Benchmarking for Improved Water Utility Performance

C E P T

USP

Vewin

UNESCO-IHE
Institute for Water Education

Benchmarking
Water Services

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Contributing Partners

UNESCO-IHE

USP of Brazil

CEPT University of India

NWSC of Uganda

Vewin/CDC of the Netherlands

Course Objectives

To present and discuss:

- The concept and methodologies of benchmarking, i.e. performance assessment and performance improvement
- Benchmarking experiences in the water sector

To do an exercise and a game with a view to:

- Gain some hands on experience with i) assessing water utility performance, comparing them and identifying areas of improvement; ii) prioritizing measures and wisely investing funds to achieve improved performance

To discuss various cases with a view to:

- Understand some of the tools available with utilities and regulators to improve performance
- To develop a Joint or Individual Action Plan for application in participant's own organisation

Course programme

Week 1

- Lectures, Exercise, Site Visit, Utility simulation game,

Week 2

- Four case Studies, **Action Planning**

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Action Plan

Goal: to enable each participant to apply the learnings on benchmarking from this course to his/her own work environment by developing a doable Action Plan

Process: the Plan will be prepared on the last course day. Each participant will identify his/her Professional Goals in the area of BM, the Issue/ Problem to be targeted, and the Solutions. From there the Action Plan will be developed. Participants are encouraged to start thinking about their Action Plan from the 1st course day onwards

Sessions for Week 1

Days 1/2: Lectures Benchmarking: Introduction, presentations, discussion

Day 3: Exercise Benchmarking

Day 4: Site Visit

Day 5: Water Utility Simulation game

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Sessions for Week 2

Day 6: Case Study #1: PNQS, Brazil: prize

Day 7: Case Study #2: NWASCO, Zambia: regulator

Day 8: Case Study #3: NWSC, Uganda: incentivising performance improvement

Day 9: Case Study #5: PAS, India: Performance assessment & improvement

Day 10: Action Planning

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Topics Days 1/2

- Opening session (#1)
- Introduction to Benchmarking (#2)
- Application of BM in the WatSan Sector (#3)
- Institutionalization of Benchmarking:
  - Voluntary benchmarking by Utilities (#4)
  - Mandatory benchmarking required by Regulators (#5)
- Benchmarking experiences in the WatSan Sector
  - Perspectives (#6)
  - Methods (#7)
  - Indicators (#8)
  - Performance Improvement (#9)
  - Framework for Pro-poor indicators (#10)

Training Materials Days 1/2

- Presentation (120 slides)
- Support Material (…. pages)
- Additional Reading and References (.. pages)

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Topic 2:
Introduction to Benchmarking

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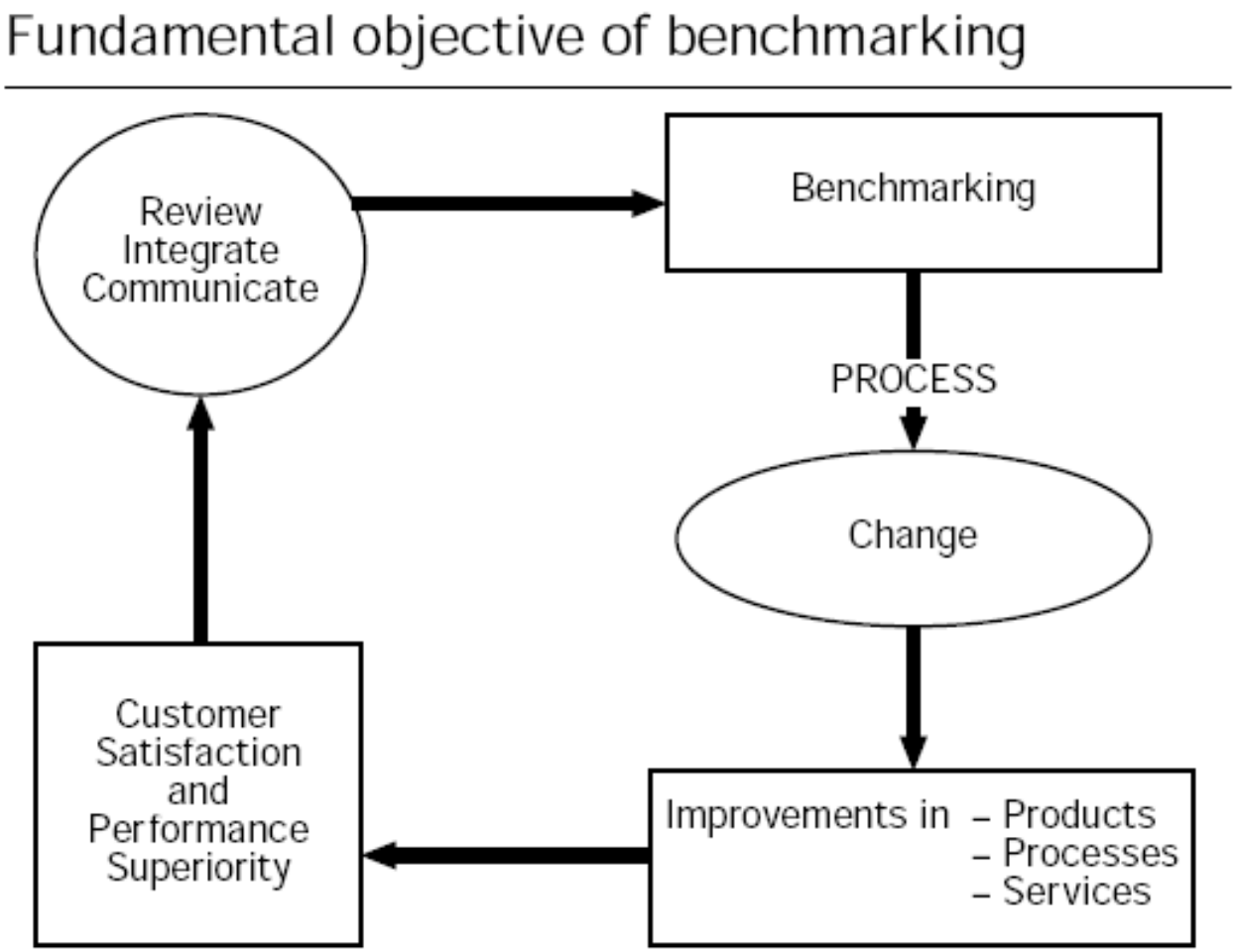
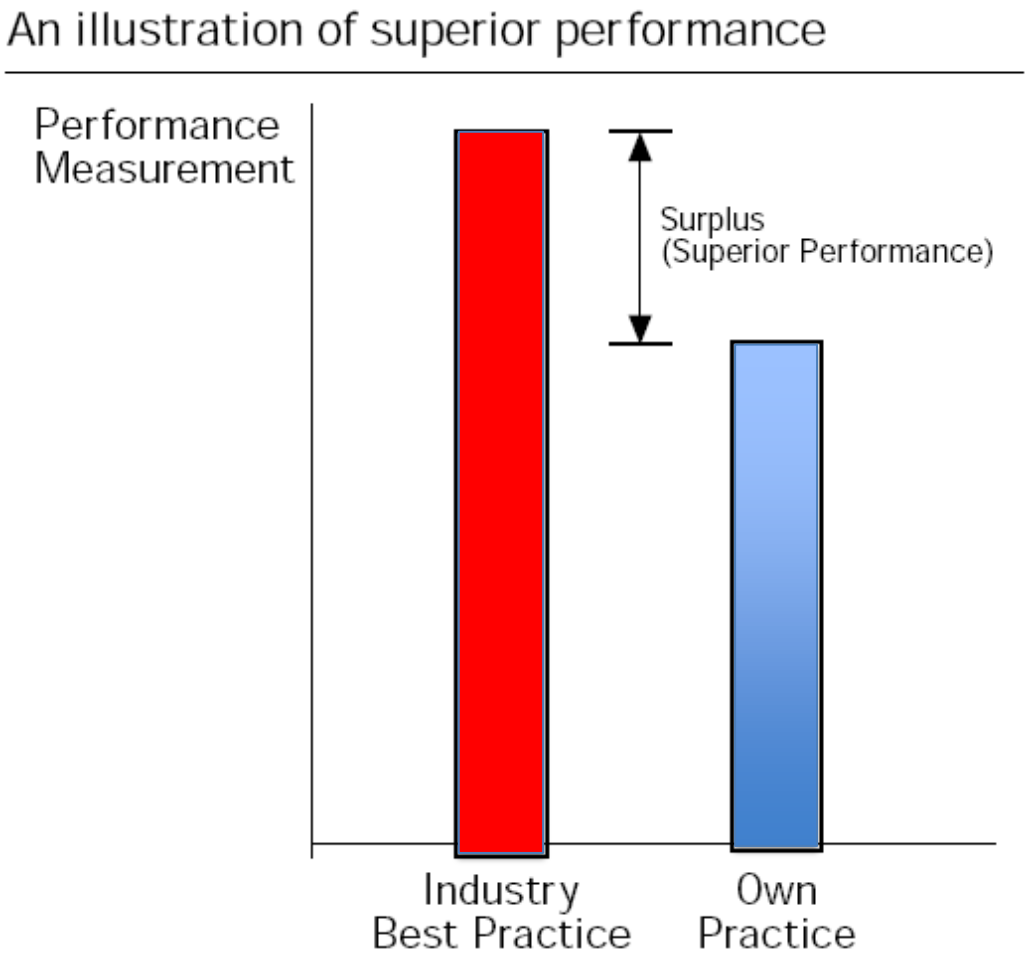
Introduction



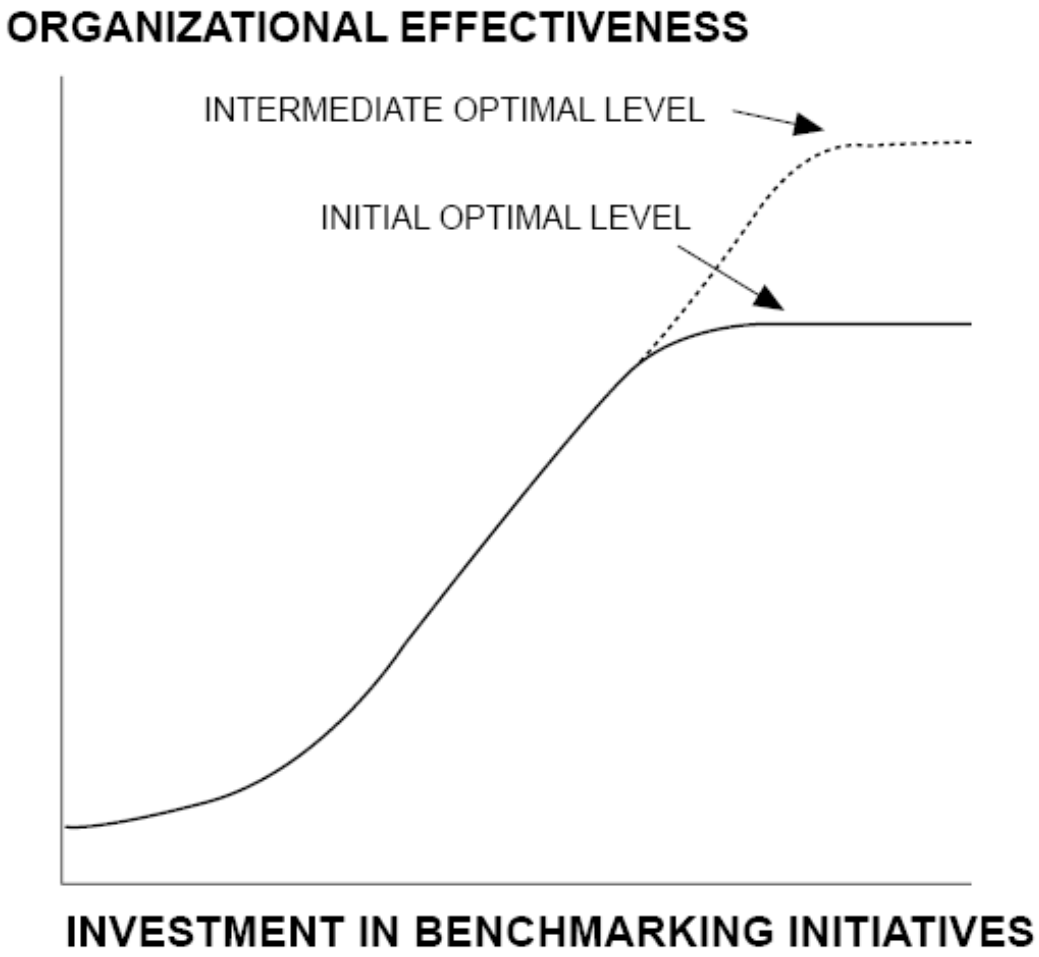
Source: Booth, 1995

Introduction



Source: Fong, 1998

Introduction



Source: Dorsch, 1998

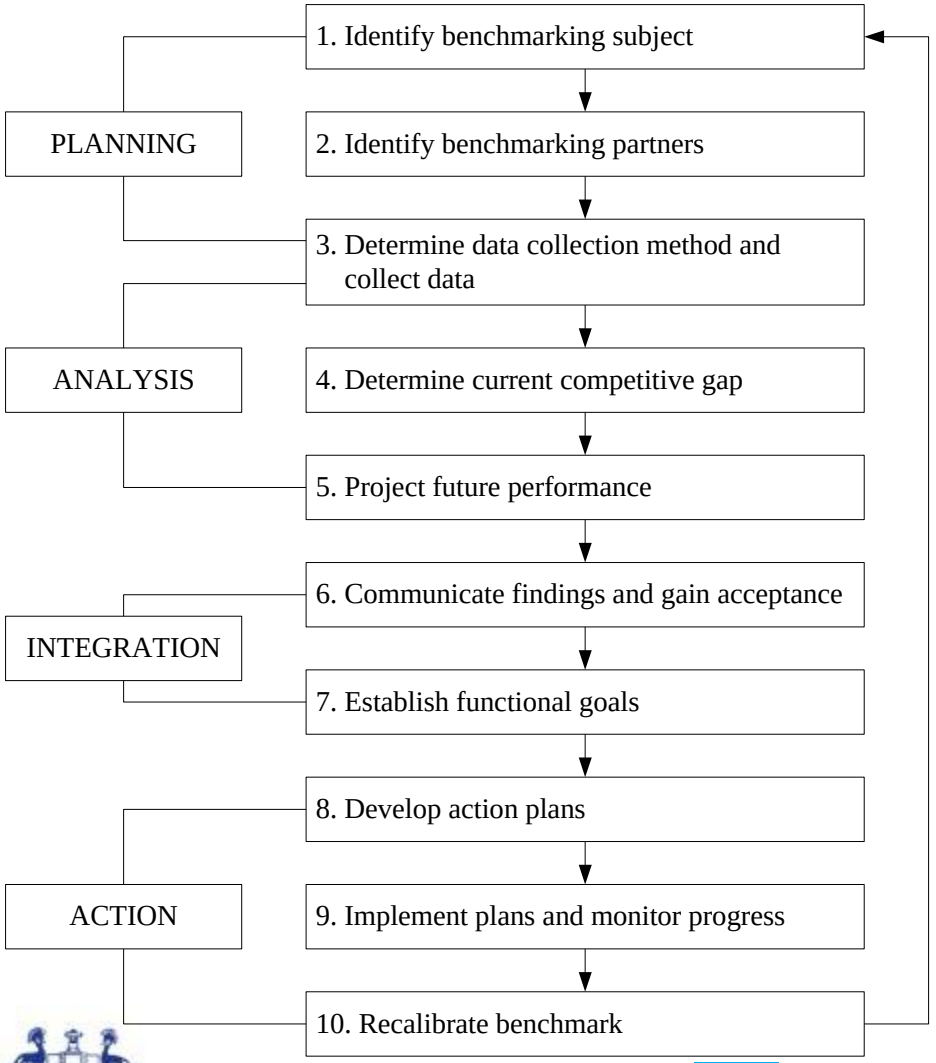
Introduction

Benchmarking definitions:

- Harrington (1995): “a continuous process to compare with the best practices, to project future trends in them, and to implement them in order to meet and exceed customer expectations.
- Watson (1993): “a continuous search for and application of significantly better practices that leads to superior competitive performance”
- Boxwell (1994): “is about setting goals by using objective, external standards and learning from others, with the emphasis on learning how rather than how much”
- Camp (1989): ‘’is the process of comparing one's business processes and performance metrics to industry bests or best practices from other companies’’.

Introduction

Benchmarking Process:



Source: Camp, 1989, in Anand & Kodali, 2008

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Introduction

Classification (1):

Classification	Type	Definitions
Name of the referent	Internal	Comparing within one organization about the performance of similar units or processes
	Competitor	Comparing with direct competitors, catch up or even surpass their overall performance
	Industry	Comparing with company in the same industry, including non-competitors
	Generic	Comparing with an organization which extends beyond industry bounderies
	Global	Comparing with an organization where its geographical location extends beyond country boundaries

Source: Fong, 1998

Introduction

Classification (2):

Classification	Type	Definitions
Content of Benchmarking	Process	Pertaining to discrete work processes and operating systems
	Functional	Application of the process benchmarking that compares particular business functions at two or more organisations
	Performance	Concerning outcome characteristics, quantifiable in terms of price, speed, reliability, etc.
	Strategic	Involving assessment of strategic rather than operational matters

Source: Fong, 1998

Introduction

‘Strategy is easy. Tactics are hard.’ (Andrall Pearson)

‘I’ll take solid execution over brilliant strategy any day.’ (Arthur Rock)

Benchmarking supports Strategic Planning

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Introduction

How it started: Xerox

- for nearly 20 years Xerox enjoyed a near-monopoly in the copier industry (patent protection/high growth)
- by 1975: 75% of world market share, revenues US$ 4 billion, but also first time earnings decline since 1951
- by 1980: market share dropped by 50%
- by 1979: start of competitive benchmarking and in 1981 throughout the company: ‘every department should be benchmarking itself against its counterpart department at the best companies’
- by 1990: regained market share and competes successfully with over 100 copier makers worldwide

Introduction

Xerox: benchmarking companies and processes

Company	Process
American Express	Collections
American Hospital Supply	Inventory control
AT&T	Research and development
Baxter International	Employee recognition; human resources management
Cummins Engine	Plant lay-out and design; supplier certification
Dow Chemical	Supplier certification
Florida Power and Light	The quality process
Hewlett-Packard	Research and development; engineering
L.L. Bean	Inventory control; distribution; telephonics
Marriott	Customer survey techniques
Milliken	Employee recognition
USAA	Telephonics

Introduction

Xerox benchmarking results:

- Reduced machine defects by 90%
- Increased marketing productivity by one-third
- Raised incoming parts acceptance to 99.5%
- Reduced service labour costs by 30%

Introduction

Application of benchmarking:

- In Private business: OK (= inevitable: competition)
- Question: But what about Public services, since there is no competition, why do benchmarking??
  Answer: Increasing pressures on public sector organisations related to:
  - ✓ Need for accountability
  - ✓ Need to reduce costs
  - ✓ Need to achieve more with same or less resources
  - ✓ Public demand for improved access and quality of public services
  - ✓ Need for change in organisational culture or behavior

Introduction

These pressures are encapsulated by **New Public Management** (1980's) that introduces:

- Market-orientation
- Customer orientation (or client focus)
- Accountability for results both within the organisation as well as externally
- Autonomy of the organisation and decentralization of authority within (reducing the burden of hierarchical rules and fostering greater discretion at lower points in the hierarchy)

Topic 3:

Benchmarking in the Water and Sanitation Sector

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Application

Application of benchmarking in the water sector:

- In water and wastewater utilities:
  - Instruments are well established
  - Practiced by a minority of utilities
- In river basin organisations:
  - Instruments are being established
  - Practiced mostly on a pilot basis

Application

‘Performance assessment’ (or ‘metric benchmarking’)

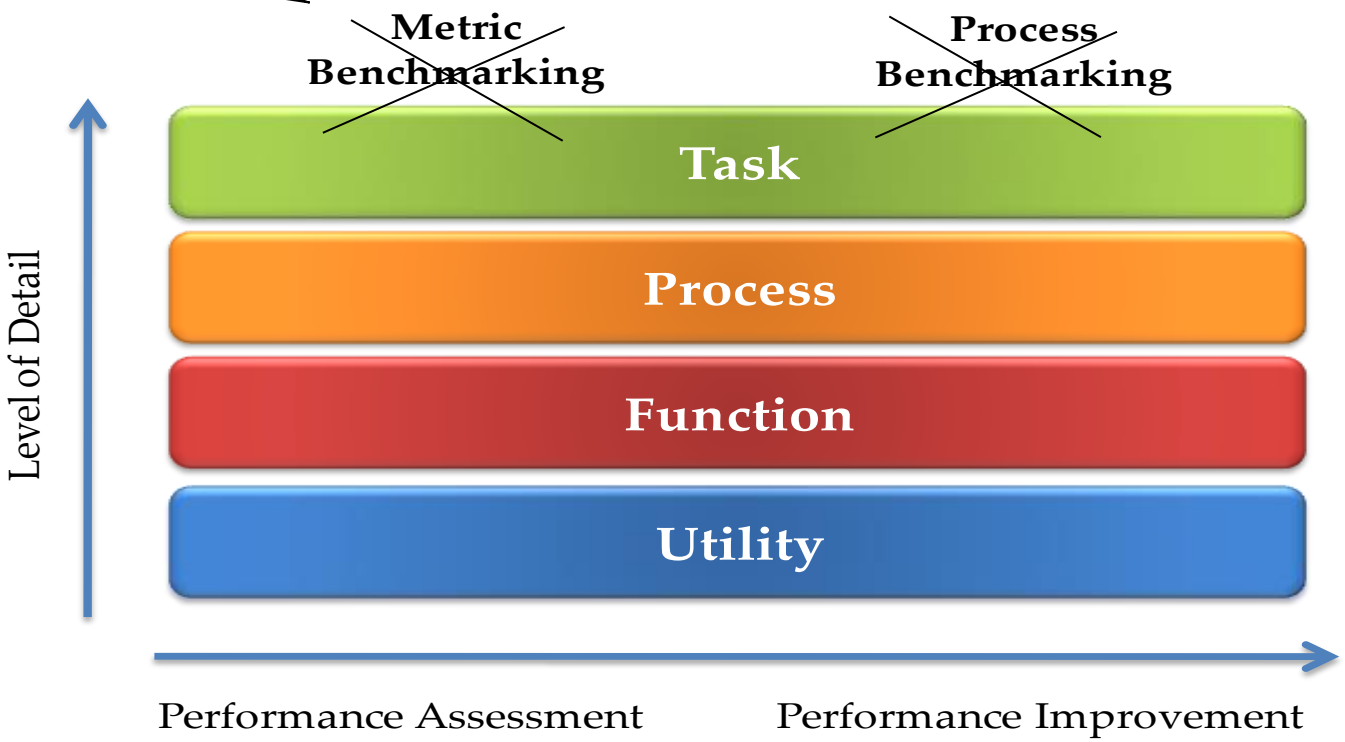
- performance measurement: e.g. ‘% of population served’ or ‘labour productivity’
- performance comparison: comparison over time, with another water provider, with a guideline/standard

‘Performance improvement (or ‘process benchmarking’)

- performance improvement deals with discovering the differences in the underlying policies, processes and methods being used: e.g. on leakage detection in an effort to reduce Non Revenue Water
- processes can be compared between water utilities but also between a water utility and an organisation in another sector: e.g. an energy provider on billing and revenue collection

terms now considered inappropriate by IWA

Application



Source: Cabrera et al, 2011

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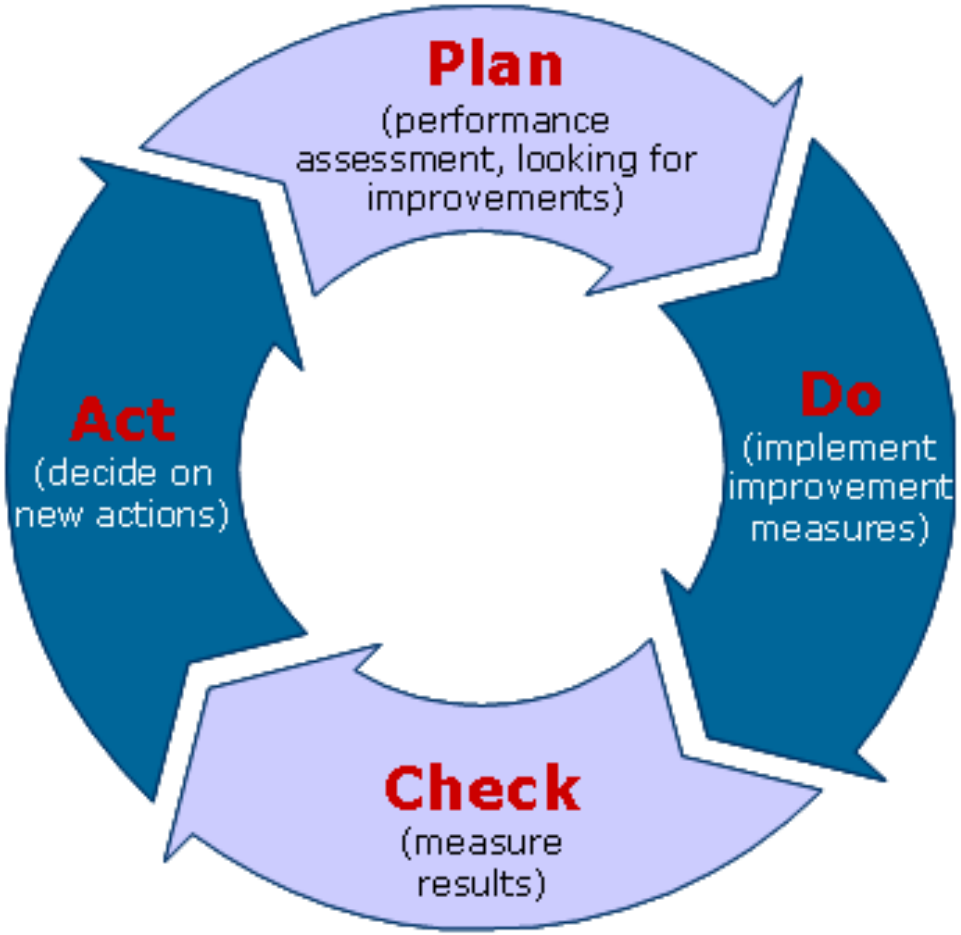
Application

Benchmarking as a continuous process:



Source: Dane, 2009

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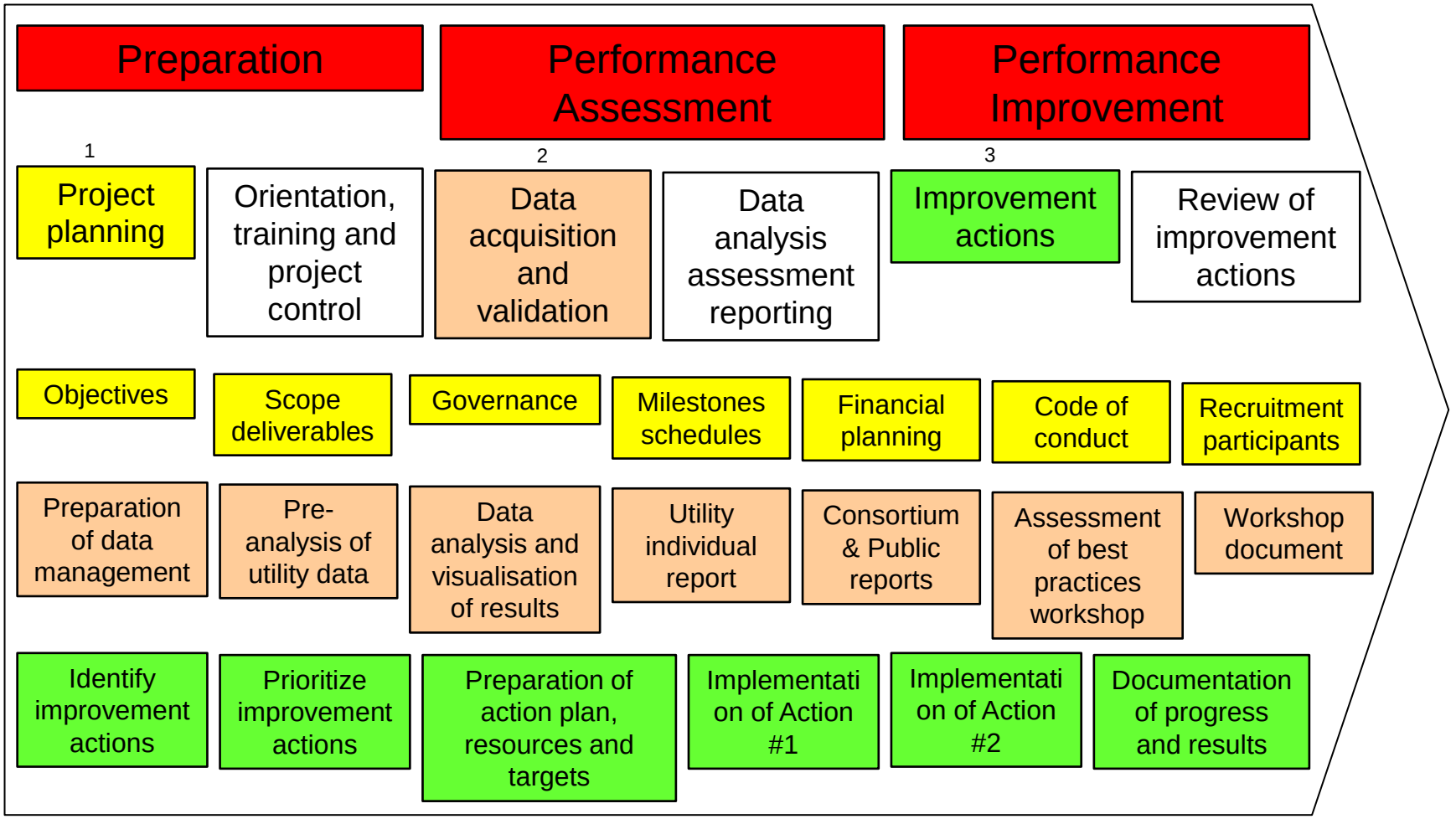
Application



Source: Cabrera et al. 2011

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Application

International Water Association

- Difficulties when comparing performance (surface water vs. groundwater, topography, availability of water resources, per capita GNP, cost of resources, etc.) within the same country, but probably more so when comparing across countries or even continents
- Example: A utility operating in a relatively flat, industrialized country such as the Netherlands, with access to an abundance of water resources, with a high average per capita income and low urbanization rates has less challenges to address than a utility operating in water-scarce and mountainous areas of Mexico, with a much lower per capita income
- This means that when we compare performance, we must be aware of contextual differences between utilities. IWA has introduced contextual indicators to help explain differences in performance

Source: Alegre et al, 2006

Application

Performance Assessment

Indicator	2002
Population served	538,600
Water supply connections	131,136
No of Employees	762
Unaccounted for water (UFW)	32%
Working Ratio	0.62
Staff per 1000 connections	5.66
Service coverage – water supply	85%
Average domestic tariff (US$/$m^3$)	0.18

Is this utility well performing?

Application

Performance assessment: comparison over time

KPI	2000	2001	2002
Population served	460,900	480,000	538,600
Water supply connections	94,724	112,427	131,136
No of Employees	713	730	762
Unaccounted for water	24%	28%	32%
Working Ratio	0.82	0.67	0.62
Staff per 1000 connections	7.20	6.49	5.66
Service coverage – water supply	75%	80%	85%
Average domestic tariff (US$/$m^3$)	0.30	0.40	0.45

The same utility….is it performing well now?

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Application

SEAWUN:

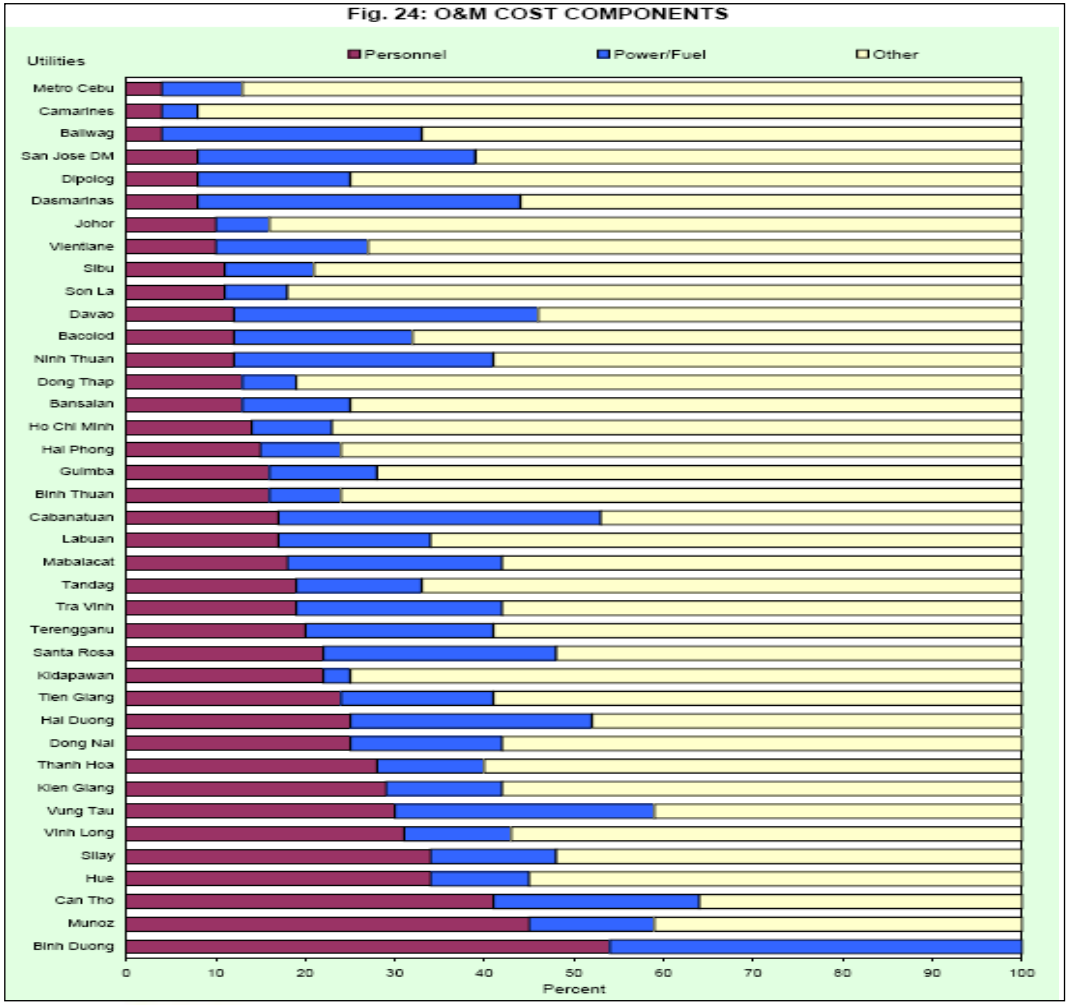
39 South East Asian utilities

Cost Components:

Personnel

Power/Fuel

Other



Source: SEAWUN & ADB, 2007

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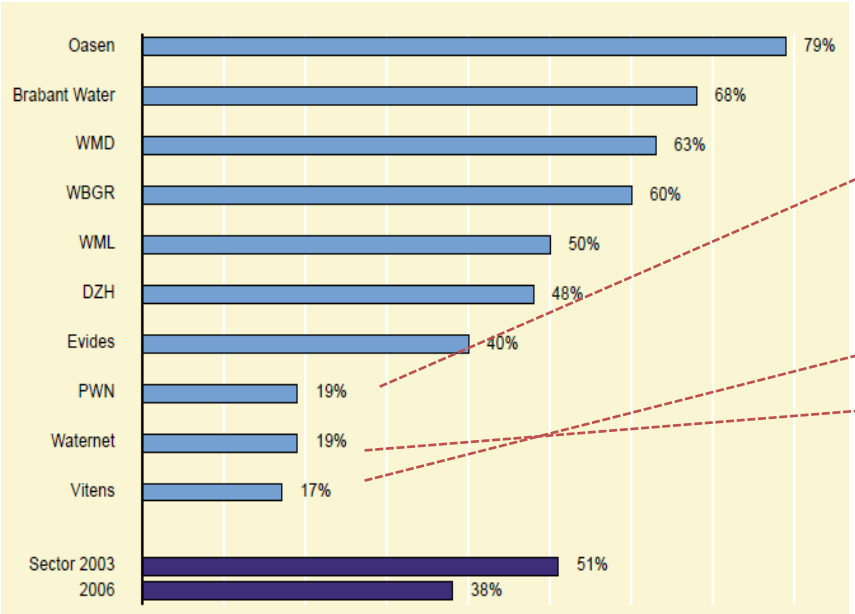
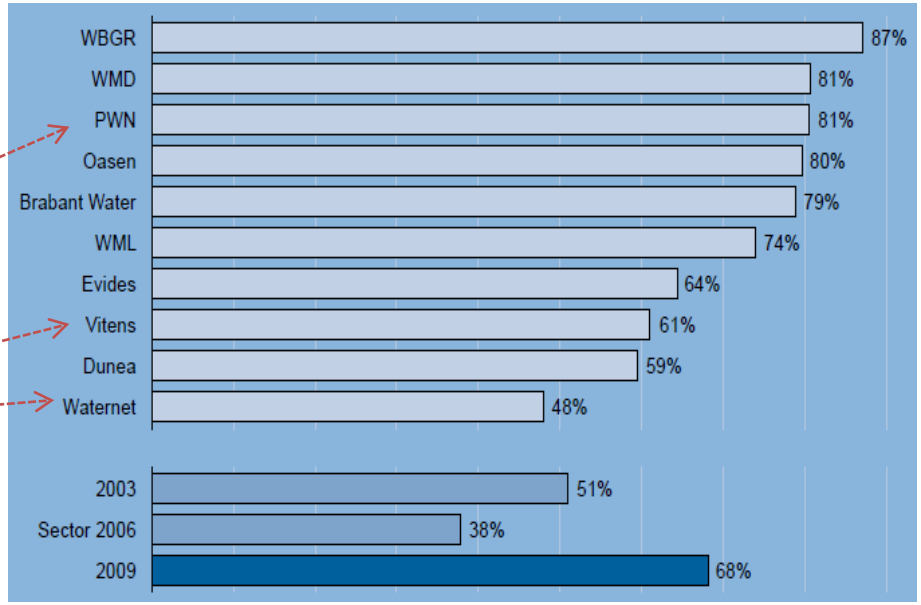
Application

Vewin: 10 Dutch water supply companies

% of customer calls answered within 20 seconds

Performance of worst performers improved significantly





Source: VEWIN, 2007, 2010

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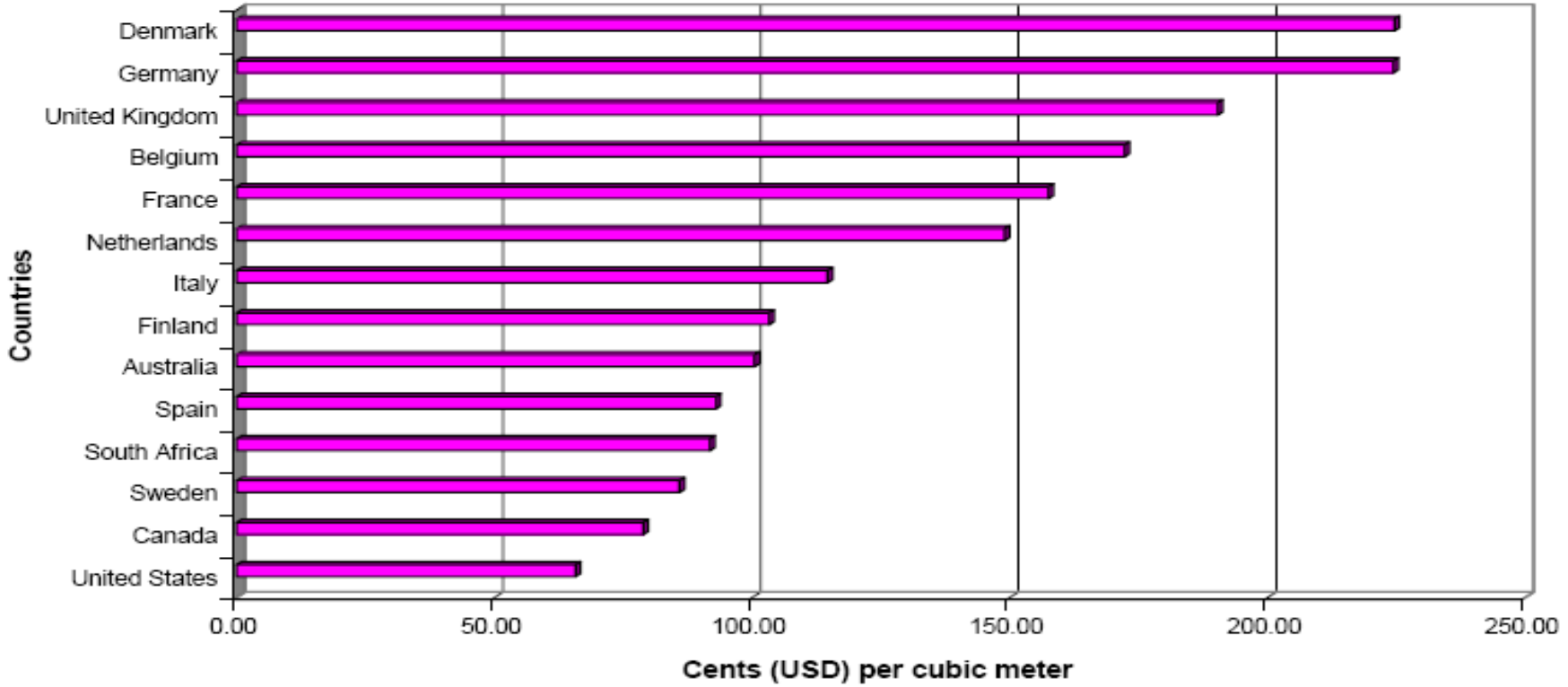
Application

Performance comparison across countries



Source: NUS, 2006

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Application

Performance comparison across countries

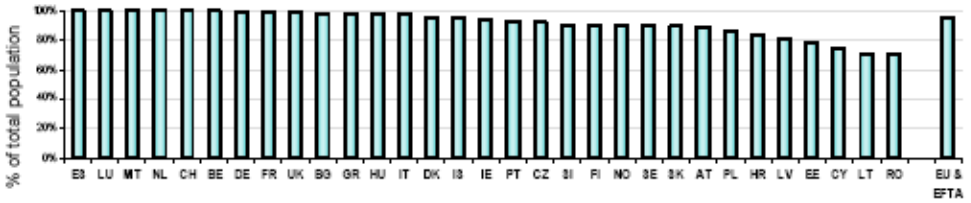

Figure 15 Population served by drinking water services (EUREAU, 2008; OIEAU, 2004; WHO-UNICEF, 2008; UN, Statistics Division, 2007).

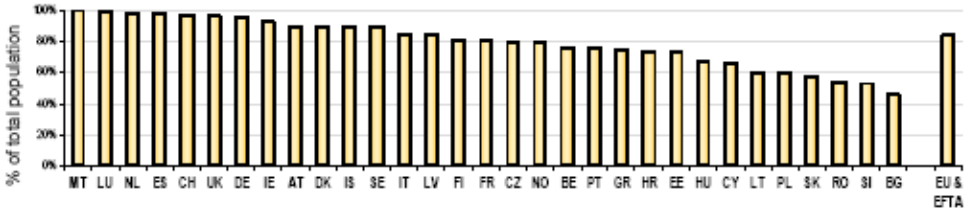

Figure 16 Population served by wastewater collection services (EUREAU, 2008; ECOPROG, 2006; OIEAU, 2004; WHO-UNICEF, 2008; UN, Statistics Division, 2007).

Figure 17 % of population served by wastewater treatment services (EUREAU, 2008; ECOPROG, 2006; OIEAU, 2004; WHO-UNICEF, 2008; UN, Statistics Division).

Source: Eureau, 2008

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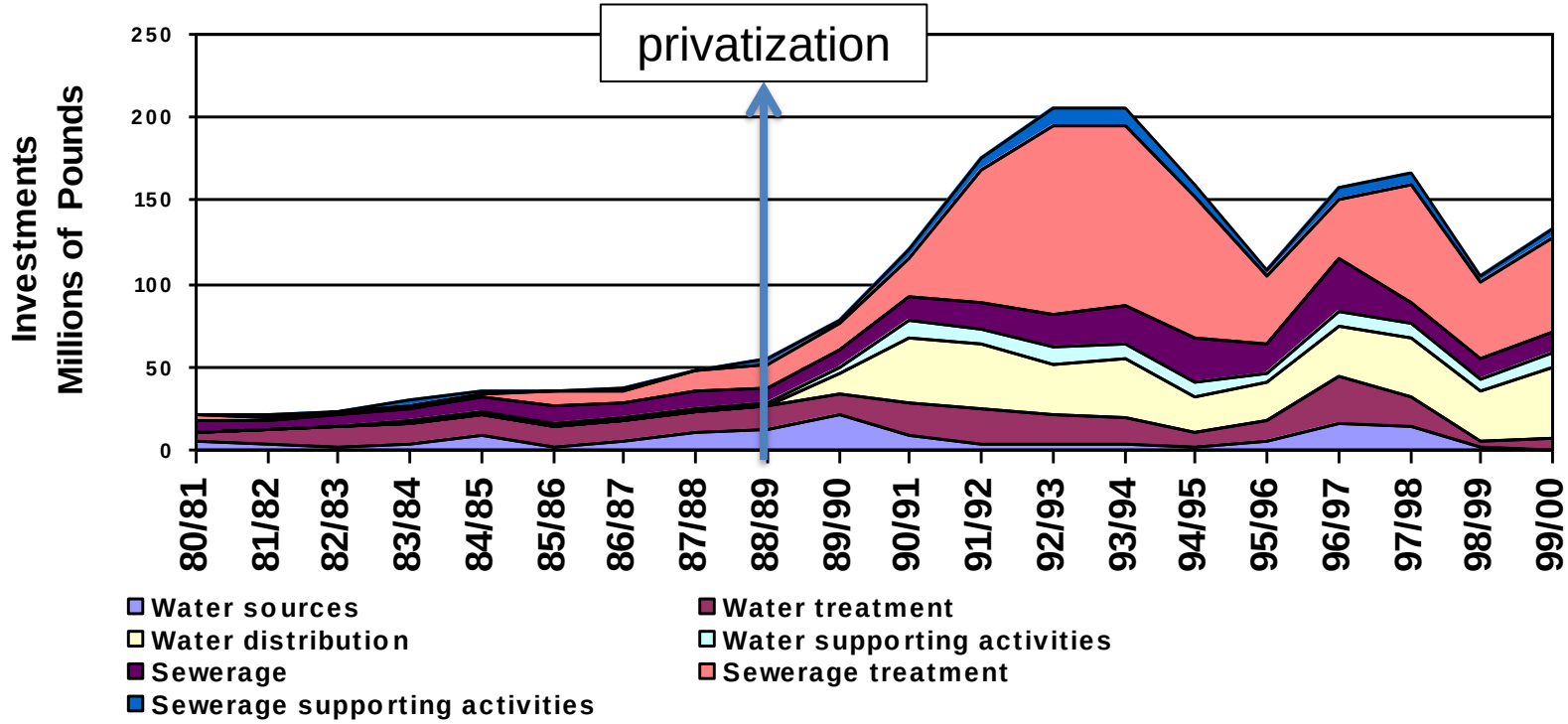
Application

England and Wales (post-privatisation)
Performance comparison over time



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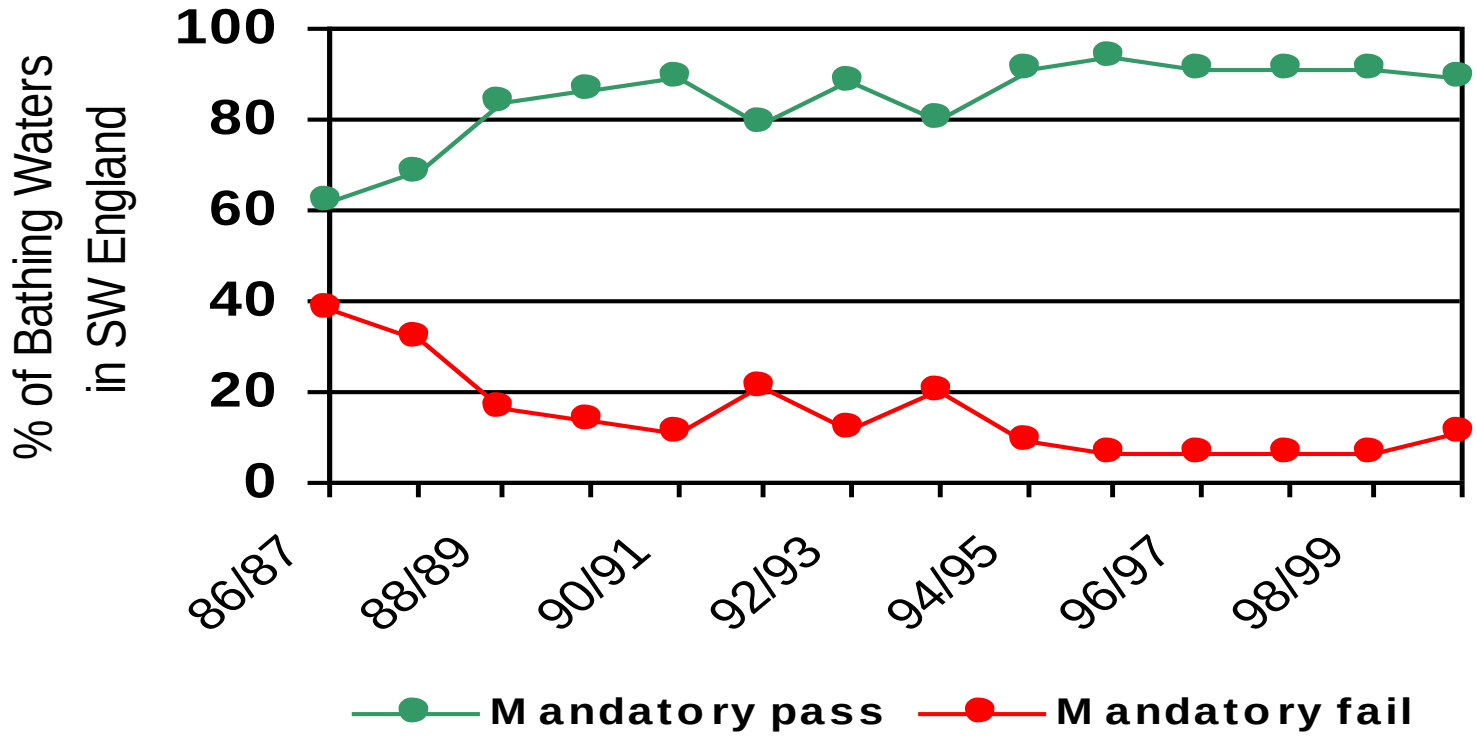
Application

England and Wales (post-privatisation)
Performance comparison over time



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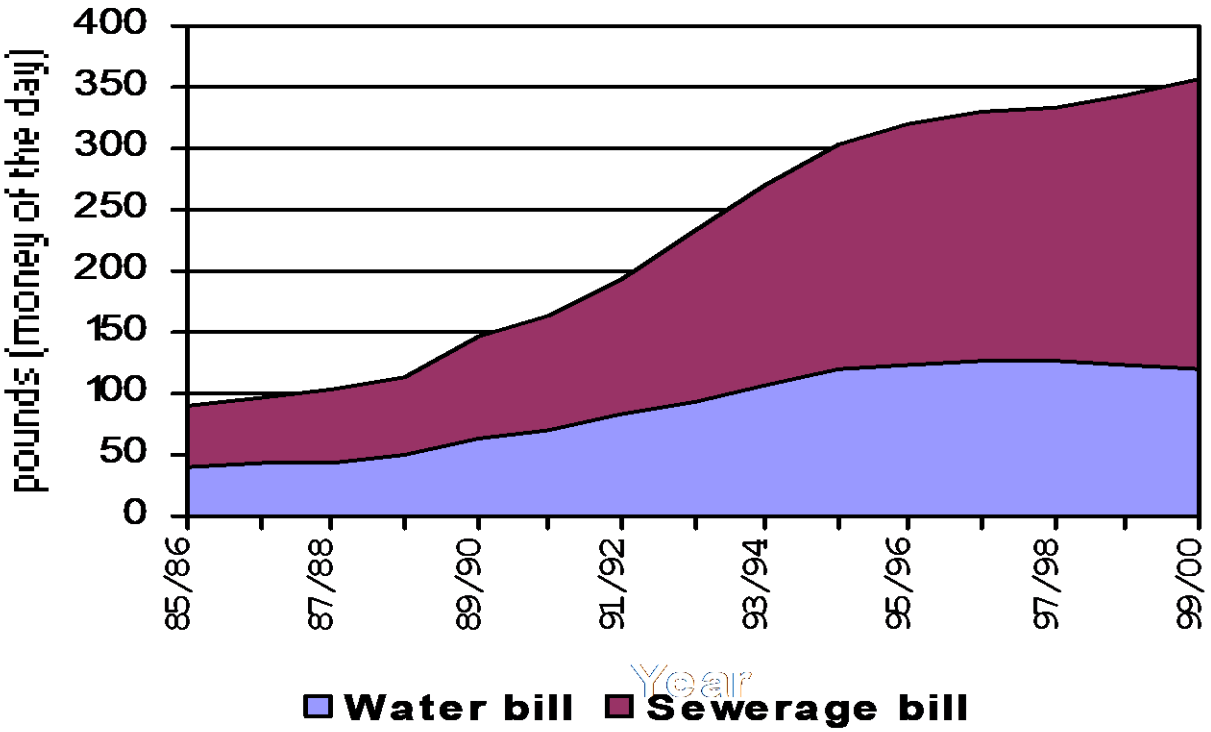
Application

England and Wales (post-privatisation)
Performance comparison over time



Topic 4:

Institutionalisation of Benchmarking (1)

Voluntary Benchmarking by Water Utilities

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Voluntary benchmarking

	Vewin (Dutch)	EBC (European)
Objectives:		
• Assess utility performance	√	√
• Learn from other participants	√	√
• Transparancy (external)	√	
Participating utilities from:		
• One country only	√	
• Multiple countries		√
Comparative costs:		
• High	√	
• Low		√
Sharing of results:		
• Results in the Public Domain	√	
• Results are Confidential		√

Voluntary benchmarking

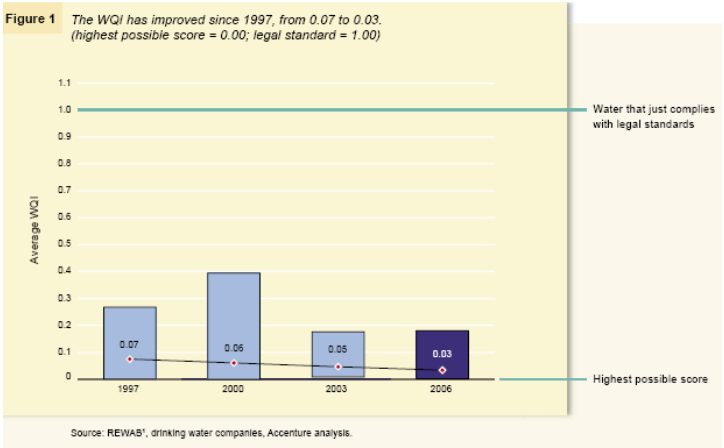
Benchmarking directed by Vewin

- Vewin is the Association of Water Supply Companies in the Netherlands;
  - the 10 companies were engaged in voluntary benchmarking from 1997-2010
- Objectives of Benchmarking:
  - Provide greater transparency to stakeholders and other interested parties
  - Provides the water companies with insights in performance (gaps) and suggestions to improve their processes and so reduce the performance gap
- Four categories or perspectives are subject to performance assessment:
  - Water Quality
  - Service Quality
  - Environmental Impact
  - Finance and efficiency
- Target groups for communicating the Benchmarking results:
  - Central government
  - Customers
  - Supervisory directors and shareholders
  - Drinking water companies

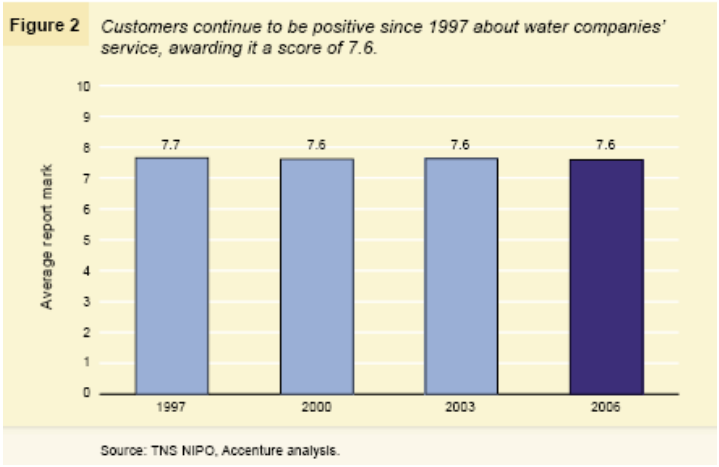
Voluntary benchmarking

Vewin: Results Benchmarking

Water quality



Service quality

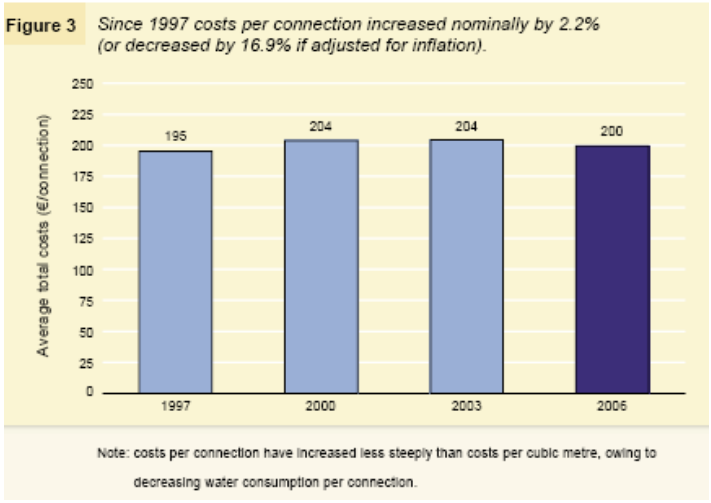


Environmental Impact

Since 1997, the total energy use per m^3 of drinking water produced increased by 4%, partly due to the softening process and new water treatment processes. In the same period the share of sustainable energy use went up from 5% to 34%.

In 2006 94% of the residues of the drinking water production process were reused; an increase of 1 percentage point compared to 1997.

Finance & efficiency



Source: VEWIN, 2007

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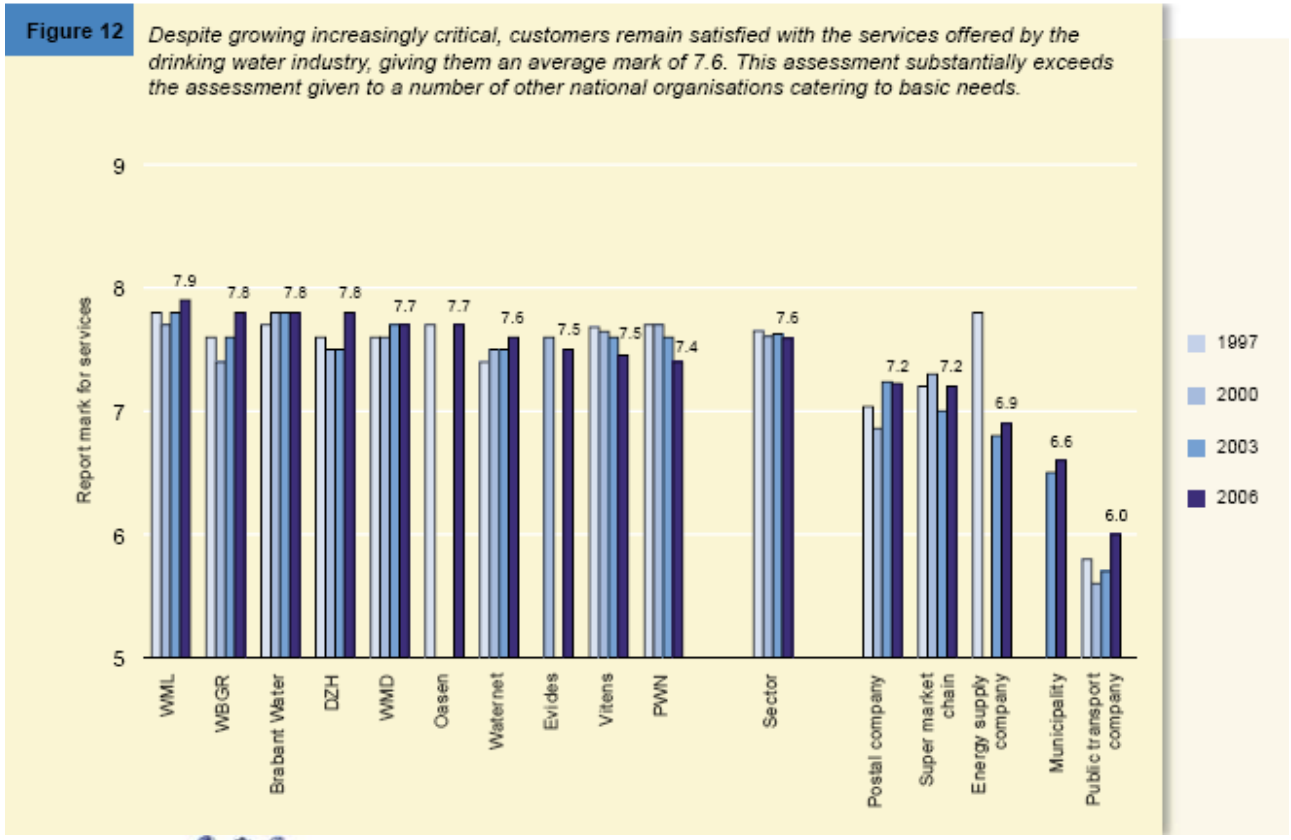
Voluntary benchmarking

VEWIN: Results Benchmarking

Service Quality 1:

Customer satisfaction with water service



Source: VEWIN, 2007

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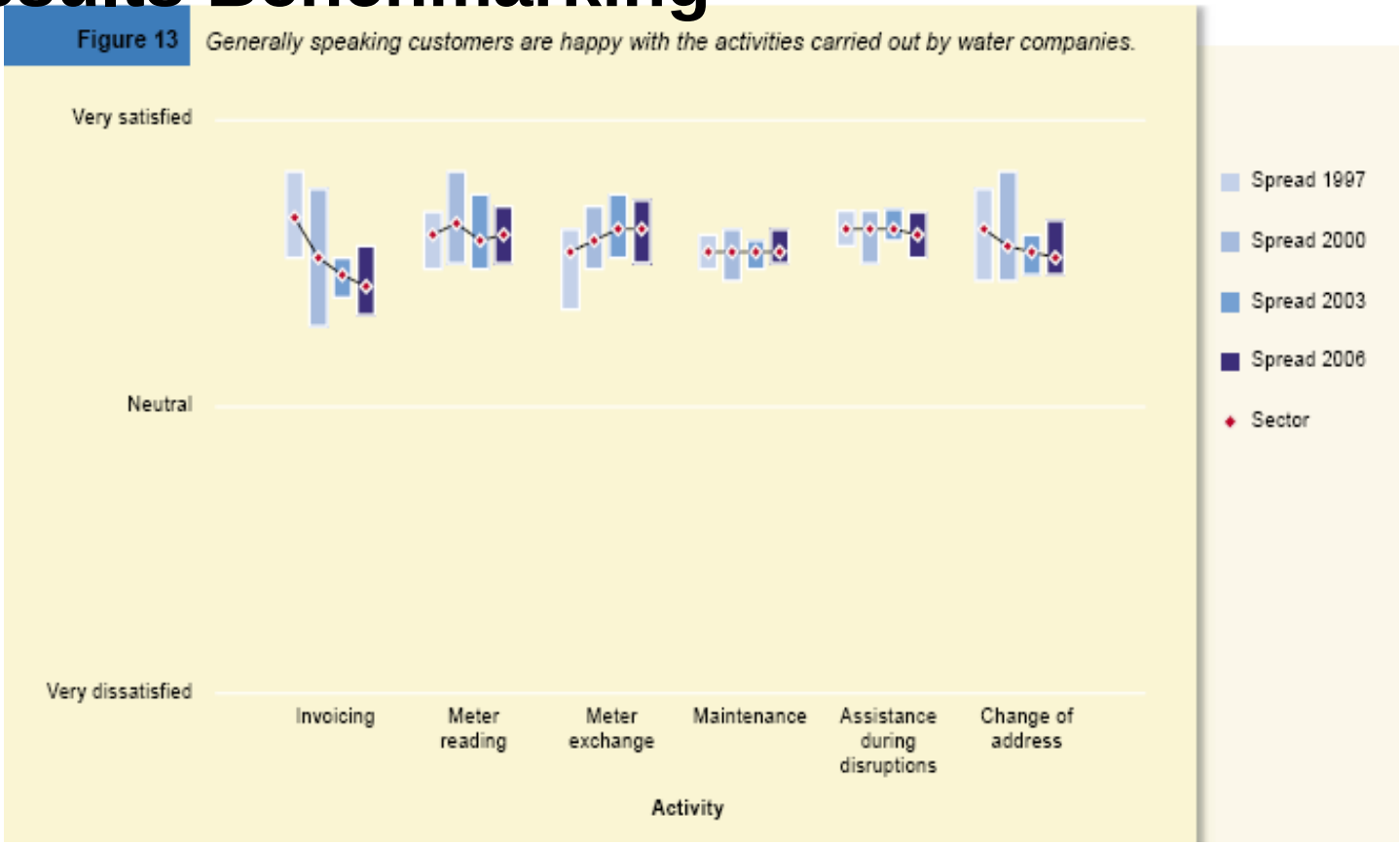
Voluntary benchmarking

VEWIN: Results Benchmarking

Service Quality 2:

Customer satisfaction with water company activities



Source: VEWIN, 2007

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Voluntary benchmarking

Dutch Water Boards (UvW): 5 perspectives

Treatment

Functioneren installaties

Welke zuiveringsprestaties worden geleverd?

Stakeholders

Finance

Belanghebbenden

Hoe presteert de organisatie in de ogen van de belanghebbenden?

Financiën

Tegen welke kosten?

Innovation

Environment

Innovatie

In hoeverre is de organisatie in staat te vernieuwen en te verbeteren?

Milieu

Hoe milieubewust is de organisatie?

Source: Deloitte & UvW, 2003

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Voluntary benchmarking

Dutch Water Boards: perspectives or focal areas

- Treatment: removal efficiencies/quantity removed
- Finance: tax charged/costs of treatment
- Environment: removal beyond legal norms/environmentally friendly measures
- Innovation: assessment by independent assessor/cooperation/new services
- Stakeholders: satisfaction scores municipalities, licensing authorities/industry/ inhabitants near wwtp

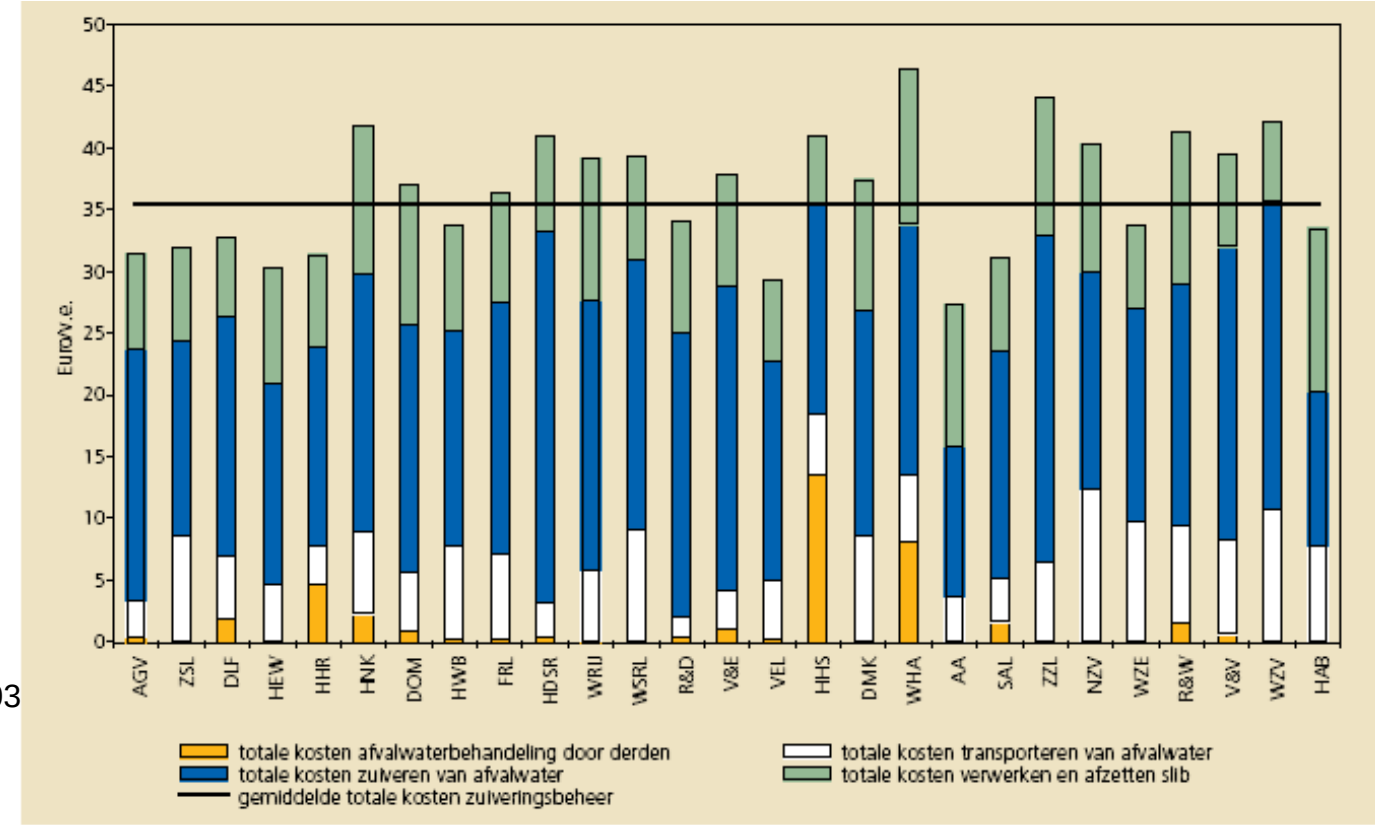
Source: Deloitte & UvW, 2003

Voluntary benchmarking

UvW: 27 Dutch Water Boards

Finance:
Costs in Euro/ pollution equivalent

- SludgeTr&Dis
- WWTreatment
- WWTransport
- WWTreatment by others



Source: Deloitte & UvW, 2003

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Voluntary benchmarking

UvW Overall results

Water Board	Treatment	Finance	Environment	Innovation	Stakeholders
Hoogheemraadschap Amstel, Gooi en Vecht		11	23	4	17
Zuiveringschap Limburg	15	3	20	15	12
Hoogheemraadschap van Delfland	24	15	27	17	
Zuiveringsschap Hollandse Eilanden en Waarden	14	5	18	6	12
Hoogheemraadschap van Rijnland	8	4	5	12	
Hoogheemraadschap Hollandse Noorderkwartier	13	20	2	1	22
Waterschap de Dommel	22	9	19	24	17
Hoogheemraadschap van West-Brabant	16	5	11	17	12
Wetterskip Fryslan	12	13	2	9	17
Hoogheemraadschap de Stichtse Rijnlanden	3	21	9	9	12
Waterschap Rijn en IJssel	10	9	8	2	3
Waterschap Rivierenland	17	19	15	7	3
Waterschap Regge en Dinkel	1	8	9	8	3
Waterschap Vallei & Eem	5	17	12	19	3
Waterschap Veluwe	23	2	23	14	3
Hoogheemraadschap van Schieland	7	18	1	27	1
Waterschap De Maaskant	2	12	7	22	1
Waterschap Hunze en Aa's	20	24	21	16	3
Waterschap De Aa	6	1	15	24	3
Waterschap Groot Salland	21	5	13	3	3
Waterschap Zuiderzeeland		24	4	23	22
Waterschap Noorderzijlvest		21	25	19	3
Waterschap Zeeuwse Eilanden	19	15	17	11	17
Waterschap Reest en Wieden	9	24	5	13	12
Waterschap Velt en Vecht	18	23	26	4	17
Waterschap Zeeuws Vlaanderen	11	24	21	19	22
Hoogheemraadschap Alm en Biesbosch	4	14	13	26	

Rank 1 - 9	Rank 19-27
Rank 10-18	No data

Which are the worst performers??

Source: Deloitte & UvW, 2003

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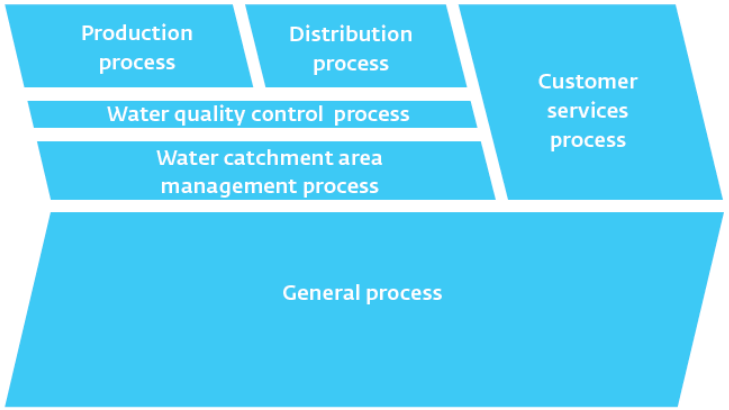
Voluntary benchmarking

European Benchmarking Cooperation (EBC)

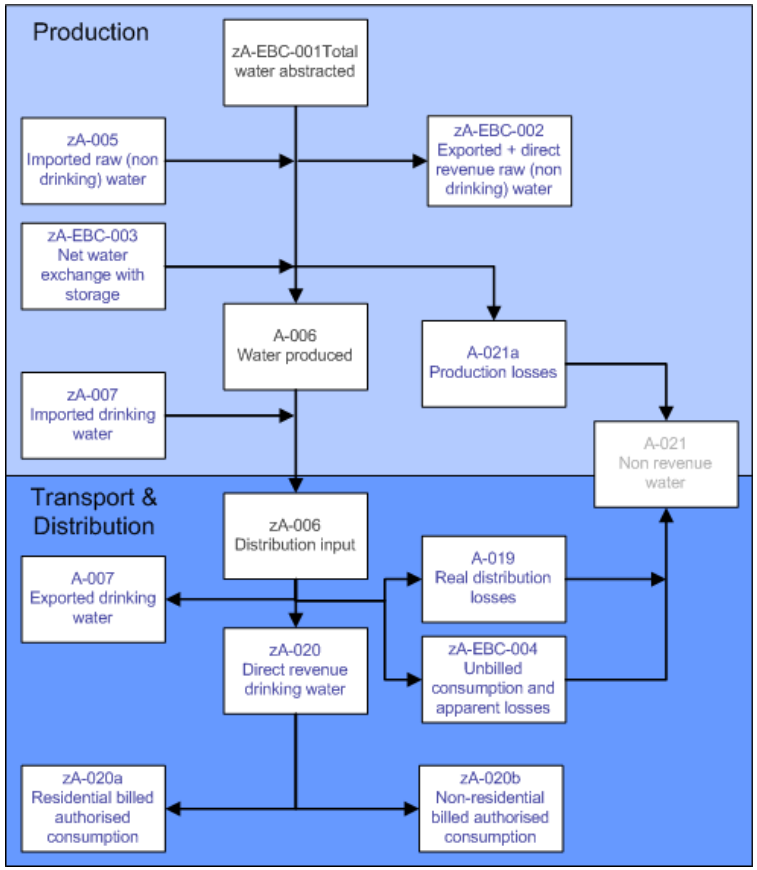
- Started in 2004 by associations and groups of water operators from The Netherlands and Scandinavia
- Learning in national networks diminishes after a long period of benchmarking; also low numbers of participating utilities in national networks (e.g. 10 in The Netherlands)
- Annual benchmarking exercise since 2007
- Participation 2010: 41 utilities/21 countries; 2011: 45 utilities/19 countries; 2012: 50 utilities
- Low-cost: no external accountability >> avoid high cost of data auditing
- Choice of ‘’levels’’: basic, standard and advanced

Voluntary benchmarking

European Benchmarking Cooperation (EBC)



Level of Participation	Type of benchmarking	Indicators
Basic	General characteristics	36
Standard	PIs at Utility level	175
Advanced	PIs at Process level	273



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Voluntary benchmarking

European Benchmarking Cooperation (EBC)

Figure 4: Share of water bill in disposable household income (%)

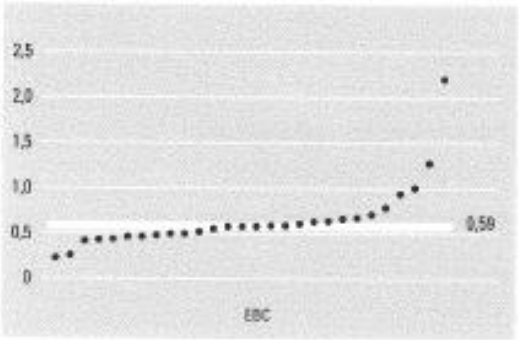
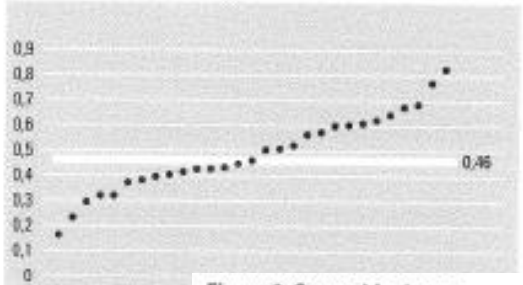


Figure 5: Electricity use per m³ water produced (kWh/m³) Environmental sustainability:



Water

Wastewater

Figure 9: Sewer blockages (No./100 km sewer)

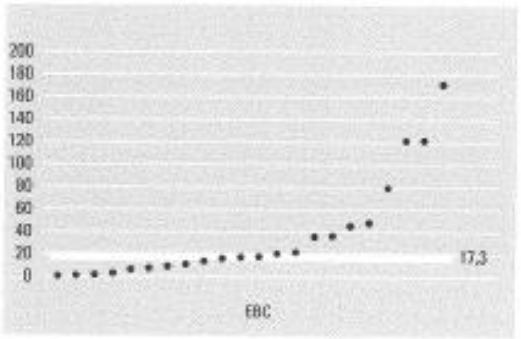
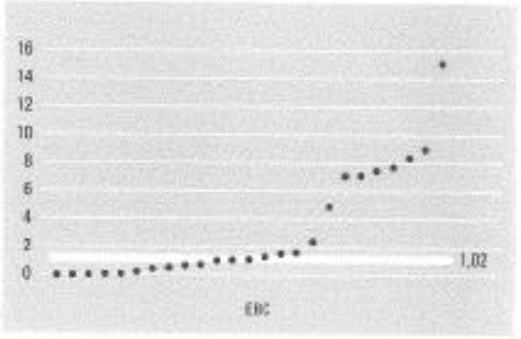


Figure 10: Total complaints (No./1000 inhabitants)



Source: EBC, 2011

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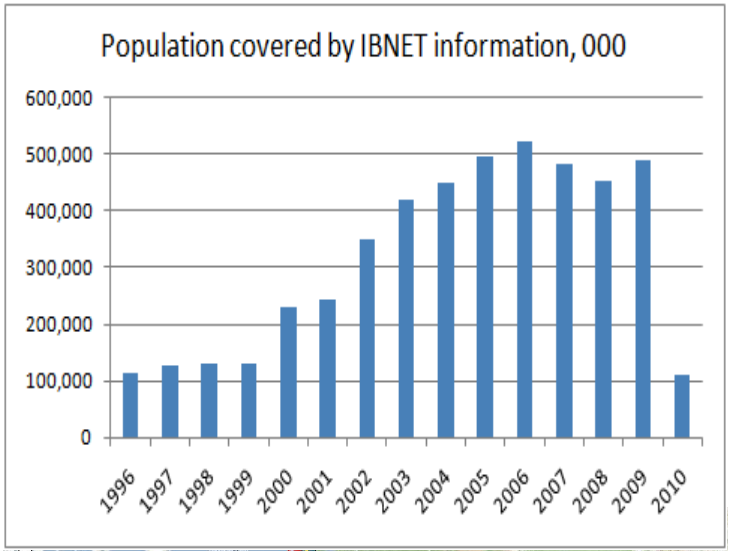
IBNET

Characteristics:

- Continuous updating from 1996
- 3500 utilities from 115 countries participate (Oct.2012)
- 75% > 4 years time series
- IWA based data collection standard and indicators
- Built-in cross-checks
- Date certification (since 2011)
- Used for performance assessment by development agencies, banks, JMP
- Data collection standard in a few countries



Source: Danilenko, 2011

Topic 5:

Institutionalisation of Benchmarking (2)

Benchmarking by Regulators

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Benchmarking by Regulators

	Voluntary (by utilities)	Mandatory (by regulator)
Implementation national policies: • depends on cooperation utilities • prescription of related indicators • can be enforced and incentivized	√	 √ √
Participating utilities: • volunteering utilities only • all utilities	√	 √
Incentives for performance improvement: • name and shame • carrot and stick options	√	 √

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Benchmarking by Regulators

Benchmarking by the Zambian Regulator - NWASCO

	UFW [%]	Trend	Water Quality [% compliance to number of samples]#	Trend	Metering Ratio [%]	Trend	Water Service Coverage [%]	Trend	Sanitation Coverage* [%]	Trend	Hours of supply	Trend	Staff per 1,000 connections	Trend	Collection efficiency [%]	Trend	O+M Cost coverage collection* [%]	Trend
LWSC	51	↓	84	↑	50	↑	68	↑	17	↑	16	→	11	↑	73	↓	91	↓
NWSC	38	↑	84	↑	55	↑	85	↑	52	↑	16	→	9	→	63	↓	78	↓
KWSC	46	↑	93	→	32	↑	84	↓	46	↓	15	→	9	↓	68	↓	60	↓
MWSC	42	→	92	↓	46	↑	87	↑	63	↓	17	→	8	↓	89	↑	134	↑
LGWSC	52	↑	76	↑	77	↑	65	↑	25	↑	17	↑	15	↑	73	↑	80	↑
SWSC	40	→	93	→	76	↑	89	↑	53	↑	18	↑	10	→	121	↑	113	↑
CHWSC	50	↑	45	↑	25	↑	58	↑	25	↑	12	↑	16	↓	56	↓	54	↓
NWWSC	31	↑	97	→	100	→	63	↑	5	↑	22	↑	13	↓	88	↑	104	↑
WWSC	47	↓	50	↓	10	↓	57	↑	17	↑	8	→	14	↑	81	↓	71	↓
CWSC	33	↓	70	↑	100	→	79	↑	46	↑	21	↓	11	↑	76	↓	76	↓
Av.	45 (w)	→	82 (s)	↑	51(w)	↑	74.4 (w)	↑	34(w)	↑	16.2 (s)	↑	**		78(w)	↓	80 (w)	↓

0	3	6
1	5	3
1	2	6
4	4	1
0	3	6
5	4	0
0	0	9
6	1	2
1	1	7
3	3	3

Worse than the relevant average and benchmark not achieved

Better than the relevant average but benchmark not achieved

At least "acceptable" benchmark achieved

(w) weighted average

(s) simple average

Source: NWASCO 2009

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Benchmarking by Regulators

Benchmarking by the Zambian Regulator - NWASCO

Provider	Total Customer complaints 2007/08	Total Customer complaints 2008/09	Total Complaints Resolved 2008/09	Total Complaints % resolution 2008/09	Complaints per 100 connections 2007/08	Complaints per 100 connections 2008/09
LWSC	16,257	14,825	10,822	73%	31	21
NWSC	11,346	13,575	9,585	71%	28	33
KWSC	9,450	8,241	6,697	81%	21	20
MWSC	17,683	12,370	11,542	93%	39	31
LGWSC	3,506	3,963	3,500	88%	31	31
SWSC	2,824	2,140	2,021	94%	11	8
CHWSC	4,965	8,433	7,338	87%	40	73
NWWSC	1,089	877	710	81%	19	14
WWSC	1,724	1,801	1,298	72%	21	22
CWSC	541	513	356	69%	9	8
TOTAL COMPLAINTS	69,385	66,738	53,869			

Source: NWASCO 2009

Benchmarking by Regulators

Benchmarking by the Kenyan Regulator - RWASEB

Performance indicators and benchmarks

Indicator			Sector Benchmarks			Scoring Criteria			
						Upper limit		Lower limit	
			Good	Acceptable	Not Acceptable	Performance	Score	Performance	Score
1	Collection efficiency		>90%	85-90%	<85%	≥90%	30	≤50%	0
2	Non-Revenue Water (NRW)		<20%	20-25%	>25%	≤20%	30	≥70%	0
3	Water Quality	Drinking water quality	>95%	90-95%	<90%	≥95%	20	≤80%	0
		Compliance with residual chlorine test	>95%	90-95%	<90%	≥95%	10	≤50%	0
4	Hours of Supply	Population>100,000	21-24	16-20	<16	20-24hrs	20	≤8hrs	0
		Population<100,000	17-24	12-16	<12	16-24hrs	20	≤4hrs	0
5	O&M cost coverage		≥150%	100-149%	<100%	≥130%	20	≤70%	0
6	Metering ratio		100%	95-99%	<95%	100	20	≤50%	0
7	Staffing(No per 1000 connection)	Large and very large WSP	<5	5-8	>8	≤5	20	≥20	0
		Medium and small companies(with up to3 towns)	<7	7-11	>11	≤7	20	≥20	0
		Medium and small companies(with more than 3 towns)	<9	9-14	>14	≤9	20	≥25	0
8	Water Coverage		>90%	80–90%	<80%	≥90%	20	≤30%	0
9	Sanitation Coverage		>90%	80–90%	<80%	≥90%	10	≤20%	0
	Total Maximum score:						200		
10	Personnel Cost as a % of (O&M) costs	Large and Very Large Companies	<20%	20-30%	>30%	N/A	N/A	N/A	N/A
		Medium Companies	<30%	30-40%	>40%				
		Small Companies	<40%	40-45%	>45%				

Source: WASREB 2011

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Benchmarking by Regulators

Benchmarking by the Kenyan Regulator - RWASEB

	INDICATORS													
NAME OF WSP/ MAIN TOWN		Drinking Water Quality	Compliance with Chlorine Standards	Unaccounted for water in %	Water coverage in %	Sanitation coverage	Hours of supply No.	Staffing	Collection efficiency in %	Cost recovery O&M in %	Metering ratio in %	Total Score	Ranking	Overall Ranking
WSPs Very Large (More than 35000 Connections)														
Nairobi		100	98	40	67	29	13	5	80	113	94	144	1	6
Nakuru		64	100	47	70	73	16	5	92	118	89	138	2	8
Eldoret		71	94	52	65	80	24	4	81	101	90	131	3	12
Mombasa		58	91	35	63	88	6	10	90	114	55	110	4	22
WSPs Large (10000- 34999 Connections)														
Nyeri		100	99	39	68	87	24	6	90	143	96	176	1	1
Malindi		82	96	7	80	53	24	6	85	70	98	146	2	4
Nanyuki		100	99	46	60	98	16	7	84	81	85	143	3	7
Kericho		100	100	52	51	15	23	11	86	102	99	136	4	10
Tetu Aberdare		44	100	63	68	100	20	7	80	107	78	119	5	14
Nyahururu		73	96	57	37	65	18	10	95	108	85	115	6	18
Kisumu		91	94	62	29	6	18	10	84	97	96	111	7	21
Kirinyaga		100	99	86	32	No Data	23	18	107	105	85	109	8	23
Gatamathi		95	91	79	23	81	16	5	101	91	29	105	9	25
Mathira		100	100	61	30	67	20	7	78	90	39	105	10	27
Nzoia		60	99	57	46	62	20	7	88	87	62	104	11	28
Kikuyu		No Data	No Data	46	34	70	16	5	94	70	96	103	12	29
Othaya Mukurweini		100	97	65	61	97	17	9	69	66	41	96	13	33
Kilifi Mariakani		76	90	39	56	52	24	20	83	86	62	96	14	36
Nakuru Rural		78	100	36	46	No Data	7	9	90	111	18	92	15	38
Western		98	94	41	29	29	11	11	79	53	0	85	16	47
Kahuti		84	100	72	19	70	18	13	87	85	51	82	17	49
Chemosit		100	90	67	46	No Data	10	19	78	25	85	75	18	54
Murang'a South		83	90	57	30	78	8	10	96	48	32	73	19	58

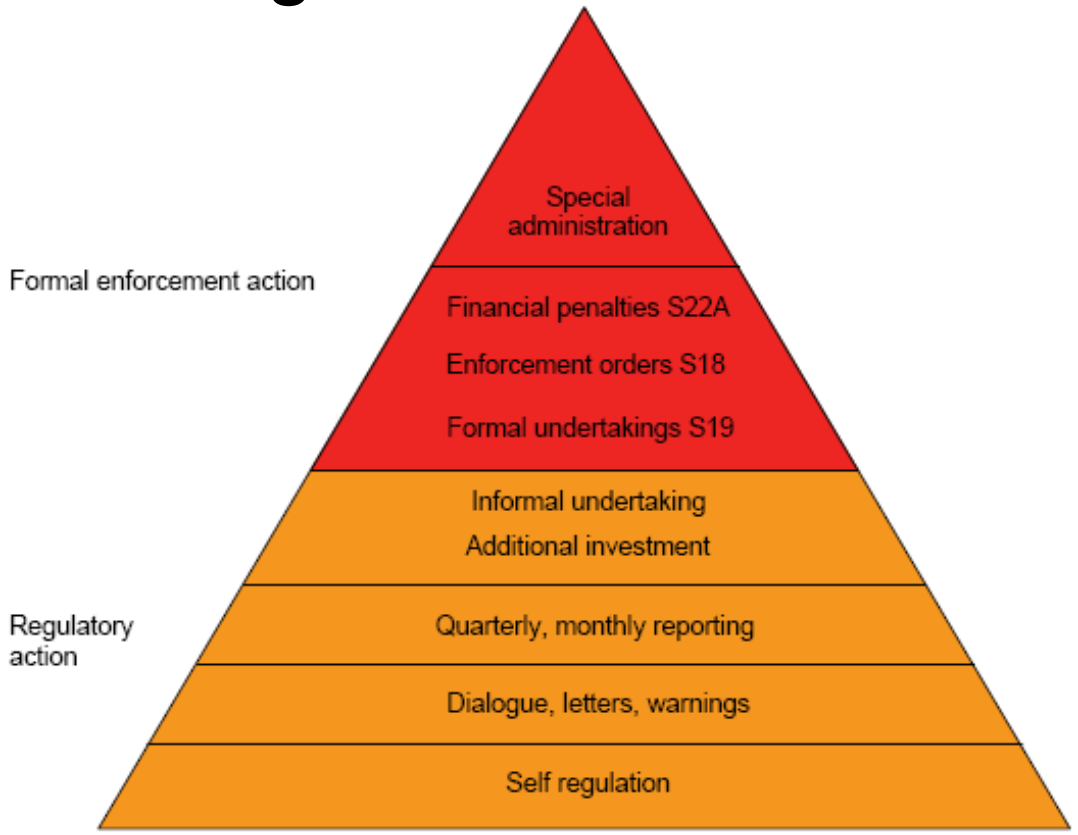
Source: WASREB 2011

Benchmarking by Regulators

Benchmarking by the UK Regulator - OFWAT

‘’at present we regulate a large monopoly industry using comparative competition.
We use comparative competition to encourage each company to meet the standards of the best performers

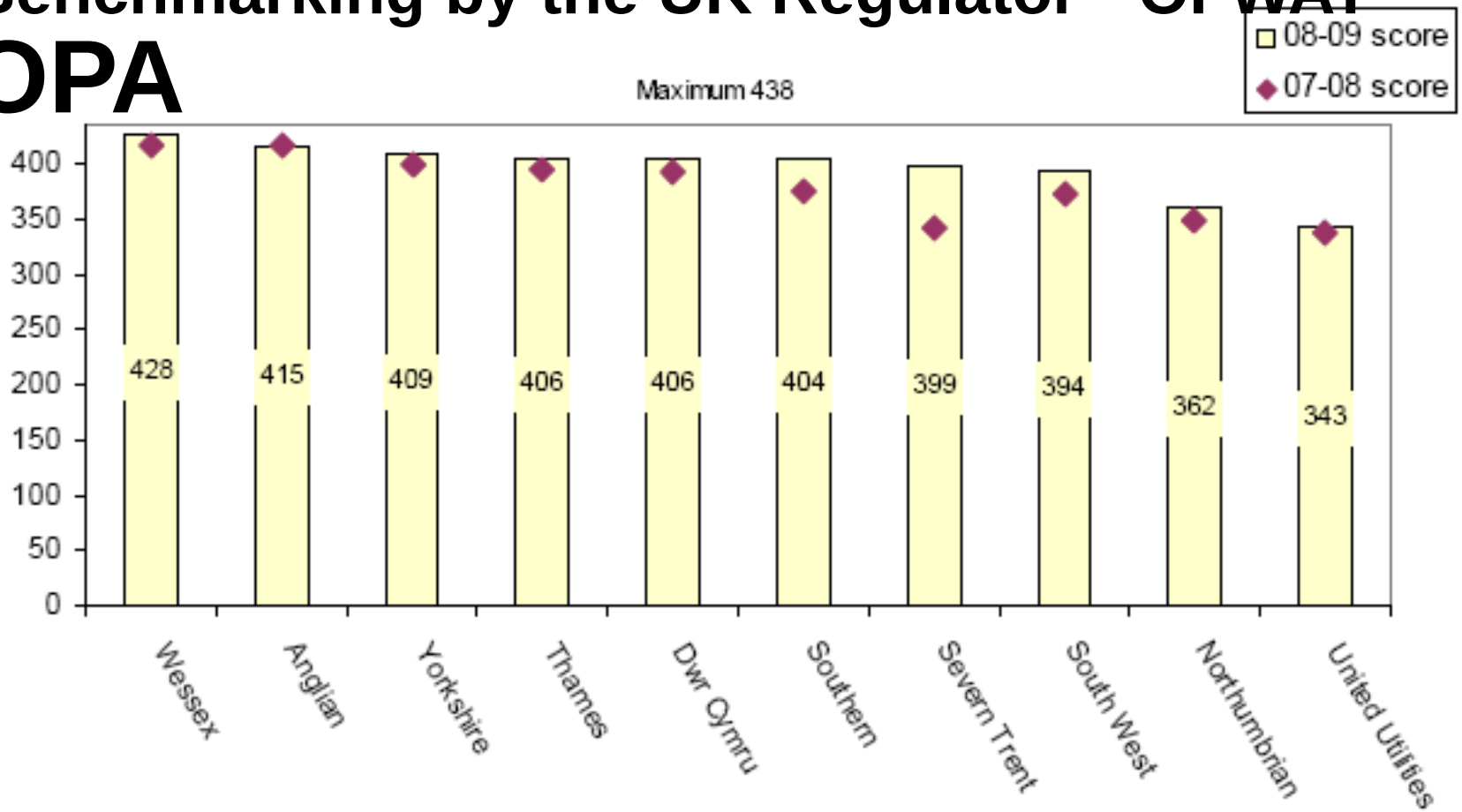
Source: Ofwat 2009a



Benchmarking by Regulators

Benchmarking by the UK Regulator - OFWAT

OPA



Source: Ofwat 2009b

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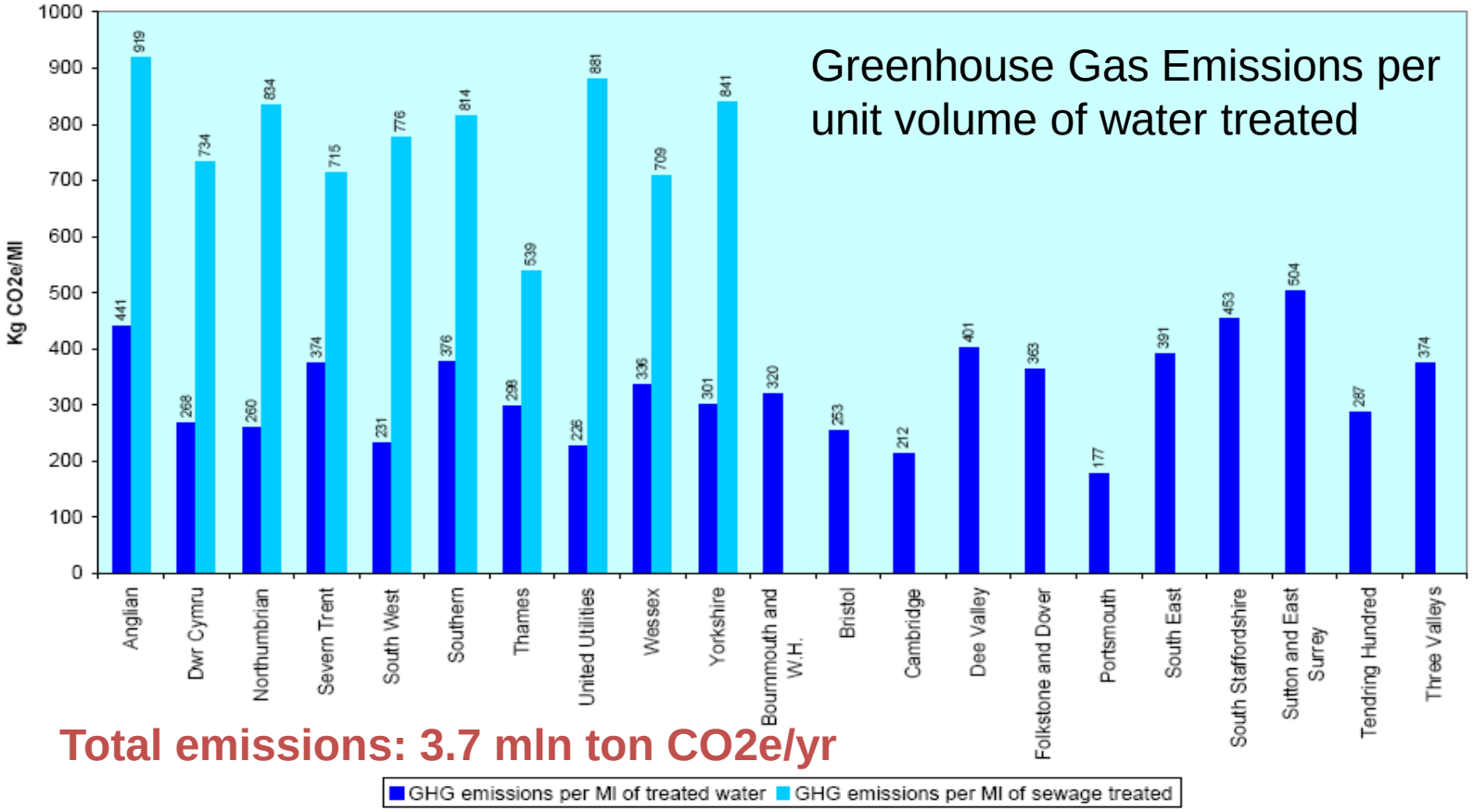
Benchmarking by Regulators

Benchmarking by the UK Regulator - OFWAT



Total emissions: 3.7 mln ton CO2e/yr

Source: Ofwat 2009b

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Benchmarking by Regulators

Benchmarking by the UK Regulator - OFWAT

Climate change agenda: mitigation measures approved by the regulator as part of the future watsan charges for 2010-2015

Mitigation
We included all of the 33 stand-alone renewable energy schemes proposed within price limits
We included £57 million for renewable energy projects, delivering £8.8 million of operational expenditure savings to customers every year when complete.
By 2015, companies will be generating over more than 1TWh a year from renewable energy sources
This saves the equivalent of more than half a million tonnes of $C0_2e$ each year

i.e. – 15%

Source: Ofwat 2009d

Topic 6:
Experiences:
Benchmarking perspectives

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Benchmarking perspectives

Say we decided to benchmark, <u>what</u> do we want to benchmark??

(brief discussion)

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Benchmarking perspectives

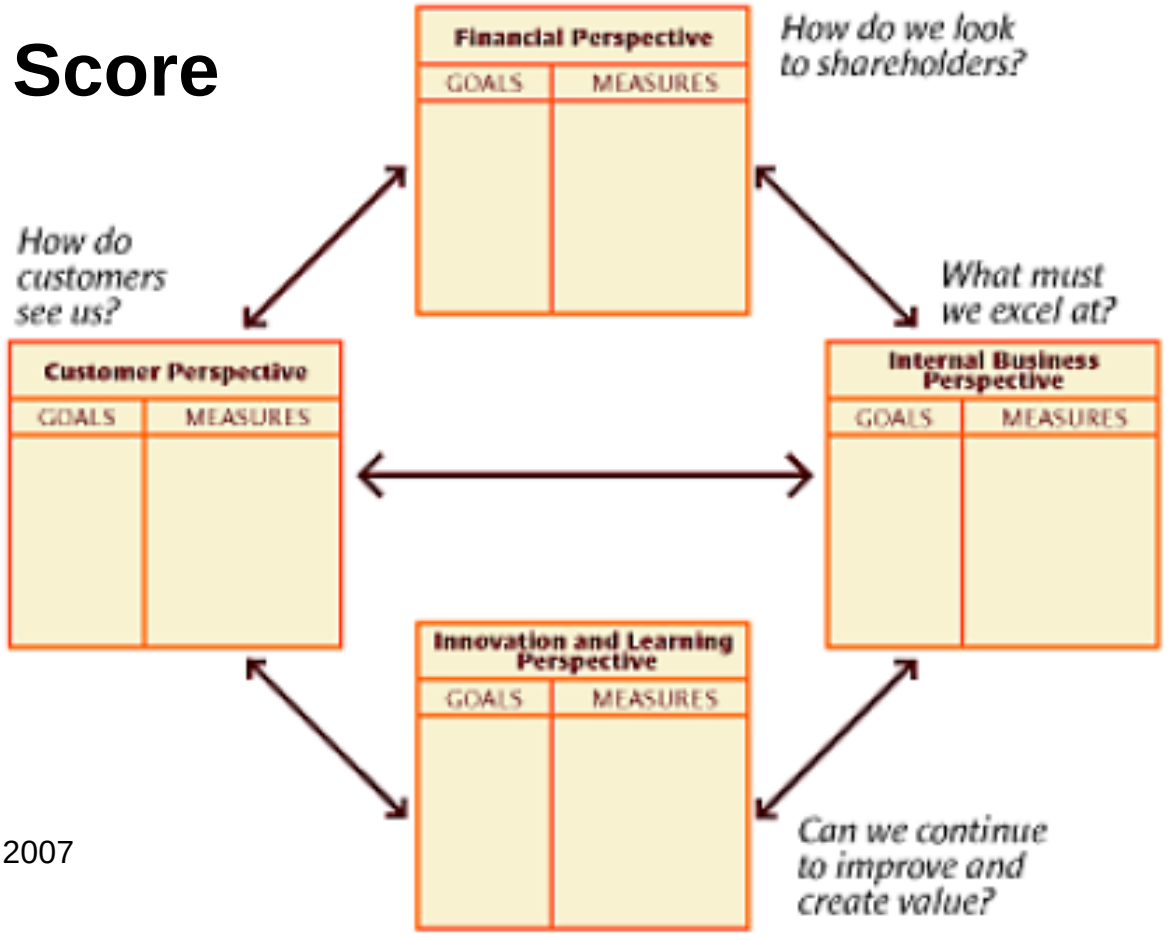
Developments in measuring organisational performance:

- 1980s: shareholder value
  - Narrow definition: Balanced Score Card (BSC)
    - Successful
- 1990s: stakeholder values
  - Wider definition: Triple Bottom Line (TBL)
    - Interaction with society (community, environment)
    - Becoming more successful (riding on CSR agenda's etc..)

Source: Hubbard, 2006

Benchmarking perspectives

Balanced Score Card:



Source: Norton and Kaplan, 2007

Benchmarking perspectives

Sample BSC:

Financial		Internal processes	
Sales growth	3%	Productivity	3.8%
Return on sales	6.8%	Labour turnover	12%
Return on assets	5.1%	Ave. unit production	4 days
Return on equity	15.5%	Working capital/sales	10%
Gearing	73%	Capacity utilization	73%
Customers/market		**Learning and development**	
Market share	32%	New products developed	1
No. of new customers	12,350	New markets entered	2
Product return rate	1.5%	R&D spend/sales	2.5%
Defects	2.8%	Training spend/sales	5.5%
Order cycle time	7 days	Investment/total assets	10%

Source: Hubbard, 2006

Benchmarking perspectives

TBL has Three Perspectives:

- Economic
  - How competitive are our products?
- Social
  - What is our impact on the communities?
- Environmental
  - What is our use of resources and what of by-products (waste) to we create?

Source: Hubbard, 2006

Benchmarking perspectives

Sample TBL:

	This year	Target
1 → *Economic*		
Sales growth	5.3%	5.0%
Profit growth	5.8%	5.2%
Return on equity	13.6%	15.0%
Return on assets	3.0%	3.5%
Gearing	55%	55%
2 → *Social*		
Lost time injury frequency	3.8	5.5
Reliability of supply (1–10 scale)	8.7	8.5
Responsiveness (1–10 scale)	7.5	7.8
Overall customer satisfaction (1–10 scale)	8.1	8.5
Sponsorship	$0.4m	$0.3m
Education	20 classes	20 classes
3 → *Environment*		
EMS plants certified	19	17
Spillages	109	68
Nitrogen discharge	1500 tonnes	1400 tonnes
Suspended solids discharge	2100 tonnes	1700 tonnes
Wastewater reuse	19.7%	20.0%

Source: Hubbard, 2006

Benchmarking perspectives

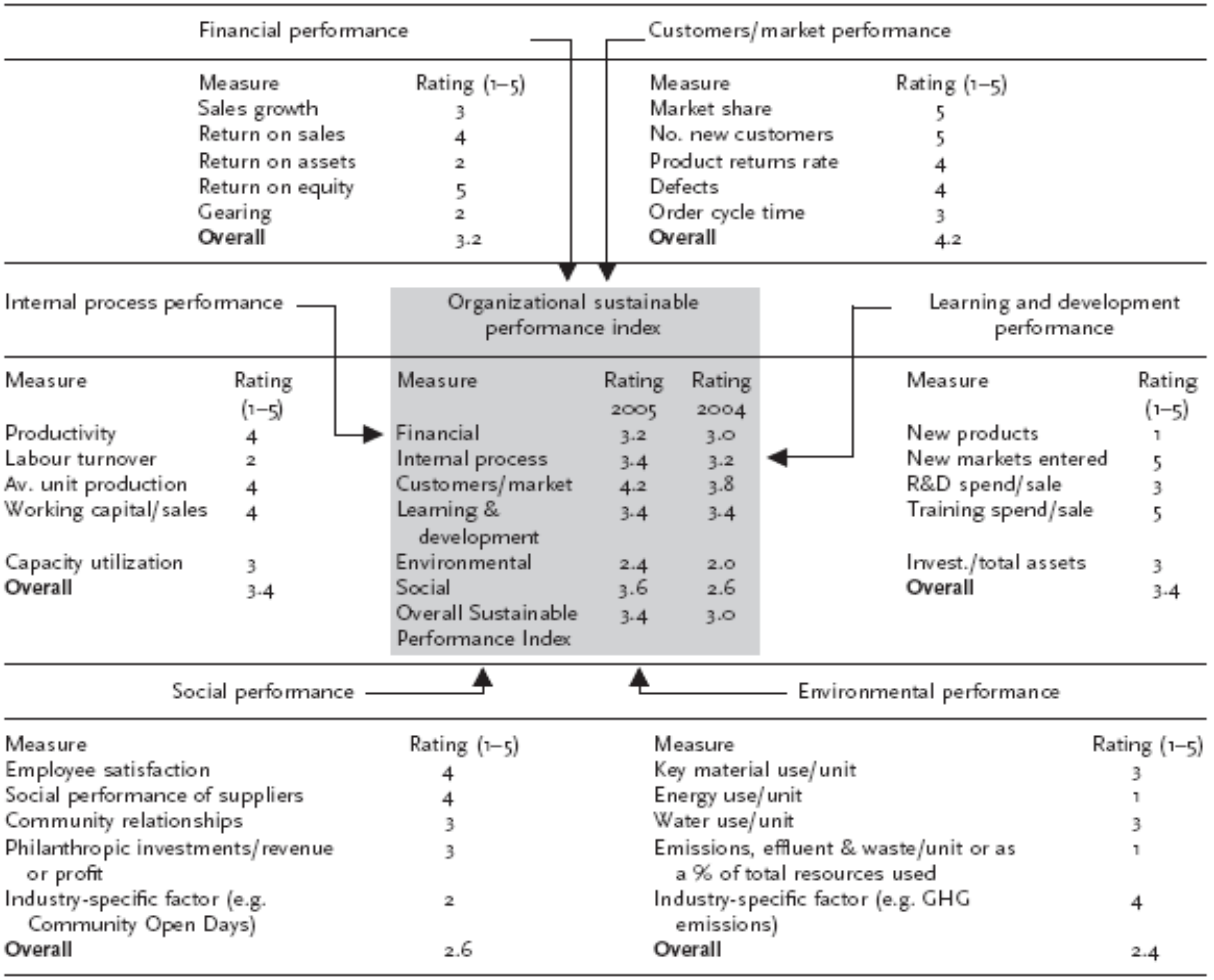
Sample SBSC: 6 perspectives, the 4 'old' BSC ones + the 2 new ones: social and environmental performance, including KPIs with current and target values

Financial			Internal processes		
	Current	Prior		Current	Prior
Sales growth	3.0%	2.0%	Productivity	3.8%	4.0%
Return on sales	6.8%	5.4%	Labour turnover	12.0%	16.5%
Return on assets	5.1%	6.1%	Ave. unit production	4 days	4 days
Return on equity	15.5%	16.0%	Working capital/sales	10.0%	10.0%
Gearing	73.0%	77%	Capacity utilization	73%	77%
Customers/market			**Learning and development**		
	Current	Prior		Current	Prior
Market share	32.0%	30.0%	New products	1	0
No. new customers	12.350	10.145	New markets entered	2	1
Product return rate	1.5%	1.4%	R&D spend/sales	2.5%	1.5%
Defects	2.8%	3.0%	Training spend/sales	5.5%	7.3%
Order cycle time	7 days	7 days	Invest./total assets	10.0%	10.0%
Social performance			**Environmental performance**		
	Current	Prior		Current	Prior
Employee satisfaction	4.1	4.4	Key material use/unit	12.0 kg	10.5 kg
Social perf. of suppliers	3.8	3.0	Energy use/unit	2.0 kW.h	2.3 kW.h
Community relationships	3.0	2.5			
Philanthropic investments/revenue or profit	1.0%	1.0%	Water use/unit	2.5 l	2.6 l
			Emissions, effluent & waste/unit or as a % of total resources used	3.0 t	4.0 t
Industry-specific factor: e.g., community open days	2	1			
			Industry-specific factor: e.g., GHG emissions	4.0 t	3.8 t

Source: Hubbard, 2006

Benchmarking perspectives

The concept of the OSPI, the Overall Sustainable Performance Index



Financial performance

Measure	Rating (1–5)
Sales growth	3
Return on sales	4
Return on assets	2
Return on equity	5
Gearing	2
Overall	3.2

Customers/market performance

Measure	Rating (1–5)
Market share	5
No. new customers	5
Product returns rate	4
Defects	4
Order cycle time	3
Overall	4.2

Internal process performance

Measure	Rating (1–5)
Productivity	4
Labour turnover	2
Av. unit production	4
Working capital/sales	4
Capacity utilization	3
Overall	3.4

Organizational sustainable performance index

Measure	Rating 2005	Rating 2004
Financial	3.2	3.0
Internal process	3.4	3.2
Customers/market	4.2	3.8
Learning & development	3.4	3.4
Environmental	2.4	2.0
Social	3.6	2.6
Overall Sustainable Performance Index	3.4	3.0

Learning and development performance

Measure	Rating (1–5)
New products	1
New markets entered	5
R&D spend/sale	3
Training spend/sale	5
Invest./total assets	3
Overall	3.4

Social performance

Measure	Rating (1–5)
Employee satisfaction	4
Social performance of suppliers	4
Community relationships	3
Philanthropic investments/revenue or profit	3
Industry-specific factor (e.g. Community Open Days)	2
Overall	2.6

Environmental performance

Measure	Rating (1–5)
Key material use/unit	3
Energy use/unit	1
Water use/unit	3
Emissions, effluent & waste/unit or as a % of total resources used	1
Industry-specific factor (e.g. GHG emissions)	4
Overall	2.4

Source: Hubbard, 2006

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Benchmarking perspectives

International Water Association

- Context for performance assessment and comparison:
  - Monitor an essential service i.e. vital to health & welfare of customers;
  - Counterbalance the monopolistic character of water services;
  - Investigate issues of scale and scope.
- Context specific challenges, e.g.:
  - Keeping pace with growth/expanding coverage
  - Ensuring the sustainability of services
  - Improving quality of services
- Five General Utility Management Objectives:
  - Appropriate level of service
  - High productivity
  - Sustainable use of water and other resources
  - Efficient use of financial resources
  - Effective and efficient use of physical assets

Source: Alegre et al, 2006

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Benchmarking perspectives

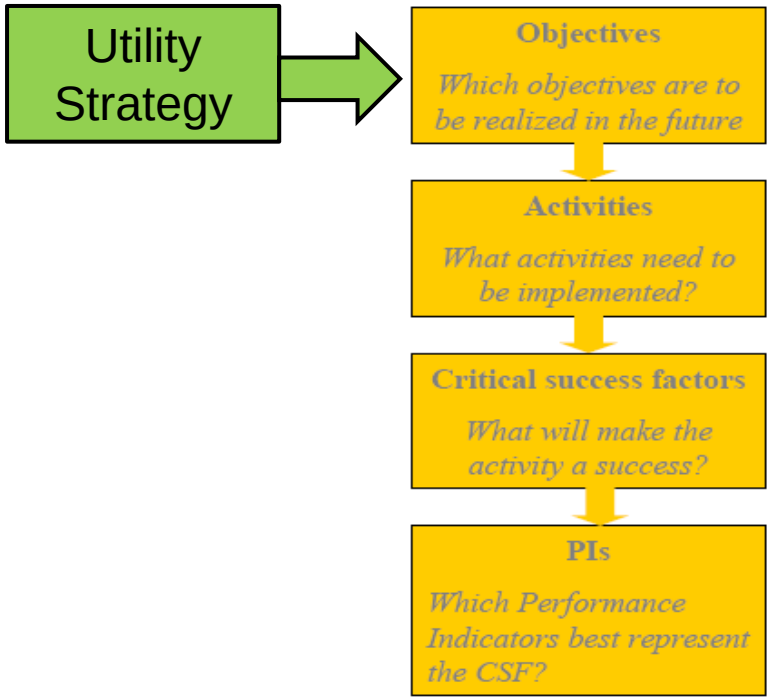
International Water Association

- Avoid PIs to become a goal in itself
- How to arrive at a System of PIs
  - Management strategy
  - Objectives
  - Critical success factors
  - Performance indicators
- Integration of performance assessment within all management activities to show that the main perspectives (financial, customer, processes, learning, growth) are interconnected and must be considered as a whole.

Source: Alegre et al, 2006

Benchmarking perspectives

International Water Association



Reduce NRW by 10%

New metering programme
Increase leak detection

Meter replacement
Accurate meter reading
Leakage detection and repair

Op8, Meter replacement
Op30, Customer reading efficiency
Op4, Leakage control
Op23 Apparent losses
Op28, Real losses per mains length

Source: Alegre et al, 2006

Benchmarking perspectives

SBCS and the choice of perspectives by Vewin and UvW associations in The Netherlands

SBSC	Vewin Drinking water	UvW Wastewater
Product	Drinking Water Quality	Wastewater Treatment
Customer	Service Quality	
Finance	Finance and Efficiency	Finance
Innovation		Innovation
Environment	Environmental	Environment
Social		Stakeholders

Benchmarking perspectives

Tynan and Kingdom

- A well-run utility provides service to all customers who demand it, at a level that meets their needs and which they are willing and able to pay for.
- Seven categories to measure performance:
  i. Operational efficiency
  ii. Cost recovery
  iii. Commercial performance
  iv. Coverage and access
  v. Asset maintenance
  vi. Service quality
  vii. Price and affordability

Source: Tynan and Kingdom, 2002

Benchmarking perspectives

Objective: to propose improvements to the existing benchmarking tools to allow utilities and others to develop a much stronger focus on service provision to the poor

5 Perspectives:

i. **Policies, arrangements and capacities**
ii. **Collaboration**
iii. **Tools**
iv. **Sustainability**
v. **Quality of Watsan Services Provision**

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Benchmarking perspectives

Discussion:

- What are the most pressing challenge(s) for your organisation?
- Wat, by consequence is/should be the strategic focus of your organisation?
- Which objectives would you formulate to realize the strategy?
- Which perspectives would best capture the strategy and the objectives?

NB: strategy can cover a.o. the growth/diversification of the customer base, differentiation of products/services, the balancing of expenditures and revenues, new partnerships, changes to the internal organization

Topic 7:
Experiences:
Performance indicators

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Performance Indicators

International Water Association

- IWA publications:
  - Performance indicators in water supply services (revised 2014)
  - Performance indicators for wastewater services (2003)

- These publications provide:
  - A rationale for performance assessment
  - A system of performance indicators

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Performance Indicators

International Water Association

- Categories of Performance Indicators (Water supply)
  - Water Resources (4)
  - Personnel (26)
  - Physical indicators (15)
  - Operational indicators (40)
  - Quality of service indicators (34)
  - Economic and financial indicators (47)

  A total of 166 indicators !!

- In addition there are 100 indicators for describing the context in the following categories: undertaking profile, service information, system assets, consumption and peak factors, demography and economics, environment

Source: Alegre et al, 2006

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Performance Indicators

International Water Association

Water Supply, Examples of Performance Indicators:

- Water Resources (4):
  - WR 4, Reused supplied water (%)
- Personnel (26):
  - Pe 16, University degree personnel (%)
- Physical indicators (15)
  - Ph 3, Transmission/distribution storage capacity (days)
- Operational indicators (40)
  - Op 16, Mains rehabilitation (%/year)
- Quality of service indicators (34)
  - QS 32, Billing complaints/queries (no./customer/yr)
- Economic and financial indicators (47)
  - Fi 40, Current ratio (%)

Source: Alegre et al, 2006

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Performance Indicators

International Water Association

Performance Indicators defined:

- Ph 3, Transmission/distribution storage capacity (days)

  Ph3 = C2 / A3 x H1

  A3 = System input volume (m3)

  C2 = Treated water storage capacity (m3)

  H1 = Assessment period (day)

- QS 32, Billing complaints/queries (no./customer/yr)

  QS 32 = (F20 x 365 / H1) / E10

  E10 = Registered consumers (customer)

  F20 = Billing complaints and queries (No.)

  H1 = Assessment period (day)

All variables such as A3, C2, H1, etc.. are defined

Source: Alegre et al, 2006

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Performance Indicators

Tynan and Kingdom (7 categories)

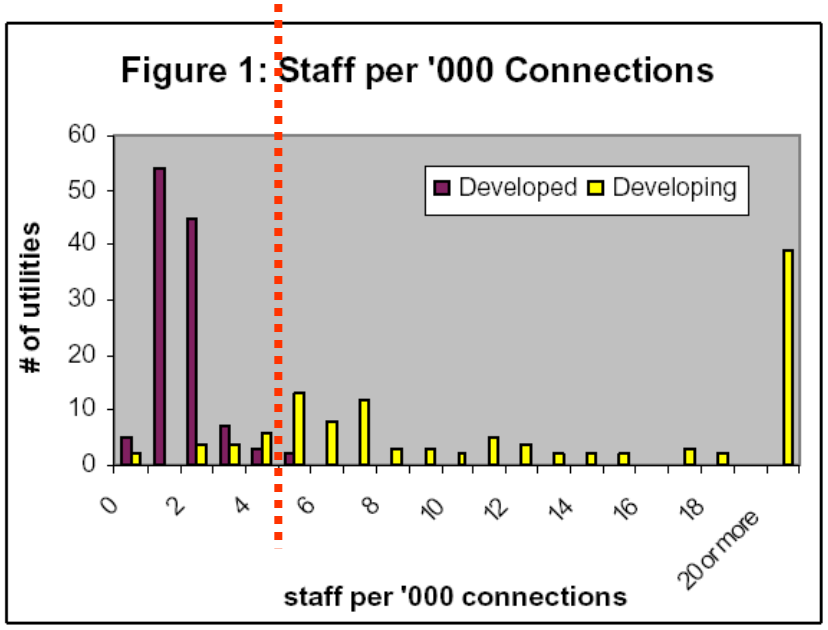
Operational efficiency

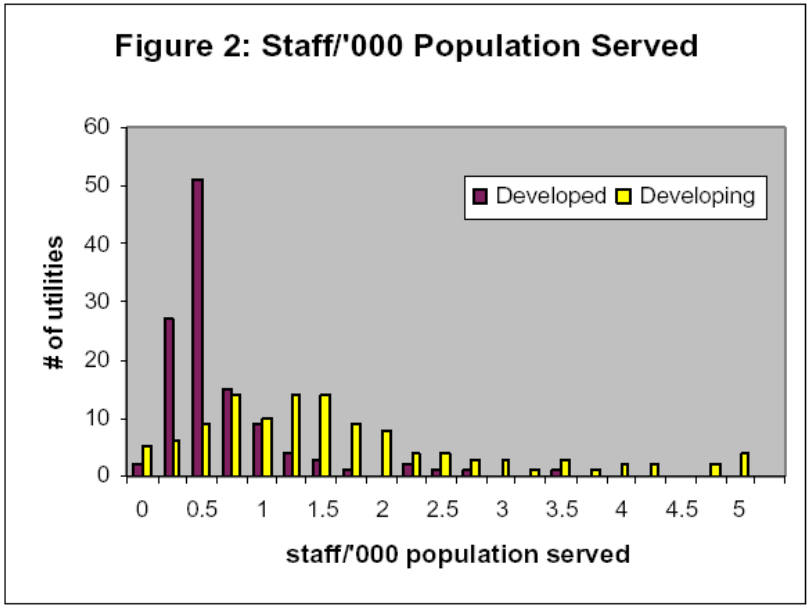
- Operational efficiency refers to the lowest cost of labor, energy, water and the materials in the day-to-day operation of a utility, with the most efficient combination partly dependent on local input prices and prior capital investment decisions.
- Ratio's
  1. Staff per 1000 connections
  2. Staff per 1000 population served
- A high number for either ratio may indicate inefficient use of staff.

Source: Tynan and Kingdom, 2002

Performance Indicators

Operational Efficiency





Recommendation: 5 staff/1000 connections

Source: Tynan and Kingdom, 2002

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Performance Indicators

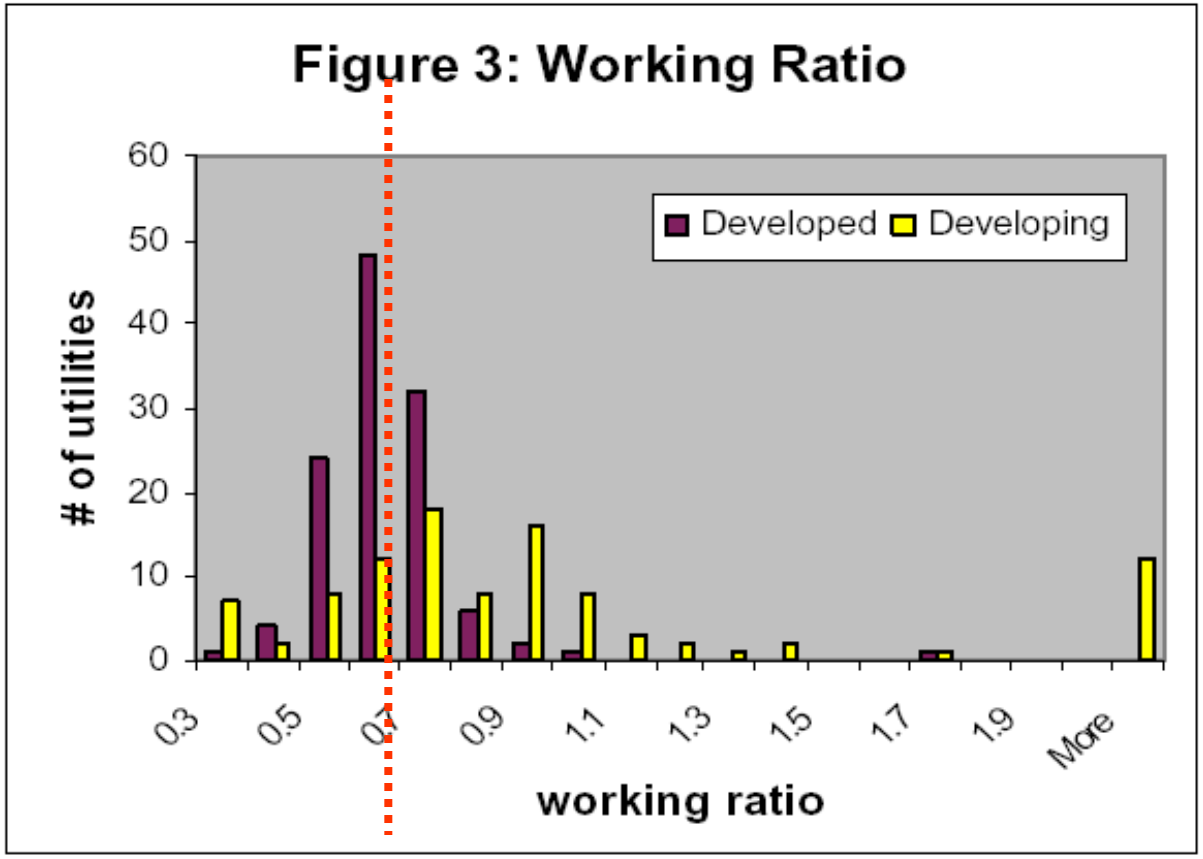
Cost recovery

- A well-run utility needs adequate funding to pay for its capital investments, and meet its operational costs. Failure to reach this level of funding can lead to under-investment in assets, weakened operations and a declining level of service to customers.
- Working Ratio
  - **Working ratio**: the ratio of total annual operational expenses (excluding depreciation and debt-related expenditures) to annual pre-tax collections from billed services and subsidies.

Source: Tynan and Kingdom, 2002

Performance Indicators

Cost recovery: Recommendation: WR < 0.68



Source: Tynan and Kingdom, 2002

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Performance Indicators

Issue: Reliability of Data

10 large Indian public water utilities participated in a performance assessment pilot

		Coverage	Production	Metering	Working ratio	Complaints	Daily supply
		in %	lpcd	% of total connections	Opex as % of oper rev	% of water connections	Hours per day
City Boards	Bangalore	91%	143	90%	1.0	NA	2.50
City Boards	Chennai	98%	107	4%	1.4	44%	3
City Boards	Hyderabad	95%	192	93%	1.1	39%	1
City Company	Jamshedpur	79%	608	1%	0.9	43%	6
City Corp.	Chandigarh	100%	290	71%	1.3	2%	12
City Corp.	Indore	54%	102	0%	5.4	0%	0.75
City Corp.	Pune	88%	274	16%	0.8	NA	7
City Corp.	Rajkot	98%	126	0.4%	6.6	30%	0.33
State Agency	Bhubaneswar	45%	269	1%	3.3	8%	3
State Agency	Dehradun	80%	149	8%	1.4	4%	4

Reliability scale: A* | B | C | D*

** A refers to a high degree of reliability and D refers to low or negligible reliability. Darker the shade higher the reliability.*

Source: WSP, 2008

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Performance Indicators

Qualitative Indicators

Context:

- Came up in the water sector when wanting to benchmark the performance of River Basin Organisations (RBOs)
- RBOs are not only more diverse than water and sanitation providers (mandate, objectives, budget, basin size, staffing, etc..) but also …. RBOs are in different stages of development
- Conclusion: quantitative indicators cannot work when wanting to compare across this variety of RBOs >>> search for **qualitative** indicators that enable assessment and subsequent comparison

Source: CapNet, 2008

Performance Indicators

Qualitative Indicators for Benchmarking RBOs

Areas Covered	No of Indicators
Coordinated decision making	19
Responsive decision making	10
Goals, goal shift and goal completion	7
Financial sustainability	12
Organizational design	20
Role of law	5
Training and capacity building	6
Information and research	18
Accountability and monitoring	6
Private and public sector roles	12
	115

Source: Hooper, 2006

Performance Indicators

Example of Qualitative Indicators

BUILDCAPAC	**Capacity building mechanisms relevant to their cultural, political and administrative setting and level of economic development of the country within which they operate**	**74**	**Evidence of training programs to improve the skills of river basin managers and stakeholders, specific to their situation**
		75	**Evidence that the RBO provides the leading voice on basin wide land and water uses**
		76	**Evidence of the RBO informing its constituencies and decision-makers of basic issues and management solutions**
		77	**Evidence that the RBO leadership is well-trained, articulate, responsible and has listening skills**
TRAINING	**Human resources capacity building**	**78**	**Existence of well-trained staff with capacity to work in teams and plan across sectors and disciplines**
		79	**Evidence of training programs in the concept of IWRM and the tools of coordinated management**

Source: Hooper, 2006

Each indicator scores between 0 and 5 points

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Topic 8:
Experiences:
Assessment methods

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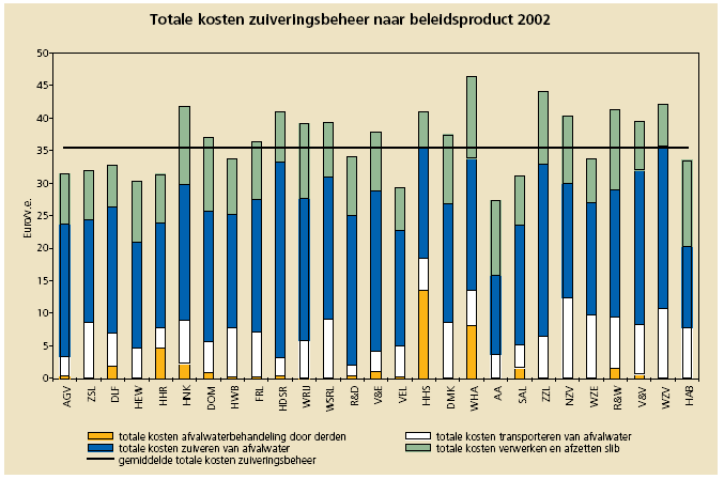
Assessment Methods

Introduction:

- Benchmarking for the purpose of performance improvement determines and then simply compares values for individual performance indicators and then goes on to identify, understand, adapt and adopt the related business processes.
- This approach to benchmarking does not bring out i) how utilities utilise inputs to maximise output; ii) opportunities for cost minimisation; iii) a ranking of overall performance at utility level. These are however relevant issues, not only for utilities, but also and perhaps more so for regulators
- The methods used for benchmarking can be distinguished as follows:
  - ❖ Partial metric methods (single indicators)
  - ❖ Overall Performance Indicators (composite index)
  - ❖ Frontier methods (modelling overall system performance)

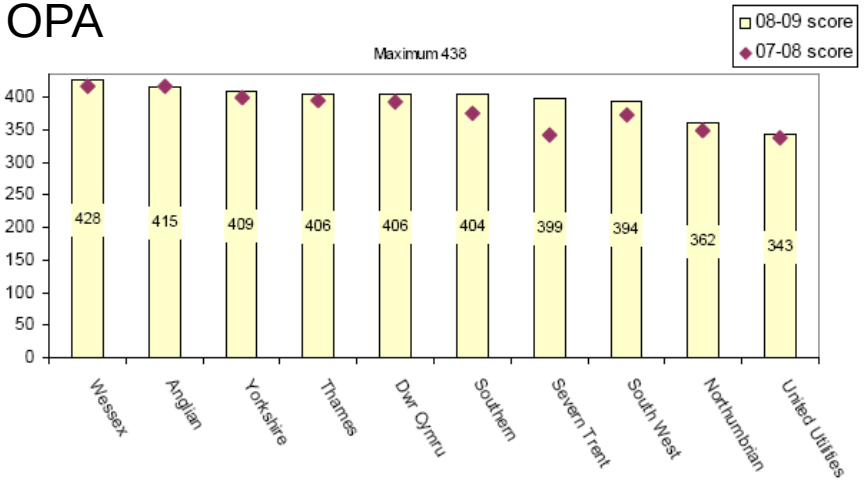
Assessment Methods

Partial Metric



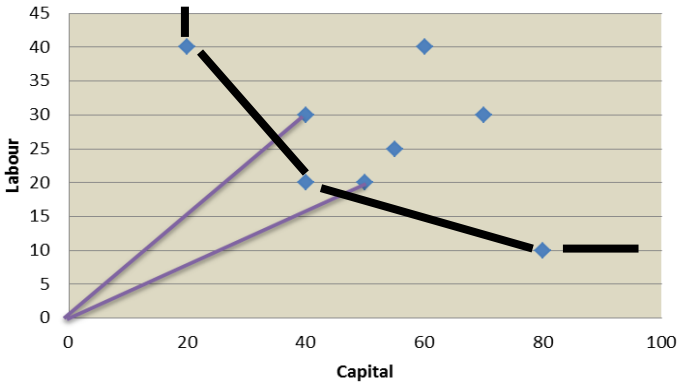
Source: Ofwat 2009b

OPA



Source: Ofwat 2009b

Frontier



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Assessment Methods

Partial Metric Methods

- The partial metric methods involve calculation of different measures of financial, operating, commercial, and quality characteristics of a firm
- ***Advantages of partial metric methods:*** they provide the simplest way to performance comparisons – performance indictors are easy to calculate, they seem easy to interpret and data is readily available in annual reports
- ***Disadvantages of partial metric methods:*** specific core indices fail to account for the relationships among different factors. A firm that performs well on one measure may do poorly on another, while one utility doing fairly well on all measures may not viewed as the most efficient . In addition, an excessive number of indices makes it difficult to discern meaningful comparisons.

Assessment Methods

Overall Performance Indicator (OPI)

- The specific core indices are often combined in some way to create an overall performance indicator, through a weighted average of core indices, where the weights reflect the importance the regulator assigns to each aspect of firm performance.
- **Advantages:** the use of an OPI provides an summary index that can be used to communicate relative performance to a wide audience
- **Disadvantages:** i) the weights used to compute the OPI are arbitrary; ii) the result by itself does not show the possible deficient areas (black box)

Assessment Methods

Scoring to calculate the OPI by Regulator RWASEB

Maximum scores vary between 30 for ''Collection efficiency'' and 10 for ''Sanitation coverage''

Indicator			Sector Benchmarks			Scoring Criteria			
			Good	Acceptable	Not Acceptable	Upper limit		Lower limit	
						Performance	Score	Performance	Score
1	Collection efficiency			85-90%	<85%	≥90%	30	≤50%	0
2	Non-Revenue Water (NRW)				>25%	≤20%	30	≥70%	0
3	Water Quality	Drinking water quality	>95%			≥95%	20	≤80%	0
		Compliance with residual chlorine test	>95%	90-95%		95%	10	≤50%	0
4	Hours of Supply	Population>100,000	21-24	16-20	<16	20-24hrs	20	≤8hrs	0
		Population<100,000	17-24	12-16	<12	16-24hrs	20	≤4hrs	0
5	O&M cost coverage		≥150%	100-149%	<100%	≥130%	20	≤70%	0
6	Metering ratio		100%	95-99%	<95%	100	20	≤50%	0
7	Staffing(No per 1000 connection)	Large and very large WSP	<5	5-8	>8	≤5	20	≥20	0
		Medium and small companies(with up to3 towns)	<7	7-11	>11	≤7	20	≥20	0
		Medium and small companies(with more than 3 towns)	<9	9-14	>14	≤9	20	≥25	0
8	Water Coverage		>90%	80–90%	<80%	≥90%	20	≤80%	0
9	Sanitation Coverage		>90%	80–90%	<80%	≥90%	10	≤20%	0
	Total Maximum score:						200		
10	Personnel Cost as a % of (O&M) costs	Large and Very Large Companies	<20%	20-30%	>30%	N/A	N/A	N/A	N/A
		Medium Companies	<30%	30-40%	>40%				
		Small Companies	<40%	40-45%	>45%				

Source: WASREB 2011

Assessment Methods

‘Total’ Methods

- Total methods capture the interrelationship analysis of several inputs and outputs of a single firm, allowing for the identification of distinct types of efficiency such as technical and cost efficiency
- Total methods may be classified in terms of the primary intent of the analytical exercise, the type and quantity of data available, and the resources at the disposal for the needed calculations

Assessment Methods

'Total' Methods

1. **Index Methods**
2. **Estimation using mean and average methods**
3. **Frontier Methods**

   (i) Stochastic Frontier Analysis (SFA)

   (ii) Non-Stochastic Frontiers Analysis (Data Envelopment Analysis, DEA)

Assessment Methods

Frontier Methods:

- Frontier techniques place a greater emphasis on performance variations relative to the top performing firms.
- Frontier-based methods estimate (SFA: using regression techniques) or identify (using DEA techniques) the efficient performance frontier for a sample of firms.
- The efficient companies are sometimes referred to as the ‘peer firms’ and determine the efficient frontier.
- The efficient frontier is the benchmark against which the relative performance of firms is measured.
- Companies that form the efficiency frontier use minimum inputs to produce the same quantity of outputs
- The distance to the efficiency frontier provides a measure of inefficiency

Assessment Methods

Stochastic Frontier Analysis (SFA)

- SFA attempts to empirically estimate an efficient frontier, incorporating the possibility of measurement errors (or random factors) in its estimation.
- To separate inefficiency and noise, the statistical analyst needs to make strong assumptions regarding the distribution of error terms within the sample
- SFA may be further classified into production, distance and cost frontiers

Assessment Methods

SFA:

(a) Production Frontier

(b) Distance Frontier

(c) Cost Frontier

$$\ln C = \delta + \sum_w \alpha_w \ln W_w + \sum_y \chi_y \ln Y_y + \varphi_t t$$
$$+ \frac{1}{2}\sum_w \sum_v \gamma_{w,v} \ln W_w \ln W_v + \sum_w \sum_y \kappa_{w,y} \ln W_w \ln Y_y + \sum_w \mu_{w,t} \ln W_w t$$
$$+ \frac{1}{2}\sum_y \sum_z \varsigma_{y,z} \ln Y_y \ln Y_z + \sum_y \xi_{y,t} \ln Y_y t$$
$$+ \varphi_{private,t} D_{private} t + \varphi_{Ofwat,t} D_{Ofwat} t$$

- Shows costs as a function of the level of output and input prices.
- It is useful when trying to determine output prices that would allow utilities to recover efficient costs (not just realised costs).
- The minimum cost function defines a frontier showing costs associated with various level of inputs, the input prices, and other control variables.

Assessment Methods

Non-Stochastic Frontiers: Data Envelopment Analysis (DEA)

- DEA is a method in which linear programming techniques are applied to a framework of a multi-input, multi-output production function
- DEA benchmarks firms only against the best producers
- The assumption is that if any one firm can produce a certain level of output utilising a specific number of inputs, then any comparable firm of equal scale should be capable of doing the same.
- The most efficient producers for any given level are used to form composite (or hypothetical) producers, allowing the analyst to identify an efficient solution for every output level

Assessment Methods

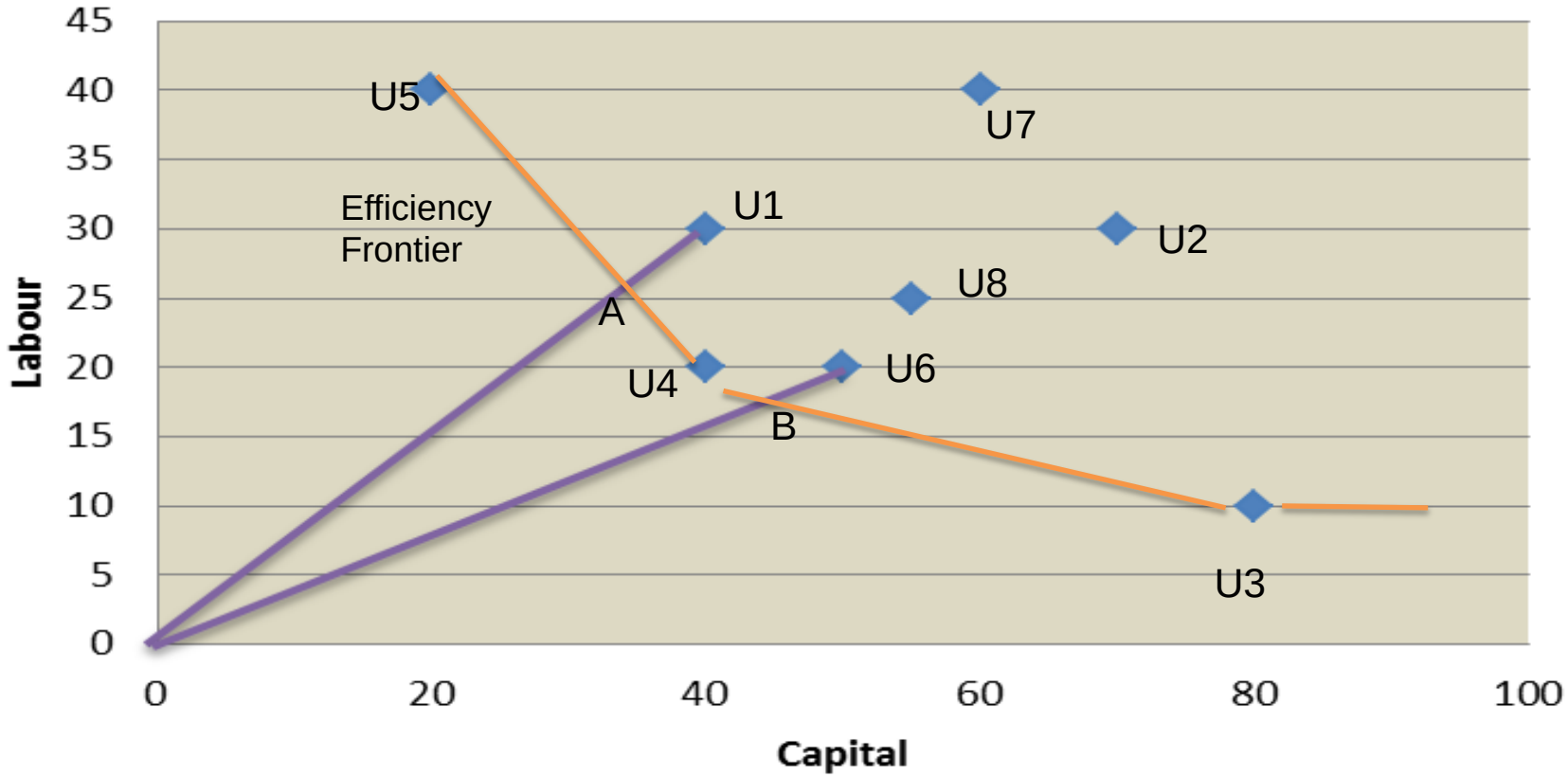
DEA (simplified)

Suppose we have 8 firms where we have obtained data on the inputs (capital and labour) versus output (water delivered) as shown in the table below and the figure on the next page:

Utility	Capital	Labour	Water Delivered
U1	40	30	10
U2	70	30	10
U3	80	10	10
U4	40	20	10
U5	20	40	10
U6	50	20	10
U7	60	40	10
U8	55	25	10

Assessment Methods

Drawing the Efficiency Frontier



Assessment Methods

Efficiency Frontier, construction and analysis:

- An Efficiency frontier can be constructed with the input data – reflecting the minimum amount of inputs required to produce a given output level
- Firms 5, 4 and 3 are used to construct the efficient frontier – the rest are labelled as technically inefficient. They could reduce the amount of input and still produce the same amount of output as the firms on the frontier
- Technical efficiency (TE) of utility 1 is radial distance 0A divided by distance 0U1 multiplied by 100%; the TE of utility 6 is radial distance 0B divided by distance 0U6 multiplied by 100%

Assessment Methods

Example: Performance analysis of state vs private utilities

Performance of African water utilities Between 61 and 84 utilities per PI	State operated	Privately operated
Labour costs/total costs	29%	21%
Staff per thousand connections	20	13
Staff per million m3 water distributed	123	78
Fuel cost/total operating costs	20%	11%
Chemical cost/total operating costs	17%	4%
Capital utilization	60%	67%
Consumer charges ($/m3)	168	305
Percentage of population served	63%	64%
Unaccounted for Water	35%	29%
Continuity of supply	17 hr/day	16 hr/day
% of customers metered	69%	79%

Source: Kirkpatrick et al, 2004

Assessment Methods

In summary there are three methods being used for assessing the performance of water utilities:

- The **Partial Metric Method** that seems best suited for use by Utilities that want to directly compare indicator values and from there move on to compare processes and practices
- The **Overall Performance Indicators** and the **Frontier methods** (SFA, DEA) that serve Regulators, Academics and Operators that want to establish overall effectiveness and efficiency of water utilities

Topic 9:

Performance improvement

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Performance Improvement

Performance improvement may be induced:

i. at the initiative of utility managers after performance comparison
ii. by those governing the utility after reviewing benchmarking reports
iii. by the water association or other coordinating body in charge of the benchmark
iv. by the regulator after a sector review

Performance Improvement

Case Study Sydney Water Board

Aim: to establish how the key business processes can be managed to deliver the products and services that the **customers** want at the least possible **cost**

Approach: select only the most significant operational processes and compare these in detail with ‘best practise’ organisations

Source: Green, 1994

Performance Improvement

Case Study Sydney Water Board

Key processes

Maintenance – both planned and unplanned

Asset – including major renewals, system expansion to cope with growth and system improvement

Catchment operation – including the harvesting of water from all sources

Treatment operation

Reticulation operation – including local distrubution reservors, pumping stations, and pipes

Revenue collection – including meter reading, database management, issuing bills, receiving payments, debtor control, and policy

Marketing – including pricing and demand management

Planning – including strategic and system planning

Customer service – including all day-to-day contacts and ‘’over-the-counter’’ services

Source: Green, 1994

Performance Improvement

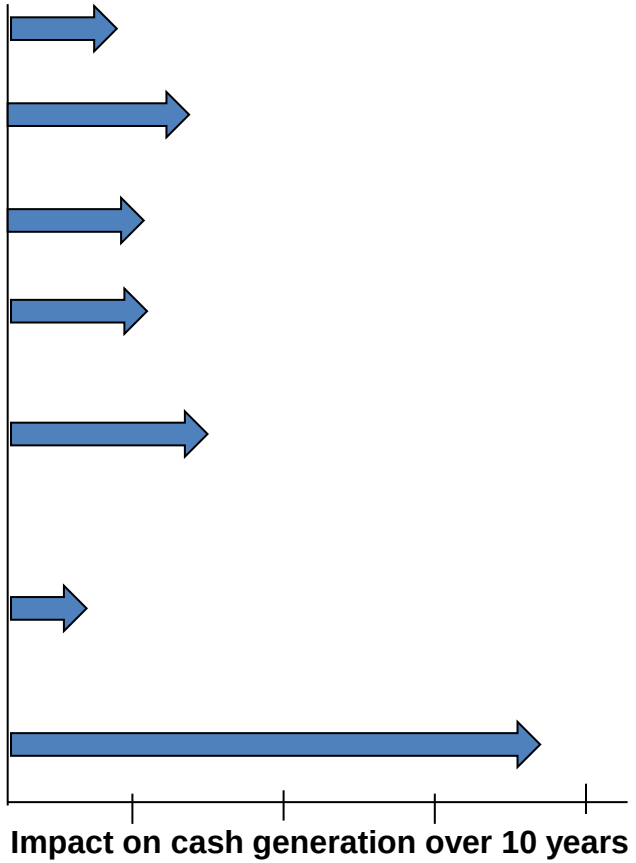
Case Study Sydney Water Board

Selected for benchmarking

1. Improve revenue collection by 10%
2. Increase prices (use and availability) by 10%
3. Reduce planning costs by 10%

Selected for benchmarking

4. Improve maintenance efficiency by 10%
5. Reduce all capital expenditures by 5% through asset planning
6. Delay water resources capital expenditures after 1995 by demand management
7. Capital assets creation done for 5% less



Source: Green, 1994

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Performance Improvement

Case Study Sydney Water Board

Process Performance Measures Revenue Collection	Company 1	Company 2	Company 3	Company 4	Company 5
Number of bills per revenue staff member per year	21,000	8,800	26,000	92,000	10,000
Properties per revenue staff member, excluding meter reading	6,000	4,400	4,300	5,400	1,900
Time to complete:					
Simple subdivision	5 min	6 min	< 5 min	N/A	15-30 m
Change of address	< 1 min	< 30 s	< 30 s	< 1 min	3-5 m
Provide account balance	3 min	< 1 min	N/A	20 sec	3-5 min
Percentage of meter readings requiring rework	N/A	0,7%	< 3%	1-2%	1,2%
Collections as a percentage of total bills issued	84%	99,8%	99,9%	99,1%	99,1%

Source: Green, 1994

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Performance Improvement

Case Study Sydney Water Board

Best practices in revenue collection:

Metering and billing frequency: read annually, bill monthly, leading to low meter-reading costs and regular cash flow

Receiving payments: direct debit from customers accounts with minimal bank transaction fees, leading to predictable cash stream at minimal collection cost

Sharing costs with others: shared meter reading and collection (combined water, sewage, power and heating), leading to low meter-reading and low collection costs

Pricing policy: simple, stable pricing framework, leading to simplified hard and software, minimal billing queries

Automation and systems design: highly automated processing leading to improved customer service and less customer enquirees

Physical overheads: automated payments, use of agencies and central inquiry handling by telephone, leading to absence of expensive ‘shopfronts’

Source: Green, 1994

Performance Improvement

Case Study Sydney Water Board

Process Performance Measures Water reticulation	Company 1	Company 2	Company 3	Company 4	Company 5	Company 6
Operations staff per 1,000 km pipe	17	14	19	23	29	9
Staffed depots per 1,000 km2	5.8	2.1	1.5	1.2	1.2	14
Technical staff per 1,000 km2	1.8	0.9	0.4	1.7	N/A	1.0
Main breaks per 100 km per year	2.1	12.2	16.3	26.8	16.0	13.7
Pumps per maintenance worker	7	19	12	N/A	14	10

Source: Green, 1994

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Performance Improvement

Case Study Sydney Water Board

Best practices in reticulation system O&M:

Skills and training – staff on pumping stations have ‘ownership’ of assets and multiple skills, including supervision of contractors

Planning and scheduling – all routine maintenance work is planned and scheduled with contractors to cover peak and specialist workloads

Avoid unnecessary system disturbance – do not ‘overmaintain’fittings, valve exercising only on strategic valves

System losses – high emphasis on leakage reduction as part of demand management and cost minimisation, including delay or elimination of new assets

Physical overheads – combine depots and maintenance workforce with sewage organisation including also integrated maintenance schedules

Travel time – maintenance workers operate from home, get instructions mailed and come to depot to restock supplies and attend meetings

Source: Green, 1994

Topic 10:
Framework for Pro-poor indicators

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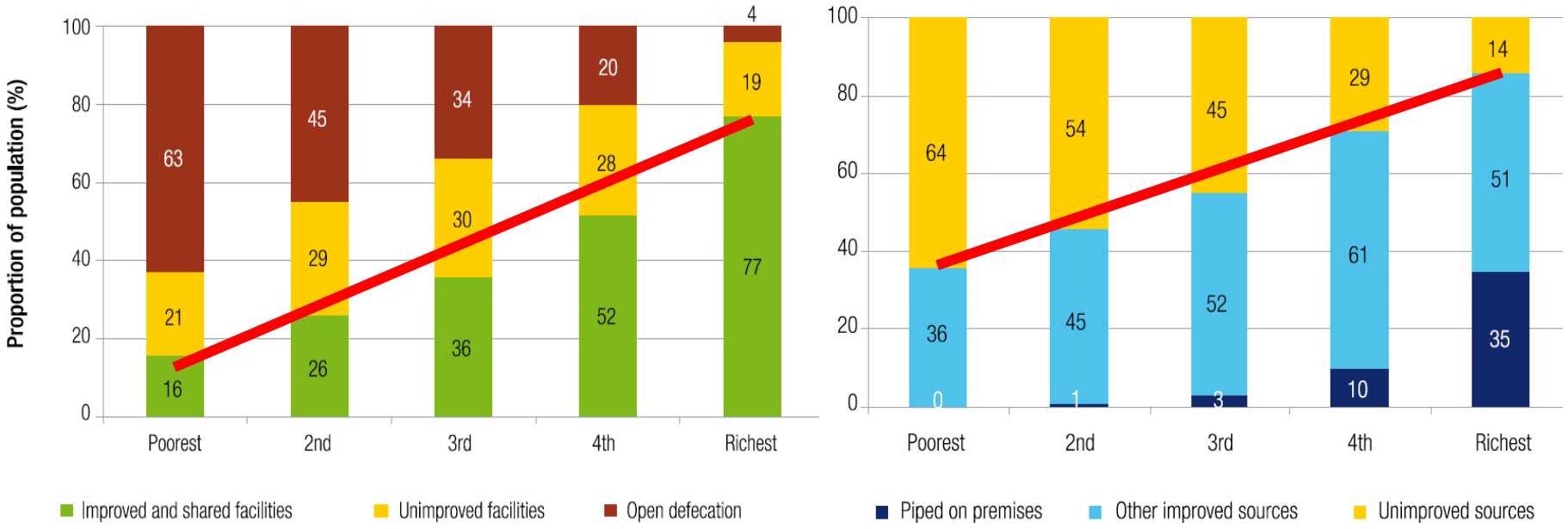
Rationale for Pro-Poor Benchmarking

The poor are two to five times less likely to use improved facilities than the rich >> focus on the poor >> pro-poor benchmarking



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Focus of Pro-poor Benchmarking

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Factors known to favor pro-poor services provision

- the (political) resolve to supply services and remove obstacles (pro-poor policies, regulation, land issues)
- pro-poor technology (such as water kiosks, public standposts, public and multi-family latrines, small bore sewers, etc..)
- affordable services (tariffs, connection fees, flexibility to pay arrears, targeted subsidies, micro-credit, etc.)
- effective, innovative and sustainable institutional arrangements (utility partnerships with small scale private providers, Govt/Utility/NGO/CBO/Community cooperation, community self-help schemes, etc.)

Perspectives

Five Perspectives:

1. **Policies, arrangements and capacities**
2. **Collaboration**
3. **Tools**
4. **Sustainability**
5. **Quality of Services Provision**

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Parties subject to assessment and area of assessment

- Government/regulators/municipality – policy, legislation, regulation, resource allocation, collaboration, incentives, compliance
- Utility – capacity, incentives, tools, collaboration, sustainability
- CSOs/communities – collaboration
- Slum dwellers (end users) – appreciation of services

Perspectives and Indicators

Perspective	Party	Indicator	
Policies, arrangements and capacities	Gov	1	Political initiative and support
	Gov	2	Capacity of the regulating authority
	Uti	3	Capacity of the service provider
Collaboration	All	4	Inter agency collaboration
	All	5	End user or Community Participation
Tools	Gov/Uti	6	Mapping the poor
	Gov/Uti	7	Pro-poor financial instruments
	Gov/Uti	8	Pro-poor technology
	Gov/Uti	9	Pro-poor incentives
Sustainability	All	10	Innovation and learning
	All	11	Durability
Services provision	End users	12	Quality of pro poor sanitation services
	End users	13	Quality of pro poor water supply services

Assessment Framework

P	Indicator		Items	Variable
1	1	Political initiative and support	3	12
	2	Capacity of the regulating authority	3	12
	3	Capacity of the service provider	3	12
2	4	Inter agency collaboration	2	8
	5	End user or Community Participation	2	6
3	6	Mapping the poor	1	4
	7	Pro-poor financial instruments	3	12
	8	Pro-poor technology	1	4
	9	Pro-poor incentives	1	4
4	10	Innovation and learning	2	8
	11	Durability	1	4
5	12	Quality of pro poor sanitation services	5	8
	13	Quality of pro poor water supply services	8	9
5	13	**TOTALS**	35	103

Assessment

Perspective 1: Policies, strategies and capacities Indicator 1: Political initiative and support Item 1: Existence of pro-poor WSS policy		
Data collection: secondary data and interviews		
Criteria		Score
1	prioritizes WSS services provision to the poor	0/1
2	identifies water supply and sanitation services provision to the poor	1/1
3	has community participation and gender components	1/1
4	Includes a financing mechanism for pro-poor WSS services provision	1/1
Total Score		3/4

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Assessment

Perspective 5: Service Provision Indicator 12: Quality of Sanitation services							
Data Collection: questionnaires							
Criteria		unit	bench mark	Value		Score	
				slum 1	slum 2	slum 1	slum 2
1	Distance from home	m	50	21	75	1	0
2	Facility is an improved technology Facility is only for single family use	%	75	100 2	80 0	1 0	1 0
3	Facility is clean Facility does not smell offensive	%	75	77 30	64 32	1 0	0 0
4	Facility is accessible to disabled persons Facility is safe for nightly use (by women)	%	75	0 77	0 50	0 1	0 0
5	Affordability (not investigated)	%		-	-	-	-
	Total Score					**4/7**	**1/7**

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Overall Assessment

Perspective	Indicator		Score	
			SLUM 1	SLUM 2
Policies and capacities	1	Political initiative and support	93	98
	2	Capacity of regulating authority	68	68
	3	Capacity of service provider	63	63
Collaboration	4	Inter agency collaboration	88	88
	5	End user or Community participation	0	50
Tools	6	Mapping the poor	0	0
	7	Pro-poor financial instruments	50	50
	8	Pro-poor technology	50	25
	9	Pro-poor incentives	n.a.	n.a.
Sustainability	10	Innovation and learning	63	63
	11	Durability	n.a.	n.a.
Services provision	12	Quality of pro-poor sanitation services	57	14
	13	Quality of pro-poor water services	75	75

Conclusions

1. The assessment system needs to be further developed to address some methodological concerns and make it more robust
2. The assessment system establishes the capacity of the whole of the actors to enable services delivery to the poor and the actual services delivery
3. The outcome of the assessment can be viewed in one table, but the messages are in the details
4. Also, separate assessments for water supply and sanitation will provide better insights