

Initiative for the Palestinian Economy

Water



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Overview



Water summary

- **Current situation:** The water situation differs between the West Bank (significant water shortages) and Gaza (shortage in potable water, with further declining water quality from unsustainable aquifer use). The Oslo II Accords regulate the volume of water extracted from shared aquifers (this volume is not fully extracted by the PA, and a significant volume reserved for “future needs for the Palestinian people” is not used). Future needs in Gaza will increase with population growth (from 200 MCM/y to 270 MCM/y). In the West Bank demand would increase significantly if the agricultural sector is to reach its potential (from 220 MCM/y to >390 MCM/y)
- **Strategy:** In the West Bank, increased rainwater harvesting, wastewater reuse, and incremental water purchases from Israeli companies will help alleviate shortages, however, without significantly increasing aquifer extraction or purchase future demands cannot be met. In Gaza, small and large scale desalination, wastewater reuse and increased water purchases could meet future demand and stop unsustainable aquifer extraction. In order to ensure future supply, a clear and consolidated governance model is needed for water resources in the Palestinian Territories (including setting up a water sector regulator and decreasing high number of ~300 local water providers) as well as a PPP model – which could partly be facilitated by the passing of the current water law proposal. Concurrently, the Joint Water Committee needs to be revitalized and permitting for Palestinian water projects facilitated
- **Impact:** Increasing water production (excluding increased aquifer extraction and imports) in Gaza from 5 MCM/y to 140 MCM/y, and in the West Bank from ~0 MCM/y to 85 MCM/y
- **Financing:** In order to achieve these ambitions, financing of ~\$1.5bn in the next 6 years, most of it as grant finance as well as loans backed by risk insurance needs to be available for infrastructure projects on PPP basis

Overview of water sector

Current size of the sector

- In the West Bank, current needs are 220 MCM annually, with a 80 MCM gap, while 2020 needs could be 390 MCM, leaving a 250 MCM gap
- Needs in Gaza are 200 MCM, mainly sourced from unsustainable extraction from the aquifer, with a 10 MCM gap. 2020 needs could be 270 MCM, leaving a gap of 200 MCM (assuming unsustainable extraction from aquifer is limited to sustainable levels)

Sector description

- Average domestic water supply varies between Gaza (90 l/d/c) and West Bank (70 l)
- Irrigation water for agriculture purposes is severely constrained in the West Bank
- In Gaza, majority of available water is sourced from a depleting aquifer, from which the extraction has become unsustainable leading to deteriorating water quality
- In the West Bank, available water is sourced from shared aquifers with Israel under outdated and poorly maintained wells and from water purchases
- Overall, the water network is inefficient with high leakages and limited waste water treatment, leading to environmental concerns

Benchmarks

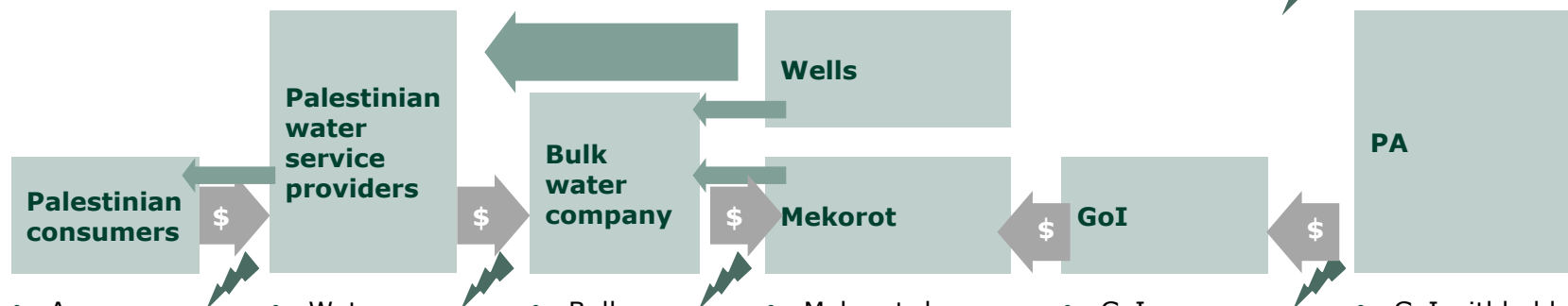
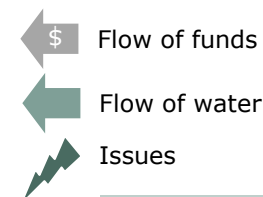
- Leakages and unaccounted-for water are currently high at an average of 35% (West Bank) & 42% (Gaza) of produced water
- A low amount of waste water (~3%) is treated in the West Bank, compared to 90% in Israel, and almost none of it is re-used for agriculture

Water sector strategy: reduce water shortages in the Palestinian Territories and improve overall waste water

	Description	Investment years 1-6 (\$m)	Potential additional MCM in 2016	Potential MCM in 2020
Strategy	1. Improve water and waste water management (including aquifer recharge) with efficiency and re-use measures in West Bank and Gaza	695	40	80
	2. Extract additional water from available natural sources: aquifers (well rehabilitation and new wells), brackish springs and dams in the West Bank and desalination in Gaza (both small and large scale)	840	150	205 ¹
	3. Address current critical shortages in Gaza by increasing purchases from Mekorot and Independent Water Producers in the short term	0	90	90
	Grand total	1,495	225	310
Potential projects	1. Increased wastewater treatment and re-use 2. Reduce leakages/theft 3. Improve collection rates 4. Rehabilitate/drill new wells in the West Bank 5. Roll out small scale desalination in Gaza 6. Roll out large scale desalination in Gaza 7. Roll out desalination of brackish springs 8. Build dams and other systems to collect WB rainwater 9. Facilitate consolidation of water utilities 10. Increase purchases from Israel in short term			
Enablers	• Clear governance model for water resources in the Palestinian Territories • Financing for water infrastructure projects by donors & Public Private Partnership structures • Permitting water infrastructure projects • Price agreements on purchases • Energy availability for desalination and wastewater treatment in Gaza • Effective payment of water and wastewater treatment with increased enforcement and pre-paid meters • Agreement on cross-border wastewater treatment			

- In the West Bank, water demand gap would be ~60 MCM in the illustrative future scenario (i.e. current level of purchases, and new projects to increase wastewater reuse, reduce leakages, rehabilitate wells, desalinate brackish springs, and build dams). This ~60 MCM gap could be addressed through sourcing from currently unavailable sources (e.g. aquifers, Jordan river) or further increase in purchases.
- This strategy aims to extend access to water by Palestinian that will enable them to realize economic development across all sectors of Economic Initiative for Palestine without prejudice to the outcome of final status negotiations in which Palestinian water rights will be addressed.

Water sector in the Palestinian Territories



Current issues

- Average collection rates for water are 65-75% in the West Bank and 25-50% in Gaza
- Water service providers (over 300) suffer revenue shortfalls from poor collection rates
- Bulk water carrier does not enforce payment by local utilities
- Mekorot does not receive all water export income from West Bank bulk carrier
- GoI pays Mekorot export income not collected from distribution companies from income withheld from PA on withheld income
- GoI withholds income not collected by Mekorot from Palestinian bulk utility from non-water related PA revenues
- Limited data transparency

Requirements

- 100% collection rates, with potential subsidies to targeted groups, e.g., refugees
- Consolidated distribution companies ensuring better financial soundness
- Enforcement of payment from local utilities to bulk water company
- Bulk payment to Mekorot or directly to IPPs with improved procurement terms
- No involvement required
- No withholding required

Current situation

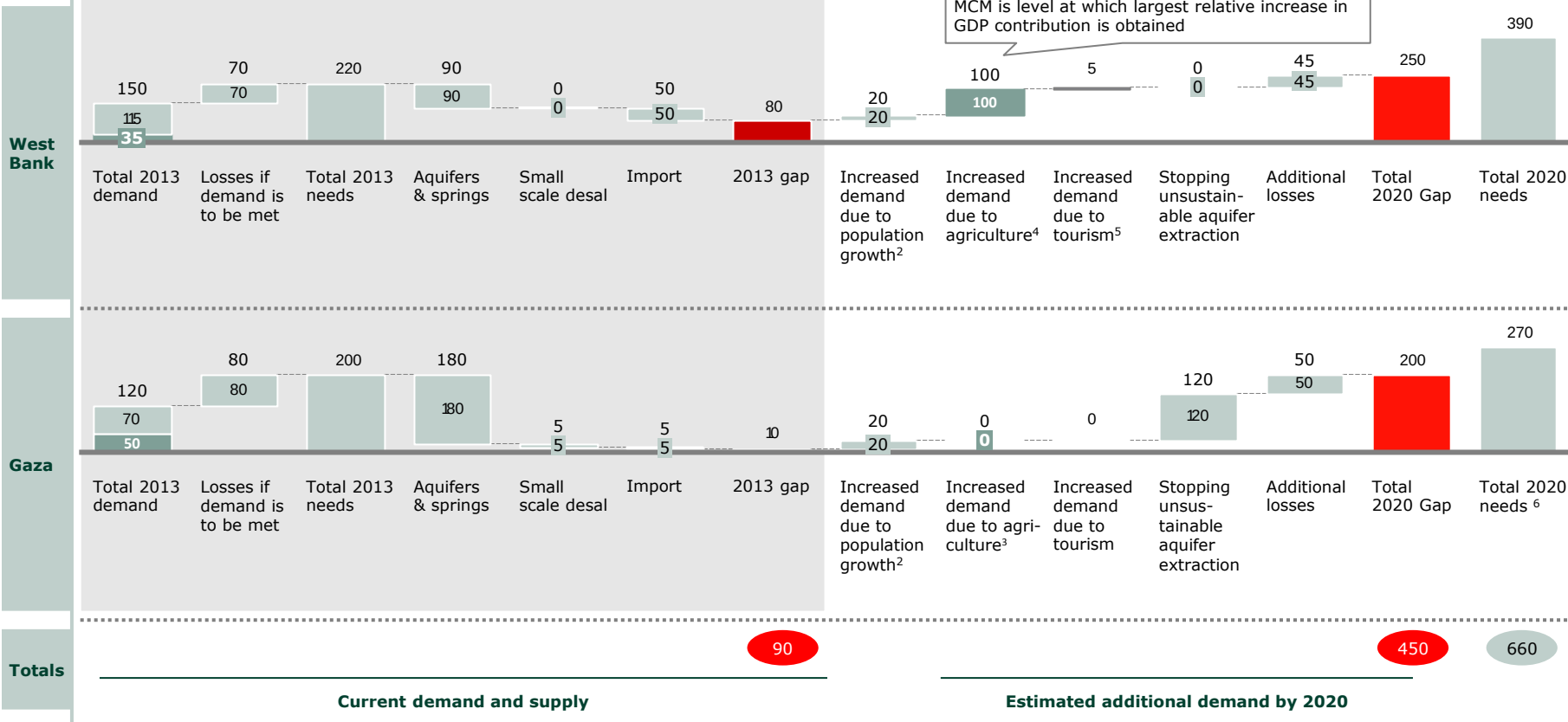


The Palestinian Territories could face a 450 MCM gap by 2020

Breakdown of current and potential future water demand/supply¹

MCM/year

Agricultural demand can be much higher, 100 MCM is level at which largest relative increase in GDP contribution is obtained



1 Population Gaza (~1.6m) is smaller than West Bank (~2.7m). Higher water usage in Gaza due to water-intensive agriculture;
 2 Based on 3.2% population growth Gaza and 2.1% in the West Bank; 120 litres per person per day
 3 Potential for up to 30 MCM extra demand if land currently unavailable due to security concerns (within 500m of border) is irrigated for agricultural purposes;
 4 WB: Agriculture workstream; assuming ~300USD/dunam cost of irrigation for additional ~350 dunums of newly irrigated land
 5 Based on increased tourism of 2 million tourists, each using 500 l/d for average of 2.5 days
 6 Includes extra demand due to switching source from unsustainable aquifer extraction to another source;
 7 Includes industrial demand (estimated at 3% of total demand)

Overview of West Bank aquifer agreements & Gaza extraction

Overview of Oslo accords (annex III, article 40)

- Oslo II accords regulated water usage of aquifers between PA & Israel
- 78 MCM reserved for “future needs of the Palestinians in the West Bank” to be developed “from the Eastern aquifer and other agreed sources in the West Bank” which has not been hitherto extracted from aquifer

Use	Oslo agreement (MCM)				Utilization 2011 (MCM)			
	Western	NE	Eastern	Total	Western	NE	Eastern	Total ¹
Palestinian Territories	22	42	54	118	25	20	42	87
“Future needs for the Palestinians in the West Bank”	–	–	78	78	–	–	0	0

Overview of Gaza aquifer

- Gaza aquifer extraction does not fall under Oslo Accords
- Sustainable extraction is ~60 MCM

Use	Utilisation 2011 ² (MCM)	
	Gaza	Total
Palestinian Territories	179	179

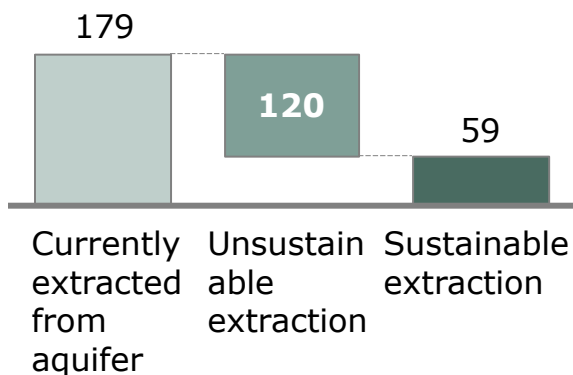
¹ Does not include water produced by unauthorized wells (estimated 10-20 mcm/y) ² Extraction levels continue to rise, with 2012 utilization being 190 MCM

Dropping extraction of Gaza aquifers to sustainable levels would decrease supply by 125 MCM

Potential

Water extracted from Gaza aquifer

MCM, 2011



- Aquifer is becoming polluted and saline due to intrusion of wastewater & seawater
- Currently > 90% of aquifer water is not potable but nevertheless drinking water is extracted from aquifer
- If continued, aquifer could become completely unsuitable within a decade (possibly as soon as by 2016)

Description

- Reduce extraction from aquifer to 55 MCM per year (max. sustainable extraction rate) or maintain rate but replenish aquifer with treated wastewater
- Shut down illegal wells and don't license new ones



Costs/price

- N/A

Enablers

- Availability of water from other resources (desalination, purchase, treated wastewater) to make up for reduced extraction
- Discipline by authorities to ensure no illegal wells and extraction from aquifer
- Technical knowledge of which wells to shut down

Contents

- Overview
- Current situation
- **Strategy and aspiration**
- Potential projects
- Enablers

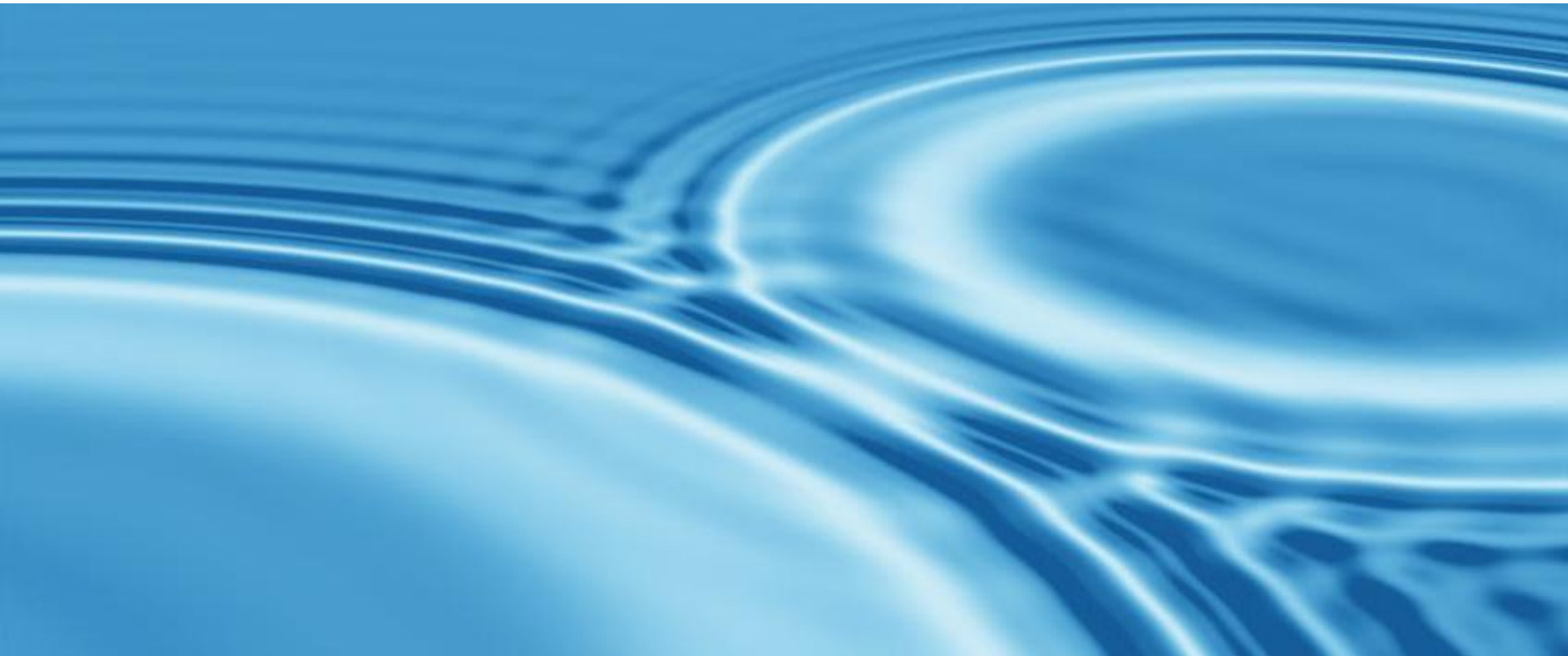


Strategic priorities should determine the relative importance of different sources of water

Strategic priorities	Description	Potential water sources
Minimise economical cost of sourcing water	• Favour cheapest sources of water from the perspective of overall economy, regardless of sources of funding	• Aquifers • Rainwater catchment
Maximise self-reliance and water independence	• Favour sources of water that are home produced to reduce reliance on imports, regardless of generation cost	• Aquifers • Rainwater catchment • Desalination • Wastewater reuse • Minimise water losses
Minimise environmental impact	• Favour sources of water with least environmental impact/carbon emissions, i.e., aquifers over desalination	• Sustainable aquifers • Wastewater reuse

Current example proposal assumes mix of all 3 strategic priorities

Strategy and aspiration



Potential projects

	West Bank	Gaza
0-3 years	Increase imports	Increase imports
	Develop new and rehabilitate existing wells	Short-term low-volume desalination
3-7 years	Waste water treatment plants & reuse	Waste water treatment plants & reuse
	Desalination of brackish springs	Large desalination
	Rainwater harvesting through dams and reservoirs	
Cross cutting initiatives	Reinforce governance model for water sector	
	Enable public private partnerships	
	Network improvements & NRW reduction	
	Increase collection rates (e.g. through pre-paid meters)	

Volume mix from different sources needs to be informed based on PA's strategic priorities

Increase purchase from Israel

IWP Mekorot

Potential

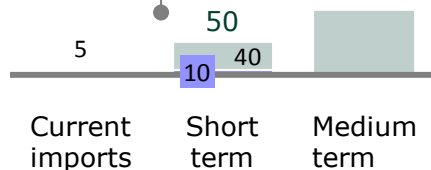
- Current imports from Mekorot water company could be expanded, prices currently being renegotiated
- Potential for Independent Water Providers (IWP) to export up to 80 MCM in the short term (potential to expand existing desal plants within short time frame – ~6 months) – this would be transported in Mekorot trunk lines and be desalinated water “blended” with other sources of water

Current and potential imports from Israel

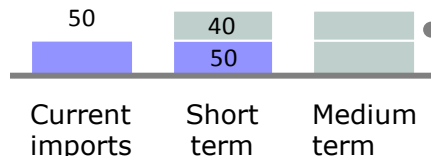
MCM IWP Mekorot

Depends on future demand for imported water (IWP can build extra capacity to meet demand)

Gaza



West Bank



Description

- Expand water import from Mekorot in the short term by doubling import to Gaza
- Increase imports from Israel IWP (80 MCM) in the short term to Gaza (40 MCM) and West Bank regions in need, esp Hebron+Bethlehem regions (40 MCM)
- Expand trunk line to allow for extra water to Gaza (currently limited to ~15 mcm including Nahal Oz pipeline that is currently not operated) and southern West Bank



Costs/price

- Current bulk price for (blended source) water is \$0.71 (NIS 2.6)
- Pricing negotiations for additional water from Mekorot ongoing, with preliminary price reached
- Water price from IWP: to be negotiated
- Cost for trunk lines not certain, need to be further explored

Enablers

- Trunk line completion and expansion
- Long term supply agreement and payment guarantees by PA or donors
- Agreement on pricing
- Agreement between GOI, Mekorot and IWPs for network usage

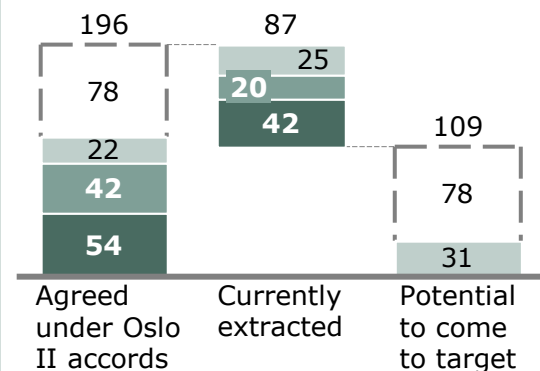
Develop new and rehabilitate existing wells in the West Bank

□ Future needs ■ Western aquifer ■ North Eastern aquifer ■ Eastern aquifer

Potential

Water extracted from West Bank aquifer

MCM, 2013



- Currently, only 87 MCM is extracted, mostly due to wells drying up or wells needing maintenance
- Oslo II accords mention 78 MCM "for future needs" (currently not being extracted)
- PA has identified 4 potential well fields in the Hebron and Bethlehem regions to increase production
- 136 agricultural wells have already been identified as targets for rehabilitation

Description

- Develop new wells in all parts of the West Bank aquifer
- Extraction to Oslo II agreement levels
- Enable and accelerate rehabilitation and drill new wells if not rehabilitation not feasible
- Develop aquifer water management program & further engineering study to optimize aquifer withdrawal



Costs/price

- Costs to bring additional 50 MCM online around ~\$120m¹

Enablers

- JWC approval and planning permission to allow drilling rigs to develop new and rehabilitate existing wells
- Change of currently applied permit regime by ICA for rehabilitation: drop need for individual permit if no change in extracted quantities
- Technical knowledge Tie-in to water infrastructure
- Funding

¹ Based PWA cost estimates for development of new wells

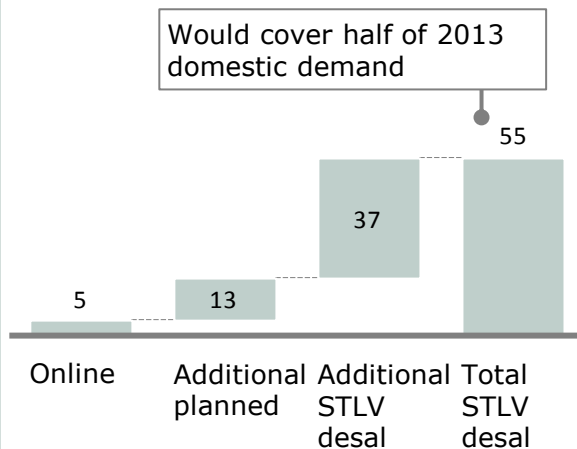
Build short-term low-volume desalination plants

Potential

- Short-term low-volume (STLV) desalination plants identified to in PWA strategies to alleviate immediate shortage. 2 medium desalination units are being built and 1 more is planned
- Modular desal units can be operational within 40 weeks and provide drinking quality water
- Water can be blended with lower-quality aquifer water to lower cost to end customer

Build-up of planned small desal capacity

MCM



Description

- Build additional 10 STLV desal units of 5 MCM capacity – producing drinking water quality
- Installation and drilling of beach wells
- Tie-in to water supply network or trucking to consumers
- Units can be built either on a grant basis (i.e. donor providing capex money upfront to PA/CMWU) or in a PPP model with a private company investing and recouping its cost through long-term pricing agreement with PA/CMWU



Costs/price

- Beach wells around 200k per unit (\$2m)
- Investment: ~\$12m per 5MCM unit

Enablers

- Opex & capex financing
- Ensure payment of water bills
- Locations for desalination
- Electricity supply to run desalination
- Permission to import desalination equipment

Gaza wastewater treatment and re-use in agriculture

Potential

- Currently almost all wastewater is discharged into the sea or is contaminating aquifer
- One sewage treatment plant is under construction in North Gaza. 2 more are planned; one in Central Gaza and the other in south Gaza
- Target is to re-use 40% of treated water in irrigation and the remainder to recharge the aquifer where possible (e.g., through natural recharge)
- Today 70% of house-holds connected to sewage network, more wastewater could be collected and treated if 100% of households were connected

Description

- Build and finalize three wastewater treatment plants in North, Central and Southern areas of Gaza Strip
- Re-use ~40% of water



Costs/price

Capex costs for 42 MCM assumed to be ~ \$205m (~\$5m/MCM)¹

40% of 42 MCM treated wastewater = 17 MCM water reused²

Enablers

- Energy supply
- Financing for capex and opex
- Tariff/opex collection/agreements
- Connecting remaining 30% of homes or other sewage collection methods
- Aquifer recharge study/knowledge
- Social acceptance of using treated wastewater for agriculture

¹ Based on similar projects in region

² Based on existing plans for total capacity by 2020

West Bank waste water treatment and re-use in agriculture

Potential

- Only two functioning modern-standard treatment plant in West Bank (Al Bireh, Nablus-West since 2013). Thus, only 6% of produced wastewater is currently treated
- ~31% of households are connected to sewage network
- Numerous plants are in various stages of planning (51 MCM capacity by 2020), with 1 scheduled to come online shortly (Jericho)
- Goal for reuse (25%) is based on geography (very hilly, collection areas not necessarily close to where water for irrigation is needed)

Description

- Build multiple regional wastewater treatment plants for water re-use
- Re-use 25% of water for agriculture (13 MCM)



Costs/price

Capex costs for 57 MCM assumed to be ~ \$285m (~\$5m/MCM) ¹

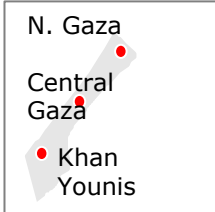
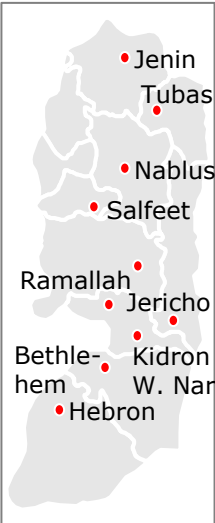
25% of 57 MCM treated wastewater = 14 MCM water reused²

Enablers

- Funding for infrastructure
- Technical knowledge
- Planning and building permissions
- PA Agreement on effluent standards for treatment and re-use
- Infrastructure and enabling environment to reuse water, including effluent and irrigation standards
- Social acceptance of using treated wastewater for agriculture
- Connecting remaining 70% of homes or other sewage collection methods
- Tariff/opex collection/agreements
- Transparent billing mechanisms and "cross-border ww protocol" on cross-border waste water

¹ Based on similar projects in region ² Based on existing plans for total capacity by 2020

Overview of plans for new major wastewater treatment plants

	Location	Size (MCM/ yr)	Capex	Phase of completion	Est. yr of completion	Comments
	North Gaza	~12	~\$70m	Under construction, expansion ~2020	2014	High re-use potential, energy supply unsure
	Central Gaza	~21	~\$90m	Design phase, expansion ~2020	2017	High re-use potential, energy supply unsure
	Khan Younis	~9	~\$45m	Planning complete expansion ~2020	2017	Reuse potential
	Total	42	~\$205m			
	Nablus West	~4	~\$20m	Online Q3 2013	2013	High re-use potential
	Nablus East	~4	~\$20m	Design phase	2017	
	Jenin	~3	~\$15m	Rehabilitation ongoing, upscale	2015	Up-scaling existing plant. High re-use potential (PPP model explored)
	Hebron	~6	~\$30m	Planning phase	2018	Re-use potential
	Jericho	~2	~\$10m	Under construction	2014	High relevance for re-use in Jordan Valley
	West Bethlehem (rural)	~1	~\$5m	Planning phase	...	...
	Ramallah Beituniya	~8	~\$40m	Design phase	2018	Ramallah North so far not approved by JWC, on hold
	Ramallah North					
	Wadi Nar/Kidron Valley	~18	~\$90m	Concept phase	...	On hold after being refused in JWC
	Al-Yamun, Qabatiya, Ya'Abad, Azzun, Tarqumiya, Dura	~5	~\$25m	Designs completed	2016	High re-use potential in some of the sites
	Tubas/Tayasir	~3	~\$15m	Design completed	2018	Includes re-use scheme
	Salfeet	~3	~\$15m	Designs completed	2018	Construction not started due to issues with JWC approval
	Total	57	~\$285			

Plans based on PWA estimates

Development of brackish springs at Dead Sea

Potential

- There are a number of brackish springs near the Dead Sea which are currently not utilized: Fashka, Turaba Ghweir, Ghazal, and Tanur springs
- Brackish water would need to be desalinated to be fit for human consumption and irrigation of all crop types. If captured, these springs have a potential 45 MCM per year
- Alternative could be development of freshwater wells further upstream (Nabi Musa syncline)
- Detailed feasibility studies are needed to analyse options and to assess cost per cm
- Water could be pumped to the southern West Bank for domestic and agricultural use or used for domestic, agricultural and tourism purposes in Jericho and the Dead Sea area

Description

- Construct reverse osmosis brackish desalination facilities to treat 45 MCM/year or
- Alternative: Develop upstream well field
- Construct transportation (pipes, booster pumps, reservoirs) for domestic purposes in Hebron, Bethlehem or Jericho and/or agriculture in Jericho area



Costs/price

- Cost to construct desalination facilities: \$100m
- Transportation system: \$20m¹
- Cost to develop wells (incl. transmission system): \$40-50m

Enablers

- Detailed feasibility study and environmental impact assessment and funding for this (0.5 MUSD)
- Financing for project
- JWC approval

¹ Based on similar costs for brackish well desalination from regional benchmark

Large desalination plant in Gaza

Potential

- Current desalination plant projected to be brought online by 2017-2018 (reverse osmosis)
- Funding of \$450m for entire project not yet agreed upon, thus stalled
- Capacity of 55 MCM, could be expanded to ~120 MCM in second phase
- Electricity capacity required for plant is ~35MW for 55MCM

Description

- Build reverse osmosis desalination plant and associated activities such as North – South Carrier, upgrade of distribution system (building on current Union of the Mediterranean plan)
- Will also have positive effect on NRW reduction



Costs/price

Capex

Desalination plant (55MCM)	230
Power plant ¹	40
Main water carrier	140
NRW reduction	35
Implementation consultancy	30

Sub total 450

- Opex : ~0.5USD/cm

Enablers

- Funding
- Electricity supply in Gaza
- More feasibility work, e.g., on social and environmental impact
- Security assurances for the plant's operation (i.e. absence of retaliatory attacks by IDF against the facility)
- Organisational and management structure
- Billing and collections from end-users

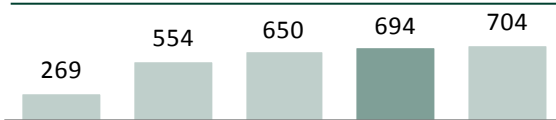
¹ Depending on power availability from other sources;

Rainwater harvesting through dams and other reservoirs (small ponds, cisterns) in the West Bank

Potential

Rainfall

mm, annual



- 165 MCM/year flow of rainwater through West Bank wadis, although difficult to capture due to irregular flow & evaporation
- Dams and other catchment systems (cisterns, small ponds) can capture and store rainwater & in some cases, also partially treated wastewater
- One dam (Al-Auja) harvests a small amount of water (2MCM) from a wadi and rainwater

Est. add. water from dams MCM/year



Description

- Build more dams in the West Bank
- Build catchment systems (eg. Cisterns, small ponds)
- Dams to catch rainwater, some springwater and some treated wastewater



Costs/price

- Capex for dams capturing ~20 MCM of rainwater ~70m USD¹

Enablers

- Technical assessment/ agreement on location of dams
- Technical knowledge
- Planning permission
- Approvals and permits for larger scale dams by JWC and smaller scale reservoirs by ICA

¹ Based on similar projects in region, assuming electricity costs for pumping

Reinforcing governance model for water sector

Overall aspiration is to create a strong regulatory environment and utilities to function effectively

		Issue	Possible option	Desired result
Local	Reduce number of service providers	~300 local West Bank water boards (municipalities and villages) - Joint projects and cross-cutting optimization challenging - Gaza Coastal Municipality Water Utility (CMWU) established but not all municipalities are on board	- Reducing number of utilities to 4 -12 through consolidation including possible private sector involvement - Formation of Joint Service Councils under PWA regulation as a step towards regional utilities	- Joint projects - Prioritization of donor aid - Private sector participation/PPPs - Increased expertise and efficiency through scale - Better services
	West Bank Water Department (WBWD)	- Bulk water carrier buys and distributes water from Israel and control wells (excluding many municipal and agricultural wells in private hands) - Current bulk carrier does not enforce payment by municipalities and thus cannot pay Mekorot for imports	- Transform West Bank Water Department into public company - Empower bulk water carrier to enforce payment of service providers - Cooperation with private sector well operation and maintenance - Increase control of bulk water carrier over Palestinian water sources	- Reduced net lending - Better reservoir planning and monitoring of extraction - Better services
	Empower PWA through water law enactment	- Difficult to enable cross-cutting initiatives or large programs - Difficulty in liaising with ~300 local water boards	- Enact water law (includes basis for new Water Regulatory Council, autonomous commercial water utilities and more PSP/PPPs) - Start program to train PWA in public/private partnerships	- Improved planning and policy making - Functioning regulation for better service provision - Increased eased of operations of PPPs
	Wastewater treatment and reuse	Reuse of treated waste water underdeveloped due to lack of institutional framework (e.g. effluent standards, roles, pricing, distributing, using water)	- Develop and implement cross-departmental strategy with participation of farmers, private sector - Define clear responsibilities of different sector actors	- Well regulated irrigation sector - Water-intensive agriculture options made possible
Trans-border	Interaction with JWC and ICA	Current JWC not functioning effectively	- Revitalize, reform or replace JWC - Ensure 3rd party presence and mediation role at JWC meetings - Joint/ independent monitoring of joint water resources - Shorten approval process for area C infrastructure	- Easier permitting - Increased monitoring of shared resources

PWA is approaching institutional reform of water sector, PA leadership and donor support for success are crucial

Overall aspiration is to create a strong regulatory environment and utilities to function effectively

	Envisaged change	Current progress	Support need
Local	Reduce number of service providers 4-12 regional water utilities	Draft regulation to establish Regional Water Utility has been produced	- Strategic study on how to design regional utilities and how to implement reform – donor funding needed - Donor aid to establish utilities + make operational
	West Bank Water Department (WBWD) National Water Company	- Plans for transformation of WBWD to National Water Company developed - Draft regulation to establish National Water Company has been produced	- Clear decision by PA to move forward with National Water Company - Further studying of business models - Further capacity development of organization (e.g., hiring, training)
	Empower PWA through water law enactment Water Regulatory Council (WRC)	- Plan in development to establish WRC and provide ability to enforce regulatory guidelines - Regulation to establish WRC has been produced	- Final enactment of new water law - Funding to design utility launch and operations - Strategy for transition over 5-10 years
	Wastewater treatment and reuse Setting up Water User Associations (WUA)	Draft regulation to establish Water User Associations has been produced	Develop strategic plan to establish sound institutional framework (beyond WUA)

Network improvements and non-revenue water reduction

Potential

- Non-revenue water (technical losses & theft) estimated to be around 42% in Gaza and 32% in the West Bank
- Long term (2032) PWA aspiration of bringing back leakage to 20%
- Reducing NRW has long-lead times and costs are unpredictable
- Potential of bringing back NRW in Gaza from 42% to 34% and in the West Bank from 32% to 27% by 2020 appears to be realistic
- Ambition based on 0.75% annual reduction in the West Bank and 1.1% in Gaza (lower in West Bank due to complex geography and low household connection rates versus relatively flat geography and high household connection rates in Gaza)
- Particularly difficult in Area C. While PA is responsible for water supply to Palestinian villages there is no enforcement capacity. Agreement with Israel on better enforcement in future and reimbursement for past losses is needed

Description

- Lowering NRW in Gaza (42% to 34%) and West Bank (32% to 27%) by
 - Improving piping
 - Increasing metering
 - Reducing theft
- Increasing revenues & availability of water



Costs/price

- Costs ~\$95m – could be far higher when technical assessment made

Enablers

- Technical knowledge to reduce NRW in cost-effective way
- Investment
- Management capacity to sustain gains
- Models to involve Private sector participation
- Ability for enforcement against theft and of collection, particularly in Area C; agreement on reimbursement for past losses

Increase collection efficiency

Current Situation

- Average collection rates for water are 65-75% in West Bank and 25-50% in Gaza. Rates particularly low in some refugee camps
- Low collection causes revenue shortfalls for service providers; end up with open debts to bulk utilities
- Some municipalities do not have separate accounts for water but use revenues to cover recurrent costs

Price for implementation

- Domestic pre-paid meters
 - ~\$15m for hardware and rollout
 - Covers 15% of households¹



Potential

- 'Financial clearance' system: municipal services are only applied if water is paid.
- Pre-paid meters have been used in few pilot communities
 - Positive user experience
 - In case of non-payment, gives significantly reduced flow to enable basic needs
 - Assurance made to consumers that prompt payment leads to better access to water
 - Consideration of social concerns required in regulation of meter usage and water access issues

Description

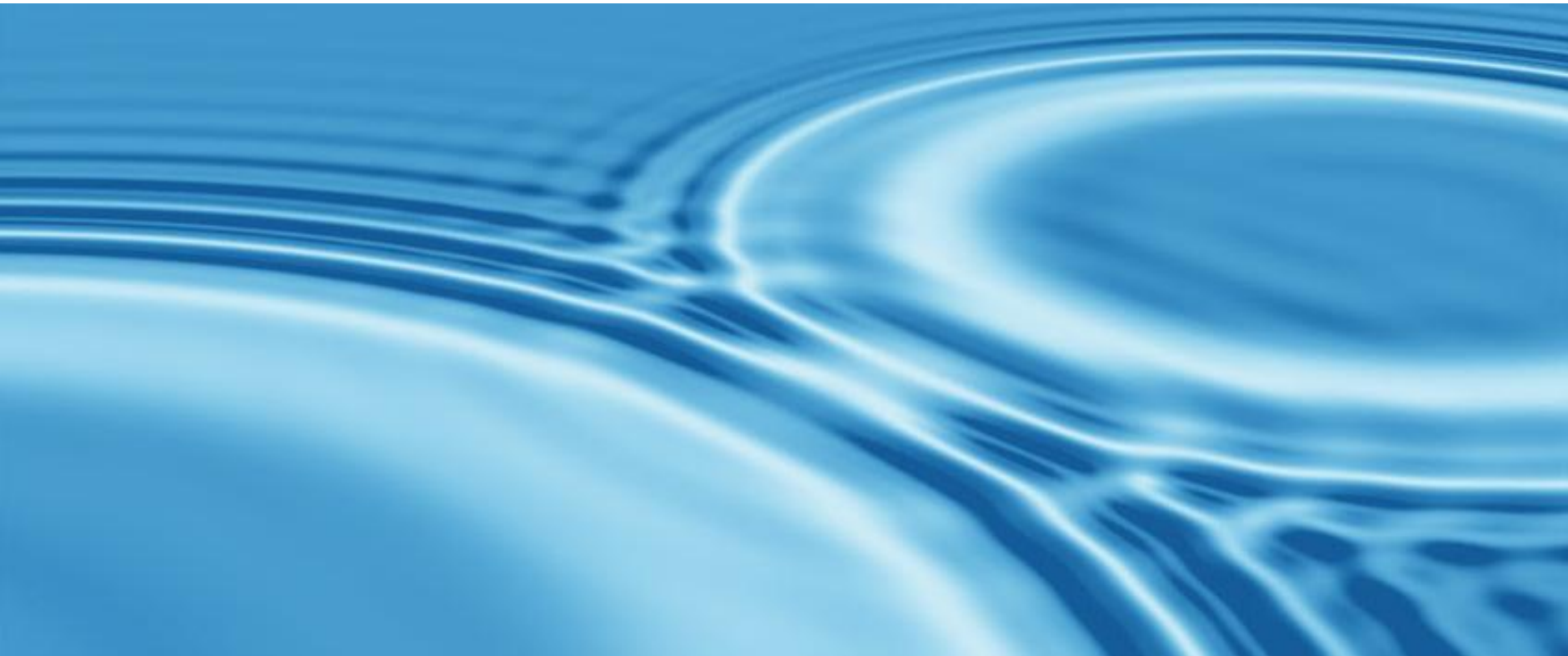
- Engage in more efficient collection and enforcement on all levels
- Introduce separate account for water revenues in municipalities and prevent use for non-water purposes
- Potential for roll-out of pre-paid meters to 15% of households
 - New areas being connected to network
 - Areas of chronically low collection rates

Enablers

- Clear political will and strategy to increase water bill collection
- Incentives for service providers to raise collection efficiency
- Investment in process reform and hardware
 - Water service providers
 - Strategic private sector partners including pre-paid meter companies
- Regulation of use of pre-paid meters and tariff

¹ Price assumed for pre-paid meter is \$150, and 482,000 households are assumed for the West Bank and 254,000 for Gaza

Enablers



Enablers for the water sector

Enablers	Current situation	Description
Infrastructure	Large scale desalination and wastewater treatment plants for Gaza require reliable energy supply	Ensure electricity availability to Gaza water infrastructure (~85 MW for desalination and ww treatment plant)
Permits & licenses	Getting permits for Palestinian water and sanitation infrastructure is constrained by two level process with JWC approval and (in Area C) Civil Administration construction permits	- Ensure functioning JWC permitting mechanism (supported if necessary by 3rd party) - Ensure permitting to enable West Bank abstraction to full Oslo accords agreements
Bilateral agreements	- Aquifer extraction is agreed upon in interim Oslo II accords without the PA extracting full share - Negotiations ongoing between PA and Mekorot on prices for increased water imports to Gaza and WB - Independent Water Producers also interested in providing water - price is crucial factor - Significant wastewater flows between Palestinian Territories and Israel and vice versa (e.g. Wadi Nar/Kidron Valley)	- Increase Palestinian extraction to levels agreed in Oslo accords - Completion of Nahal Oz water pipe connection to Gaza - Secure long-term price agreements between PA and Mekorot (possibly by involving third party in pricing negotiations) - Enable IWPs to export water to PA - Agree on how to deal with cross-border flow in both directions, eg through cross border ww treatment protocol - Agree on solution for wwtp in Wadi Nar/Kidron
Institutional governance	- Fragmented water provision (~300 local service providers) hampers joint projects and effective management - Bulk water carrier does not enforce payments - Water law awaits enactment to strengthen PWA role to carry out sector reform - Joint Water Committee between Israel and the PA does not function sufficiently - Many service providers do not pay their water bills to bulk utility, as well as consumers - As a result, PA covers deficits through net lending - No regulatory framework in place to enable Public Private Partnerships - Non-revenue water (technical losses & theft) estimated at ~42% in Gaza and 32% in the West Bank. Especially difficult in Area C due to restrictions on PA enforcement	- Reduce number of service providers by establishing 4 to 12 regional utilities and enable private sector participation/PPP - Reform bulk water carrier to leverage municipalities/local utilities and transform it to National Water Company - Enact water law asap and develop PPP framework - Revitalize JWC decision-making mechanism (with 3rd party support if necessary) - PA and service providers to step up efforts to increase collection rates to ensure financial viability of utilities, e.g. by introducing pre-paid meters - Enact water law and provisions included for PPP enablement - Strategy for effective NRW reduction scheme - Improve PA enforcement capability, enable specific enforcement capability in Area C - Agree on reimbursement of past losses incurred in Area C