

Basic Concepts of Infrastructure Asset Management



Or what I can learn from my motorcycle

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Outline



What can I learn from my motorcycle?



What 'big things' do I need in my daily life?



The big questions I have to answer



Using my personal assets



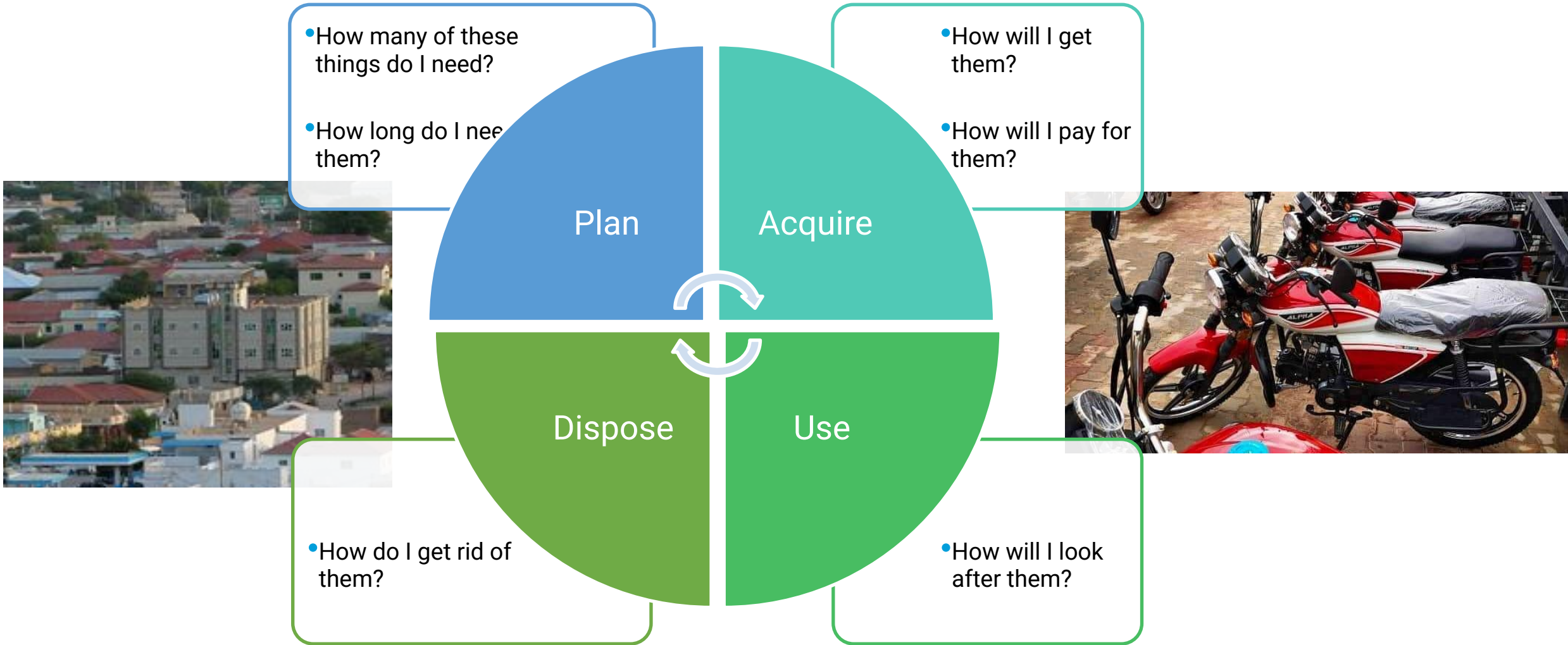
Asset Management Basics

We all have personal 'things'

Why do I need personal things?	What personal things do I need?

Personal things = Personal assets

Managing our Personal Assets



Using my Personal Assets



- What is each thing worth to me?
 - Financial value
 - Service value
- What condition is it in?
- How much longer will it last?
- Are there things I should have repaired that I didn't?
- What will I fix first?

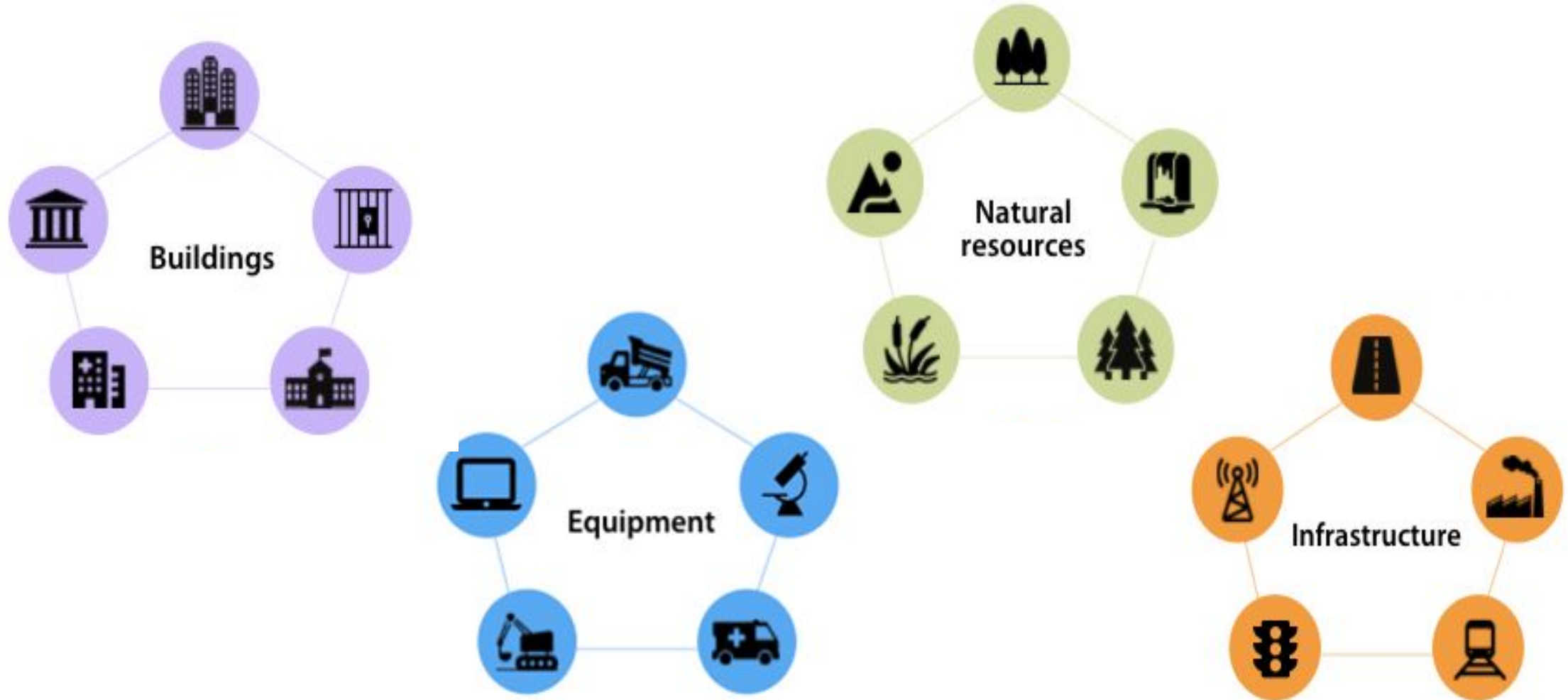
Public Things = Public Assets



We are all asset managers!

Asset Management: The Basic Concepts

What are Public Assets?



What is Asset Management?

Asset Management in short

The right assets, in the right place, at the right time, managed by the right people



Asset Value

Assets have a service value

Physical infrastructure and equipment that
serve a community

Land, buildings



Assets have a financial value - they cost money to acquire

What is the Value of a Forest?



Directly Related SDGs

- SDG 6 – Clean water and sanitation
- SDG 7 – Affordable and Clean Energy
- SDG 9 – Industry, Innovation and Infrastructure
- SDG 11 – Sustainable & Clean Cities
- SDG 13 – Climate Action
- SDG 15 – Life on Land



Let's Practice



Be prepared to discuss your answers
You have 10 minutes for this exercise.

In your group, think of at least three (3) benefits of asset management and three (3) challenges associated with implementing AM in South Africa



Benefits of Asset Management



- Economic sustainability
- Environmental sustainability
- Proper valuation of assets
- Resiliency
- Financial viability
- Enhanced transparency
- Maximised value

Asset Management Challenges



- Awareness and understanding
- Senior leadership buy-in
- Roles, responsibility, accountability
- Information
- Policy and processes
- Funding
- Materials and equipment
- Climate change/public health events

Portfolio Management



- Manage assets collectively
- Manage across multiple infrastructure systems
- Strategic
 - Best mix of assets for municipality
- Tactical
 - Best project delivery to maximise benefits and minimise cost

Strategic Considerations



Examples

Good asset management



Undertaking regularly scheduled maintenance, like oiling machinery, painting buildings or grading roads, ensures that assets last



Redeveloping or selling under-used land generates revenue and financial value for the community



Open, competitive procurement and contracting enhance public confidence

Poor asset management



Not maintaining assets reduces service value and requires expensive replacements

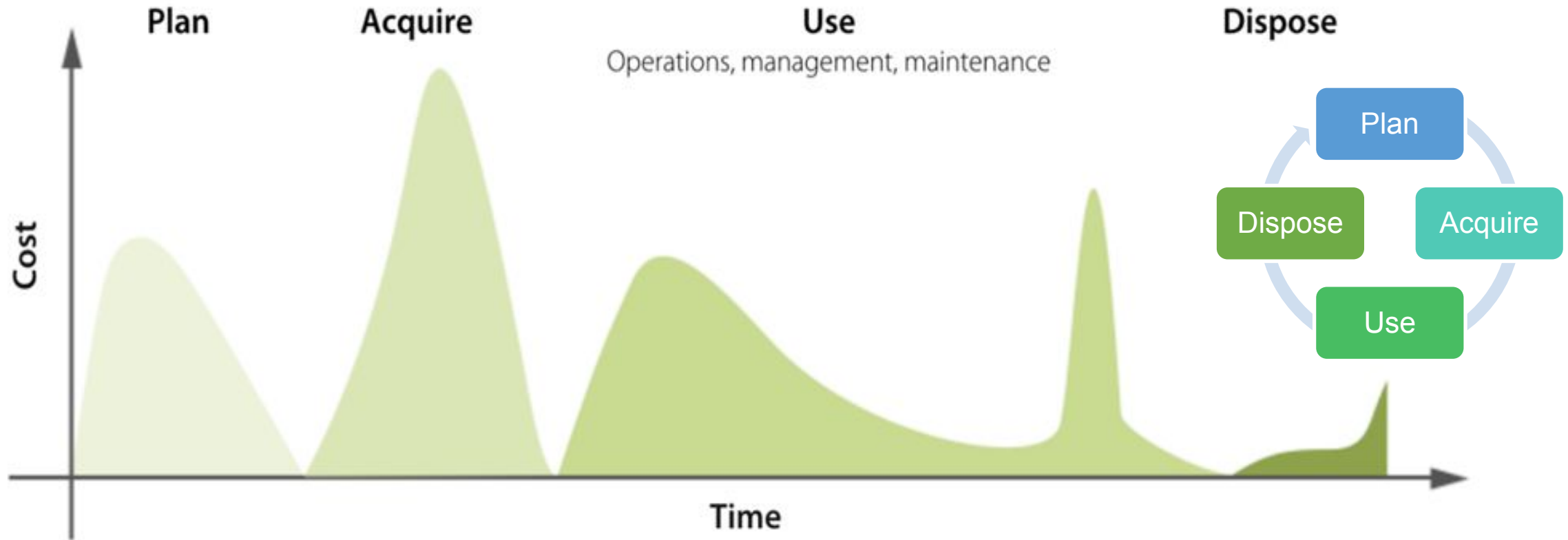


Neglecting infrastructure disrupts water and sanitation services, resulting in health hazards and possibly social unrest



Starting construction with insufficient funding jeopardizes its completion. A local school sits unfinished and deteriorates -- and so does public confidence

Asset Lifecycle



DEMAND MANAGEMENT

- Current and future demand
- Regulations
- Level of service

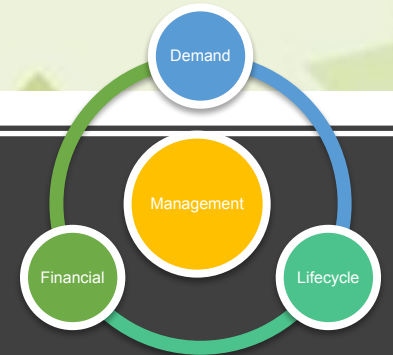
LIFE CYCLE MANAGEMENT

- Asset portfolio
- Life cycle analysis
- Risk management
- Capital improvement plan
- Decision support

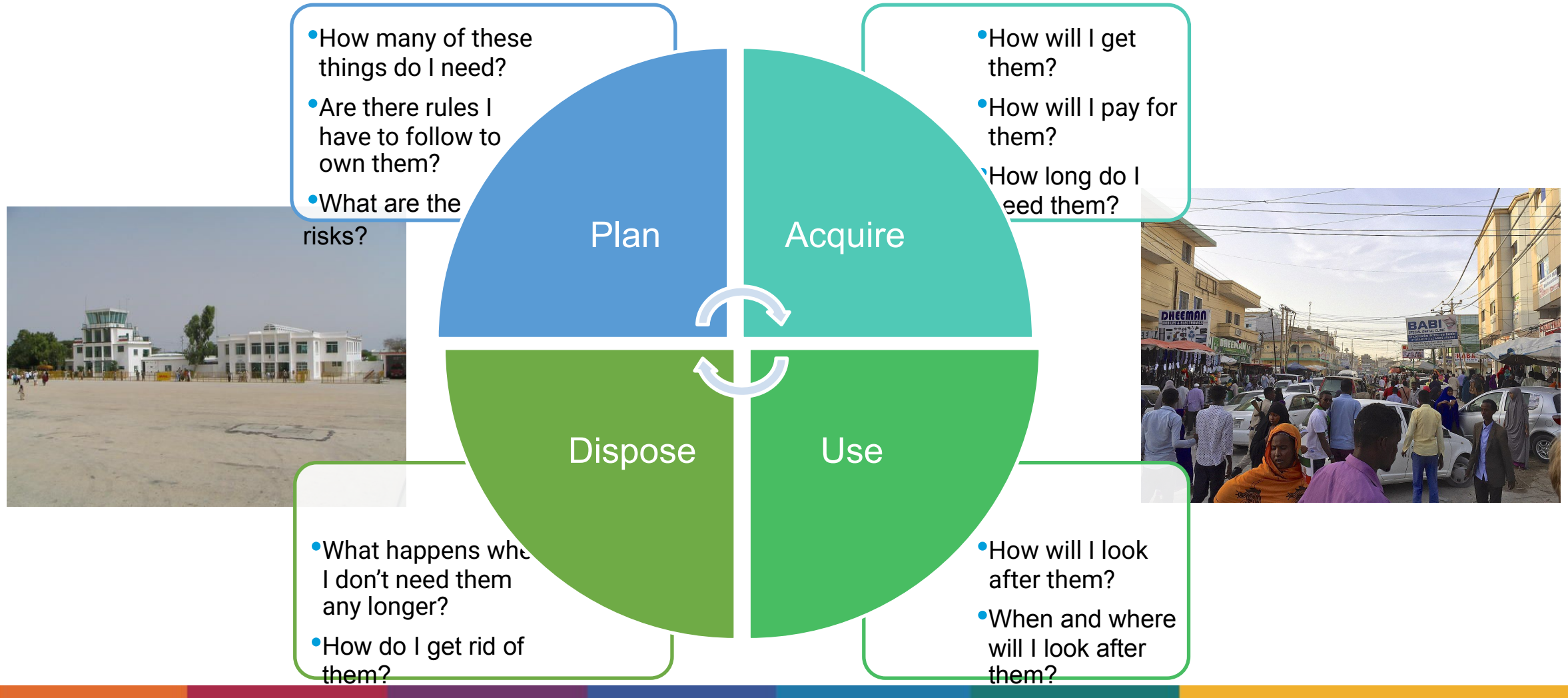
FINANCIAL MANAGEMENT

- Financial analysis (affordability)
- Benefit-cost analysis
- Funding plan

Three Pillars of Asset Management

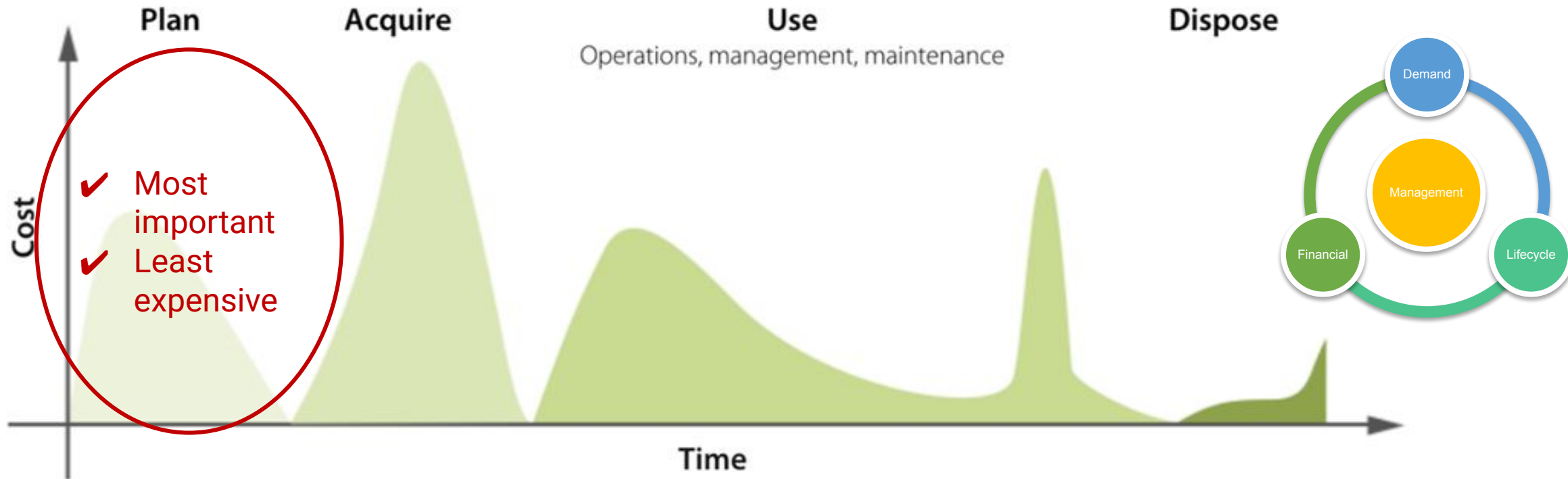


The Big Questions Revisited



Asset Management: Plan and Acquire

Plan



Planning Levels

- Strategic 5 to 25 years
- Tactical 2 to 5 years
- Operational 2 years

Strategic

- Long-range, reflects financial or business aspects
- Relies on forecasting future demand
- Included in master development plans, long-term capital plans and investment plans
- Involves senior administrators

5-25 years

Tactical

- Includes asset portfolio management plan
- Included in capital, operational and financial plans - costs are estimates
- Involves community leaders and managers responsible for assets and planning

2-5 years

Operational

- Project-level plan, based on performance and need to acquire, replace or recapitalize assets
- Costs are known, and local governments must make financial provisions in annual budget

2 years

Planning Questions

- Why do we need the asset?
- What do we need and for how long?
- What service will it deliver and for how long?
- **Are other assets affected by this asset?**
- Who will use it?
- Can we afford it?
- How will we acquire it?
- How will we maintain it?
- Do we have the right people to operate and maintain it?
- How will we dispose of it?



Planning: Current & Future Demand

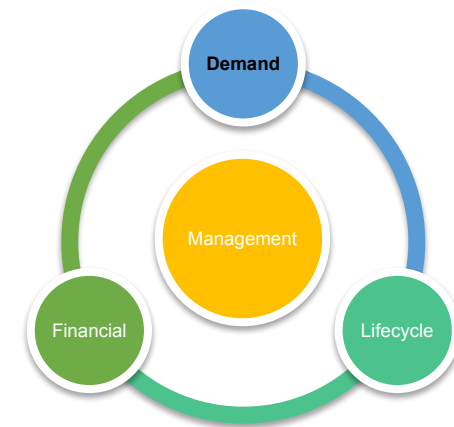
Current – Water Provision

- How do you deliver water?
- What is the current demand?



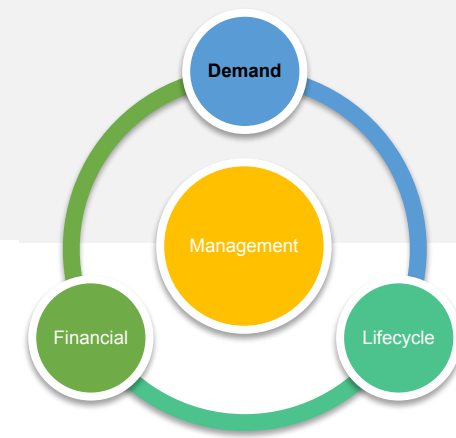
Future – Water Provision

- How do you want to deliver water?
- Will demand increase or decrease?

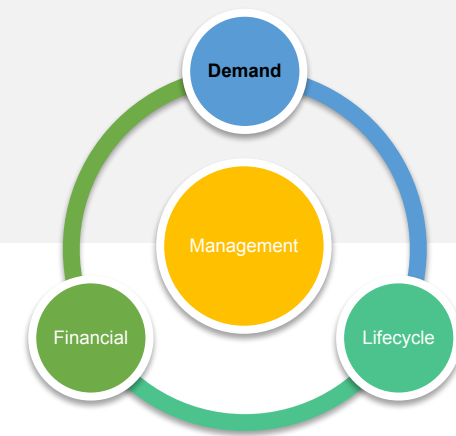


Planning: Regulations

- Legislation
- Policies
- Directives
- Standards
- Guidelines



Planning: Levels of Service



WATER PROVISION

- Piped directly to buildings
- Piped to community access point
- Community or individual boreholes



WASTE COLLECTION

- Direct collection from buildings
- Collection from community waste points
- Collection from central point
- No local collection



LAND

- Land fully serviced (water, electricity)
- Services in close proximity
- Unserviced



EQUIPMENT

- Available 24 hours per day, 7 days per week
- Available 12 hours per day, 7 days per week
- Available 8 hours per day, 5 days per week

Service Attributes or Characteristics

Accessibility

Availability

Compliance

Cost of service

Physical
condition

Reliability

Resiliency

Responsiveness

Suitability

Sustainability



Technical or customer?

Let's Play the 'Matching Game'

- Expected life of 10,000 hours before failure
- Garbage trucks available five days/week, eight hours/day
- At least 75% of paved road network will be rated as 'fair' or above
- Customer complaints will be responded to within 24 hours
- Water will be piped to community access points

Availability

Compliance

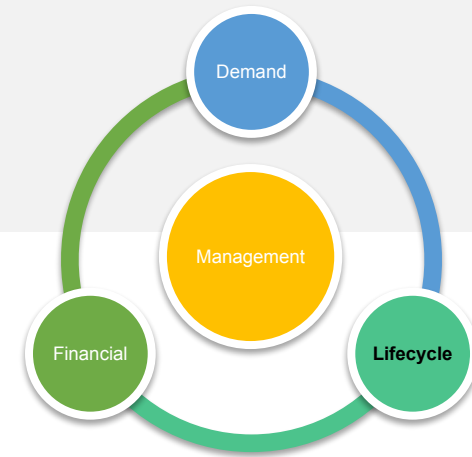
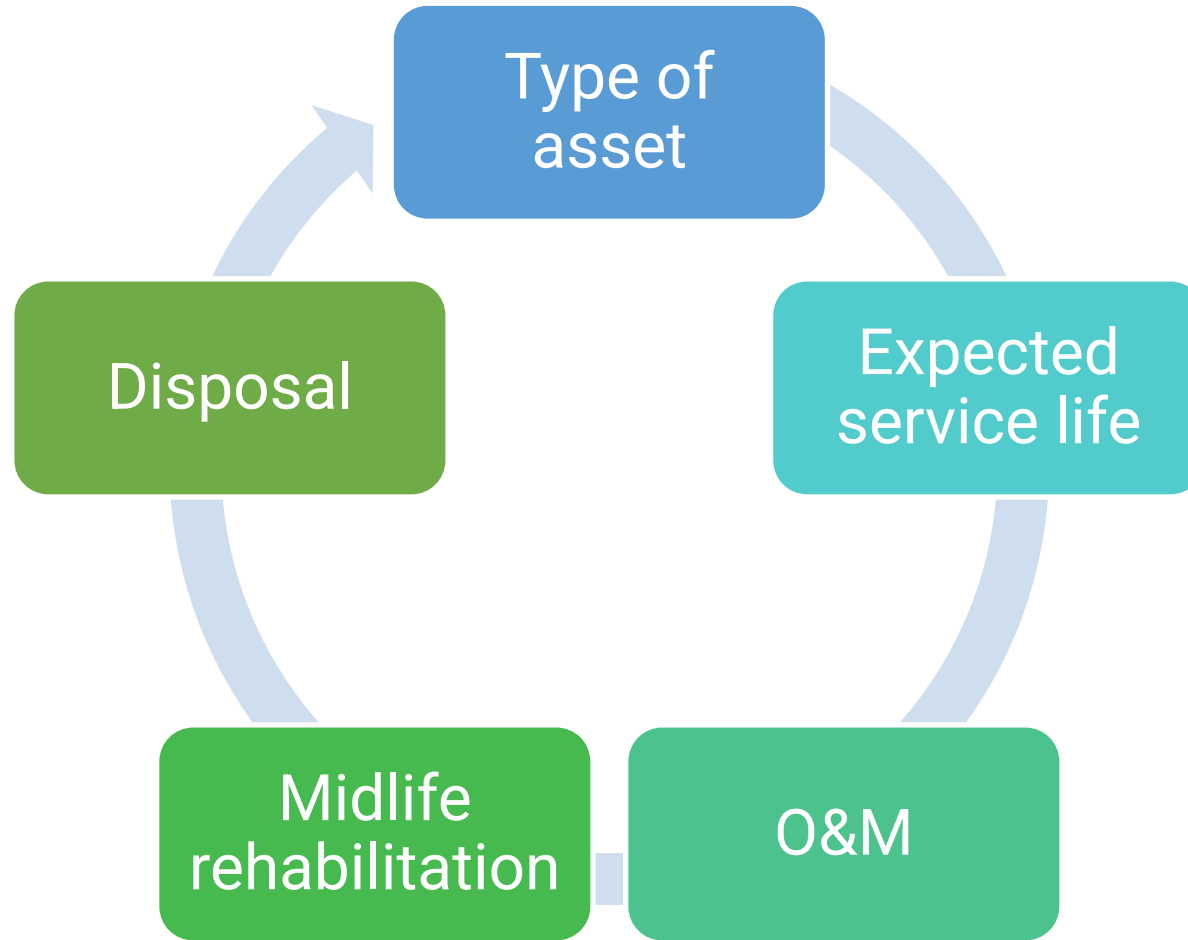
Responsiveness

Condition

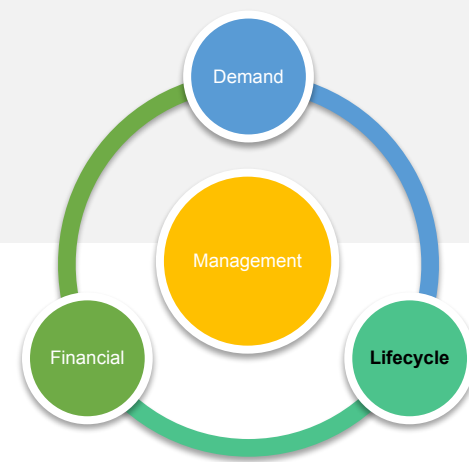
Reliability

Accessibility

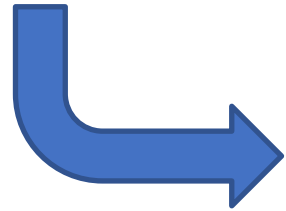
Planning: Lifecycle Analysis



Planning: Risk



Need an INCIDENT or EVENT



Pump fails on major community water point

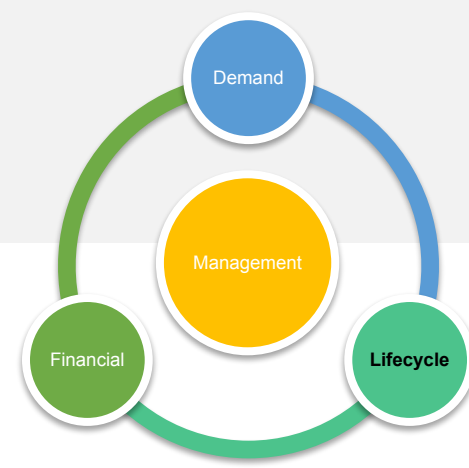
Risk = Likelihood x Consequence



probability, or
chance that an
incident occurs

the result or effect
of an incident
occurring

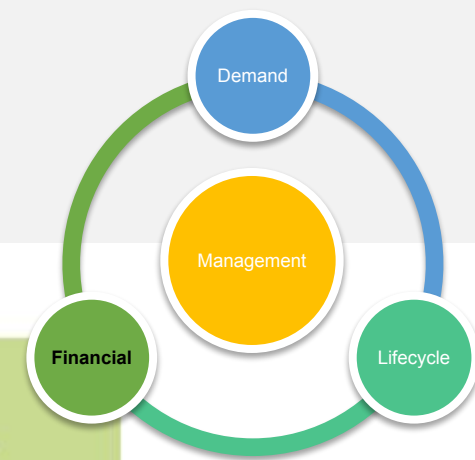
Planning: Capital Plan



- Options to meet demand
 - Status quo
 - Rehabilitate
 - Upgrade
 - Replace
- When to meet demand
- Cost to meet demand



Planning: Financial Management



FINANCIAL MANAGEMENT

- Financial analysis (affordability)
- Benefit-cost analysis
- Funding plan



Economic costs

- Business loss
- Property damage



Social costs

- Business disruption
- Service disruption
- Traffic delays
- Gender-unequal impacts
- Reduced accessibility



Environmental costs

- Contamination
- Pollution
- Public health impacts

Planning Example – A New Landfill

Strategic

- Location and size
- Regulations
- Closure and monitoring of the existing landfill
- Funding sources
- Consult the local community

Tactical

- Type of landfill
- Cost to manage over its entire lifecycle
- Type of collection services it provides and their associated costs
- Service options with the local community
- Discuss types of collection with community
- Discuss transfer systems with operations staff

Operational

- Design of the landfill
- Types of vehicles needed for collection
- Training requirements for operators
- Meet with operations staff to ensure equipment used at the new site is properly operated and maintained
- Inform community of collection system



Let's Practice



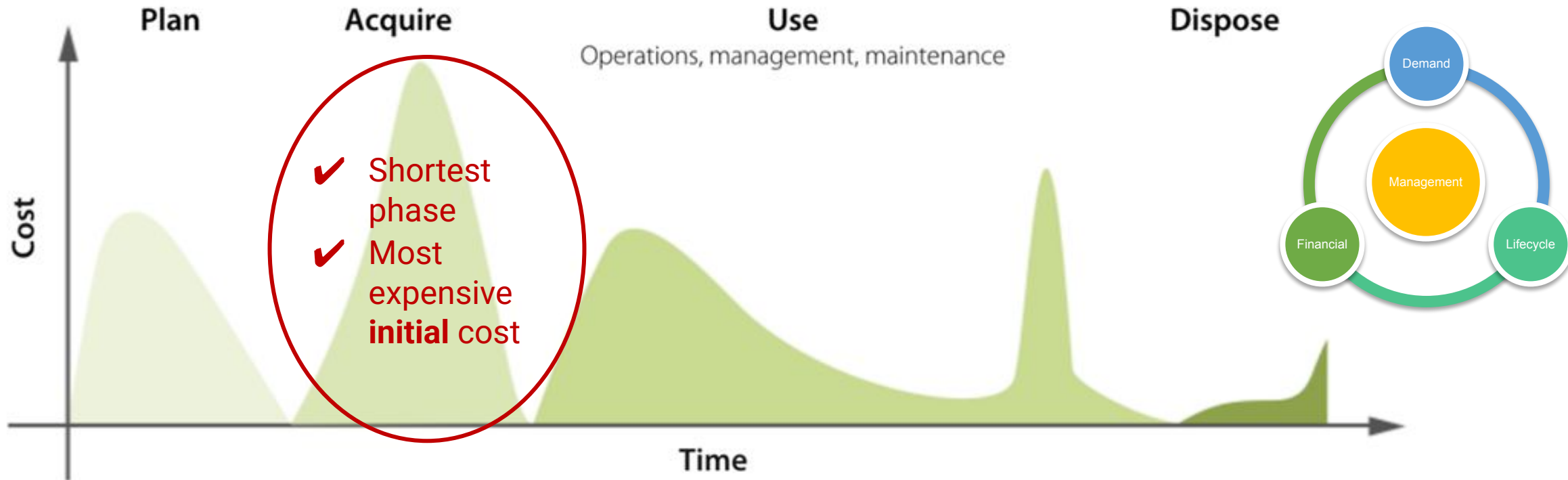
Be prepared to discuss your answers
You have 15 minutes for this exercise.

What would you have to consider at the following levels of planning for **upgrading the water supply** in your municipality?

Give two (2) considerations for each level

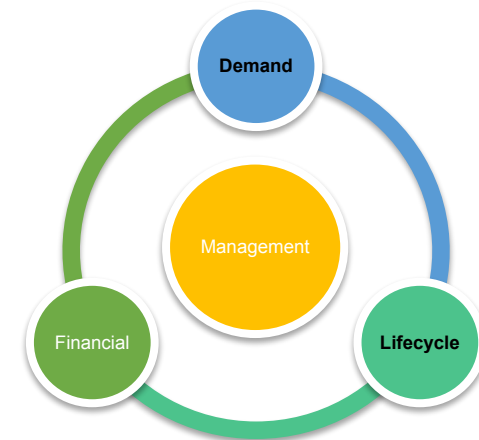
Level	Considerations
Strategic	
Tactical	
Operational	

Acquire



Acquisition Considerations

- Acquisition options to meet demand
 - Build new, purchase, lease, PPP, renovate/expand existing?
 - Legislation, policies, directives and standards
 - Service to be provided
- Lifecycle management
 - Link to capital plan & IDP
 - Portfolio - other assets affected or linked
 - Risk



Acquisition – Financial Management

- Budgeting for all costs
- Financial reporting



Economic costs

- Business loss
- Property damage



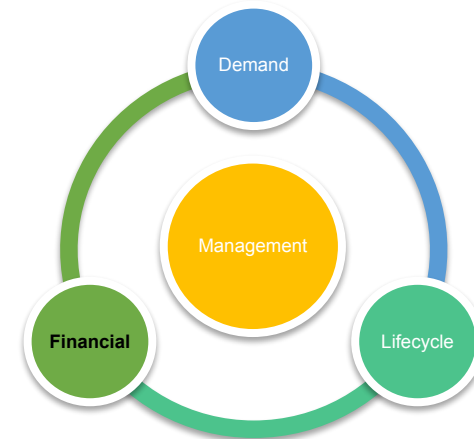
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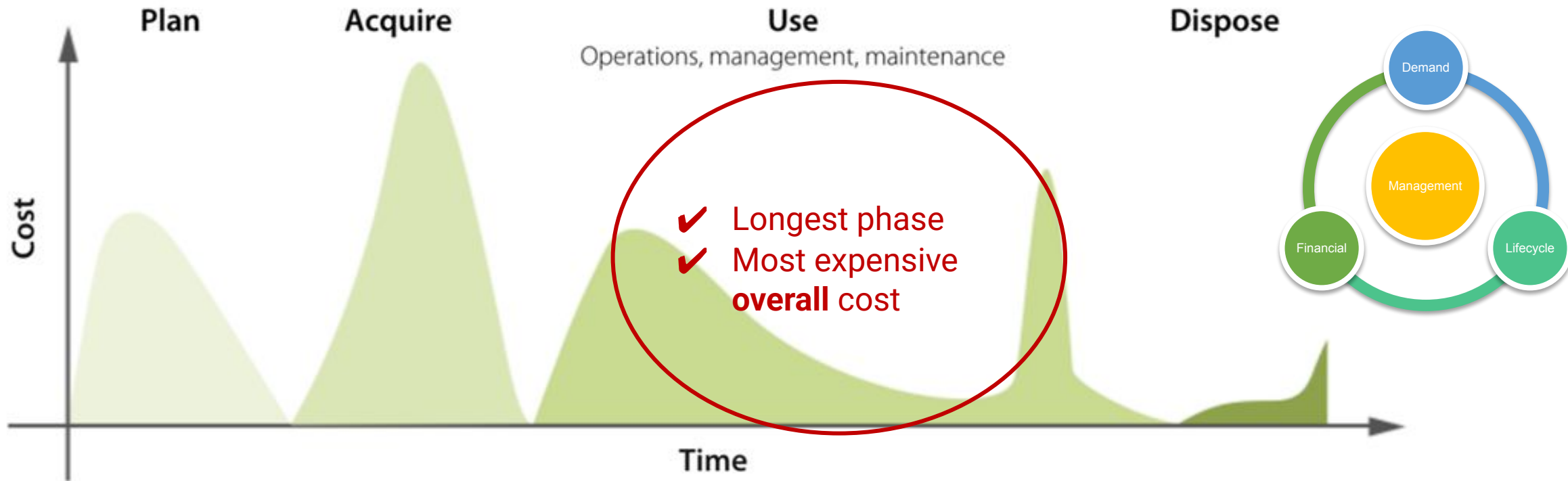
Let's Discuss



- What acquisition options will meet your demand for upgrading the water supply?
- What legislation, policies, directives and standards do you need to consider?
- Level of service to be provided?
- What are the risks?

Asset Management: Use and Dispose

Use



Fundamental AM Questions



What and
where is the
asset?



What is it
worth?



What is its
condition?



What is its
remaining
service life?



What is its
deferred
maintenance?

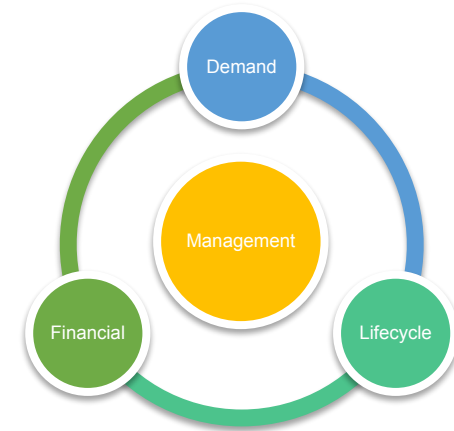


What
should you
fix first?

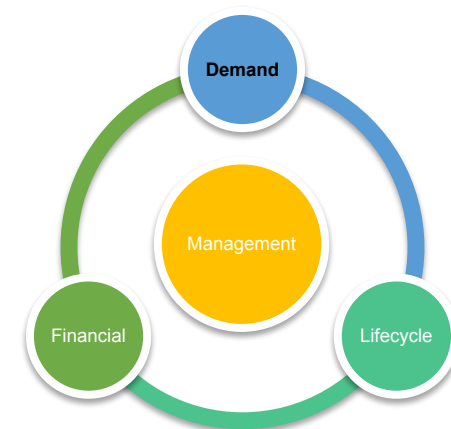
Adapted from Vanier, 2000, p. 13 with images from the Noun Project.

Use Considerations

- Demand and supply
 - Service life
- Levels of service
 - Can we afford them?
- Operations and maintenance
- Asset performance
- Performance measurement and monitoring
- Risk
- Funding
 - Affordability



Use: Service Life



SDG 6 – Clean Water and Sanitation

Goal: Clean Water and Sanitation

- Asset Performance Goal

Target: 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all.

- Asset Level of Service to be measured

Indicator: 6.1.1 – Proportion of population using safely managed drinking water services.

- Asset Performance Measure

Levels of Service



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Asset Performance

Priority Asset	Performance Goal	Level of Service and Attribute
Water Distribution System	To provide sustainable, safe and reliable basic water supply coverage to 95% of population by 2025	<u>Availability & Reliability:</u> Piped service to businesses and homes within the core area Community wells for customers outside the core <u>Sustainability:</u> Water conservation program in place <u>Accessibility:</u> Wells/water points located in areas safe for women or for women only <u>Compliance & Safety:</u> Water quality meets basic regulations

Performance Measurement & Monitoring

Technical
attributes
and
performance
measures

Sustainability?

Customer-
based attributes
and
performance
measures

Reliability

- ≤ 10 breaks per 10km of pipe per year
- < 25 service disruptions per year per well

Availability

- Water yield $\geq 25\text{L}$ per person per day
- 1 borehole per 1,000 people

Compliance

All regulatory requirements met

Responsiveness

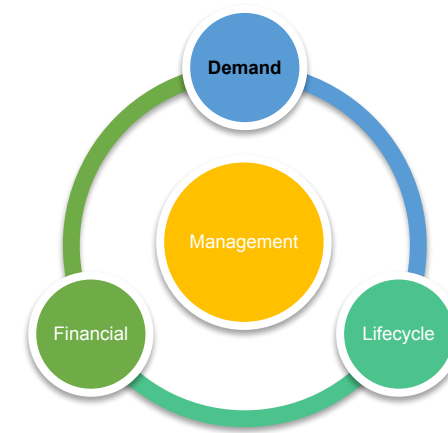
Respond to customer complaints within 24 hours

Accessibility

Boreholes accessible 16 hours per day, 7 days per week

Safety

Women have safe access to community boreholes



Let's Practice



Be prepared to discuss your answers
You have 10 minutes for this
exercise.

- What could be the reasons for the loss of performance?

Target: 25L/per
person/day

Actual: 20L/per
person/day

Availability

- Water yield $\geq$ 25L per person per day
- 1 borehole per 1,000 people

Use: Lifecycle Management

- Asset portfolio
 - Look at all of your assets
- Do we have a plan for:
 - Maintenance we will do and when
 - E.g. road grading
 - Rehabilitation of key asset components
 - E.g. road resurfacing
- What risks are associated with the operation of our assets?



Maintenance Strategy

Identifies:

- critical assets based on the risk to service delivery if the asset were not available
- all statutory and regulatory compliance requirements
- roles and responsibilities for asset maintenance
- intervention levels—at what point will we consider major maintenance or replacing assets?

Maintenance Plan Activities

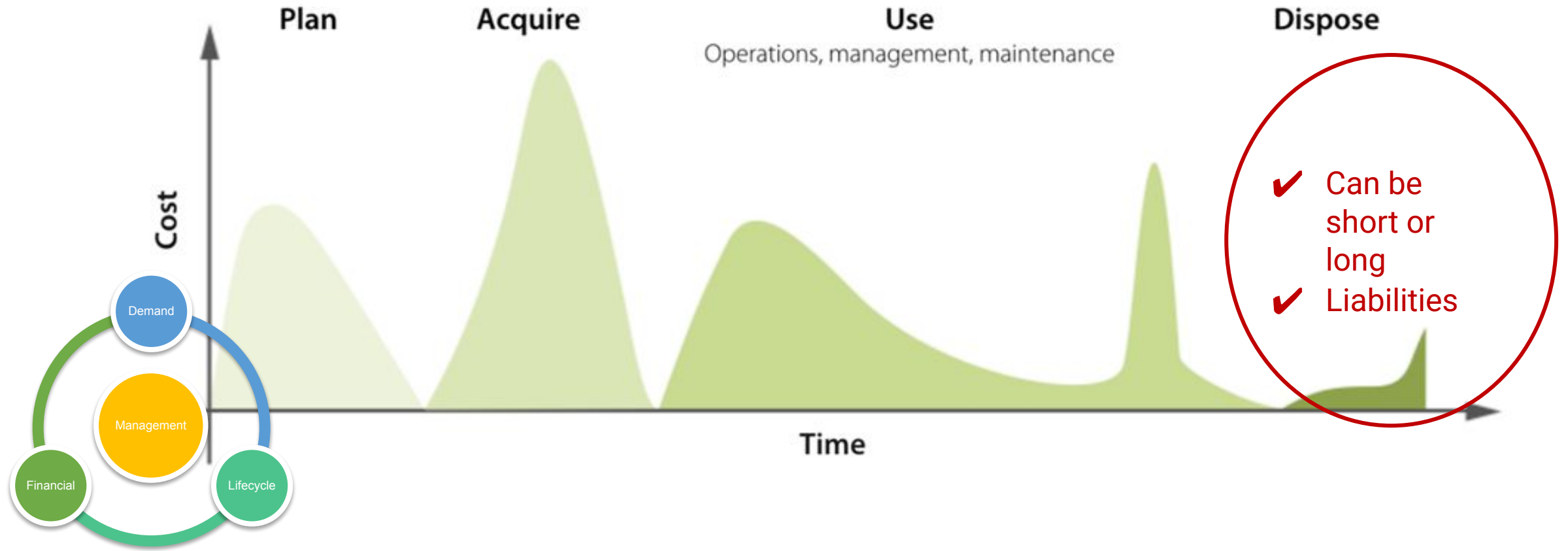
- Actions to be taken for critical and non-critical assets to keep up with normal use:
 - Inspecting, testing and monitoring for safety and compliance
 - Preventive maintenance
 - Corrective maintenance
 - Programme of scheduled maintenance activities
- Delivery mechanisms to be used
- Performance indicators to signal when major maintenance, rehabilitation or renewal is needed

Example: Maintenance Plan for street lightning

- Type of power source (solar or electric) & type of lamp
- Actions on lamp failure (e.g. replace individually upon failure, scheduled replacement of all lamps)
- Cleaning requirements (essential for solar panels)
- Performance indicators, such as response time to address faults for hazardous or non-hazardous events or to repair power outages.
- Performance monitoring protocols, such as inspection and reporting frequency.
- Replacement criteria
- Qualifications and skills of maintenance personnel
- Stock levels and equipment needed



Dispose



Disposal Considerations

- Demand
- Performance
- Sell or transfer



Let's Practice



Be prepared to discuss your answers
You have 10 minutes for this
exercise.

- How do you dispose of your assets?
- What are YOUR biggest challenges?



Summary



Asset Management is ...

- Having the right assets, at the right place at the right time
- Managed by the right people
- With the right tools