Deloitte.

Private Sector Participation in Municipal Solid Waste Projects

Bangkok, Thailand, 11 July 2018

Michael Flynn

Macro drivers—City development

Global drivers of urbanization

1.5 million people per week moving to cities

65%+ of world population living in cities by 2050

Paris Agreement—global emissions reductions

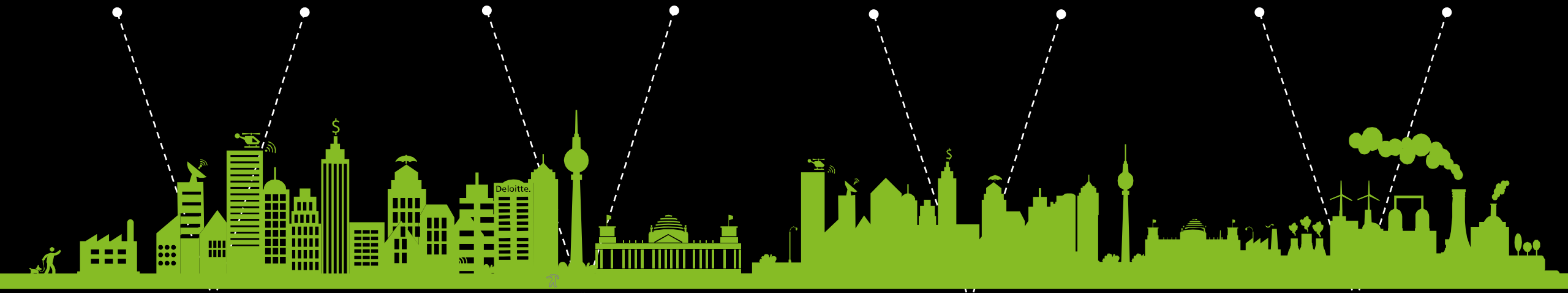
UN SDGs—clear, implementable plan

Public funding gap

UN SDG 17—Private sector participation

Citizens increasing use of technology

Mix of technology and traditional infrastructure



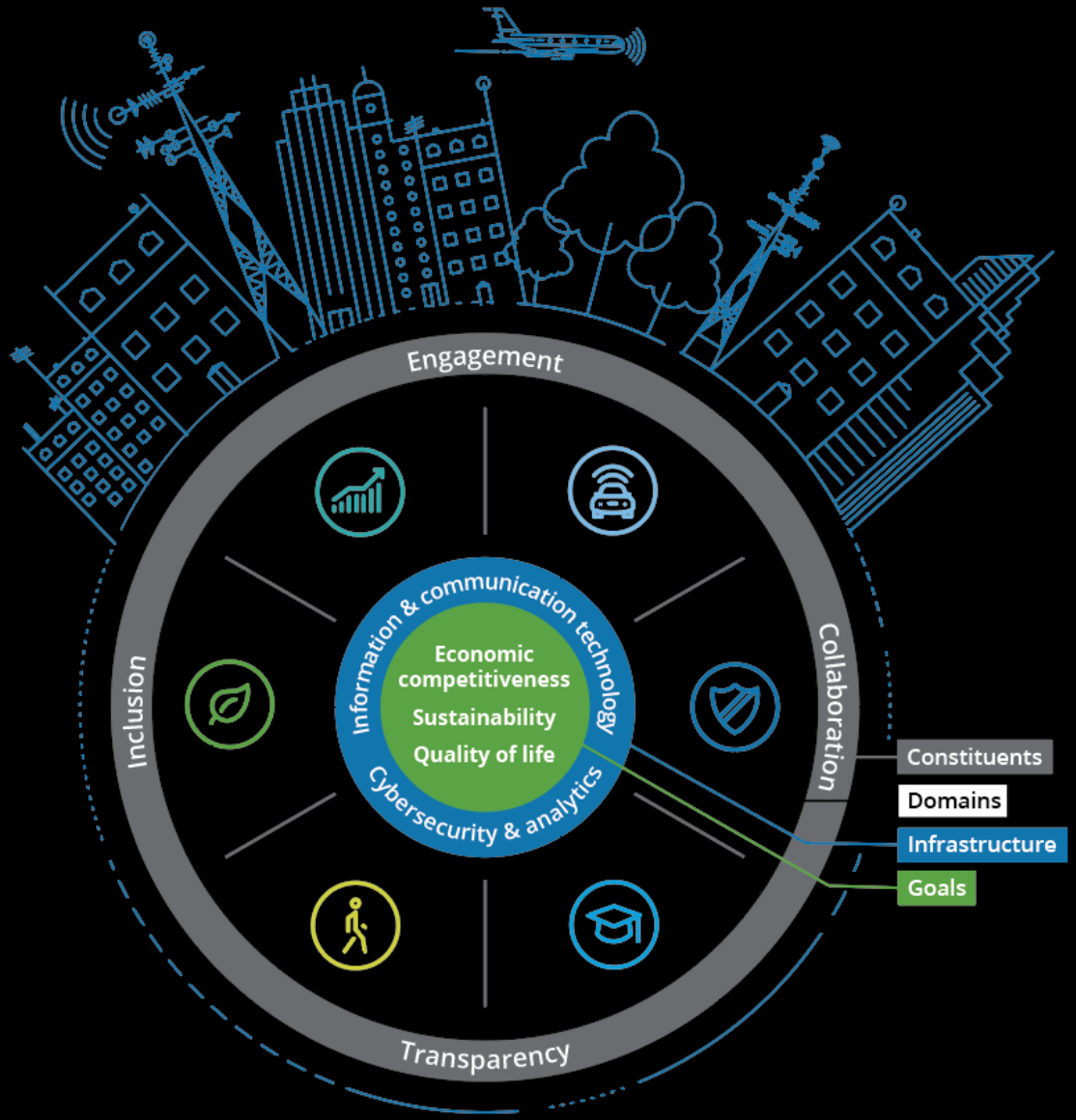
Increasing urbanization

Sustainability focus

Public private mix

Technology-led citizen services

City Development | Putting the Citizen at the Centre



City Development Goals – Citizen Centric

Three goals provide the foundation for a city initiative: Economic competitiveness, sustainability, and quality of life.

PEOPLE

Quality of life

- Improve health, safety, and education
- Create operational efficiency and timesavers
- Better citizen services

PLANET

Sustainability

- Save energy and natural resources
- Recycle and reuse assets
- Reduce Emissions

PROFIT

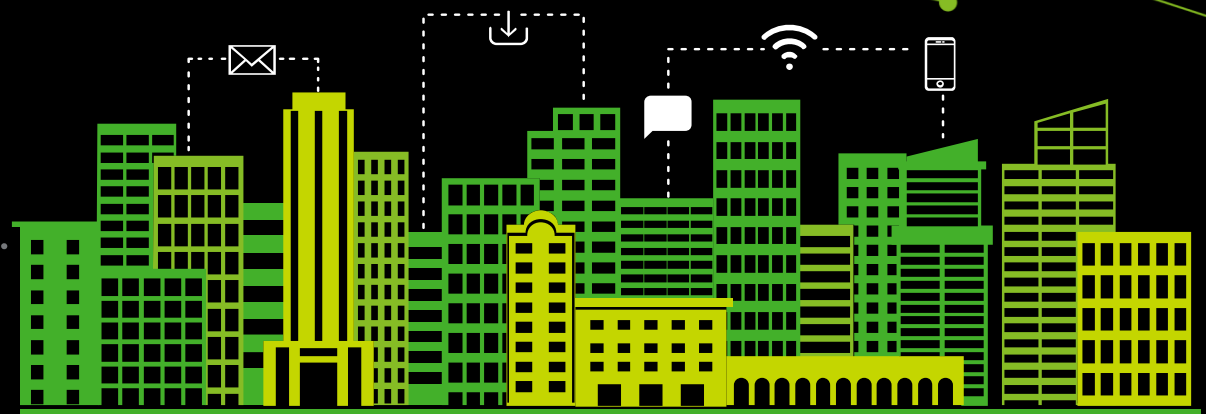
Economic competitiveness

- Attract and keep companies and workforce
- Foster innovation and entrepreneurship
- Private sector participation in service delivery and financing

Financing challenge

Public infrastructure financing challenge

- Revenue models—beyond exchequer funding
- Value capture—joined-up thinking
- Financing structures
- Procurement structures
- Value for money



Increased Technology financing challenge

Increased technology component—shorter-term infrastructure

Varying attractiveness to lenders and investors

- Revenue models not clear
- Evolution from pilot to full roll out—different players required
- Determine value of data/IP asset created
- Blending private finance types together

Model for delivering a successful sustainable infrastructure project

1

Understanding project and value

Understand business model	Understand value generated
Does funding gap exist	Direct value capture
Risk transfer potential	Indirect value capture
Return available	Asset recycling to fund investment

2

Consider funding & finance options

- Public funding
- Private financing
- Monetize value

3

Determine relevant procurement & delivery method

- Public provision
- Operating contracts
- Joint venture
- Long-term lease
- Public-private partnership
- Franchising
- Privatization

Value capture

Capturing the value of gains from an infrastructure investment, and directing those funds to infrastructure investment.

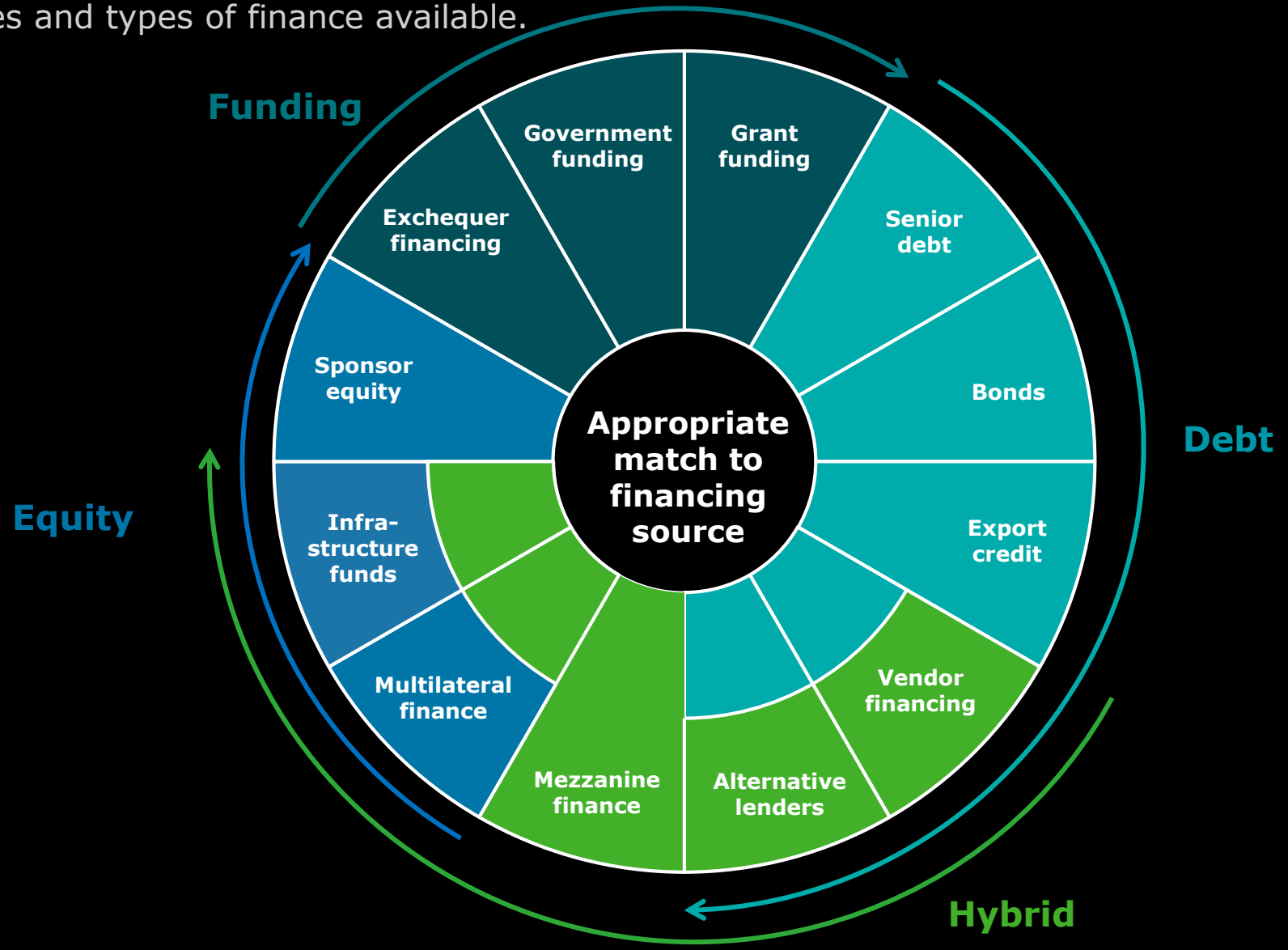
Direct value capture

Indirect value capture

Asset recycling

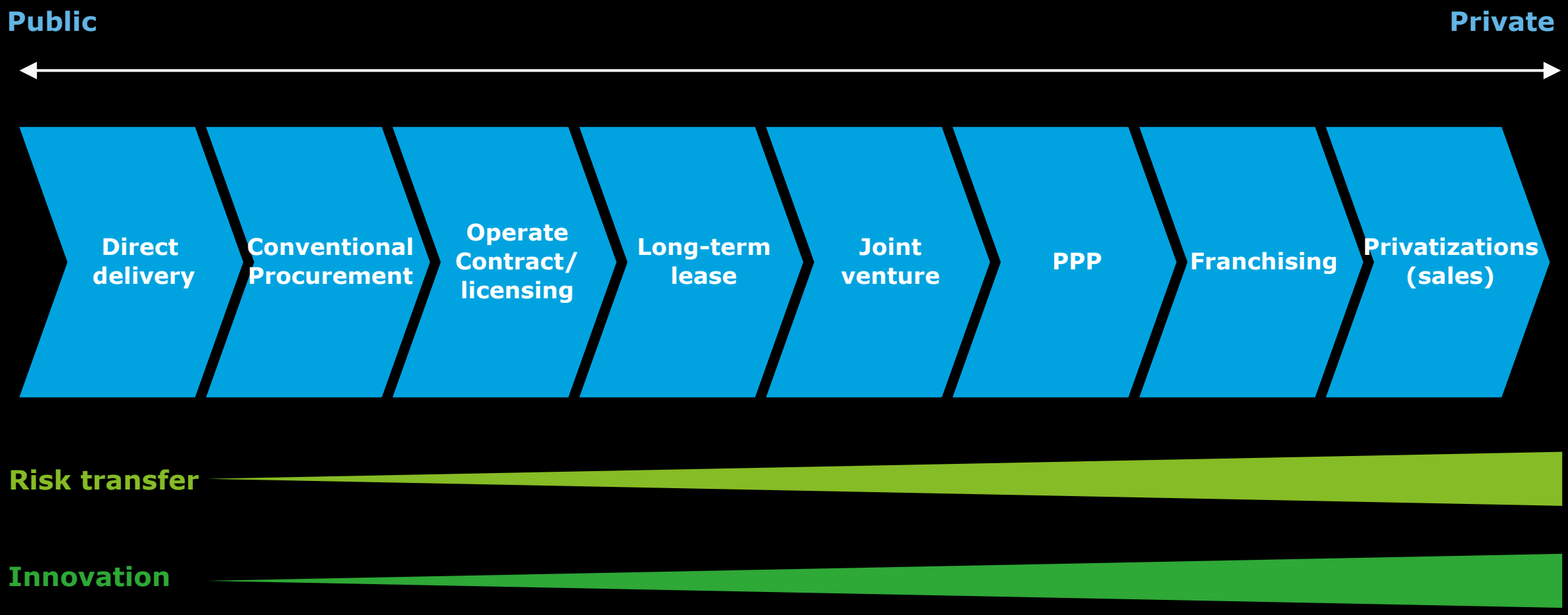
Supply of infrastructure finance

Multiple sources and types of finance available.



Varied procurement solutions

Different levels of private sector participation



Leveraging public capital to unlock private sector participation

Can exchequer funds be applied more effectively?

Single project solution

Multiple projects solution — capital program view

Alternative solutions | Leveraging public capital

- Scale up investment in project preparation and pipeline developmentProject-preparation facilities and technical assistance to increase the “bankability” of projects
- Partial revenue support
- Finance incremental cost support
- Increase of grants—emerging technologies, non-public retrofit
- Use of guarantees—revenue, loans
- Create secondary market for sustainable infrastructure projects—anchor syndicated loans
- Public policy insurance
- Public equity/subordinated equity fund

Dublin Waste to Energy PPP Project

Reduce landfill and address Dublin's non-recycled waste

- 600,000 tonne Waste to Energy Facility
- Procured by Dublin City Council, Ireland
- Design, build, finance and operate for 45 years
- Covanta Energy successful bidder
- Demand risk on waste transferred (some supports for 15 years)
- Revenue sharing on Energy sales for contract period
- 58 MW Energy production capacity (80,000 homes)
- District heating potential for 50,000 homes

Dublin Waste to Energy PPP Project

What is involved in WTE?

- Waste-to-Energy is the process of generating energy in the form of electricity and/or steam from the combustion of non-recyclable residual waste.
- Recovers the value in the waste remaining after recycling by recovering clean energy
- Use air pollution control equipment that scrubs and filters exhaust gases to achieve superior environmental performance, which is fully protective of human health and the environment.
- Provides a safe, technologically advanced means of waste disposal that reduces greenhouse gases, generates clean energy and recycles metal.
- Widely recognized as a technology that can help mitigate climate change. Waste combusted at a WTE facility does not generate methane, as it would at a landfill; the metals that would have been sent to the landfill are recovered for recycling instead of being thrown out; and the electricity generated offsets the greenhouse gases that would otherwise have been generated from coal and natural gas plants.
- Energy produced at waste-to-energy facilities is reliable baseload power, (generated 24/7). Provides opportunity to sell electricity onto the grid, but also provide steam delivered to houses, public buildings and industry.

Dublin Waste to Energy PPP Project

Benefits of the Project to Dublin City

Waste Disposal
Process 600,000 tonnes of solid waste that cannot be sensibly recycled, moving the Dublin region away from dependence on landfilling waste.

Fulfills a key part of the Dublin Regional Waste Management Plan which includes reducing waste, maximising recycling, minimising landfill, and generating energy from residual waste.

Eliminates the need to export waste to other countries, enabling the Dublin region to become self-sufficient in managing waste and achieve compliance with EU landfill diversion targets.

Energy/Heat Generation
Safely converts non-recyclable waste into c60 megawatts of electricity which is exported into Ireland's national grid – enough to power 80,000 homes.

Avoids the importation of 250,000 tonnes of fossil fuels, such as coal that would be needed to generate the same volume of electricity.

Capable of generating 90 megawatts of district heating - enough heat for 50,000 homes.

Dublin Waste to Energy PPP Project

Benefits of Project to Dublin City

State-of-the-art Design and Technology

Designed to achieve very high overall energy efficiency and energy recovery, operating 24 hours a day, seven days a week.

Employs state-of-the-art pollution control equipment to scrub and filter emissions to be fully protective of human health and the environment and exceed stringent EU emissions standards.

Minimizes water usage by using all the surface water and rain water from the site, as well as reusing water from the neighboring waste water treatment plant. Cooling water will be drawn from the local river estuary which reduces the energy requirement for cooling and maximises power output.

Benefits to the Community

Provides 100 jobs – 60 full-time at the facility and 35-40 full-time contractor and service support roles.

More than 300 jobs were created during construction, of which more than 50 jobs were given to local people. Many have secured permanent employment at the facility.

Dublin Waste to Energy PPP Project

Long timeline with lots of obstacles

Dec 2017	Covanta completed refinancing and sells 50% equity stake in the project to GIG
Sep 2014	Financial Close reached
May 2014	European Commission rules that support measures provided by Dublin City Council are in line with state aid rules. Measures include provision of a waste revenue guarantee, a waste and electricity revenue sharing mechanism and a profit sharing schedule
Mar 2014	Dublin city councillors voted to abandon the Dublin WTE project
Feb 2013	First Reserve joined Covanta as equity provider
Oct 2012	Irelands National Pensions Reserve Fund (NPRF) joins the lending club. Other lenders include Bank of Ireland, Ulster Bank, Allied Irish Bank, Barclays and GE Energy Financial Services
Sep 2007	Commercial Close - Covanta and DONG Energy
Mar 2006	DONG Energy acquired Elsam A/S
May 2005	Elsam A/S Appointed as preferred tenderer
Oct 2002	Prequalification of bidders commences

Dublin Waste to Energy PPP Project

Key risk transfer to achieve deal

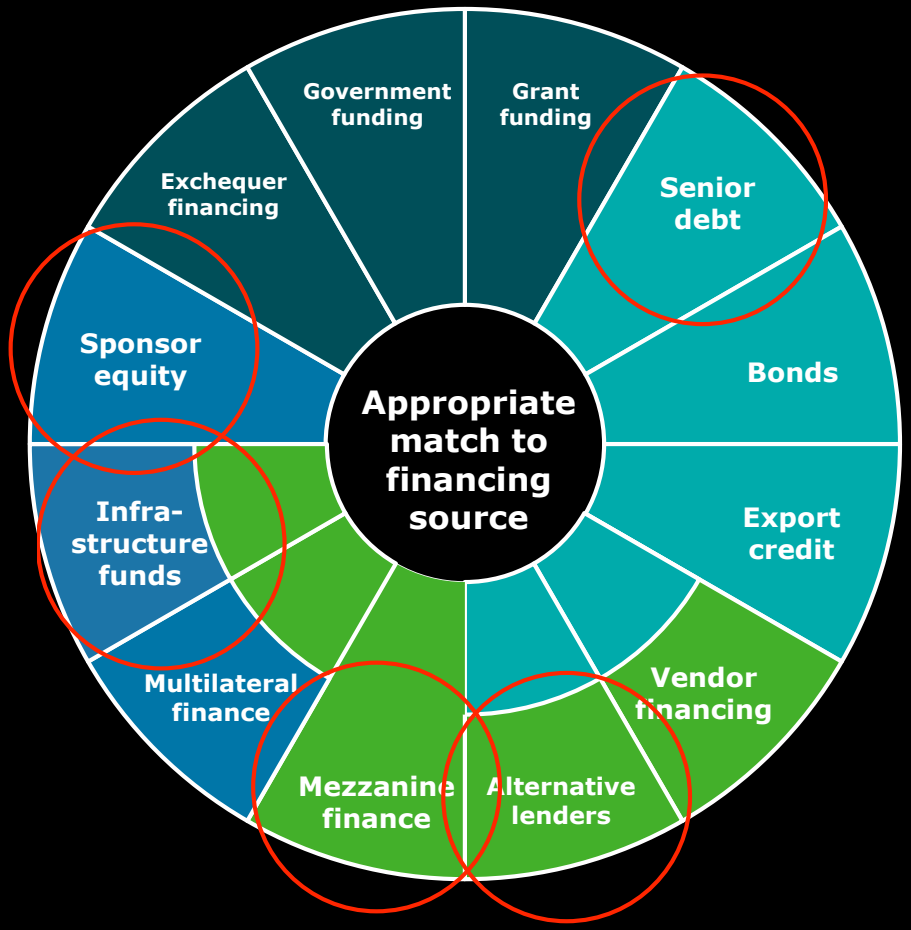
- Supply / Volume Risk
- Gate Fee risk
- Recycling

- Construction Risks
- Environmental
- Technology

- Demand Risk
- Offtake Covenant
- Level of residual waste

Dublin Waste to Energy PPP Project

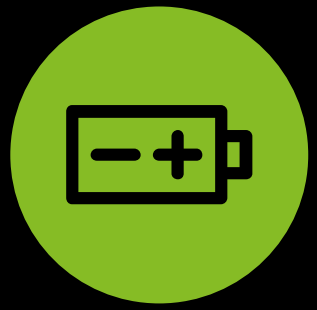
Blended Financing Structure



Type	Value (€m)	Institution
Equity	75m	Covanta
Convertible Loan	75m	First Reserve Corp
Sub-Debt	50m	Covanta
Sub-Debt	50m	Macquarie
Senior Debt	250m	Bank of Ireland
		Allied Irish Banks
		National Pension Reserve Fund
		Barclays
		RBS/Ulster Bank
Total	500m	

Dublin Waste to Energy PPP Project

Lessons Learned

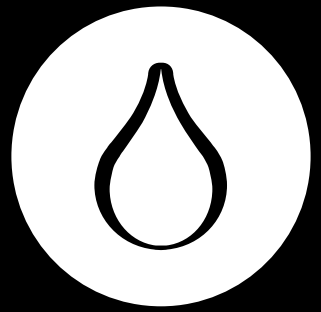


Long Term Project

45 Year Term

12 year Procurement

Flexed deal and procurement to deliver



Environmental Solution

Sustainable Focus

Reduced Landfill

Utilisation of Heat and Energy Produced

Blended Financing Solution

Multiple sources of Finance

State funds used as cornerstone during financial crisis

Value Capture

Revenue Share

Refinancing Gain Share

Supply and demand risk transferred

In conclusion

Deloitte.

Professional Services means audit, tax, consulting, and advisory.

About Deloitte
As used in this document, "Deloitte" means Deloitte Consulting LLP, a subsidiary of Deloitte LLP. Please see www.deloitte.com/us/about for a detailed description of our legal structure. Certain services may not be available to attest clients under the rules and regulations of public accounting.