

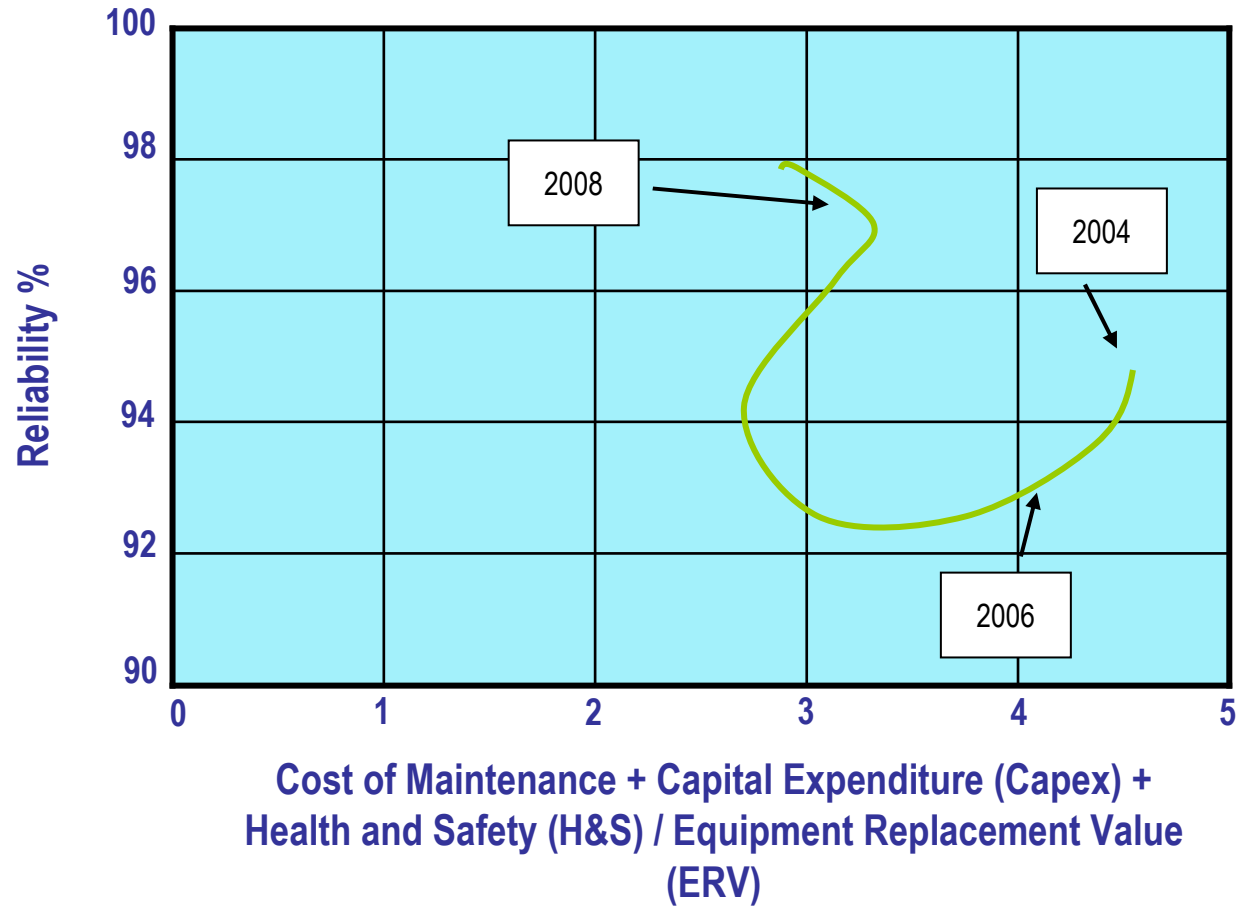
Maintenance & Asset Management

by Alan Wilson
director – Carmichael Smith Ltd.

- A chemicals / refinery site
- established for many years
 - was ready for some change

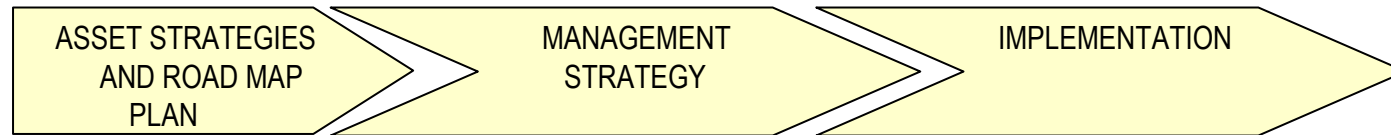


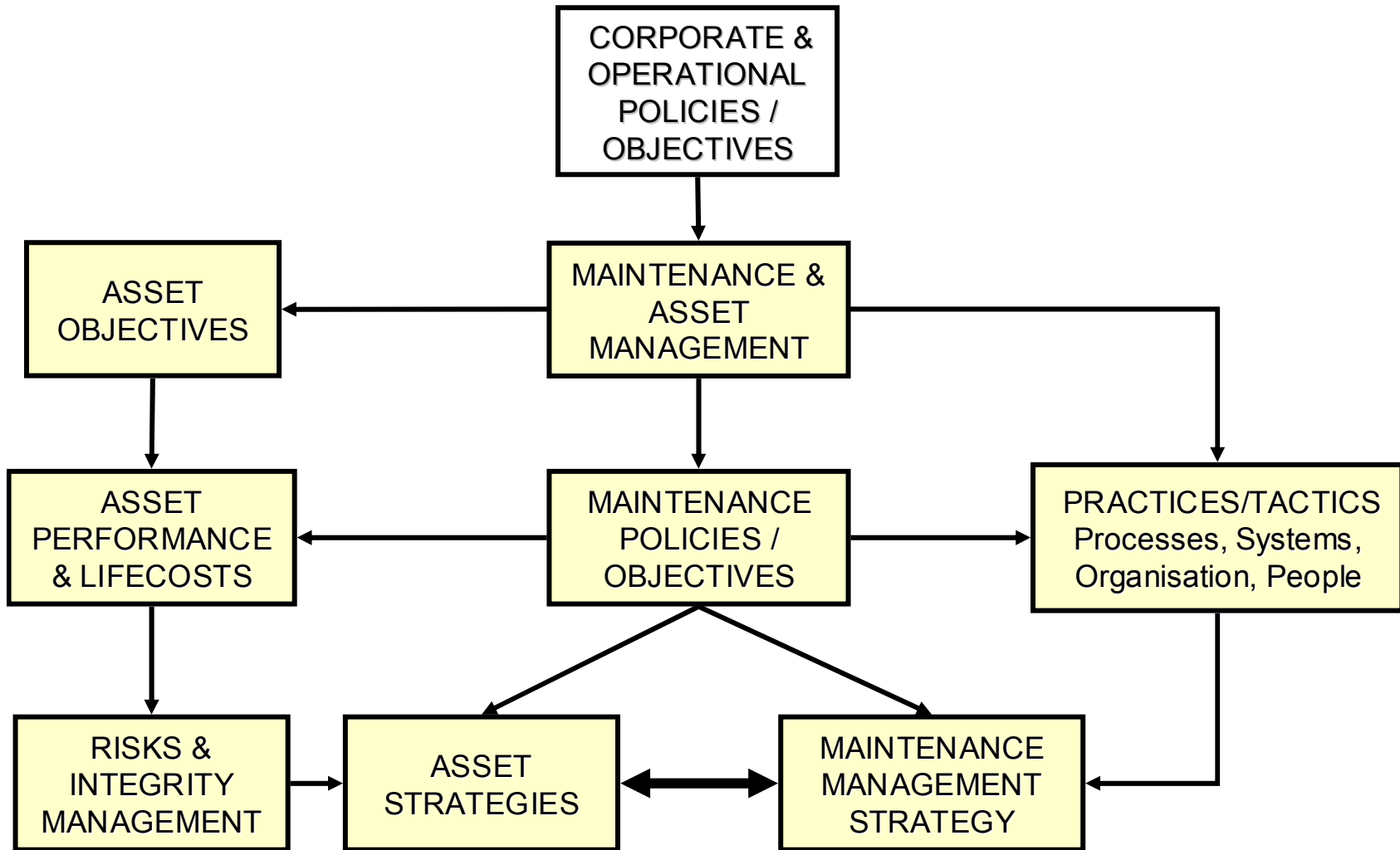
Overall asset management goal
reliability at a cost / equipment replacement value



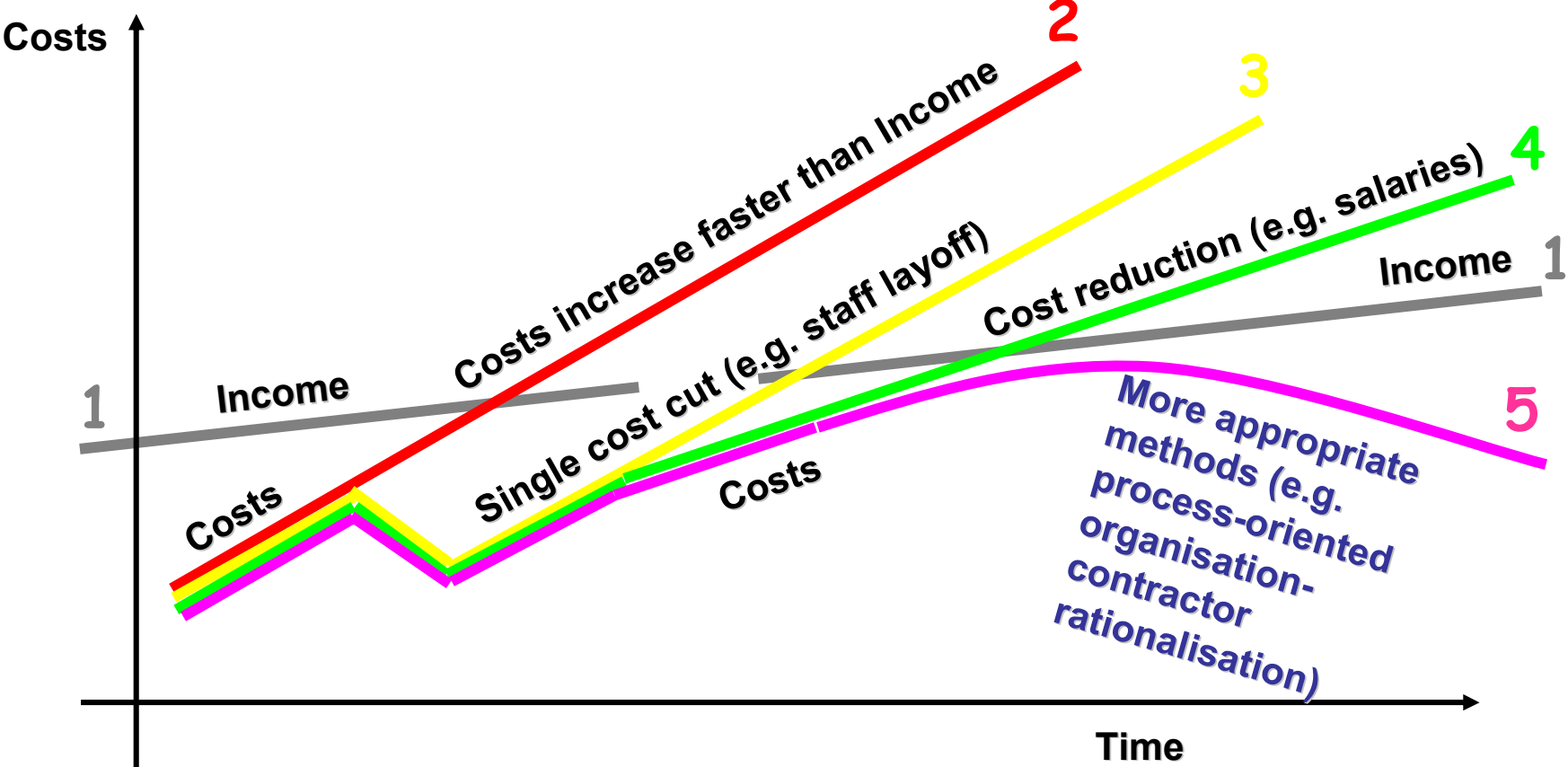
Carmichael Smith

The task



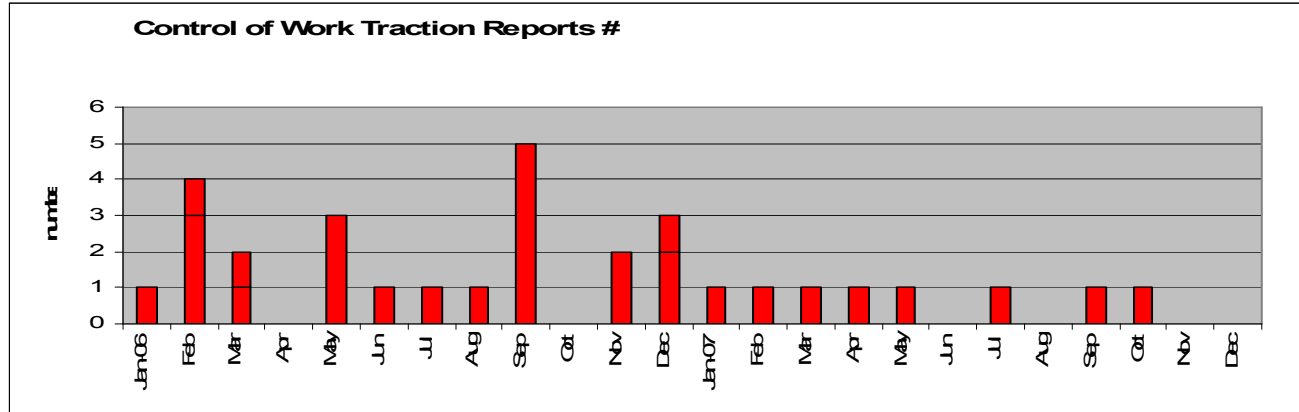


Policy 1 – Alternative cost saving potentials, other than in-house cuts, to be made

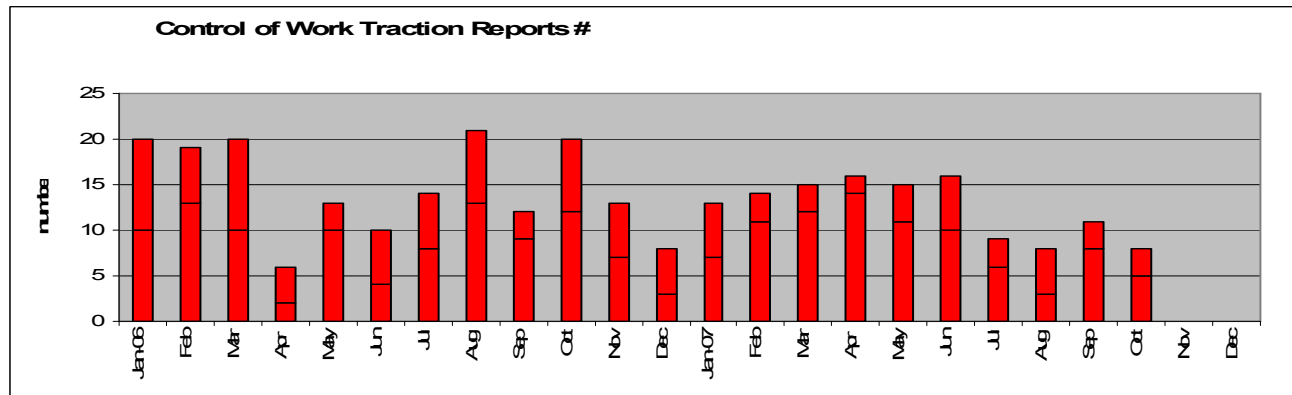


Policy 2 – Safe systems of work to be simplified and strengthened

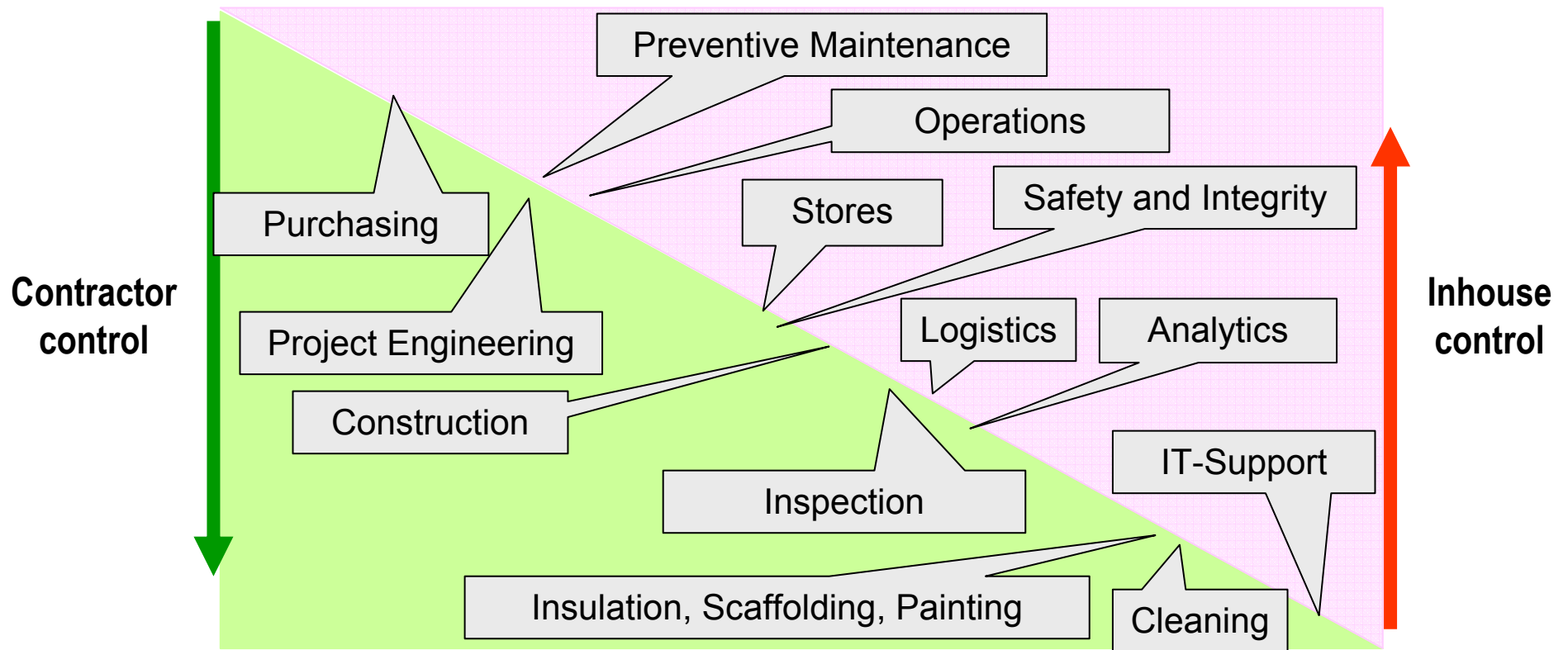
High Severity Incidents related to Safe Systems of Work – one per month average



All Safe Systems of Work Incidents –between five and twenty per month



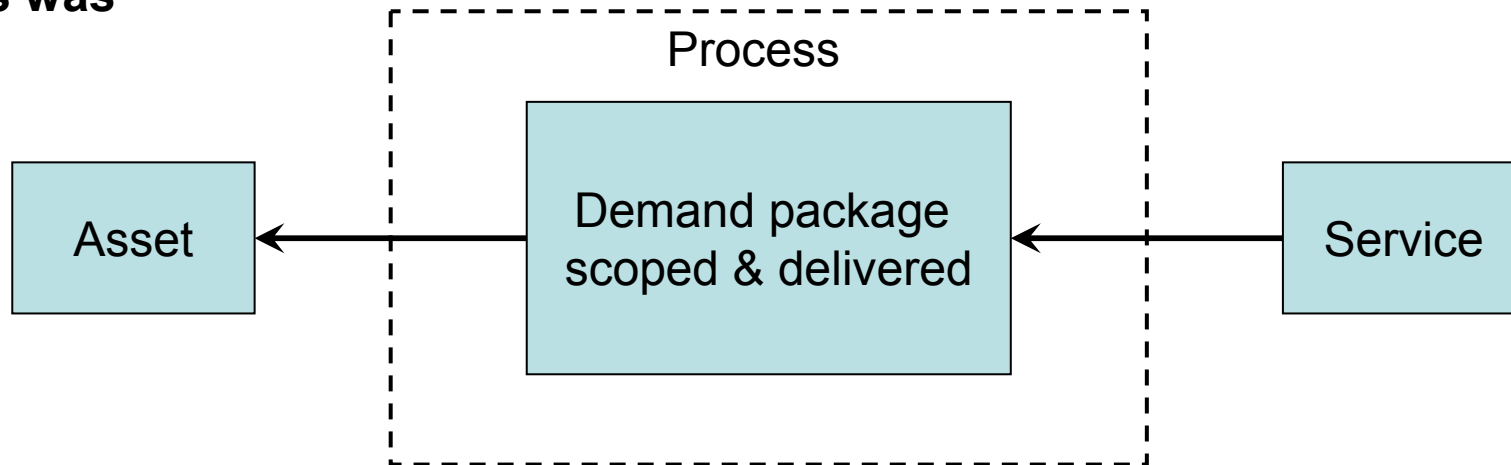
Policy 3 – Increase in-house control



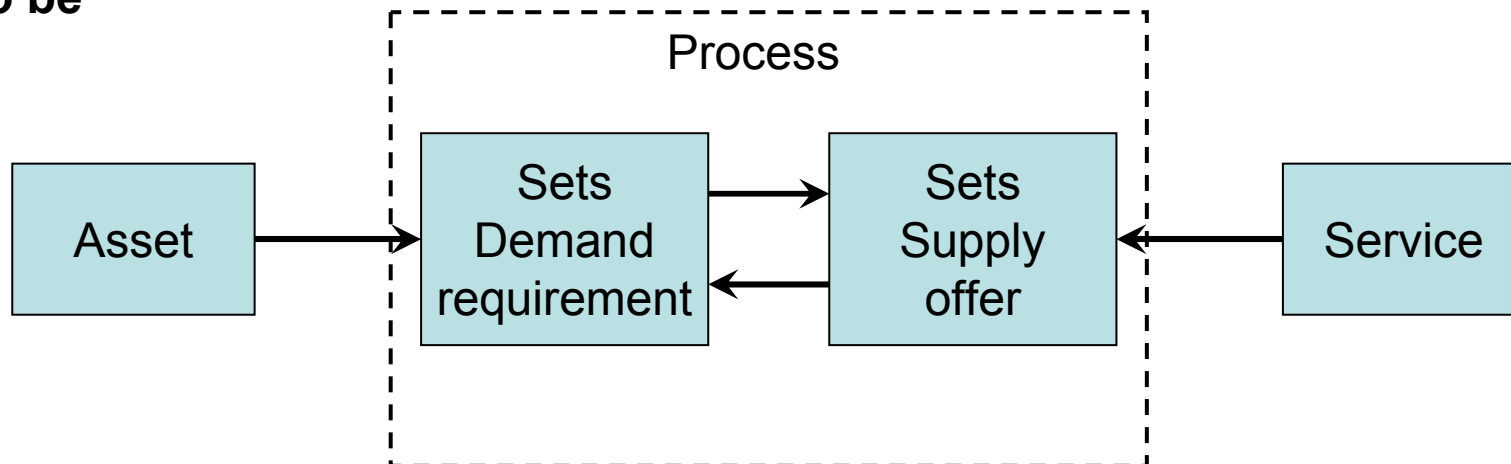
Policy 4 - Operations to be the earner & the customer

DEMAND / SUPPLY RELATIONSHIP

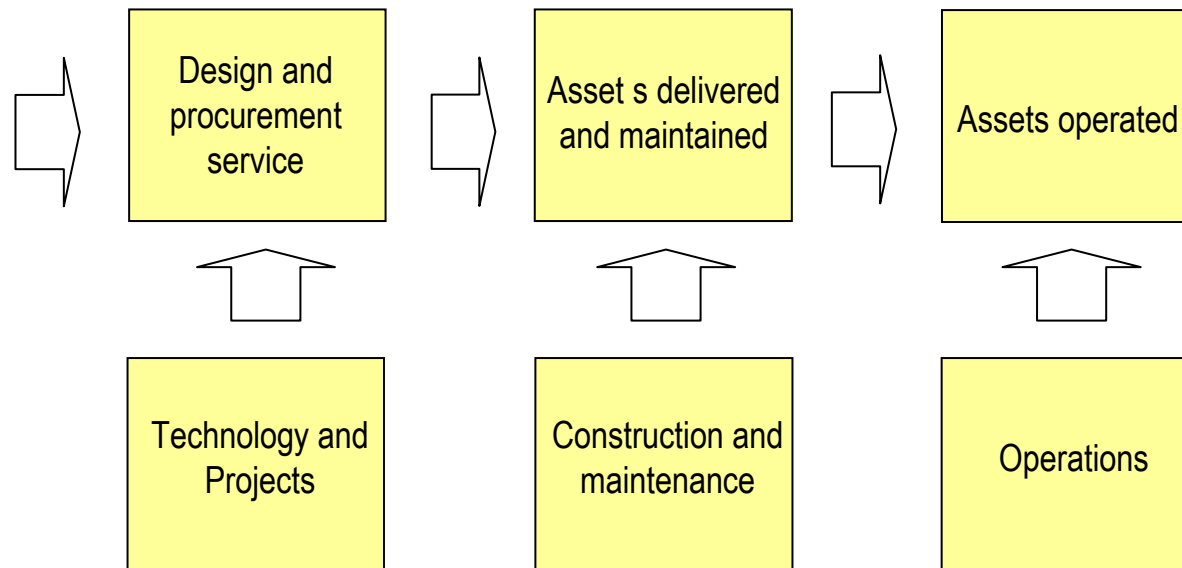
'As was'



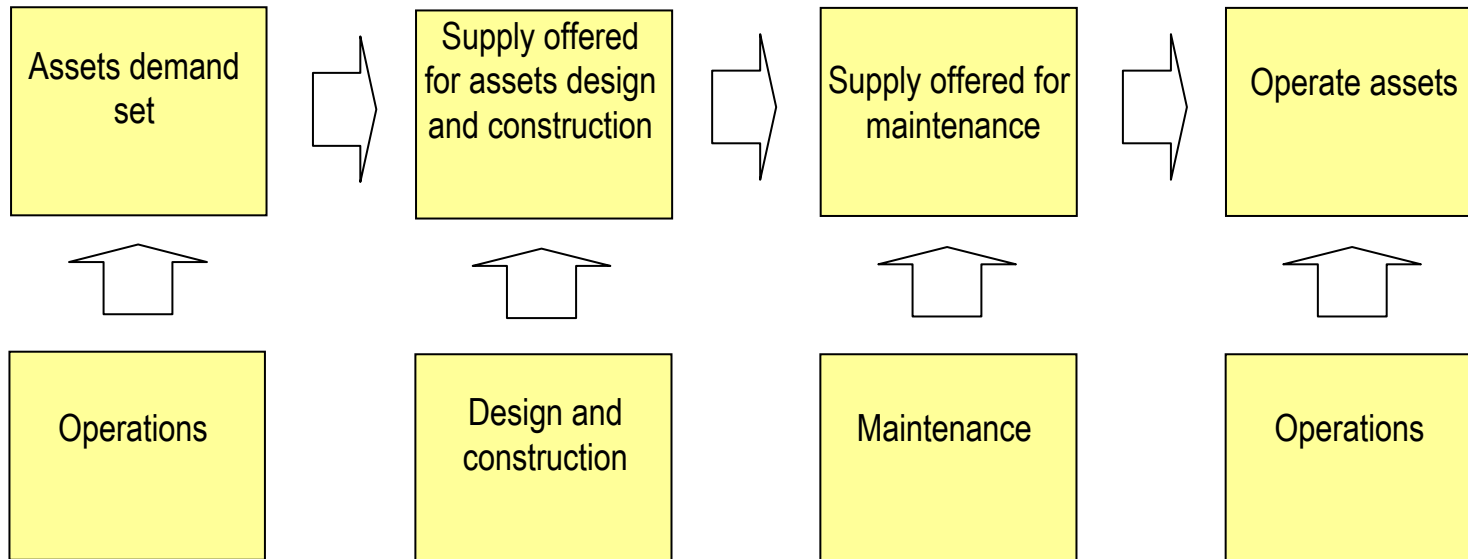
'To be'



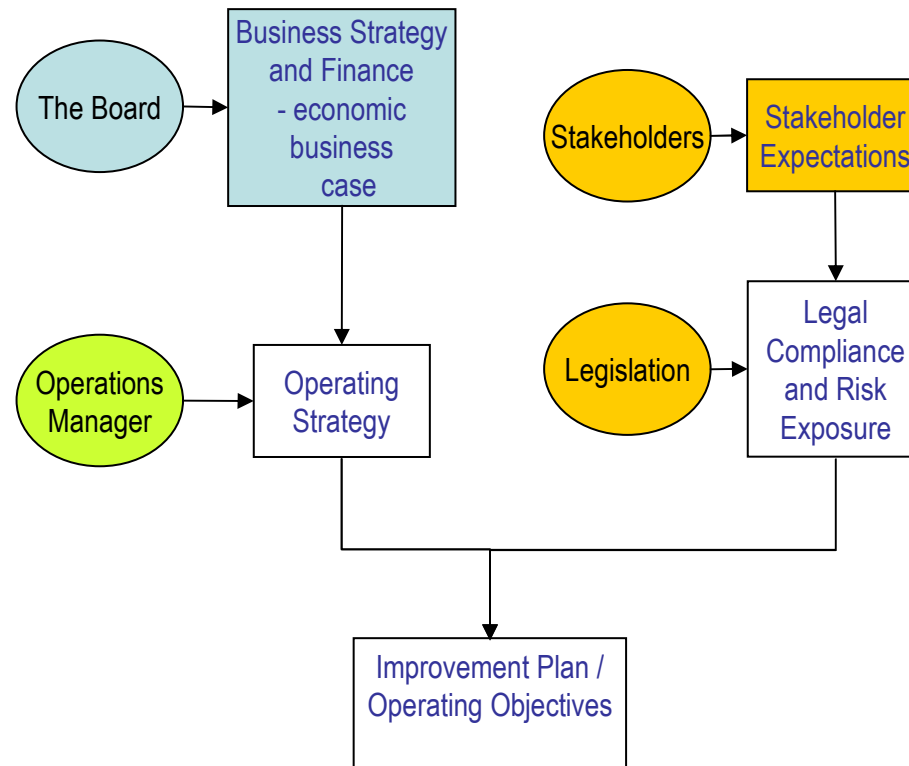
Previous approach to supplying “Operations”



New approach to supplying “Operations”



Who is setting the business plan and the objectives?

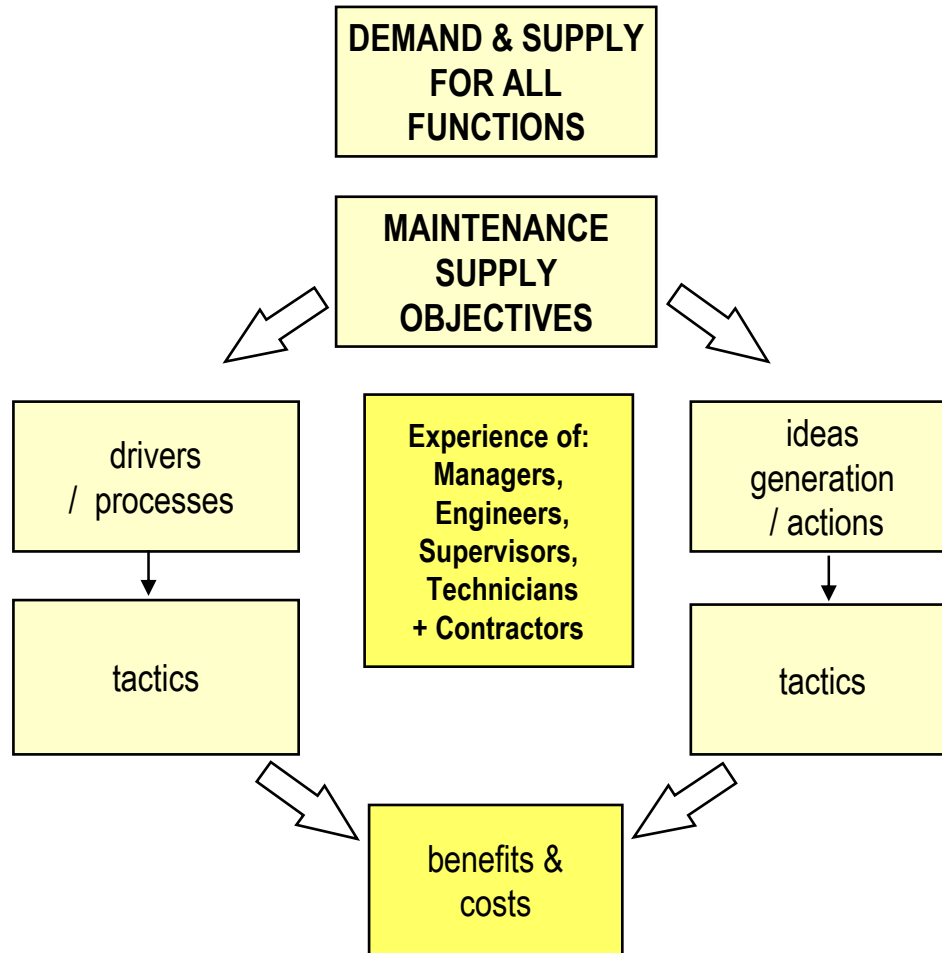


What are the Operation's long term objectives?
– short term targets?

'Road Map Plan' required for:

- 1 – 3 - 5 - 15 year timescales
- availability target of over 97%
- utilisation target of over 92% in non-turnaround year
- achievement of mean delivery of 150 k.tonnes per annum
- fulfilment of all COMAH compliance / statutory regulator requirements
- total asset management cost of 2.7 % of estimated asset replacement value (ERV)**

Strategies for implementation – an approach



What do the functions need from each other?

- the site 'demand and supply' needs

Maintenance <u>demand</u> this from Operations	How Maintenance see their <u>supply</u> to Operations
Ops. give clear information on breakdown requests	Maintenance provide feed-back on all maintenance requests
Ops. give equipment release as agreed in maintenance plan	Maintenance provide Asset Management plan for Revex / NRR / Capex / TAR
Ops. provide financial approval of all planned work requests	Maintenance delivery completed work as per request - scope / schedule / cost and quality

How Operations see their <u>supply</u> to Maintenance	Operation's <u>demand</u> this of Maintenance
Operations set the Asset strategy - give detailed plans / requirements for Maintenance to define the jobs	Maintenance define, communicate and action the maintenance daily / weekly / monthly plans
Operations provide a 'Control of Work' service	Troubleshooting / problem solving / competence and delivery
Operations give the release of equipment on- time	Jobs completed on time, on budget and work first time

'Demand and supply' to and from Maintenance – Operations – Technology - Projects

Operations

- Set asset strategy - give detailed plans / requirements eg; frequency of PM routines
- Provide COW service
- Release of equipment on time
- Provide job list of required work
- Support punching activity



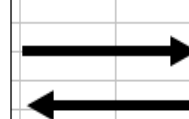
Maintenance

- Define communicate & action maintenance daily / weekly / monthly plan & provide feedback
- Trouble shooting / problem solving / competence & delivery
- QA system for identified jobs
- Jobs completed on time, on budget & work first time
- Ability to deliver breakdown without impacting planned maintenance
- Ad hoc requests on technology support on maintenance issues
- Input to & agreement of project scope & associated maintenance strategy



Technology

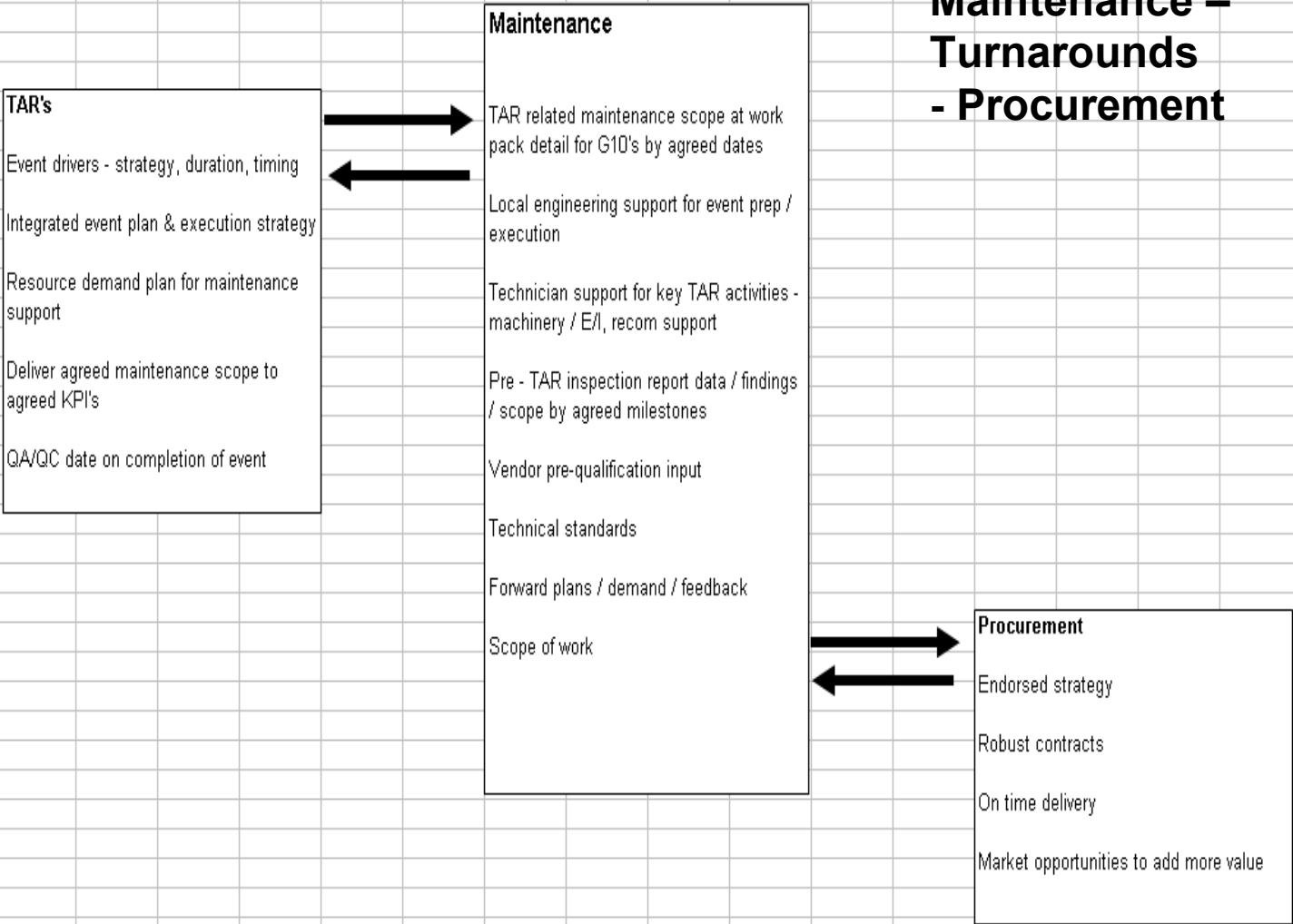
- Ad hoc support of technology to solve maintenance plans



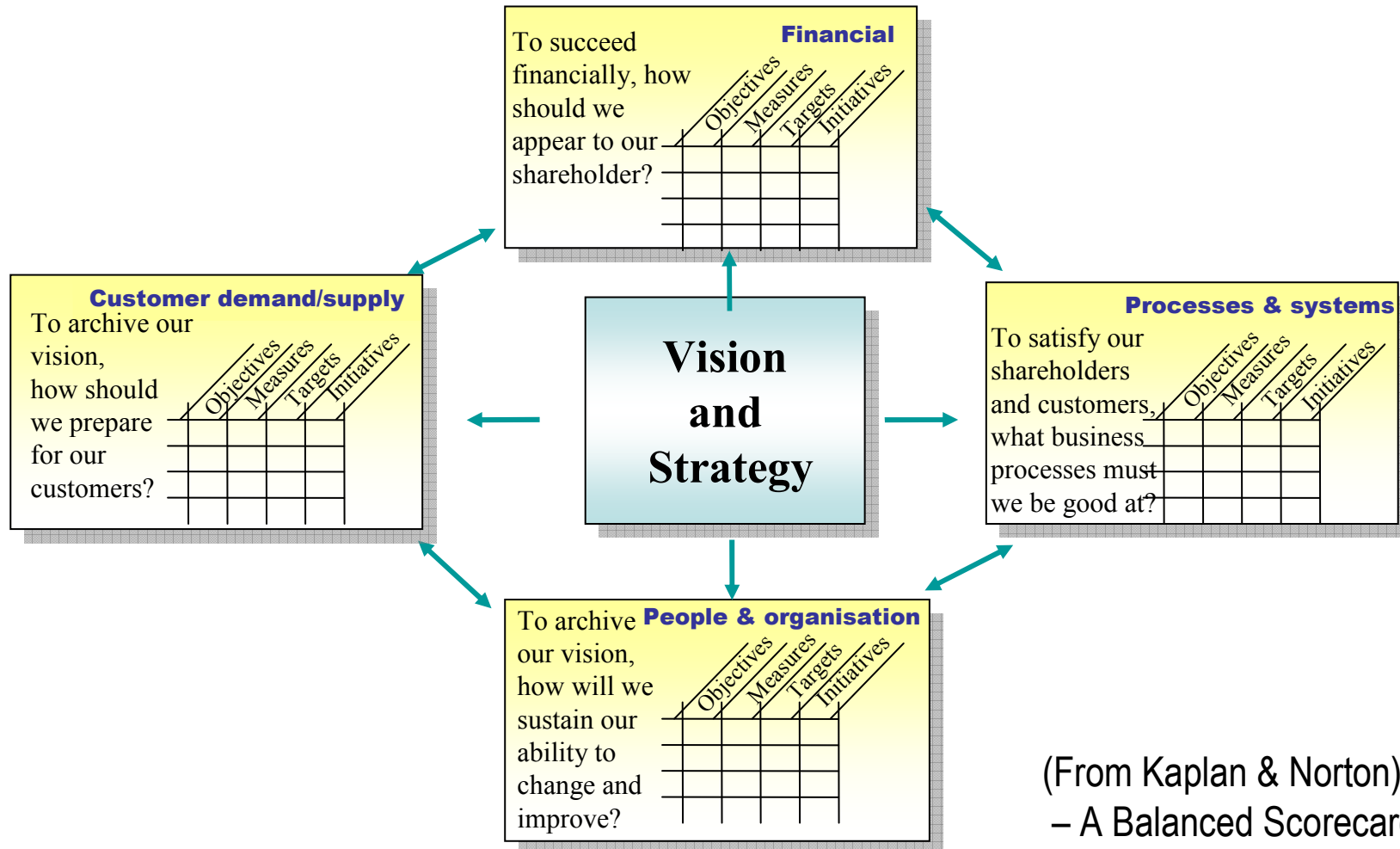
Projects

- Relevant project information for comment / agreement

'Demand and supply' – Maintenance – Turnarounds - Procurement



One way – a balanced scorecard of maintenance objectives

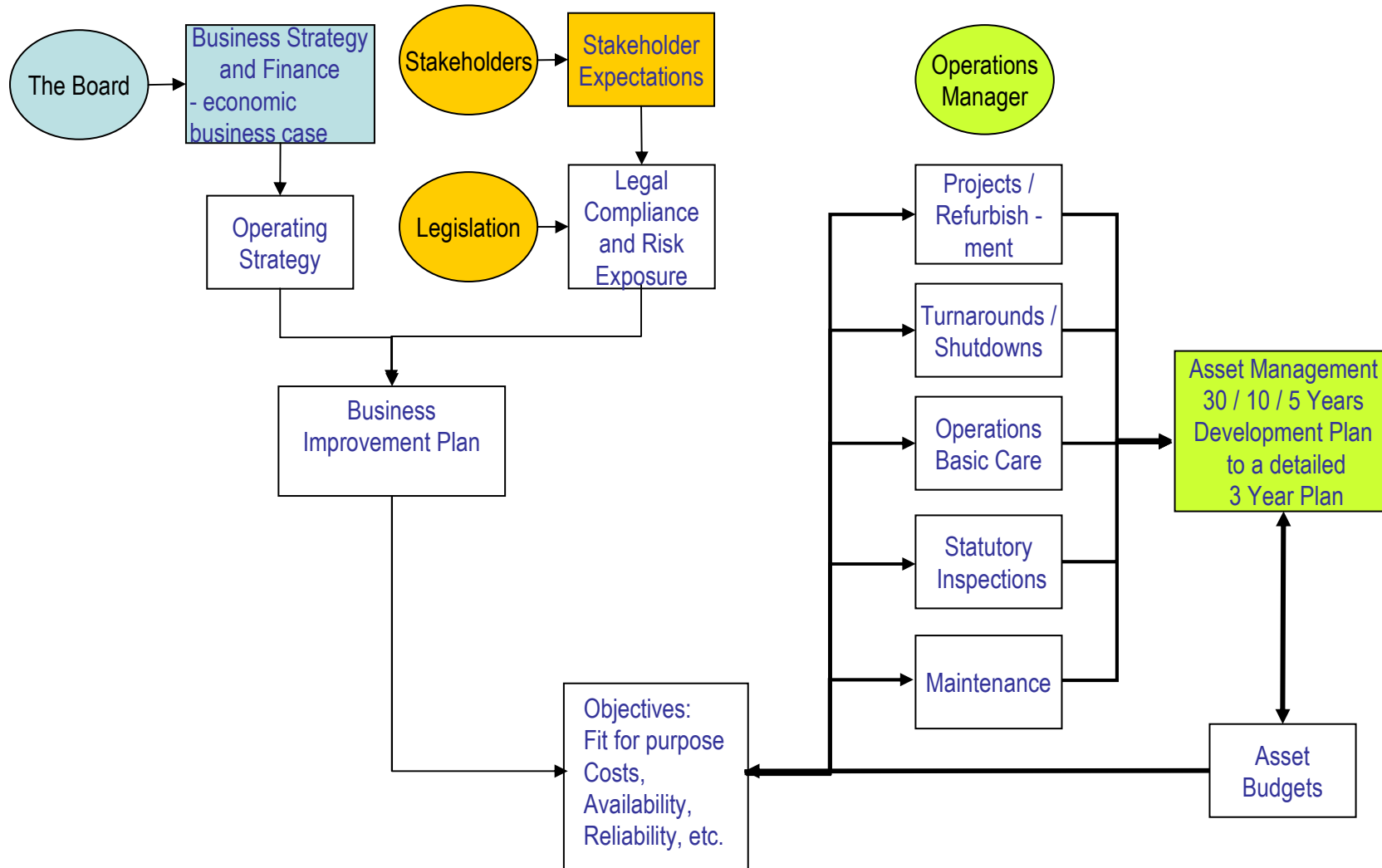


How to go about delivering the supply?

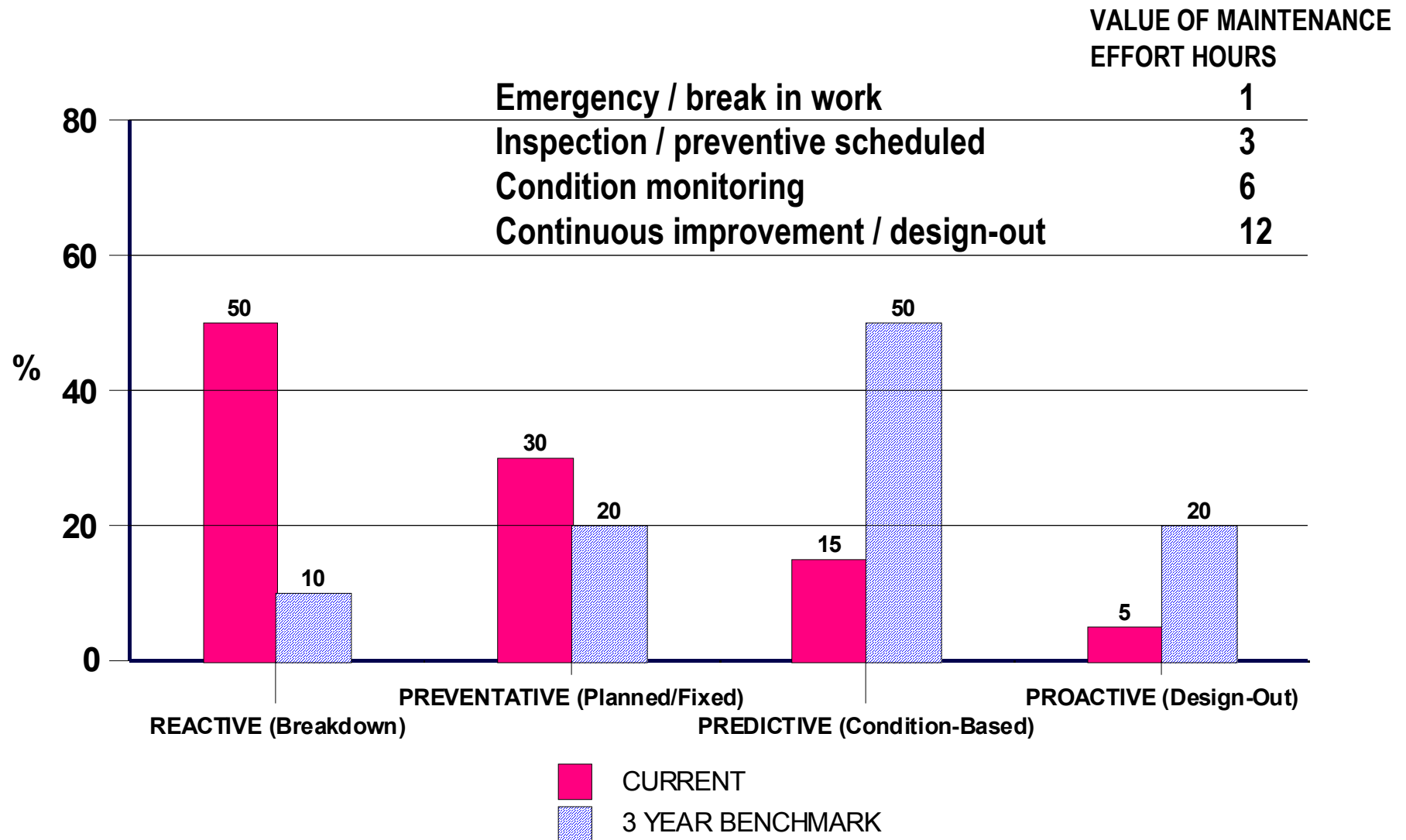
Strategic Tactics = Drivers + Targets + Actions

STRATEGIC AIMS & OBJECTIVE	LEAD PERFORMANCE DRIVER (S)	TARGETS	ACTIONS
FINANCE → remove cost penalties for legislative non-compliance	deliver management processes across site	100% compliance within 18 months	- engineering authorities to write new processes
CUSTOMER → improve medium term Asset Management Plans	coordinate plans for projects, shutdowns and maintenance	reliability, cost, safety, environment objectives	- better asset strategies - improve planning systems
PROCESSES → improve key performance indicators and their documentation	audit data and document demands and implement better systems	100% delivery of quality data to meet needs for Key Performance Indicators	- implement more easy to use computer system and re-train feedback of data
PEOPLE → develop a 'competence based site'	complete all training programmes	zero safety incidents 70% one person jobs	- multi-skill programme - improve safe working

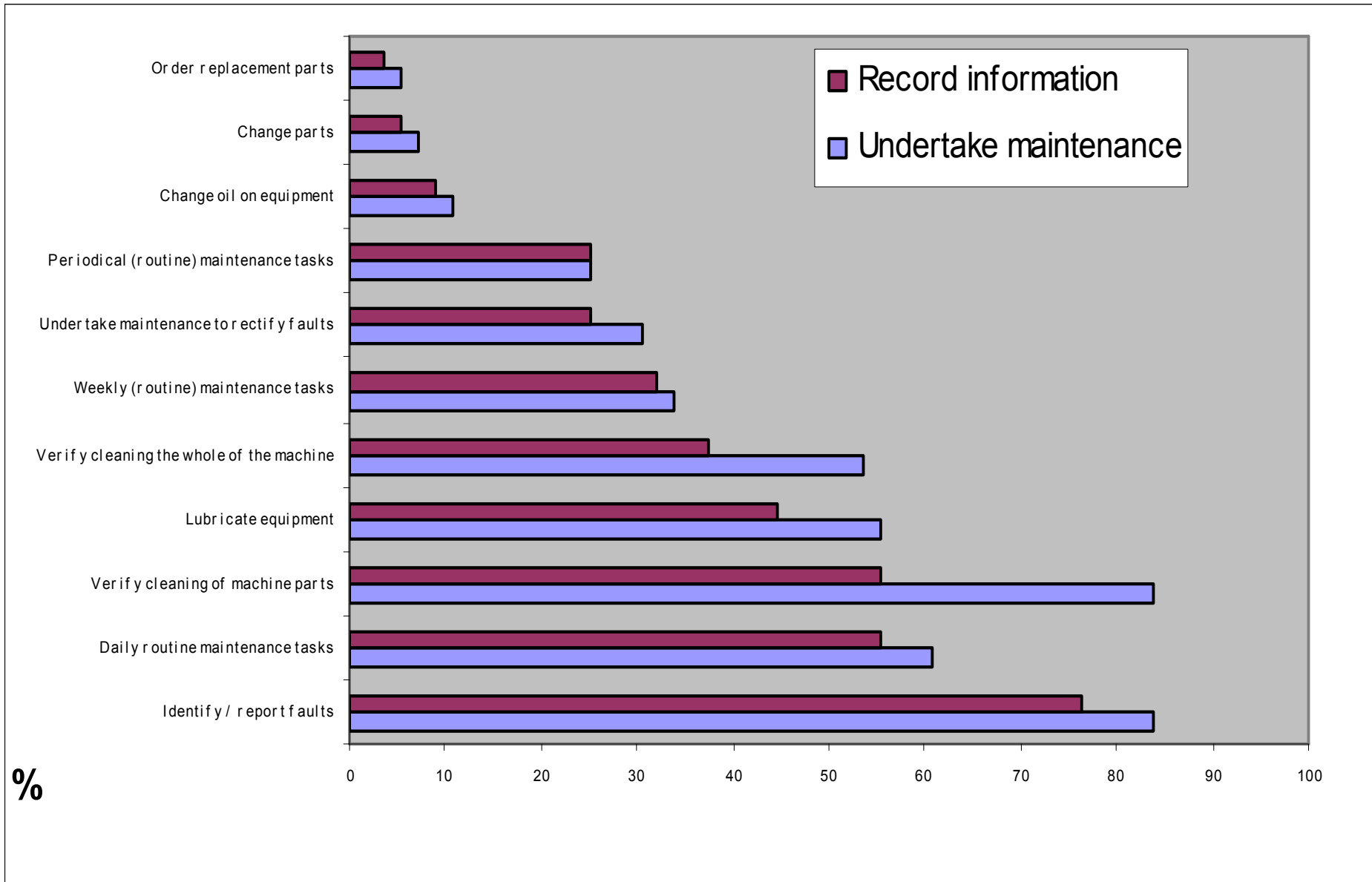
1st. delivery – a coordinated plan



Asset strategies – according to the risks of not meeting the asset objectives



include operators - 'maintenance' completed by operators



Some asset activity requirements:

Shutdowns / projects

- frequency of the shutdowns reduced?
- duration of the shutdowns extended?
- coordinated plans for years ahead
- projects capex / non-recurring revenue plan for next 5 years and detail – duration and basic costs
- investments needed – life cycle justified
- listed by type of budget justification / by assets

TAR plan for next 10 years – duration, basic cost

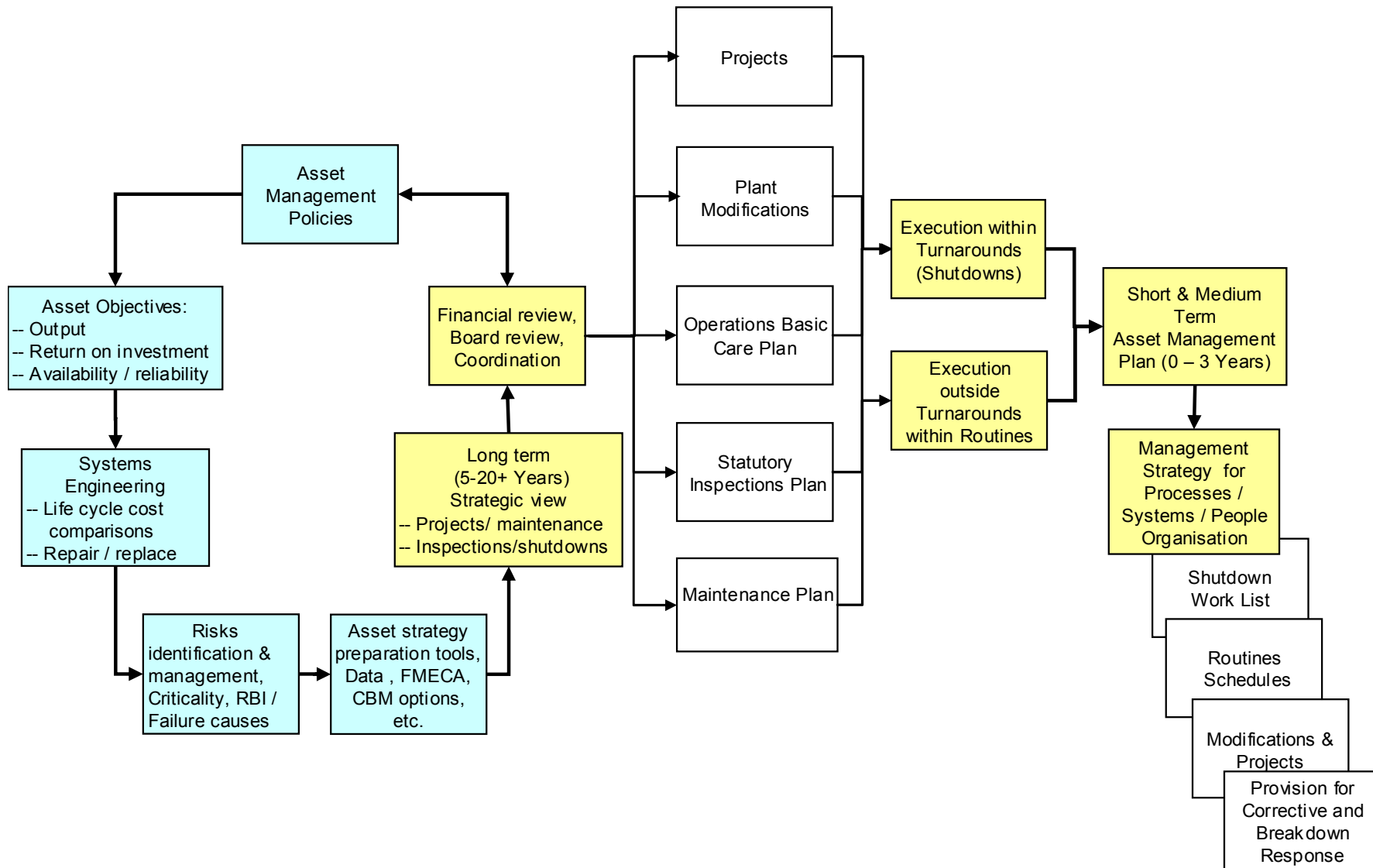
- extend turnaround to 10 weeks in 2011 to implement X project
- extend duration between turnarounds from 4 to 5 years
- assets X turnarounds planned for 2011 and 2016
- done by Mechanical and I/E Engineer***

Essential to have an up to date Asset register

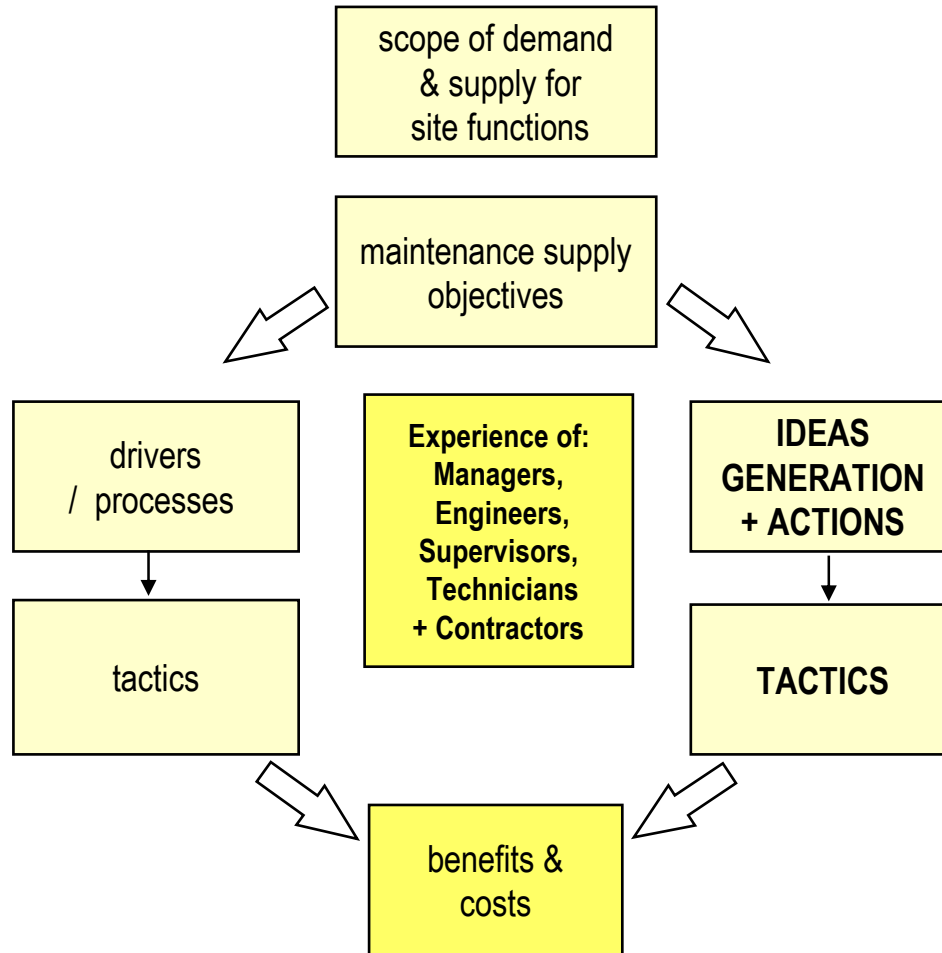
- Site A
- Plant A
- Asset system A
- Equipment item 00
- Equipment component 00
- Code system: AAA0000

- ❑ for recording asset costs within a maintenance computer system
- ❑ for describing and recognising equipment and their components
- ❑ for links between the stores stock items, equipment specifications, etc.

2nd. delivery – how to carry out the plan, the management strategy



Strategies for implementation – an approach



Carry out 'ideas generation'

- gather the team of engineers, supervisors / leaders, planners, others from across the functions (management review)
- discuss the good and the best ideas
 - for the most effective improvements
 - within the scope of the required 'demand – supply'
- commenting on what is good and not good about the current work control
- all ideas are welcomed and all are reviewed by the maintenance managers

Contractor activities

Insulation

Painting

Scaffolding

Civils

Fabrication / asbestos

Civil works

Industrial cleaning

Bundle cleaning

Crane hire

Plant hire

Valve management

Leak sealing

Demolition

Condition monitoring

Bundle cleaning

Heat exchanger repairs

Lifting equipment hire

Steam traps

Generator hire

Design services

Facilities maintenance

Dry waste

Electric motor repair

Condition monitoring

A contractor review

- ❑ front end all jobs all previously estimated by contractors
- ❑ no formal challenge / validation of contractor estimate
- ❑ poor scheduling by in-house team / contractor
 - contractor turns up - permit not available
 - contractor turns up and scaffold not erected
 - process plant unavailable – contractor assigns labour himself
- ❑ poor communication between in-house / contractor
 - on the day problems don't get fixed
 - plant, equipment or materials fails to arrive
 - poor feedback of progress
 - other resources fail to turn up
 - lack of adequate definition on variations

'Improvements' – initial criteria for benefits evaluation

Ideas Generation Notes - Maintenance / Contractor interface benefits – costs in euros			H>1m	H>1m	H 3-5y	H-external issues / IR
			M>100k	M>100k	M<3y	M-internal
			L>10k	L>10k	L<1y	L-none
<u>Nr.</u>	<u>Theme</u>	<u>Idea</u>	<u>Benefit</u>	<u>Cost</u>	<u>Time</u>	<u>Risk</u>
38	Cost Control	Use contracts containing incentives	H	M	L	L
29	Cost Control	Scope of work needs more depth and has to be done by INHOUSE people not the contractor	H	M	L	L
59	Cost Control	All contractor work needs a time estimation	H	M	L	L
60	Cost Control	Contractor estimates need to be challenged	H	M	L	L
70	Cost Control	Improve skills for carrying checks and approval of contractor invoices	H	M	L	L
71	Cost Control	Improve scheduling of contractor work	H	M	L	L
51	Cost Control	Control contractor permit requests and time for issue	H	M	L	L