

# The Commercial Law Development Program *Presents* *Public-Private Partnership Webinar Series*



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# Pre-Feasibility and Feasibility Studies



# Today's presenters



**Michael Tran**  
Bluebird Advisors  
*(previously with World Bank,  
KPMG, and Castalia)*



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P3 Collaborative, LLC  
*(previously with AECOM, WGI  
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# Objective of the Webinar

- Understand the purpose of feasibility studies and their benefits
- Breakdown the key elements of feasibility analysis for infrastructure
- Find resources for pre-feasibility and feasibility studies
- How to evaluate the quality of a feasibility analysis

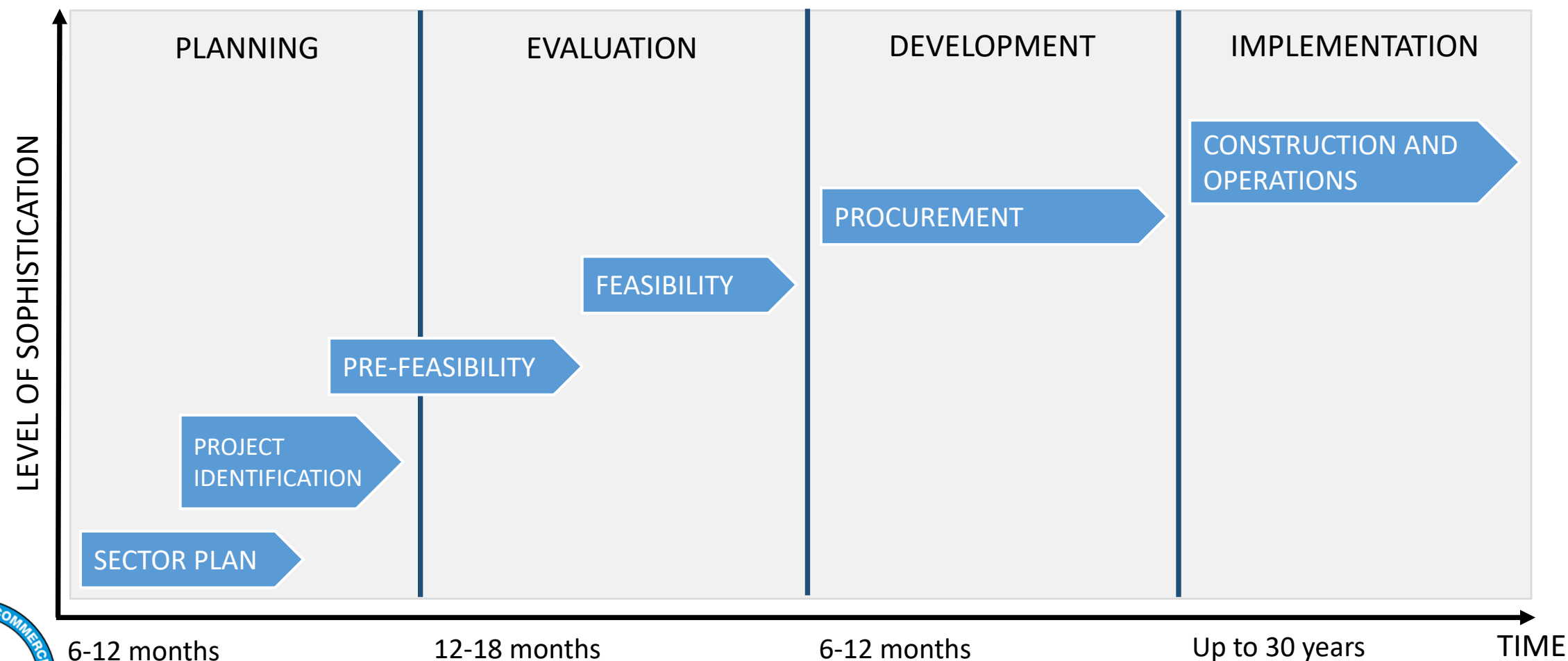


# Agenda

- What is Feasibility Analysis?
- Benefits of Pre-Feasibility and Feasibility Studies
- Elements of Feasibility Analysis for Infrastructure
- Resources for Feasibility Analysis
- Evaluating Feasibility Analysis



Feasibility analysis should be performed before contracting and procurement to determine if the project is viable

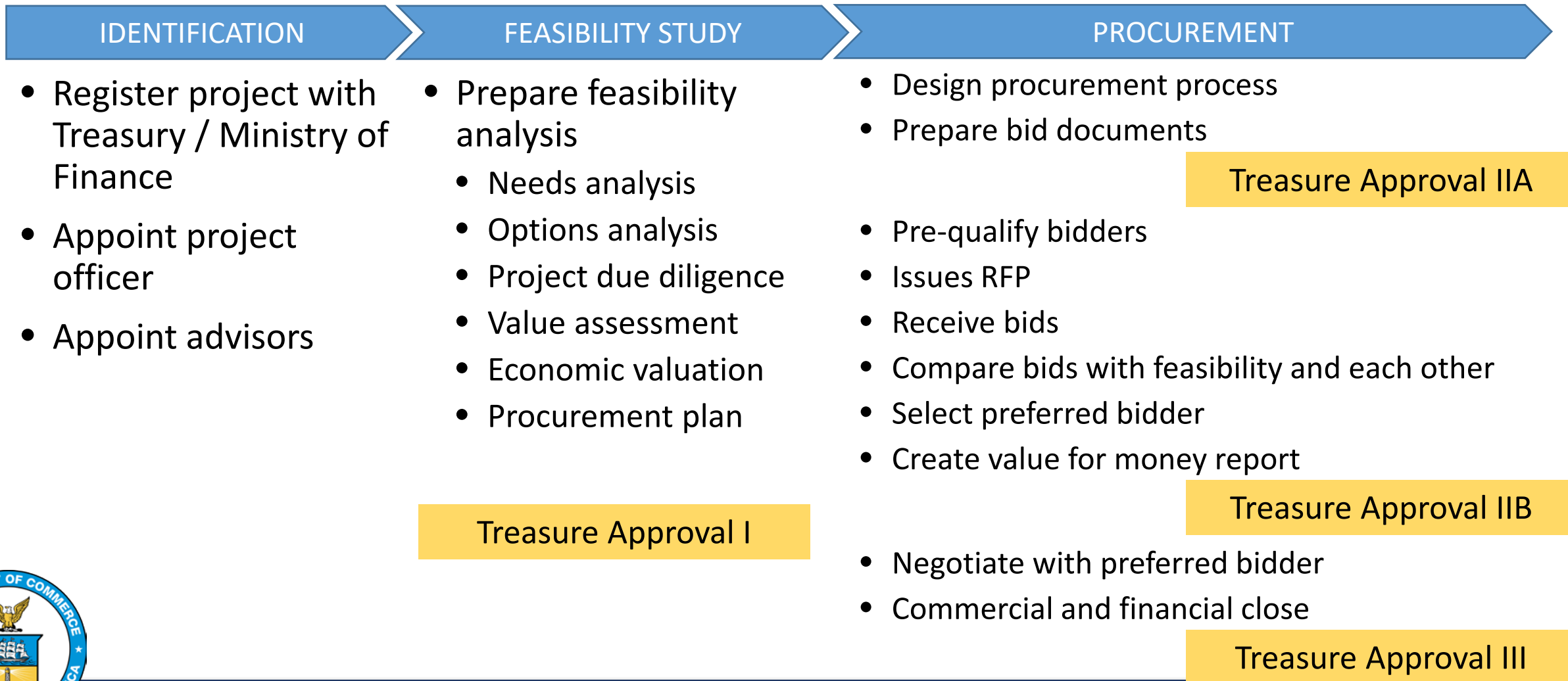


Pre-feasibility and feasibility analysis are part of the project development cycle

- Pre-Feasibility and Feasibility are part of the project development cycle. Each country has its own national policies on how to proceed with this.
- The **pre-feasibility study** is a step to determine whether the projects identified are viable and whether the additional time and resources should be invested.
- A **feasibility study** take that project a step further to look at how to mitigate risk and issues identified in the pre-feasibility stage and to determine viability.



# Example of PPP stage-gate process required by the in South African Treasury










# Pre-feasibility and feasibility will improve overall outcomes for projects

- Feasibility analysis can:
  - Save time and costs for government with preparation
  - Determine viable or non-viable projects
  - Better allocate limited government resources
  - Identify fatal flaws or issues to be addressed as project advances
  - Develop a more realistic and efficient procurement plan
  - Mitigate cost and schedule delays throughout the project life cycle
  - Actualize innovation from private sector
  - Attract higher quality private sector developers and investors



# Feasibility analysis should assess five key elements of a project

	Pre-Feasibility	Feasibility
 <b>Technical Solution and Cost</b>	Develop technical solution and rough order of magnitude	Refine technical solution and finalize cost estimates
 <b>Funding and Financing</b>	Identify funding gap and identify potential funding sources	Determine affordability and secure funding sources
 <b>Policy, Legal, and Regulatory</b>	Survey regulations and laws and identify gaps and project concerns	Review likelihood of required changes to laws and regulations for project success
 <b>Environmental and Social</b>	Identify E&S “red flags” and develop mitigation strategy	Conduct environmental and social impact assessment and mitigation strategy
 <b>Commercial Structuring and Delivery Models</b>	Assess delivery model options, including PPPs	Select delivery model and develop key commercial terms



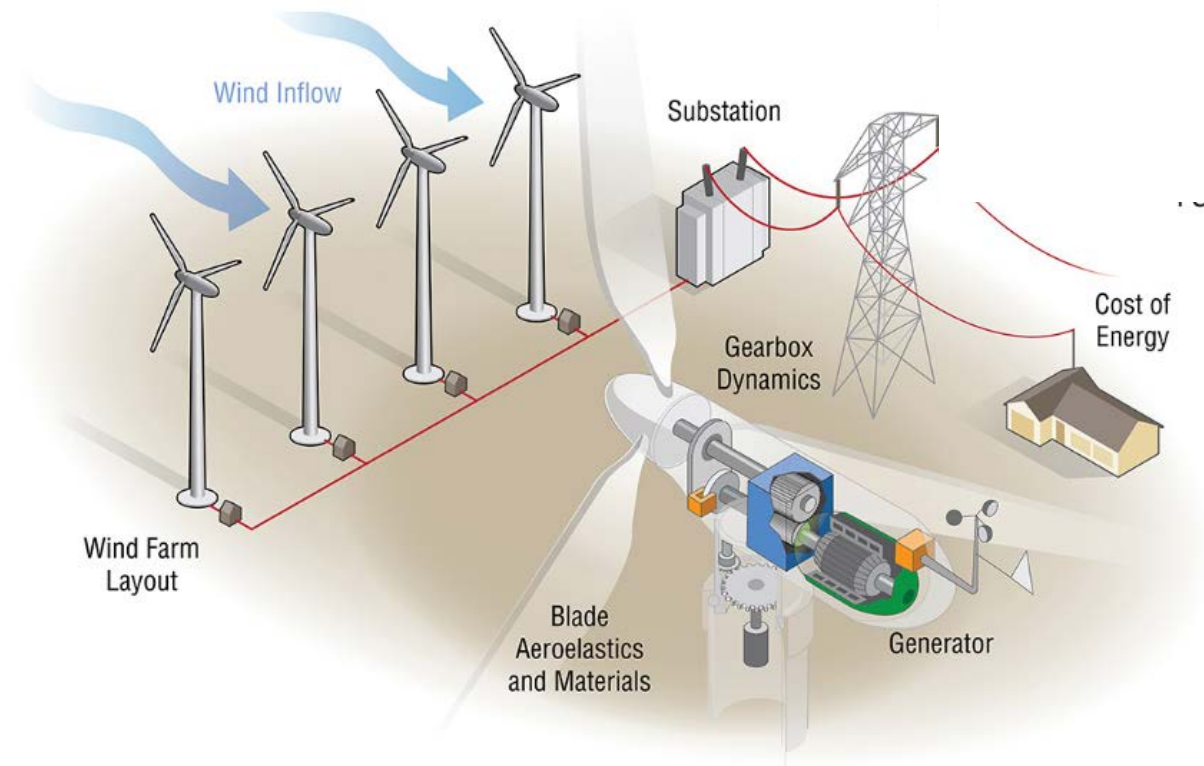
# Wind Energy Project - Case Study



- Wind project will be geared toward 150 MW Capacity
- Preliminary site selections determined from wind maps
- Transmission line would require approx. 15 miles to connect
- At \$3M/MW Installed could be in range of \$600 million








# Key components of a wind energy project



*Simplified schematic of a Wind Turbine Generator. Illustration by Alfred Hicks, NREL*



# In this next section, we will go through each area of feasibility analysis

	Pre-Feasibility	Feasibility
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# Identify technical viability of a project early and determine whether to pursue the project further

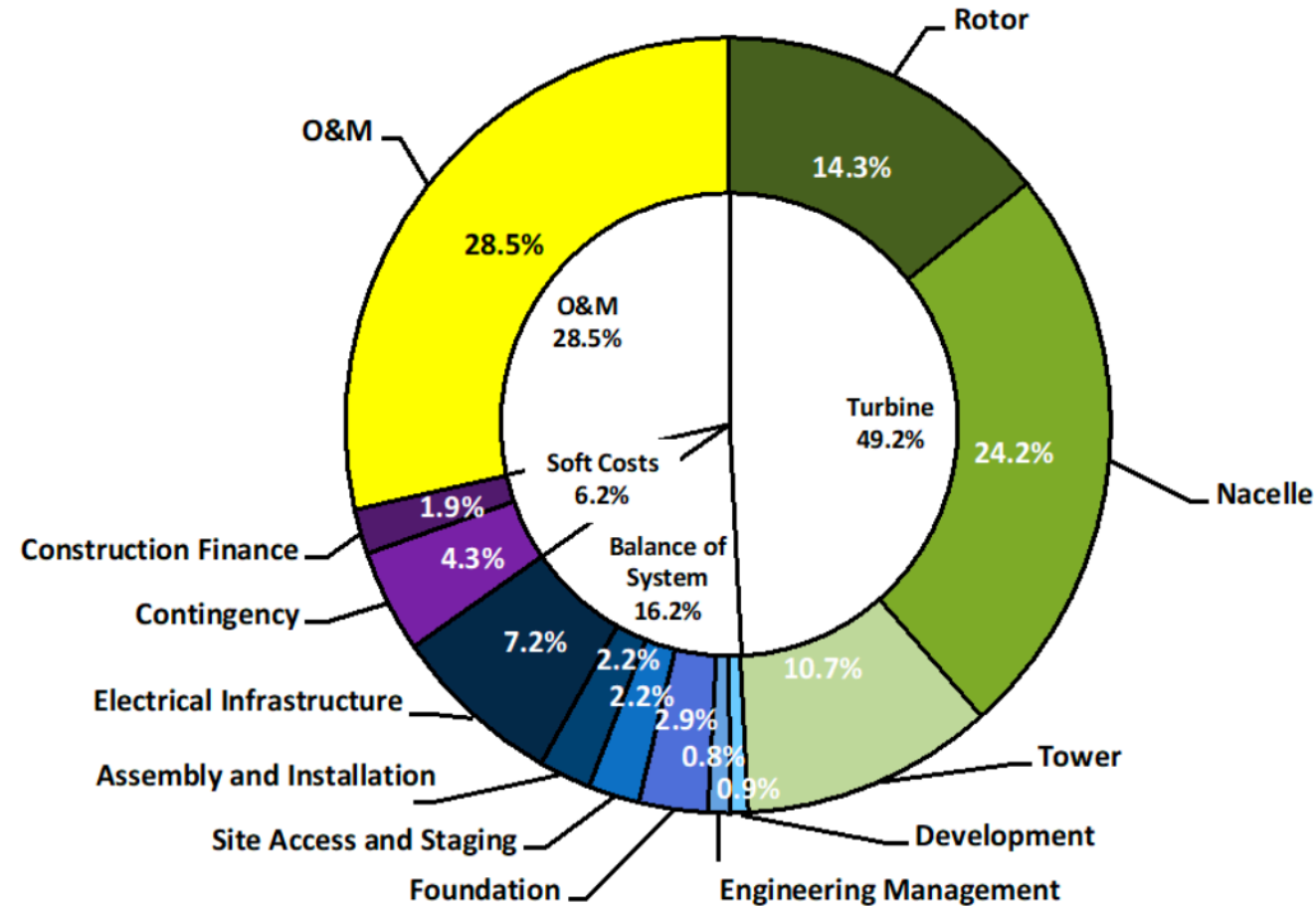
- Conduct only conceptual design & rough order of magnitude (ROM) cost estimates
- Determine need for either developmental or proven technology
- Analyze fuel and resource risks
- Review labor availability and risk
- Check availability of utilities (water, power, communications)
- Conduct high level analysis of site access, and subsurface conditions
- Review resiliency - Potential flood and adverse weather risk issues

## Wind Case Study – Key Viability Questions:

- What is the potential of wind speeds and quantity?
- What are the closest transmission line connection?
- What are the issues in acquiring the property right of way/easements?
- What are the transportation infrastructure conditions?
- What is the estimated price per kwh to be collected?



# Wind energy project elements to be considered



**Figure ES1. Component-level LCOE contribution for the 2018 land-based wind reference project**

Note: O&M represents operation and maintenance







## 2018 Cost of Wind Energy Review

Tyler Stehly and Philipp Beiter

National Renewable Energy Laboratory

Pre-feasibility can utilize general costs estimates from industry trends

**Table ES1. Summary of the Land-Based Reference Project using 2.4-megawatt (MW) Wind Turbines**

	2.4-MW Land-Based Turbine (\$/kilowatt [kW])	2.4-MW Land-Based Turbine (\$/megawatt-hour [MWh])
Turbine capital cost	1,011	20.8
Balance of system	332	6.8
Financial costs	127	2.6
CapEx	<b>1,470</b>	<b>30.3</b>
Operational expenditures (OpEx) (\$/kW/year [yr])	<b>44</b>	<b>12.1</b>
Fixed charge rate (real) [%]	7.5%	
Net annual energy production (MWh/MW/yr)	3,648	
Net capacity factor (%)	41.5%	
<b>TOTAL LCOE (\$/MWh)</b>	<b>42</b>	





# Feasibility studies will create greater confidence and attract more sophisticated developers and contractors

- Conduct schematic/preliminary design and preliminary cost estimates
- More detailed analysis of fuel risks, availability, price quality, escalation
- Review labor availability, risk of strikes, use of foreign labor
- Review availability of utilities water, power and communications
- Conduct more detailed analysis of site access, subsurface conditions
- Analysis of potential for flood and other adverse weather risk issues

## Wind Case Study - Key Technical Questions:

- What wind conditions can be reliably measured over a year or more?
- Can power transmission connections to grid connection be secured?
- What are the likely technology choices for the wind turbines and structures?
- What are the key risks regarding, site conditions, access and force majeure?

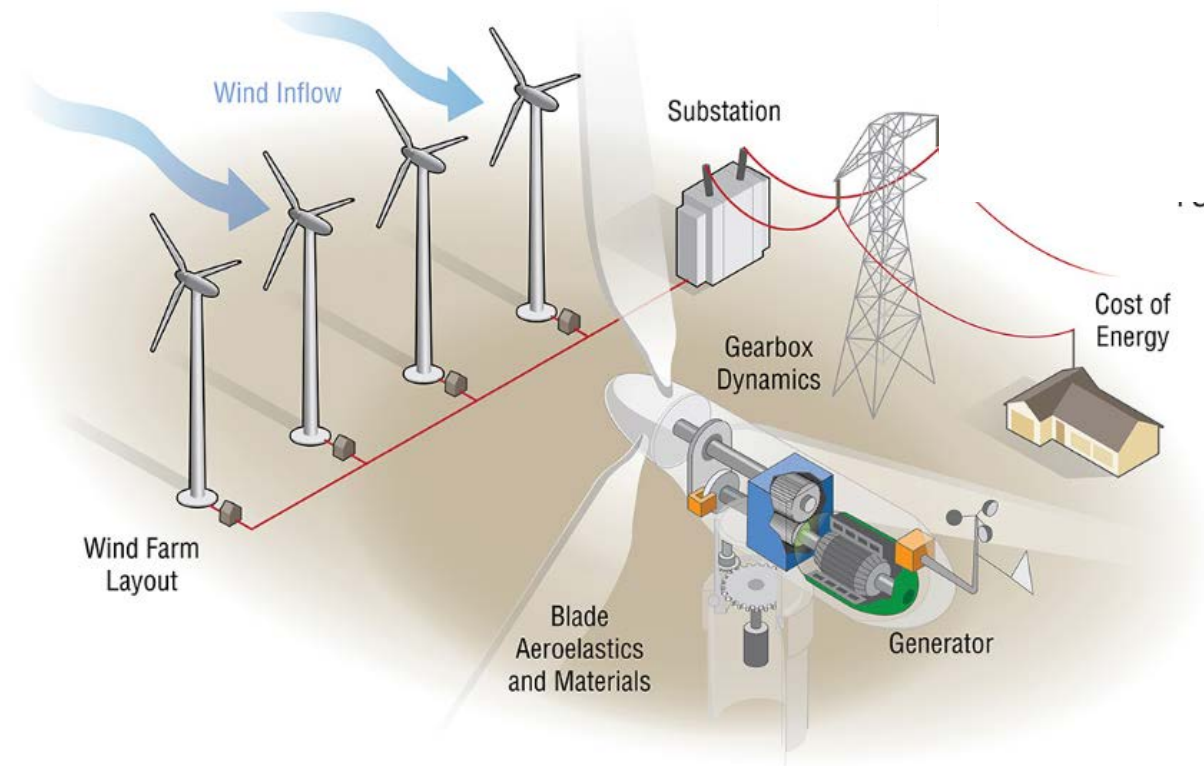


Critical to feasibility is evaluating the potential of wind energy source and grid capability

- Usually sites are screened based a wind atlas and validated with on-site wind measurements via long term or permanent meteorological-tower data
- Collection of site-specific data for wind speed and direction is crucial to determining site potential in order to finance the project.
- Local winds are often monitored for a year or more, detailed wind maps are constructed, along with rigorous grid capability studies.



# Feasibility requires a bottoms-up preliminary engineering estimate



*Simplified schematic of a Wind Turbine Generator. Illustration by Alfred Hicks, NREL*



At the pre-feasibility stage, the focus is on affordability of the project

- Identify funding sources, which can include user-fees, tax/budget revenue, MDB lending, gas taxes, payments utilities, etc.
- Compare cost and funding profiles over time to identify gaps in funding and then identify financing options meet those gaps
- Objective is to understand the affordability and begin securing funding sources
- Evaluated rough-order-of-magnitude estimate with potential funding sources

#### Wind Case Study – Key Funding Questions:

- What are the potential funding sources for the project?
- How much can the users afford to pay for electricity?
- What is the estimated level of government contribution?
- Does the funding profile match the project cost profile?
- What financing sources are available to match funding with costs?



The objective is to establish a comprehensive funding and financing plan to develop the project

- Develop financial model
- Refine funding source estimates
- Assess financing options and terms
- Engage investors (MDBs, DFIs, private investors) to assess interest in providing financing
- Begin budgeting cycle with Ministry/Department of Finance

Wind Case Study – Key Funding Questions:

- What is the cost to customers? If the costs are not affordable, how much is the subsidy required?
- Is the utility creditworthy counterpart to attract financing? Does the project need a government or guarantee?
- What are the terms of financing for the project? Does it make the project affordable?
- Are investors interested in the project?
- What is the process and timing to access government contribution?

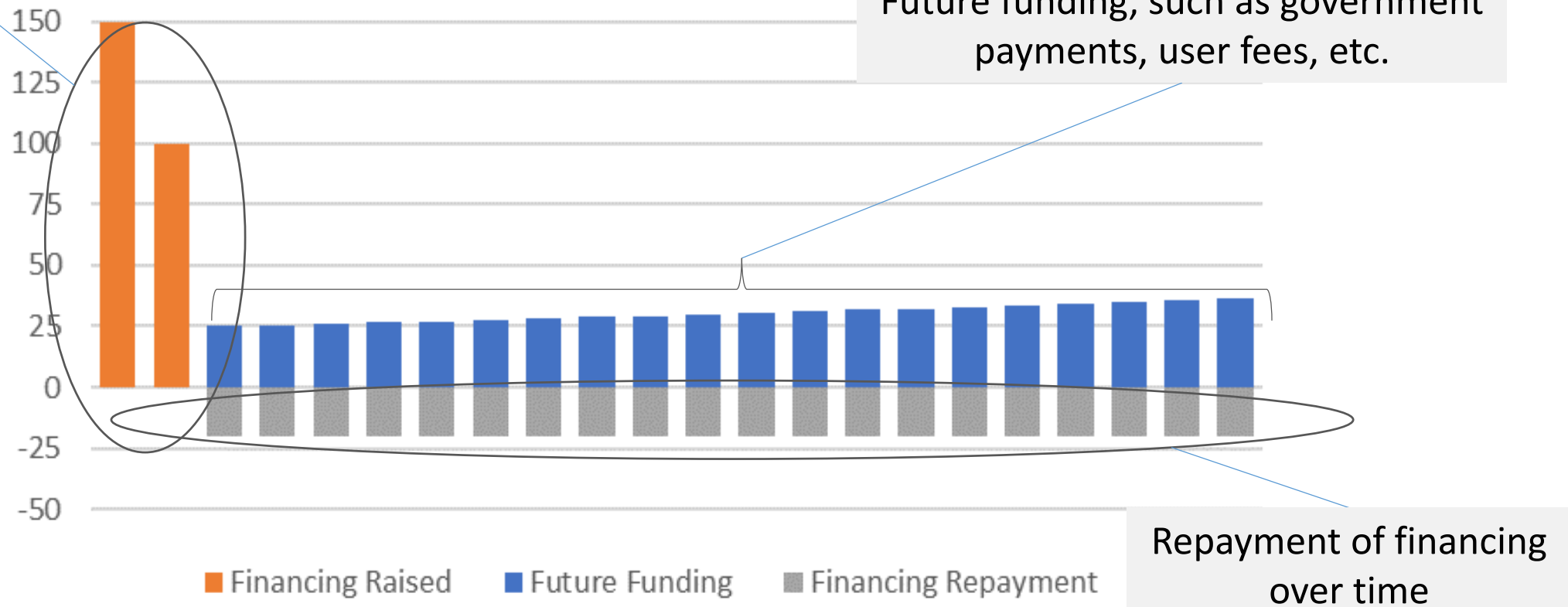




# Financing is raised upfront and repaid with future funding streams

Financing raised upfront  
based on future funding

## Funding vs. Financing



The key difference between funding and financing is that financing will need to be paid back with funding

### Core Funding Sources

- User-Fees (tolls, utility payments, etc.)
- Government Budget
- Special Funds (road funds, etc.)
- Development Grants

### Ancillary Funding Sources

- Property Development
- Right-of-Way Leasing
- Land Sale
- Tax Credits

### Development Financing

- Multilateral Development Banks
- Bi-Lateral DFIs
- National Development Banks

### Private Financing

- Capital Markets
- Investment Banks
- Institutional Investors
- Insurance
- Private Equity



# Identify key barriers to project approach early in the process

- General review of **enabling legislation** and any restrictions for procurement method
- Evaluation of **Court System** and Dispute Resolution Mechanisms
- Explore any Restrictive Zoning and **Land Use Laws**
- High level review of **Force Majeure** risks (strikes, delays in transportation, warfare, terrorism, ect.)
- **Fatal flaw analysis** of regulatory and governmental (change in regime, taxes, environmental, currency fluctuations, expropriations risk)

## Wind Case Study – Key Legal Questions:

- What are the **eminent domain powers** for needed land rights?
- What is the **current law** with respect to public private partnerships?
- What are the laws regarding **labor and transportation**?
- Is there any danger regarding the governments rights to **expropriations**?
- What is the acceptance of **international arbitration** for commercial disputes?





# Enabling Legislation and Regulations

- Key to choosing delivery approach
- Is there flexibility in procurement laws
- “Best Value Procurement” is critical - price and other factors
- Rules for transparency and fairness
- Anti corruption laws and practice



# The right legal and regulatory framework will allow the project to be successful

- Analyze any required amendments to enabling legislation for procurement method, financing, eminent domain, etc.
- Determine preferred court system, choice of law and dispute resolution mechanisms
- Evaluate need and likelihood of changes to Zoning and Land Use Laws
- Deeper analysis Force Majeure risks (strikes, delays in transportation, warfare, terrorism, etc.)
- Evaluate regulatory and governmental (change in regime, taxes, environmental)
- Evaluate currency risk/fluctuations, and expropriations risks

## Wind Case Study – Key Legal Questions:

- Do the laws allow a long-term power purchase agreement?
- Is the government likely to change regimes before a contract is firmly in place?
- What is the situation in the country in terms of sabotage, terrorism, theft?
- What are the applicable taxing regimes, likelihood of changes?
- What are currency exchange rates and stability?



## Early determination of potential red flags to a project can allow for the government to mitigation strategies

- Identify red flags or fatal flaws that might present significant roadblocks for project development, or become costly to resolve
- Consider whether the project impacts sensitive environmental habitats, whether designated or not
- Consider whether the project impacts cultural or disputed lands or lands used for settlement or productive activity

### Wind Case Study – Key E&S Questions:

- Are there any Important Bird Areas (IBAs) near the anticipated project site, or is it on a known migratory path of any endangered species?
- Are there any standing conflicts over the land; is the land traditionally held by indigenous peoples?
- Are there significant settlements in the area that would need to be moved out of the safety buffer/shadow flicker area?



# Government needs a strategy to address E&S that may prevent international investors

- Review environmental and social requirements, and the need for an environmental and social impact assessment (ESIA)
- For international financing, governments should consider aligning the ESIA and management plans with the World Bank Environmental and Social Framework (ESF), IFC Performance Standards, or equivalent

## Wind Case Study – Key E&S Questions:

- What are key E&S impacts that will be of concern with potential lenders?
- What are the local/national regulations for permitting, land acquisition, and resettlement?
- What early assessments or evaluation can the government undertake to mitigate risk for future investors?



# Incorporating E&S considerations into design can help to reduce future actions to address E&S concerns

- Establish criteria for design optimization according to the E&S mitigation hierarchy (avoid | minimize | compensate/offset)
- Consider similar E&S aspects of associated facilities (e.g. transmission lines, substations, access roads, etc.), irrespective of the source of financing, as these might impact project feasibility

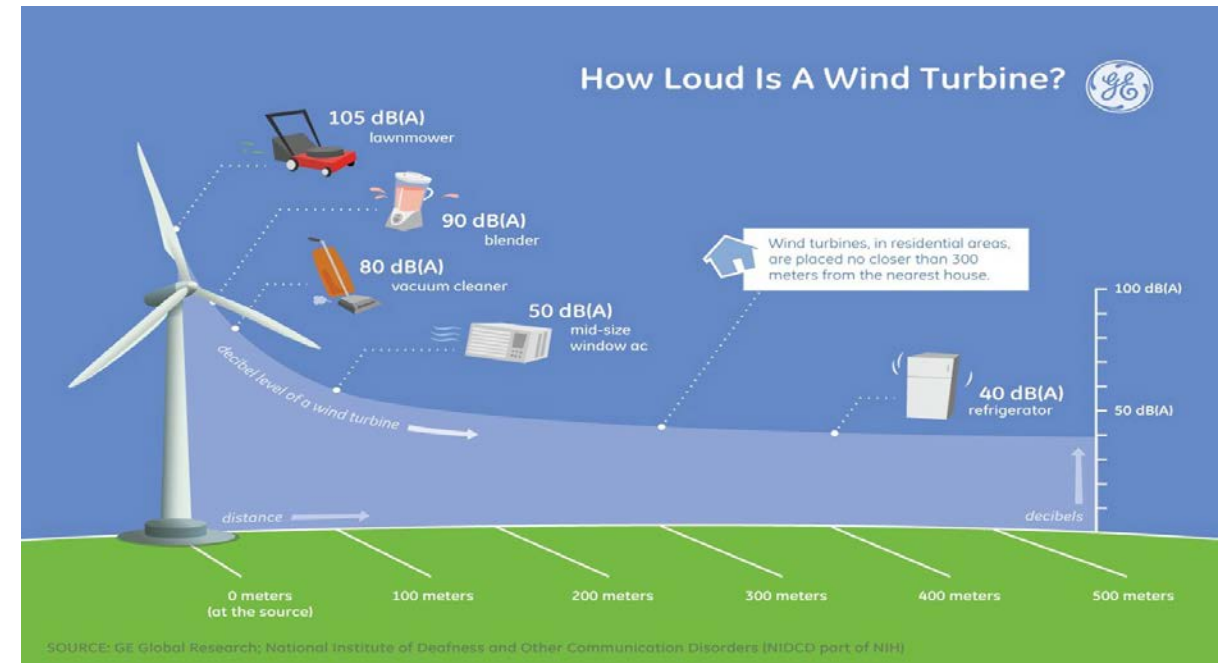
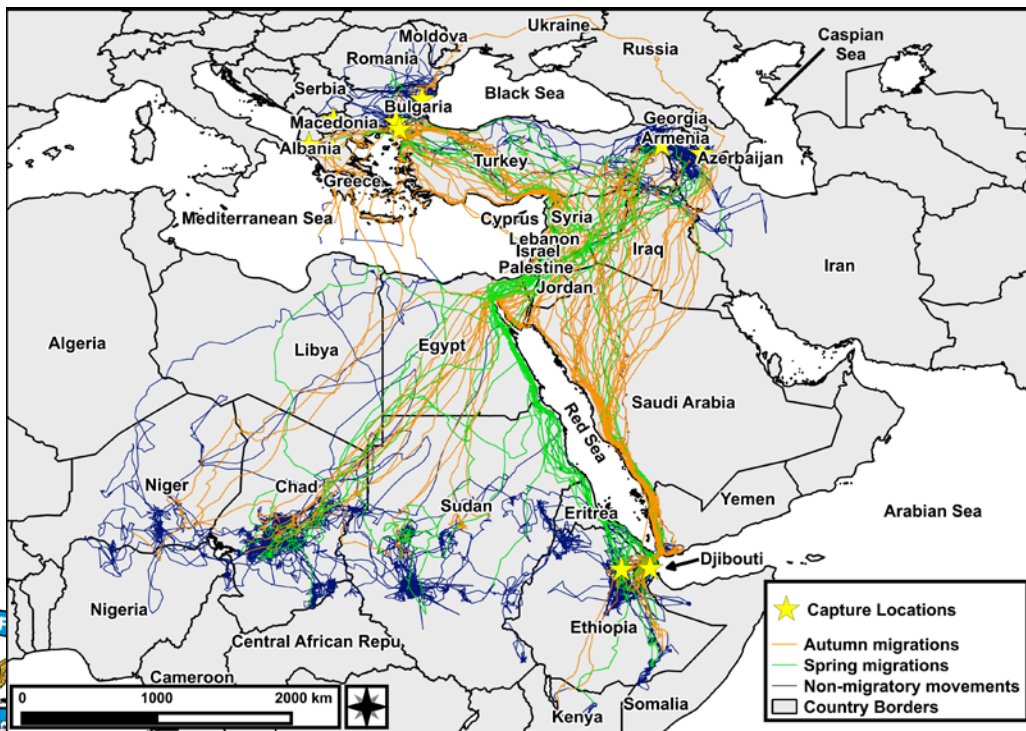
## Wind Case Study – Key E&S Questions:

- Are there designs to avoid bird strikes (such as height or bird deterrent devices)?
- Has stakeholder engagement taken place with local communities to introduce them to the project and its potential E&S impacts and management measures?
- Has a biodiversity survey been undertaken to understand specific flora and fauna that might be impacted and what measures might be required to compensate or offset for impacts?



Environmental and social impacts is key to project feasibility, particularly as it can be costly and reduce appetite for investors

Bird strikes and bird migration corridors can cause significant environmental impacts for wind energy projects



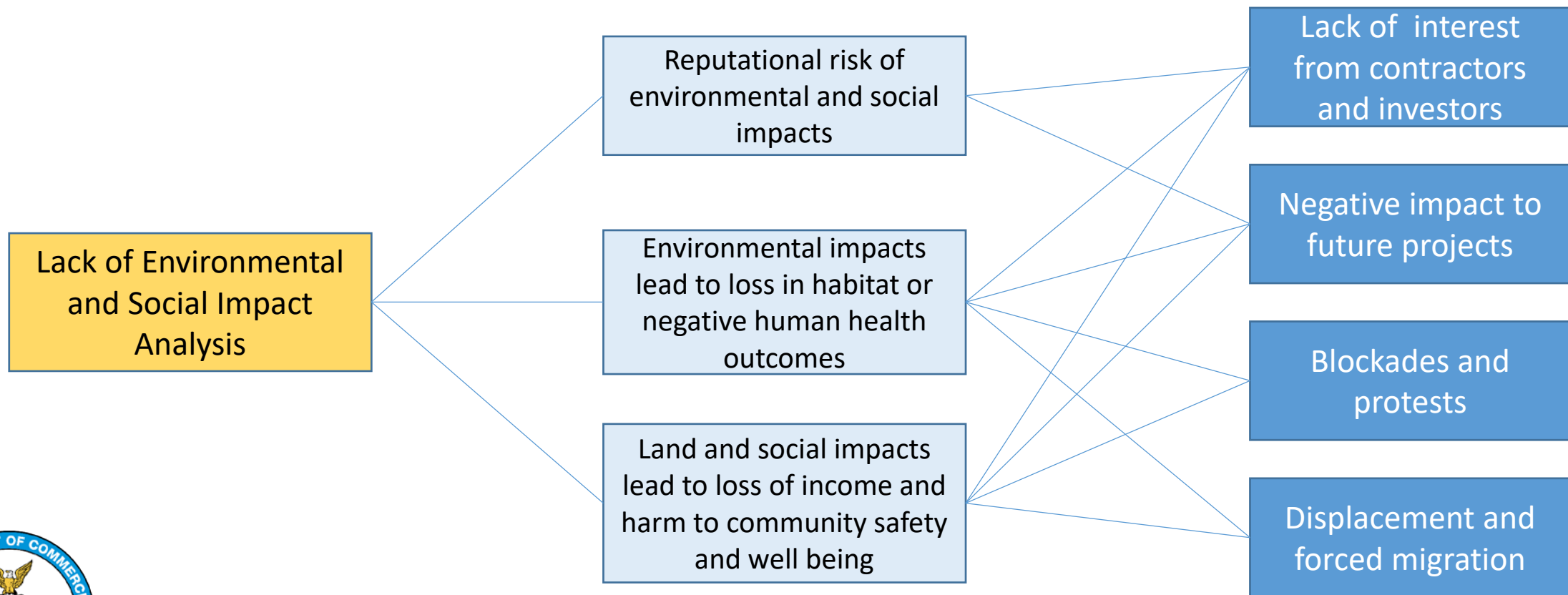
Wind projects can have noise impacts for nearby residents and requires large areas of land



E&S considerations are not only for lenders but can cause a chain of events that impact the project and future projects

E&S Impacts

Project and Broader Impacts



Evaluate delivery models that provide the optimal level of risk transfer to the private sector and project viability

- Anticipate public sector goals - financing, reliability, sustainability, security, and schedule needs
- Review different delivery approaches along with existing or required enabling legislation
- Preliminary review of public sector capabilities technical, legal and financial resources and capabilities

#### Wind Case Study – Key Commercial Questions:

- What is the government's typical procurement model?
- What are alternative methods that it should explore (PPP?)
- What is the key risks of the project, and which risks should be retained and which should be transferred?
- Does the Government understand its responsibilities and risks?





Engaging contractors and investors is key to determining appropriate commercial terms and delivery models

- Explore level of private sector interest and ability to innovate
- Determine private sector's willingness to assume risk
- Establish likelihood of competitive interest from industry
- Determine preferred alternative methods of delivery

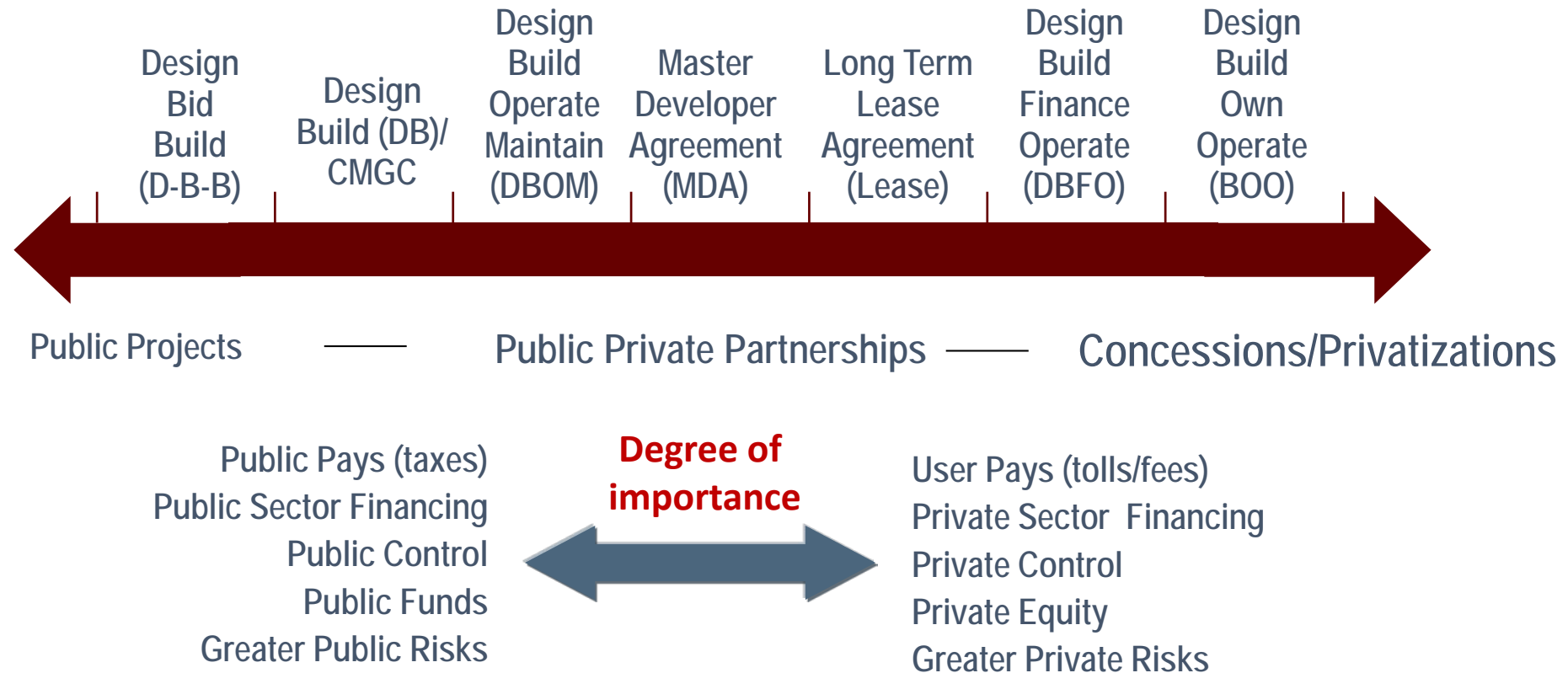
Wind Case Study – Key Commercial Questions:

- What is the interest of private sector in the projects?
- What risks are of key concern with contractors and investors?
  - For example, is the government or utility a creditworthy and capable counterpart?
- What are key commercial terms, such as payment, design, construction, operation/maintenance risk?



# Project Delivery Continuum

## *Analysis of Alternatives*



The appropriate delivery model will meet both government and private sector objectives

- Review preferred delivery approaches along with existing or required enabling legislation
- Select preferred alternative procurement/delivery approaches
- Conduct industry sounding review and gather input from private sector
- Establish competitive interest from industry for preferred alternatives approaches

#### Wind Case Study – Key Delivery Questions:

- What delivery method will be best suited for industry and the Government?
- Is the Government willing to pay for the right advisors?
- Can the project stand on its own financing through power purchase agreement?
- Can the international arbitration mechanism be incorporated?



# Government should bring on advisors that are experts in each key area of the feasibility analysis

## **Financial and Commercial Advisors**

- Can evaluate funding and financing options
- Determine affordability
- Evaluates delivery models and risks

## **Technical Advisors**

- Develops technical solutions and cost estimates
- Develops project schedule
- Analyzed needs/demand assessment (e.g., traffic studies)

## **Environmental and Social Advisors**

- Assess E&S risks of a project
- Develops impact assessments
- Creates mitigation strategies

## **Legal and Regulatory Advisors**

- Reviews legal and regulatory barriers for the project
- Identifies strategy for legal and regulatory approvals/changes for implementation
- Drafts contract documents



# Governments can consider funding from multilateral and bilateral development agencies for feasibility analysis

- Pre-feasibility studies can cost between US\$50 to US\$150 thousand for international advisors
- Feasibility studies can range from US\$250 to \$750 thousand depending on the complexity of the project

## Select Funding Options for Feasibility Analysis



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Asian Development Bank



Energy Sector Management Assistance Program



**PPIAF**  
Enabling Infrastructure Investment



# Key Issues in Evaluating Feasibility Studies

## Assumptions

- Do assumptions align with reality of the current situation? Do assumptions require a change to the current situation?
- Have the assumptions been validated by private sector or other stakeholders?

## Outputs

- Do outputs make sense?
- How do outputs compare against benchmark project? Do any of the outputs stand out?
- What are the actions or next steps for the government?

## Key Risks

- What are the key risks in the project viability?
- Are the assumptions realistic and do they require changes to current situation?
- How are the outputs impacted by sensitivity analysis?

## Aligns with Objectives

- Do the outputs and recommendations of the feasibility analysis align with government objectives?
- Does the project meet objectives of the private sector? Have the expressed interest in the project?

## Options

- Has the feasibility analysis considered all the options available to the government?
- Have any options been excluded without detailed qualitative or quantitative analysis? If so, why?



# Thank You!



**Mike Tran and Chris Kane**





# Upcoming Webinars

## **PPP Business Case Development**

The PPP process requires a significant amount of time and resources. To ensure that those resources are well spent, it is important to ensure that PPPs have the requisite business case and make financial sense in order to move forward. In this webinar, we will learn about how to structure the business case for a PPP.

## **PPP Pre-Qualification and Evaluation**

The PPP process requires a significant amount of time and resources. To ensure that those resources are well spent, it is important to have well established pre-qualification and evaluation procedures for the RfP process. Governments often run into difficulties in the pre-qualification and evaluation phase. This webinar will walk participants through how to design the evaluation process to ensure the best bid is selected.

## **Unsolicited Proposals**

Unsolicited proposals when used properly are a way for the private sector to propose innovative solutions to problems. The webinar would provide an overview of how to implement procedures at the agency level, prioritizing or limiting the types of proposals received, confidentiality policies, transparent evaluation procedures, and fair reimbursement of costs for an accepted proposal.







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# Pre-Feasibility and Feasibility Studies Section Considerations

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# Objective and Agenda

To provide detailed pre-feasibility and feasibility considerations for the following sectors:

- Power Transmission
- Transit
- Roads
- Water and Wastewater

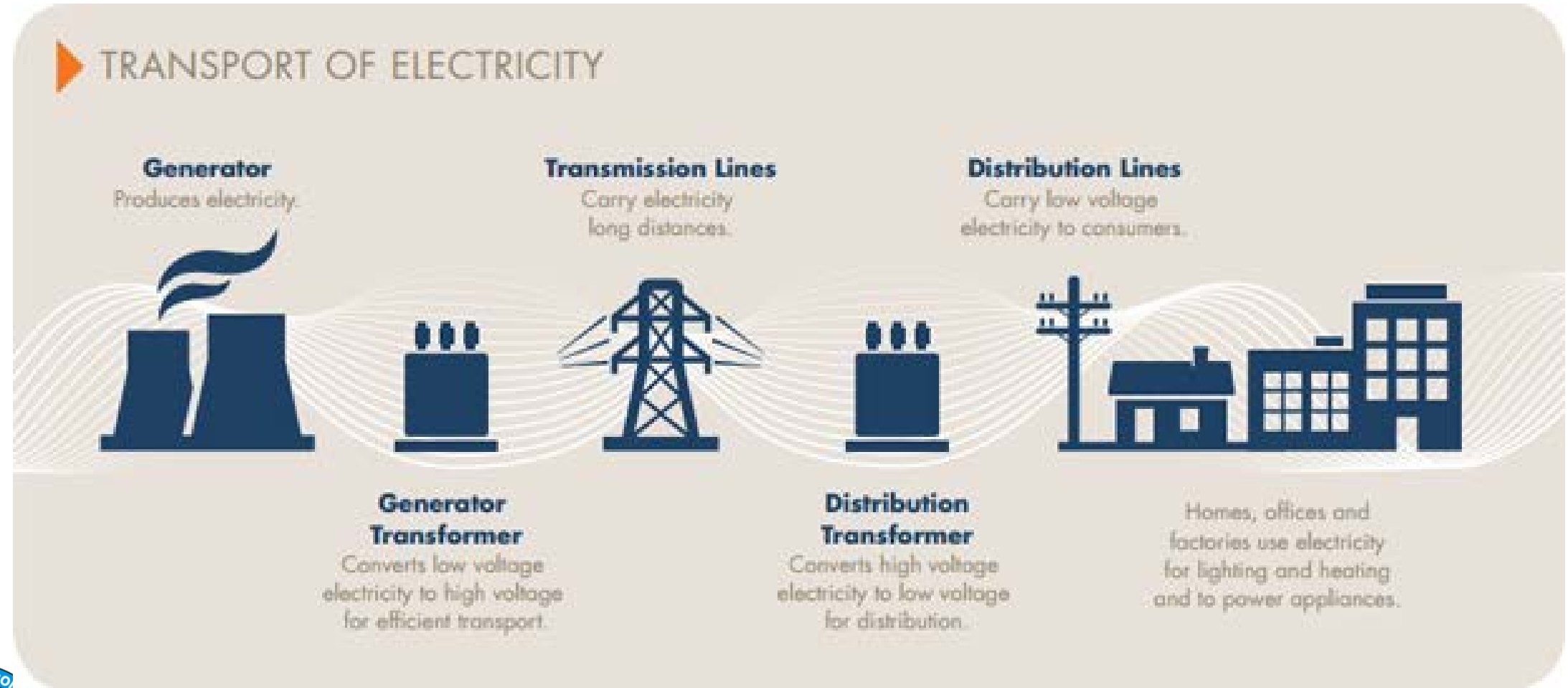


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# Overview of the Power Sector





# Dynamics of the Power Transmission

- Power Transmission plays a critical role between generators and distribution. PPP transmission projects requires certainty on sector regulation
  - Power transmission is typically planned and highly regulated. Power transmission projects can include new transmission (connecting renewable energy resources to demand centers) or upgrade transmission (to keep up with more demand or generation)
  - Governments can incentivize private investment in power transmission through creating revenue for transmission (wheeling charges) or directly through PPPs



# Power Transmission – distance, load, voltage, ROW, and reliability are key to technical feasibility

- Government or grid operator should demonstrate the need for new or upgraded transmission before beginning feasibility studies – Sector planning is essential to map out generation and demand centers
- Timing of transmission is important to match when new generation is expected to come online
- Technical analysis should include load forecasting and load flow analysis to determine technical requirements of transmission
- Route analysis will help determine the most feasible route for connection

## Power Transmission – Key Viability Questions:

- What the distance and voltage requirement? What are the expected losses?
- What is the most feasible route? How does the line improve reliability of the grid?
- Are there issues in acquiring the right-of-way? What is the expected cost and timing of acquisition?
- When is the transmission line required? What is the expected cost?



# Power Transmission – Cost Estimates

- The graphic is an example of the level of detail of cost estimates at the feasibility stage
- Pre-feasibility and feasibility estimates would fall into the Class 3-5 estimates
- Costs include right-of-way, structures and foundations, wire and conductor, equipment, and protection/fencing

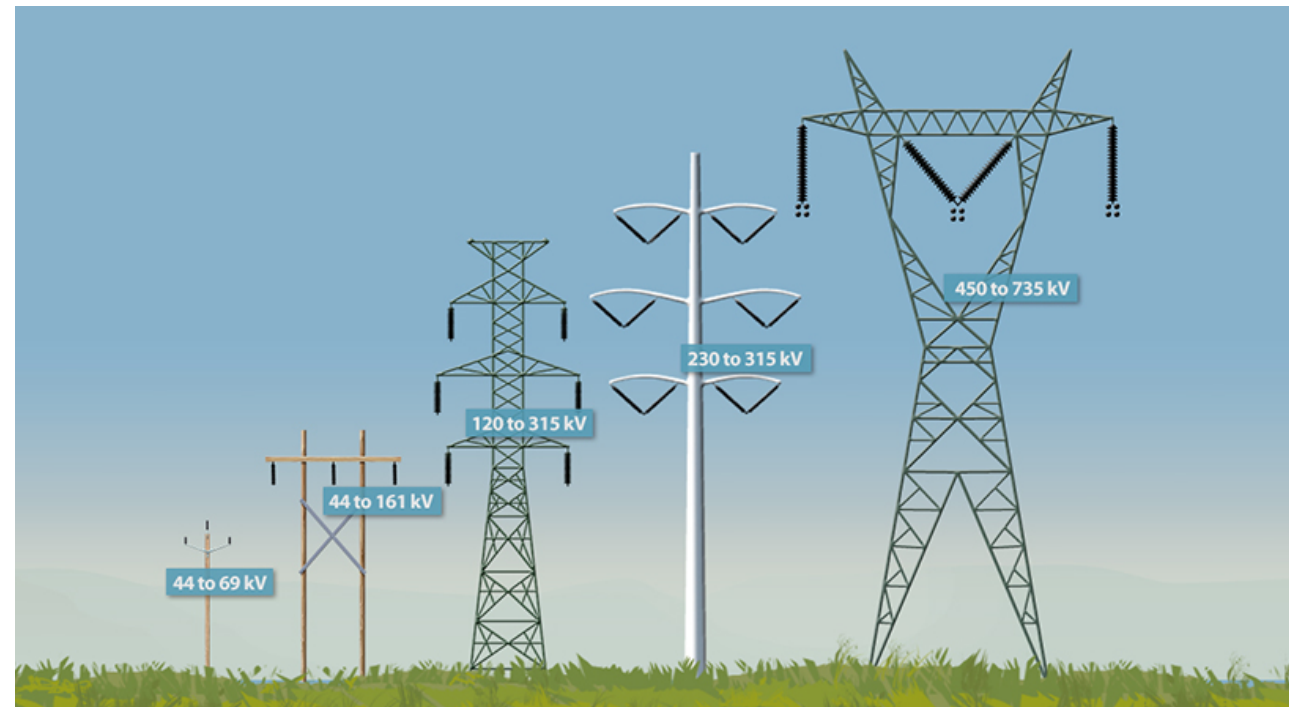
ESTIMATE CLASS	Primary Characteristic	Secondary Characteristic		
	MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES Expressed as % of complete definition	END USAGE Typical purpose of estimate	METHODOLOGY Typical estimating method	EXPECTED ACCURACY RANGE Typical variation in low and high ranges <sup>[a]</sup>
Class 5	0% to 2%	Concept screening	Capacity factored, parametric models, judgment, or analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Equipment factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -15% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%

Notes: [a] The state of process technology, availability of applicable reference cost data, and many other risks affect the range markedly. The +/- value represents typical percentage variation of actual costs from the cost estimate after application of contingency (typically at a 50% level of confidence) for given scope.



# Power Transmission - Voltage

- Correct sizing of the system depends on the distance and demand/supply of power (load)
- Emerging Technology: High-voltage direct current (HVDC) lines are an alternative that has lower losses over long distances. These are typical more expensive upfront but reduction in losses compensate over time.



# Power Transmission – funding is typically through ratepayers but requires a creditworthy counterparty to raise financing

- Power transmission is typically paid through rate base (customers) over time and returns are likely subject to regulation
- PPPs in power transmission can be through an “availability payment” structure, in which utility or government pays for capacity. The developer is not subject to demand/use of the transmission line
- PPPs can sometimes shift demand risk if demand is proven and stable – payment through “wheeling charges”

## Power Transmission – Key Funding Questions:

- Can the cost of transmission be passed to customers? If not, government subsidies may be required.
- Is the utility a creditworthy counterparty? Is a guarantee required from government?
- Will government assist with right-of-way acquisition costs?
- How will the developer/concessionaire be compensated?



## Power Transmission – Sector regulation will determine contractual relation with generators and distribution

- The regulation of the power sector will define the type of PPP. Sector regulation can include vertically integrated, wholesale markets, liberalization of distribution
- Recently, market has focused on liability issues around transmission lines as they have led to wildfires

### Power Transmission – Key Legal Questions:

- Is there clear and stable regulation for the sector that allows for private investment?
- Is there an independent grid operator that provides technical planning?





## Power Transmission – right-of-way and risks of sparking create the most significant E&S risks

- Transmission lines require significant right-of-way and buffer from development (e.g., risk of sparking)
- Right-of-way issues are particularly sensitive when connecting renewable energy generation that may be in culturally or environmentally sensitive areas (e.g., bird areas)
- Scope of E&S will also need to include access roads and substations connected to the transmission line
- E&S risks may be mitigated through planning and routing

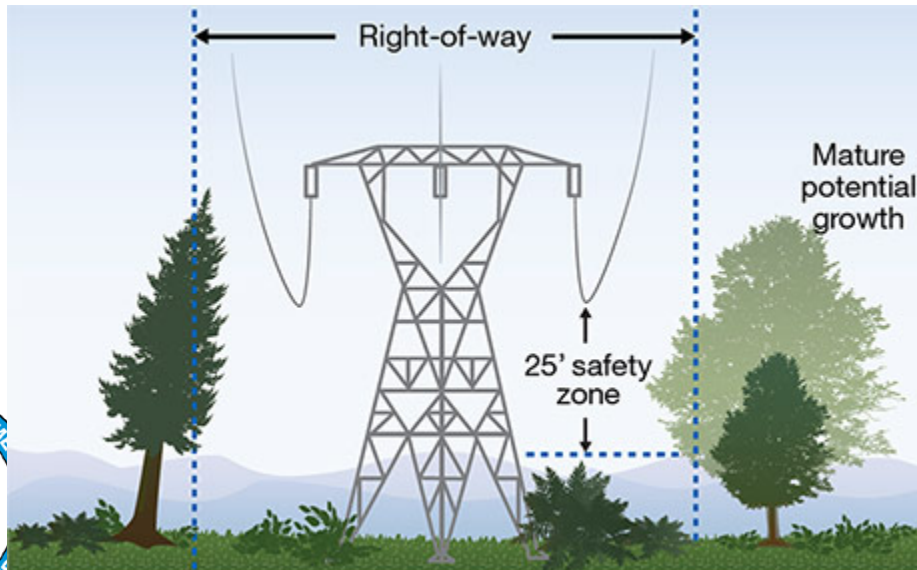
### Power Transmission – Key E&S Questions:

- How many households are along the right-of-way and will it impact their livelihood?
- What is the risk of fire or other hazards in the area (e.g., risk of wildfire)?
- Does the transmission line go through any environmentally sensitive areas? Can these areas be accessed during construction and maintenance?



# Power Transmission – government and concessionaire should work to address risks during maintenance period

- It is important for the concessionaire to prevent development near the transmission line and also clear brush in the ROW to prevent arcing that can lead to fires



Power Transmission – transmission is not as common for PPPs, so transaction structure will have to be tailored for the project

- Government or grid operator should consider the objective of the project, such as reliability, bring in new generation, or to sell excess power to another market
- Government should also assess which risks it should retain and transfer (right-of-way acquisition, demand, etc.) to determine the most efficient allocation
- Market interest and sounding can also help to structure a transaction structure that is palatable to investors

Power Transmission – Key Commercial Questions:

- Who will be the counterparty to the transaction (utility, grid operator, ministry)?
- What risks is appropriate to transfer to private sector (typically, design, construction, maintenance, and financing)?
- Are there upcoming changes to regulation that may impact the developer? How does the regulator manage stranded assets?



# TRANSIT – Choice Among Alternative Systems



Streetcars



Light Rail Transit  
Heavy Rail



High Speed Rail



Bus Rapid Transit



Commuter Rail





# Major Components of Transit Systems

- Rail Transit Cars
- Track and Guideway
- Maintenance Facilities
- Stations and Access
- Park and Ride Facilities
- Power Distribution Systems
- Systems and Controls

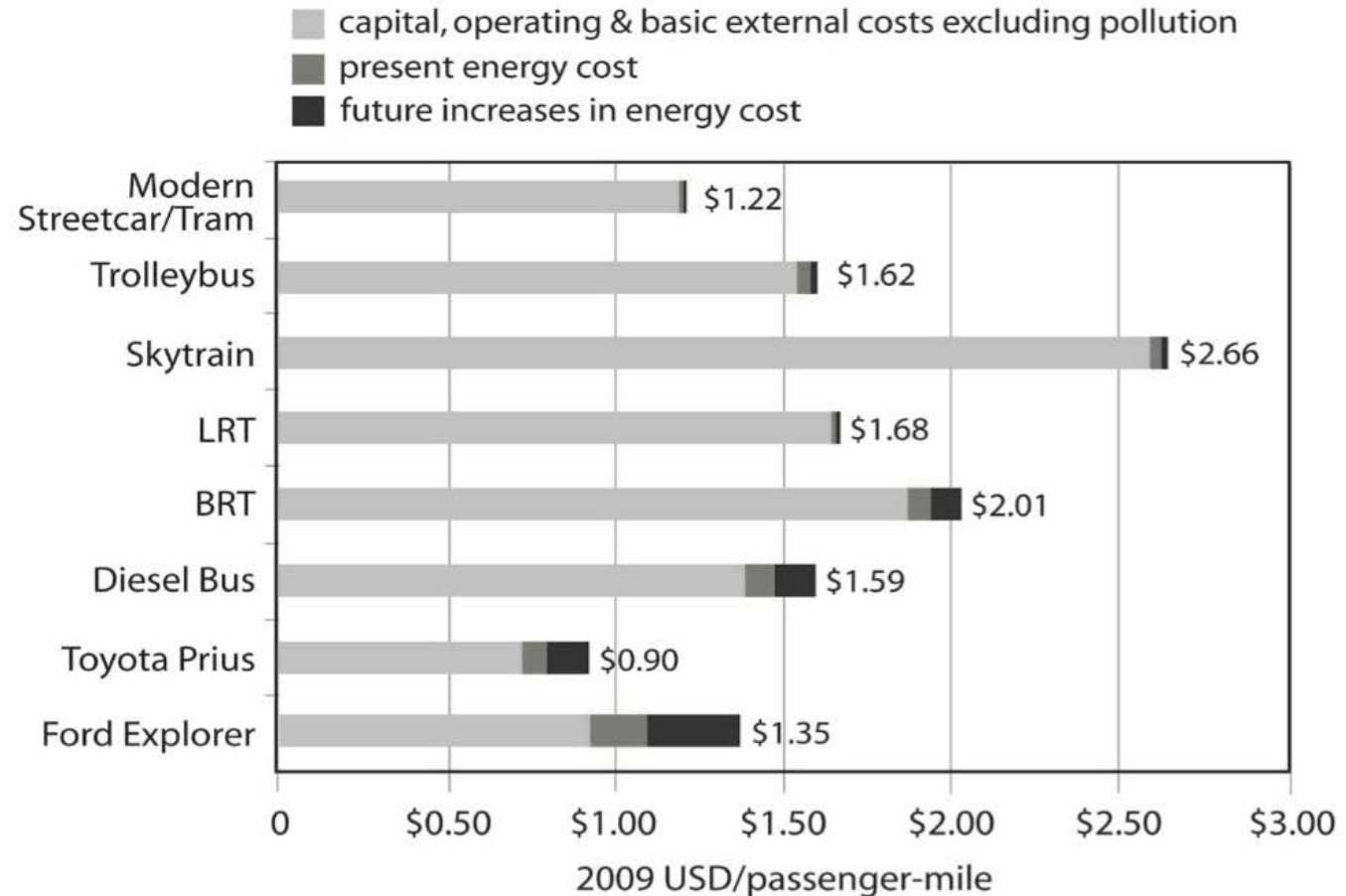


# Transit– Preliminary Cost Estimates

- Estimating costs
- Contingencies based on utilities and ROW
- Traffic control
- Positive train controls
- Operating and maintenance

Note: Chart is from “A Cost Comparison of Modes”, 2008 by Patrick Condon, UBC, Vancouver BC

**Total Costs per Passenger-Mile (basic external costs excluding pollution)**



# Transit - Shared Use with Freight, Safety and Scheduling





# Transit – Technical Challenges



- Amount of ROW, property acquisitions & utilities relocations
- Type of transit vehicle system and power source
- Overhead catenary, electric battery or fossil fuels
- Fare collection systems



# Transit – Funding Needs More Than Fares

## Core Revenue Sources

- ◆ Farebox
- ◆ Taxes (Property, Sales, etc.)
- ◆ Special Assessments (TIF, etc.)
- ◆ State Transit Funding
- ◆ State Low Carbon Funding
- ◆ Federal Grants

## Ancillary Revenue Sources

- ◆ Parking Revenues
- ◆ Advertising
- ◆ Telecoms/Fiber
- ◆ TOD/Ground  
Lease/Development Rights
- ◆ Cost Savings and Efficiencies

## Capital Markets

- ◆ Municipal Bonds and Commercial Paper

## Federal Financing

- ◆ Federal Financing Programs (RRIF and TIFIA)

## Innovative Financing

### ◆ P3 Financing

- ◆ PABs
- ◆ Equity

### ◆ Equipment Financing and Lease

### ◆ Master Developer Arrangement/Blended Financing

### ◆ Private Placement

### ◆ Crowd Funding



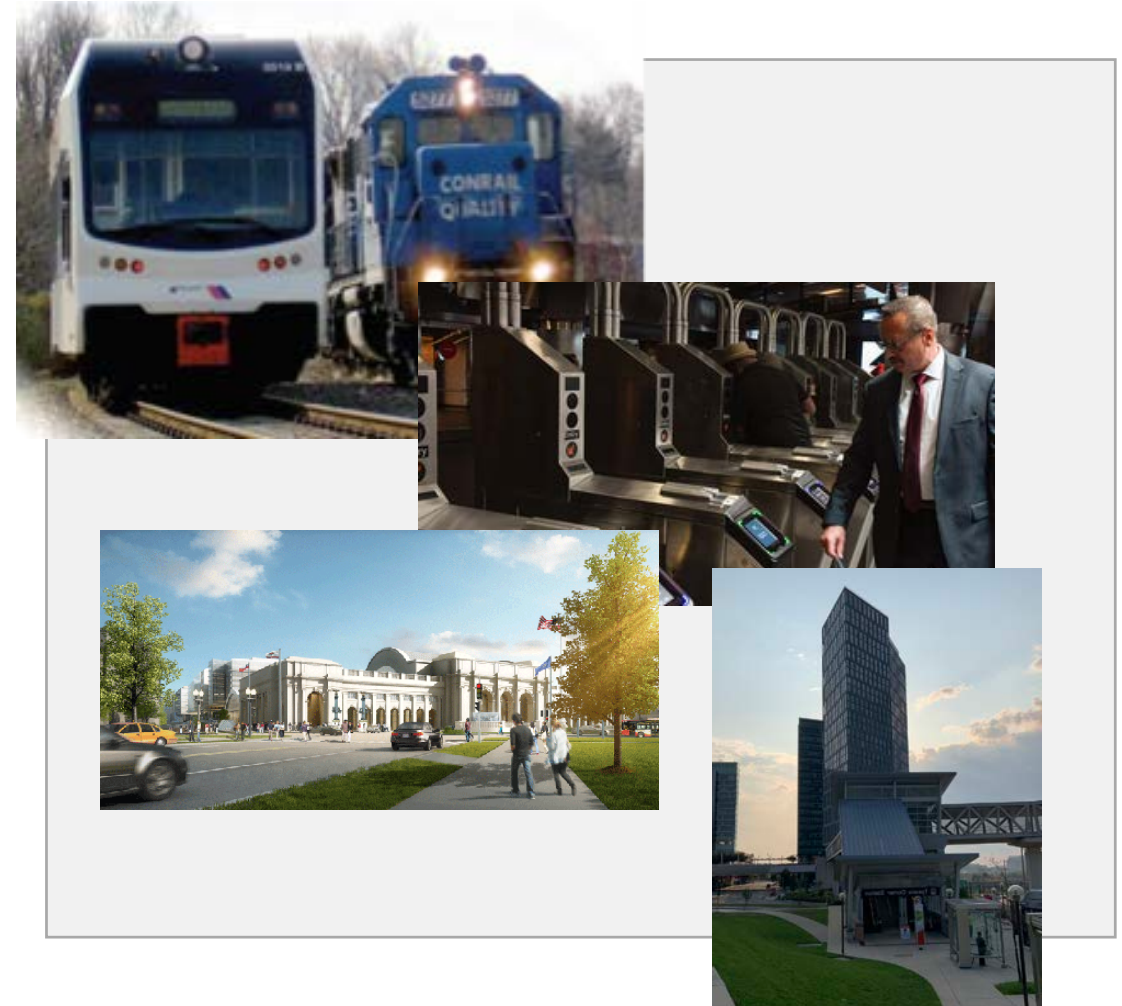
## Conduct Value Capture *Study* – ( *example 120k=pop.*)

- New streetcar project 3 miles, \$150 million
- Strategic economic development study took 6 months and cost \$50k
- Transit impact showed \$12.7 million/yr. additional tax revenues by 2020
- This will cover \$3-4 million/yr for O&M and debt capacity over 30 yrs \$100 mil.



# Transit Public Policy Considerations

- Shared Access and PTC
- System safety and security
- Standards for operations, fare collection/evasion
- Favorable zoning and land use practices to support TOD
- Stakeholder Collaboration Key
- Tax Increment Financing and Transportation Improvement Districts

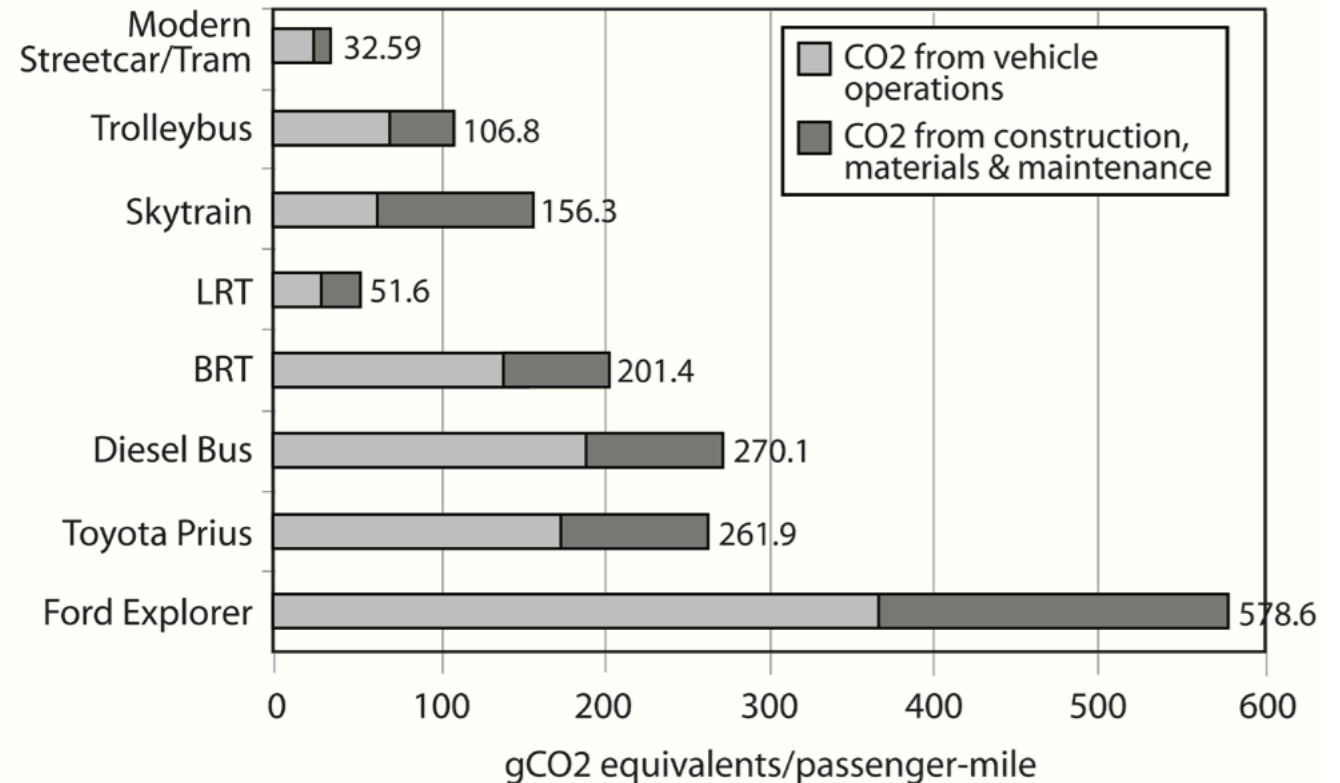


# Transit – Evaluation of Environmental & Social Benefits

- Benefit calculation for climate change
- Environmental justice issues
- Gentrification around stations
- Rights of low income users
- Fuel and power source issues

Note: Chart is from “A Cost Comparison of Modes”, 2008  
by Patrick Condon, UBC, Vancouver BC

Life Cycle Carbon Emissions per Passenger-Mile





# Transit - Evaluation of Project Delivery Systems

- Design-Build Operate
- Design-Build Finance Operate
- Bifurcate Design-Build from O&M



# Overview of the Road Sector

- Transportation has many facets, including roads, transit, pedestrian and biking
- The road sector is a critical component of the transportation network but should be considered as part of broader planning efforts





## Roads – right-of-way and expected traffic should determine the service levels of the road

- Traffic studies and transportation modes will help to define the requirements of the road and how it connects to the remaining network
- Key aspects of the road is upfront design and construction costs and then maintenance costs over time. Roads are expected to have several major maintenance events
- Considerations should also be made for alternative uses for the road that meet public policy objectives, such as bus rapid transit, high-occupancy vehicle lanes, bike and pedestrian paths, and other uses

### Roads – Key Viability Questions:

- What population centers and travel patterns is the road supporting? What are the key access points for the road?
- What is the expected level of service of this road?
- What is the forecasted traffic, origin and destination, and time of day? How can the road be optimized to serve those needs?



## Roads – funding for roads can be through government budgets, special funds, or toll revenues

- In road transactions, payment can come in the form of an availability payment, which pays for capital and maintenance costs of the project over time; through toll revenues; or a combination
- Governments can make availability payments directly through general budgets or through special road funds (e.g., funded with gas tax)
- Traffic and revenue forecasts will be key to determining viability as a toll road; tolling policies (caps, etc.) will also impact financial viability of the project

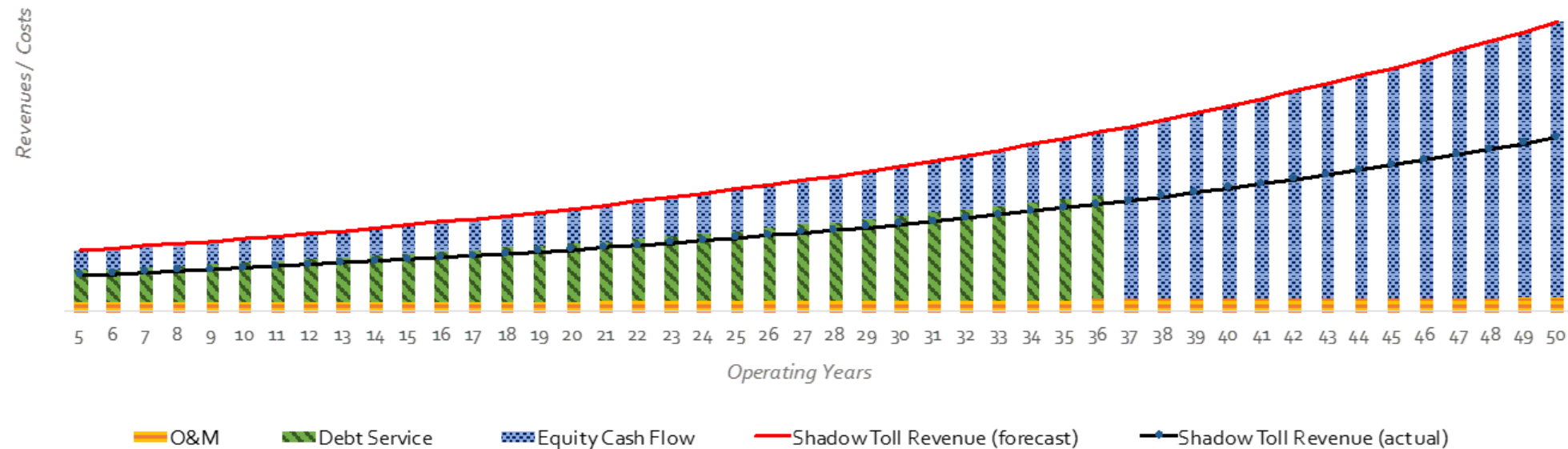
### Road – Key Funding Questions:

- What is the source of upfront and ongoing maintenance funding of the project? Does government have the ability to commit funding over a long-term period?
- If a toll road, what are the expected traffic and revenue of the road and can they support the upfront, maintenance, and financing costs of the project?
- Are there precedent transactions in the country or region that indicate investor appetite?



## Roads – hybrid funding models can share risk between government and developers

- Hybrid models include a shadow toll model. Under this model, the government covers the gap between toll revenue and actual costs based on demand for the road. This may incentivize contractors to be more efficient during maintenance and may mitigate some risks for investors



## Roads – Policymakers should consider supporting alternative modes of transportation and congestion relief in design

- Policies could incentivize bus rapid transit, carpooling, bicycle and pedestrian traffic, and other mechanisms to reduce congestion
- As PPPs transfer risk, the government should assess its ability to manage these performance-based contracts and potential changes/disputes

### Roads – Key Legal Questions:

- What are the overarching policy objectives in the transportation sector?
- Can the road help to support other transportation modes?
- Are there established policies and procedures to manage a third-party, including inspections for performance?



## Roads – right-of-way, relocation, and safety are the main risks to address in an impact assessment

- Road expansions will likely impact residents that live along the roadway and depend on it for livelihoods.
- Relocation may also require livelihood restoration, and these impacts may be significantly pronounced in dense or urban areas
- Safety risks of drivers on the roadway should also be considered and should meet standards required by lenders and investors
- Scope of E&S should also include labor required for construction and ongoing maintenance

### Road – Key E&S Questions:

- How many households are along the right-of-way and will it impact their livelihood?
- Will construction or maintenance require labor to move to the area? How will the contractor manage impacts on the community?
- Are there impacts to environmentally sensitive areas caused by the road (e.g., dams, culverts, wetlands, etc.)?



Roads – PPPs for roads are common but government should consider long-term implications

- PPPs are long-term contracts that require dedicating funding long-term to a project. This means that funding cannot be used for other purposes
- In projects that share demand risk with developers, the government may be limited in creating alternative routes during the concession

#### Roads – Key Commercial Questions:

- Does the legislation allow for multi-year budget commitments?
- Have risks been identified and analyzed to determine level of risk transfer?
- Has a market sounding been completed? Is there sufficient market interest in the project?





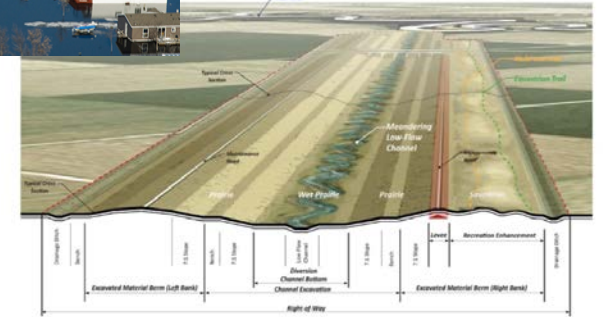
# Water Treatment



# Wastewater Treatment



## Flood Control



## Navigation



## Water Storage & Hydro Power





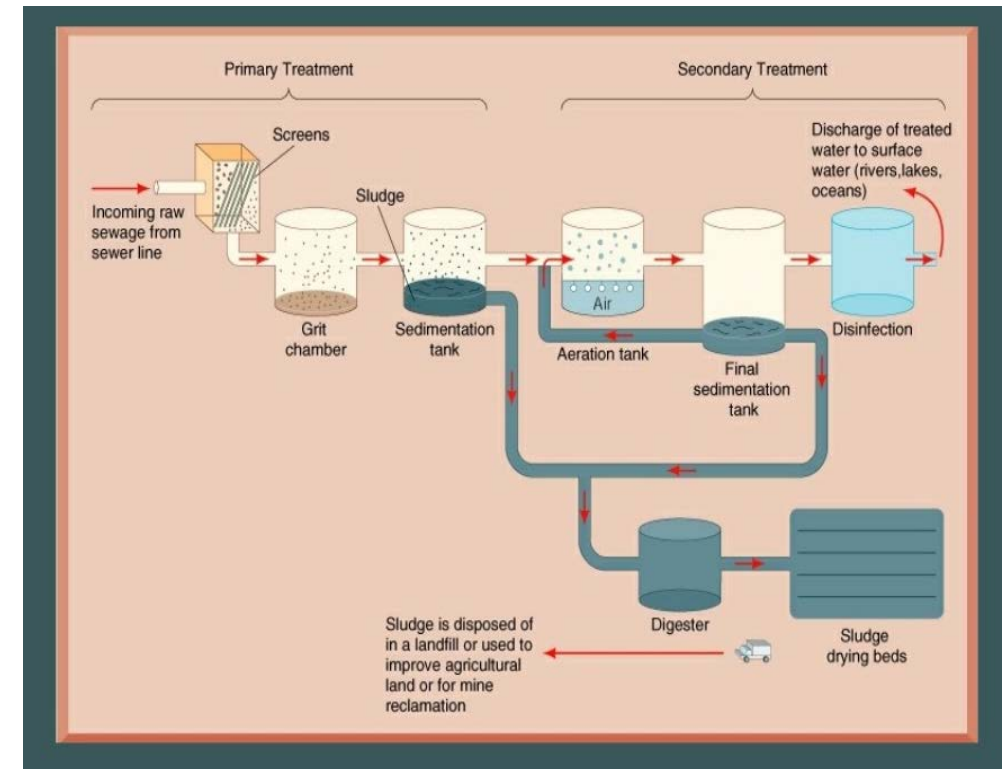
# Water and Wastewater Primary Technical Issues

- **SOURCES OF WATER** for drinking (ground, surface, reservoirs, ocean)
- **POLLUTANTS** present for treatment of water or wastewater (contaminants, sewage, industrial waste, combined sewer overflow)
- What **LEVEL OF TREATMENT** is required both for drinking water, and discharge of wastewater
- **TREATMENT TECHNOLOGIES**



# Levels of Treatment for Pre-Feasibility/Feasibility Analysis

- Pre-treatment (industrial users, agriculture, storm water runoff)
- Preliminary Treatment (screening)
- Primary Treatment (physical)
- Secondary Treatment (biological)
- Tertiary Treatment (reuse cleaning)
- Biosolid Disposals



# Key Drivers For Pre-Feasibility/ Feasibility Analysis

- Design Requirements
- Treatment Plant components
- Collection Systems
- Conveyance Systems
- Distribution Systems
- Disposal and Uses for Waste Products
- Metering and Billing Systems



# Water Funding and Financing Issues

- For P3 in water/wastewater must consider sources of funding
- What is the public ability to pay
- Taking revenue risk means some private control over rate setting
- To make water/ wastewater treatment affordable often requires government subsidies
- State Revolving Funds, Government Loans, User fees

Victoria, Canada

McLoughlin Point Wastewater Treatment Plant

Required a variety of funding sources





# Water – Funding Sources to Explore

## Core Revenue Sources

- ◆ User fees
- ◆ Taxes (Property, Sales, etc.)
- ◆ Special Assessments
- ◆ State Water Funding
- ◆ Federal Grants

## Ancillary Revenue Sources

- ◆ Biosolid Production and Sale
- ◆ Biogas Production and Sale
- ◆ Cost Savings and Efficiencies

## Capital Markets

- ◆ Municipal Bonds and Commercial Paper

## Federal Financing

- ◆ Water Financing Programs (WIFIA)

## Innovative Financing

- ◆ P3 Financing
  - ◆ PABs
  - ◆ Equity
- ◆ Equipment Financing and Lease
- ◆ Private Placement
- ◆ Crowd Funding



# The Politics of Water Quality and Treatment

- Considerations whether it is an arid or wet country
- Dealing with the impacts of climate change
- Cross-boundary water resource issues
- Water resource management, safety and security
- Standards for storm water runoff, discharges, industrial pre-treatment
- Standards for safe drinking water
- Allocation among multiple users



# Safe Drinking Water Standards and Availability

- Access to water and sanitation are recognized by the United Nations as human rights, reflecting the fundamental nature of these basics in every person's life
- W.H.O. Health-Based target setting
- Regulated pollutants and water treatment
- Environmental enforcement
- Right to minimum sustenance
- Agricultural and other needs





# Water Wastewater - Evaluate Project Delivery Systems

- Design-Build Finance
- Design-Build Operate
- Design-Build Finance Operate
- Separate Design-Build from O&M



# Thank You!



**Mike Tran and Chris Kane**



# Upcoming Webinars

## **PPP Business Case Development**

The PPP process requires a significant amount of time and resources. To ensure that those resources are well spent, it is important to ensure that PPPs have the requisite business case and make financial sense in order to move forward. In this webinar, we will learn about how to structure the business case for a PPP.

## **PPP Pre-Qualification and Evaluation**

The PPP process requires a significant amount of time and resources. To ensure that those resources are well spent, it is important to have well established pre-qualification and evaluation procedures for the RfP process. Governments often run into difficulties in the pre-qualification and evaluation phase. This webinar will walk participants through how to design the evaluation process to ensure the best bid is selected.

## **Unsolicited Proposals**

Unsolicited proposals when used properly are a way for the private sector to propose innovative solutions to problems. The webinar would provide an overview of how to implement procedures at the agency level, prioritizing or limiting the types of proposals received, confidentiality policies, transparent evaluation procedures, and fair reimbursement of costs for an accepted proposal.





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