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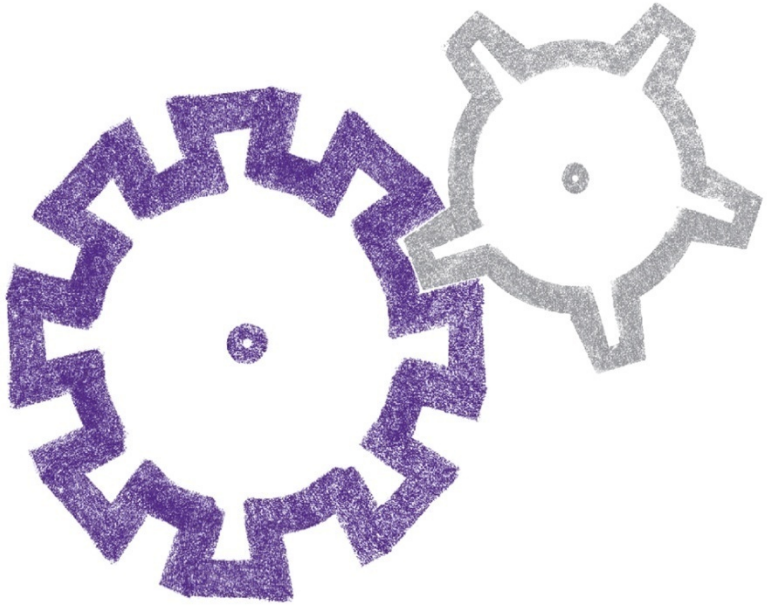
Infrastructure Sustainability

Western Conference 2011



Your Presenters

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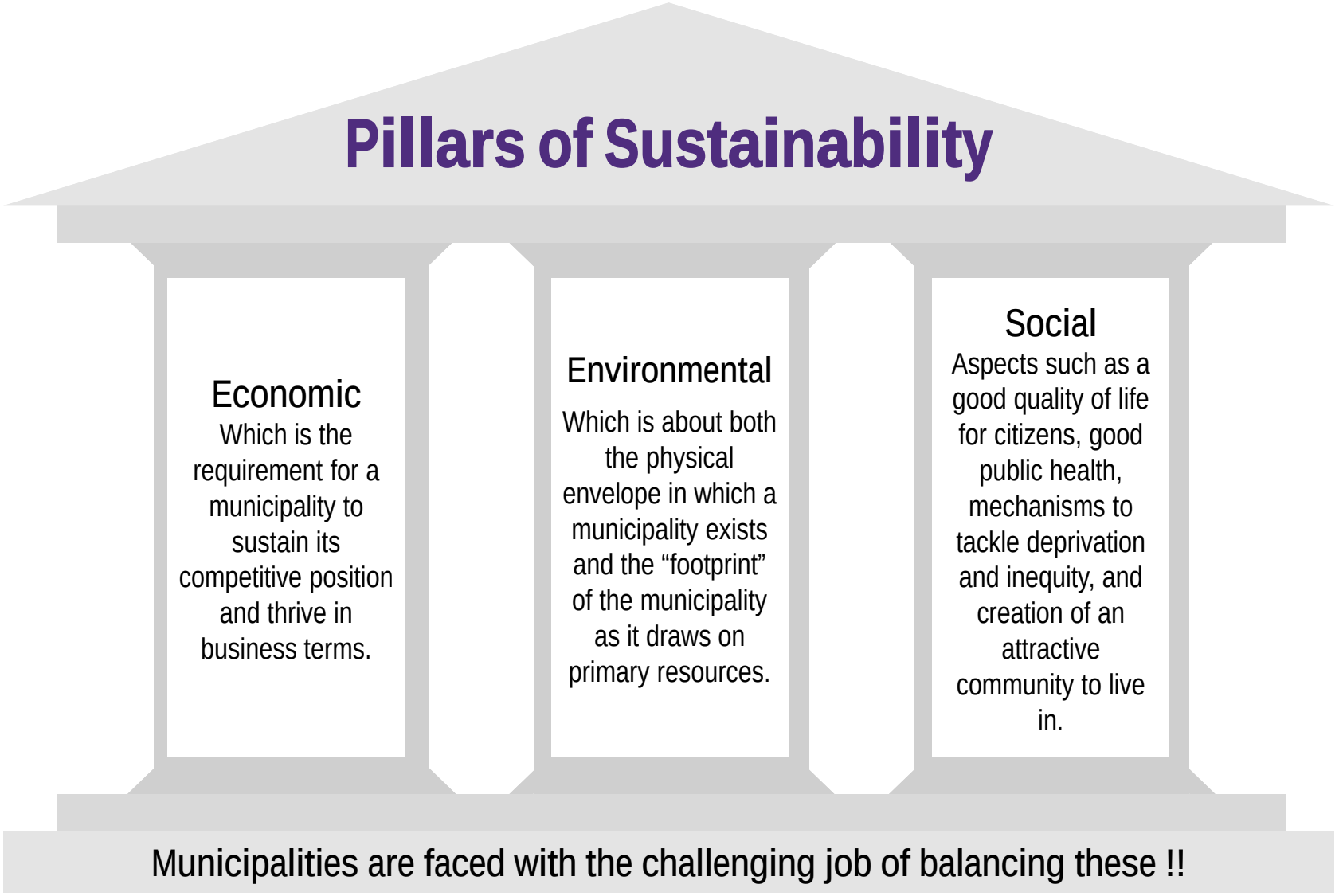
Pillars of Sustainability



Both politicians and citizens are becoming more aware and recognize the need to pursue strategies such as…..

- Water conservation
- Waste minimization
- Zero wastewater discharge
- Waste to energy
- District heating
- Greenhouse gas reduction

All have infrastructure impacts!!

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Municipal Waste Management

Case Study

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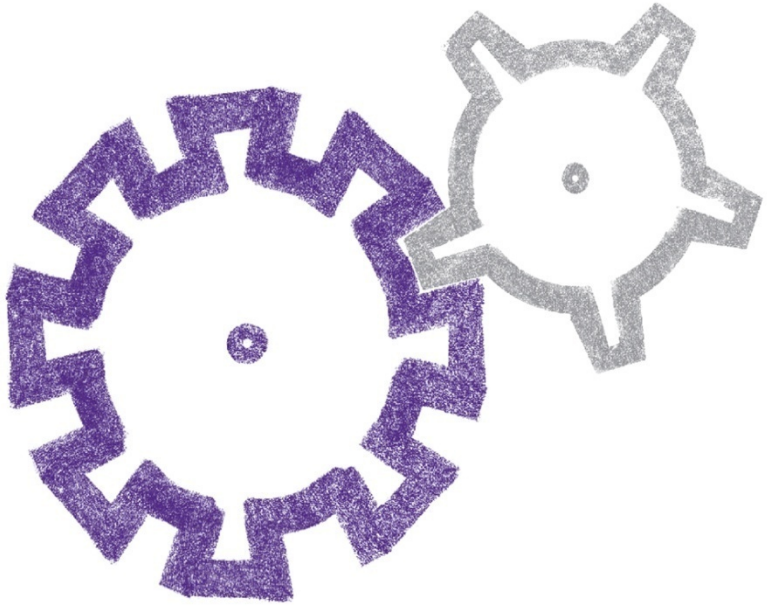


City of Edmonton
Waste Management Utility

- Integrated waste management system – providing a range of comprehensive waste management services, including collection, processing and disposal activities (however, very discreet elements)
- Primary focus is to provide these services to the City's residential sector (single family and multi-family), also competitively offered to non-residential (commercial, industrial, construction and demolition.

Services Provided Under Two Main Service Programs

Collection

- Direct collection for waste and recyclables for all residential households & some commercial
- Management of drop-off centers (eco stations) for the collection of waste, recyclables and household hazardous waste

Processing and Disposal

- Highly integrated facilities and programs at the EWMC
- Processing includes:
  - Materials Recovery Facility
  - Processing & Transfer Facility
  - Composting Facility
  - E-Waste Recycling Facility
  - Construction & Demolition
- Landfill disposal of non-recoverable waste

Waste Management System is to ….

- Provide service that is responsive, dependable and equitable
- Demonstrates leadership in environmental protection, including the diversion of residential waste of 90% by 2013
- Provides services which are affordable to residential households
- Exemplifies beneficial synergistic programs, technologies and partnerships

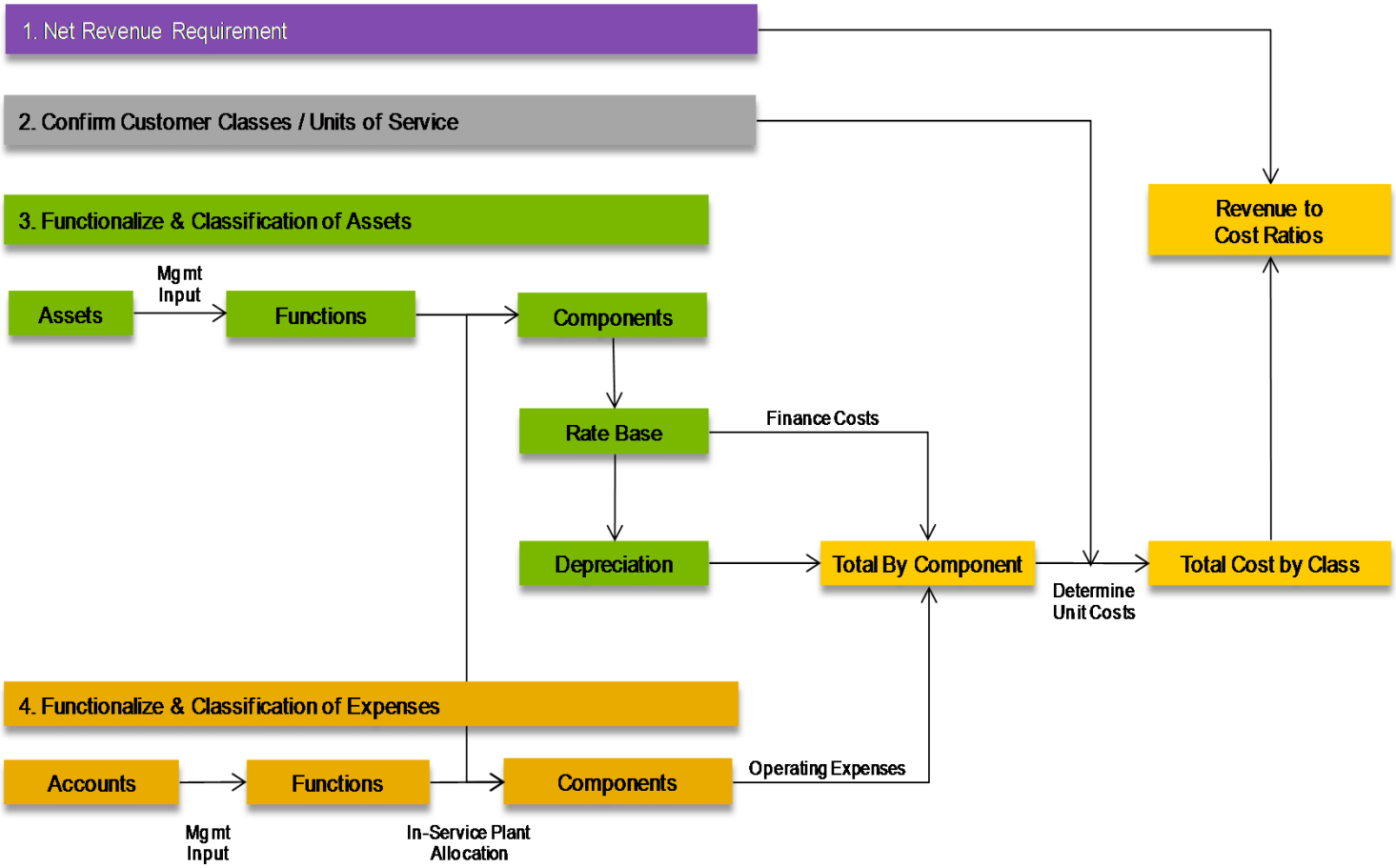
Economic, Environmental, Social !!

Evaluate Costs Incurred to Provide Services

- Waste Management Utility fully reliant on a combination of fees and revenues from: monthly residential utility billing, commercial contracts, tipping fees collected at EWMC and Eco-stations, and other miscellaneous sources (ie. GHG credits)
- Cost recovery analysis separately for single family vs. multi-family vs. commercial customer classes
- Analyze costs of service separately for collection vs. processing & disposal for each customer class

All this to feed into rate making analysis !!

Cost of Service Study
Critical Issues for Infrastructure Sustainability



Determine Overall Revenue Requirement

- Matching costs/revenues
- Need to understand cost structure and align that to revenue (whether stand alone utility, or in tax base)
- Determine total annual cost of providing service or the overall revenue requirement to fund all costs associated with service
  - Direct operating costs
  - Debt service costs, represented by annual interest paid
  - Capital expenditures, represented by annual depreciation
  - Indirect and overhead costs required to be services
  - General indirect & direct non rate revenues that offset the cost of services

Functionalize Costs

- Need to understand the various cost structures for the components of your delivery service and allocate appropriately
  - Capital costs – asset depreciation expense and financing (interest) charges
  - Operating costs – direct & indirect costs, overhead charges, including corporate management and shared services
- Drives various discussions/decisions on rate structure/funding model
  - Are services supportable
  - Is the funding model appropriate
  - How integrated are the various functions/services
  - User pay/flat fee
  - Competitive pressures on aspects of service
  - Flexibility in infrastructure

Confirm Customer Classes and Units of Service

- Need to define and confirm the different customer classes
  - Single family, multiple family, commercial customers
  - Units of service ties to volumes (usage and consumption of resources)
- Drives various discussions/decisions on rate structure/funding model
  - Are there different classes of users
  - What is in base rate vs. user fee
  - Do different customer classes align with different processes/services
  - Do different customers utilize infrastructure in differing capacities

Allocate Costs to Customer Classes and Perform Cost Recovery Analysis

- Need to distribute functional costs to customer classes using customer units of service
  - Provides a detailed breakdown of total costs per customer class on a function by function basis
- Cost recovery ratios analyzed to determine
  - Supportability of service model
  - Equity between customer classes
  - Supportability with other sustainability pillar philosophies
    - waste reduction
    - clean energy/carbon reduction
    - citizen equity

TBL Municipal Utility Framework

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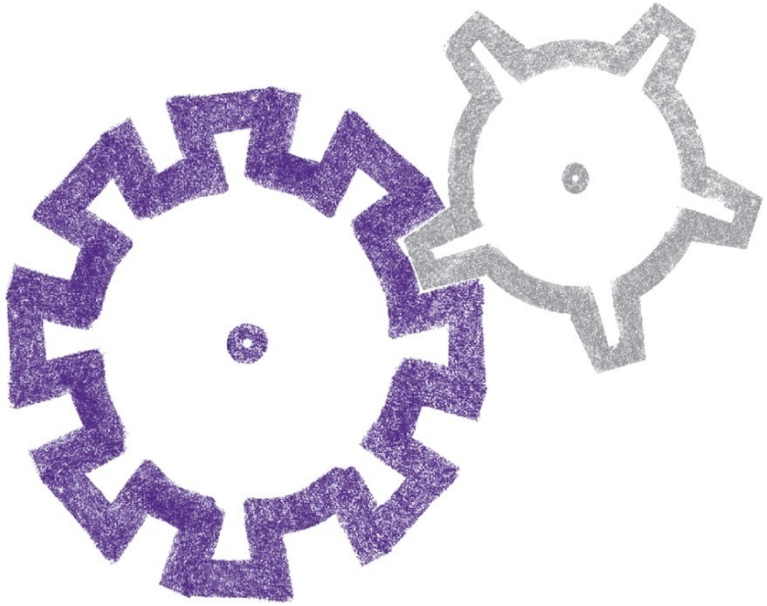

Municipal Utility TBL Challenges

- Economic
  - Long-life assets; means long-term implications of decisions
  - Alternative financing (e.g. grants, developer levies, etc.) for capital, has potential to create future financial sustainability
  - Balance conservation pricing with need for economic development
- Environmental & Social
  - Decisions around infrastructure investment, operations, services provided, and pricing have a direct impact environmental and social footprint
    - Waste treatment investment
    - Water conservation tools
    - Customer equity; not only among existing, but also future
    - Access to essential municipal services

Existing Municipal Utility Model

Cost of Service

Resource Administration Charges	• Overhead for effective planning and management of infrastructure and resources
Capital Cost	• Debt repayment - principal & interest • Depreciation expense • Return on equity
Operations & Maintenance Costs	• Expenditures required to operate and maintain treatments plants and pipes

Revenue Requirement = Cost of Service

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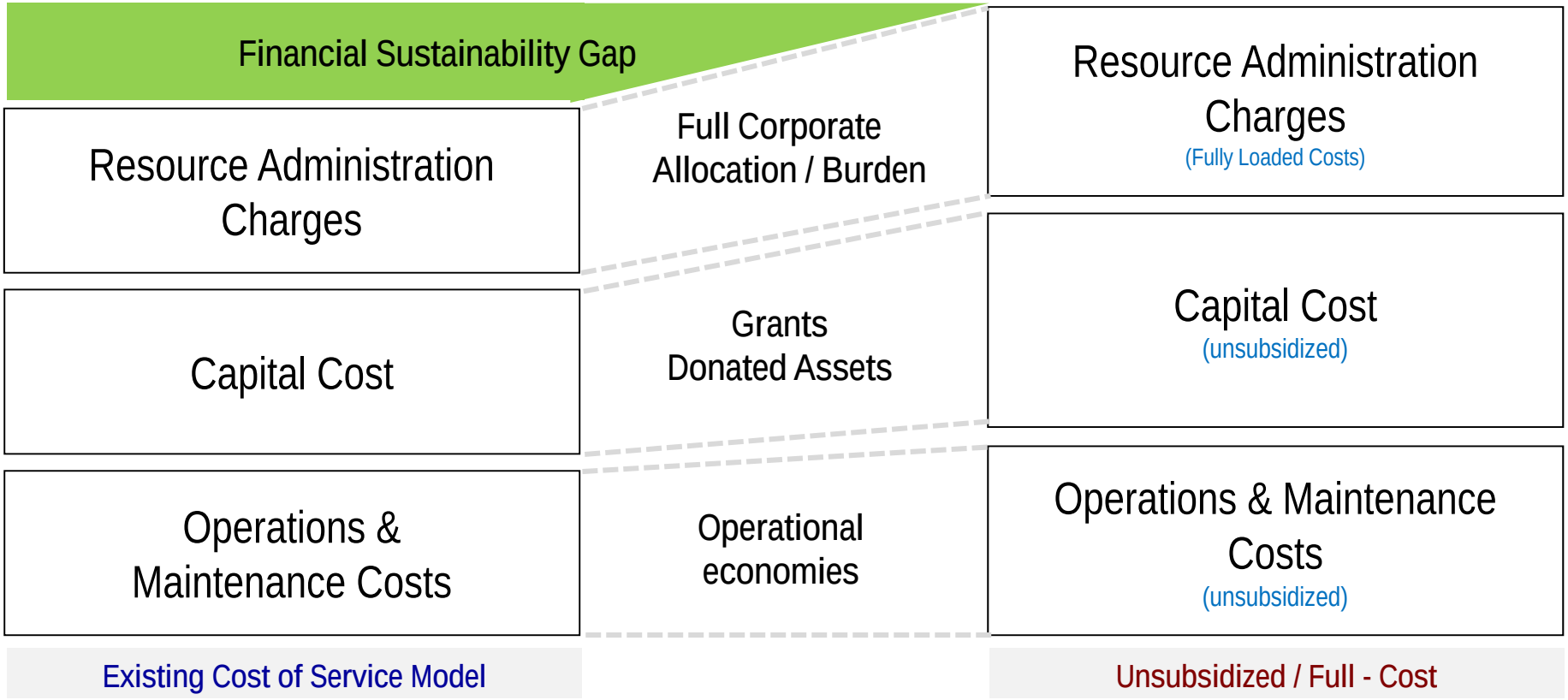
Full Cost Municipal Utility



Revenue Requirement = Full Cost

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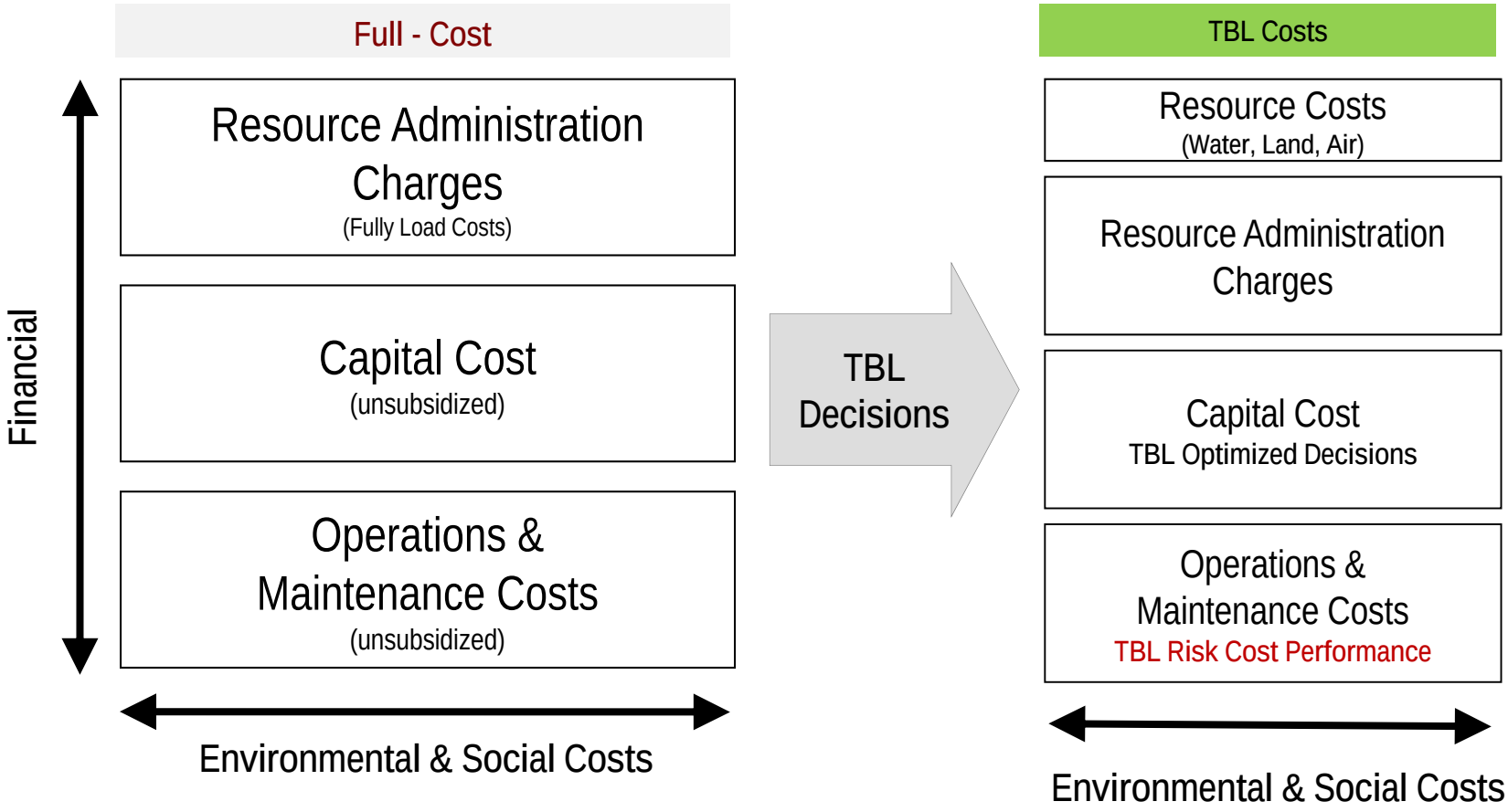
TBL Municipal Utility



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Capital – Investment Decisions

ECONOMIC

- Total capital cost
- Contributions from others
- Lifecycle maintenance costs
- Replacement costs
- Change in local employment: direct one-time; direct ongoing; indirect
- Proportion of local businesses that will benefit

Description of any:

- Foregone alternative use of invested resources
- Lost opportunities from non-investment in the planned capital project

ENVIRONMENTAL

- Net greenhouse gas emissions (tonnes of CO2) mitigation:
  - Construction
  - During the life cycle of the project
- Estimated energy consumption by type:
  - Construction
  - During the life cycle of the project

SOCIAL

- Proportion of scenic surroundings that are maintained or enhanced
- Description of initiatives to preserve natural and built environment

Operating - Maintenance

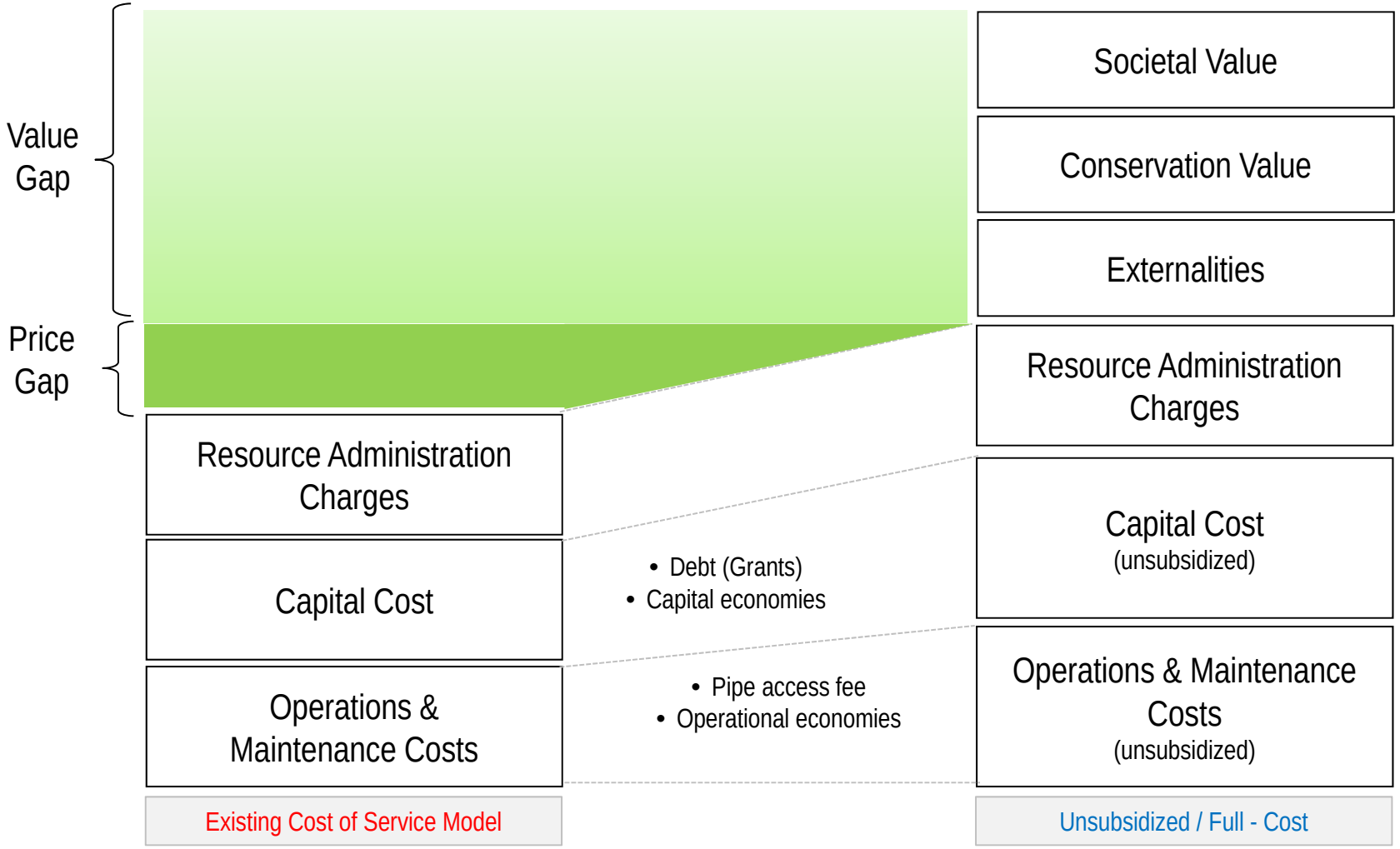
- Utilize TBL Risk Based Approach
  1. Define TBL risk costs for infrastructure
     - Calculate the probability of infrastructure failure / down-time = P
     - Calculate the TBL consequence in financial terms = C
     - Example: water main supplying a industrial enterprise, located near natural gas main
       - Environmental = cost of dditional GHG due to traffic congestion
       - Economic = general economic loss (business supplied), missed appointments
       - Social = traffic disruption, reduced quantify life, cost of a life
     - Calculate Risk Cost = P*C
  2. Estimate financial cost of maintenance

Maintenance Costs < Risk Cost

Municipal District Heat Case Study

- Evaluated Alternative Heat Sources
  - Natural Gas vs. Heat from nearby Waste-to-Heat facility
  - Capital Investment for all alternatives equivalent
  - TBL Benefits of Waste-to-heat fuel supply
    - Natural gas offset – cost offset
    - GHG credit - $15 per tonne credit (cash inflow)
    - Reduced water consumption (cost offset)
  - Positive NPV

Water Pricing – Example



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Questions

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