, India | https://files.wri.org/d8/s3fs-public/urban-land-value-capture-sao-paulo-addis-ababa-and-hyderabad.pdf https://ppp.worldbank.org/public-private-partnership/zone-betterment |

1. Advertising and marketing in high-footfall public areas

Background

Advertising is a well-established business segment for operators of public transit stations, terminals, and airports. **High footfall areas within public transit are perfect locations to promote a product, service, or cause and are effective customer touchpoints for brands.**

Communities in high-mobility cities often regard advertising in public transit stations as quick reflections of what is in the market.

In considering potential revenues from advertising and marketing, governments can leverage high footfall public areas for use in advertising and marketing while keeping journeys comfortable for passengers and avoiding uncomfortable distractions from advertising and marketing activities.

Value creation proposition (Case Study: Stellar Ace, Singapore)

Community-orientated value creation

SMRT Corporation Ltd. (SMRT) manages and operates train services on the North-South (NS), the East-West (EW), the Circle (CC), the new Thomson-East Coast Mass Rapid Transit (MRT) Lines and the Bukit Panjang Light Rail Transit (LRT). The rail network is complemented by SMRT bus, taxi and private hire vehicle services.

| SMRT Modes | Network information | Annual ridership |
|------------|--|--------------------------------|
| Trains | 95 MRT stations | 513 million in 2020 |
| Buses | <ul style="list-style-type: none"> 88 bus service routes 1,200 buses | 240 million passenger journeys |

Source: <https://www.smrt.com.sg/News-Room/Information-Kit>

Stellar Ace, a subsidiary of SMRT, is the operator for advertising and marketing of the broader public transportation network covering the NSEW, CC Lines, and the Bukit Panjang LRT trains and stations, as well as media advertising

assets on buses, taxis, and in malls, among others.

With SMRT's out-of-home advertising assets, advertisers can reach out to their target audience via multiple touchpoints nationwide. The ads are placed throughout the assets using interactive LEDs, motion sensors, and other technology. The advertisers pay a monthly service fee to Stellar Ace as the operator of the advertising in the stations.



Advertising in Stations Source: Stellar Ace, 2021

Key players for delivering improved services

Since 2016, the Land Transport Authority (LTA) owns the rail operating assets and SMRT is responsible for maintaining the rail infrastructure. SMRT is a wholly-owned subsidiary of Temasek Holdings which is a Singaporean state holding company.

Under the New Rail Financing Framework (NRFF), effective in January 2022, SMRT is granted the right to use the assets and operate the lines for 15 years (with potential for a five-year extension).¹⁴

What sets Stellar Ace apart?

Leveraging an established and extensive infrastructure asset network: Stellar Ace manages and markets advertising solutions in the SMRT network covering 95 stations with ~500 million annual ridership and 88 bus routes with ~240 million annual passenger journeys.

Connected Experience: Integration of various customer touchpoints through a digital network including digital screens in high footfall areas, mobile app and eCommerce platform.¹⁵

Mechanism for Maximizing Funding for Infrastructure

¹⁴

https://www.lta.gov.sg/content/ltagov/en/who_we_are/our_work/public_transport_system/rail/new_rail_financing_framework.html

¹⁵ <https://www.marketing-interactive.com/stellar-ace-breaks-into-hdb-ooh-space-in-north-east-district-of-sg>

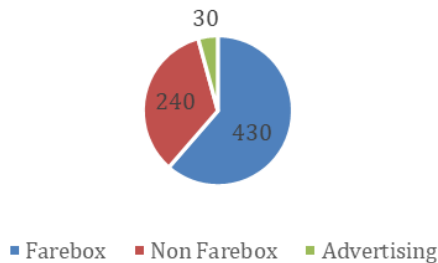
As an asset owner, LTA shares in fare revenue shortfall and potential upside if SMRT profits outperform. SMRT payments to LTA goes for the right to use LTA rail operating assets is earmarked for asset replacement and repair.

SMRT pays an annual Licence Charge into the Railway Sinking Fund, which will fund the replacement and repair of operating assets. The Licence Charge which SMRT pays LTA increases with higher profits (fare and non-fare).¹⁶

LTA shares in fare revenue risk and fares are regulated separately by the Public Transport Council. Through the Licence Charge mechanism LTA shares in fare revenue shortfall and in the upside if profits (especially from non-fare revenues since fare revenues are regulated) outperform.

Before COVID-19, non-farebox income contributed around SGD 270 million or 40% of the total revenues while farebox revenue amounted to around SGD 700 million.¹⁷

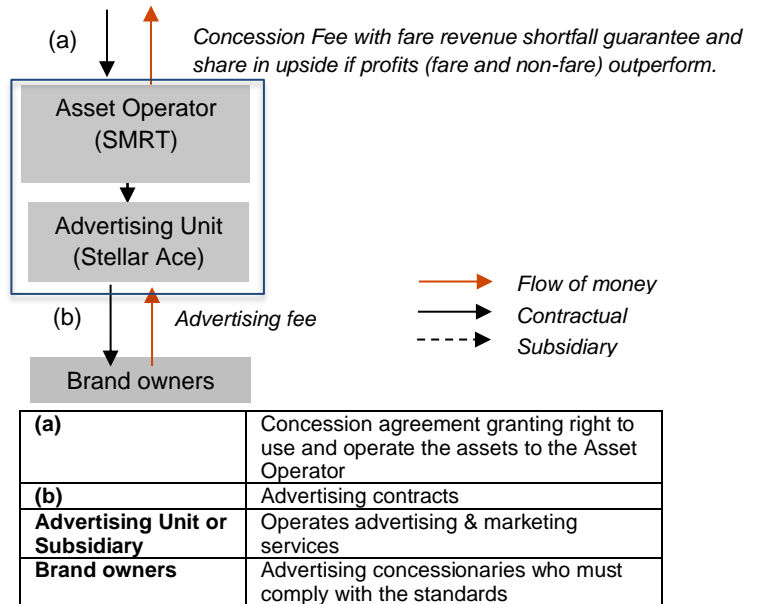
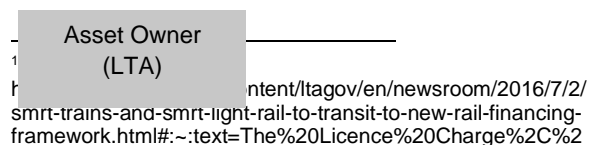
SMRT Total Revenue (2018)
in million SGD



Non-farebox revenues come from taxi operations, rental of commercial and office space leases, vending, ATM spaces, engineering services, and advertising.

Advertising revenues contributed around SGD 30 million or 12% of the total non-farebox revenue.

Typical Business Model



Lessons learned

Managing the risks

- **Demand risk:** LTA shares some risk in shortfall of SMRT's fare revenues which are regulated.
- **Revenue capture:** Through the Licence Charge mechanism **LTA shares in the upside if profits outperform expectations** (especially from non-fare revenues since fare revenues are regulated).

Ease of implementation

- Implementation model is relatively straightforward but knowledge of the commercial revenues that can be captured would be needed in public sector to set reasonable expectations and private sector needs expertise in advertising to manage commercial risks. A dedicated unit or subsidiary, similar to Stellar Ace, would need to be set up to manage marketing and advertising activities.

¹⁶https://www.smr.com.sg/Portals/0/SMRT%20Group%20Review%202020-2021.pdf

¹⁷https://www.smr.com.sg/Portals/0/SMRT%20Group%20Review%202020-2021.pdf

2. Naming rights in stations and city icons

Background

In a similar way that advertising and marketing leverages high footfall areas, naming rights can leverage city icons to connect with consumers.

By offering naming rights to reputed brands, governments can monetize the iconic image of infrastructure assets and engage reputable brands to leverage value from naming rights for brand recall and positive brand association.

However, naming rights for city icons such as stations need guidelines that align naming rights with community values.

Value creation proposition (Case Study: Station Naming Rights, Dubai)

Community-orientated value creation

The Roads and Transport Authority (RTA) plans and provides an integrated transport system within Dubai and connects Dubai to other Emirates of the UAE and neighboring countries to achieve Dubai's vision & serve the vital interests of the Emirate.¹⁸ RTA operates public buses, metro and tram, taxis, marine transport, and inter-city transport.

| RTA Modes | Network information | Annual ridership (2020) |
|-----------|-----------------------------------|-------------------------|
| Trains | • 53 stations | 113.63 million |
| Buses | • 156 bus routes • 18 stations | 95.42 million |
| Trams | • 11 stations | 3.65 million |

Source: RTA, 2020

With its Red and Green lines, Dubai Metro has 8,112 sqm of total retail space, 200 retail outlets, 228 ATM machines, and 90 metro kiosks.¹⁹

In 2008, RTA launched the "Dubai Metro Naming Rights Project" that would sell naming rights for 23 out of 53 stations (excludes stations with historical landmarks). Naming rights packages include collateral material, signage inside the station, signage outside the station, and inside the trains.

¹⁸ <https://www.rta.ae/wps/portal/rta/ae/home/about-rta/explore-rta#abtMissionVision>

¹⁹ <https://www.rta.ae/wps/portal/rta/ae/corporate-services/advertising/rail-investment-office/naming-rights>



Naming Rights in Dubai Stations Source: RTA, 2022

What sets it apart?

Clear articulation of benefits for users and beneficiaries of Naming Rights Program: The Dubai Government clearly states the following as objectives of the Metro Naming Rights Program, clarifying the value of naming rights for users and beneficiaries.²⁰

| | |
|---------------------|---|
| RTA | Increase revenues for improvement of stations, lines, facilities; services expansion; and additional maintenance. |
| Corporations | Exclusive right to put brand on a Dubai Metro station improving brand visibility. |
| Community | Improvement of public facilities and services without increasing taxes/fares. |

Differentiated offering: The RTA has positioned the Dubai Metro Naming Rights as an opportunity for brand owners to own naming rights, supported by high-tech and interactive digital marketing that can result in optimal engagement rates and potentially higher revenue opportunities.

Key players for delivering improved services

RTA was established in 2005 as a public entity with an independent corporate body and full legal capacity to perform all business and actions to achieve its objectives.

Under its Dubai Naming Rights Program, RTA adopts **evaluation criteria** to select companies to associate with. For example:

- **General Criteria** – no personal names allowed, must have presence in Dubai, no

²⁰

<https://www.rta.ae/wpsv5/links/NamingRights/objectives.html>

history of fraudulent or unethical behavior, among others.

- **Commercial Criteria** – 65% for price, 15% for contract duration, 20% for payment scheme.
- **Additional Criteria**– commitment to Dubai and corporate social responsibility. ²¹

In 2010, RTA partnered with Hypermedia for metro advertising management, including planning advertising spaces and designing, operating, and marketing advertising services at stations, trains, and lines of the Dubai Metro (Red & Green Lines and Route 2020) for ten years.²²

Mechanism for Maximizing Funding for Infrastructure

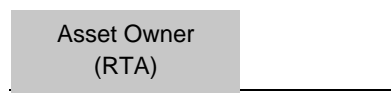
As an asset owner, RTA generates additional revenues from naming rights to pay for improvement of stations, lines, facilities; services expansion; and additional maintenance. The community benefits from improved service without having to pay higher taxes.

Based on RTA's bid form, naming rights has a minimum contract term of 10 years. Bidders must quote a first-year fee (annual inflation increase is applied) and specify a payment scheme. RTA suggests a 30% upfront fee based on the total contract amount upon signing the contract.²³

The sale of naming rights for Dubai Metro stations generated a revenue of around AED 2 billion (around USD545 Million) from 2010 to 2020.²⁴

In 2008, when the naming rights program was launched, naming rights were bought at values ranging between AED 70 to 90 million or USD 19 to 25 million.²⁵

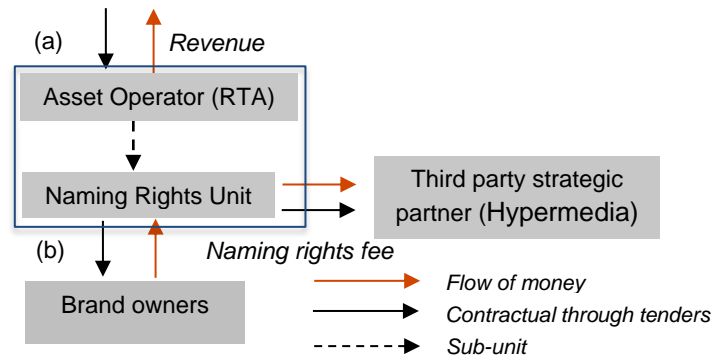
Typical Business Model



²¹ <https://www.rta.ae/wpsv5/links/NamingRights/criteria.html>

²² <https://mediaoffice.ae/en/news/2021/June/30-06/RTA-Hypermedia-sign-10year-partnership-agreement-to-manage-the-metro-advertising>

²³ <https://www.rta.ae/wpsv5/links/NamingRights/BID%20FORM.pdf>



| | |
|---------------------------------------|---|
| (a) | Concession agreement granting right to use and operate the assets to the Asset Operator |
| (b) | Naming Rights contracts |
| Asset Operator (sub-unit): | Operates naming rights program |
| Third-party strategic partner: | Advertising & Marketing expert hired by Asset Operator |
| Brand owners: | Naming right concessionaries who must comply with the standards |

Lessons learned

Managing the risks

- **Reputational risk:** Public stations are iconic landmarks of a city. Naming right for city icons is attractive to companies who want to be known as household brands. When RTA launched the Metro Naming Rights Program in 2008, more than 250 companies and brands applied. RTA has excluded stations with historical names from the Naming Rights Program, and RTA carefully selects which companies/brands can participate.

Ease of implementation

- Naming rights is a relatively straightforward concept to implement. RTA runs the tender for naming rights and selects the companies based on defined evaluation criteria. In 2010, RTA engaged Hypermedia, a marketing and advertising agency, to plan advertising spaces, design, operate and market advertising services at

²⁴ <https://gulfnews.com/uae/transport/naming-rights-for-seven-stations-on-route-2020-up-for-grabs-1.2275882>

²⁵ <https://gulfnews.com/uae/transport/dubai-raises-dh18b-from-metro-naming-rights-and-funding-1.71114>

stations, trains, and lines of the Dubai Metro.

Other examples:

- **Kuala Lumpur Metro Naming Rights** – Prasarana, a state-owned public transport provider in Kuala Lumpur (KL), launched the first naming rights project in Southeast Asia. The naming rights tender allows brands to bid for the right to transform KL LRT or monorail station to reflect their corporate identity and name the station. In return, Prasarana earns a fee and commuter experience is enhanced as part of the evaluation criteria for award. For example, companies participating in the naming rights tender can propose free Wi-Fi and upgrades to stations to enhance commuter experience.²⁶ The naming rights can cost more than 10 million RM or 2.3 million USD for a 5-year deal.²⁷
- **Singapore Sports Hub Naming Rights** – The Singapore Sports Hub is a 35-hectare sports and recreation district established under a 25-year Public-Private Partnership agreement between Sports Singapore and SportsHub Pte Ltd. In 2013, OCBC signed a 15-year naming rights deal worth 50 million SGD or 36 million USD for naming rights to Singapore Sports Hub facilities such as the multi-purpose indoor arena and aquatic center. Revenue from the sponsorship will be re-invested into the hub's operation.²⁸

²⁶ <https://www.pharpartnerships.com/pharnews/phar-launches-first-ever-station-naming-rights-programme-in-south-east-asia#>

²⁷ <https://www.thesundaily.my/archive/1579438-FSARCH332969>

²⁸ <https://www.straitstimes.com/sport/ocbc-secures-50-million-15-year-naming-rights-deal-as-main-sponsorship-partner-of-singapore>

3. Commercial uses of virtual spaces: SP Digital, Singapore

Background

Launching services on a digital platform can help companies grow their core business, support expansion into new products and services and generate new revenues.

These digital platforms can host customer-paid services (sale of new products or services), merchant-paid usage (e.g., registration or listing fee) and third-party-paid data monetization (e.g. advertisements).²⁹

Value creation proposition

Community-orientated value creation

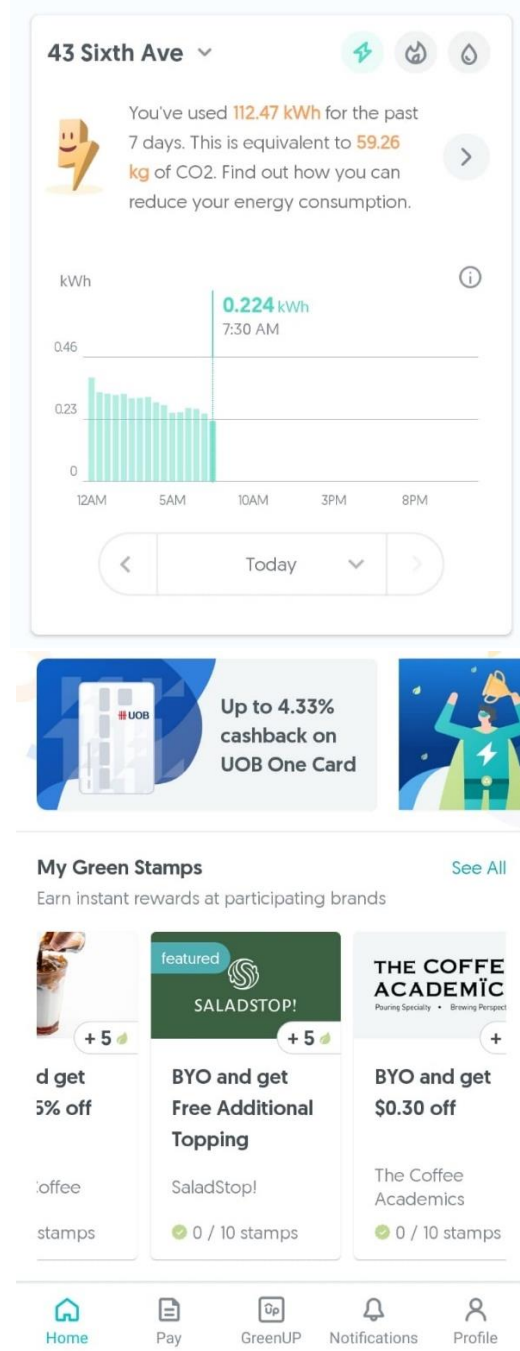
SP Group provides utility services to most of Singapore's retail customers. From this platform, SP Digital, a subsidiary of SP Group, provides digital solutions driven by data, an Artificial Intelligence (AI) & Internet of Things (IoT) that supports customers in their journey towards energy efficiency, cost optimization and occupant well-being covering residential, commercial, and industrial needs.

1) SP Utilities App

SP Digital has created an app for retail customers to manage their customer accounts, including payment management and having up-to-date information on utilities consumption that allows them to understand and optimise their utility consumption. The SP app provides a platform with near universal retail customer coverage that offers a channel for which other merchants/business partners pay SP Digital fees to be able to market their goods and services. When retail customers meet milestones for reducing carbon footprint, they can redeem points for rewards provided by merchants/business partners on the platform.³⁰

SP Digital, with its 'big data' resource on consumer behavior in Singapore, can monetize partnerships with merchants who use the SP Digital platform to reach retail customers by

participating in SP Digital's instant rewards program.



SP App Dashboard

2) Energy Tech Solutions

²⁹ <https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/how-do-companies-create-value-from-digital-ecosystems>

³⁰ <https://www.spgroup.com.sg/sustainable-energy-solutions/sp-utilities-app>

Considering that buildings account for about 40% of energy-related carbon emissions, SP Digital offers business solutions leveraging digitalization and big data analyses to enable building owners and facility managers to improve building performance. SP Digital's suite of Green Energy Tech (GET™) solutions integrates different building systems and diverse data sources to make utilities management experience seamless.³¹

SP Digital has partnered with Changi Airport to pilot smart meters that monitor energy use and flag sudden spikes which may be a sign of leaks. The smart meters have helped the airport cut operational costs significantly.³²

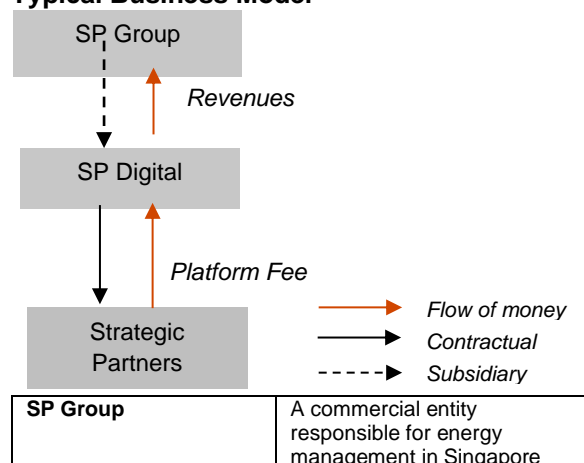
Key players for delivering improved services

SP Digital is a wholly owned subsidiary of Singapore Power Limited (SP Group) which is wholly owned by Temasek.

Mechanisms for Maximizing Funding for Infrastructure

From the digital services, SP Digital's revenue in 2020 is estimated at 4.4 million SGD.³³ In addition, SP Digital receives platform fee revenues from strategic partners that will benefit from each transaction used via the App.

Typical Business Model



³¹ <https://www.spdigital.sg/green-energy-tech.html>

³² <https://govinsider.asia/transformation/how-singapore-is-powering-its-sustainable-energy-vision-sau-sheong-chang-sp-digital/>

| | |
|---------------------------|---|
| SP Digital | <ul style="list-style-type: none"> Manages and leads energy-saving through establishment of SP Digital App with innovative digital services Responsible for strategic partnerships to automate billing, metering, and other activities related to energy management |
| Strategic Partners | Partners with SP Digital to market their brands in exchange to assistance in improving digital services in SP Digital App |

The Singapore government benefits from SP Group revenues through taxes, dividends, and Net Investment Returns (NIR) paid by Temasek.

From 2000 to 2015, Temasek was under a government spending framework, where up to 50% of dividends from Temasek can be used by the Singapore Government for budget spending. The remaining dividends were locked up as past reserves of the Singapore Government.

Since Temasek's inclusion in the NIR Framework in 2019, the Singapore Government may spend up to 50% of Temasek's expected long-term returns, net of inflation. NIR Contribution is the single largest contributor to Singapore Government revenues, at 21% of the 2022 Government Budget.

Lessons learned

Replicability

- The Singapore energy market works on a full cost recovery basis. Thus, there is no revenue share back to government in this model. Instead, the value capture mechanism for Temasek and its subsidiaries is largely due to Singapore government's policy led by MOF for investing government reserves and balancing current and future use of dividends and investment returns.
- In many developing countries subsidies are provided to their energy sector. This value creation mechanism can **provide alternative funding and can be captured as a revenue share that can lessen government subsidies or limit user tariffs.**

³³ <https://www.datanyze.com/companies/sp-digital/427095594>

- The SP app is also an example of bundling the utility retail functions, such as monitoring, invoicing and revenue collection. Bundled utility retail can increase revenue collection rates as consumers are inclined to pay for core utility services such as power, piped town gas and water, but are then also more inclined to pay for other services such as sanitation and waste management services and discretionary services such as telecoms.

4. Commercial uses of physical places and virtual spaces created on the back of public infrastructure: Changi Airport, Singapore

Background

Traditionally, revenue generated from the aviation industry has been associated with aeronautical-related transactions (e.g., landing fees, passenger fees, etc). However, in the last 20 years, airports have undergone retail development to be repurposed into multifaceted hubs that provide aviation services while offering retail functions. For instance, Airports Council International (ACI) reports that non-aviation revenue make up 62.5% of global revenue from airports.³⁴

Governments can leverage unproductive spaces in airports as high-traffic public areas for targeted leasing while keeping journeys comfortable for passengers.

Airports with a plethora of facilities provide a comfortable and luxurious experience to travellers who are thus more inclined to purchase from duty-free shops or dine at F&B restaurants. Consequently, **concessionaries benefit from the increased revenue from retail sales while the government receives income from leases and taxes.**

Value creation proposition

Community-orientated value creation

The Changi Airport is a crucial component of the government's strategy to sustain Singapore as a regional commercial hub.

Changi Airport is one of the world's busiest airports, having served 68.3 million passengers in 2019. It comprises four terminals, with a fifth mega terminal currently under construction. More than 100 airlines operate from Changi Airport to destinations in Asia, Africa, Europe, the Middle East, Oceania, and the Americas.

³⁴ <https://blog.aci.aero/aci-airport-economics-report-is-a-benchmark-for-measuring-the-industry-performance-in-post-covid-recovery/>
35

<https://www.changiairport.com/content/dam/cacorp/publicatio>

Changi Airport Group (CAG) has upgraded existing infrastructure in the Changi Airport Terminals to accommodate non-travel services such as retail and F&B to expand its consumer base to non-travellers.

The construction of Jewel Changi Airport (Jewel) offered a whole new multi-dimensional experience at Jewel, with its array of shops, restaurants, best-in class attractions and lush verdant landscaping. CAG also enhanced the Changi Experience with more airport facilities within Jewel, such as early check-in and GST refund counters, a new Changi Lounge for passengers, as well as an expanded and refreshed Terminal 1.³⁵



Attractions in Jewel³⁶

What sets it apart?

Online retail platform: iShopChangi

When the pandemic hit in early 2020, passenger traffic at Changi Airport plummeted and so did sales at airside retail. All of Changi Airport's airside concessions were challenged to find new revenue streams, including iShopChangi, the airport's e-commerce platform. With the traveller market no longer a viable source of sales, the business turned its focus to the non-travelling domestic market. Tax and duty-free items such as wines and spirits are now available to non-travellers through iShopChangi at over 40% off regular prices all year round, this product category has been a hit among local consumers³⁷

Key players for delivering improved services

Changi Airport is operated by Changi Airport Group (CAG) which is directly owned by Singapore government. CAG, as asset owner, benefits from leasing real estate to private companies, which is a core component of CAG's revenues.

[ns/Annual%20Reports/2020/CAG%20AR201920_Corporate%20Information.pdf](https://www.changiairport.com/content/dam/cacorp/publication/Annual%20Reports/2020/CAG%20AR201920_Corporate%20Information.pdf)

³⁶ <https://www.jewelchangiairport.com/en.html>

³⁷ <https://www.changiairport.com/corporate/media-centre/changijourneys/the-changi-experience/ishopchangipivot.html>

CAG's in-house Commercial team is responsible for the retail planning and development of Jewel Changi and the four-passenger terminals. Moreover, the Commercial team is in-charge of managing retail concessions to maximize CAG's revenue streams from non-aviation transactions.

Mechanism for Maximizing Funding for Infrastructure

CAG generates over 40% of its total revenues from airport concessions and rental income.

CAG has planned, built, and manages over 70,000 sqm of space for shopping and dining outlets across the four passenger terminals. Concessionaries pay fixed rental fee to lease concession spaces. The rental price is dependent on the size and location of the concession space, and the tenancy period is typically three years with the possibility of renewal.

In the final two months of FY 2019/20 and consequently, concession revenue dived by 57.5% and Changi Airport registered a 4.1% y-o-y decline in airport concession and rental income to SGD 1.3 billion.

The opening of Jewel in April 2019 created a new revenue stream for the Group and was the key driver for the increase in CAG's revenue. While sales at Jewel was also affected by Covid-19 in the last two months of Financial Year (FY) 2019/20, Jewel's higher than-expected number of visitors in its first year of operations helped to supplement the Group's topline with SGD129 million in revenue in FY 2019/20.

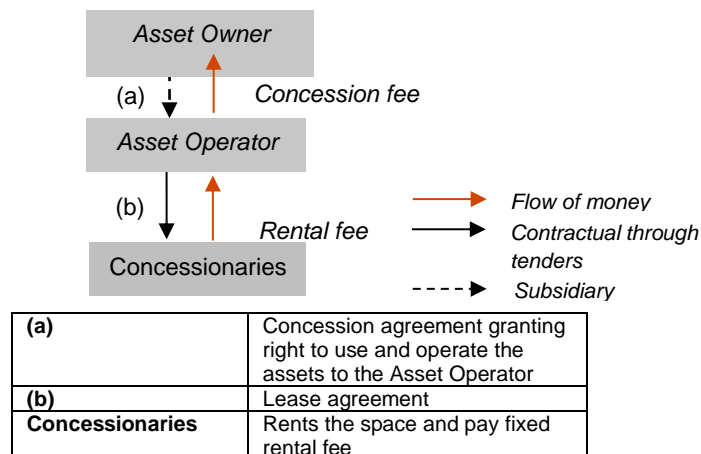
CAG closed the financial year with total revenue of S\$3.1 billion, 2.6% above the previous year, largely due to first-time contributions from Jewel.³⁸

In 2021, from the total gross revenue of 696,748 million SGD, airport concessions and rental income contributed 43.8%. While airport service fees (i.e., landing, parking, aerobridge, passenger service, and security fees) contributed 24.8% and revenue from other airport services (i.e., cargo services, franchise fees, utility charges, consultancy fees, carpark revenue, and other sundry income) and interest income made up the remaining 31.4%.³⁹

The Singapore government benefits from its investment in CAG through taxes and

dividends. In FY 2019/2020, CAG recommended no dividend payout. Shareholder's equity increased marginally by less than 1% to reach S\$7.9 billion.⁴⁰

Typical Business Model



Lessons learned

Managing the risks

- By diversifying retail offerings to non-travellers, CAG was able to maintain some flow of revenues from airport concessions and rental income even during the COVID-19 pandemic when air travel was significantly restricted. In FY 19/20, CAG closed the financial year with total revenue of S\$3.1 billion, 2.6% above the previous year, largely due to first-time contributions from Jewel.⁴¹

Ease of implementation

- CAG's in-house Commercial team is responsible for the retail planning and development of CAG's revenue streams from non-aviation transactions.

5. Commercial uses of physical spaces created on the back of public infrastructure: Retail in Northwestern Hospital, Chicago

Background

Health care is one of the primary frontiers for developing a responsive, customer-centric approach.

³⁸ Ibid
³⁹ Ibid

⁴⁰ Ibid
⁴¹ Ibid

Healthcare also creates physical space that is well-suited for accommodating healthcare related retail and consumer services to provide greater value to the community.⁴²

Hospitals have a captive customer base, continuous operating hours and a large catchment area.⁴³ Yet, the majority of hospitals in Emerging Markets and Developing Economies are underserved in terms of healthcare related retail and consumer services. However, healthcare providers are recognizing the benefits of incorporating healthcare related retail and consumer services into their public spaces. Examples of healthcare related retail and consumer services include food and beverage, pharmacies, opticians, gift shops, retail of domestic healthcare appliances, gyms, hotels for visitors or for out-patients no longer requiring full-serviced hospital beds, etc.

Value creation proposition

Community-orientated value creation

The 894-bed Northwestern Memorial Hospital (NMH) is an academic medical center in the heart of downtown Chicago, USA. NMH is one of the first and largest hospitals that has incorporated a significant quantity of retail space in its campus (6,500 sqm) that is focused on serving its patients and visitors, hospital employees and local neighborhood.

NMH's retail properties have street level access and internal access to reach employees, visitors, and the surrounding neighborhood. The retail complex includes more than 20 food service retailers including national brands, a flagship restaurant that's also open to the public, and non-food retailers such as gift shops, bookstore, florist and a convenience store.⁴⁴

What sets them apart?

Health-conscious products and menu. Selections included exciting new options like unique healthy food choices. In addition, Northwestern

Hospital provides street access to accommodate outdoor café dining and a mixture of other retail services specifically tailored for our patients, families, and the local neighborhood.

Making it Functional: Integrating Restaurants and Retail into the Healthcare Environment.

Through sensible design, the noise levels are well adjusted during day or night, and infection control is observed with the Shop & Dine area properly sealed off from the rest of the hospital.

Online menu options for more straightforward navigation. A complete list of all Chicago campus dining options is available through the Northwestern University Feinberg School of Medicine mobile app.

Key players for delivering improved services

Northwestern Memorial HealthCare (NMHC) is the corporate parent for an integrated nonprofit health system at over 200 sites across Chicago with 11 hospitals including the Northwestern Memorial Hospital (NMH) which is the primary teaching affiliate of Northwestern University's Feinberg School of Medicine (FSM).⁴⁵

Mechanism/s for Maximizing Funding for Infrastructure

Ancillary commercial revenues in hospitals, especially in developing countries where healthcare services are heavily subsidized, can provide additional funding for operations and maintenance or for subsidizing healthcare services to patients in social classes.

In 2021, Northwestern Memorial HealthCare earned around USD 7.4 billion total revenue (patient service revenue, rental & other revenue, and net assets from donor and grants) of which patient service revenue makes up around 92%. The lease of commercial space is accounted under "Rental and other revenue", which

⁴² <https://knowledge-leader.colliers.com/editor/retail-dimensions-health-care-part-health-care-retail-setting/>

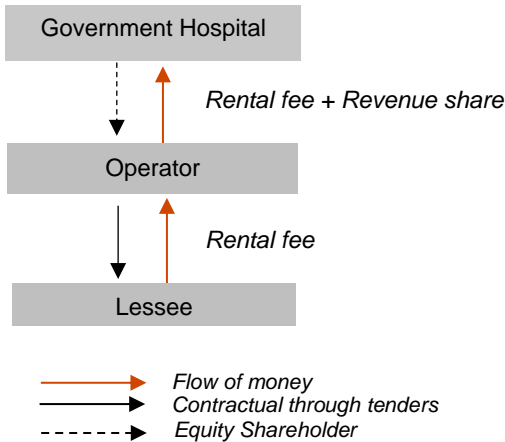
⁴³ <https://knowledge-leader.colliers.com/editor/retail-dimensions-health-care-part-ii-retail-health-care-setting/>

⁴⁴ Ibid

⁴⁵ [https://www.nm.org/about-us/northwestern-medicine-newsroom/media-relations/about-our-health-system#:~:text=Northwestern%20Memorial%20HealthCare%20\(NMHC\)%20is,and%20Northwestern%20Medicine%20Regional%20Medical](https://www.nm.org/about-us/northwestern-medicine-newsroom/media-relations/about-our-health-system#:~:text=Northwestern%20Memorial%20HealthCare%20(NMHC)%20is,and%20Northwestern%20Medicine%20Regional%20Medical)

generated USD 414 million around 5.6% out of the total revenue.⁴⁶

Typical Business Model



| | |
|-------------------|--|
| Government | Asset Owner |
| Operator | Responsible for the core and/or non-core services including operations of retail space |
| Lessee | Leases the retail space for permissible commercial activities |

developing countries and would need to be assessed.

- Operational risk:** Northwestern Hospital's core service is to provide quality health care to its patients. In deciding to incorporate a significant retail component within its medical campus, the hospital management considered that hospital buildings are complicated spaces and commercial real estate for functions such as F&B are a very different type of structure.

Lessons learned

Managing the risks

- Market risk:** Northwestern Hospital is situated in Streeterville which is a buzzing neighborhood. With nearly 10,000 employees, 67,000 neighborhood residents, and 3,000 hotel rooms within a five-block radius from Northwestern Memorial Hospital, the retail potential was significant.⁴⁷ The scale of the retail potential may not be as significant in

⁴⁶ <https://www.nm.org/about-us/financial-statements-and-annual-reports>

⁴⁷ <https://www.skender.com/news-media-item/building-opportunity-shop-dine-northwestern-brings-right-mix-retail-offerings-healthcare-environment/>

6. Commercial uses of physical places and virtual spaces created on the back of public infrastructure: Pilot Courier Hubs and Lockers in Residential Areas, Singapore

Background

Increasing volume of online purchases and deliveries through e-commerce platforms have led to higher volume of delivery vehicles on the roads to residential areas. Almost all kinds of goods, from electronics to household items, can be delivered to people's doorsteps.

This acceleration in e-commerce in Singapore has made it difficult for delivery companies handling higher parcel volumes to find suitable spaces to fulfil consumers orders, especially in scheduling and achieving the last mile delivery in accordance with delivery slot availability.

As a response, courier hubs in residential areas and parcel lockers in high footfall areas such as in malls and MRT stations have been deployed in Singapore.

- **Courier hubs** can be found in residential areas as transit spots before items are delivered, mainly in vacant parking areas.
- **Parcel lockers** let online shoppers conveniently collect or return their purchases anytime. Parcel lockers are common in malls, post offices, and MRT stations. In addition, parcel lockers were installed in Housing Development Board (HDB) neighborhoods in Punggol or Bukit Panjang.

Value creation proposition (Case Study 😊)

Community-orientated value creation

Courier hub pilot aims to enhance last-mile business-to-consumer delivery operations. Courier hubs were rolled out at two multi-story car parks in Punggol Drive and Buangkok Link in 2021 with operational hours 9 am to 6 pm daily, and the four

designated lots in each carpark can be used for regular parking outside of these hours.⁴⁸

Suitable car park lots are designated to provide a safe and convenient area for the orderly sorting, holding, and dispatching of parcels on foot to nearby residents to complete deliveries. This can allow more deliveries to be completed and potentially reduce use of vehicles in last-mile deliveries to residential areas.⁴⁹



Nationwide parcel lockers network run by Pick Network Pte Ltd (PICK) is a multi-agency effort with strong support within government.



In 2021, 200 parcel lockers were placed island-wide with 1,000 lockers targeted to be deployed within the year. The lockers have been strategically placed such that one is only a 5-minute walk from residents who can then pick up their parcels whenever possible because the lockers are open 24 hours a day, seven days a week.⁵⁰

Key players for delivering improved services

⁴⁸ <https://www.trendradars.com/singapore/show/93378/>

⁴⁹ <https://www.ura.gov.sg/Corporate/Event/Courier-Hub-Pilot>

⁵⁰ <https://www.businesstimes.com.sg/garage/pick-network-launches-first-batch-of-over-200-parcel-lockers>

Courier hubs pilot is a collaboration between the Urban Redevelopment Authority, HDB, Enterprise Singapore, Singapore Land Authority and logistics operators Ninja Van and Shopee Express.⁵¹

The Infocomm Media Development Authority (IMDA) is a statutory board under the Singapore Ministry of Communications and Information (MCI). The IMDA and PICK are working with HDB, Land Transport Authority, Ministry of Home Affairs, Ministry of National Development, Ministry of Transport, People’s Association, Singapore Civil Defense Force, and the Singapore Police Force on processes such as the siting of lockers and the co-development of safety and security guidelines, to ensure the smooth implementation of Pick’s Nationwide Parcel Lockers Network.⁵²

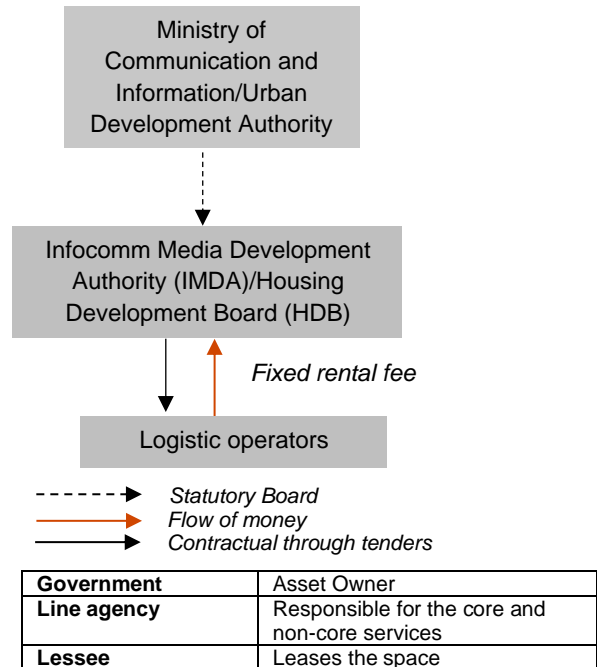
Pick is also partnering with logistics service providers (LSPs) such as FedEx, Huper Express, QXpress, S.F. International, UPS, WMG, XDel, and ZTO to enable seamless parcel drop-offs and returns through its lockers.

Mechanism /s for Maximizing Funding for Infrastructure

We understand that the HDB leases space and logistic operators assist the development of courier hubs, with standardized parking charges for delivery companies that use the facility.

For parcel lockers, Infocomm Media Development provides the space as mandated by Ministry of Communication and Information, while PICK, as the locker provider, rents the space, installs the lockers, and ensures its operations throughout Singapore. PICK then charges the users of lockers.

Typical Business Model



Lessons learned

Implementation

- Courier hubs and Nationwide Parcel Network are simple ideas for utilizing available and idle spaces such as residential car parks which are usually empty during the day. Additional revenues from renting out these spaces to LSPs demonstrate a low-hanging opportunity for commercial activities that can generate revenue for operations and maintenance of public housing buildings.

7. Control of real estate development rights to enhance value: Jurong Innovation District, Singapore

Background

⁵¹ <https://www.ura.gov.sg/Corporate/Event/Courier-Hub-Pilot>

⁵² <https://www.imda.gov.sg/news-and-events/Media-Room/Media-Releases/2021/Nationwide-Parcel-Locker-Network-Launched>

Value Creation in the control of real-estate development rights can be well illustrated by considering hubs such as Education Hubs, Health hubs, Digital Hubs, Transit-Oriented Developments, Mixed-use Developments and Innovation Districts.

Innovation districts are geographic areas where public and private stakeholders collaborate to attract entrepreneurs, start-ups, and business incubators to revitalize depressed downtown areas.⁵³

The rise of innovation districts can be attributed to their inherent benefits. **Innovation districts are well-equipped with state-of-the-art amenities and equipment that lessees can tap on, enhancing their corporate productivity and experience of workers, customers, and users.** Consequently, the popularity of innovation districts increases the rental revenue collected by the government.

Value creation proposition

Community-orientated value creation

The manufacturing sector in Singapore contributes approximately 21% of Singapore's Gross Domestic Product (GDP) and employs almost 500,000 staff, making it a pivotal industry in Singapore.⁵⁴

Jurong Innovation District (JID), Singapore's first 600-hectare innovation hub, was built to spur innovation in areas such as robotics, advanced manufacturing, urban solutions, clean technologies, and intelligent logistics.

The hub is expected to create some 1,200 jobs in the next 18 months, with the district's workforce growing to over 4,500 once companies such as industrial developer Surbana Jurong and bicycle components heavyweight Shimano move their operations into the district.⁵⁵

The construction of JID has revitalized Jurong from a brownfield area of old industries and low-productivity warehouses into a lively industrial park aimed at catalyzing innovation.

Furthermore, concentrating all the manufacturing powerhouses of Singapore in a single district

⁵³ <https://www.brookings.edu/essay/rise-of-innovation-districts/>

⁵⁴ <https://www.jtc.gov.sg/about-jtc/news-and-stories/feature-stories/5-things-you-should-know-about-jurong-innovation-district>

facilitates the creation of a manufacturing ecosystem.



JID comprises five precincts: Nanyang Technological University, Cleantech Park, Bahar, Bulim, and Tengah. Presently, anchor tenants of Jurong Innovation District include Nanyang Technological University, Siemens, Shimano, and YCH Group.

In 2020, JID continued to make strides to become Asia's advanced manufacturing hub. Over the past year, it attracted \$420 million worth of new investments.

Key players for delivering improved services

JID is a development by JTC, a statutory board under the Ministry of Trade and Industry. JTC is in charge of Singapore's industrial progress developing and managing industrial estates and providing facilities to enhance operations of industries.

For example, fully serviced plots and buildings that appeal to leading businesses to co-locate in a commercial ecosystem, attracting and retaining the best global talent.

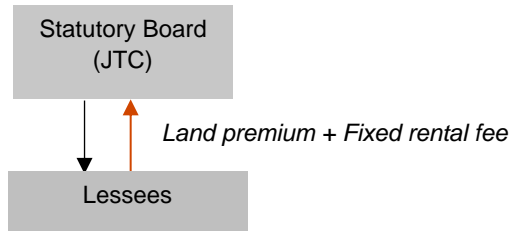
Mechanism for Maximizing Funding for Infrastructure

Rental revenue earned by JTC ultimately flows to the government as JTC is a statutory board. Consequently, the government can utilize the revenue to develop more serviced plots for industrial development.

⁵⁵ <https://www.jtc.gov.sg/-/media/project/jtc-cx/corpweb/assets/about-jtc/resources/documents/jtc-annual-report-fy2020-2.pdf>

In 2020, rental income from land and building contributed 88.7% to JTC's total operating revenue of SGD 2.3 billion.⁵⁶

Typical Business Model



- Flow of money
- Contractual through tenders
- - - - - Statutory

| | |
|------------------------|---|
| Government | Landowner |
| Statutory Board | Responsible for industrial development |
| Lessees | Rents the space and pays a fixed rental fee |

In JTC Corporation's current business model, lessees are charged a fixed rental fee to lease land, office, or shared spaces in Jurong Innovation District. Size, location, and the availability of amenities are factors that determine the rental fee.

Managing the risks

- JTC follows standard lease agreements for its land and/or building with contract provisions that require lessees to adhere to pre-agreed uses ensuring that a development is in line with Singapore's broader strategy.
- JTC is conservative in risk taking as a landlord of industrial estates rather than as a co-investor.

Lessons Learned

Confidence for sustainable delivery for communities

- State-of-the-art facilities at Jurong Innovation District enhance the productivity of its locators while providing a stable revenue stream for JTC for it to perform its mandate of championing Singapore's industrial progress.

⁵⁶ <https://www.jtc.gov.sg/-/media/project/jtc-cx/corpweb/assets/about-jtc/resources/documents/jtc-annual-report-fy2020-2.pdf>

8. Infrastructure sharing: Telecom Infrastructure Sharing in Thailand

Background

Infrastructure sharing of physical assets between different parties **can maximize the utility of infrastructure or minimize costs** needed to build and operate assets, creating a win-win situation for parties involved especially cost-savings from reduction in capital investment required for expanding, maintaining, and upgrading network connectivity.

In the telecommunication industry, the rapid deployment and changes to technology can quickly render old telco infrastructure obsolete and operators are required to spend a large amount of capital on building new infrastructures.

Tower sharing, for example, also reduces barriers to entry allowing **new entrants to compete with incumbent companies and prevent market monopoly leading to improved service quality while keeping prices competitive.**

Moreover, as 5G technology is rolled out, the 5G technology needs a much high density of cell towers and antennas due to the shorter signal range. Therefore, there will be more significant commercial pressures on mobile telco network providers to minimize costs.

Value creation proposition

Community-orientated value creation

Tower companies in Thailand are subject to infrastructure sharing regulations which makes it mandatory to share telecom infrastructure assets on fair commercial terms with new players.

Infrastructure sharing encourages collaboration across telco companies that guarantee faster and more efficient infrastructure procurement. This way, the national broadband target can be achieved in a timely manner.

In 2015, Thailand's second largest mobile operator Digital Total Access Communication (Dtac) has reached an agreement with larger rival

Advanced Info Service (AIS) to share infrastructure (2,000 towers in 2015) in a bid to cut costs while expanding network coverage and capacity to keep pace with mobile broadband demand.⁵⁷

Most of the towers are located in provincial areas. Under the collaboration, the operators will also jointly work to roll out new towers instead of duplicating the effort.⁵⁸

Key players for delivering improved services

The National Broadcasting and Telecommunications Commission (NBTC) is an operating body overseeing Thailand's broadcast and telecom industries.

It aims to drive the digital connectivity and telecommunications coverage around Thailand and encourages infrastructure sharing to reach its goals. Accordingly, the NBTC has set out guidelines and regulations where incumbent MNOs must share their infrastructure unbiasedly with new entrants.

There are over 60,000 telecom towers in Thailand, operated mainly by Advanced Info Services (AIS) which is part of Singtel group, Total Access Communication Plc (Dtac) which is a subsidiary of Norway's Telenor, True Corporation Plc (True), and National Telecom (NT) a state-owned company.⁵⁹

National Telecom was established in 2021 through the merger of CAT Telecom and TOT which were both state-owned companies and party to concessions with Dtac, AIS and True.

Mechanism/s for Maximizing Funding for Infrastructure

Infrastructure sharing can effectively reduce total cost of ownership (TCO) by up to 40% for operators, and significantly reduce OPEX relating to land lease, power and backhaul which typically comprise almost half of the OPEX in emerging markets.⁶⁰

Typically, telcos generate revenue by providing consumers with different telecommunication services such as voice and data connectivity

⁵⁷ <https://www.commsupdate.com/articles/2015/08/14/dtac-confirms-ais-network-sharing-cat-joint-venture-deals/>

⁵⁸ <https://www.telecomasia.net/content/ais-dtac-sign-long-term-tower-sharing-deal/>

⁵⁹ [https://www.bangkokpost.com/thailand/special-reports/911524/waves-of-fear-over-phone-tower-](https://www.bangkokpost.com/thailand/special-reports/911524/waves-of-fear-over-phone-tower-claims#:~:text=There%20are%20more%20than%2060%2C00,of%20the%20existing%20electrical%20cables.)

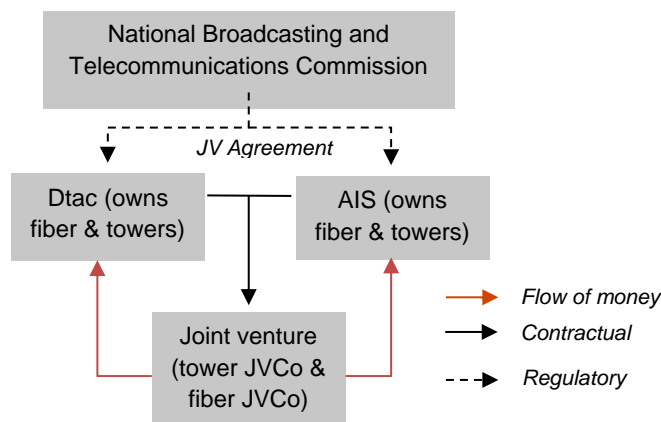
claims#:~:text=There%20are%20more%20than%2060%2C00,of%20the%20existing%20electrical%20cables.

⁶⁰ <https://www.gsma.com/futurenetworks/wiki/infrastructure-sharing-an-overview/>

services. However, larger telcos can also share their infrastructures with small operators through a leasing or revenue-sharing model, which has gained traction in emerging markets, especially with the new 5G development, where a large amount of capital is needed to build the infrastructures.

Aside from forming partnerships to share telco infrastructure, some telco companies are considering divesting their towers in sale-and-leaseback arrangements which free up capital for investment in other focus areas.⁶¹

Typical Business Model



| | |
|--|--|
| National Telecommunication Commission | <ul style="list-style-type: none"> Regulatory agency overseeing Thailand's broadcast and telecom industries Responsible for 5G provision |
| Telco Companies | Share the infrastructure for more effective cost spending on building networks and improving services. Dtac owns 51%, while AIS owns 49% |
| Joint Venture | Manage shared telecoms towers and fiber-optic infrastructure Roll out of new towers |

Apart from private telco infrastructure sharing partnerships, National Telecom (NT) which is a state-owned company is positioning as an infrastructure-sharing provider, seeking partnerships to develop sustainable revenue streams in the future as its spectrum-sharing concession contracts with three major mobile operators (Dtac, AIS and True Corporation Plc) are slated to expire in 2025.⁶²

NT's assets comprise 25,000 telecom towers, nine routes of submarine cables, total spectrum of 600 megahertz of bandwidth on six spectrum ranges, 4,000 kilometers of cable conduits, 4 million fiber-optics cores and 13 data centers and international call services. NT aims to provide infrastructure-sharing services to operators to support effective cost management.⁶³

Lesson Learned

Managing the risks

- **Regulatory Risk:** Collusion between parties involved in infrastructure sharing can defeat the mechanism's purpose. Collusion can result in less competition between telcos, to support higher network leasing charges, which would push up consumer prices.
- **Operational Risk:** Sharing telco infrastructure results in limitations for development of operators' services. Operators might find it challenging to change their service as they do not have the right to alter the infrastructure. Also, there might be long locked-up periods that are restrictive for the operators.

Replicability

- Government properties can be used to provide portfolios of real-estate to situate telco towers on a shared basis and earn revenues

⁶¹ <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/southeast-asia-s-telcos-to-look-to-tower-tech-deals-as-5g-rollout-costs-add-up-69667006>

⁶² <https://www.bangkokpost.com/business/2259223/building-a-brand-identity>

⁶³ Ibid

9. Infrastructure sharing: Utility Tunnel in GIFT City, India

Background

Public utilities are normally located in the 'public commons' of the urban landscape, namely above or under roads and pavements. As the density of urbanized communities increase, the maintenance, renewal and upgrade of utility infrastructure in public commons real-estate has become progressively more complex and expensive.

Infrastructure sharing of physical assets between different utility providers **can maximize the utility of infrastructure and/or minimize costs** needed to build and operate assets, creating a win-win situation for parties involved especially cost-savings from reduction in capital investment required for expanding, maintaining, and upgrading network connectivity.

Several countries have developed **utility corridors/utility tunnels** that are typically used by different utility providers to lay their physical assets there, for example, cables for providing basic facilities such as power, and telecoms connectivity. In addition, pipelines for water supply, town gas supply, district cooling water, wastewater collection and even pneumatic solid waste management systems can also be laid in the same tunnel.

Value creation proposition

Community-orientated value creation

Gujarat International Finance Tec-City (GIFT City) is an integrated development on 886 acres of land with 62 million sq ft of built-up area envisioned as an emerging financial hub in Gujarat, India. GIFT City features office spaces, residential apartments, schools, hospitals, hotels, clubs, retail and various recreational activities. As well as a multi-service special economic zone.⁶⁴

A Utility Tunnel was developed across the city to accommodate all utilities including power cables, raw water supply line to the water treatment plant (WTP) and treated water supply

from the WTP to various developments, district cooling pipes, ICT cables, automated waste collection pipe, and fire hydrant water pipes, among others.⁶⁵

The Utility Tunnel at GIFT City will approximately be 16 kilometers long, 8 meters wide and 11 meters deep. The provisions are made in the tunnel for smooth access, separation of utilities, proper drainage, lighting, and maintenance and security avoiding the need to excavate the roads for future repair, maintenance, renovation and upgrades of any utility.⁶⁶



GIFT Utility Tunnel⁶⁷

Key players for delivering improved services

Gujarat International Finance Tec-City Company Limited (GIFTCL) was incorporated in 2007 as a joint venture between Gujarat Urban Development Company Limited (GUDCL) and Infrastructure Leasing and Financial Services Ltd. (IL&FS).⁶⁸

GUDCL facilitates urban development by assisting state government in formulation of policy, institutional capacity building, project implementation, and in raising funds from multilateral agencies for urban projects.⁶⁹

Mechanism/s for Maximizing Funding for Infrastructure

For utility providers, multi-utility corridors & tunnels enable the offset of initial capital outlay required in laying utilities and also then paying, via leasing fees, for only a share of the cost of creating the multi-utility corridors & tunnels.

⁶⁴ <https://giftgujarat.in/>

⁶⁵ <https://www.giftgujarat.in/utility-tunnel>

⁶⁶ Ibid

⁶⁷ <https://www.giftgujarat.in/utility-tunnel>

⁶⁸ <https://faculty.washington.edu/jbs/itrans/gift-city.pdf>

⁶⁹ <https://www.giftgujarat.in/promoters>

For the master developer, multi-utility corridors & tunnels create cleaner and smarter real-estate with higher utility reliability that are more appealing to blue-chip anchor locators.

For Financiers of multi-utility corridors & tunnels, there is a stable long-term revenue from the long-term leasing to utility providers that are normally rated as low risk.

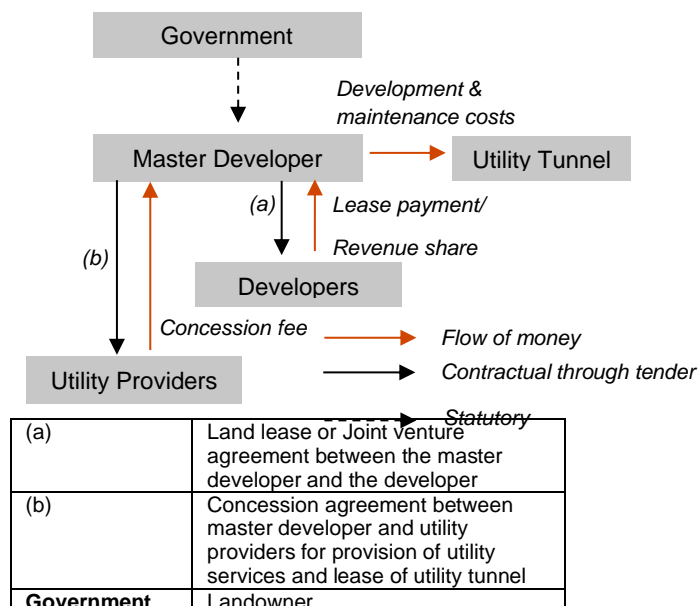
For municipal governments, as the ultimate asset owner of multi-utility corridors & tunnels create a way of monetizing the public commons to create a stable own-source revenue.

GUDCL appoints an EPC that can conduct works related to the utility tunnel through public tenders. Tender announcements are accessible in their e-procurement system.

The cost of the tunnel is estimated at INR 3.15 billion.⁷⁰ GUDCL issued separate tenders for different components. For example, GIFTCL launched the tender access control system for the utility tunnel was launched in 2021 with a contract value of INR 9,66,000.⁷¹

The initial cost of a utility tunnel can be recovered within four years.

Typical Business Model



⁷⁰ https://www.bentley.com/en/project-profiles/gujarat-international-finance-tec-city_integration-of-urban-infrastructure-through-utility-tunnel

⁷¹ <https://www.tendersontime.com/india/details/implementation-access-control-system-utility-tunnel-phase-2-gift-city-dta-and-sez-area-328e761/>

| | |
|----------------------------------|---|
| Master Developer (GIFTCL) | Responsible for overall development including provision of infrastructure services that increase attractiveness |
| Developers | Through a land lease agreement develop certain components of the integrated development |
| Utility Providers | Provides utility services in the integrated development and rents the utility tunnel |

Lesson Learned

Implementation

- High initial outlay for developing multi-utility corridors and long-term maintenance liability is a significant barrier for adoption which requires a longer-term view of benefits in order to justify investment decision by governments. But this can also be addressed commercial structures that require all utility providers to use the infrastructure and so create long-term stable revenues that makes the capital investment attractive for financing.
- Utility tunnels remove the need for repeated excavation and reinstatement procedures over its lifetime of 60 to 100 years and therefore eliminates many of the longer-term costs. For example, maintenance works carried out within utility tunnels reduce the size of the working area and requirements for equipment, labor and materials.⁷²
- Master developers of a greenfield site can rent space to utility owners.⁷³

⁷² D.V.L. Hunt, D. Nash, C.D.F. Rogers, Sustainable utility placement via Multi-Utility Tunnels, Tunnelling and Underground Space Technology, Volume 39, 2014, Pages 15-26, ISSN 0886-7798,

<https://doi.org/10.1016/j.tust.2012.02.001>.

⁷³ Ibid

10. Leveraging climate opportunities: Sembcorp Tengeh Floating Solar Farm

Background

Floating solar photovoltaic (FPV) installations open up new opportunities for scaling up solar generating capacity, especially in countries with high population density and competing uses for available land. Further, FPVs can generally generate more energy because of the cooling effect of water and can eliminate major site preparation such as leveling or laying of foundations which need to be done for land-based installations.⁷⁴

Other than contributing to the climate agenda, renewable energy projects bring security of energy supply, economic benefits and renewable energy developers can brand themselves as firms embracing sustainability. Furthermore, renewable energy projects can provide governments with an additional source of revenue from leasing land or water bodies to developers.

Value creation proposition

Community-orientated value creation

Singapore achieved its 2020 solar target of 350 megawatt-peak (MWp) in the first quarter of that year. In the longer term, Singapore is pursuing a new solar target of at least 2 gigawatt-peak (GWp) by 2030.⁷⁵

Sembcorp Tengeh Floating Solar Farm is a 60MW floating solar farm installed at Tengeh Reservoir in 2021. With 122,000 solar panels spanning 45 hectares, the solar farm is one of the world's largest inland floating solar projects. Besides increasing Singapore's solar energy deployment, the solar farm enabled Singapore to adopt a 100% green waterworks system.⁷⁶

The construction of Sembcorp Tengeh Floating Solar Farm has catalyzed Singapore's transition towards renewables, with the solar farm offsetting 7% of PUB's annual energy needs and significantly reducing PUB's carbon

footprint. In addition, the electricity generated from the solar farm will be sufficient to power Singapore's five local water treatment plants.

Installing solar PV systems in the reservoir facilitates optimized land use while enabling the Singaporean government to generate funding from leasing out spaces to Sembcorp Industries. Furthermore, Sembcorp Industries signed a 25-year power purchase agreement (PPA) with Public Utilities Board (PUB), enabling the Sembcorp to generate stable revenue via the sale of electricity, whilst PUB has increased security of power supply.

What sets them apart?

Minimum impact on biodiversity

Tengeh Solar Farm is carefully designed to minimize the impact on the reservoir's water quality, flora, and fauna. Sufficient gaps between solar panels were incorporated to improve the airflow and allow adequate sunlight to reach aquatic life. Additional aerators were also put in place to maintain oxygen levels in the reservoir. Floats deployed are made using high-density polyethylene (HDPE) - a certified food-grade, recyclable, UV, and corrosion-resistant material.

Practical construction to mitigate project delay risks

New and innovative ways of working were deployed to mitigate the impact of project delays by implementing a new engineering and construction technique to design a custom-built jig that increased the rate of solar panel assembly by up to 50%. This project is also the first in the world to deploy advanced drone electroluminescence imaging technology on a utility-scale PV system. Drone electroluminescence imaging captures X-ray-like signals emitted by PV modules to accurately and rapidly pinpoint defects that can be caused by various factors from the manufacturing to the installation stage. Identifying and replacing defective modules has ensured that the PV system runs optimally.

Key players for delivering improved services

Sembcorp Tengeh Floating Solar Farm is owned by Sembcorp Floating Solar Singapore, a wholly owned subsidiary of Sembcorp Industries. Temasek Holdings have a 49.5% equity stake in Sembcorp Industries.

⁷⁴ World Bank Group, ESMAP and SERIS. 2019. Where Sun Meets Water: Floating Solar Market Report. Washington, DC: World Bank.

⁷⁵ <https://www.ema.gov.sg/ourenergystory>

⁷⁶ <https://www.channelnewsasia.com/tengeh-reservoir-floating-solar-farm-officially-opens-big-step-towards-environmental-sustainability-says-pm-lee-2020521>

In addition to collecting rental revenue from leasing out spaces in Tengeh Reservoir, the government also receives a portion of the revenue generated by Sembcorp Industries for the sale of electricity.

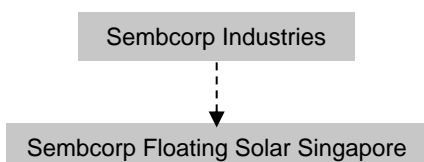
Mechanism/s for Maximizing Funding for Infrastructure

Typically, greenfield renewable energy projects face several hurdles that can affect project viability, including securing a robust power offtake agreement to mitigate revenue risk, land acquisition and the associated costs, obtaining planning permissions and environmental permits, and a high capital investment to create the power generation assets. The Project structure mitigated all these risks. Consequently, Sembcorp Tengeh Floating Solar Farm was able to raise finance for the capital investment of SGD 40 million which Sembcorp Industries was able to secure funding via a project finance loan from DBS Bank.⁷⁷

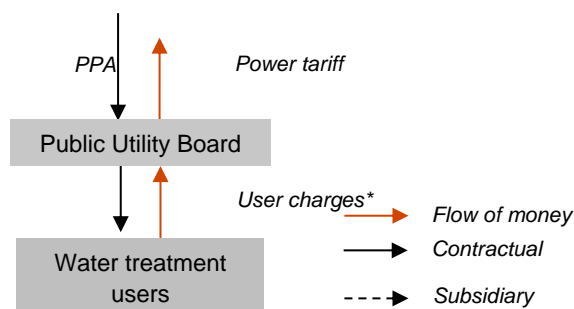
Sembcorp Industries signed a Power Purchase Agreement (PPA) with Public Utilities Board (PUB) for 25 years, enabling them to achieve revenue certainty in the long run.⁷⁸ Sembcorp Industries was appointed to design, build own and operate the solar farm. The project will generate green energy to power water treatment and is expected to offset 7% of PUB's (Public Utilities Board) current energy needs.⁷⁹

PUB benefits from leasing space on its reservoir, plus long-term secure supply of renewable power at preferential rates. The Singapore government benefits from Sembcorp Industries revenues through taxes, dividends, and Net Investment Returns (NIR) paid by Temasek.

Typical Business Model



https://www.dbs.com/newsroom/DBS_Bank_provides_SG_D40_million_loan_facility_to_Sembcorp_Industries_for_Singapores_first_single_large_scale_floating_solar_photovoltaic_system



| | |
|-----------------------------|--|
| Sembcorp | Responsible for the core services |
| Public Utility Board | Through PPA, ensures the effectiveness of the energy usage for water utilities |
| Users | Pays to the PUB for services |

* Water is priced not only to recover the full costs of its supply and production, but also to incorporate the higher cost of producing water from unconventional sources, specifically NEWater and desalinated water.⁸⁰

There can also be a water-lease contract between PUB and Sembcorp but such information has not been disclosed.

Lessons learned

Managing the risks

- **Site risk and Revenue risk:** Greenfield renewable energy projects are complex projects requiring integration and operation by specialists, the Singapore government's rigorous tender process mitigated the key project risks. Especially, by PUB both providing the project site and a long-term power offtake agreement, the project was considered have an elevated 'bankability'.

Leveraging Climate Opportunities:

- Tengeh Solar Farm benefits from PUB being the primary client, securing revenues for at least the next 25 years.
- Strong support from major banks such as DBS Bank that saw domestic

⁷⁸

<https://www.inframationnews.com/deals/3788286/tengeh-60mw-floating-solar-project.html>

⁷⁹

<https://www.inframationnews.com/deals/3788286/tengeh-60mw-floating-solar-project.html>

⁸⁰ <https://www.pub.gov.sg/watersupply/waterprice>

renewable energy projects as core to strengthening their brand.

- Renewable energy projects may involve rigorous testing as new technologies utilized in the projects will have to meet national or global technical standards
- Solar panels can be deployed in reservoirs and natural water bodies whilst mitigating adverse impacts on the surrounding environment, biodiversity, and water quality.
- Cooperation of entities responsible for managing water bodies is crucial. Positive examples include tenders of water-lease contracts in Korea with K-water, and in Singapore with PUB.⁸¹

⁸¹ World Bank Group, ESMAP and SERIS. 2019. Where Sun Meets Water: Floating Solar Market Report. Washington, DC: World Bank.

11. Leveraging climate opportunities:
SolarNova Rooftop solar program,
Singapore

Utilizing rooftop spaces to deploy solar photovoltaic (PV) systems can be a viable renewable energy source especially for highly urbanized cities.

The deployment of rooftop solar PV systems has increased significantly in recent years because of rapidly declining costs and supporting policies. Solar PV installations can be arranged in smaller configurations for mini-grids or domestic use. In many markets, self-consuming PV electricity is already more economically attractive than buying electricity from the grid.⁸²

In land-scarce regions such as Singapore where other forms of renewable energy, such as wind, tidal and hydro are not viable options, there is substantial solar potential that can be harnessed by deployment on the rooftops allowing industries and housing blocks to generate renewable energy for self-use and for selling excess capacity to the grid.

Value creation proposition

Through various rooftop solar initiatives, Singapore is accelerating renewable energy generation. Private players in Singapore like Sunseap Leasing Pte Ltd. (Sunseap) have partnered with Housing Development Board (HDB) through the government's SolarNova program which aims to accelerate deployment of solar PV systems in Singapore.

In 2019, Sunseap won the fourth tender under the SolarNova program for 70 MegaWatt-peak (MWp) to install more than 170,000 solar panels on the rooftops of more than 1,200 Housing and Development Board (HDB) blocks and 49 government sites.⁸³

With the seventh tender (SolarNova7) that will be awarded in the fourth quarter of 2022, the HDB is on track to meet the target of 540MWp of solar PV capacity by 2030.⁸⁴

What sets it apart?

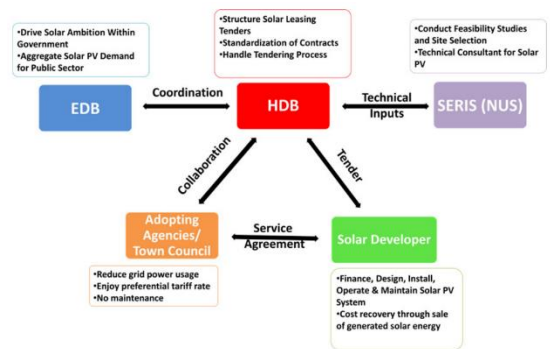
⁸² <https://www.irena.org/newsroom/articles/2021/Dec/Better-Understanding-of-Rooftop-Solar-PV-Installation-Can-Support-Increased-Deployment>
⁸³ <https://www.sunseap.com/sg/news/2019/sunseap-wins-tender-for-one-of-singapore-largest-solar-projects-to-install-more-than-170000-solar-panels-on-HDB-rooftops.html>

Renewable Energy Credits from SolarNova4. Facebook previously signed a Virtual Power Purchase Agreement (VPPA) with Sunseap, to purchase renewable energy credits (RECs) from the excess energy generated from solar panels in the SolarNova 4 project. The solar energy generated will support the tech company's operations in Singapore, including Facebook's first custom-built data center in Asia.⁸⁵

Sunseap's Solar Leasing Scheme Beyond SolarNova4, Sunseap's Solar Leasing Scheme allows businesses to monetize unused rooftop space. Under its Solar Power Purchase Agreement (PPA) with commercial building owners, Sunseap finances, installs, and maintains the solar systems and charges their customers for the building energy consumption at competitive electricity tariff rates over 20-25 years.⁸⁶

Key players for delivering improved services

The SolarNova Program is jointly led by HDB and Economic Development Board (EDB). HDB launches and awards solar leasing tenders under the SolarNova program to developers who would finance, design, install, operate and maintain rooftop solar systems.



Source: <https://www.hdb.gov.sg/about-us/our-role/smart-and-sustainable-living/solarnova-page>

Sunseap Group is a solar energy system developer, owner, and operator headquartered in Singapore. Sunseap Leasing Pte Ltd. is subsidiary of Sunseap Group that focuses on bringing rooftop solar panels at an affordable cost to homeowners.

Mechanism/s for Maximizing Funding for Infrastructure

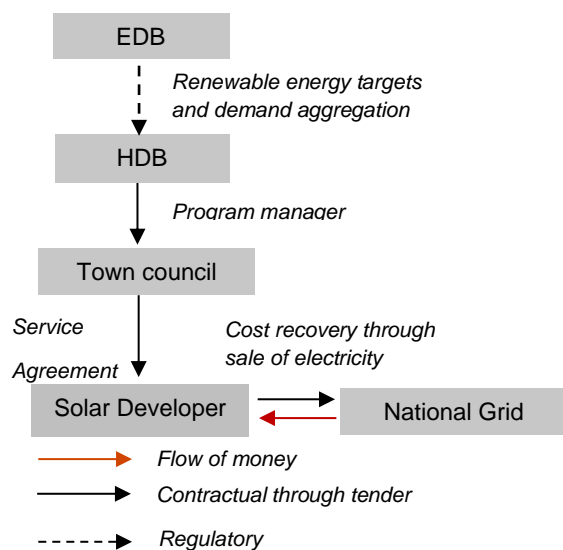
⁸⁴ <https://www.hdb.gov.sg/about-us/news-and-publications/press-releases/HDB-to-bring-solar-energy>
⁸⁵ [https://www.sunseap.com/sg/news/2021/sunseap-secures-\\$85.8-million-green-loan-from-DBS-and-UOB-to-finance-singapore-largest-clean-energy-project.html](https://www.sunseap.com/sg/news/2021/sunseap-secures-$85.8-million-green-loan-from-DBS-and-UOB-to-finance-singapore-largest-clean-energy-project.html)
⁸⁶ <https://www.sunseap.com/sg/commercial/solarppa.html>

Private solar PV system developers have responsibility to design, finance, install, operate, and maintain the solar PV systems. The solar energy harnessed is used to power common services in the HDB estates like lifts, lighting in common areas and pumps, helping town councils to mitigate rising energy costs through a power purchase agreement between the solar developer and town councils.⁸⁷

The solar leasing model allows government agencies to purchase the solar power at a preferential rate below the retail price, and without rendering any up-front installation costs.⁸⁸

Local councils directly benefit from the revenues received from the service agreement, through which they are granting the rights for use of government property rooftops for solar power generation.

Typical Business Model



| | |
|---|---|
| Government (HDB) | Structures solar leasing tenders, standardizes contracts and handles tendering process |
| Solar developer (Sunseap Leasing) | As the solar developer Sunseap will finance, design, install, operate, and maintain rooftop solar systems |
| Rooftop Owner (Adopting agencies/ Town Council) | Signs the service agreement with solar developer |

Lessons learned

Confidence for sustainable delivery for communities

⁸⁷ <https://www.hdb.gov.sg/cs/infoweb/about-us/news-and-publications/press-releases/solarnova-programme-16102016>

⁸⁸ <https://www.gihub.org/emerging-funding-and-finance/case-studies/whole-of-government-coordination-to-accelerate-solar-deployment/>

⁸⁹ Ibid

- The government took the lead through a **whole-of-government effort** that integrated different government boards and beneficiaries and set a good example to incentivize the private sector in utilizing public rooftops for solar power electricity generation.⁸⁹
- Governments in middle and emerging economies can replicate this program through setting up standard procurement structures and contracts, assisting government agencies to assess the suitability of assets and providing support in running procurement program.

Managing the risks

- The government effectively aggregated public sector solar demand for private sector solar developers and ensured economies of scale. Solar leasing, in the form of a Power Purchase Agreement, provided a range of contract pricing structures that offered competitive rates, helping the government save on electricity bills.⁹⁰
- Sunseap has secured a \$85.8 million loan from DBS and UOB for the SolarNova4 utilizing Sunseap's Green Financing Framework. Sunseap's Green Financing Framework aligns with the International Capital Market Association's Green Bond Principles 2018, the Loan Market Association's Green Loan Principles 2018, and ASEAN Green Bond Standards 2018.⁹¹

Other examples

- JTC in Singapore has also launched its solar deployment program on industrial buildings making solar deployment mandatory for new leases, lease renewals land-based facility launches and tenders for sites with at least 800 sqm of available and technically viable contiguous rooftop area and with remaining lease period of at least fifteen years.⁹²

⁹⁰ Ibid

⁹¹ [https://www.sunseap.com/sg/news/2021/sunseap-secures-\\$85.8-million-green-loan-from-DBS-and-UOB-to-finance-singapore-largest-clean-energy-project.html](https://www.sunseap.com/sg/news/2021/sunseap-secures-$85.8-million-green-loan-from-DBS-and-UOB-to-finance-singapore-largest-clean-energy-project.html)

⁹² <https://www.jtc.gov.sg/get-help/managing-your-tenancy-or-lease/solar-deployment>

12. Leveraging climate opportunities: EV charging infrastructure, India

Background

The cost of electric motorbikes and mopeds has now reached parity with the traditional internal combustion motorbikes and mopeds. Moreover, electric charging costs are relatively cheaper than gasoline. Consequently, there has been a sharp increase in the uptake of electric vehicles (EV), especially motorbikes and mopeds in Asia, not only in developed countries such as China and Japan but also in emerging markets such as India, Indonesia, and Thailand.

Successful EV adoption requires a change in consumer behavior enabled by public policy to create an EV ecosystem that makes EV use affordable and reliable.

The shift to EV use is imperative for countries with net zero commitments, given that transport is a leading source of greenhouse gas (GHG) emissions. Although a strong push toward EV would also create higher energy demand that can easily offset gains if energy sources are not clean.

The charging infrastructure is the backbone of electric mobility. India perceives key barriers for EVs including high capital investment, lack of affordable land in dense urban areas with public charging seen as a standalone land use requiring dedicated space, limited power distribution capacity, and long charging times.⁹³

Value creation proposition

Community-orientated value creation

The Government of India supports the EV industry by encouraging electric and hybrid vehicle purchases through its Faster Adoption and Manufacturing of Electric Vehicles (FAME). FAME II is a 3-year program supporting electric and hybrid buses, electric 3W, 2W and 4W passenger vehicles.⁹⁴

Under FAME I and II, about 371,000 EVs were supported with total incentive of around Rs. 634 Crore (~USD 79.6 million) as of July 2021, and 427 charging stations have been installed. Under FAME II, Rs. 1000 Crores (~USD 125.6 million) is allocated for the development of charging infrastructure in the country.⁹⁵

The Government of India has set a target to electrify 70% of all commercial vehicles, 30% of private cars, 40% of buses, and 80% of two-wheeler and three-wheeler sales by 2030. This target entails simultaneous penetration of charging stations across India.⁹⁶

In 2022, Tata Power has installed 150 EV charging points across residential societies, malls, commercial complexes and petrol pumps in Mumbai. The EV charging points are powered by renewable energy sources like wind, solar and hydropower.⁹⁷

Key players for delivering improved services

Ministry of Heavy Industries & National Real Estate Development Council assist the development of EV charging to achieve renewable targets.

Tata Power, a subsidiary of Tata Group, has consolidated its position at the top of the sector, accounting for over 50% of PCPs in the country. Even in the home charging and fleet charging verticals, Tata Power's market share is at ~40%.⁹⁸

Mechanism/s for Maximizing Funding for Infrastructure

The Memorandum of Understanding (MoU) between Tata Power and National Real Estate Development Council for 5,000 EV charging points across Maharashtra was signed to boost EV adoption in the state. Tata Power will provide comprehensive EV charging solutions across properties of member developers of

⁹³

<https://energy.economictimes.indiatimes.com/news/power/india-has-made-the-right-move-on-charging-infrastructure-for-electric-vehicles/83803723>

⁹⁴ <https://www.iea.org/policies/12517-faster-adoption-and-manufacturing-of-hybrid-and-electric-vehicles-fame-scheme-phase-i-ii>

⁹⁵

<https://pib.gov.in/PressReleasePage.aspx?PRID=1741569>

⁹⁷ <https://timesofindia.indiatimes.com/city/mumbai/tata-sets-up-150-ev-charging-pts-with-green-fuel/articleshow/92400236.cms>

⁹⁷ <https://timesofindia.indiatimes.com/city/mumbai/tata-sets-up-150-ev-charging-pts-with-green-fuel/articleshow/92400236.cms>

⁹⁸

https://www.tatapower.com/PressRelease/Report_media-29nov21_a49b179394.pdf

National Real Estate Development Council (NAREDCO).⁹⁹

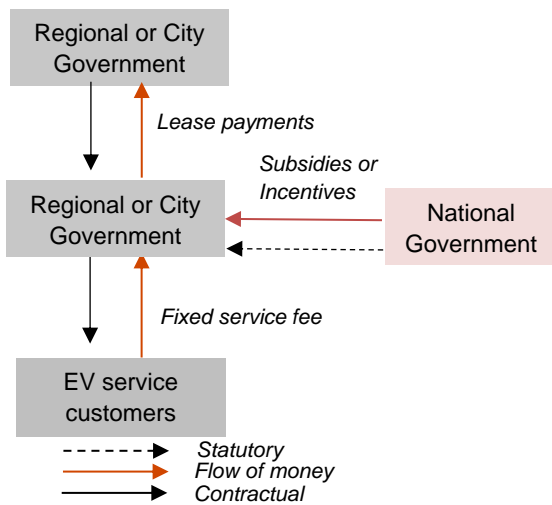
While in Gujarat state, Ahmedabad Municipal Corporation (AMC) will lease land at adjusted rates of INR 10 (USD 13 cents) per sqm with an allotment of ~50 sqm for each charging station. The AMC plans to establish 25 charging stations in the first phase. The 10-year contract will be awarded to the bidder offering the highest fee, subject to a mid-term review at the end of five years. The charging rates to be paid by users will soon be decided by the state government.¹⁰⁰

- Subsidies and incentives to grow the value chain for EV such as manufacturing of EV vehicles and installation of EV charging points were applied in India to encourage growth in private sector business.
- However, as demand rises, land can be leased at more commercial rates.

Replicability

- Similar to AMC, governments can consider partnering with private sector to install EV charging points and earn a concession fee or lease payments and a revenue share once utilization goes beyond a certain threshold.

Typical Business Model



| | |
|------------------------------------|---|
| Regional or City government | <ul style="list-style-type: none"> • Climate agenda • Leases out real estate properties (spaces) for installing EV chargers |
| National government | Potential support for EV charging installations |
| Private sector | Installation, maintenance, and upgrading of the chargers as and when required. Ensure access to 24x7 vehicle charging, monitoring, and e-payments facilities. |

Lessons learned

Implementation

⁹⁹ https://www.business-standard.com/article/companies/tata-power-signs-mou-with-naredco-for-5-000-ev-charging-points-122042801171_1.html

¹⁰⁰ <https://www.inframationnews.com/news/11917236/indian-municipality-plans-ev-charging-stations-ppp.html>

13. Usage of facilities during off-hours or off-seasons: Events in Wembley Stadium, UK

Background

Cities across Europe are using festivals and events to achieve place marketing and economic development objectives and encourage cultural engagement and social cohesion. As a result, people are seeing more park concerts, festivals, competitions, and bazaars in public facilities.

Wembley Football Stadium (Wembley Stadium) in London which is traditionally used for seasonal sporting events like Football Association (FA) Cup is being rented to event organizers for mega-events and concerts during off-season.

Value creation proposition

Community-orientated value creation

Wembley Stadium hosts major football matches, including home matches of the England national football team and the FA Cup Final.

The £326.5 million government-funded Stadium is crowned by the 134-meter-high Wembley Arch, which serves aesthetically as a landmark across London. With 90,000 seats, it is the largest stadium in the UK and the second-largest stadium in Europe.

Wembley Stadium is regularly used for English football games, mainly the FA cup. However, during off-season, the space hosts concerts and events of big acts that draw a high number of visitors from overseas who tend to extend their stay in England resulting in higher tourist spending associated with these events.

The rebuilding of the Wembley Stadium transformed the local area of Brent with investments in public infrastructure such as £70 million for road, rail and pedestrian routes to prepare the existing infrastructure for influx of fans on event days. Apart from that WNSL also promote and support local community projects.¹⁰¹



Concert crowd at Wembley Stadium¹⁰²

What sets it apart?

Amenities and connectivity

The Stadium has a range of hospitality spaces that allow 10,000 people to dine before a match. These facilities are also designed to be used on non-match days for conferences, dinners, and other events. The new Stadium has revitalized the London Borough of Brent, with upgraded public transport links encouraging match-day arrivals and benefitting local residents and businesses. Up to 1,800 people visit the area daily on the famous Wembley Stadium tour.

Key players for delivering improved services

Wembley National Stadium Limited (WNSL) which operates the Wembley Stadium is wholly-owned by The Football Association (FA), a governing body for football in England.

Sport England leads the development of sport in England and administers funding for sports from the National Lottery of England from which a £120 million Lottery Grant funded the purchase of the old Wembley Stadium.

The London Development Authority (LDA), the regional development authority for London, which was dissolved in 2012, has contributed £21 million to the rehabilitation of the Wembley Stadium.

Mechanism/s for Maximizing Funding for Infrastructure

During the 2017/18 season, the FA generated record revenue of £376m (USD 445.7m) from The Football Association Limited, Wembley National Stadium Limited, and the National Football Centre Limited.

The FA has invested back a record £128m (USD 151.7m) invested back into football. For example, on The FA's Full-Time mobile app which has been a game-changer for grassroots

¹⁰¹ <https://www.wembleystadium.com/about/Local-Community>

¹⁰² <https://www.iq-mag.net/2017/02/wembley-concerts-boost-record-fa-revenue/>

football, making the management of teams much more efficient and effective.¹⁰³

The 2017/18 season was the busiest year to date at the Wembley Stadium with 58 events and over 4 million spectators hosted including sporting events and concerts of big acts such as Ed Sheeran and Taylor Swift.¹⁰⁴

In 2019, Wembley Stadium hosted more concerts than ever (a total of 38 shows) with a total gross of USD 102.2m. Among other acts to host big concerts, BTS grossed USD 13.5 million, and the Spice Girls grossed USD 27.3 million. Along with sold out concerts, the new hospitality facilities including F&B improvements also sold strongly.¹⁰⁵

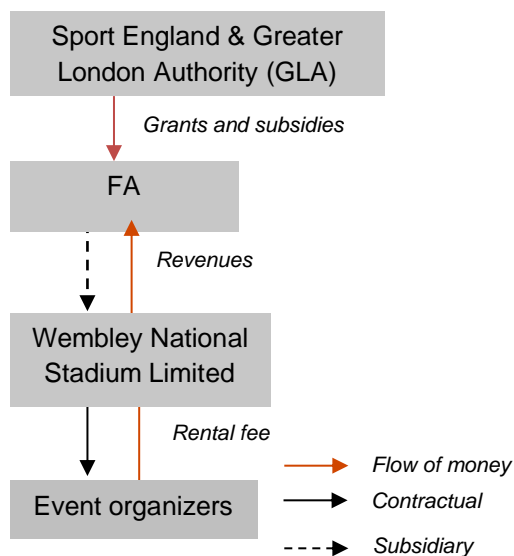
| | |
|-------------------------|---|
| Event organizers | Organize events, sell tickets, and promote the events |
|-------------------------|---|

Lessons learned

Managing the risks

- **Operational Risk:** Developing a sporting venue that can accommodate multiple sporting and recreational events would require a more extensive land area and higher CAPEX and OPEX investment. Extended off-season like the COVID-19 pandemic may require more funding from government to maintain sports and concert venues.

Typical Business Model



| | |
|---|--|
| Sport England | Responsible for sports events and lifestyle in the UK |
| London Development Agency | economic development body, promoting economic renewal and development. |
| FA | Responsible for the core services |
| Wembley National Stadium Limited | The asset owner rents the space to event organizers |

¹⁰³ <https://www.thefa.com/news/2019/apr/12/2017-18-financial-results-120419>

¹⁰⁴ Ibid

¹⁰⁵

<https://www.theticketingbusiness.com/2020/02/27/wembley-stadium-reports-successful-year-concerts-2019/>

14. Repurposing or adaptive reusing of old assets: St. James Power Station, Singapore

Background

Repurposing or adaptive reusing of old assets is becoming popular as they give second chances for revenues to the government, otherwise idle. For example, government of Singapore leased St. James Power Station into a productive asset by awarding development rights through which upfront payments and/or lease revenues can be generated to restore and preserve the historical assets.

Value creation proposition

Community-orientated value creation

James Power Station, which was previously a power station and gazetted in 2009 as a national monument. The building, a historical and unused old asset, was turned into a technology-intensive Dyson headquarters giving the asset a second life.

The restoration work of 110,000 sq. ft office space at St James Power Station included repainting and replacing building materials to preserve the original architecture of the building.¹⁰⁶

In the newest phase of its S\$4.9bn global investment programme, Dyson is investing S\$1.5b into its future in Singapore over the next four years. This restoration of St James Power Station into Dyson's headquarter is one of the first phases included in the investment.

Dyson's ultimate aim is to hire more than 250 engineers and scientists, with roles spanning robotics, machine learning, AI, high-speed electric digital motors, sensing and vision systems, connectivity, software, power electronics, and energy storage. The investment will also support ongoing university research programmes to drive technology development, building on its existing global programmes.



As Dyson's global headquarters, Singapore is a hub for Dyson's research and engineering teams, as well as commercial, advanced manufacturing, and supply chain operations. Over 1,400 Dyson people work in Singapore, 560 engineers and scientists.

What sets it apart?

Brand new integration strategy of a company to the new locality

To successfully integrate the Singaporean market, Dyson is environmentally conscious and understands the historical structure of St James Power Station; this new headquarters is an inspiration for sustainable workplaces and preserving local heritage. This is a sensible move of a global company to safeguard the rooted history of where the business takes place while transforming the old asset into a productive headquarter.

Key players for delivering improved services

Government of Singapore owns the asset St. James Power Station, while the real estate development rights were transferred to Mapletree Investment as the landlord.

Mapletree Investment, wholly owned by investment holding Temasek, currently manages four Singapore-listed Real Estate Investment Trust (REITS) and six private real estate funds. Mapletree owned and managed S\$55.7 billion of properties as of 2019¹⁰⁷.

Mechanism/s for Maximizing Funding for Infrastructure

¹⁰⁶ <https://vulcanpost.com/783522/dyson-hq-st-james-power-station-singapore/>

¹⁰⁷ <https://www.businesstimes.com.sg/real-estate/mapletree-eyes-s10b-of-deals-a-year-as-more-funds-planned>

Mapletree Investments leases the old asset to Dyson for use as the Dyson global headquarters.

The Singapore government benefits from Mapletree Investment revenues through taxes, dividends, and Net Investment Returns (NIR) paid by Temasek.

What is the rationale for setting up a sovereign wealth fund?

From 2000 to 2015, Temasek was under a government spending framework, where up to 50% of dividends from Temasek can be used by the Singapore Government for budget spending. The remaining dividends were locked up as past reserves of the Singapore Government.

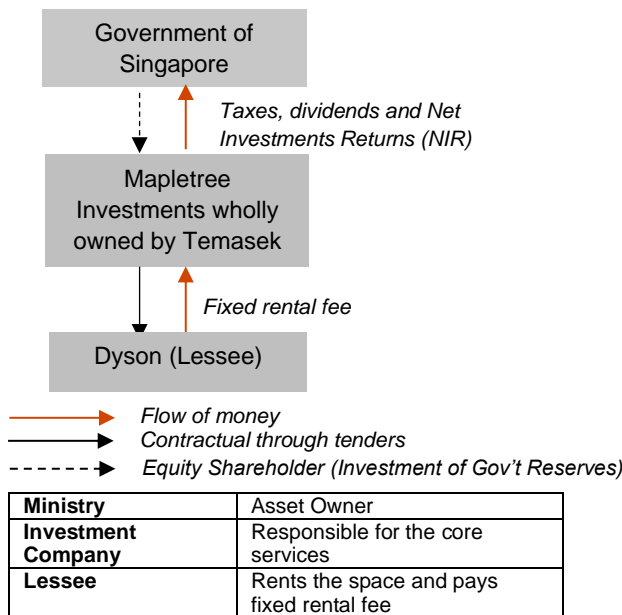
Since Temasek's inclusion in the NIR Framework in 2019, the Singapore Government may spend up to 50% of Temasek's expected long-term returns, net of inflation. NIR Contribution is the single largest contributor to Singapore Government revenues, at 21% of the 2022 Government Budget.¹⁰⁸

- Mapletree Investment involvement is crucial in ensuring that St James Power Station can be transformed into a high-tech Dyson headquarters. As the real estate developer of the area, Mapletree Investment also assists the handover process to Dyson to be smooth and timely.

Replicability

- The value capture mechanism for Temasek and its subsidiaries is largely due to Singapore government's policy led by MOF for investing government reserves and balancing current and future use of dividends and investment returns. Such value creation from idle historical assets can be adopted for different countries and the value captured through own-source revenue generation for local governments through rentals, developer impact fees or betterment levies.

Typical Business Model



Other Cases:

Arcade Independence Square, Sri Lanka



Source: <https://sg.lakpura.com/pages/arcade-independence-square?shpxid=483fa641-7e74-49aa-88b6-ce745867f51f>

Arcade - Independence Square (Arcade) is one of the most important refurbishment and development projects undertaken by the Sri Lankan Ministry of Defence and the Urban Development Authority (UDA) which converted the old Auditor General's Building into a grand and trendy shopping and entertainment destination spending Rs. 700 million (USD 1.98 million) for the renovation.¹⁰⁹

The arcade provides office spaces, commercial outlets, entertainment rooms and all other facilities while preserving its original architectural design and magnificence, opening new opportunities for employment.¹¹⁰

Lesson Learned

Managing the risks

¹⁰⁸ <https://www.temasek.com.sg/en/about-us/ins-outs-temasek>

¹⁰⁹ <https://www.uda.gov.lk/restoration-historical-building.html>

¹¹⁰ <https://www.army.lk/news/arcade-independence-square-colonial-buildings-restored-their-grandeur-magnificence-vested>

Arcade Independence Square generated a monthly income of Rs. 10 million (USD 27,800) in 2014 but revenues gradually declined from 2015 while it was under UDA management. Considering this, the UDA board decided to lease the Arcade to the private sector to generate greater revenue. The Department of Valuation recommended that Rs. 120 million (~USD 330,000) should be obtained as annual lease.¹¹¹

Currently, Arcade is being operated by Odel PLC as a luxury boutique experience destination, adding its cluster of operating and managing high-end shopping malls in the country. In 2021, Odel PLC yesterday said it entered into an agreement with the Urban Development Authority (UDA) to lease, operate and manage Arcade Independence Square for a period of 10 years (with option to renew for another 10 years).¹¹²

Odel PLC, a subsidiary of Softlogic Holdings PLC, concurred to pay Rs. 10 million monthly (USD 27,800) and Rs. 120 million (~USD 330,000) as a total upfront fee at the time of signing the agreement. They also paid another Rs. 240 million (~USD 660,000) towards security deposit. Softlogic Holdings PLC is a diversified conglomerate in Sri Lanka engaging in multiple industries such as ICT, Healthcare, Retail, Financial Services, Automobiles, and Leisure.¹¹³

¹¹¹ <https://www.newsfirst.lk/2021/03/25/uda-was-losing-revenue-state-min-gives-reasons-for-leasing-arcade-colombo/>

¹¹² <https://www.dailymirror.lk/business-news/Softlogics-Odel-to-operate-Arcade-Independence-Square-from-April/273-208440>

¹¹³ <https://www.themorning.lk/arcade-independence-squares-10-yr-lease-another-retail-giant-also-engaged-in-bidding-godahewa/>

15. Zone Betterment: Betterment Levy for Hyderabad Outer Ring Road, India

Background

Government investment in integrated public infrastructure in zones can lead to 'betterment' of that zone, increasing its productivity, attractiveness and value for communities using those places and spaces.

Betterment Levy imposes fees on land that has gained value because of improvements in public infrastructure invested by the government. A few cities in India have already used Betterment Levy as an LVC tool.

In Hyderabad, Hyderabad Metropolitan Development Authority (HMDA) uses area-based land value capture (LVC) mechanisms such as impact fees and betterment charges to generate revenues.

Value creation proposition

Community-orientated value creation – *Zone Betterment*

The Hyderabad Outer Ring Road (ORR) is a 158-km, eight-lane ring road expressway encircling Hyderabad and connects to more than 30 radial roads, allowing cars to bypass the crowded city center and to move around the city more efficiently, lessening traffic, noise, and pollution in the urban center.¹¹⁴

Areas around the corridor (Growth Corridor) is classified as a mixed land use zone integrating land use and transport planning through planned satellite townships and a metro system. Because of the ORR construction, the Hyderabad Metropolitan Development Authority (HMDA) had anticipated large-scale development and other problems that emerge from high-density commercial development, such as traffic congestion.¹¹⁵

The corridor aims to develop well-planned and well-connected urban settlements and satellite townships around the Hyderabad Metropolitan area. HMDA prepared a Comprehensive Plan and Special Development Regulations for the areas falling within the Growth Corridor.¹¹⁶

Key players for delivering improved services

This Betterment Levy mechanism is a collaboration among multiple stakeholders, which are Hyderabad State Government, banks, HUDA, local authorities, and beneficiaries of the ORR (private developers and individuals)

HGCL (Hyderabad Growth Corridor Limited) is an SPV that was set up to execute the construction of the ORR that was procured through PPP.

The project's total cost was evaluated to be Rs. 6,696 crores (around 8.4 billion USD), of which Rs. 699 crores (around 87 million USD) amounting to the first phase was provided through loans borrowed from a consortium of commercial banks led by the Bank of Baroda. Rs. 2,439 crores (around 3 billion USD) were financed through PPP and supported the first part of the project's second phase¹¹⁷

Mechanism/s for Maximizing Funding for Infrastructure

The Hyderabad Local Government raised revenue for funding repayment of the upfront capital investment from real-estate development around the ORR using area-based charges as follows:**Error! Bookmark not defined.**

- Special Development Charges (SDCs) managed by the city government charge up to 1.5 times the regular fee for building permissions. The charge bracket is classified based on the proximity to the ORR, and
- Development Deferment Charges (DDCs) managed by local villages charge landowners who keep lots vacant.

Both mechanisms are **one-time charges collected to pay for public infrastructure requirements that emerge** from new developments.

Revenues from SDCs and DDCs from 2011 to 2015 were lumped under HDMA's development charges revenues. In 2016, SDC receipts were 3-4 percent of total development charges and contributed 1.5 percent to net revenues of HDMA.

Revenues from SDC are directed to general budget and reporting lack sufficient granular data on outflows of revenues captured and allocations are not traceable.

¹¹⁴ <https://files.wri.org/d8/s3fs-public/urban-land-value-capture-sao-paulo-addis-ababa-and-hyderabad.pdf>

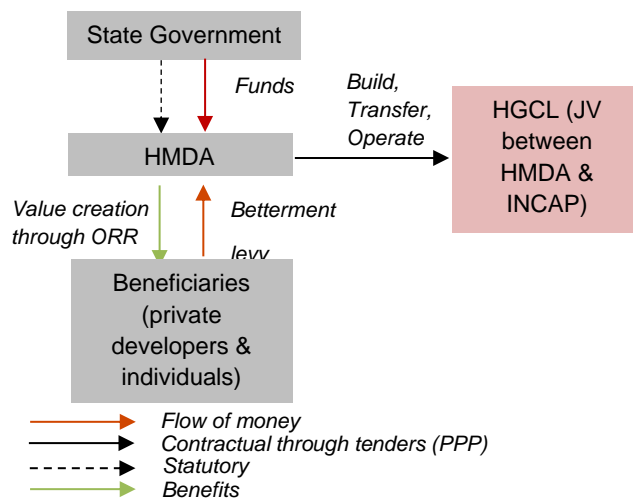
¹¹⁵ Ibid

¹¹⁶ Ibid

¹¹⁷

https://mohua.gov.in/upload/whatsnew/59c0bb2d8f11bVC_F_Policy_Book_FINAL.pdf

Typical Business Model



| Telangana State Government | Source of funds |
|--|---|
| HMDA (Hyderabad Metropolitan Development Authority) | Planning agency - Receives funding to provide core services (i.e., toll roads) and collect charges from beneficiaries |
| HGCL | Joint venture – between HMDA & INCAP, responsible for a construction |
| Beneficiaries | Pays set charges based on zones because of infrastructure improvements |

Lesson Learned

Managing the risks

- Implementation Risk:** The implementation of Betterment Levy in Hyderabad has been less practical and more aspirational in its potential to bring in money for the city and encourage equitable development. Despite this it is a good starting point and a chance for strengthening institutional set up, capability and legislation for successful LVC implementation.
- Political Risk:** To effectively address equity concerns and sustain support for progressive taxation and policies, transparency must be upheld. Only then will the higher tax revenues brought on by new infrastructure and subsequent economic growth be employed. Land-use and transportation authorities, along with housing, finance, and economic development agencies, are a few government actors who must coordinate to ensure that Zone Betterment work.

Annex 3: Cases Studies from Municipal Public-Private Partnership Framework of World Bank

In addition to the above case studies, the below link is for the World Bank's Municipal PPP Framework which includes 98 Project Summaries with examples of commercial value capture in various sectors and from countries around the world.

Link: <https://ppp.worldbank.org/public-private-partnership/library/municipal-public-private-partnership-framework-project-summaries>

The table below provides project summaries of the 98 case studies.

| No. | Case Studies | Project Summaries |
|-----|--|---|
| 1. | Moncloa Transportation Exchanger, Madrid, Spain | Transportation exchangers are intermodal nodes of urban and interurban transport networks. As demand for public transportation grew, however, the Moncloa exchanger's capacity was pushed to its limits during peak hours. In 2007, there was a modification in the project's design. The Moncloa exchanger has improved Madrid's mobility and its citizens' quality of life significantly. Through this PPP, Madrid was able to develop high quality infrastructure within a very short period of time and with a lower impact on the public budget. |
| 2. | Hong Kong Mass Transit Railway Corporation, Hong Kong SAR, China | Hong Kong, a densely populated city, invests heavily in its public transport system, mainly its railways. The government created the Hong Kong Mass Transit Railway Corporation (MTRC) to manage the metro services. When planning new railway lines, MTRC not only assess construction costs but also develops a master plan to assess property development opportunities along the railway. It buys development rights for 50 years from the government, allowing it to build above railway stations and adjacent land. These rights are later tendered to private developers with an added premium based on the railway's value. Private developers handle construction and commercialization, while MTRC oversees the work, enforces standards, and shares revenues from residential and commercial properties. The revenue benefits both MTRC and the Hong Kong government through taxes and dividends since the government is the majority shareholder of MTRC. |
| 3. | Challenging Case: Yongin Everline Light Rail Transit, Seoul, Republic of Korea | In 1996, Yongin City planned a public-private partnership (PPP) to create the Yongin Everline Light Rail Transit (LRT) due to expected increased travel demand. However, it was delayed until 2001 due to a lack of bids. In 2002, a consortium led by Daelim Industrial Co., Ltd. and Bombardier Transportation submitted the only proposal. They were chosen as the preferred bidder and formed Yongin Rapid Transit Co. Ltd. The PPP agreement was signed in 2004, granting the consortium a 30-year concession to design, build, and operate an 18 km Yongin LRT at a cost of KRW 728 billion (USD 646 million). Ownership remained with Yongin City, which guaranteed 90 percent of minimum revenue over the 30-year period, and the consortium had to provide extra funds for cost overruns, up to a limit. |
| 4. | Sheberghan City Bus Terminal, Sheberghan, Afghanistan | In Sheberghan, bus passengers faced issues like long waits without facilities, traffic jams, and accidents due to the lack of a proper bus station. To address this, the municipality built a new bus terminal through a public-private partnership (PPP). They invested \$50,000, received \$120,000 from a US development aid agency, and the private partner contributed \$60,000. In addition to running the terminal, the private partner built 16 shops for the municipality, leasing them for five years to recover their investment. Afterward, they paid rent to the municipality, generating revenue. This PPP solved traffic problems, improved passenger conditions, and earned income for the municipality. |
| 5. | Modern Bus Terminal and Municipal Market, Danli, Honduras | In Danlí, Honduras, an old and chaotic bus terminal led to traffic issues. To solve this, a private proposal by Flefil y Asociados was accepted by the municipality. They planned an upgraded terminal with 418 stalls, parking, and more. The private partner invested \$4 million and conducted land studies to avoid extra costs. After construction, they sold stalls and terminal spaces to recoup their investment. The municipality can buy stalls and rent them to others. The project aimed to be energy-efficient and accessible. It opened in early 2018, benefiting over 400,000 people. The municipality only compensates for completed work if the contract ends early due to unforeseen circumstances, and other risks are handled by the private partner, Celaque Constructora. |

| No. | Case Studies | Project Summaries |
|-----|---|--|
| 6. | Challenging Case: Bus Terminal-cum-Commercial complex, Mohali, India | Mohali needed a new bus terminal to meet its growing transportation needs. To make it financially attractive, they combined it with commercial facilities - a unique concept called "busopolis." This included a bus terminal, a hotel with a helipad, and an office tower. Revenue came from bus exit fees, commercial leases, parking, and advertising. A private partner was chosen through competitive bidding, offering an upfront fee of \$8 million and annual fees. The total project cost increased to \$74 million. The project started in 2016 but faced challenges, as people preferred the old bus stand to avoid fees. Some investors in the commercial areas didn't receive their spaces as promised by the developer. |
| 7. | Challenging Case: Amritsar Intercity Bus Terminal, Punjab, India | The Amritsar Bus Terminal was overcrowded and in poor condition, serving thousands of buses daily. To solve this, the Government of Punjab used a public-private partnership (PPP) with Rohan Rajdeep Infrastructure (RRI). RRI financed, built, operated, and maintained the terminal for 11 years and five months. They earned revenue from bus fees, shop leases, advertising, and parking charges. RRI paid a one-time project fee of \$50,000 and a monthly lease of \$700 to the Punjab Infrastructure Development Board (PIDB). The government agreed not to build similar facilities nearby during the concession period to support RRI's success. |
| 8. | Challenging Case: Bus Terminal and Commercial Complex, Dehradun, India | In Dehradun, a city in Uttarakhand, a new Inter-State Bus Terminal (ISBT) and Commercial Complex were needed due to the growing population and tourism. The Mussoorie Dehradun Development Authority (MDDA) initiated a public-private partnership (PPP) project. Ramky Infrastructure Ltd won the bid in 2003, offering the highest annuity payment to MDDA. This 20-year concession agreement, extendable for ten more years, required Ramky to design, finance, build, operate, and maintain the ISBT and commercial complex. They earned revenue from bus usage fees, commercial leases, and other services. MDDA received an annual lease payment of \$114,000, increasing by 5 percent each year after a four-year moratorium. Over the concession period, MDDA expected to receive about \$2.7 million. |
| 9. | Challenging Case: Urban Transport Services, Peja, Kosovo | In Peja, Kosovo, a mix of private buses and taxis caused traffic and pollution issues. To improve transit, the municipality entered a 10-year PPP contract in 2012 worth \$4.6 million with a private partner. They handled bus services and built/maintained bus stops on municipal land. The bus stops would go to the municipality after the term, but buses stayed private. Revenue came from passenger fares and advertising. The municipality agreed to exclusive bus operation rights but couldn't stop illegal services, hurting the private partner's earnings. |
| 10. | Transmilenio Bus Rapid Transit Project, Bogotá, Colombia | In Bogotá, Colombia, population growth and bus system issues led to traffic congestion and pollution. To address this, the city established TransMilenio S.A. in 1999 to create a Bus Rapid Transit (BRT) system. They chose BRT over a metro system due to cost-effectiveness and broader coverage. TransMilenio S.A. manages the BRT system, coordinating with private sector operators who own and operate the buses. Operators are consortiums of local and international investors. They bid competitively and get paid based on kilometers operated. This avoids reckless driving and mistreatment of passengers. The system is a public-private partnership where the public sector provides capital investments, and the private sector operates the fleet and ticketing systems. It consists of core routes with exclusive lanes and feeder routes. Bogotá's TransMilenio BRT system is a global PPP success story, serving as a model for over 100 cities worldwide. It covers 114.4 km with terminals, parking, stations, and more. TransMilenio reduced travel time by 32%, boosted property values, increased tax revenue, improved air quality, and decreased road fatalities. |
| 11. | Pulkovo International Airport, St. Petersburg, Russia | St. Petersburg's Pulkovo Airport faced overcapacity and needed a makeover. Through a 30-year PPP, the NCG consortium led by VTB Capital took on this \$1.36 billion project. Funding came from equity and loans from international institutions like IFC and EBRD. The airport's diverse revenue sources made it financially independent, avoiding the need for government subsidies. The concessionaire earned money from airport activities and paid the city \$737 million in concession fees over 30 years. Once the concession period ends, the improved airport becomes city-owned. This project is unique for not relying on state subsidies or guarantees. This project earned recognition globally for its innovative urban infrastructure approach. In 2013, it was among the top 40 emerging market PPPs showcasing best practices, receiving a silver medal award for Asia, the Middle East, and North Africa. It stood out for its transparent and strategic private partner selection process. |
| 12. | Commercial and Landside Operations of I Gusti Ngurah Rai International Airport, Bali, Indonesia | Indonesia's Bali Airport, managed by PT Angkasa Pura I (AP1), sought to boost its landside commercial operations, which historically lagged behind aeronautical activities. In 2012, AP1 partnered with India's GVK, granting them a 65% stake in managing the landside facilities. GVK was chosen for its expertise in this area. The Indonesian government funded renovations. AP1 and GVK organized transparent selection processes for business partners. Notably, DFS and Dufry International won a bid to operate retail and duty-free shops. Several food and beverage operators also secured contracts. This collaboration led to remarkable results, increasing non-aeronautical revenues 15 times and significantly improving customer satisfaction. The success of this PPP stemmed from AP1's recognition of its limitations in |

| No. | Case Studies | Project Summaries |
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| | | non-aeronautical revenue generation and its partnership with an experienced international player like GVK, who brought expertise and a 65% stake in the management concession. This strategic cooperation benefited both parties and enhanced Bali Airport's commercial operations. |
| 13. | Tecon 1 Container Terminal at Suape Port, Pernambuco, Brazil | Suape Port in Brazil aimed to become a regional container shipping hub, so the Government of Pernambuco initiated a PPP to develop Tecon 1, the first dedicated container terminal there. With IFC's assistance, International Container Terminal Services (ICTSI) won the bid by offering substantial lease payments, well above the minimum required. The PPP agreement, signed in March 2001, had ICTSI finance, build, operate, and maintain the terminal for 30 years, after which assets would transfer to the state. ICTSI generated revenue from tariffs charged to terminal users, without any rate caps on transshipment tariffs. They committed to investing \$385 million over the concession period. Container operations began quickly, with substantial investments in various aspects. Suape Port's success as a PPP stemmed from its clear strategic importance and the opportunity to develop and sustain operations over the long term |
| 14. | Challenging Case: Doraleh Container Terminal, Djibouti | Djibouti's strategic location near the Red Sea and the Suez Canal prompted the government to build a new container terminal in Doraleh, outside Djibouti City. They opted for a PPP, forming a joint venture (DCT) with Dubai Ports (DP) World. DCT, 67% owned by Djibouti's port authority and 33% by DP World, developed, financed, and operated the terminal under a 30-year BOT PPP. The project cost \$396 million, financed by banks, multilateral agencies, and equity. Revenue came from terminal handling charges and government import/export taxes. The terminal, opened in 2009, created jobs and was highly productive. However, in 2018, Djibouti terminated its contract with DP World, citing sovereignty concerns and bribery allegations. They took control of the terminal and sold shares to China Merchant Holding International, which built the Doraleh Multipurpose Port in 2017. |
| 15. | Bundled Bridge Replacement, Pennsylvania, United States | Pennsylvania needed to replace many small bridges and chose 558 of them based on need and practicality. These bridges were grouped into a single PPP project by PennDOT. Plenary Walsh Keystone Partners (PWKP), a consortium of infrastructure specialists and local construction companies, won the bid for this project. The PPP spans 28 years, with 42 months for construction and 25 years of maintenance, valued at \$1.1 billion. Financing comes from tax-exempt Private Activity Bonds (PABs) and private equity contributions. Payments are tied to construction milestones and availability, with a part allocated for repaying the PABs. This bundling approach allows for cost savings and faster completion of the bridge replacements, addressing a significant portion of structurally deficient bridges in the state and saving taxpayers about 30% of the cost compared to PennDOT doing it alone. |
| 16. | Challenging Case: Hangzhou Bay Bridge, China | In 1993, Ningbo and Jiaxing municipal governments in China decided to build a trans-sea bridge to showcase economic growth in the Yangtze River Delta. In 2001, they established Ningbo Hangzhou Bay Bridge Development Co. Ltd. for a 30-year Build-Operate-Transfer (BOT) project. The project cost was RMB 11.8 billion (USD 1.42 billion), with RMB 149 million (USD 18 million) from private enterprises. Toll fees were the primary income source, and additional revenue was expected from hotels, restaurants, and more on the bridge. The project aimed to recover costs in 15 years with a 12.58 percent ROI. However, the platform on the bridge with hotels and restaurants was closed due to substantial annual losses, about RMB 50 to 60 million. |
| 17. | Challenging Case: Cross-City Tunnel, Sydney, Australia | The Roads and Traffic Authority of New South Wales planned a cross-city tunnel (CCT) in Sydney's CBD to reduce congestion. They opted for a PPP due to the high cost, and Cross City Motorway Pty. Ltd. (CCM), a consortium, won the project. CCM financed, designed, built, operated, and maintained the CCT. They estimated high traffic but faced low actual usage partly due to high tolls and the closure of surface roads, leading to controversy. CCM sought compensation, went bankrupt with debts of AUD 560 million (USD 380 million), and the government sold the project for AUD 700 million (USD 475 million) to ABN Amro and Leighton contractors in 2007. The tunnel is privately owned and will return to the government in 2030. |
| 18. | Water and Sanitation System, Bucharest, Romania | Bucharest faced water supply and sanitation challenges, including leaks, low revenue, and EU compliance issues. To solve this, they pursued a PPP with IFC's help, aiming to improve services, maintain ownership, and avoid a private monopoly. Veolia (formerly Vivendi) won the bid and formed a joint venture called Apa Nova București, with 80% owned by Veolia and 20% by the municipality. The concessionaire improved service quality, expanded coverage, reduced losses, and invested \$250 million without subsidies, while keeping tariffs below the Romanian average. |
| 19. | Small Scale Water Infrastructure, Busembatia, Uganda | Busembatia, a small Ugandan town with limited water sources, faced water quality issues. IFC, with support from various agencies, facilitated a water PPP in 2010. They helped design a management contract, longer than typical, to attract private operators. Trandint Limited won the bid, securing financing from local banks. They committed to expanding connections and not raising tariffs during the contract. The majority of capital investment came from |

| No. | Case Studies | Project Summaries |
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| | | performance-based subsidies. Trandint installed numerous connections, improved water production, and increased collection rates, significantly benefiting the town. |
| 20. | Challenging Case: Drinking Water Supply, Jakarta, Indonesia | Jakarta faced water issues with limited access to piped water, affecting many residents. In 1997, a PPP was pursued to improve water supply. Two international water companies were chosen based on personal connections to officials. They signed 25-year agreements to manage water supply in different areas, partnering with local companies. Private partners were to invest \$318 million in the first five years but invested less due to economic challenges. Fixed payments were made by the government to private partners, regardless of billing revenue, to encourage expanding coverage to poorer neighborhoods. However, currency exchange rate fluctuations and political issues led to payment challenges and a cycle of debt. Contract revisions in 2001 and 2004 aimed to address some issues but did not fully resolve them, impacting service quality and expansion goals. This case highlights the importance of being prepared and adaptable when pursuing a PPP. While no one could predict the Asian Financial Crisis, it revealed serious flaws in this PPP's design. Both parties in a PPP should be willing to negotiate when unforeseen events occur. The agreement should include safeguards like third-party assessments, mediation, and formal dispute resolution mechanisms if one party refuses to cooperate. Flexibility and fair resolution methods are crucial in such situations. |
| 21. | Desalination Plant, Ensenada, Mexico | In 2012, Ensenada, Mexico, faced a water shortage of 130 liters per second due to its growing population, wine industry, and tourism. To tackle this, a 20-year concession was granted to build a desalination plant capable of producing 250 liters of fresh water per second. OHL Medio Ambiente Inima S.A.U. (Inima) won the project through a bidding process. It was financed by loans, federal resources, and private funding. The project began operating in June 2018. One significant lesson is the importance of blending various financing sources, including international institutions, to optimize water investment programs under the State Development Plan. This approach helped address Ensenada's water challenges. |
| 22. | Challenging Case: The Dar Es Salaam Water and Sewerage Authority (DAWASA), Dar es Salaam, Tanzania | Dar es Salaam faced water and sewerage issues, with outdated infrastructure and significant losses. In 2002, to secure debt relief, Tanzania planned to privatize DAWASA, its public utility. Multilateral donors provided loans for a \$145 million upgrade, and private companies showed initial interest. Eventually, BGT became the sole bidder, winning the project. BGT formed CWS and operated under a lease contract. Challenges arose, including shareholder issues, low collections, and disputes. CWS couldn't meet targets, leading to a contract renegotiation and eventual termination. The government deported CWS managers, leading to the contract's dissolution. This case underscores the complexity of privatization in the water sector and the challenges faced when private operators struggle to meet targets and expectations. |
| 23. | Challenging Case: Water Supply Project, Mysore, Karnataka, India | In 2004, the Karnataka government and the World Bank initiated the Karnataka Urban Water Sector Improvement Project (KUWASIP) to address water supply issues in Indian cities. Mysore, Karnataka, faced a century-old water system problem and awarded a six-year concession to Jusco in 2008. The project was valued at INR 1.64 billion (USD 23.4 million), financed by the central government. It had three phases: preparation, system rehabilitation, and operation/maintenance. The public sector handled pricing, illegal connections, and retained financial risks. Jusco managed operation and maintenance, with shared technical risks. This project aimed to improve water supply efficiency and services in Mysore. |
| 24. | Waste Water Treatment Plant, Udaipur, India | Udaipur, a city located in the water-scarce Indian state of Rajasthan, is an economically dynamic city and a popular tourist destination. Before 2012 Udaipur city produced, on average, around 70 million liters of sewage per day. Due to the city's inadequate wastewater infrastructure, the city was struggling to maintain the cleanliness of its lakes, which were being contaminated by the raw residential sewage. In September 2012, a court order was issued to hotels and the municipality to deal with the problem. The local authority decided to pursue a PPP to deliver the infrastructure needed to comply with the court order. |
| 25. | Integral Treatment of Wastewater and Bio-Solids, Municipality of Saltillo, Mexico | The municipality of Saltillo faced environmental problems due to untreated wastewater discharge, leading to fines and health hazards. A 20-year PPP project was initiated to build a wastewater treatment plant. Frisco S.A de C.V. won the project through a competitive bidding process. Construction began in 2006, and the plant started operations in 2008. IDEAL, the project developer, assumed risks related to design, financing, construction, and operation, while the municipality retained political, demand, and inflation risks. The municipality secured funding through a credit facility and paid IDEAL through a monthly tariff covering investment and operation costs. The project also introduced energy co-generation and planned to sell treated water to companies. Additionally, it improved agriculture and land values in the region by addressing pollution issues. |
| 26. | Industrial Water Supply, Surat | Surat City in India faced water shortages due to industrial growth, and in 2014, they launched a wastewater recycling project with the Asian Development Bank. Costing \$40 million, it aimed to recycle sewage into industrial-grade water using advanced treatment plants. Enviro |

| No. | Case Studies | Project Summaries |
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| | Municipal Corporation, India | Control Associates won the construction contract and a 10-year operation agreement. The Indian and Gujarat governments, along with Surat Municipal Corporation, contributed funding. Revenue was expected from user charges set at \$0.28 per 1,000 liters, less than freshwater prices. This revenue covered the annual operation cost of \$4 million, making the project self-sustaining. It helped ease water resource strain and is a successful wastewater treatment example in India. |
| 27. | Municipal Waste Thermal Treatment Plant, Poznań, Poland | The City of Poznań in Poland launched a waste-to-energy project due to EU waste management rules. They chose a public-private partnership (PPP) with Sita Zielona Energia to design, fund, build, and manage the project. Sita Zielona Energia is a partnership between SITA Polska and Marguerite Waste Polska. The project's cost was about \$192 million, partially funded by a \$96 million EU subsidy. It started in 2017 and now supplies 30% of the city's electricity while reducing waste treatment costs by 20%, saving around \$38 million annually. The private partner handles construction, operation, and maintenance, while the city manages demand and pays based on the project's performance and cost savings. |
| 28. | Municipal Solid Waste Treatment Project, Wenzhou, China | The City of Wenzhou in China faced a growing waste problem, generating around 400,000 tons of household waste annually. To address this, they formed a public-private partnership (PPP) with Wei Ming Environmental Protection Engineering, a local private company. Together, they built and operated a municipal waste-to-energy incinerator plant. The incinerator was designed to handle 320 tons of waste daily, generating electricity. In the first phase, it treated 160 tons daily, producing 9 million kWh annually, with 7 million kWh for sale. The private partner invested \$13 million, operated the plant for 25 years, and transferred it to the government afterward. The private partner received support, including a waste disposal fee, tax exemptions, and a VAT refund. Revenue came from selling electricity and waste disposal fees. The project benefitted from China's renewable energy laws and increased tariffs for waste-to-energy electricity. The plant has been operating since 2003. |
| 29. | Keppel Seghers Waste-to-Energy Plant, Singapore | Singapore faced a growing waste problem between 1970 and 2000 due to rapid urbanization. To address this, they chose mass-burn incineration as the technology to dispose of solid waste. This decision was based on its waste reduction, electricity generation, and recycling capabilities. Singapore initially built four Waste-To-Energy (WTE) plants through government contracts, bearing the financing and operational risk. Later, they decided to develop a fifth plant using a different approach, a PPP model. However, the first attempt didn't attract interest from the private sector due to concerns about waste growth uncertainty. After a study, Singapore adopted a DBOO scheme with a 'take-or-pay' approach. This meant the government agreed to buy all incineration capacity at a set price, taking on the demand risk. Keppel Seghers won the tender, and the plant has operated successfully since 2009. |
| 30. | Solid Waste Management, West Bank and Gaza | Decades of conflict in the West Bank and Gaza caused a lack of investment in essential services like waste management, especially in Hebron and Bethlehem, home to nearly 1 million people. They faced a waste problem, with most of it being dumped illegally. To fix this, the Palestinian Authority created the Joint Services Council and sought help from the World Bank and IFC. They secured funding from various sources, including a global aid partnership. This reassured private companies to get involved. Three private operators from Spain, Greece, and Egypt-Palestine bid for the project, and the Greek consortium won in 2013. They manage transfer stations and a landfill. The Palestinian Authority pays them based on the waste they handle. Local governments handle fees. This project has reduced greenhouse gas emissions and improved waste services for 840,000 people. People are now more willing to pay for these services, and the project is financially sustainable. Additionally, it helped close 17 unsanitary dumpsites. |
| 31. | IT Network Integration, Barcelona, Spain | Barcelona City Council faced the challenge of managing multiple IT networks by different companies and wanted to upgrade its IT infrastructure while ensuring efficiency and cost-effectiveness. They decided on a Public-Private Partnership (PPP) to integrate and manage these networks. The PPP involved bundling various activities, including the management of active and passive IT networks, construction, and operation. Private operators were invited to design the IT infrastructure according to the city's guidelines, and Tradia Telecom S.A. won the contract in 2014 for a ten-year duration. In this unique business model, Tradia financed the IT infrastructure upgrades and received availability payments plus the right to sell excess network capacity. IMI paid an annual fee for Tradia's IT operation service and received a fee for the use of the infrastructure sold by Tradia to other operators. Despite a change in government and regulatory changes, the project benefited both the city's administration and residents. It improved services, expanded Wi-Fi, and contributed to Barcelona's goal of becoming a smart city. However, Tradia faced challenges in selling spare capacity due to regulatory changes. |
| 32. | Next Generation Nationwide | The Singapore government aimed to boost its global competitiveness by creating a high-speed broadband network called the Next Generation Nationwide Broadband Network (NBN). They decided to partner with the private sector through a Public-Private Partnership |

| No. | Case Studies | Project Summaries |
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| | Broadband Network, Singapore | (PPP) to make this happen. In this partnership, they chose two companies: OpenNet Consortium for the network's physical infrastructure (like fiber optic cables) and Nucleus Connect for the active parts (like routers and switches). The government offered financial support to these companies. The government's role was to ensure timely funding and set the right rules. The private partners had to create a sustainable business for the NBN, provide technical expertise, and cater to users' needs. This project benefited everyone - individuals got better mobile services, businesses had a strong network for data-heavy tasks, and info communication companies had new business opportunities in an expanded market. |
| 33. | Free Public Wi-Fi and Interactive Kiosks Project, Kansas City, United States | Cisco and Sprint, two major US tech firms, proposed a project to Kansas City Government: free public Wi-Fi and interactive kiosks. The goal was to provide internet access, improve city operations, boost the economy, and enhance residents' lives. Using Sprint's existing Wi-Fi network, part of the city's Smart City setup, they signed an agreement in June 2015. This project covered a 2.2-mile streetcar line and added 25 interactive kiosks for smart functions like lighting and surveillance. The project cost \$16 million, with \$3.7 million from the local government, funded by advertising on the kiosks. The revenue-sharing initially favored the advertising company but shifted to 25% for the city and 75% later. While Cisco and Sprint didn't directly profit, they gained exclusive access to kiosk-collected data, aiding future Wi-Fi expansion and offering residents internet access, local info, and emergency alerts. |
| 34. | Establishment of High Capacity Wireless Infrastructure, Pimpri-Chinchwad, Maharashtra, India | Pimpri-Chinchwad in Maharashtra, India, is a growing industrial city. They wanted better wireless infrastructure for the city and its public services and aimed to manage it while sharing revenues. So, they decided on a Public-Private Partnership (PPP). In this partnership, a private company named IL&FS, along with partners, agreed to fund and manage the city's e-infrastructure. This included internet services for offices, businesses, and citizens, along with e-governance, e-education, and e-health services. The city provided the land. The private company paid the city a percentage of its revenue, starting at 2.5% on the first INR 25 crore (USD 3.5 million) and increasing over time. By year ten, it reached INR 21.4 crore (USD 300,700). The total project cost was around INR 428.4 crore (USD 6.02 million). |
| 35. | Municipal Geographic Information System (GIS), Surat Municipality, India | In India, many cities are using Municipal Geographic Information Systems (GIS) to manage property data digitally with location details. This helps cities cope with population growth and urbanization. The benefits of Municipal GIS include boosting tax collection, improving urban planning, and better infrastructure maintenance. Surat Municipal Corporation (SMC) in India partnered with Antrix Corporation and Scanpoint Geomatics Ltd to develop a web-based GIS system in six phases. The system, launched in 2015, has improved asset management, revenue collection, and decision-making. It now offers services like health monitoring, permission issuance, and building usage certificates. SMC plans to expand the GIS system to integrate water supply and manage solid waste containers in the future. This project shows how a PPP can help municipalities enhance their e-governance through GIS. |
| 36. | Smart Poles and Streetlights, Bhopal, Madhya Pradesh, India | Bhopal, a major city in India, aimed to become smarter through the "Smart Cities Mission." They bundled two projects, smart poles and intelligent streetlights, into one PPP project. Ericsson and Bharti Infratel were awarded this project in 2017. The project cost about INR 6.9 billion (USD 98 million) and required no city investment. It included installing 400 smart poles with LED streetlights, surveillance cameras, environmental sensors, Wi-Fi, and electric vehicle charging and replacing 20,000 conventional streetlights with LED lights that can be controlled remotely, report failures via SMS, and detect power theft. These smart elements were tracked by the Intelligent Traffic Management System. Funding came from energy savings, advertisements on the poles, and fiber optic cable usage under the poles, with revenue shared between the city and the private operator. However, there were coordination issues among authorities, leading to too many poles and distractions for drivers. This highlighted the need for better coordination in PPP projects to serve citizens effectively. |
| 37. | Bangalore One, Government of Karnataka, India | Citizens in Bangalore were facing hassles when dealing with government offices – long waits, limited access times, and various locations for different services. To simplify this, the Karnataka Government initiated a PPP project called Bangalore One. They chose a consortium of CMS Computers Ltd and Ram Informatics Ltd as partners. These centers offered a one-stop solution for government services, open 365 days a year. The government provided infrastructure and data, while the private partner handled the software. Services included bill payments, certificates, licenses, and more. The project aimed to free up government offices for complex tasks and improve efficiency. Bangalore One expanded to over 100 centers, offering various services, and even mobile access. It won awards for its effectiveness and sustainability, proving that when there's strong determination to address real needs, PPP projects can thrive. |
| 38. | Mandaluyong City Market, Manila, Philippines | In Mandaluyong City, Philippines, a major market was destroyed by fire in 1991. With limited funds for rebuilding, the city opted for a PPP under the Build-Operate-Transfer (BOT) Law. They awarded the project to Macro Founders and Developers, Inc. (MFD). The project involved constructing a seven-story commercial center called "The Marketplace." This |

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| | | <p>complex included a public market, shops, parking, and entertainment facilities. The Asian Financing and Investment Corporation (AFIC) provided a concessional loan to finance it. Funding came from private equity, advances from shop owners, and debt. MFD took on most risks, while the city managed the public market and collected fees. MFD handled maintenance and security for the market and ran the commercial complex. At the end of the 40-year contract, MFD would transfer the commercial complex to the city. The city also earned revenue through taxes on market activities. Additionally, MFD's construction of a box culvert helped mitigate flooding in the area. This project showcases innovative financing using a mix of funds and creative revenue generation to support affordable vendor facilities.</p> |
| 39. | Pike Place Market, Seattle, United States | <p>In the late 1960s, there was a plan to modernize Seattle's Pike Place Market. Citizens voted in 1971 to save the market, leading to the creation of the Pike Place Market Preservation and Development Authority (PDA) in 1973. PDA, a non-profit public company, manages most of the properties in the nine-acre Market Historic District. PDA's role is to oversee the long-term development of the market, ensuring it remains inclusive for all. PDA council members are appointed by the Mayor, and a separate non-profit called the Pike Place Market Foundation raises funds and provides community support. The project includes a nine-acre complex with a public market, rental housing for low- and moderate-income residents, luxury condos, a hotel, and various community services. It generates revenue mainly from tenant rents and property management activities, with some contributions from investments and bonds. This project serves as a small business incubator, connects local farmers with consumers, offers social services and affordable housing, preserves historic buildings, attracts tourists, and fosters community development. It received recognition with the Rudy Bruner gold medal for Urban Excellence in 1987, highlighting its success.</p> |
| 40. | Challenging Case: Bocaue Public Market, Bocaue, Bulacan, Philippines | <p>The municipality of Bocaue in the Philippines wanted to build a public market and a commercial center through a public-private partnership (PPP). The public market cost about \$1.2 million, and the commercial center cost approximately \$3.8 million. The idea was that the income generated from the commercial center would help support the low-cost tenants in the public market. With assistance from the USAID-funded BOT III Project, the municipality prepared the project and found a partner, Meditech. They started building the public market in 1998, but when it was completed in 1999, local vendors refused to use it. They had several concerns, including high rent, small stall spaces, poor ventilation, and safety doubts about the building. These issues led to a halt in the project, including the construction of the commercial center. The key lesson here is that involving stakeholders early in the process is crucial for project sustainability. In this case, lack of communication with prospective tenants led to problems and objections after the market was built.</p> |
| 41. | Slaughterhouse Redevelopment, Cagayan de Oro City, Philippines | <p>In 2000, Cagayan de Oro City needed to upgrade its old slaughterhouse due to the booming poultry industry. They chose Mega Integrated AgroLivestock Farm Corporation (MEGA FARM) through competitive bidding in 2004, investing \$3 million. MEGA FARM transformed the old facility into a modern Abattoir Complex, covering 2.45 hectares, with slaughtering facilities, water treatment, a livestock auction market, and meat delivery vans. They pay the city a monthly fee and recover their investment by charging users. Fee increases are limited to 10%, justified by operational costs and competitive rates in Visayas and Mindanao. The project's advantages included a strategic location near livestock sources, reducing transportation costs. MEGA FARM also benefited from property and business tax exemptions. Despite agriculture PPPs being challenging, this project is a successful example in the Philippines.</p> |
| 42. | Grain Silos Project in Punjab, India | <p>To address food grain storage issues causing \$14 billion in annual damage in India, Punjab's state government partnered with the International Finance Corporation (IFC) in a public-private partnership (PPP). They aimed to build 50,000 metric tons of modern silos equipped with automation and real-time monitoring, reducing waste and preserving grains for up to three years. In 2010, LT Foods Limited, a Delhi-based company experienced in rice processing and storage, won a 30-year concession to build and operate silos in Amritsar, Punjab. The \$7 million project was financed by YES BANK and Rabobank. LT Foods handled construction and operation, while PUNGRAIN managed grain procurement and payments, transferring construction and operation risks to LT Foods. The silos, with 50,000 metric tons capacity, opened in April 2011 and served as a model for improving grain storage, known as the "Amritsar model of silos," inspiring other Indian state governments.</p> |
| 43. | Kalangala Integrated Infrastructure Programme, Bugala Island, Uganda | <p>In 2005, Bugala Island in Lake Victoria, Uganda, faced development challenges. Most residents relied on fishing and farming, lacking essential infrastructure like transport, electricity, and clean water. Private sector investment was discouraged. Residents partnered with InfraCo Africa and formed Kalangala Infrastructure Services (KIS) with Ugandan government support. KIS aimed to provide: (i) two commercial ferries; (ii) a 1.6 MW hybrid solar-thermal power plant; (iii) Solar-powered water system (iv) road upgrades. Financing of \$44 million came from equity, debt, and grants. Operational costs would be covered by user fees, subsidies for water and electricity, and a road usage subsidy. Although the project</p> |

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| | | faced early challenges, by 2013, it improved connectivity, benefiting the fishing and farming communities, and creating jobs. Expansion plans include scaling up solar power and enhancing the electrical grid and roads. This project succeeded by bundling infrastructure, diversifying revenue, achieving scale, and attracting investors, mitigating demand risks, and supporting other projects. |
| 44. | Challenging Case: Automated Multi-level Car Park, Connaught Place, New Delhi, India | To combat unauthorized parking congestion in New Delhi's Connaught Place, a public-private partnership (PPP) between the New Delhi Municipal Council (NDMC) and DLF, a prominent Indian real estate company, was formed. DLF financed, built, and managed advanced multi-level car parks named "CAPITOL POINT" for 30 years before handing them over to NDMC. These car parks could accommodate 1,408 vehicles, included commercial spaces and offices, and cost INR 1.2 billion (USD 17.1 million). NDMC managed site-related risks, while DLF shouldered most other responsibilities, from financing to operation and maintenance. DLF paid INR 2.2 million (USD 31,325) annually to NDMC for the space. Revenue for DLF came from user fees (around INR 10 or USD 0.14 per hour per car) and rent from commercial spaces and offices. This case highlights the importance of user-friendly public facilities and considering factors like design, location, affordability, and cost comparisons. Challenges included car retrieval delays, emphasizing that public authorities can't transfer all operational risks to private partners. They must ensure public needs are met, even by supporting the private partner when issues like illegal parking arise, often involving traffic police alongside the private operator. |
| 45. | Underground Parking and Commercial Services Center, San Borja, Peru | San Borja District in Lima, Peru, lacked public parking in its busy commercial area. To solve this, they planned a 32-year Public-Private Partnership (PPP) project for self-financed underground parking. The estimated cost was USD 13,479,600. The private partner would handle design, financing, building, operating, maintaining, and eventually transferring a 14,320 sqm underground facility. It'd provide 353 parking spaces and host businesses. About 2,800 vehicles were expected daily. During construction, 600-800 jobs were projected, with around 40 permanent positions post-launch. The municipality would get 8% of gross income from parking and commercial rents. The private partner could set prices. This shows how urban areas can optimize space with underground development for parking solutions. |
| 46. | Parking Area under Rivera Navarette Avenue in San Isidro, Peru | San Borja District in Lima, Peru, lacked public parking, especially in its busy commercial center. To tackle this, they pursued a 32-year Public-Private Partnership (PPP) project for underground parking, self-financed by the private partner. The estimated investment was USD 13,479,600. The private partner would handle design, financing, construction, operation, maintenance, and the eventual transfer of a 14,320 square meter underground facility. This three-story parking and service center, below a public park, would offer 353 parking spaces and house businesses like banks and pharmacies, serving around 2,800 vehicles daily. During construction, the project would create 600-800 jobs, with approximately 40 permanent positions post-launch. The municipality would receive 8% of gross income from parking and commercial rentals, while the private partner could set prices. This project shows how urban space challenges can be addressed through underground development for parking solutions. |
| 47. | Challenging Case: Queen Elizabeth II Medical Center Car Parking Project, Western Australia, Australia | In 2009, the Queen Elizabeth II Medical Centre Trust and the State of Western Australia collaborated with Capella Parking Pty Ltd in a 26-year, AUD 140 million (USD 100 million) Public-Private Partnership (PPP) project to improve parking facilities at the medical center. Capella handled design, financing, construction, operation, and maintenance of a new multi-level car park, funded through debt and equity. Their revenue came from parking fees, commercial rentals, and a license fee to the Trust. Construction finished ahead of schedule in November 2013, expanding parking spaces. Challenges included capped staff parking fees and hospital delays, resulting in AUD 15.89 million (USD 11.38 million) in compensation to Capella by August 2017. In February 2018, a Special Inquiry reviewed the contract and compensation policy changes. This case highlights the importance of promptly addressing issues in PPP projects and the need for thorough anticipation and management of potential challenges in PPP contracts. |
| 48. | Challenging Case: Multi-level Car Parks in Thimphu City, Bhutan | To ease traffic congestion in Thimphu City, Bhutan's capital, the Royal Government partnered with Thimphu Thromde (City) for a 22-year Public-Private Partnership (PPP) project. KCR Private Limited, a consortium comprising CE Construction Private Limited, KNG Private Limited, and Rinson Construction Private Limited, won the contract. KCR is responsible for designing, financing, operating, and maintaining two multi-level car parks (MLCPs) and upgrading 1,000 public parking spaces. KCR covers the entire project cost and generates revenue from parking fees and commercial rentals. They pay the City an annual fee of USD 230,000. Most risks, including financial, design, construction, and demand, are with KCR. However, project changes raised costs from USD 4 million to USD 7 million, with pending approval for an extension in construction completion and the concession period. This case emphasizes the need for careful planning and due diligence in PPP projects, especially when dealing with scope or design changes, and the importance of clear |

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| | | contractual provisions to manage such changes while considering risk allocation and project viability. |
| 49. | Administrative Center, Tlajomulco Municipality, Jalisco, Mexico | To address the challenges posed by the expansion of its public offices and rapid population growth, the municipality of Tlajomulco de Zuniga in Guadalajara, Mexico, chose a 30-year Public-Private Partnership (PPP) to create the Tlajomulco Administrative Center (CAT). Operadora Audaz S.A. won the PPP contract through national competitive bidding in 2011. The municipality managed permitting, land acquisition, demand, and other risks, while the private partner handled design, construction, operation, and financing. The project included an administrative building, a multi-use gymnasium, external facilities, and road renovations. The municipality successfully addressed administrative challenges through a PPP by clearly allocating risks, utilizing external expertise, and detailed planning for the Tlajomulco Administrative Center. |
| 50. | Bundled Courts Project, Ireland | In July 2012, the Government of Ireland launched a major PPP project as part of its Infrastructure Stimulus Package and Public Private Partnership Program. This project aimed to improve seven courthouse facilities identified by the Courts Service to reduce waiting times, litigation costs, and enhance judicial services. The National Development Finance Agency (NDFA) managed the procurement, and BAM PPP PGGM was chosen as the preferred bidder in June 2015. The concession contract covered design, finance, construction, and maintenance of the courthouses for 25 years, with additional services like cleaning, waste management, and IT infrastructure. Construction began in early 2016, funded through a structured financial solution with senior debt from Mitsubishi UFJ, private placement by Talanx Asset Management GmbH, and equity from BAM PPP PGGM. Payments to the private partner were contingent on construction completion and service commencement, with deductions for service performance. The courthouses were delivered between 2017 and 2018 and have been successfully serving their intended purpose, addressing the urgent needs of courthouse facilities in Ireland. |
| 51. | Sports Hub, Singapore | The Singapore government needed a new national stadium and sports hub after the closure of the Singapore National Stadium in 2007. They pursued a PPP arrangement with Sports Hub Pte Ltd. (SHPL), a consortium comprising various companies. The agreement required SHPL to bear the construction costs, while the government would make regular payments over 25 years. The completed Sports Hub, costing SGD 1.33 billion (USD 980 million), featured the National Stadium and an adjoining mall, the Kallang Wave. The deal aimed to benefit both parties, allowing the government to avoid a significant upfront capital expenditure, while SHPL received periodic payments. The agreement also ensured commercial viability. SHPL would be paid as long as the venue complied with performance metrics, and commercial profits were shared between SHPL and the government. The project faced initial challenges, including issues with the field condition, a leaky roof, and pricing concerns. These were addressed, but differences in objectives between SHPL and Sport Singapore persisted. The project highlights the PPP structure's ability to spread costs over time but underscores the importance of aligning the parties' incentives and objectives for long-term success. In essence, this project showcases how a PPP can distribute costs and risks between public and private partners but also emphasizes the need for a shared vision and goals to avoid conflicts and ensure project success. |
| 52. | Ricoch Coliseum at Exhibition Place, Toronto, Canada | <p>The Coliseum in Toronto, a historic arena originally used for agricultural events, needed refurbishment to become an 11,000-seat ice hockey arena and attract a professional hockey team. The City of Toronto pursued a PPP with BPC Coliseum Inc. and Coliseum Renovation Corporation (CRC) in 2002 for this transformation. The partnership involved renovating the Coliseum in exchange for a 49-year lease at a total cost of CAD 38 million (USD 29 million), with both BPC and the city contributing capital for the renovation. CRC, a sub-tenant, provided an American Hockey League (AHL) team, the Toronto Roadrunners, as part of the project. Revenue would be generated through sub-leasing the arena, selling naming rights to Ricoh Canada, renting it for various events, and collecting taxes and fees from venue activities. Partners would share net revenues, with the city and BPC receiving a return on their investments. Despite forecasts, actual attendance during the first Roadrunners season fell far short of expectations, leading to negative cash flow and owed debts. This triggered a termination of the sub-lease.</p> <p>The city and BPC then entered into a flat rental agreement with Maple Leaf Sports & Entertainment Ltd. to ensure consistent payments, which helped repay the city's guaranteed loan and provided a return on its investment. This project underscores the importance of robust due diligence when forecasting attendance and highlights how partnering with an experienced private sector operator can lead to better project structuring and risk mitigation in PPPs. The private partner's expertise in sports facility operation and negotiation skills were vital in reaching a mutually acceptable solution.</p> |

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| 53. | Campin Coliseum (Movistar Arena), Bogota, Colombia | The Coliseo Cubierto El Campin In "ogot", Colombia, was showing signs of deterioration and required substantial upgrades. In 2012, Colombiana de Escenarios S.A.S. presented an unsolicited proposal to renovate, upgrade, and operate the facility, now named the Movistar Arena. The private entity proposed the renovation, technological updates, and operation of the arena to Instituto Distrital de Recreación y Deporte (IDRD), the facility's manager. IDRD would take responsibility for design, financing, and construction. The financing mix was 50% equity and 50% debt, with no public funds involved. A concession agreement was established in 2015, structured as a 300-month concession. The contract value was estimated at COP 90 billion (USD 29 million). Renovation included increasing capacity, adding special seating spaces and VIP rooms, constructing new spectator facilities, a parking area, and installing a closed-circuit TV system. Public areas and access to the facility were also improved. The concessionaire generated revenue from usage rights, sponsorships, commercial exploitation, and other project-related sources. They paid IDRD a monthly amount equal to two percent of gross revenues. |
| 54. | Aquanova America, Saint-Dié-des-Vosges, France | The small city of Saint-Dié-des-Vosges in France aimed to boost its local economy and tourism by constructing a new aquatic center. They chose a Public-Private Partnership (PPP) model to build and operate the facility. The consortium Groupe Duval, including an investor, facility maintainer, and operator, won the project through a 25-year contract. The private consortium handled design, financing, construction, maintenance, and operation of the aquatic center, which was valued at around EUR 18.5 million (USD 21 million). The facility, completed in 2014, included various amenities like pools, massage facilities, and a fitness center, focusing on sustainability with water-saving equipment. An availability-based contract was used, where the private partner received performance-based maintenance fees. Penalties applied for subpar performance. The private partner collected visitor revenue, expected at EUR 1.1 million (USD 1.25 million) annually, while the city gained substantial VAT revenue. The facility saw a significant increase in visitors, and the private partner actively promoted it. This project demonstrates the flexibility of PPP structures. Saint-Dié-des-Vosges adapted the model to suit the project's unique needs, resulting in a valuable facility and financial benefits for both the city and the private partner. |
| 55. | Düsseldorf Museum, Kunstpalast, Germany | The historic Kunstpalast building in Düsseldorf faced deterioration, and the city lacked the funds for renovation. In 1998, the City of Düsseldorf partnered with energy corporation E.ON through a PPP to restore the building and establish the Museum Kunstpalast Stiftung. E.ON, selected partly due to its existing relationship with the city, purchased a plot behind Kunstpalast for EUR 10 million and planned to build an office building. A joint fund was created for the renovation, upkeep, and operation of the cultural facility, with E.ON contributing EUR 11.5 million for Kunstpalast's rehabilitation and EUR 9 million for the adjacent museum complex through sponsorship. The city provided EUR 4 million for building rehab and granted the same amount for annual operational costs. Urban funding programs from the Land of North Rhine Westphalia contributed EUR 12 million. Kunstpalast became a private foundation in 2000, with additional private partners like Metro Group and Evonik Industries AG joining as founder-sponsors in 2001. Municipalities can leverage land development rights to finance infrastructure projects. A blend of private and public funding sources, along with private partner expertise, can maximize the impact of limited public resources. Partnering with private entities can provide not only financial support but also specialized knowledge, marketing expertise, and the ability to attract additional partners and sponsors. |
| 56. | Akaretler Row Houses, Istanbul, Turkey | The Akaretler Row Houses in Istanbul, originally built in 1875, required preservation and redevelopment due to their historical significance. Obtaining permits was challenging due to strict preservation regulations. In 2005, the Bilgili Group was appointed to redevelop the site through a PPP. The Bilgili Group was tasked with restoring the historic structures and developing a mixed-use project with offices, retail spaces, a hotel, residences, and parking. They were also responsible for marketing, neighborhood renovation, and maintaining a local park. The total project cost was estimated at USD 58 million, with an expected net return on investment of USD 12 million for the Bilgili Group. The municipality benefited from local tax income, property and tourism tax incentives, and infrastructure improvements funded by generated taxes. Completed in 2008, the project included offices, shops, restaurants, the Hotel W Istanbul, and residential units. The project received recognition with the Urban Land Institute (ULI) Awards for Excellence in Europe, the Middle East, and Africa. This project illustrates how a well-structured PPP can revitalize historical assets, diversify revenue sources, and share responsibilities and risks between public and private partners. It also demonstrates the importance of incentives and infrastructure development to support such projects. |
| 57. | Challenging Case: Jal Mahal Palace, Jaipur, India | The Jal Mahal, a historic palace in Jaipur, India, surrounded by the Man Sagar Lake, faced ecological challenges due to pollution. To restore this site, the Rajasthan Tourism Development Cooperation (RTDC) entered into a PPP. The project had three phases: lake |

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| | | and palace restoration, entertainment and retail facilities construction, and hotel upgrades. The first phase included restoring the lake ecosystem through sewage treatment, drain diversion, lake cleaning, and reforestation, funded by the private partner's contributions. Disputes arose over the lease's value and hotel capacity expansion, leading to the Rajasthan High Court nullifying the 2004 tender process. Ensuring adherence to laws, regulations, and public support is crucial for successful PPPs, especially when involving cultural or environmental sites. This project illustrates the importance of legal compliance, stakeholder engagement, and public support in PPPs, particularly when dealing with significant cultural and environmental assets. |
| 58. | Elbphilharmonie, Hamburg, Germany | The Elbphilharmonie project in Hamburg, Germany, aimed to transform a historic warehouse into a modern concert hall and mixed-use complex. The project began as an unsolicited proposal from a private developer to the city. It underwent several design changes and cost increases during the planning stages. Originally, the city intended for private investors to cover construction and financing, but later shifted to city ownership of commercial facilities to secure lower interest rates, transferring some risks to the city. The contract was awarded to the Adamanta consortium, responsible for building and operating the complex. Construction faced delays and cost overruns, eventually totaling approximately EUR 760 million, a significant increase from the initial estimates. Inadequate planning, optimistic assumptions, and public pressure contributed to these challenges. Demand for the concert hall grew after its opening, but lessons include the importance of thorough feasibility studies and avoiding shortcuts in project preparation. Hiring qualified advisors is also crucial to maintain objectivity. This project underscores the significance of investing in comprehensive project preparation and seeking unbiased advice to prevent cost overruns and ensure project success. |
| 59. | Bundled State Parks, California, United States | Facing budget cuts in 2010, California shut down many state parks and accumulated over USD 1 billion in maintenance costs. To keep parks open, California State Parks (CSP) sought partnerships. Three parks were managed under a PPP by American Land & Leisure (AL&L). AL&L created operational plans for each park, handled minor improvements and day-to-day operations, while CSP managed major maintenance. AL&L generated revenue from user fees and paid rent to CSP. This model encouraged AL&L to attract visitors, and revenue increased by 28% in the first year. The partnership helped rescue parks that were previously operating at a deficit. |
| 60. | Marine Sanctuary and Forest Preserve, Chumbe Island, Tanzania | Chumbe Island, near Zanzibar, faced environmental threats due to overfishing and habitat degradation. Chumbe Island Coral Park Ltd (CICP) proposed a marine sanctuary and forest preserve. They secured a lease to develop eco-friendly bungalows and gained management rights over the sanctuary and reserve. CICP invested \$1.2 million, with donor support. Eco-tourism revenue covers operation costs, research, and conservation. CICP achieved financial and environmental sustainability, and while not focused on profit, they could expand if needed. The project's success highlights the importance of stakeholder support in PPPs, especially for unsolicited proposals. |
| 61. | Kruger National Park, South Africa | South Africa National Parks (SANParks) manages 19 national parks and sought PPPs in the 1990s to reduce reliance on state funding, shift risks to the private sector, and focus on wildlife conservation. In 2001, SANParks partnered with Nature's Group to operate and manage Kruger National Park's amenities. The consortium paid SANParks a monthly fee based on its revenue, leading to increased profits for SANParks. Although there were initial challenges like staff resistance and customer service issues, improvements were made. SANParks expanded PPPs, creating jobs and offering various facilities and activities in national parks. |
| 62. | Jozini Tiger Lodge, Jozini Municipality of KwaZuluNatal, South Africa | The Jozini municipality in South Africa, with great tourism potential, faced challenges like unemployment and lack of infrastructure. To harness tourism opportunities related to the 2010 Soccer World Cup, a PPP was formed to build the Jozini Tiger Lodge, a 4-star hotel. The municipality, private investors, local communities, and the National Empowerment Fund partnered in this ten-year agreement. The municipality facilitated services and approvals, private investors provided capital, local communities contributed land, and the NEF offered financial support. The hotel's ownership would transfer to the local community after the contract. The private partners owned 69% of shares, focusing on maintaining high service standards, while the local community held 31% of shares, benefiting from dividends. The agreement ensured 80% of lodge employees came from the local community. Construction finished in December 2009, and the lodge opened ahead of the Soccer World Cup. It achieved financial sustainability within six months and experienced significant revenue growth in 2012. This success attracted more investments and improved local employment and the economy. This project demonstrates the importance of involving the local community, fostering a sense of belonging, and having a well-defined strategic vision for a PPP project to thrive. It capitalized on a major event and maintained high service standards to achieve long-term goals. |

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| 63. | Qiaoxi District Central Heating, Zhangjiakou, China | Zhangjiakou municipality in China needed to upgrade its central heating system due to inefficiency and pollution. They decided to pursue a PPP for this project. Beijing Yuanlong Heat Company Limited (BYHC) won the bid and established a joint venture with the local government. Under the 25-year agreement, BYHC took over operations and maintenance of the heating system, installing new boilers and expanding service coverage. The Project Company generated revenue from user tariffs and pipeline connection fees. Initially, there were challenges with staff transfers and community opposition. To address these, the Project Company introduced employee incentives and shared pipeline installation costs with the local government. As a result, the Project Company improved heating services, reduced user complaints, raised indoor temperatures, and increased fee collection rates. They also expanded service coverage and saved on energy costs. This project highlights the advantages of joint ventures in PPPs, such as knowledge transfer, technology improvement, and leveraging private sector efficiency. It also shows how collaboration can benefit both parties and the community involved. |
| 64. | Roof-top Solar Program, Gujarat, Gandhinagar, India | In 2010, the Municipal Government of Gujarat initiated India's first 'Gandhinagar rooftop program,' a 5 MW solar rooftop project to address the rising power demand. The project aimed to install solar panels on government and private buildings in Gandhinagar. The project was designed with the help of the International Finance Corporation (IFC) as the lead advisor. Two private companies, Azure Power and Sun Edison, were selected to develop 2.5 MW each through competitive bidding. They agreed to design, finance, install, operate, and maintain the solar infrastructure for 25 years, selling the generated power. The winning bidders proposed a tariff slightly higher than what was approved by regulators, and the municipality covered the difference. Public buildings provided space for 80% of installations, with the remaining 20% on private residences, incentivized by a 'green incentive' payment. Initially, the project faced challenges, including reluctance from property owners, revenue model complications, and operational issues. However, it improved over time, and Gandhinagar now generates nearly 7.5 MW of solar energy from rooftops. Due to its success, the project is being replicated in more Gujarat cities. This project showcases the municipality's commitment and support, including providing space on public buildings and a modest tariff subsidy. Such public contributions to a PPP can yield value-for-money, especially when considering non-financial benefits like reduced carbon emissions. |
| 65. | Bioenergy Plant, Nuevo Leon, Mexico | In Nuevo León, Mexico, a landfill in Salinas Victoria produced methane gas and posed environmental challenges. To tackle this, the state decided to build a biogas plant via a PPP. Waste Processing and Ecological Comprehensive System (SIMEPRODE), the landfill owner, initiated a bidding process in 2000. Bioeléctrica S.A. de C.V., a private firm, won the bid and created Bioenergía de Nuevo León, S.A. de C.V (BENLESA) to operate the plant. The plant captures methane from a 44-hectare area and generates electricity using seven engines. Financing came from Bioeléctrica, SIMEPRODE, the World Bank, and the Global Environment Facility. BENLESA manages the plant and sells surplus energy to the Electricity Federal Commission. SIMEPRODE retained some financial and land risk. BENLESA expanded ownership to include municipalities and government agencies, who also buy energy. The plant now powers public facilities, street lighting, and transportation, reducing greenhouse gas emissions. This project showcases adapting to legal and regulatory contexts, allowing compliance with energy laws, and achieving environmental benefits. |
| 66. | Rooftop Solar PV and Energy for Underserved Communities, Connecticut, United States | In Bridgeport, Connecticut, high energy costs were burdening low-income households. To alleviate this, the CT Green Bank initiated the 'Solar for all' program in 2015, a PPP with PosiGen to install solar panels and energy-efficient products on homes. PosiGen, selected for its experience in serving lower-income communities, offered affordable solar panel leases regardless of income or credit score. CT Green Bank provided funding through rebates and incentives to PosiGen, along with subordinated debt and a working capital loan. This enabled PosiGen to design affordable lease options for homeowners. They leased solar installations for 20 years with fixed payments, offering energy efficiency upgrades for an additional fee. The lease guaranteed electricity production or homeowner reimbursement. By June 2018, PosiGen had leased 1,651 solar installations, reducing energy bills for families by over \$1,280 annually. The project received recognition and awards for its clean energy leadership. PosiGen engaged the community, including local representatives and religious leaders, to understand their needs. They simplified contracts and adapted to challenges like permit delays and infrastructure issues, ensuring project success. |
| 67. | Street Lighting Project, Nasik, Maharashtra, India | Nasik Municipal Corporation (NMC) in Maharashtra, India, faced power supply shortages and high electricity costs due to rapid development. To address this, they initiated an Energy Saving Company (ESCO) project with Sahastratronic Controls Private Limited (SCPL). SCPL, as the ESCO, upgraded street lighting facilities. They installed 486 streetlight controllers covering 19,000 streetlights to improve efficiency. SCPL guaranteed a minimum 25% energy savings for five years. The project cost around INR 2 crores, with SCPL financing part of it. Under the Energy Services Agreement (ESA), NMC issued a no-objection |

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| | | certificate for SCPL to mortgage assets. In return, SCPL compensated NMC through an indemnity bond. By March 2007, the project achieved INR 48.1 million in savings with a 31% average energy cost reduction. This innovative shared savings model served as a national example for municipalities, allowing NMC to improve infrastructure and reduce energy costs without direct public investment. |
| 68. | Energy-efficient Street Lighting, Bhubaneswar, Odisha, India | Bhubaneswar, the capital of Odisha, India, had outdated and inefficient street lighting, causing budget strain for maintenance. To improve this, Bhubaneswar Municipal Corporation (BMC) partnered with Shah Investments, an Indian Energy Service Company (ESCO), through a PPP managed by the International Finance Corporation (IFC). The ESCO was responsible for financing, installing, and maintaining energy-efficient street lighting for 10 years, covering 20,000 streetlights. BMC set performance standards and monitored ESCO's performance. By using efficient lighting, BMC expected annual savings of about USD 100,000. ESCO received a fixed monthly fee from BMC, equal to 90% of energy savings, plus a maintenance fee per light pole. A control center and customer service line were set up in 2015. This project creatively used energy savings to pay the ESCO and emphasized ongoing municipal involvement in PPP management, even after the private partner takes over operations. |
| 69. | Reconstruction, Management, and Maintenance of Street Lighting and Other Public Facilities, Juvignac, France | The city of Juvignac in France needed infrastructure upgrades due to population growth. They opted for a PPP with SPIE Sud-Ouest. The 18-year contract, worth around EUR 8.8 million (USD 10 million), included renovating public lighting, traffic lights, video surveillance, and high-speed communications infrastructure. SPIE Sud-Ouest was chosen based on cost, implementation time, and alignment with the city's plans. They were responsible for replacing lighting, upgrading traffic lights, installing cameras, and civil engineering for the communications network. The city made regular payments to SPIE Sud-Ouest for operation and maintenance. The contract included performance guarantees, like a low failure rate for street lighting. This project highlights the importance of competitive bidding, clear performance metrics, and effective project management for successful PPPs. |
| 70. | City Improvement Districts, Johannesburg, South Africa | Johannesburg's City Improvement Districts (CIDs) began in 1993 as a voluntary partnership involving local businesses, the city government, and the community. CIDs address post-apartheid challenges and urban issues through property owner referendums. Once established, property owners share costs based on property value and form a board to choose an urban management company. CIDs provide extra services without replacing government ones, with a typical 3-5 year initial timeline. Dissolution follows the same referendum process. This model has expanded to other cities like Cape Town and Pretoria, succeeding by aligning interests and responsibilities among stakeholders, emphasizing the importance of PPP collaboration. |
| 71. | Durban Point Waterfront Development Project, EThekweni, South Africa | The Durban Point Waterfront project aimed to revitalize an underused area at the entrance to Durban Harbor. It involved creating a modern mixed-use development covering a large area. The project was divided into several precincts, including residential, commercial, and public spaces, with a focus on accommodating various needs. The master developer for this ZAR 35 billion (USD 2.5 billion) project was the Durban Point Waterfront Development Company (DPDC), jointly owned by the municipality and a private consortium led by UEM Sunrise. DPDC invested in infrastructure upgrades and sold land to private investors for development, attracting significant private investment. Property values in the area were expected to increase by at least 10 percent per year, contributing additional tax revenues. The project started in 2018 with the construction of the beach promenade. This project illustrates how municipalities can leverage development rights to finance infrastructure investments, particularly in strategically located but underutilized areas. However, such initiatives require careful planning, alignment with development plans, and stakeholder consultation to succeed. |
| 72. | Croydon Council Urban Regeneration Vehicle, London Borough of Croydon, United Kingdom | The Croydon Council Urban Regeneration Vehicle (CCURV) is a long-term partnership established in 2008 to rejuvenate key real estate assets in Croydon, London, with a total investment of GBP 450 million. It involves the Croydon Council and a private partner, John Laing Equity. The project selection process began in 2007, with a competitive dialogue process involving 19 potential partners. John Laing Equity emerged as the winning bidder in 2008. In this partnership, the council contributed land and property assets, while the private partner provided equity funding and development expertise. CCURV operates as a joint venture with equal ownership and voting rights. It focuses on revitalizing properties for economic and social benefits. The council retains oversight and planning responsibilities while sharing access to development opportunities with the private partner. Revenues generated from urban redevelopment projects are used to repay costs and are shared equally as profits between the partners. Projects include new council offices, a leisure center, housing schemes, and more. This partnership has benefits like faster project delivery, risk sharing, aligning public and private interests, utilizing private property development |

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| | | expertise, enhancing land value, and community development. It also creates job and training opportunities for local residents and involves local companies in the supply chain. |
| 73. | Redevelopment of Library and Fire Station, Washington, District of Columbia, United States | In Washington D.C., the District aimed to rejuvenate the West End Library and Fire Station while also providing affordable housing. They achieved this by allowing a private developer, EastBanc Partner, to redevelop district-owned land and air rights. The project included new library and fire station facilities, residential condominiums, retail spaces, and affordable rental units. The budget for the library and fire station was capped at \$9.4 million and \$8.6 million, respectively, and any remaining funds were allocated to affordable housing. The District retained responsibility for environmental risks up to a certain point, after which the developer assumed the risk. The project faced initial community opposition, but community input was sought and considered throughout the process. The project showcased how municipalities can leverage development rights to finance infrastructure projects and the importance of community engagement, political support, and flexibility in making such projects successful. |
| 74. | Fire Station Refurbishment, Chapel Hill, North Carolina, United States | The town of Chapel Hill needed to renovate an aging fire station and saw an opportunity to use its strategic location to fund the project. They partnered with East West Partners to build a new fire station, a modern office building, and a shared parking deck. East West Partners contributed \$1.75 million for the fire station, with the town and county also providing funding. The project involved demolishing the old fire station, temporary relocation, and construction of the new facilities. The town retained ownership of the property, which was transferred back in 2018. The office building achieved full occupancy. This project demonstrates how municipalities can leverage land and strategic locations to finance infrastructure projects and the importance of planning for related developments in PPPs. |
| 75. | Capitol Crossing, Washington, District of Columbia, United States | The Capitol Crossing project in Washington, D.C. is an ambitious plan to build a multi-level platform over the I-395 highway, creating valuable development space. The project aims to revitalize downtown areas, connecting neighborhoods, and includes office buildings, residential units, retail spaces, green areas, and parking facilities. The estimated cost is \$1.3 billion, privately funded based on land value and real estate prices. Property Group Partners (PGP) purchased development rights in 2012, with an estimated project value of \$11 billion. PGP committed to building affordable housing units and involving local businesses. They pay a negotiated fee until construction ends, followed by regular taxes. This project shows how cities can use highway development rights for funding, emphasizing community involvement and determination despite contract and permit challenges. |
| 76. | Downtown Renewal, Silver Spring, Maryland, United States | Downtown Silver Spring was deteriorating, prompting private developers and Montgomery County to collaborate on a revitalization PPP in 2000. The private consortium, PFA Silver Spring, led the project. They engaged stakeholders, explained plans, gathered input, and addressed concerns, fostering community support. The development included offices, retail, cinemas, housing, a hotel, parking, and public spaces, revitalizing the area with an estimated cost of \$517 million. Montgomery County leased the land to the private developer for 99 years at \$1 per year. Profit-sharing and financing terms were set, ensuring alignment of interests. This project underscores the importance of community engagement, stakeholder communication, and well-structured PPPs with aligned incentives for success. Downtown Silver Spring was transformed, housing institutions like the American Film Institute and Discovery Communications. |
| 77. | South Waterfront Central District Greenway, Portland, Oregon, United States | In 2003, the Portland Development Commission partnered with private developers to transform the South Waterfront Central District. The plan included three phases to develop transportation, housing, sanitation, and recreation infrastructure, notably the South Waterfront Greenway (SWG), a riverside park and walkway. Landowners, including private developers and Oregon University, dedicated land for the SWG at no cost. Funding came from various sources, such as parks development charges, tax increment funding, and environmental remediation funds. SWG opened in 2015 to enhance connectivity, provide recreational space, and stimulate further development in the area. This project's success rested on strategic project selection and meaningful stakeholder engagement, ensuring alignment with development goals and addressing environmental concerns through collaboration with various stakeholders. |
| 78. | Mixed Use Development, Virginia Beach, Virginia, United States | In 2011, the City of Virginia Beach received a proposal from the Breeden Company to transform an underused parking lot into apartments, an indoor skydiving facility, commercial space, and a public parking garage. They entered a Comprehensive Agreement under the Virginia Public-Private Education Facilities and Infrastructure Act. Breeden purchased the site for nearly \$8 million and took on financial and construction risks. The city shared infrastructure costs and later bought the parking garage back, leasing it to Breeden for apartment parking. The project received recognition as one of the best mixed-use PPPs, showcasing how municipalities can use land development to finance infrastructure when strategically placed. |

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| 79. | Long Beach Civic Center Project, Long Beach, California, United States | The City of Long Beach faced infrastructure problems and budget constraints. They partnered with the Port of Long Beach to create a new Civic Center and relocate the Port headquarters. Plenary Properties Long Beach LLC (PPLB) was selected through competitive bidding to build it, with an estimated cost of \$520 million. The project included a city hall, port HQ, main library, solar panels, parking, and more. PPLB financed it through equity and loans from HSBC, Allianz, and Sumitomo Mitsui Banking Corp. In return, they received a 40-year operational concession. The project also included commercial developments, generating revenue, tax income, and jobs. It was seen as cost-effective and efficient, delivering value for money to Long Beach while revitalizing the Civic Centre. |
| 80. | Regent Park Affordable Housing Project, Toronto, Canada | Regent Park, a struggling neighbourhood in Toronto, needed a major makeover. The Toronto Community Housing Corporation (TCH) proposed a CAD 1.1 billion redevelopment plan over 20-25 years, involving private partners. After a failed first attempt, Daniels Corporation became the partner for the project. Different phases of the project had varying financing structures, with TCH taking on more risk initially to attract private investors. The project successfully revitalized the neighbourhood by refurbishing affordable housing and engaging the community through formal and informal consultations, addressing language and cultural needs. This approach demonstrated how phased financing and community engagement can transform underserved areas. |
| 81. | Sustainable Housing Project, Turin, Italy | The City of Turin initiated affordable housing projects by repurposing abandoned buildings, particularly targeting vulnerable individuals and families. One project involved refurbishing a neglected nine-story building through a PPP with a consortium led by Oltre Venture. Oltre Venture partnered with Cooperativa DOC and Fondazione CRT to establish an SPV called Ivrea 24. The municipality provided a 90-year ground lease for the property, focusing on energy efficiency and environmental impact. Oltre Venture and Fondazione CRT co-financed the project, resulting in the refurbished building opening in 2011 with various services and affordable rental options. By 2014, the project reached a breakeven point due to energy-efficient measures, showcasing the potential of private sector expertise and leveraging existing assets for infrastructure investments. |
| 82. | Challenging Case: Slum Rehabilitation Scheme, Maharashtra, India | In Mumbai, the Government of Maharashtra launched the Slum Rehabilitation Scheme (SRS) in 1995 to redevelop slums by involving private developers who received extra development rights in return. The Slum Rehabilitation Authority (SRA) oversaw SRS projects, offering eligible slum inhabitants new on-site housing and letting them choose the developer. Private developers benefited from Transferable Development Rights (TDR) and extra development space. However, the SRS faced challenges, including a real estate market downturn and slow progress in redeveloping slums. A court ruling eased consent requirements for certain projects in 2013. Some slum dwellers also encountered issues with the quality of new apartments and maintenance costs, leading them to return to their old homes. This project highlights the importance of government support and involvement in affordable housing initiatives and the need to balance risks effectively in PPPs. |
| 83. | Challenging Case: Dege Eco Village, Dar es Salaam, Tanzania | In Dar es Salaam, Tanzania, the National Social Security Fund (NSSF) partnered with Azimio Housing Estate Ltd. to address urban housing shortages. The Dege Eco Village project aimed to provide 7,160 apartments and 300 villas across income brackets. NSSF owned 45%, and Azimio Housing Estate held 55%, contributing land and cash. The project was divided into three phases, but it faced challenges due to inadequate infrastructure, irregularities, and approval process issues, leading to project abandonment. This project emphasizes the importance of careful planning, securing funding, and adhering to approval processes for project credibility and success. |
| 84. | Challenging Case: Unity Housing Estate, Bauchi Town, Nigeria | In Bauchi, Nigeria, the state government initiated a PPP with Terraquest Development Company Ltd. in 2009 to address housing shortages. The project aimed to provide affordable housing in three phases. Terraquest handled design and construction, while the state government provided land, payment commitments, and infrastructure support. Funding came from the Federal Mortgage Bank of Nigeria. The first phase was completed successfully but faced issues due to the government's alleged non-payment of compensation. This led to price increases and complex tenant requirements, resulting in many vacant properties. This project highlights concerns regarding the public partner's payment obligations and the importance of involving stakeholders for accessibility. |
| 85. | Bundled Schools, Ireland | In 2005, Ireland's Minister for Education and Science launched a program to construct 27 new schools in rapidly growing areas through public-private partnerships (PPPs). The schools were grouped into five bundles. BAM Schools Bundle 3 Ltd., a joint venture of BAM PPP and PGGM, won the 25-year contract for eight schools in Bundle 3. They were responsible for financing, designing, constructing, and maintaining the schools. The project, costing approximately EUR 412 million, began in 2012, and all schools were operational by April 2014. The project received awards and generated around 2,500 jobs, demonstrating the advantages of bundling projects for economies of scale and consistent quality. |

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| 86. | Free Computer Training for Underprivileged Children, Kolkata, West Bengal, India | In 2003, the Bengal Services Society (BSS) and Kolkata Municipal Corporation (KMC) partnered to create a free computer training centre for underprivileged children. They used an unused KMC school. The centre educated children aged 10 to 14 with free 45-minute training sessions six days a week, giving certificates upon completion. This collaboration repurposed a neglected public asset to benefit low-income families. While the initial phase was successful, there's limited information on its expansion to other underused KMC school buildings. This initiative illustrates how municipalities can utilize existing, underused assets to provide valuable services to residents. |
| 87. | Mafra and Ericeira Business Factory, Portugal | In 2015, the Municipality of Mafra in Portugal aimed to boost entrepreneurship in its villages through a PPP. They partnered with Territórios Criativos, a private operator, to establish two business incubators. The municipality provided space, and funding came from national government institutions. Revenues came from fees, room rentals, and local bank sponsorship. The incubators offered workspace, training, mentoring, legal advice, and more. The project promoted networking and supported 60 projects, with half of the entrepreneurs being women. To ensure sustainability, they planned to introduce progressive fees and seek local company sponsorships. This successful project highlights the importance of careful planning, collaboration, and diverse funding sources in PPPs for public service initiatives. |
| 88. | James F. Oyster Bilingual Elementary School, Washington, District of Columbia, United States | In 1993, the James F. Oyster Bilingual Public Elementary School faced closure due to its deteriorated condition and lack of funding. To save the school, a PPP involving the District of Columbia's Public School District, the municipal government, and a private real estate developer was formed. The developer constructed an adjacent upscale apartment building, generating revenue to finance the new school. Bonds worth \$11 million, repaid by the apartment building's revenue, funded the school's construction, with no direct cost to taxpayers. The renovated school, completed in 1998, showcased modern facilities and exemplified repurposing valuable land for infrastructure projects. |
| 89. | Varaždin County School Program, Croatia | In 2006, Varaždin County, Croatia, faced school overcrowding and planned to build new schools and renovate existing ones through a PPP with availability payments. Eight contracts were awarded to domestic companies for approximately EUR 40 million. These companies financed and operated 22 schools and ten gymnasiums, with construction starting in 2006. The facilities opened on time in 2008, leading to educational improvements. This successful project became a model for similar PPPs in Croatia, highlighting the efficiency of bundling concessions and leveraging private sector expertise. |
| 90. | Public Schools, Belo Horizonte, Minas Gerais, Brazil | The city of Belo Horizonte in Brazil faced a severe shortage of educational facilities, leaving over 11,000 children on waiting lists for schools. To address this, they partnered with Odebrecht, a major construction company, in a 20-year PPP project. Odebrecht's Educac Consortium financed, built, and equipped 32 preschools and five primary schools. They also handled non-teaching services like maintenance, security, and cleaning. The city provided the land and managed staffing and educational aspects. The project used an availability-based model, with the city making regular payments to Odebrecht based on performance and availability indicators. Construction was completed in 2014, with an investment of USD 95 million, accommodating over 18,000 children. The project later expanded to 51 schools, serving 25,000 students, reflecting its success. |
| 91. | The North Toronto Collegiate Institute, Toronto, Canada | The Toronto District School Board (TDSB) faced the challenge of revitalizing North Toronto Collegiate Institute (NTCI), an aging high school, with limited funding and land availability. To achieve this, they entered into a unique Public-Private Partnership (PPP) with developer, Tridel. Tridel bought 0.7 acres of NTCI's land for CAD 23 million, using the proceeds to fund the school's reconstruction, estimated at CAD 52 million. Tridel leveraged financing through planned residential developments and green debt financing due to LEED standards. The project involved extensive stakeholder input, including the local community, NTCI alumni, students, and more. The refurbished school, with modern amenities and a 600-seat theatre, opened in 2010 alongside residential towers developed by Tridel. This PPP successfully revitalized NTCI's facilities while providing land for profitable residential developments. |
| 92. | Kenyatta University Hostels, Kenya | Kenyatta University in Kenya faced a shortage of student accommodations due to a growing number of students seeking higher education. To tackle this, they pursued a Public-Private Partnership (PPP) with advisory support from the International Finance Corporation. In 2014, a consortium led by Africa Integras won a PPP contract worth USD 57 million. The project aimed to build and operate student hostels for 20 years before transferring them to the university. Construction began in April 2018. The hostels, designed for over 9,000 undergraduates, postgraduates, and married students, include various amenities. Notably, the university collects hostel rents as part of tuition fees, managing the collection risk themselves. This project helps address student housing needs while maintaining affordability. |
| 93. | Inkosi Albert Luthuli Hospital, KwaZulu-Natal, | In the 1990s, the KwaZulu-Natal government in South Africa wanted to build a top-notch hospital. Initially planned as an academic hospital with 1,000 beds, it was scaled down due to complexities and funding issues to a 846-bed referral-only hospital, with construction |

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| | South Africa | starting in 1996.To achieve its vision, the KwaZulu-Natal Department of Health (KZNDoh) pursued a Public-Private Partnership (PPP). The Impilo Consortium won a 15-year PPP contract valued at ZAR 746 million (USD 50.28 million) in 2001. The consortium handled non-clinical services, maintenance, and equipment. The KZNDoh financed the medical side, and equipment was handed back at the contract's end. The project began in June 2002 and was extended to 2019 due to positive service feedback. Challenges included forex risk due to currency fluctuations. |
| 94. | Challenging Case: Construction of District Hospital, Żywiec, Poland | The city of Żywiec in Poland needed a new hospital to replace an old one. They opted for a Public-Private Partnership (PPP) with InterHealth Canada Ltd. The private partner would design, finance, construct, and run the new hospital for 30 years. The project included constructing a modern 340-bed hospital, costing around EUR 35 million for the building and EUR 17 million for equipment. The private partner invested a quarter of the total cost, got a loan from the European Bank for Reconstruction and Development, and received payments from the National Health Fund (NFZ) based on the healthcare services provided. The city was responsible for monitoring service quality. Construction started in 2015 but faced some delays. No further updates were available regarding the project's status. |
| 95. | Majadahonda's Puerta de Hierro Hospital, Madrid, Spain | The Puerta de Hierro Hospital in Madrid was aging, and with the city's growing population, a new hospital was needed. Due to budget constraints, a Public-Private Partnership (PPP) was chosen to finance this project. A consortium led by ACS, Dragados, Bovis Lend Lease, and SUFI won the bid and formed Hospital of Majadahonda S.A. The project involved designing, building, financing, operating, and maintaining a modern hospital with 700 beds and various facilities. The private partner provided equity and obtained a syndicated loan for financing. They were responsible for construction, non-medical services, and even commercial areas like shops and parking. The public partner transferred land, made regular payments, and ensured the contract's economic balance. The project faced delays, but the hospital now operates successfully, serving its intended purpose. |
| 96. | Hemodialysis Centers, Dhaka and Chittagong, Bangladesh | In Bangladesh, kidney disease was a major health issue, with many patients unable to access affordable dialysis treatment. To address this, the government partnered with Sandor Medicaids Private Limited, an Indian company experienced in dialysis centres. The private partner set up modern dialysis facilities at the National Institute of Kidney Diseases and Urology (NIKDU) in Dhaka and Chittagong Medical College and Hospital (CMCH). Under the ten-year PPP agreement, the private partner handled equipment, financing, and operations, while NIKDU and CMCH provided space and utilities. The project aimed to provide both government-supported and private patients with affordable dialysis. The government subsidized fees for some patients. The centers opened in 2017, increasing Bangladesh's dialysis capacity and potentially saving lives. However, there were reports of illicit appointments for dialysis services, leading to government efforts to strengthen monitoring and take action against involved employees. |
| 97. | Hemodialysis Center at the National Kidney and Transplant Institute, Quezon City, Manila, Philippines | The National Kidney and Transplant Institute (NKTl) in Quezon City, Manila, faced problems like a shortage of hemodialysis machines, old equipment, and rising maintenance costs. Due to budget constraints, they couldn't buy enough new equipment. So, they opted for a PPP with Fresenius Medical Care Inc. In this five-year equipment lease agreement, Fresenius provided modern hemodialysis equipment, maintained it, ensured supplies, trained staff, and handled technology upgrades. NKTl provided space, staff, utilities, maintained quality standards, and made lease payments based on the number of treatments. The project was a success, with NKTl having 47 state-of-the-art machines running 24/7, accommodating 120 outpatients daily. This increased revenue, making the project financially viable. NKTl extended the partnership in 2009, and the project was recognized as one of the world's top 40 PPPs, highlighting how PPPs can improve services efficiently while managing costs and risks. |
| 98. | Dialysis Services, Andhra Pradesh, India | The Government of Andhra Pradesh faced a problem with high demand for dialysis services from low-income patients. Existing facilities were expensive, charging around INR 1,200 to 2,000 per treatment, which many couldn't afford. To improve access and affordability, they partnered with B Braun Medical (India) Private Limited, a subsidiary of a German healthcare company, to build and operate dialysis centres in 11 state-run hospitals. The private operator invested around INR 45 million and provided dialysis services for seven years, after which the centers would be government-owned. The government paid INR 1,200 per treatment, with most going to the private partner and a portion to the hospital. The government also mobilized patients, while hospitals supplied space, power, water, and clinical staff. The project aimed to offer better dialysis access, especially to low-income patients. After the contract ended in 2016, the government expanded the project to 26 hospitals at a lower cost per treatment, partnering with NephroPlus. This partnership maintained high-quality standards and regular audits. In 2018, NephroPlus reported serving over 5,000 patients through the project. |

Annex 4: Recommendations in Drafting ToRs for Pre-Feasibility and Feasibility Studies

In order for Project Owners to practically operationalize CVC, engaging a qualified expert and clearly specifying CVC assessment in the scope of work for the feasibility study are key steps. This section provides recommendations on suggested clauses on a CVC-related scope of work and expert qualifications to include in the TOR.

Scope of Work

Table below provides some suggested clauses to add CVC assessment in the scope of work of the TOR for a feasibility study based on the six steps of project level assessment discussed in the Guidelines.

| Topic | Suggested Clauses to Include in the Scope of Work |
|--|---|
| Identifying potential CVC for projects | <ul style="list-style-type: none"> Analyse and identify the potential for CVC in the project based on a comprehensive review of project characteristics, stakeholder mapping and international experience Assess demand for CVC considering factors such as market trends, customer preferences, and industry dynamics. Analyse how the CVC activities will contribute to and strengthen the core services |
| Readiness of enabling environment for CVC | <ul style="list-style-type: none"> Review readiness of policy, legal and institution to implement identified CVC for the project If gaps are identified, recommend how to address those gaps to implement CVC |
| Technical assessment of potential CVC | <ul style="list-style-type: none"> Assess technical, legal, political, environmental and social feasibility of CVC opportunities , including cost of implementing CVC and any additional cost for core services resulting from the CVC Review and adjust technical design to add CVC in the project design by considering both commercial services and supporting facilities |
| Assessing commercial feasibility of CVC | <ul style="list-style-type: none"> Identify additional revenue streams that can be generated through commercial activities, and risks associated with those revenues Conduct market sounding to gather feedback from local community, potential investors and financial institutions on the commercial potential of CVC, proposed project structure and risk allocation. |
| Planning for implementation | <ul style="list-style-type: none"> Assess the capacity of the Project Owners to implement CVC and identify any technical support required for successful implementation, including any changes to the project, financial/commercial structuring and regulatory complexity |
| Managing risks | <ul style="list-style-type: none"> Identify risks associated with CVC and propose measures to mitigate those risks |

Personnel and Expert Requirements

In addition to the scope of work, the TOR should include requirements for experts with experience in analysing and implementing commercial activities, for example:

- A commercial specialist with relevant experience in carrying out commercial activities.
- A real estate specialist with relevant experience in assessing demand and key commercial structures in the real estate sector.

A financial specialist with relevant experience in developing business models and commercial structures, commercial contract terms and analysing financial and commercial feasibility of commercial opportunities.