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Water and Industrial Development
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Global water and sanitation market dynamics: Implications from South Africa's industrial development

Gaylor Montmasson-Clair, Trade & Industrial Policy Strategies (TIPS)

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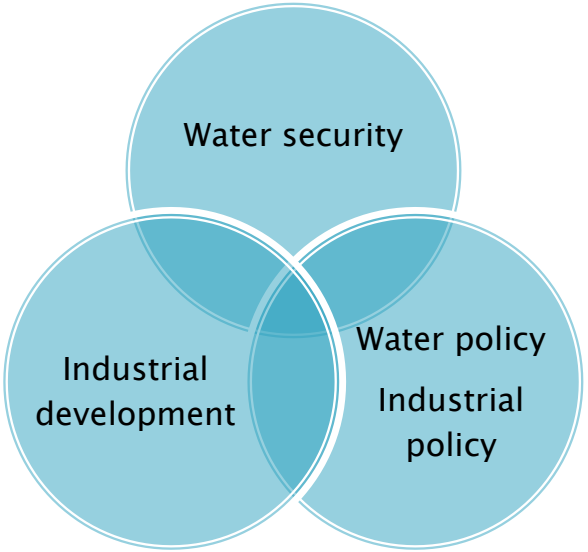
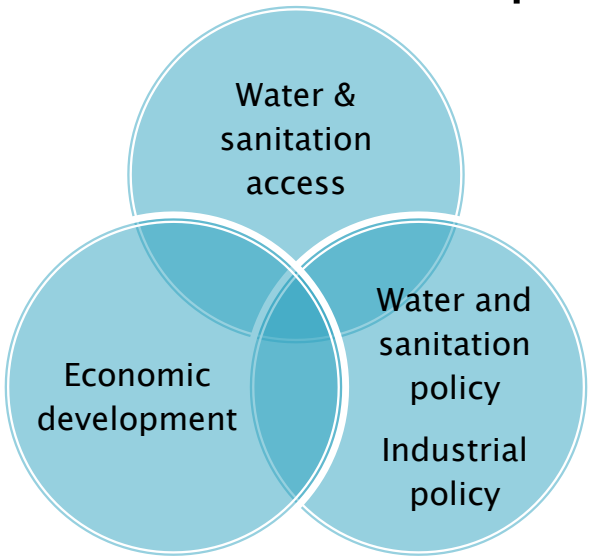
Introduction

Water-industrial development nexus



Sanitation-economic development nexus



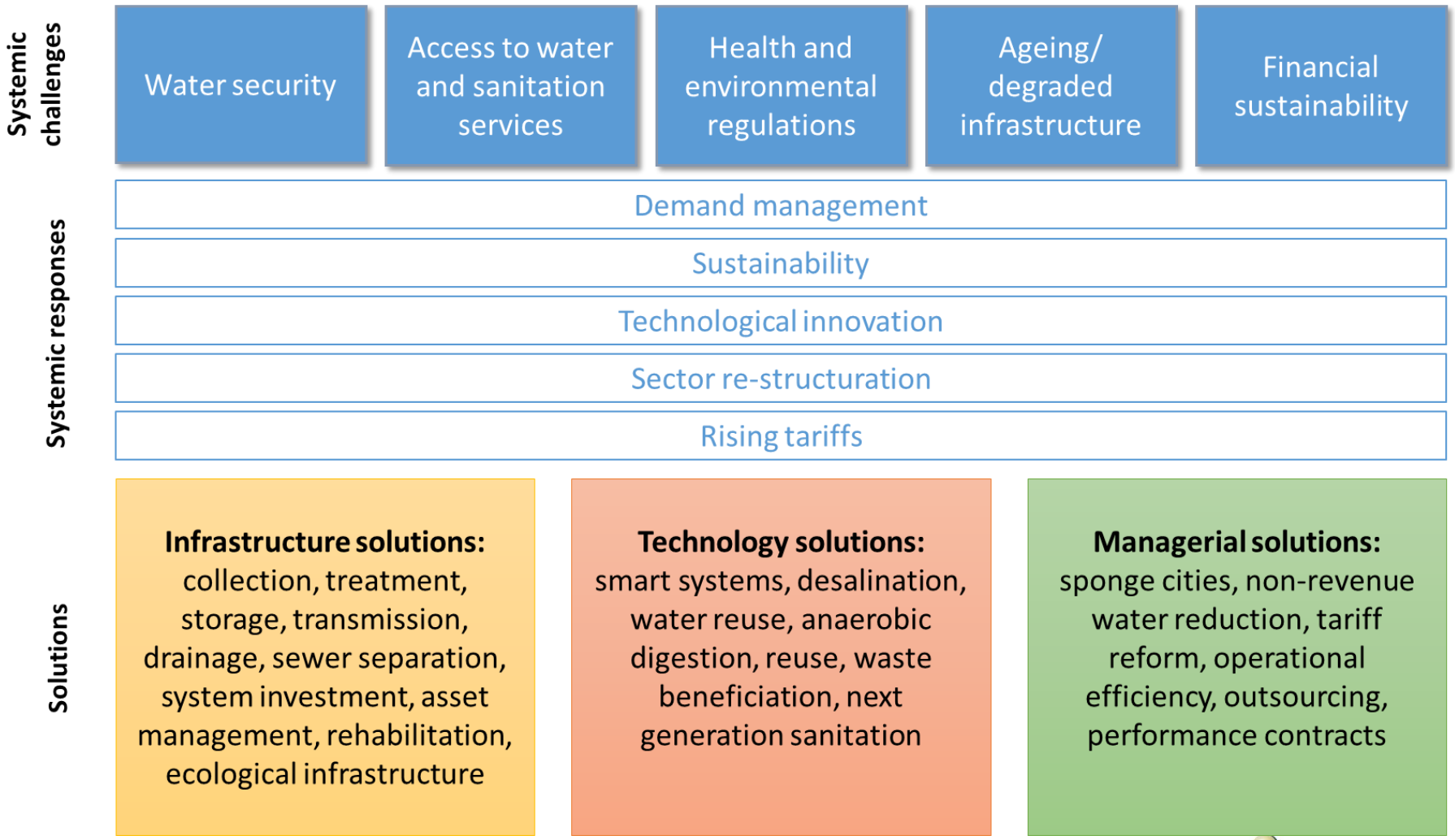
From a trade and industry perspective, two complementary streams, which go hand in hand:

- Water security and access to modern water and sanitation services relies on technology and industrial development
- Industrial development, and more broadly, economic development, depend on water security and modern water and sanitation services

Source: TIPS

Systemic challenges: Pressures towards structural change

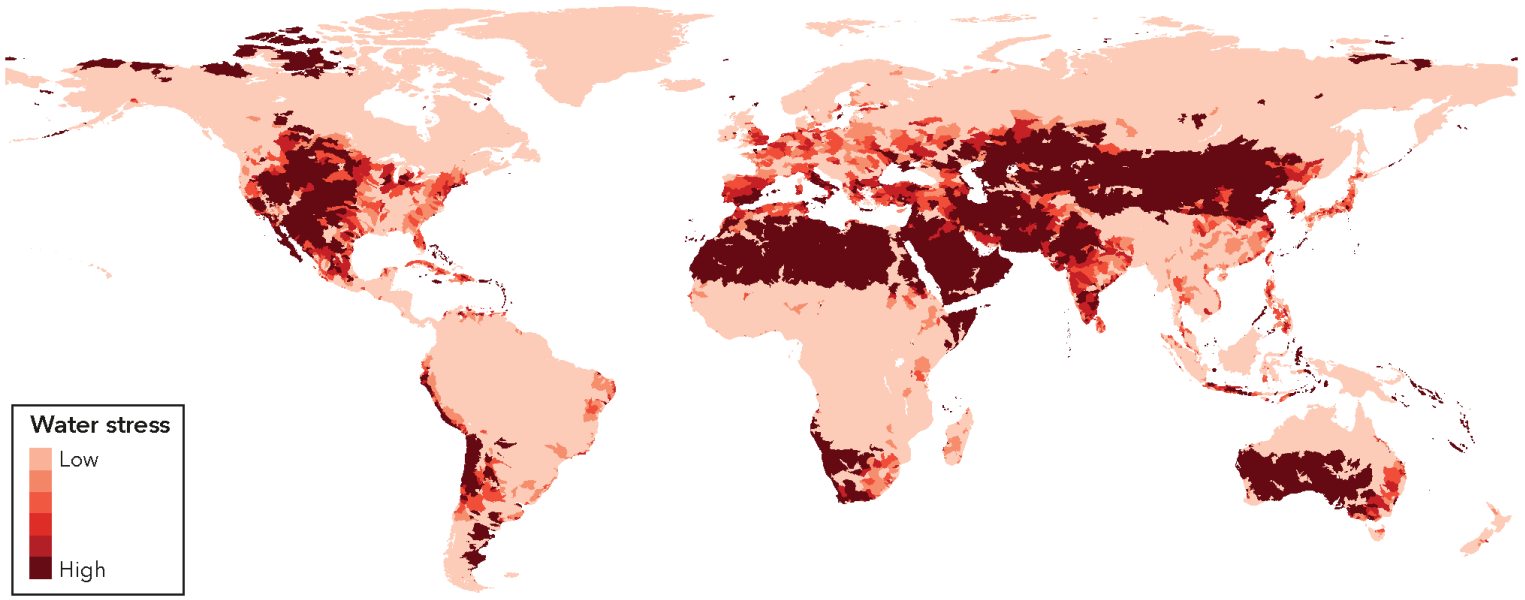
Main market drivers and constraints



Source: TIPS

Systemic challenges: Pressures towards structural change

Water stress by region



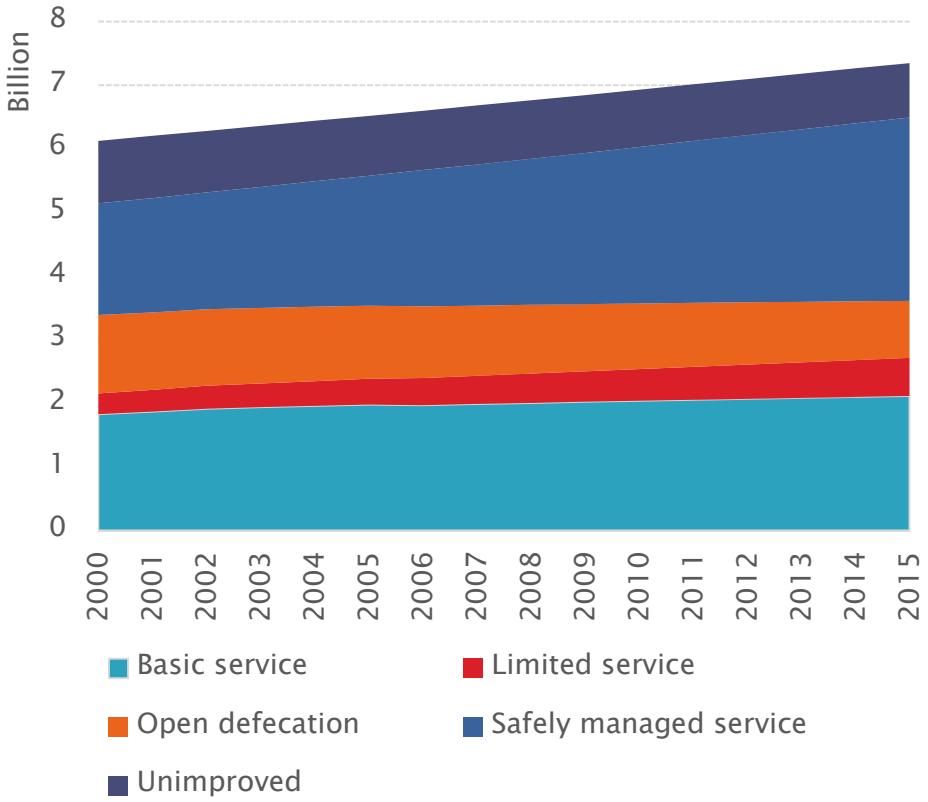
- Heightened pressure on water supply security, particularly in the light of climate change impacts, forces the industry to respond to
  - increased water scarcity as well as
  - a rising volume of natural disasters, such as floods and droughts

Source: GWI, 2017

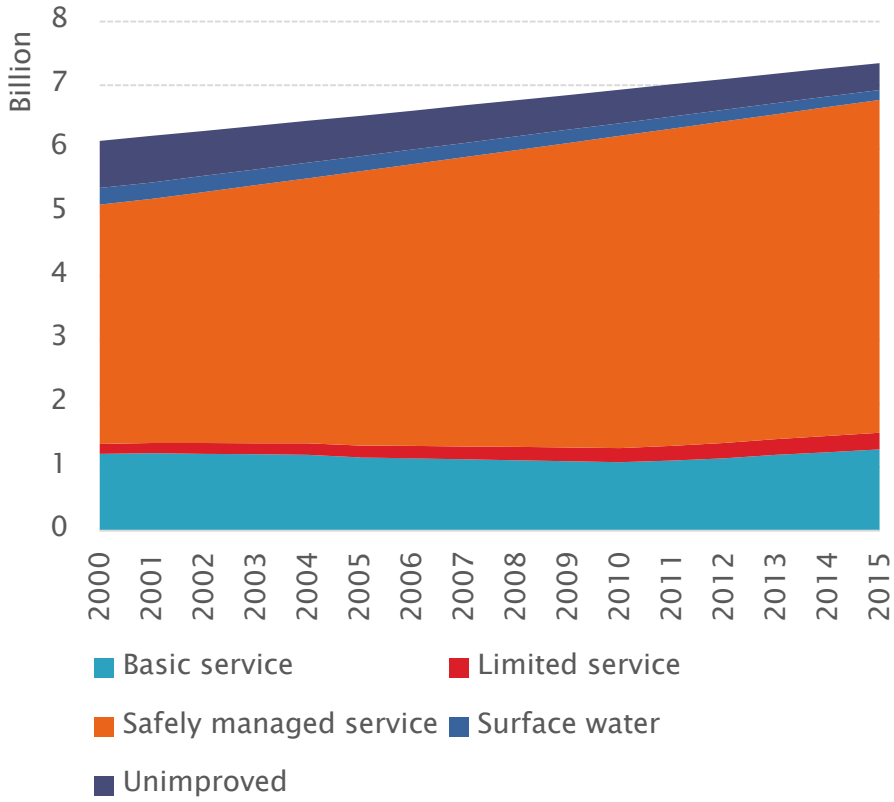
Systemic challenges: Pressures towards structural change

- Access to water and sanitation services remains very unequal with large parts the world still lagging significantly behind.

Global access to sanitation services from 2000 to 2015



Global access to water services from 2000 to 2015

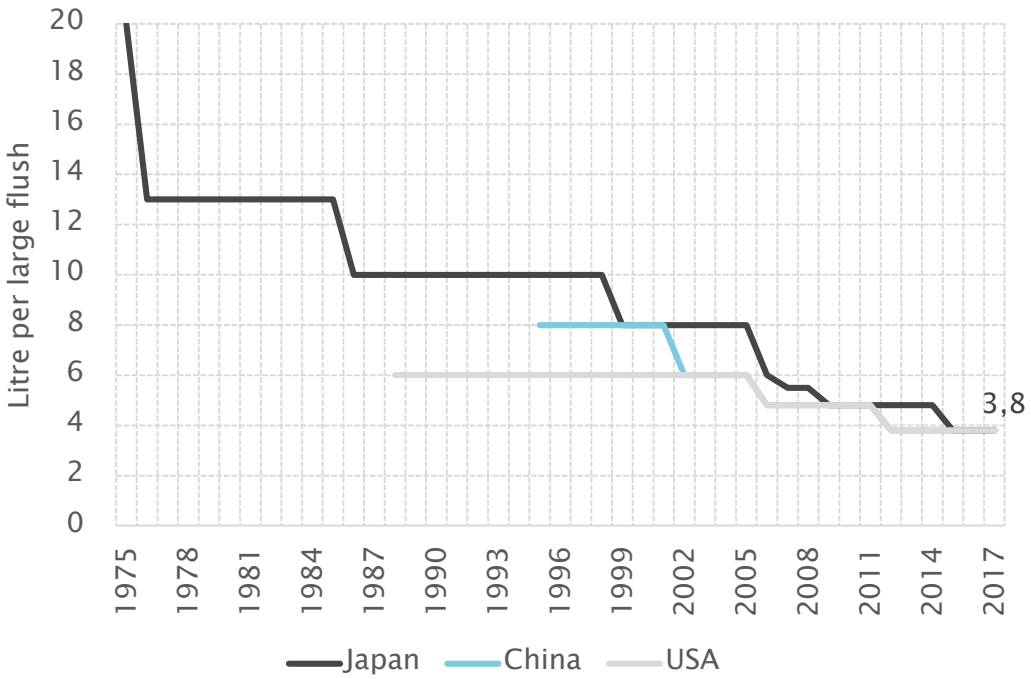


Source: Author, based on JMP data

Systemic challenges: Pressures towards structural change

- Increasingly tighter health and environmental regulations on drinking water standards and wastewater treatment are pushing utilities and relevant stakeholders to adopt new technologies and modernise their systems.

Trends in water efficiency of conventional toilets

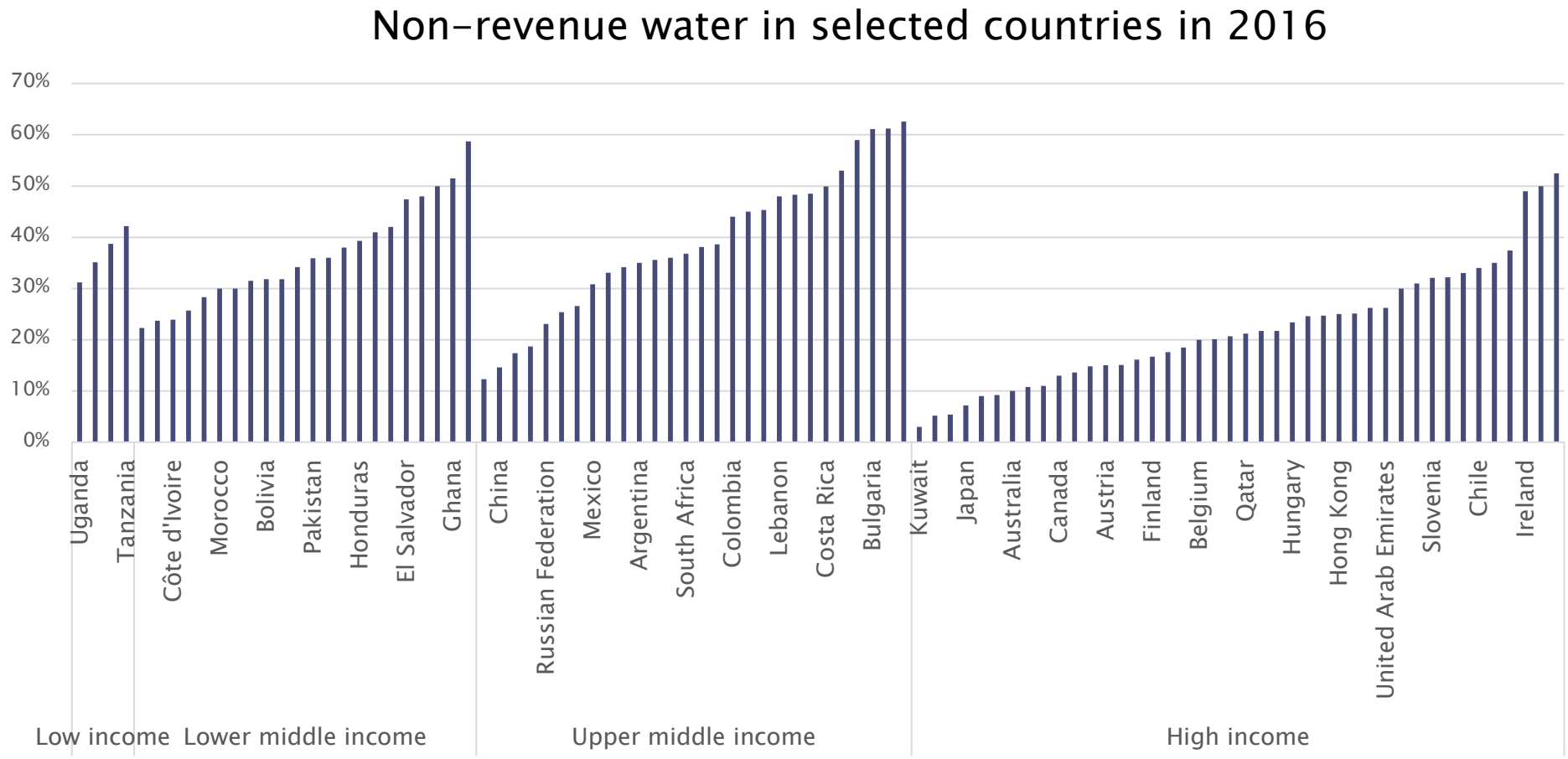


- Financial sustainability is becoming increasingly more difficult to ensure for utilities. Insufficient revenues and rising input costs squeeze the ability of utilities to operate and leave less and less room to manoeuvre.

Source: Author, based on Toto, 2016

Systemic challenges: Pressures towards structural change

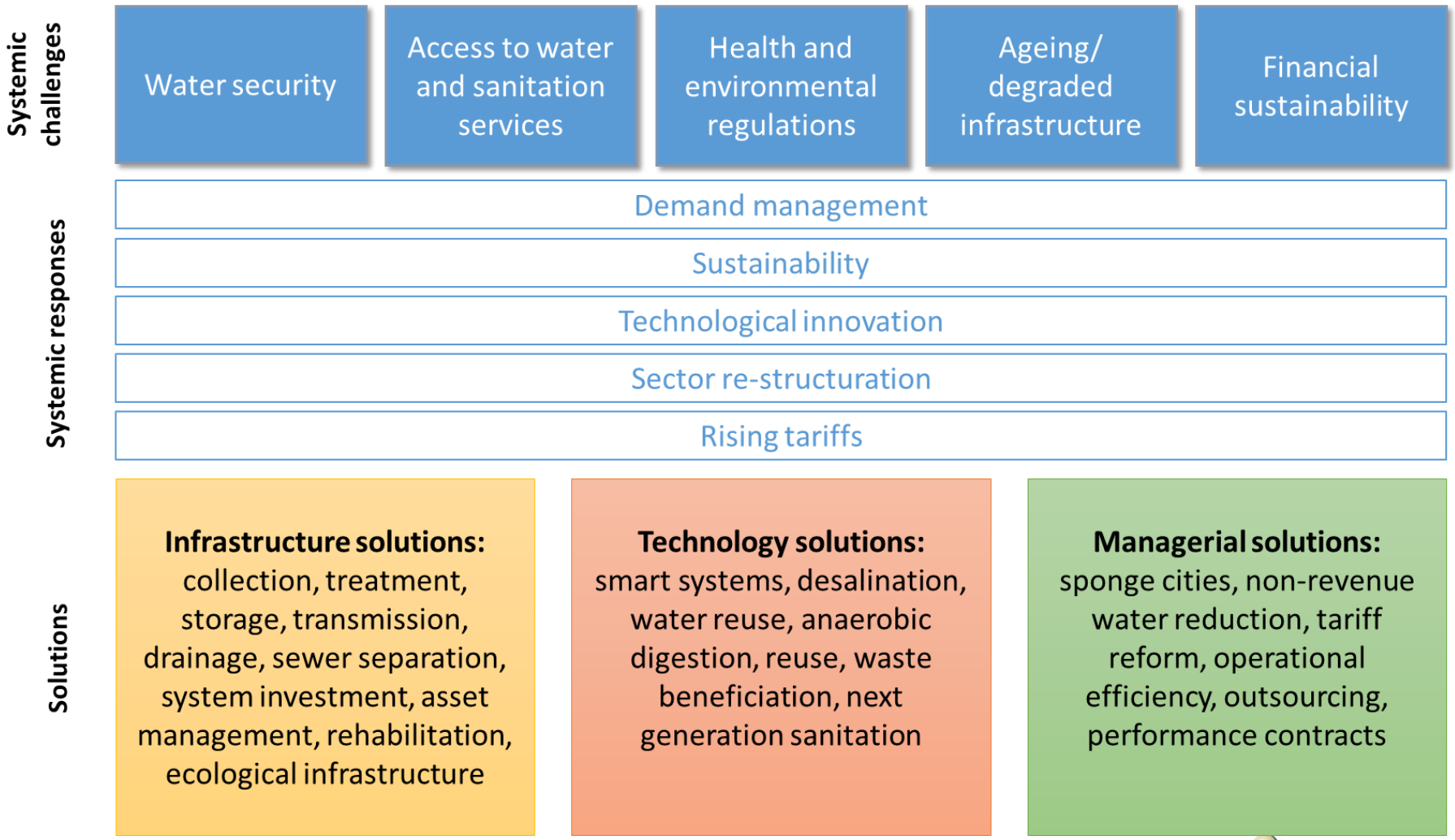
- Ageing and degraded infrastructure leads to significant failures, leakages and contamination.



Source: Author, based on data from GWI

Systemic challenges: Pressures towards structural change

Main market drivers and constraints

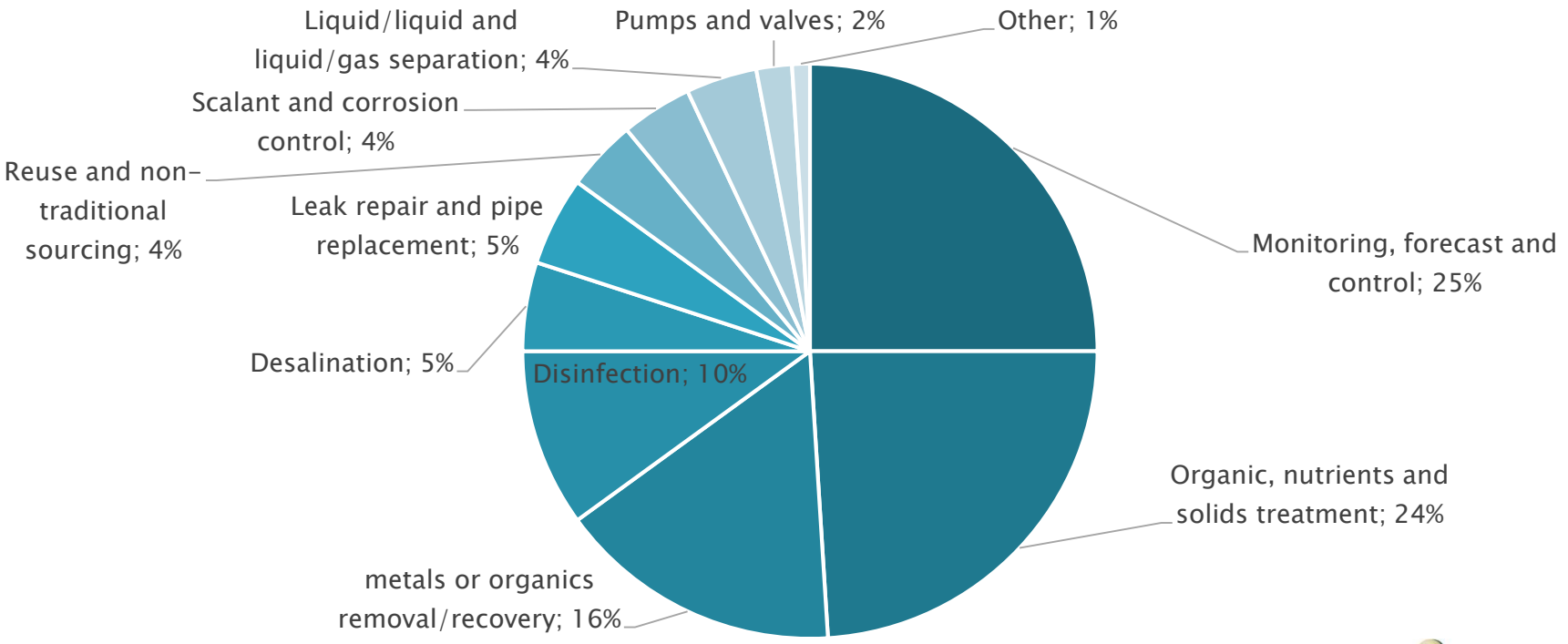


Source: TIPS

Systemic responses: Towards a more sustainable sector

- Increased focus on demand management is a key trend pushing evolution in the water and sanitation sector.
- Increasing awareness and responses from water providers as well as users. Notably to reduce the water footprint of economic activities

Start-up technology types in the water and sanitation sector

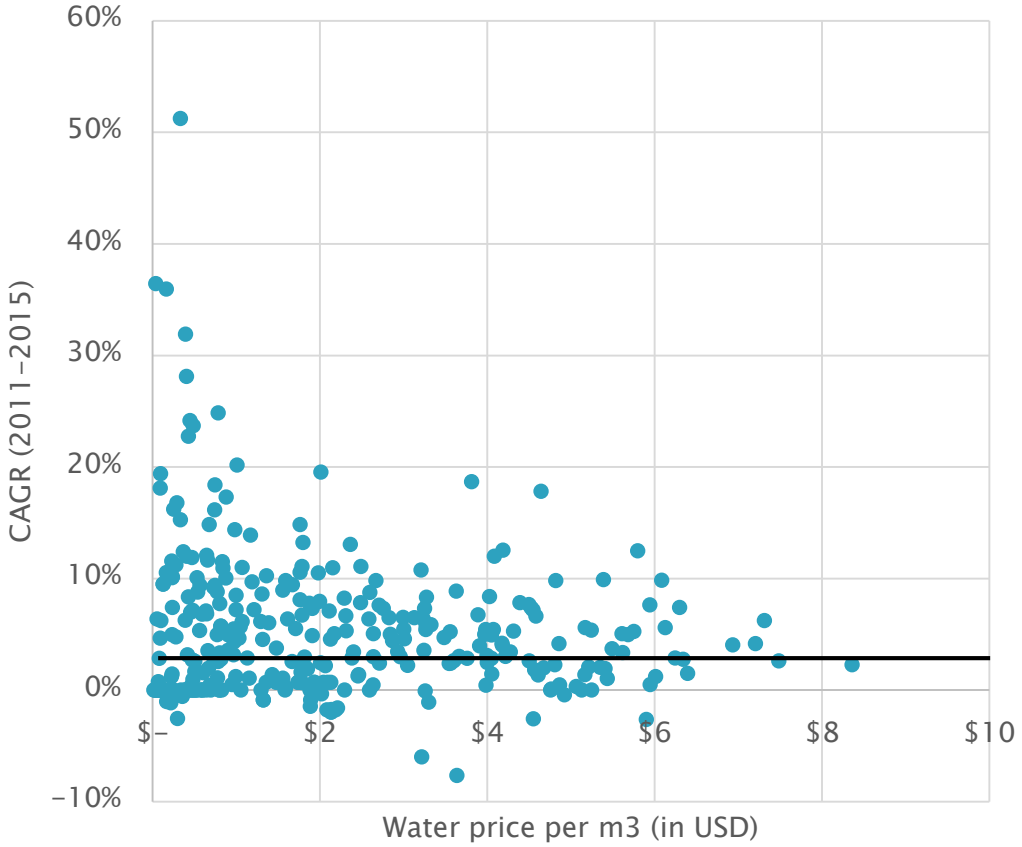


Source: Lux Research, 2013

Systemic responses: Towards a more sustainable sector

- Water tariffs are evolving rapidly

Water tariffs in selected cities in 2015 (in USD) and 2011-2015 CAGR (in %)



- Spurred interest in technological innovation, particularly smart/digital systems, waste minimisation and beneficiation and water treatment/re-use.
- The economics of water and sanitation, a sector which generally values safety over financial gains, is progressively changing to let innovation play a larger role in the future of the sector.

Source: Author, based on GWI data

Systemic responses: Towards a more sustainable sector

- Increasing financial constraints also push the sector to restructure
  - Changing operating models of utilities towards increasing autonomy and accountability
  - Stronger of the private sector with increased regulation

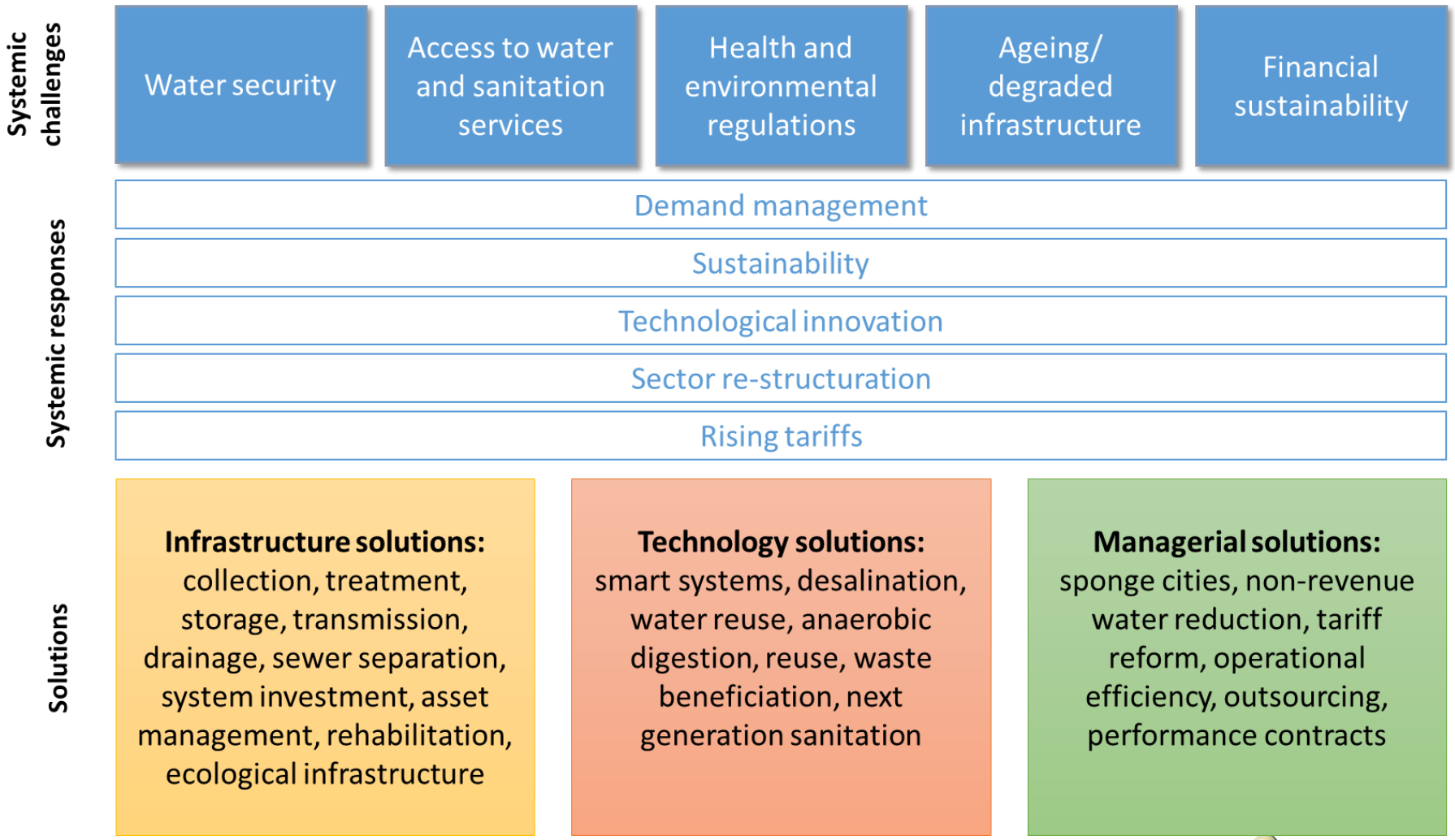
Corporate structure of utilities worldwide

Utility structure	Key features	Number of utilities	Populated served	Spending
Unincorporated municipal or government departments	Part of government department, direct political control, no separate balance sheets	290 000	44%	33%
Subsidiaries of incorporated public works or multi-utility organisations	Own balance sheet as part of separate municipal or governmental organisation also providing other public works and utility operations.	7 000	15%	24%
Incorporated municipal or government bodies	Separate entity under municipal ownership and control but own balance sheets	9 000	24%	35%
Mixed economy organisations	Majority owned by the local government, with private investors as minority shareholders, direct responsibility for finances, but no direct control over tariff setting.	100	1%	2%
Investor-owned utilities	Privately owned, but regulated by a government appointed body.	250	2%	5%
Independent not-for-profit organisations	Independent of government, but not run on a for-profit basis.	20	1%	1%
No utility service	No utility coverage	n/a	14%	n/a

Source: GWI, 2017

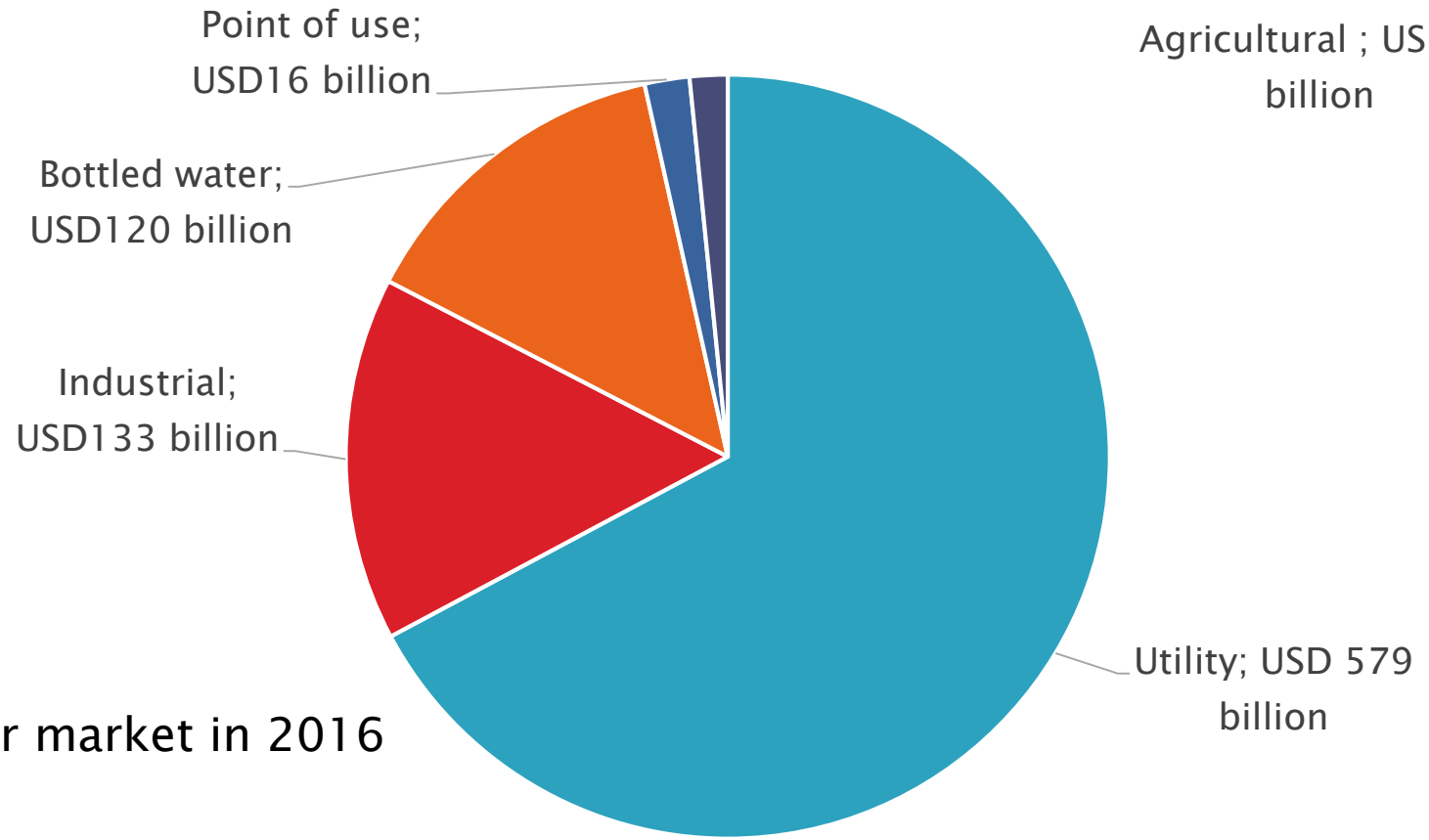
Systemic challenges: Pressures towards structural change

Main market drivers and constraints



Source: TIPS

Global market demand: A utility-driven sector



Global water market in 2016

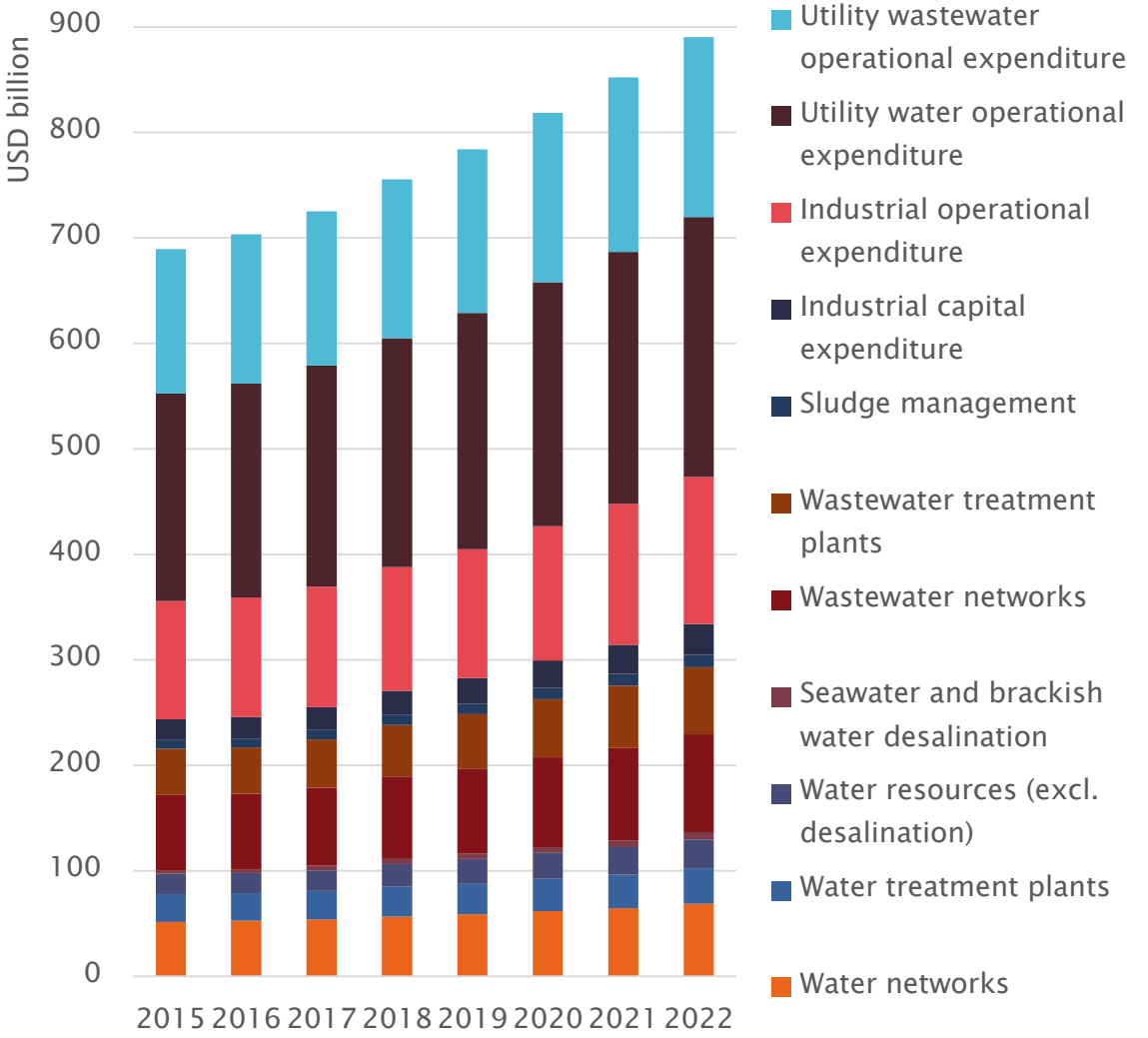
- Global water market worth USD862 billion in 2016
- Dominated by the utility (67%) and industrial (15%) sectors

Source: TIPS, based data from GWI

Global market demand: A utility-driven sector

- The market is expected to reach close to USD 900 billion by 2022, growing by +3.7% per annum from 2015-2022.
- Operational expenditures (64%) are larger than capital expenditures.
- Water- (28%) and wastewater-related (20%) operational expenditure by utilities account for the lion's share of this market

Global capex & opex per application (USD billion)

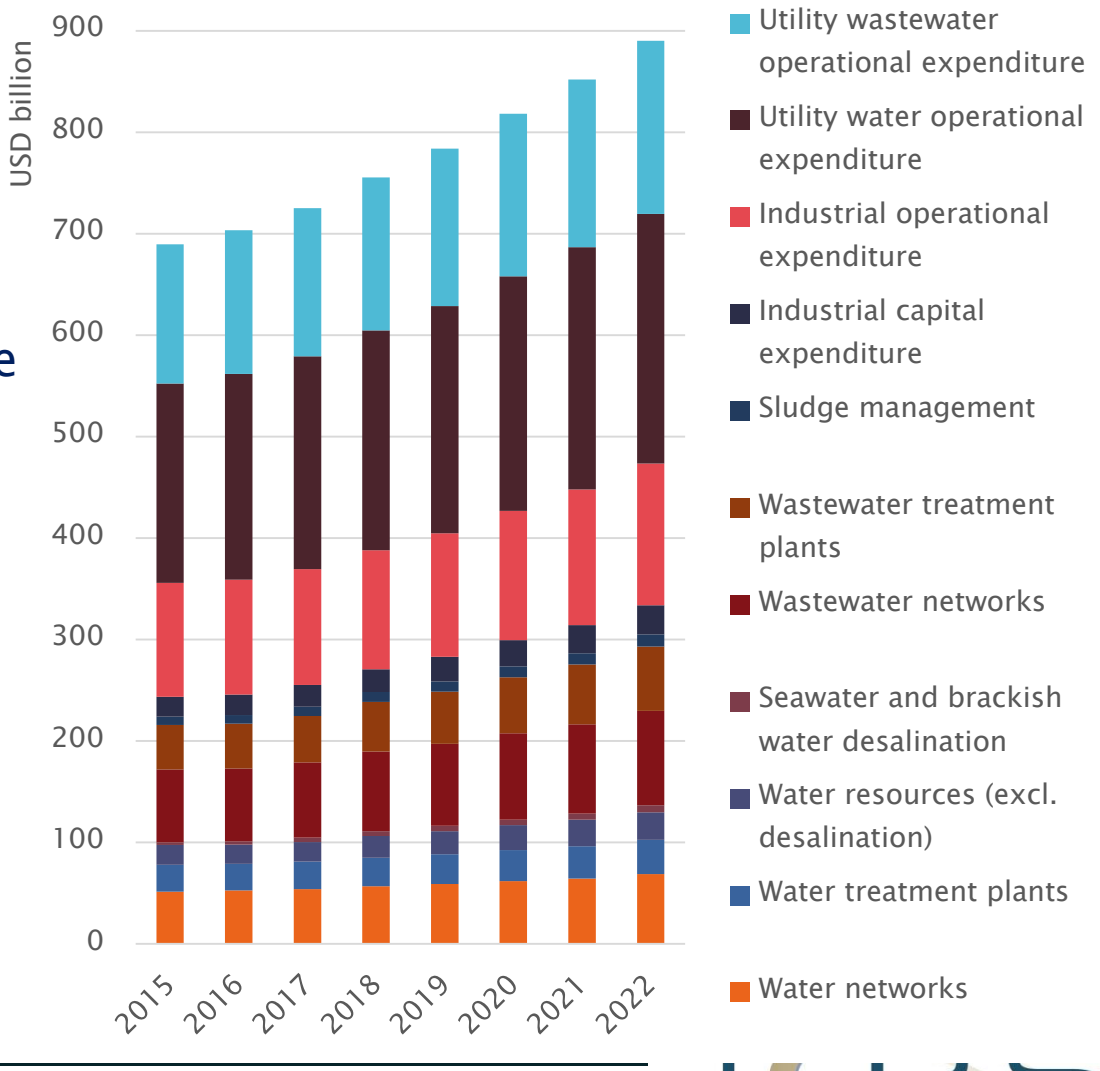


Source: TIPS, based data from GWI

Global market demand: A utility-driven sector

- The spread between operational and capital expenditure is expected to further widen in the future as:
  - Utilities shift from large infrastructure projects to the rehabilitation of existing infrastructure and the implementation of smart, digital solutions.
  - Decentralised solutions for both water supply and wastewater treatment are increasingly attractive and rapidly spreading out.

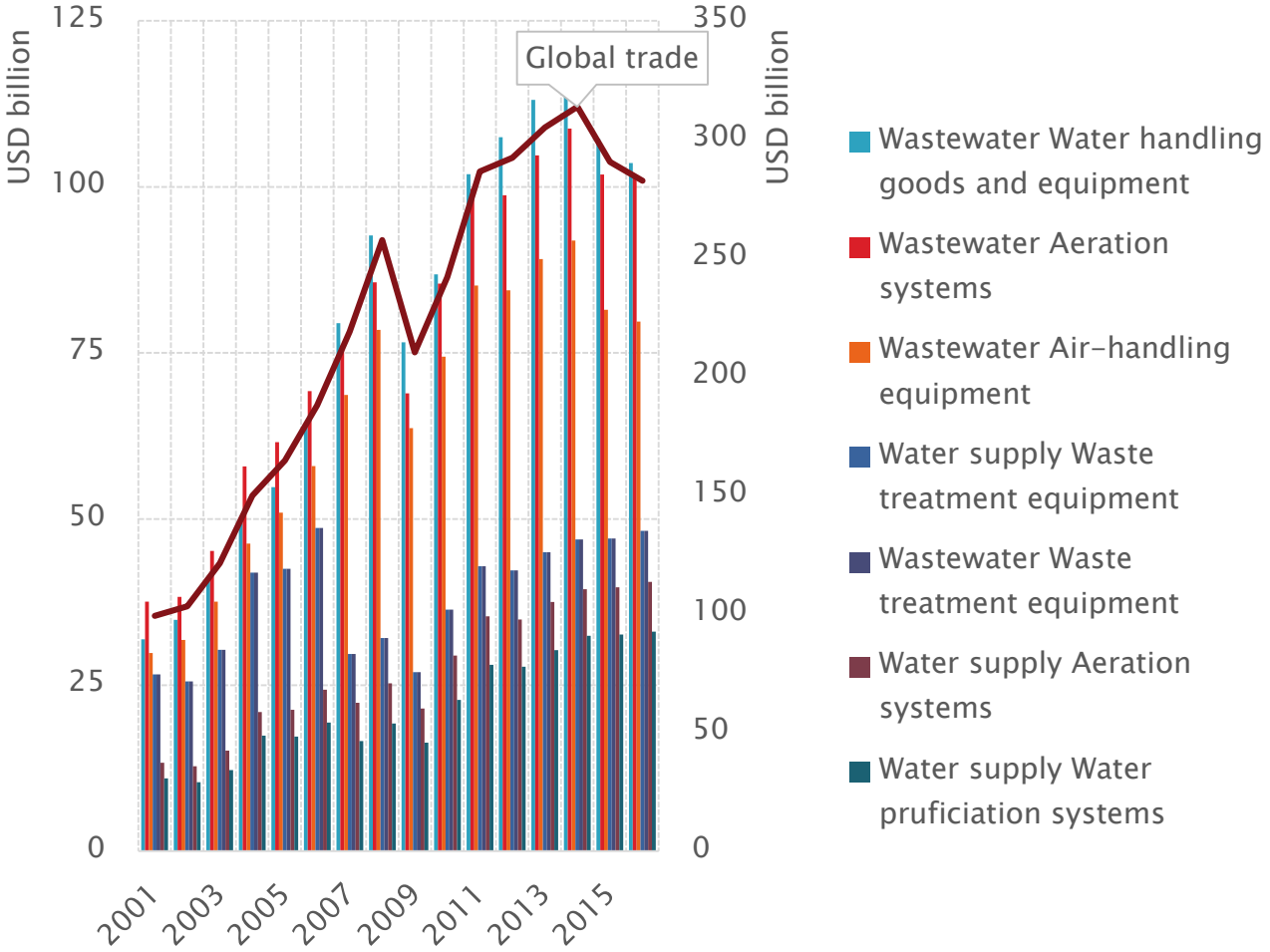
Global capex & opex per application (USD billion)



Source: TIPS, based data from GWI

Global market demand: A utility-driven sector

Global trade in water- and wastewater-related goods from 2001 to 2016 (in USD billion)



- Global trade in water- and wastewater-related products amounted to approximately USD 282 billion in 2016, i.e. more than a third of the global market in that year.
- While this is consistent with the structure of the market, which favours local players, it also denotes the key role of trade in equipment.

Source: Author, based on data from TradeMapNote: the sum of individual categories is larger than global trade due to some products figuring in more than one category

Global market demand: A utility-driven sector

- In line with the global spending on equipment, trade is dominated by pumps, valves and compressors as inputs into wastewater systems for water handling, air handling and aeration systems.

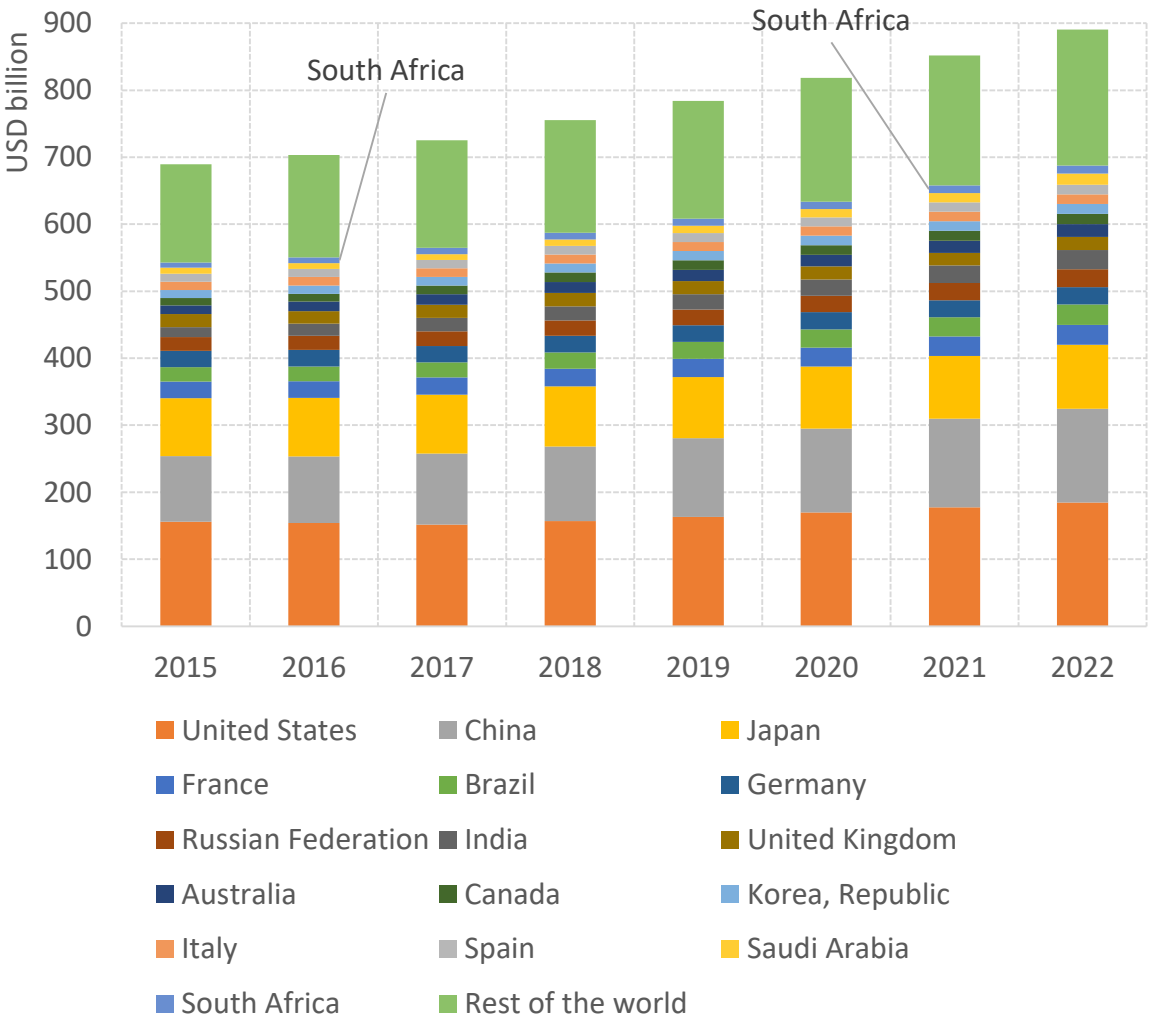
List of main traded water- and wastewater-related products in 2016

Item	HS Code	Value (USD billion)	Share of total imports
Valves, such as pressure or flow control, flush, ball, butterfly or diaphragm valves	848180	48.3	17,1%
Electrical machines and apparatus	854370	32.8	11,6%
Air pumps, air/ gas compressors and ventilating or recycling hoods incorporating a fan	841480	18.8	6,6%
Parts of air/vacuum pumps, air/gas compressors, fans and ventilating or recycling hoods incorporating a fan	841490	15.3	5,4%
Compressors for refrigerating equipment	841430	13.0	4,6%
Centrifugal, power-driven pumps	841370	12.2	4,3%
Parts of machinery and apparatus for filtering or purifying liquids or gases	842199	12.1	4,3%
Refrigerating or freezing equipment	841869	8.5	3,0%
Instruments and apparatus for measuring or checking pressure of liquids or gases	902620	8.3	2,9%
Machinery and apparatus for filtering or purifying liquids	842129	7.7	2,7%
Other 60 products	n/a	105.5	37,3%

Source: Author, based on data from TradeMap

Geographically-concentrated markets

Global capex & opex per country (USD billion)



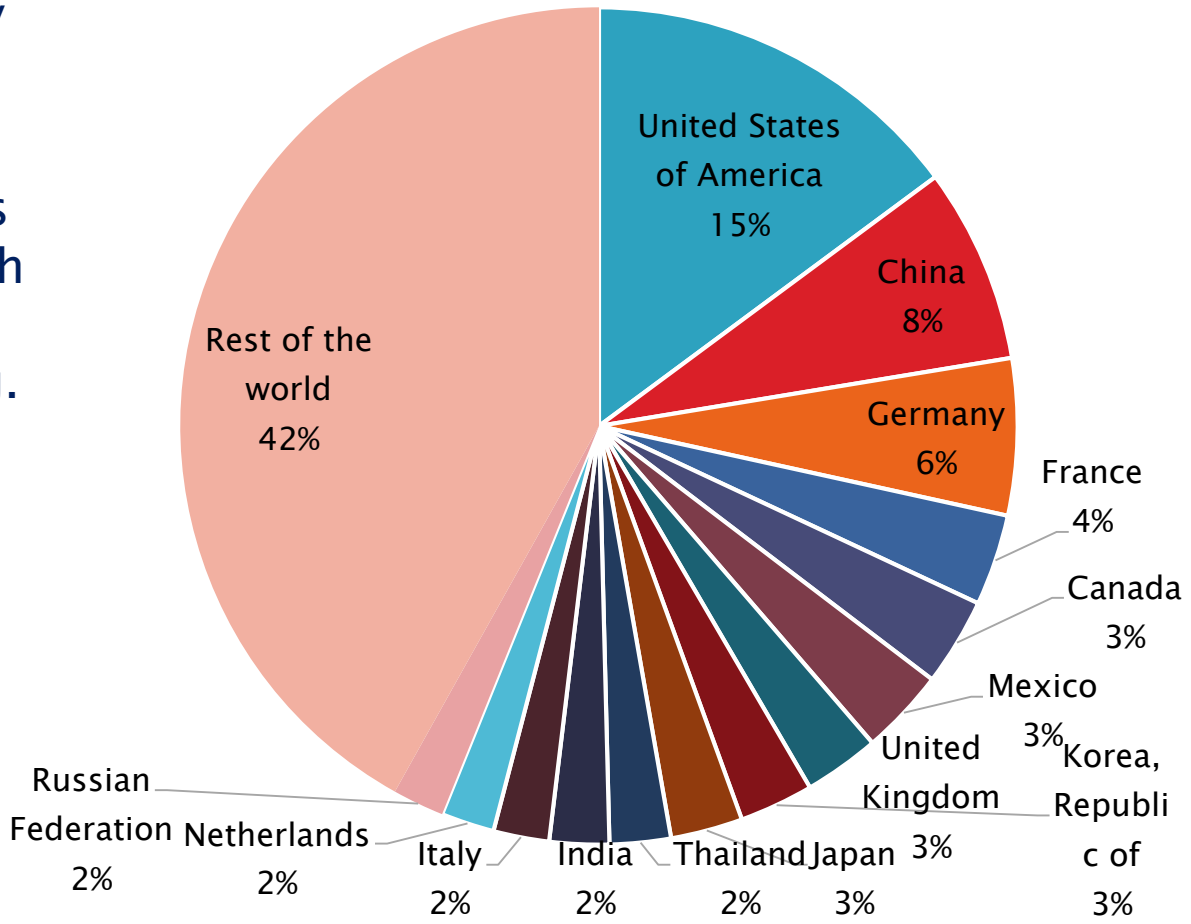
- Global demand led by the USA (21%), China (15%) and Japan 12%)
- SA: 1,3% of market
- CAGR: +3,7% over the period
- India (+9,8%) and Saudi Arabia (+9,2%) forecasted to witness fastest growth in top markets
- Some countries seeing exceptional growth: Jordan (+24%), Ethiopia (+16%)

Source: TIPS, based data from GWI

Geographically-concentrated markets

- Imports of water- and wastewater-related products are dominated by few countries
- Half the demand originates from just 10 countries, with the USA, China, Germany, France and Canada leading.
- All leading importers feature as top market (and vice-versa), with the exception of Mexico (NAFTA)

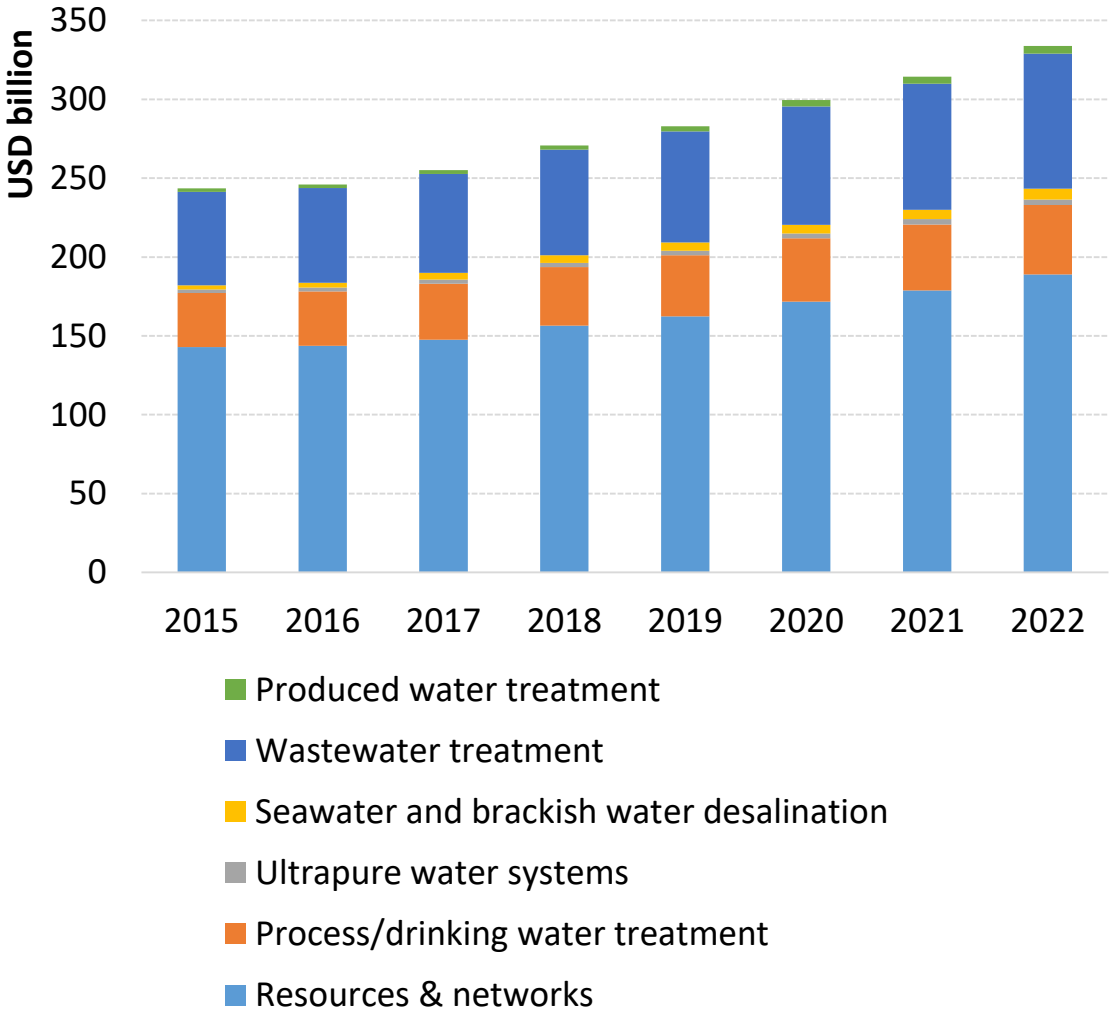
Import of water- and wastewater-related goods in 2016 per country



Source: Author, based on TradeMap data

Market segment / technology

Global capex per segment (USD billion)

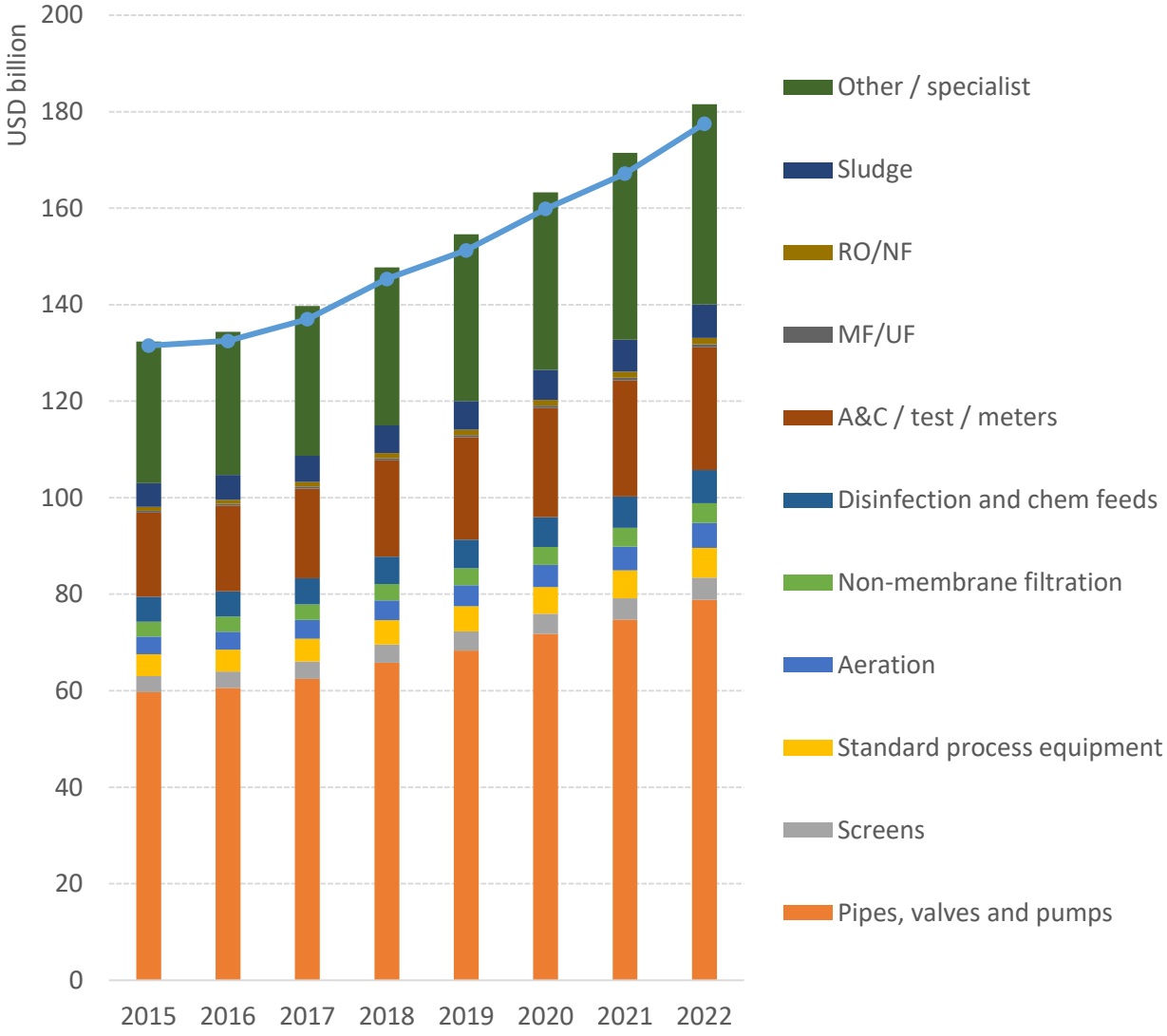


- Resources & networks account for 58% of the global capex market, followed by wastewater treatment (25%)
- Strong growth in small markets, unconventional resource development (desalination and water reuse) as well as sludge management

Source: TIPS, based data from GWI

Market segment / technology

Global equipment expenditure per sector (USD millions)



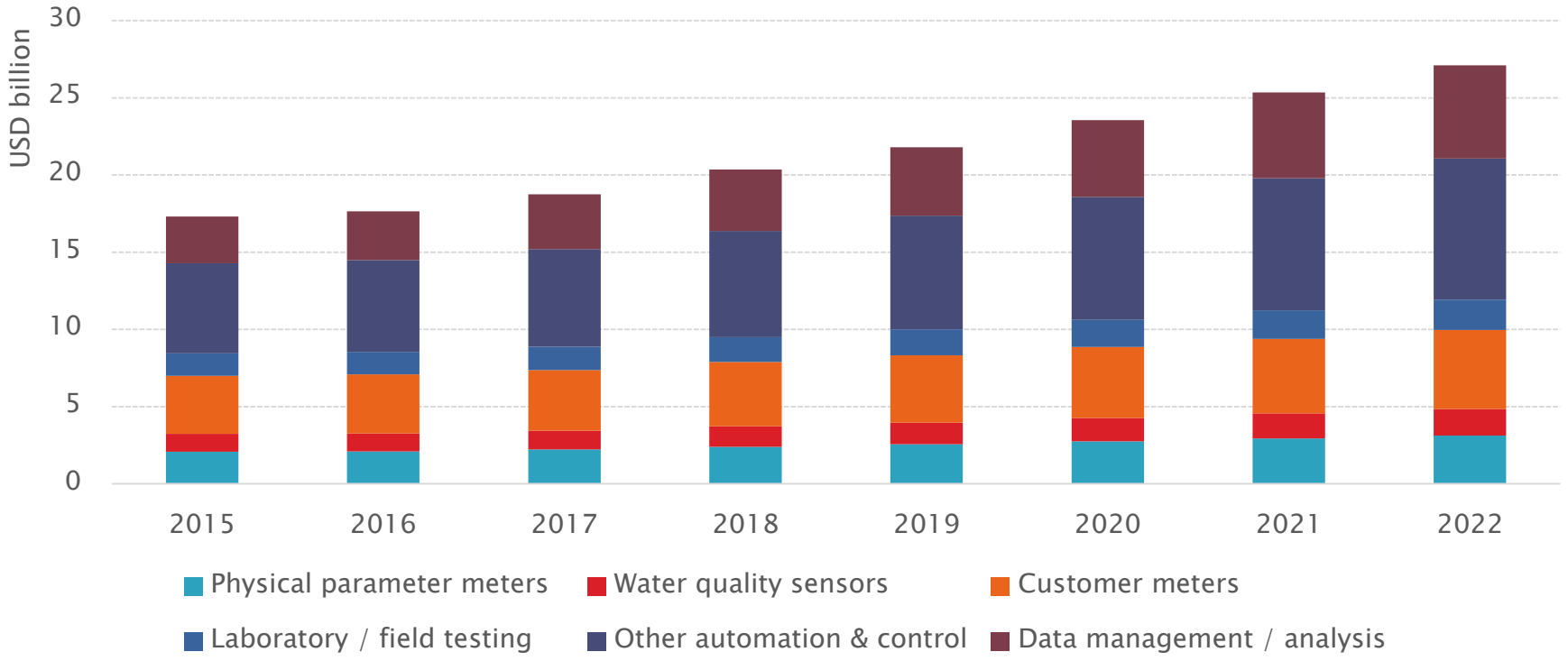
- The global equipment market is estimated to USD 180 billion by 2022 (+4.6% p.a.)
- Heavily dominated by pipes, pumps and valves, which account for 44% of it.
- Automation and control equipment, including sensors and meters, constitutes the second largest segment (14%)

Source: TIPS, based data from GWI

Market segment / technology

- The emphasis of digital solutions by utilities is supported by the imperatives of stretching capital budgets and optimising operations as well as transitioning towards smart city management.

Global spending on digital solutions in the utility sector from 2015 to 2022 (in USD billion)



Source: TIPS, based data from GWI

Global supply dynamics: Disaggregated but geographically-concentrated

- Given the structure of demand, dominated by civil engineering and localisation policies driven by state-owned entities, supply chains have a strong local flavour in most markets.
- Water businesses are not big businesses and aside from utilities, there are few water pure players

Top 10 water-related companies in 2017

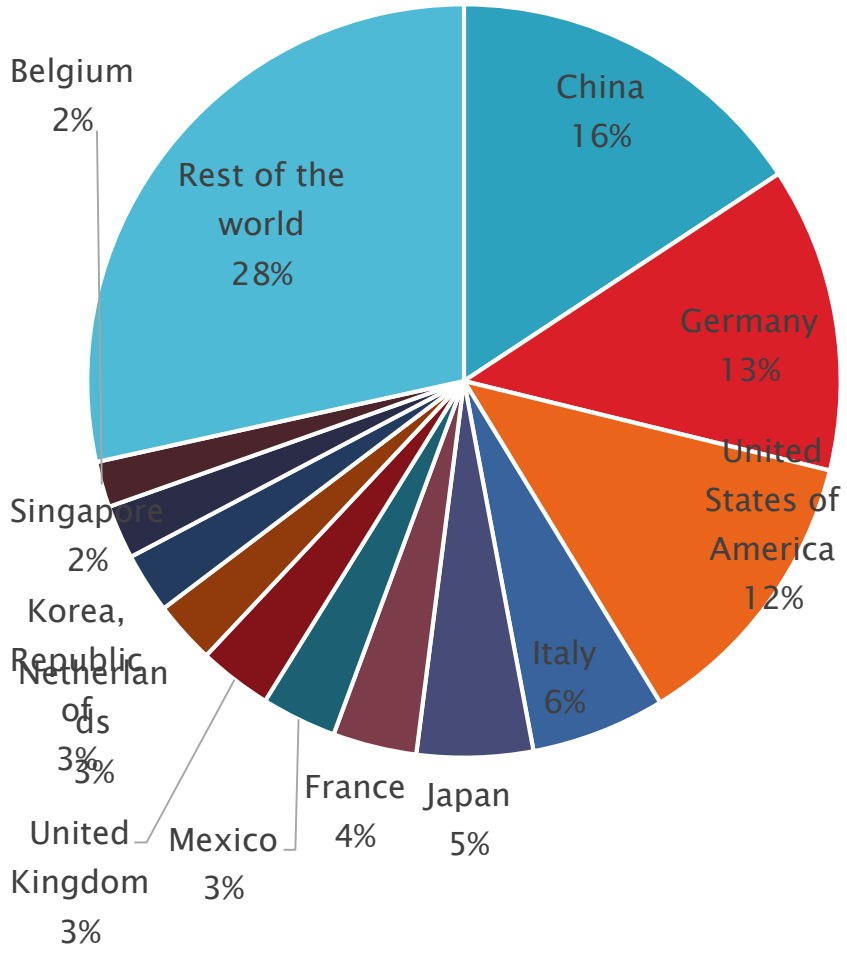
Firm	Origin	Description	Revenue (USD billion)	Sectors of operation
Veolia	France	Water operator and systems integrator	12,5	Eq Sy En Op C
Suez	France	Water operator and systems integrator	11	Eq Sy En Op Ow C
Ecolab	USA	Water treatment chemicals and related services	7,1	Sy C
Pentair	USA	Pumps, valves, UF membranes, and pool equipment	5	Eq Sy
Xylem	USA	Pumps, analytics, & wastewater technology supplier	3,7	Eq Sy
Grundfos	Denmark	Pump supplier with strength in residential	3,2	Eq
American Water	USA	Regulated utility & non-regulated services	3	Op Ow
Sabesp	Brazil	Water concessionaire	3	Op Ow
Thames Water	UK	Regulated utility	2,9	Op Ow
Severn Trent	UK	Regulated utility and contract-ops	2,6	Op Ow

Source: TIPS, updated from GWI data

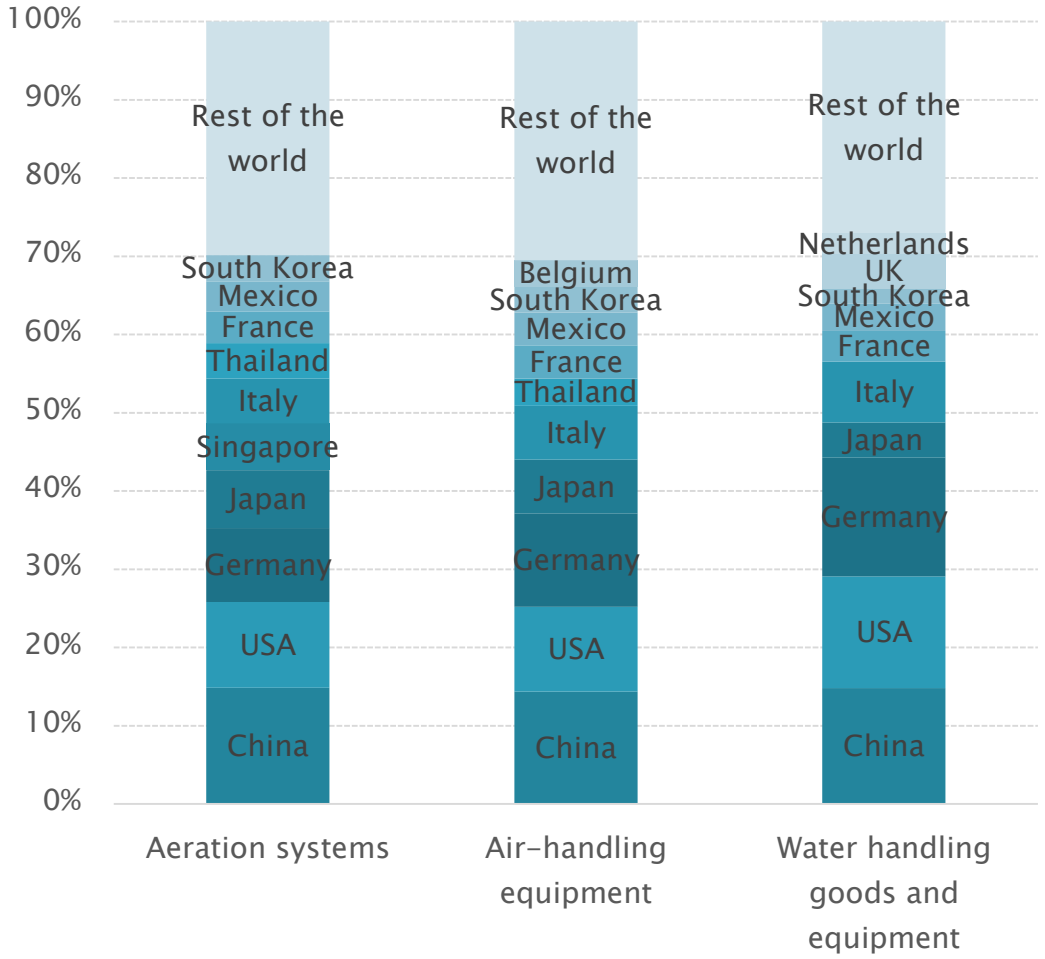
- Despite this high degree of disaggregation, expertise is fairly concentrated geographically.
- Importantly though, a number of Chinese firms have progressively made their way to the top 50 of the industry

Global supply dynamics: Disaggregated but geographically-concentrated

Water- and wastewater-related exports by country in 2016



Leading exporters of main water-related traded products

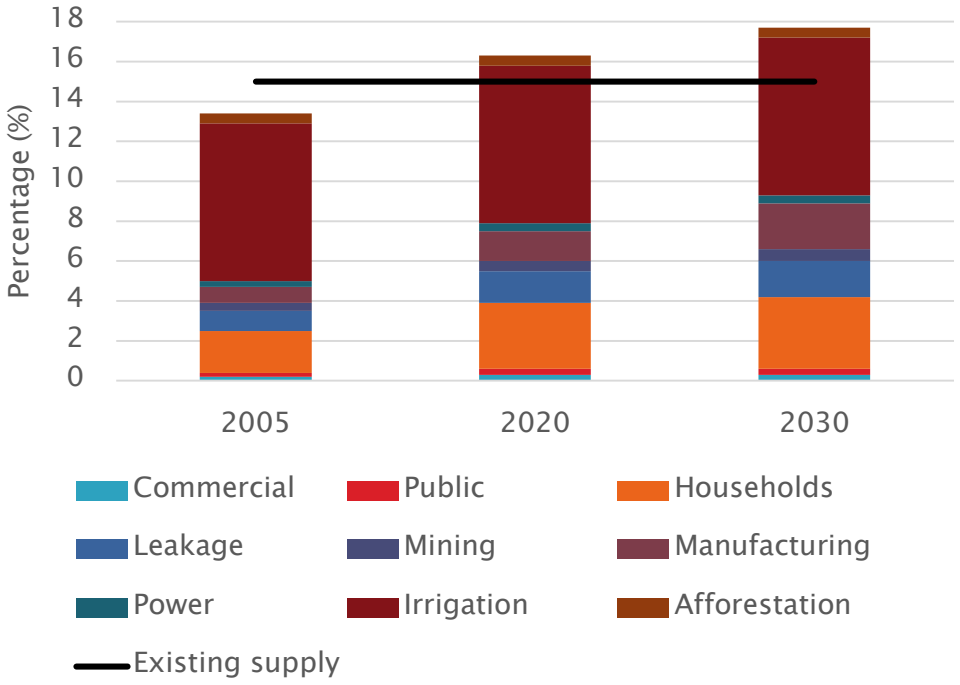


Source: Author, based on TradeMap data

Implications for South Africa's industrial development

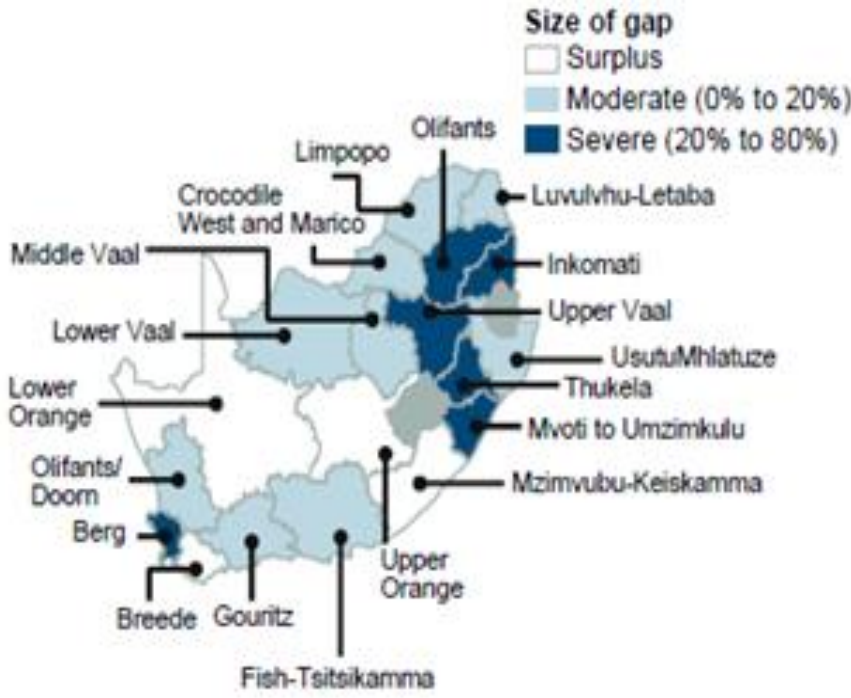
- South Africa faces similar challenges as the rest of the world in terms of water security, access to water and sanitation services, water quality, infrastructure development and financial sustainability.
- Water demand is forecast to keep growing, leading to severe gaps in core industrial areas (GP, KZN, MP, WC)

Project water demand in South Africa



Source: TIPS, based on data from WRG, 2009

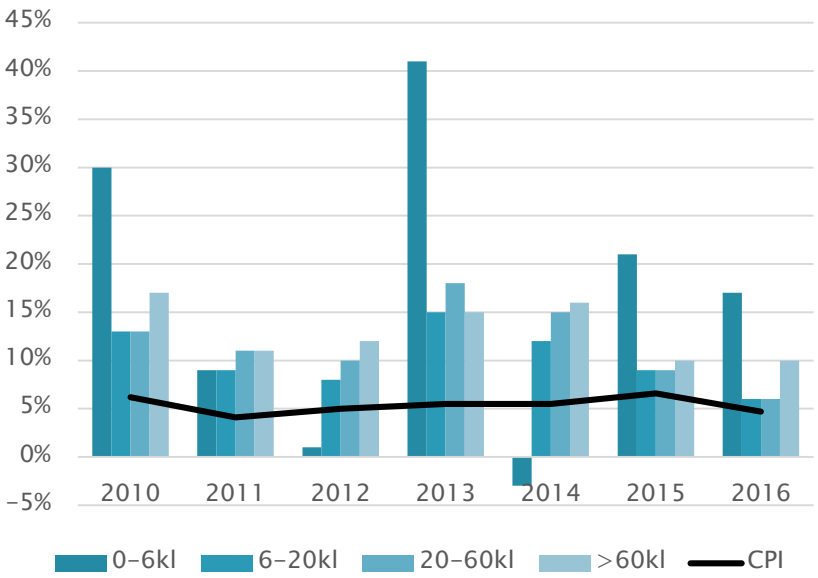
Project gap between water supply and demand in 2030 (in % of demand)



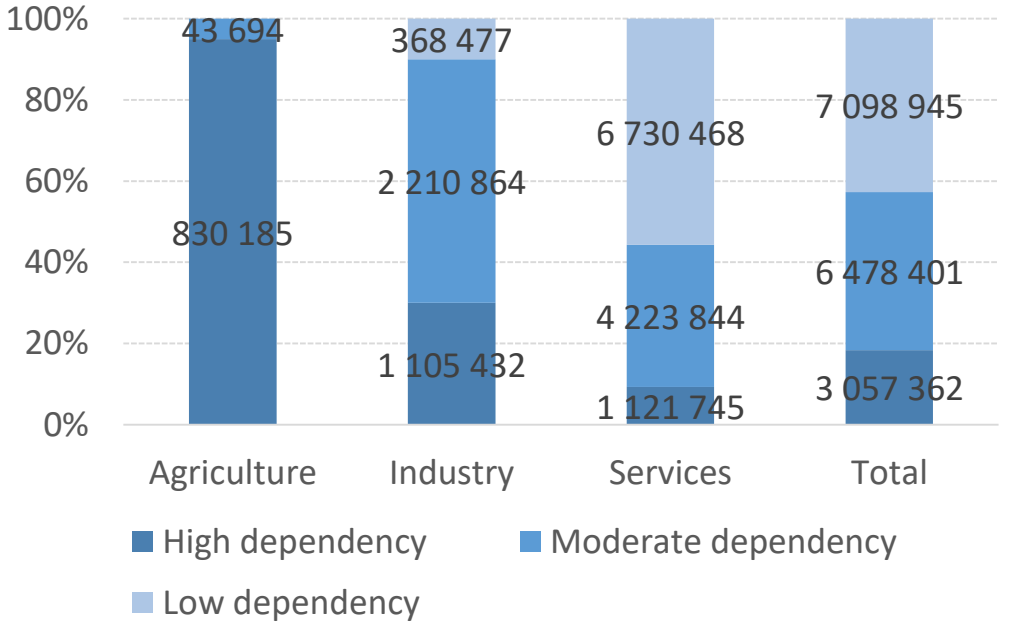
Source: WRG, 2009

Implications for South Africa's industrial development

Growth rate of municipal tariffs from 2010 to 2016 per consumption levels



South Africa's employment by degree of water dependency in South Africa in 2016



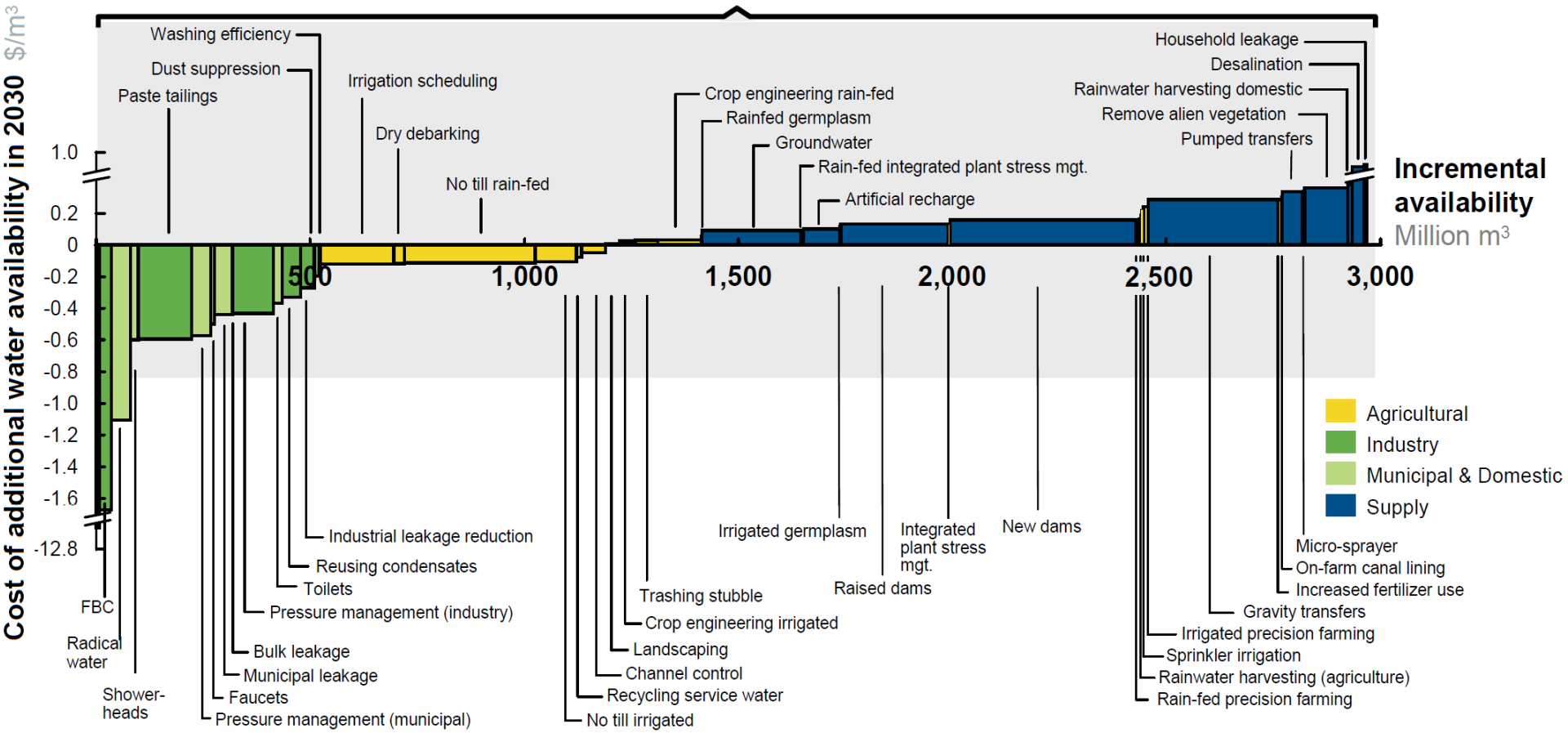
- Water prices have been rising faster than inflation. This trend is expected to persist, if not amplify, with growing supply concerns
- Approximately 9.5 million jobs are significantly dependent on water in South Africa, including the quasi-totality of agricultural jobs and a third of industrial employment

Source: DWS, 2016

Source: TIPS, based on data from Statistics South Africa

Implications for South Africa's industrial development

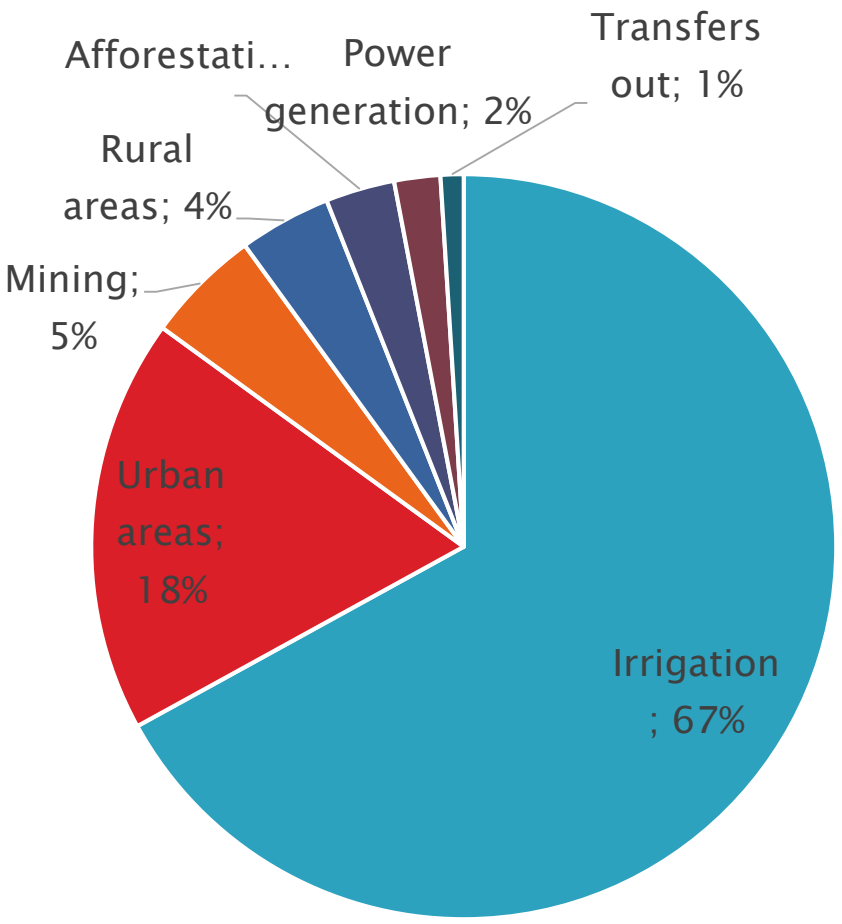
South Africa's water availability cost curve



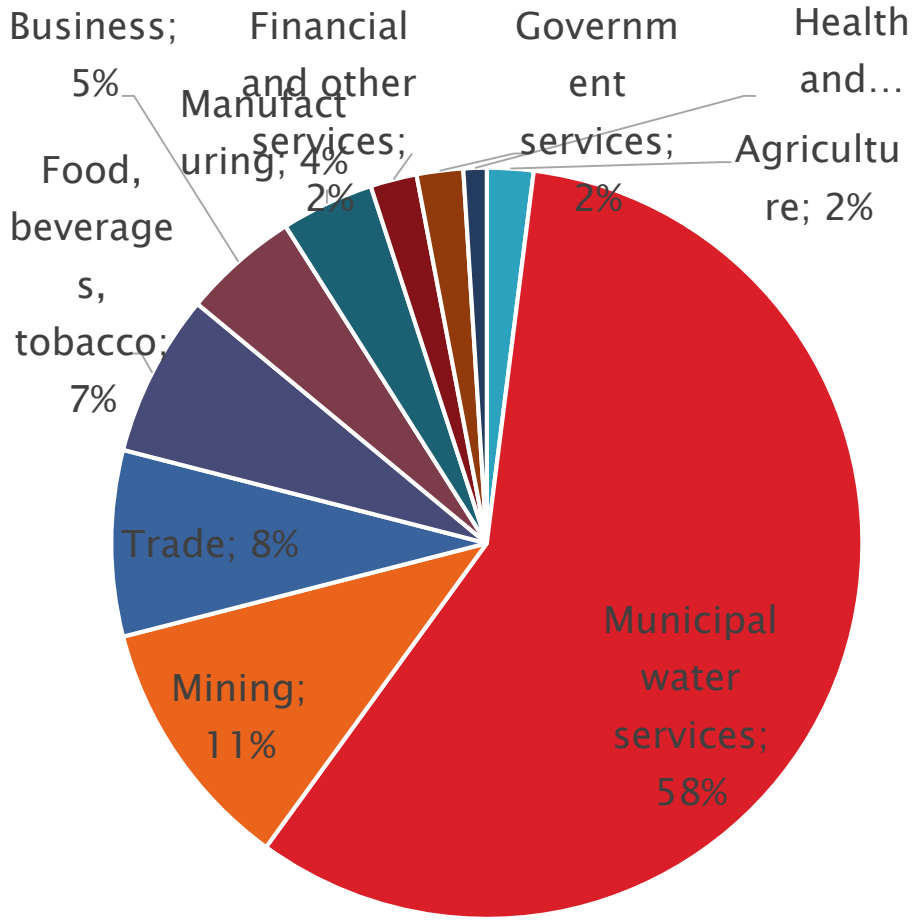
Source: Addams et al., 2009

Implications for South Africa's industrial development

Water use in South Africa by sector



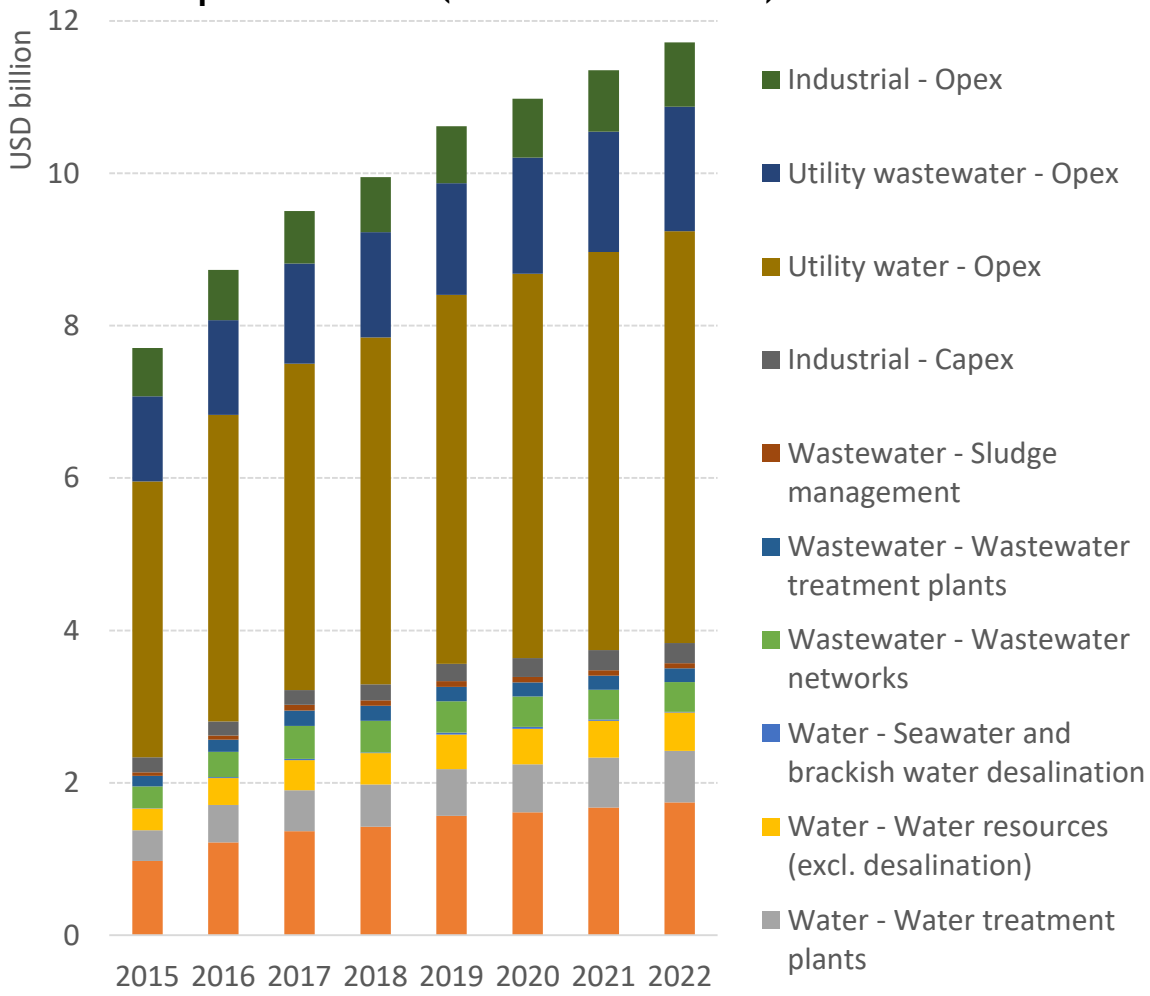
Financial value of water sales by sector



Source: TIPS, based on data from GreenCape

Implications for South Africa's industrial development

South Africa's capital and operational expenditure (in USD billion)

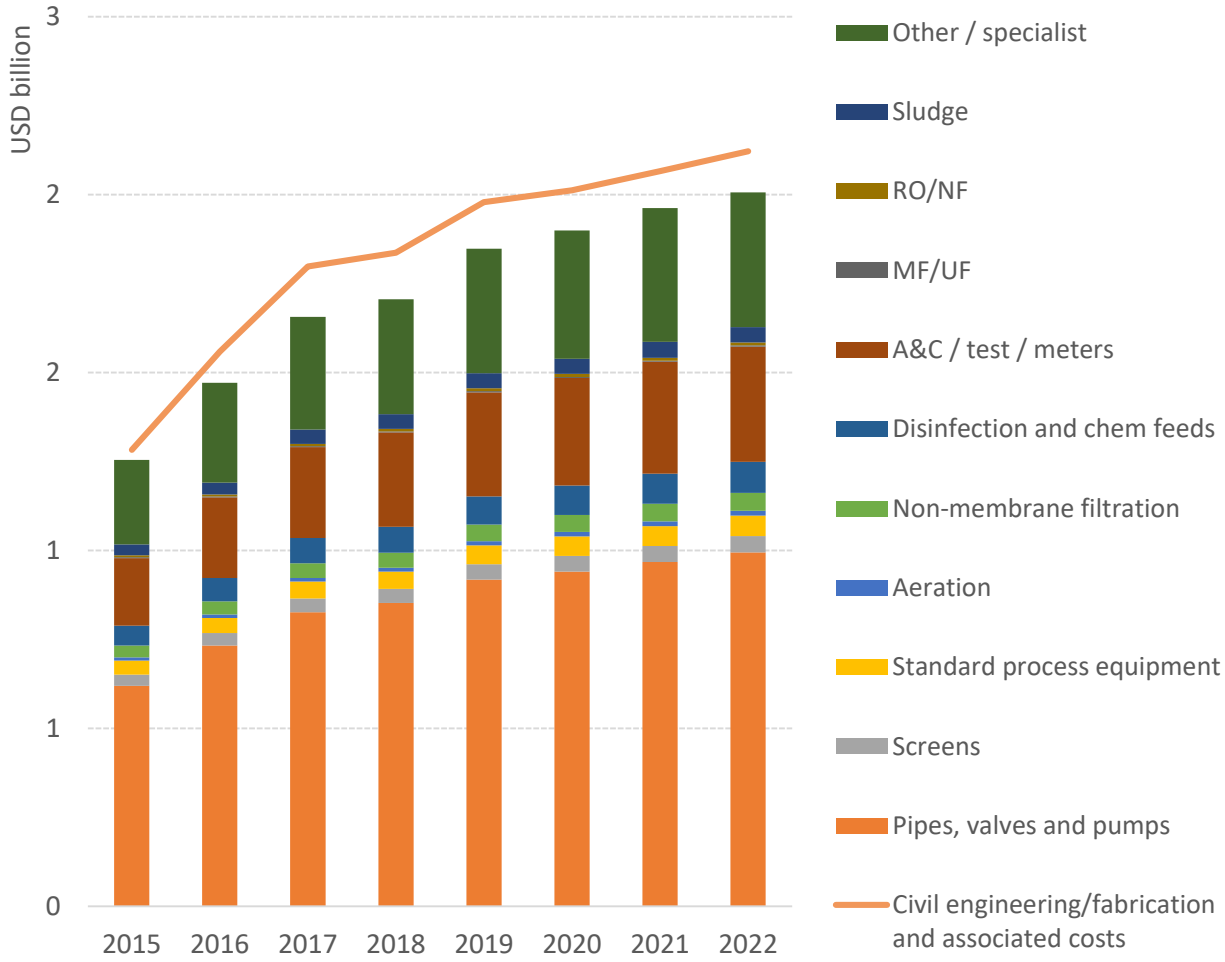


- SA's water market, while small on a global scale (slightly more than 1%), is significant at the local level.
- Rising at 6.2% p.an from 2015 to 2022, it is expected to reach USD 11.7 billion
- The civil engineering (18%) and equipment (17%) components are furthermore growing strongly, at 7.5% and 6.9% per year over the 2015–2022 period.

Source: TIPS, based data from GWI

Implications for South Africa's industrial development

South Africa's equipment expenditure per segment from 2015 to 2022 (in USD billion)



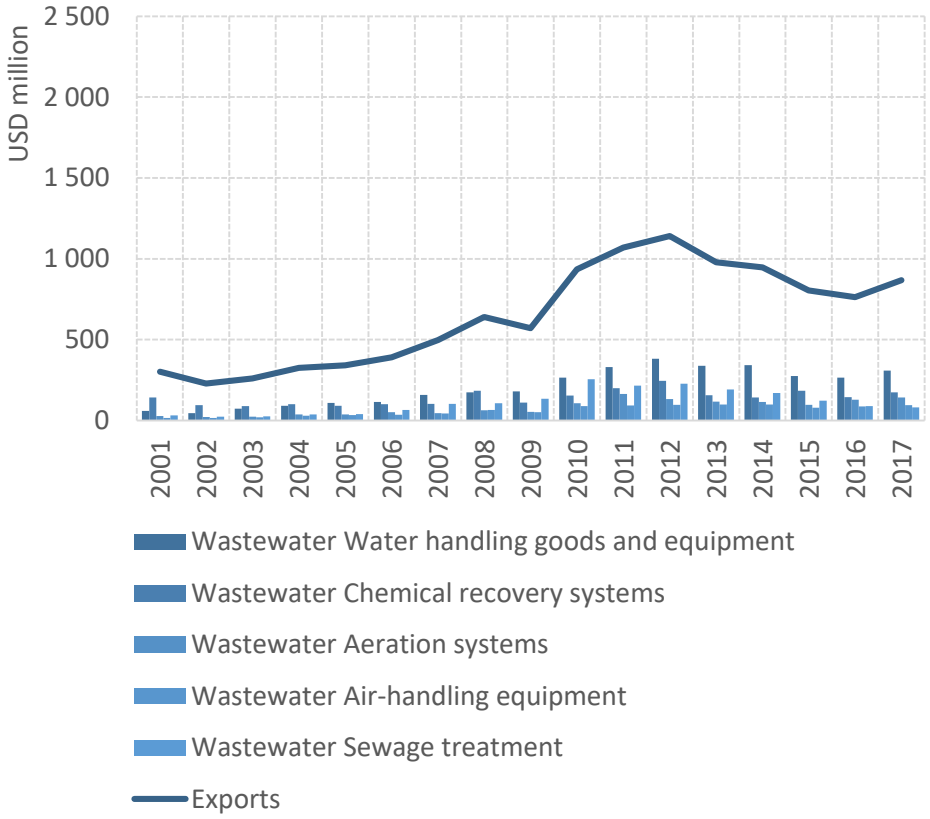
- Rising demand for water-related equipment
- The utility sector accounts for 93% of equipment expenditure
- Civil engineering (43%) dominates the equipment segment, followed by pipes (15%)

Source: TIPS, based data from GWI

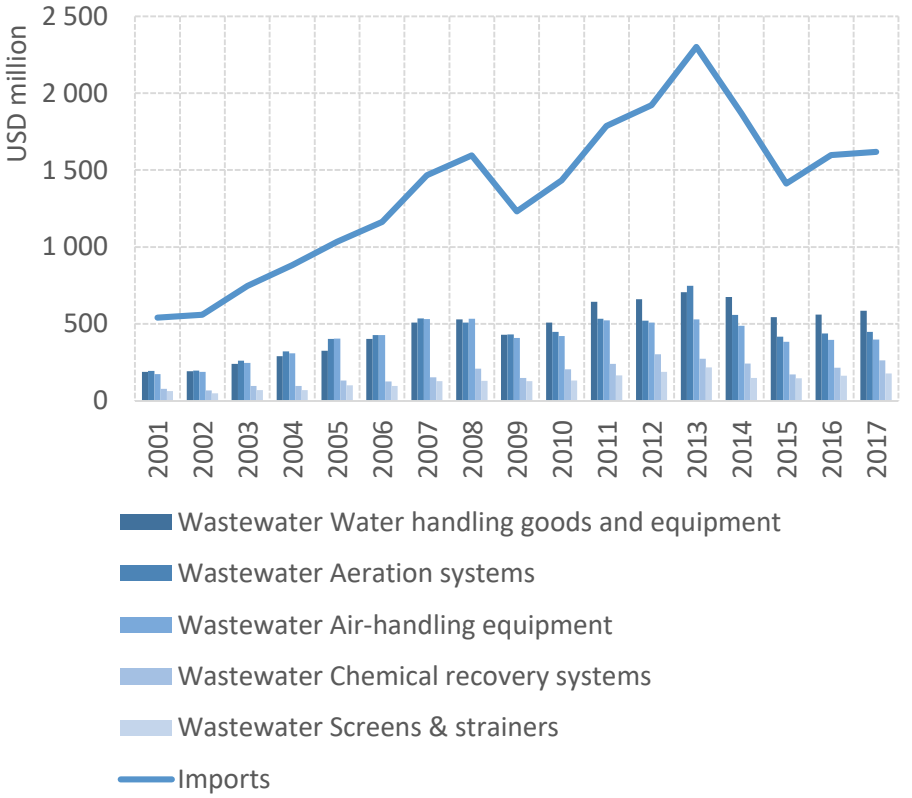
Implications for South Africa's industrial development

- Despite noteworthy exports, the South African market is heavily dependent on imports

SA's export of water- and wastewater-related goods (in USD million)



SA's import of water- and wastewater-related goods (in USD million)



Source: TIPS, based on data from TradeMap

Conclusions

- The global water and sanitation sector is a vibrant market, growing at a strong pace.
- The progressive restructuration of the sector to adapt to its new operating conditions are opening doors for prospects.
- Water and sanitation issues remain essentially state-led in every country and demand is largely dominated by (state-owned) utilities rather than industries or households.
- As utilities restructure and adapt to their new environment, notably by shifting from capital to operational expenditure, this opens new opportunities on the market.

- From a South African industrial development perspective, systemic challenges are increasing the vulnerability of South Africa's water and sanitation systems.
- In turn, necessary responses are putting at risk industrial and economic development.
- The nature of water and sanitation markets opens room for industrial development opportunities, particularly for import substitution.
- The ability of SA to align industrial development and water policies and objectives will determine whether new dynamics in the water and sanitation sector hamper or support industrial development in the country.

Trade & Industrial Policy Strategies

Supporting policy development through research and dialogue

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