Office of the Quartet Representative Tony Blair

Initiative for the Palestinian Economy
Construction and Building Materials

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Overview of the Palestinian construction sector

Sector description

- Increasing household size in recent years (5.4 in 2007 to 6.0 in 2013) driven by limited new housing construction
- Housing construction not targeted at low to middle income (average unit prices are higher than housing budget of 50% to 80% of population)
- Significant challenges with titling, land registry and fragmented ownership; only ~35% of West Bank land is registered (at current target registration rate it will take approximately 80 years to register entire West Bank)
- Tight mortgage lending standards (e.g., only 5-15% of Areas A/B available for mortgages; of $500M AMAL program <1% allocated)
- Lengthy permit process for new construction in East Jerusalem (24 to 84 months) and Area C

Baseline

- Represents ~22% of GDP, at $2.3B
- Accounts for ~16% of employment, at ~143K jobs
- Average construction ~9,000 housing units 2008-2011

Regional benchmarks

- Housing cost $550-700 per sq. m. in Palestinian Territories vs. $375-550 per sq. m. in Turkey and $250 per sq. m. for affordable housing in India
- Average mortgage rate 5 to 6.5% vs. 3.2%-4.0% in Israel

Investment case

Engage

- As artificial, externally imposed economic and political constraints are removed, catch-up growth in Palestinian Territories will drive increases in household income
- Introducing large-scale affordable housing schemes will unlock housing demand from new socio-economic segments
- Increasing access to low-interest mortgages, through loan guarantees and first loss schemes, will further boost demand
- Improved land registration creates new investment opportunities across West Bank
- Modernised rental regulation (ending rent control, automatic right to renewal) increases flexibility in rental market and spurs investments in new rental property

Creating profit opportunities in the housing sector

Mainly potential investable opportunities

Mainly supporting initiatives

	Activities	Status
Understanding demand	• Effective demand survey	• Under way
Identification of suitable land	• Further analysis ~100K dunums of suitable land identified in IPE	• Under way
Land registration	• PLA resource and capacity building • Judges dedicated to land disputes	• Under way - ramping up of land registration efforts
Housing development	• PPP to drive affordable housing • Urban infill and periphery development • Donor financing of off-site infrastructure • Leveraging affordable housing experiences from other regions, eg., Turkey, Africa	• Affordable housing pilot program initiated • Ongoing private sector discussions
Mortgage financing	• Consumer education • Training of banking personnel • Affordable mortgage programs	• AMAL restructuring under way • Financial literacy ongoing • Mortgage market development initiated
Sales & rental	• Development of specialised real estate agents, with broad portfolio of houses	• Rental regulation improvements

Potential projects and enablers for construction strategy

Potential projects

Housing construction

Develop **housing tailored to specific income groups and geographic areas**

- West Bank: **Urban in-fill, urban periphery, and planned city developments**

- Gaza: **Affordable housing on available state land**

- **Upgrade substandard housing**, e.g., connect to public water and sewage networks (focus on Gaza and East Jerusalem)

Other infrastructure

- Construct **key projects** required by other sectors

Financing

- **Financing:** expand existing **low-cost financing** initiatives (e.g., AMAL) and **launch additional options** to spur construction growth and enable low-income rentals and home purchases

Enablers

Construction industry capacity

- Access to building materials
- Local or on-site capacity
- Skilled labour
- Machinery and technology

Economic enablers for development

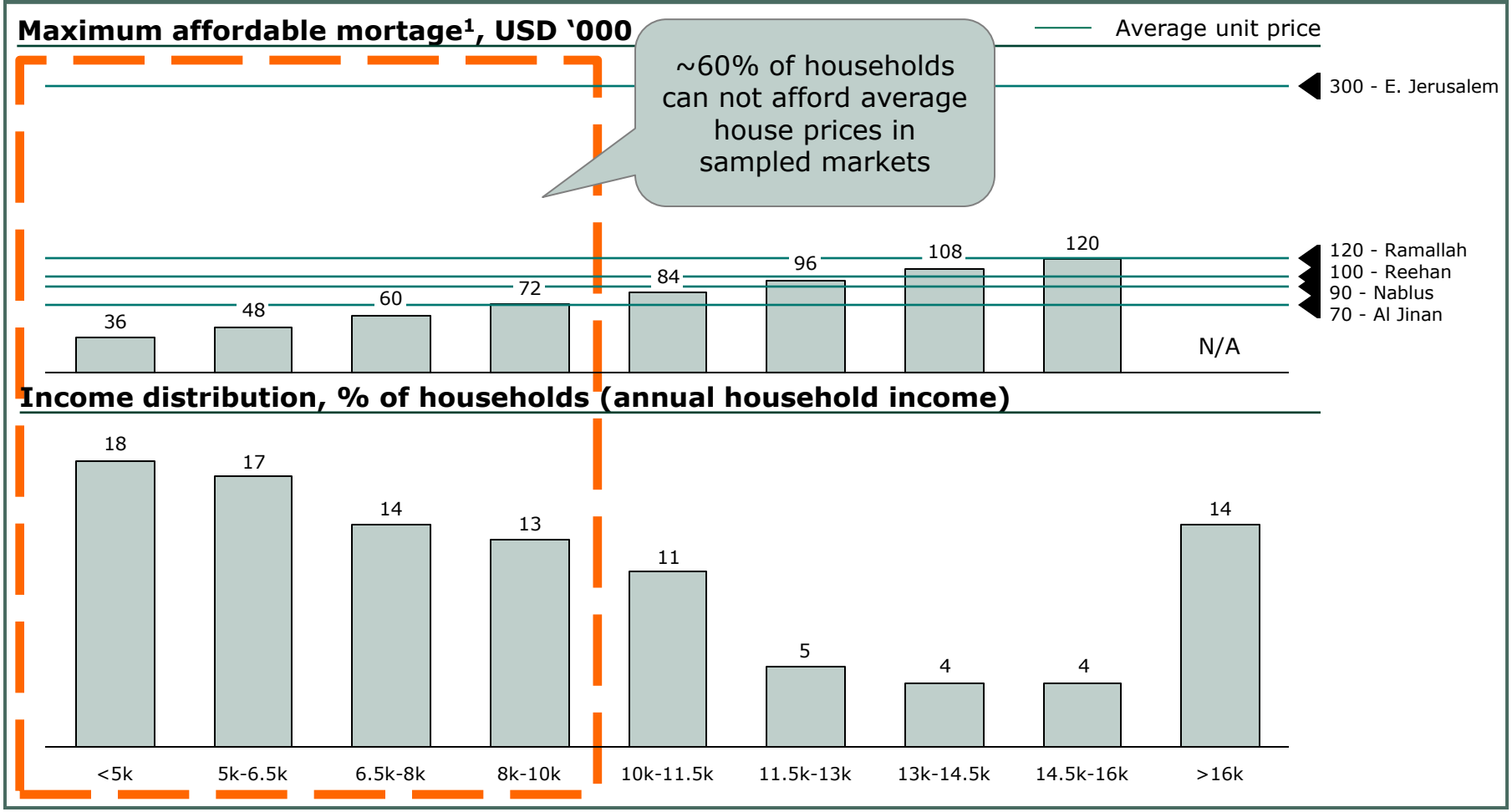
- **Financing availability**
- Basic infrastructure

Governance process

- **Land registration**
- National master plan in place
- Permitting / zoning process
- Project management

Data shows major pent-up demand for affordable housing and significant opportunities…

Mortgage affordability by income group

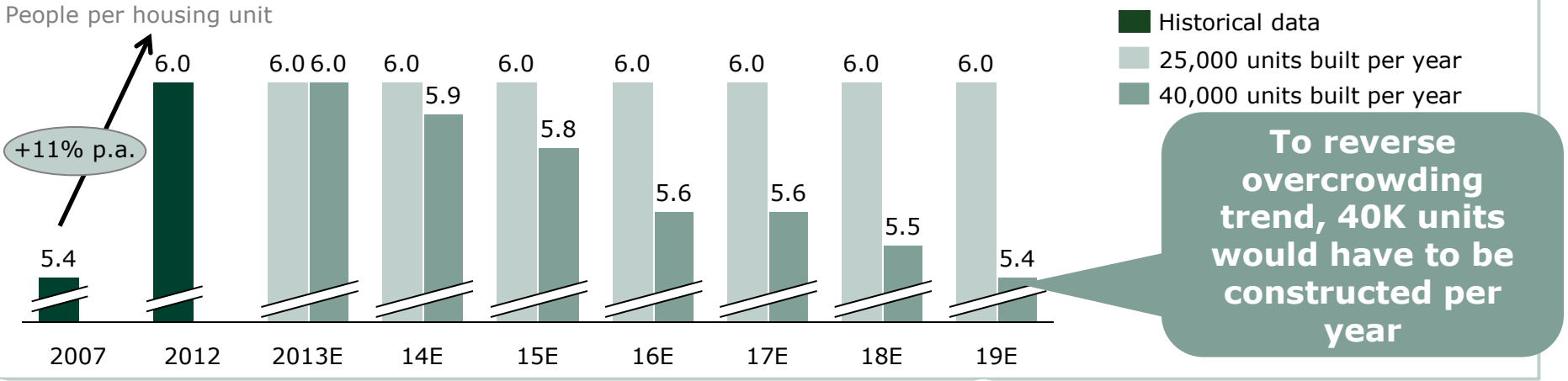


1 At 5% interest rate, 25 year mortgage, 50% DTI, no down payment

7 Reference: PCBS; interview with contractors

…requiring 25-40K housing units per year

1 Significant housing construction required to curb trend toward over crowding



2 Sector has proven capacity to build 33K units/year

3 Estimates based on previously published reports

- RAND arc study indicates that **32,000 units per year need** to be built to keep constant housing density
- PCBS, UN, and IPCC reports indicate a total **latent demand of ~130K**
  - Driven by **overcrowding and structural issues** in the existing housing stock
  - Would require construction of **25-40K units per year** to fill

1 Includes illegal units until 2007. 1990-2007 based on actual construction. 2008-2012 based on permits issued, which PCBS considers a good approximation

Source: PCBS

Opportunistic, targeted land registration can support implementation of the IPE

1 Agreeing on criteria for land to be approved for fast-track registration

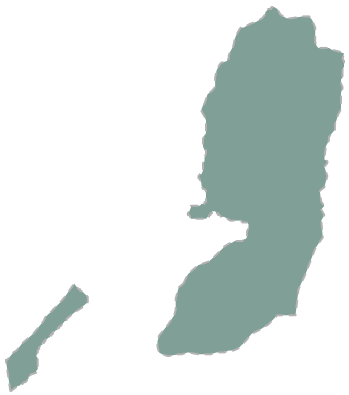
Key criteria for suitable land

- Geographically suitable for housing (topography, etc.)
- Location (proximity to infrastructure, existing urban centres)
- Low cost of land
- Land suitable for registration (ideally: high ownership concentration, low dispute frequency, etc.)

2 Creating and empowering task force to drive registration

- Task force needs mandate and resources to act quickly and decisively
- Potential membership
  - Relevant PA ministries
  - Palestinian Land Authority
  - Judiciary
  - Developers
  - Investors
  - Facilitating agency (OQR/World Bank)

3 Applying criteria to map to identify suitable land



4 Leveraging private sector investment

- Private sector developers can play key role in demarcation and surveying process
- Appropriate mechanism (tendering, performance-based contracts, etc.) for selecting and involving private sector will need to be developed
- Suitable areas for housing should be matched with developers with relevant capabilities

Housing need could be addressed with several different housing types tailored to demographic and geographic segments

		Description	Examples
West Bank	A Urban infill 	• Dense construction in urban centres to take advantage of available land; targets mostly mid- to high-income levels	• Land in centres of East Jerusalem, Ramallah, Bethlehem, Hebron, Nablus, Jenin, and other cities
	B Urban periphery 	• Construction around existing urban centres to increase city size • Various price points to serve multiple income groups	• Reihan[1]; land outside, Ramallah, Bethlehem, Hebron, Nablus, Jenin, and other cities
	C Planned cities 	• Newly constructed cities on the outskirts of existing urban hubs • Housing across income-levels with a high level of standardisation and possibly pre-fab elements	• Rawabi can be tailored to serve lower-income segments
Gaza	D Gaza-focused affordable housing 	• Affordable housing to address overcrowding and substandard housing in Gaza Strip (pre-fab housing as possible solution)	• TOKI case study for Gaza-context

1 PADICO

Breakdown of housing types

		West Bank			Gaza
		A Urban infill 	**B Urban periphery** 	**C Planned cities** 	**D Gaza-focused affordable housing** 
Geo-graphy	**Area**	• Within urban centres	• Just outside urban centres	• Close to urban hubs (but not directly connected)	• Gaza Strip
	Development size	• Small lots (1-20 dunum)	• Medium (10-1,000 dunum)	• Very large (1,000-6,000 dunum)	• Large (500-1,000 dunum)
	Land cost/unit[1]	• $13K ($100k – 500k/dunum)	• $13-16K ($50k – 300k/dunum)	• $7-11K ($20k-200k/dunum)	• $0-8K
Demo-graphics	**Household income**	• Medium to high (>$10k)	• Medium to high (>$10k)	• Low to medium (<$10k)	• Low to medium
	Household size	• 3-5	• 4-7	• 4-6	• 4-7
Housing	**Average size unit (sqm)**	• 120	• 120-150	• 100-150	• 115
	Density (house-to-lot ratio)[2]	• High (>300%)	• Medium (100-300%)	• Medium (100-300%)	• Medium (100-300%)
	Construction cost, incl. land	• ~$73k	• ~$73-91K	• ~42-63K	• ~$38-46K
	Height of building (# of stories)	• 4-8	• 2-6	• 2-8 (mixed)	• 1-3
Infrastructure (road, sewage, power, water, schools)		• Connection to existing infrastructure	• Connection to existing infra-structure; possible extended capacity necessary	• All new infrastructure neces-sary (incl. energy/water but also commercial infrastructure)	• All new basic infrastructure necessary (incl. energy and water)
Scale		• Project-by-project base with 10 to 30 units per projects (private investment)	• Medium scale projects with several hundred units per project (private investment)	• High-scale, high-capital projects for multi-thousand units per project (possibly public investment)	• High-scale projects, partially government-funded

1 Calculated using apartment size and land cost/sqm. Dunum cost reflects proximity to urban centre
2 Density is defined as ratio of living area per land area

Reference: Architects and contractor data; expert interviews

Construction costs vary across housing types

West Bank

Gaza

A Urban infill

Ø = 120 sqm

B Urban periphery

Ø = 120-150 sqm

C Planned city

Ø = 100 to 150 sqm

D Affordable housing

Ø = 115 sqm

Construction costs
USD/sqm

Construction cost/unit
USD (range)

Additional profit margin for developer[2]

	Land	Labour	Building materials	Other[1]	Total	Construction cost/unit (USD)
A Urban infill	110	130	300	65	605	73,000
B Urban periphery	110	130	300	65	605	73,000 – 91,000
C Planned city	70	90	210	50	420	42,000 – 63,000
D Affordable housing	70	70	210	50	400	38,000 – 46,000

+5%

Land subsidy would decrease average unit cost to $38,000

Note on unit costs

- Land and other costs (esp. infrastructure) depend greatly on location + proximity to infrastructure
- Labour and building materials cost depend on scale, size and quality of building
- Government provided land will help make housing affordable
- Land costs could be reduced if area C is unlocked
- Building materials costs can be reduced through new design, processes and techniques

1 Includes infrastructure access costs and fees 2 Below risk-adjusted market rates of return for developers; additional subsidies for land, infrastructure, and capital may be needed

Reference: Interviews with contractors; case studies

Analysis of potential supply and demand across housing types in West Bank for projected income distribution in 2016

Outside solution | ✓ Possible solution | X % of total population

Supply

	Housing type		Size[2] sqm	Const. cost $k	Selling price, $k	Rental	<36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	>120	Units, %	# units constructed annually	Value of annual investment, $ M[1]
A	Urban infill 	1	120 sqm	73	77						✓	✓	✓			17	2.5K – 4K	~240
B	Urban periphery 	2	150 sqm	91	96									✓	✓	25	3.8K – 6K	~660
		3	120 sqm	73	77						✓	✓	✓			16	2.5K – 4K	
C	Planned cities 	4	150 sqm	63	66					✓						19	2.8K – 4.5K	~440
		5	100 sqm	42	44		✓	✓	✓							23	3.4K – 5.5K	
						Rental												

Maximum affordable mortgage for housing
$ '000

<36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	>120
11	4	8	19	12	12	9	5	20

Demand in %

Σ = 15K to 24K

1 Does not include roads, which come to an additional annual investment of ~$80M per year in the West Bank
2 Unit sizes are indicative, reflecting existing preferences, and may be reduced

Affordable housing as a profitable industry

Enabler	Description
 **Price**	• Carefully priced at the exact price point (between 3 - 5x household income range) given price elasticity of customers
 **Construction**	• Use of techniques such as aluminium concrete form etc. to lessen costs and construction cycle time (e.g.,: 20% less costs, 21 day cycle time); construction process industrialised
 **Land/ location**	• In the outskirts of the city at lower land purchase costs; large plot sizes (e.g.,: ~50,000 sqm) to build low density units and land cost managed at ~ 15-20% of overall cost/unit
 **Development strategy**	• High-rise structures avoided; development strategy is to buy parcel of land, build as quickly as possible and achieve high inventory turnover on the units
 **Infra-structure**	• Primary infrastructure connectivity provided by government; but secondary infrastructure (internal roads, street lights, sewage treatment …) managed at ~ 15-20% of overall costs
 **Technology**	• Selective use of alternate technology to lower costs (e.g.,: fly ash bricks); both process and building material technology used
 **Financing**	• Partnerships with lending institutions to provide loan schemes to the unorganised sector; innovations in lending such as Micro-Housing finance and flexible credit check processes

TOKI is a private-public partnership (PPP) example of innovative construction methods enabling affordable housing

Overview

TOKI - the **Turkish Housing Development Administration –** issues tenders for the disposal of government-owned land for mass housing projects.

- TOKI has **access to government-owned land**
- **Contractors** bid for the development of this land
- The land development is split into:
  - **PPP revenue sharing** for high-end housing
  - **public ownership** for affordable housing

BETWEEN 2003-2012

535,000 housing units and supporting infrastructure completed at **2,350 sites across Turkey** (approx. 64.5 million sqm)

86% affordable housing (~$40,000 / unit; price per sqm $375-550)

14% luxury projects for fund raising

Construction method

Formwork technology …

Alternate materials …

Economical design…

Pre-cast / pre-fab …

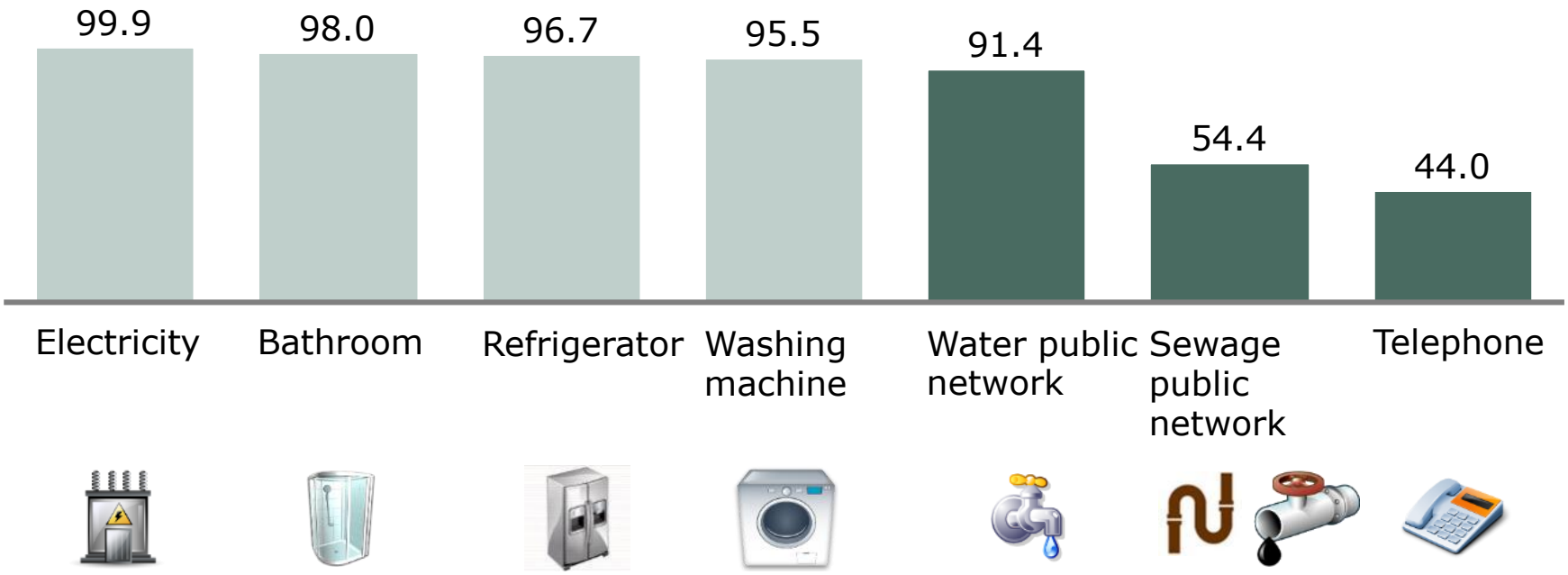
- TOKI has adopted **innovative construction technology** (pre-cast factory built homes, aluminium and tunnel formwork technology) to rapidly develop good quality housing communities
- These building methods have helped **scale up rapidly** (to 70,000 units constructed per year within 10 years)

Lessons learned

- Important to give program **high profile** (TOKI reports directly to PM office)
- Need to have a **firm legal basis**
- **Important** to provide innovative financing
  - E.g., larger down-payment for longer instalment plan
  - Bank credit lines …

Almost 10% of households do not have access to the public water network, and ~50% do not have access to the public sewage network

% households with access to basic infrastructure

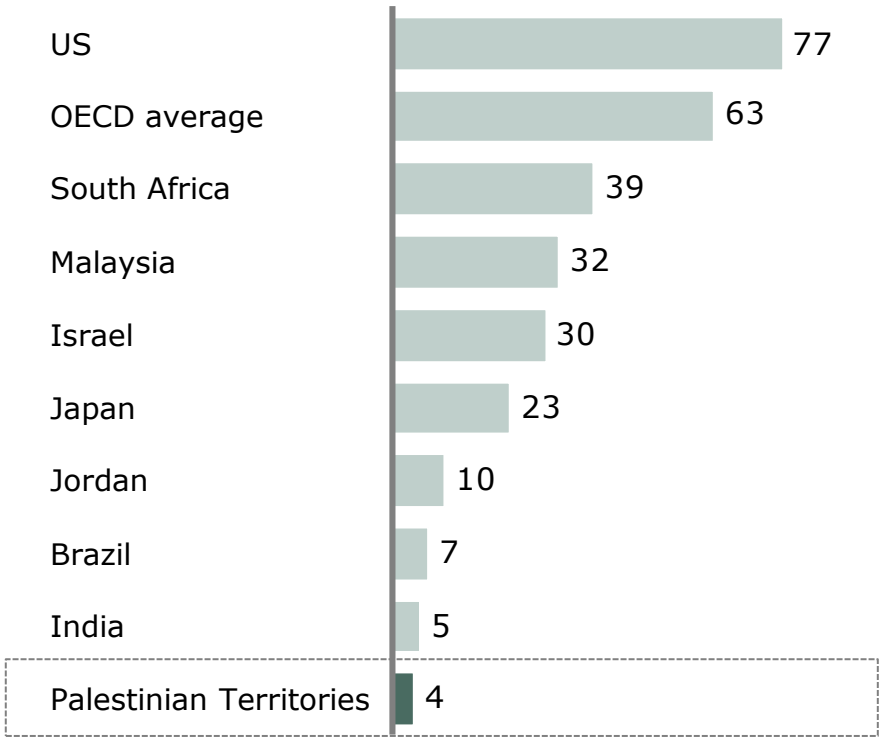


- Substantial amount of housing is not connected to the **sewage public network** (close to 50%) and close to 10% does not have access to **water public network**
- Access to **electricity and basic housing equipment** (bathroom, refrigerator, washing machine) is on the other hand very high

There is scope to increase mortgage penetration to reach the IPE ambition

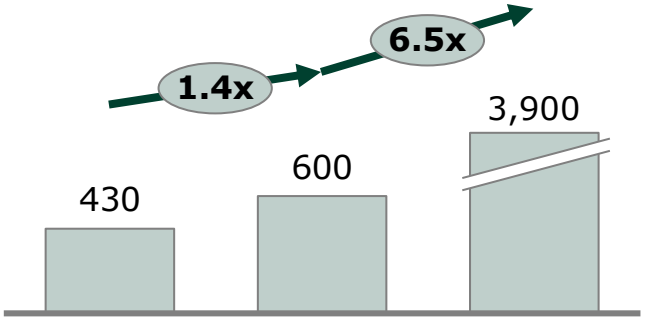
PT needs to increase the mortgage market growth rate to reach the ambitious IPE target

Mortgage debt as percentage of GDP 2011[1]
Percentage



PT needs to increase the mortgage market growth rate to reach the ambitious IPE target

Current and estimated future outstanding mortgages in the Palestinian Territories 2011-2016[2]
USD millions



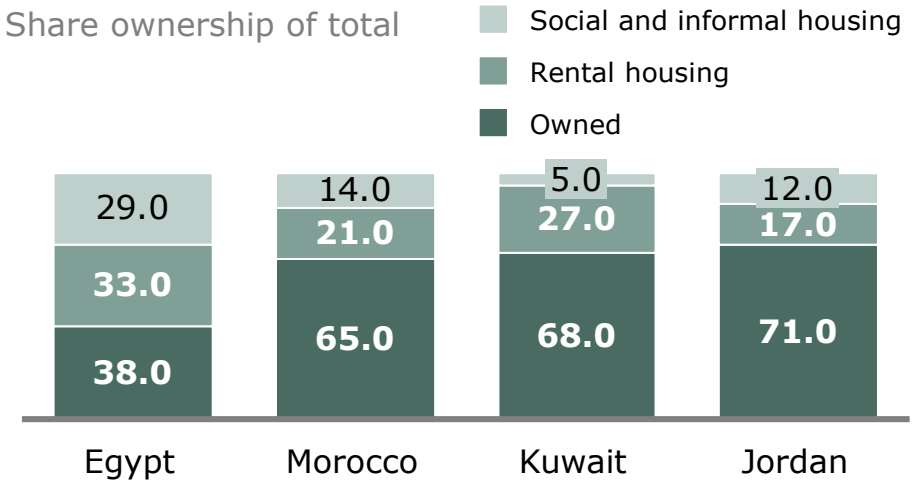
	2011	2013	2016 est.
% of GDP	4	6	28
% of residential debt	29	31	N/A
% of bank deposits[3]	6	7	N/A

1 References: 2011 or latest available, WMM (PT 2011), CESinfo (US 2010), Israel National Bureau of Statistics (2010), CIBC 2009 (others), National Mortgage Corporation (Malaysia 2012), EBRD (Jordan 2012)
2 Assuming 120m USD of outstanding loans in 2013 to be paid off by 2016 3 total bank deposits

Potential for rental schemes in Palestinian Territories

Small share of housing is rented in Palestinian Territories…

…whereas comparable economies show a larger share of rental housing



Potential initiatives

- Develop existing **rent schemes** and design **rental solution for low-income housing** by making finance available
- Use Gaza-focused affordable housing and planned city projects to enable **increased access to rental housing**
- **Investigate potential for government to act as rental agency**, especially for low-income groups
- Consider **changing tenant protection** (rent control and right to lease renewal) which limits rental sector

 Reference: PCBS, IMF

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GOI enabler
PA enabler
Joint enabler

Enablers - construction

	Current situation	Description of enabler
INSTITUTIONAL	• **East Jerusalem**: Very limited housing construction due to only 11-13% of EJ having been zoned for residential purposes, restrictive regulations limiting housing density, and very slow processing of new master plans.	• **Amend existing master plan to create more residential and commercial areas** and allow for greater housing density. Ensure priority processing of new master plans.
	• **Little/no Palestinian housing construction allowed in Area C** due to very slow permitting process • **Limited access to Area C for basic** infrastructure (roads, sewage etc.) which delays and complicates construction projects in Area A and B	• **Allow Palestinian housing construction on selected land in Area C** around urban centres, to facilitate affordable housing • **Grant permission for key Palestinian infrastructure** (roads, water, sewage, electricity, etc.) in Area C, connecting new housing with pre-existing urban areas in Area A and B
	• **Insufficient imports of building materials into Gaza**	• **Allow building materials to be imported** for the private sector into Gaza in quantities to meet forecast construction demand
organisation-AL	• **Inefficient land registration processes**; target registration rate would take over 80 years to include all West Bank in land registry • Lack of ownership data regarding Palestinian owned land in Area C	• **Increase land registration capacity in WB**, by strengthening judicial and PLA capacity and ensuring more targeted approach • Ensure sharing of data and files regarding all land in Area C, to facilitate titling and real estate transactions
	• **Underdeveloped mortgage market**, at $600 m (~5% of GDP), with limited consumer awareness and nascent banking capabilities	• Improve institutional readiness, **strengthen consumer understanding, increase underwriting capabilities**, and grow deposit base

Overview of Palestinian building materials sector

Sector description

- The Palestinian Territories building materials sector is largely dependent on imports, specifically of cement (1.5M tonnes / year), steel (300K tonnes / year) and sand (255K tonnes / year)
- Domestic production is dominated by stone and marble (2.4 M tonnes/year), and gravel (6.7 M tonnes/year). Stone and marble account for the largest Palestinian manufacturing activity
- The main issues facing domestic production of these key materials are a
  - Diffuse nature of the industry
  - Lack of modern machinery
  - Limited access to new quarry land
  - Lack of permits to use explosives to produce gravel
- Rapid construction growth as a result of the IPE will amplify these challenges

Baseline

- Along with construction,
  - Represents ~22% of GDP, at $2.3B
  - Accounts for ~16% of employment, at ~143K jobs

Regional benchmarks

- Stone average international export (excluding Israel) price $~56 vs. Turkey $60, driven by Turkey's higher local value added
- Cement average price $115-123 vs. Turkey $75
- Gravel production value for integrated crushers is 5x lower for Palestinian versus Israeli run operations ($21 M versus $105 M)

Investment case

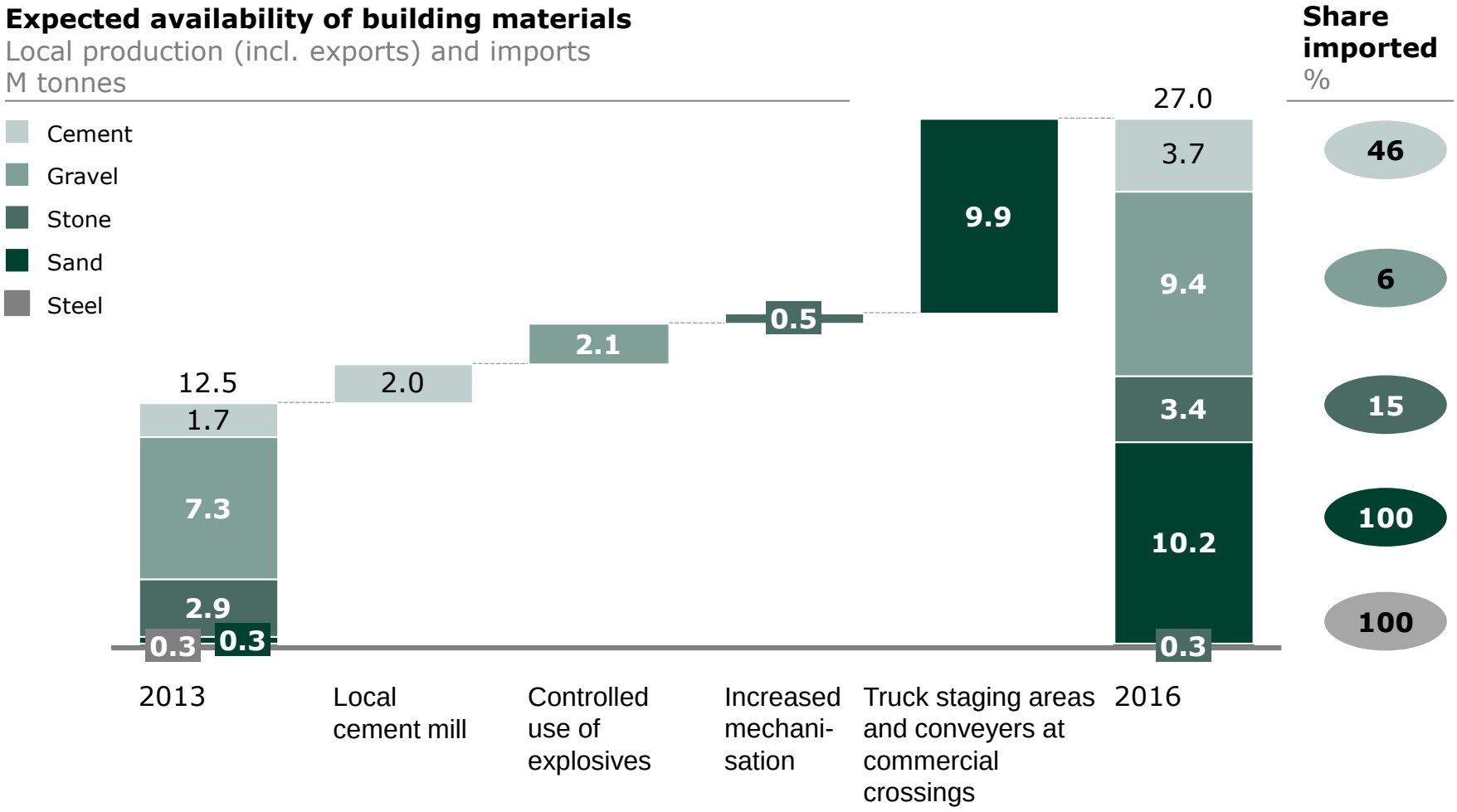
Engage

- As artificial, externally imposed economic and political constraints are removed, catch-up growth in PT will drive increase demand for building materials (tourism, agriculture, construction, water, energy)

- Increased demand will provide investment opportunities:
  - A domestic cement mill in WB to provide sufficient cement to meet increasing needs (possibly another in Gaza?)
  - More ready-mix concrete plants
  - More operational quarries

- Take advantage of domestic stone and marble industry to develop value-add proposition
  - Increased mechanization to improve local productivity in international stone and marble exports (slabs and tiles)
  - Improve stone & marble processing (e.g., in industrial zones) and introduce aggregation mechanism for small producers to grow exports of high-value stone & marble

Total availability of building materials could be increased from 12.5 M tonnes to up to 27M tonnes in three years



Reference: Steel company, PCSC, USM, PCBS, PIF, PCBS

Investable opportunity

Supporting initiative

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Potential projects in building materials sector

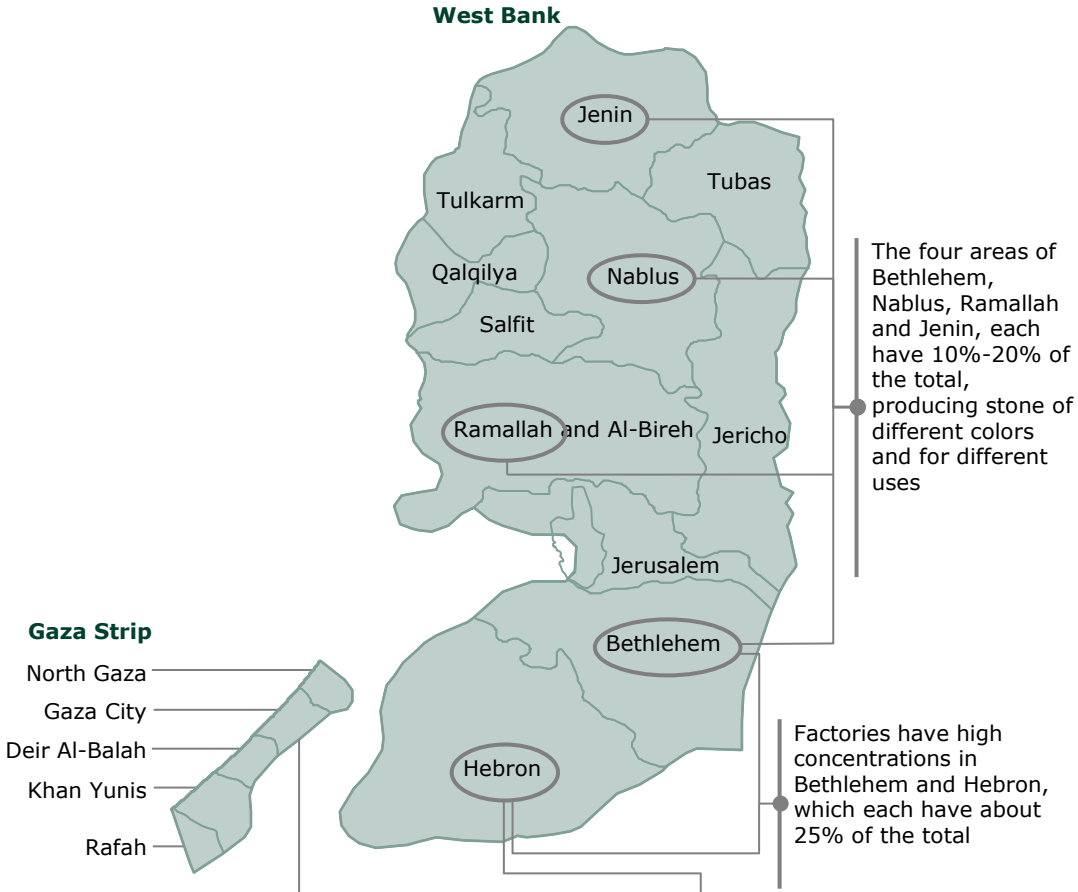
		Potential project	Description
Increase **reliable supply** of key building materials through **diversified imports** and increased **local productivity** to support incremental demand for housing and infrastructure	1	Conduct geological survey	Determine size and location of additional stone reserves
	2	Controlled and regulated use of explosives[1]	Facilitate access to gravel and ensure future economic viability of local production sites
	3	Build local cement mill	Substitute cement imports by creating local production site and building up new partnerships with international exporters
	4	Build truck staging areas/conveyors	Facilitate all material imports; would have effects across materials if import increase needed
Increase **local value added** and grow **stone and marble exports**	5	Facilitate consolidation of the stone and marble industry	Improve/introduce access to industrial zones to improve ability to export higher value stone products
	6	Increase mechanisation	Improve local productivity in international stone and marble exports (slabs and tiles)

1 Provided by Israeli company

1 Conduct geological survey to determine location and magnitude of additional stone deposits

Stone/marble as a key industry which faces risk of depletion

- 300+ quarries, 1,000 factories and workshops
- Annual production of more than 2.38 M tonnes (of which 20% consumed domestically)
- Annual sales of around $400 M (of which $70 M exports outside of Israel)
- Experts estimate stone quarries in Area A/B to be 70-80% depleted[1]



To counter risk of depletion

- Conduct **geological survey** to prioritize areas for guiding excavation and to estimate the volume and type of the stone; focus on Hebron and Bethlehem with estimated reserves of 1,500 cubic meters (estimated cost: $0.5 M for a 3,000-dunum area)
  - 1,200 dunum in Hebron (200 A/B; 1,000 C) and 1,500 in Bethlehem (300 A/B; 1,200 C)
- **Possible next step:** Establish a transparent, affordable and efficient **permitting process for new quarries**

1 PIF, USM

2 Pilot controlled and regulated use of explosives

Explosives

Current approach	Possible approach with higher productivity	Investment need	Potential impact
• Explosives only at 4 selected Palestinian-run quarries • To produce 4000 tonnes of gravel without explosives – Production Time of 10 days – Total cost of $4600 (fuel for machine = 2000 litres of diesel ($3800); salary for operator ($530); machinery maintenance costs ($270)	• Controlled use for all quarries with integrated crushers (~12) • To produce 4000 tonnes of gravel – Production time of 2 hours – One detonation, costing $2100 • Israeli partner company to provide material and services	• Costs covered by quarry owner	• **Increase in production** from integrated crushers of ~900% **or 2.1 M tonnes if all 12 given explosive licenses under current conditions** • Cost decrease **~230%** to enable economic feasibility of crusher • Time to produce decreased from 10 days to 3 days (assuming use of one crusher)

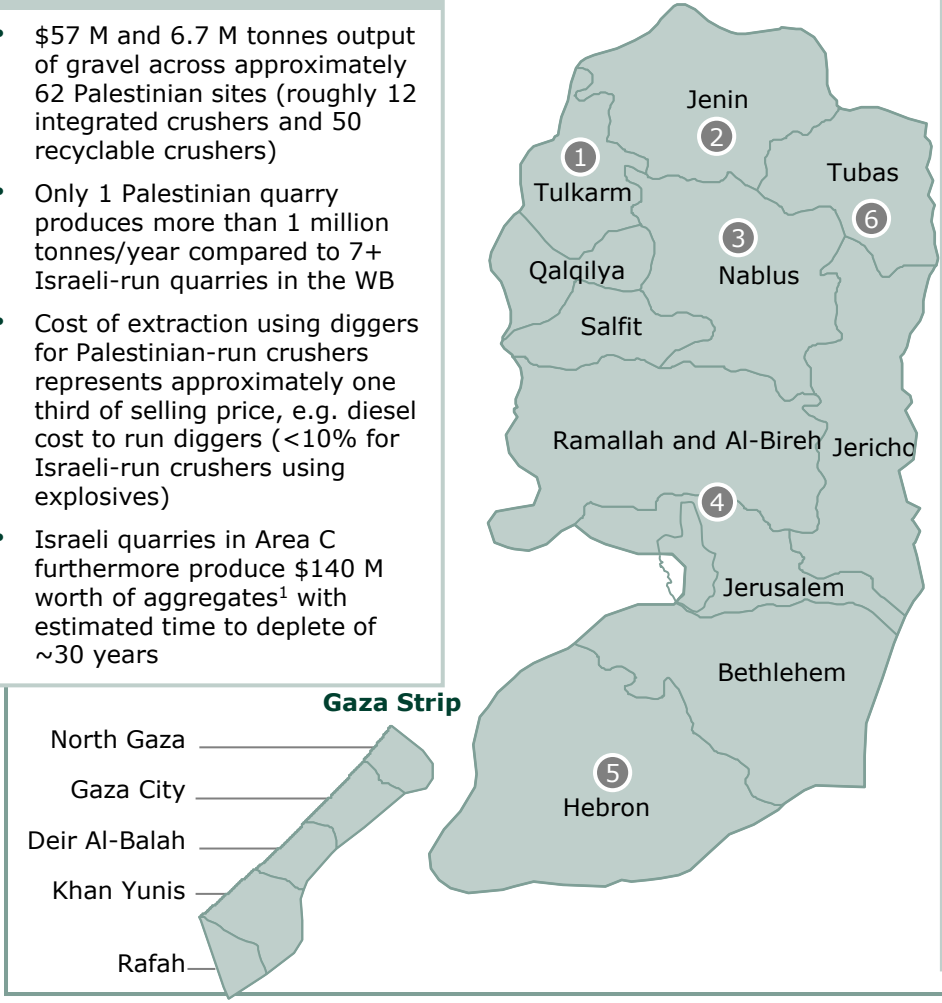
Additional costs: Running the quarry requires a fixed cost of ~$200 for electricity used to run crushing machines. A crushing machine can crush any amount between 500 - 1500 tonnes. Therefore production in small quantities also increases the running costs for the crushing machines

Reference: expert interviews; quarry owners

2 Increase output of gravel industry

Overview

- $57 M and 6.7 M tonnes output of gravel across approximately 62 Palestinian sites (roughly 12 integrated crushers and 50 recyclable crushers)
- Only 1 Palestinian quarry produces more than 1 million tonnes/year compared to 7+ Israeli-run quarries in the WB
- Cost of extraction using diggers for Palestinian-run crushers represents approximately one third of selling price, e.g. diesel cost to run diggers (<10% for Israeli-run crushers using explosives)
- Israeli quarries in Area C furthermore produce $140 M worth of aggregates[1] with estimated time to deplete of ~30 years



Production levels of selected quarries compared to capacity level

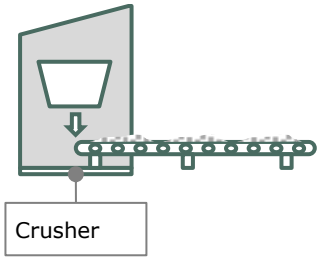
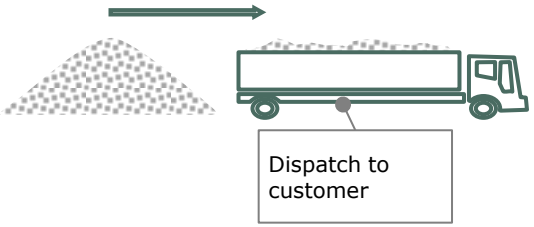
		Production m tonnes	Capacity m tonnes
1	Anabta x2	0.1	2.0
2	Jenin x3	0.2	0.4
3	Beit Iba x2	0.2	0.9
4	Qalandia/ Ram x4	1.5	3.0+
5	Samu'a	0.1	1.5
6	Yasid	0.3	0.6
	Total	2.4	6.0

Steps to increase productivity

- Pilot controlled use of explosives for remaining 8 quarries using integrated crushers
- Conduct **geological survey** to prioritize areas for guiding excavation

1 Palestinian Ministry of National Economy

2 Gravel quarry process overview

Process step	Mineral extraction	Crusher	Dispatch to customer
			
Description	• Can extract via fuel intensive digging machines • Or via explosives	• turns the raw material into various types of gravel • $200/day to run • Capacity: 500-1500 tonnes/day	• Trucks will then carry product to site of need – RMX plant, construction site, road works (use depends on quality of gravel)

Example: Produce 4,000 tonnes (average output of 1 blast with explosives)

				Cost/ton
A **Time and cost to produce with machines**	• Time: 10 days • Cost – Fuel: $3800 – Labour: $530 – Machinery maintenance: $270 – Total cost of extraction: $4,600	• With output of 400 tonnes/day you would require the crusher 9/10 days • Cost of crusher: – 9x$200 = $1,800	Summary: Extraction: $4,600 Crusher: $1,800 **Total cost: $6,400** Output: 4,000 tonnes of gravel	**A** **$1.6**
B **Time and cost to produce with explosives**	• Time: 2hrs • Cost – 1 detonation: $2,100 – Total cost of extraction: $2,100	• With immediate output of 4,000 tonnes, it would take the crusher running at full capacity 3 days to process • Cost of crusher: – 3x$200= 600	Summary: Extraction: $2,100 Crusher: $600 **Total cost: $2,700** Output: 4,000 tonnes of gravel	**B** **$0.68**

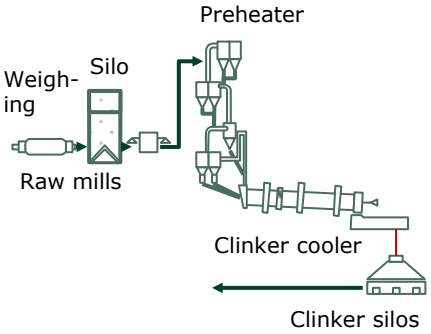
3 Two alternative approaches to build a local production facility

Process steps

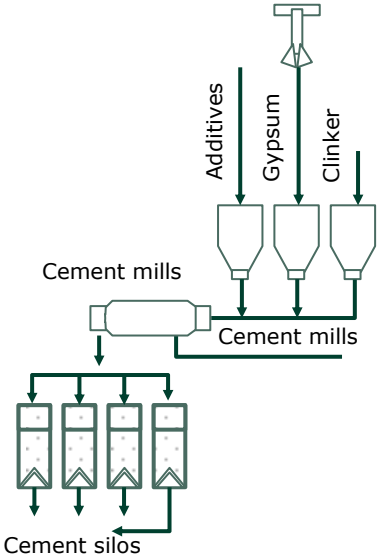
Quarry

Limestone (calcaire) quarry

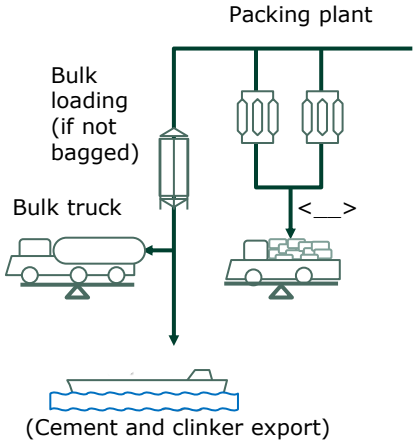
Clinker production



Clinker grinding



Dispatch



2 Clinker grinding station ($70-120 M)

1 Fully integrated cement plant ($260-340 M)

3 Both options could help improve cement supply security

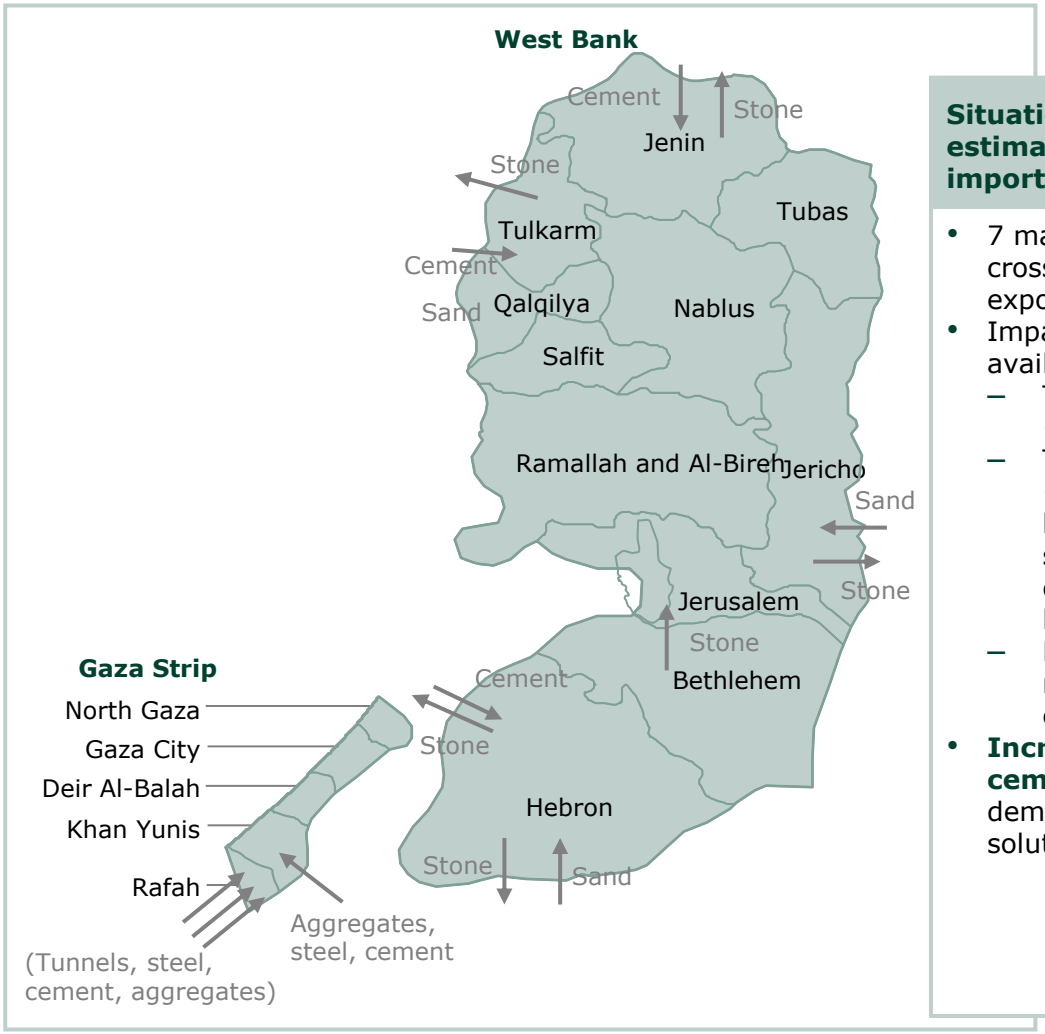
☐ Option chosen for impact estimate

	1 Fully integrated cement plant	2 Clinker grinding station / cement mill
Description	• Fully integrated cement plant; from raw material extraction to finished products	• Grinding of imported clinker (cement mill; clinker storage; cement storage; bagging + bulk dispatch)
Capacity impact	• 1.7 M tonnes of cement/year (output: 5000/tonnes kiln per day); typical plant 3x	• 1 – 2. M tonnes of cement/year (input .9 – 1.8 M tonnes clinker/annum)
Capex	• $150 to 200 per ton produced/year → $260-340 M (-20% Chinese plants)	• $ 70 to 120 M ($70 – 120 per ton produced/year)
Cash Cost $/Ton excl. depreciation (Delivered bulk cement)	• 141 (would be higher production cost than selling price; hence only possible with imports of coal or pet coke via Israeli or Gaza ports to decrease energy costs)	• 92
FTE	• 200-250 (plus 4x indirect jobs)	• 80-100 (plus 4x indirect jobs)
Time to implement	• 30-36 months	• 12 -14months
Enablers	• Financing (capex) • Land (1-2 sqkm) • Raw material reserves of 50 years • Fuel (3 GJ/ton clinker); key enablers would be import of cheaper solid fuels or alternative fuels programs (e.g., materials such as Refuse Derived Fuel (RDF), olive residue after pressing) • Power (110 kwHr/ton cement) • Clinker – 1,5 M tonnes	• Financing (capex) • Securing clinker supply (input .9 – 1.8 M tonnes clinker/annum) and additive material (gypsum, pozzolana, fly ash, limestone) • Power (35 – 40 KwH/ton cement)
Qualification/ Rationale	✓ Full independence from imports; reliability of supply; easy to scale up and down; strategic choice × Big investment; slow implementation; environmental impact; energy intensive	✓ Increased degree of independence (can store clinker for longer time and in large amounts) ✓ Quick implementation and lower implementation costs ✓ Could be part of future integrated cement plant × Still dependent on imports of clinker (Jordan, Egypt)

 Reference: Expert interviews

4

Truck staging areas and conveyors at commercial crossings



Situation today and estimated impact on import/export costs

- 7 main commercial crossings to import/ export building material
- Impact on costs and availability:
  - Transportation **costs +10 to 15%**
  - Time to transport **+1.5 hours** (mainly border), even if source and destination just few km apart
  - Reduced certainty regarding availability of materials
- **Increased imports of cement, steel and sand** demand for short-term solutions

Potential options

- Various options to improve efficiency of transports:
  - **Conveyors and truck staging areas** at commercial crossings
  - **Opening hours** 24x7
  - Enable **door-to-door transportation**
- **Investment:**
  - Truck staging area: $ 1.3 million for space for 78 trucks (13 heavy trucks 18m+, 18 medium size, 47 small trucks)
- Costs could be decreased by up to **30%** with marginal investment

 Reference: PCSC; expert interviews

4 Exports of marble/stone across the value chain

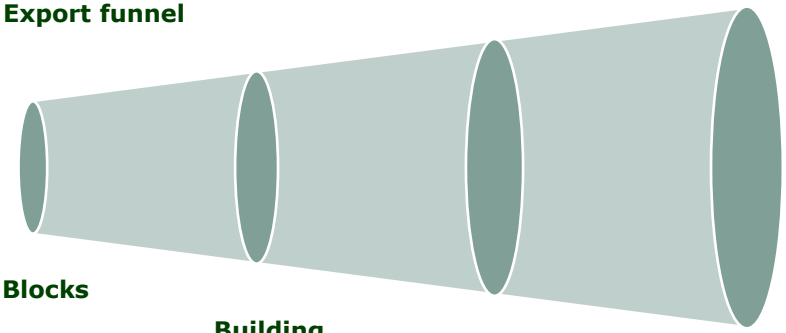
Value chain within marble/stone sub-sector

Export funnel

Sales of domestic output

- Israel = 60%
- International = 15%

- Local = 25%



Selling price $ per unit	Blocks	Building Stones (3-8cm)	Slabs (3-4cm)	Tiles (1-2cm)
• Israel	Not sold	12-17	15-20	16-32
• International	Not sold	30-50	40-70	30-65
% of exports by value	0	14-15	26-27	56-57
International exports by tonnes (000's)	0	13.0	15.0	25.25

Total tonnes of stone produced= 2.4 M

Total exports = $246 M[1] which are driven by 25 (tiles) to 50 (slabs) factories out of 1000

Potential actions

- Provide incentives such as those potentially offered through industrial zones (see next page)
- Aggregation of SME's products[2] and improved market knowledge
- Expand access to required machinery
- Better enforcement of PA restrictions on exporting unrefined stone (blocks/cubes)

Potential impact

- Lower production costs
- Allow smaller enterprises to export products in aggregate opening up foreign markets
- Enable companies to produce higher value products such as tiles with greater productivity through improved access to machinery such as polishers and resin lines
- (potential economic impact of **$60 M** unlocked – machinery project)

1 2011, Umcomtrade; 2 e.g., USAID's COMPETE program pairs ~20 SMEs with ~3 larger stone factories who purchase unfinished stone and process for onward sale to international markets

Source: USM, PIF

5 Facilitating the consolidation of the stone and marble industry will enable further investment and moving up the value chain

Current situation

- Highly fragmented industry with over 1000 stone and marble factories and 300 quarries
- 60% of all stone and marble production is exported to Israel for further processing which is then often re-exported internationally
- Only around 75 factories are capable of exporting high-value processed stone products such as slab and tile capable of meeting international standards
- International market demand for "Jerusalem stone" is high and growing. Due to fears that the local industry is not able to reliably supply contracts, international buyers often choose to deal with Israeli middle men instead

Consolidation of industry

- Provide financing for larger (and medium) stone and marble producers to absorb smaller operations in order to consolidate the industry
- Incentivize small and medium size producers to partner or form consortiums
  - This will help ensure stability in supply of raw material to larger producers
  - Will lead to increased access to financing for purchases of necessary machinery which will enable increased international exports

Industrial Zones for stone and marble industry

- Provide access for both large and medium sized producers to industrial zones to increase ability to export higher value products internationally through the following incentives:
  - Ability for producers to aggregate product to meet large contracts
  - Access to cheaper electricity and water costs
  - Increased stability in export capability
  - Increased access to international market knowledge

Source: USM, PIF

6 Improve access to advanced machinery to increase productivity and utilisation rates

	Overview of current status and alternative approach	Necessary steps	Investment need ($ M)	Potential impact ($ M)
Machinery 	• Lack of sufficient machinery to increase productivity and ability to produce higher value stone product – Old machines take **3 to 4 days** to transform 1 m3 into slabs – Modern machines lead to **productivity increases of 5x to 7x** for slabs (only 120 factories have such machines) – **International guidelines** for tile processing require specific machines (different to Israeli standards); only 50 factories capable of internationally exporting slabs and 25 factories for slabs and tiles today	• Facilitate imports of new machinery (customs limitations)	• 0.85-1.15 per factory	• **60** (doubling of int'l tile and slab capable exports)
	• Small size of most stone refiners and restrictions to obtaining machinery make it unobtainable	• Financial support to buy expensive machinery	• Increase AMAL etc.	• Productivity increase **+20% to +30%** (within slabs 5x to 7x)

6 High-value stone production and exports could be doubled by providing advanced machinery to 75 factories

Local stone production industry produces limited amounts of high-value add stone for export

- Only ~75 of 1,000+ stone factories are exporting high-value processed stone products such as slab and tile
- The international market demand (e.g., sizes of tiles)is not fully addressed, and could absorb increased output
- However, limited access to finance for SMEs to purchase necessary machinery (e.g., $600K slab polisher)

This could be addressed by increasing the number of stone companies producing and exporting slabs and tiles, with significant capital investment

Potential solutions		Capex $ '000	Amortized Capex (20yr) $ '000	Annual sales[1] $ '000
• Machinery for high-quality slab production				
– Slab cutter		1,000	50	
– Slab polisher		600	30	
	TOTAL	**1,600**	**80**	**800**
• Machinery for high-quality tile production				
– Slab cutter		1,000	50	
– Slab polisher		600	30	
– Tile polisher		300	15	
	TOTAL	**1,900**	**95**	**1,600**

- **Needed to address potential increase in domestic demand**
- **Return on investment is highly attractive**
- **Access to capital is key constraint in accessing lucrative high-value add export market**

1 Estimate based on current market: 50 slab producers with output of ~$40M and 25 tile producers with output of ~$20M

Enablers for the building materials sector

Office of the Quartet Representative Tony Blair

Enablers	Current situation	Description
Permits and licenses	• Use of explosives permitted at only 4 Palestinian gravel quarries; alternative quarrying approaches lead to ~60% lower productivity • Stone and gravel quarries in Area A/B are facing a risk of depletion within the coming years • Limited information and rough estimates available on stone reserves across the PT	• Issue permits to additional Palestinian quarry operators for controlled use of explosives, or allow current permit-holders to use explosives on additional quarries • Expand zoning area and Improve permitting process for new quarries and retroactive permitting for those currently in operation without the required permits (e.g. Beit Fajjar quarries) • Increase use of more productive equipment, e.g., integrated crushers • Conduct geological survey (3,000 dunams of land in Hebron and Bethlehem) to locate reserves of stone for new quarries
Movement of goods and people	• Key building materials (e.g., cement, steel, stone) are imported by consolidating supply base (~$500 M currently) • Temporary supply shortages have resulted in complete stand-still of Palestinian construction industry (e.g., for up to 1 week) • Restrictions at commercial crossings (e.g., back-to-back transportation) increase transportation time and costs (~90 mins per crossing and 10-15% cost impact) and decrease reliability of material supply	• Ensure import policy and process facilitate diversified imports and take advantage of global capacity (e.g., cement from Turkey, Southern Europe) • Extend opening hours at crossings (e.g., until 8pm, 7 days per week) • Allow door-to-door transportation of key items (vs. current back-to-back system) • Permit and financing for development of infrastructure at commercial crossings (e.g., conveyor, truck staging area)