COUNTRY INSIGHTS

ACCELERATING ZERO-EMISSION BUILDING SECTOR AMBITIONS IN THE MENA REGION

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BEIRUT, LEBANON
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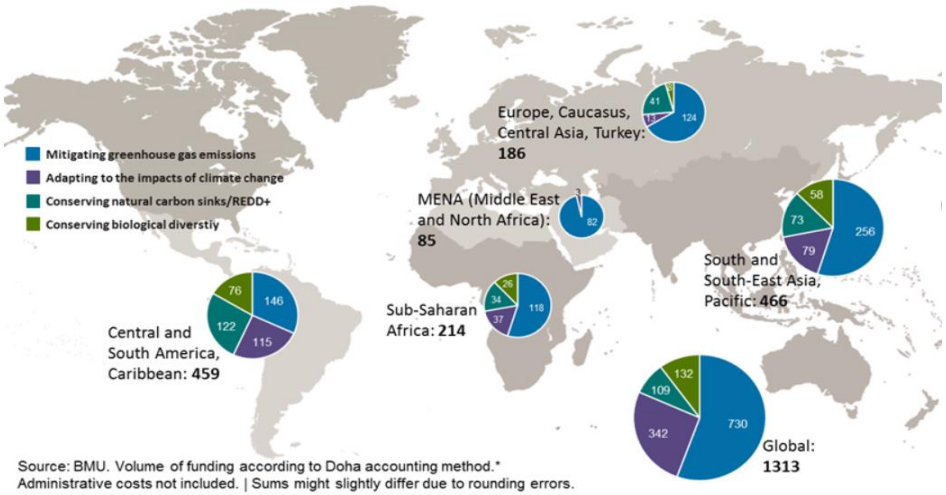
GERMANY'S INTERNATIONAL CLIMATE INITIATIVE - IKI

- Since 2008, the International Climate Initiative (IKI) of the Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU) has been financing climate and biodiversity projects in developing and newly industrializing countries, as well as in countries in transition

- The IKI is a key element of Germany's climate financing and the funding commitments in the framework of the Convention on Biological Diversity.

- The IKI funds projects in the following areas:
  - Mitigating greenhouse gas emissions
  - Adapting to impacts of climate change
  - Conserving natural carbon sinks with a focus on reducing emissions from deforestation and forest degradation (REDD+)
  - Conserving biological diversity

Level of IKI support according to region 2008-2017
(in million euros)



Source: BMU. Volume of funding according to Doha accounting method.* Administrative costs not included. | Sums might slightly differ due to rounding errors.

OBJECTIVES AND AIMS OF OUR PROJECT

TARGETED: Increase use of efficient or renewable energy-based heating and air conditioning systems in new multi-family residential buildings.

INCLUSIVE: Draw from insights from a broad range of stakeholders groups, from owners-occupiers to financial institutions, authorities, ministries, project developers, municipalities, utilities.

HOLISTIC: Develop technical, economic and political solutions and recommendations for all relevant stakeholder groups.

FORWARD-LOOKING: Build on project knowledge and prepare the ground for future collaboration to implement recommendations.

FROM BASE ANALYSIS TO DISSEMINATION

WP1: Macro economic base analysis

Selection of target countries for Phase 2

WP2: Support for the implementation of pilot projects

Demonstrate technical and economical feasibility of energy efficiency measures in pilot projects

WP3: Policy dialogue for energy efficiency measures in the building sector

Improve political framework for energy efficiency in buildings

WP4: Dissemination/Visibility

Impacts

- Increase of building energy performance standards
- Reduction of the energy import dependency, increase of energy supply security
- Benefits for private households through lower energy costs, healthier indoor climate
- Raising public awareness for climate relevant issues, supporting climate policies

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PROJECT METHODS & FINDINGS

ACCELERATING ZERO-EMISSION BUILDING SECTOR AMBITIONS IN THE MENA REGION

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4 JULY 2018

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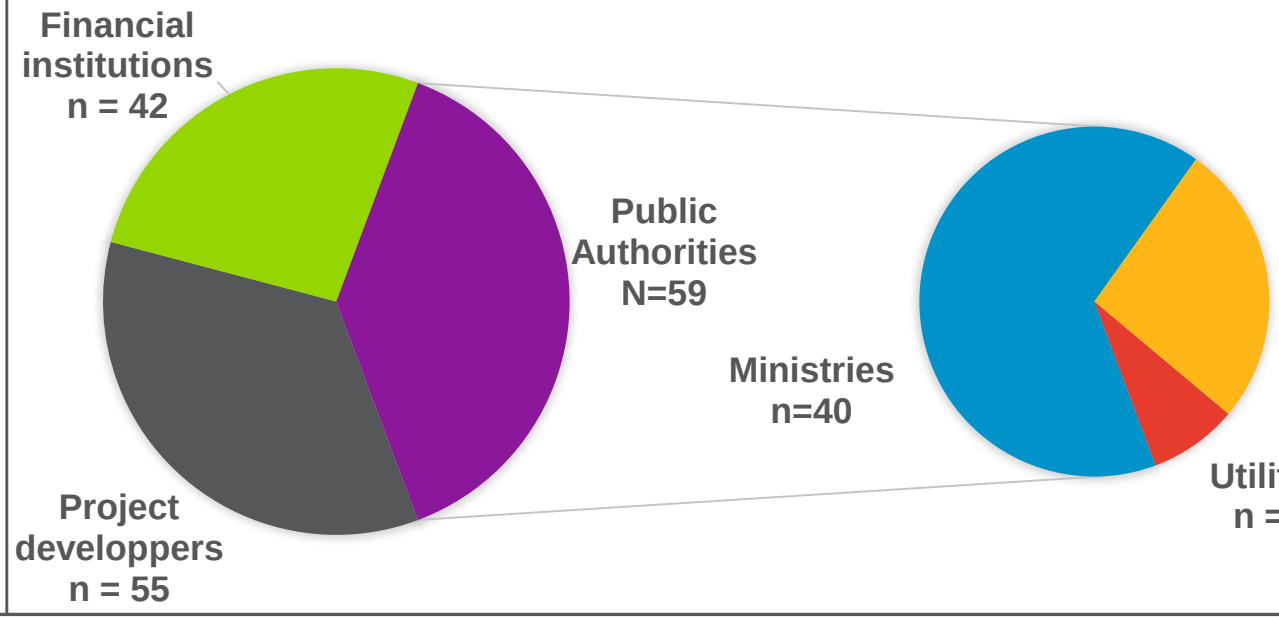
OVER 150 INTERVIEWS CONDUCTED BY PROJECT PARTNERS



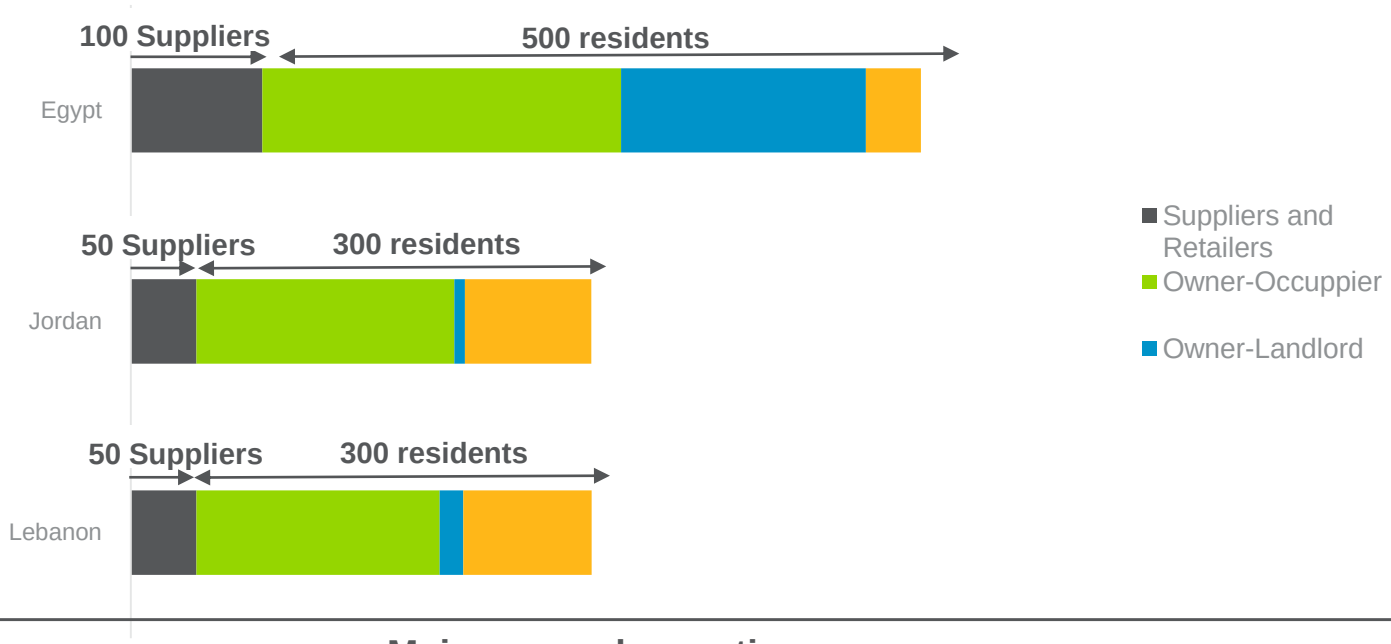
Main research questions

Context: What are the current heating and cooling technologies you are installing/supporting/permitting?

Barriers: What hinders you to install/support/permit higher efficient heating and cooling equipment?

Recommendation: How to accelerate ambitions for energy efficiency in heating and cooling?

1,300 SURVEYS CONDUCTED BY GFK, REVIEWED LOCALLY



Main research questions

Context: What are the current heating and cooling technologies you are purchasing/assembling/importing?

Barriers: What hinders you to purchase/assemble/import higher efficient heating and cooling equipment?

Recommendation: How to accelerate ambitions for energy efficiency in heating and cooling?

DEVELOPING POLICY RECOMMENDATIONS

DRAFT POLICY RECOMMENDATIONS

We welcome feedback to recommendations and will share fact sheets via email. Please feel free to contact us to share your insights and views!

Public authorities and Municipalities

PUBLIC AUTHORITIES CHALLENGES

Despite differences between Jordan, Lebanon and Egypt, overarching challenges identified for ministries, utilities and municipalities are similar across the region:

Electricity **tariffs** that are often not cost-reflective reduce the incentive for energy efficiency and the room for manoeuvre of the government and utilities.

Sometimes insufficient reflection of efficient heating and cooling as topics in **building codes** (e.g., lack of requirement to cover % of demand through renewables or efficient sources).

Lack of **capacities** (in terms of number of officers and training) to enforce existing regulation such as building codes, resulting high share of informal construction and poorly enforced codes.

Lengthy and sometimes cumbersome **permitting procedures**, lack of digitalization in the permitting process.

POLICY RECOMMENDATIONS

MINISTRIES, UTILITIES AND MUNICIPALITIES

Goal: **Reinforce the framework for energy efficiency in buildings and improve enforcement of existing regulation and permitting.**

Recommendations

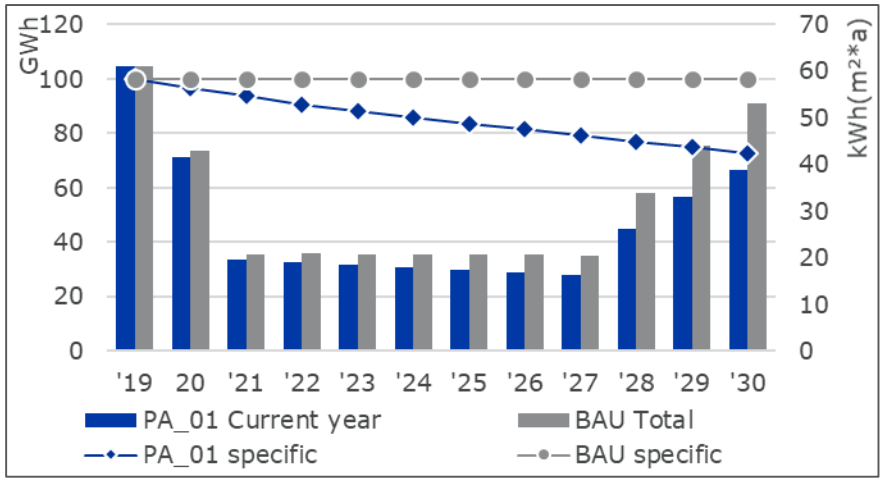
- **Improve** and evaluate existing building codes regarding the role of energy efficiency; where needed, fortify codes through additional requirements
- **Strengthen the capacities** of enforcing bodies through training and hiring.
- **Digitalize the permitting process** to close loopholes in enforcement.
- Introduce **benefits for developers and owners exceeding efficiency** requirements: accelerated permitting, greater floor space, improved loan conditions etc.
- Overarching: continue to work toward **subsidy phase-out**.

Expected Impact

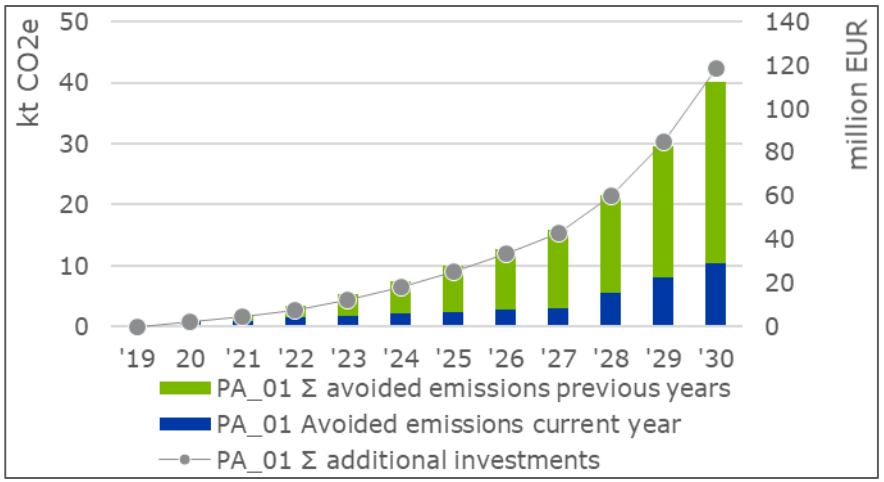
- **Higher overall standard** for efficiency required in new residential buildings (SWHs, PV) – rapid gains due to high construction rate.
- Better **enforcement of existing rules** to bring effective standard to the level of legal requirements.
- **Speed up permitting** for developers/owners and reduce risk of deviation from requirements.
- Provide **additional incentives** for energy efficient and/or renewables-based heating and cooling, beyond financial incentives

ENFORCE MANDATORY ENERGY PERFORMANCE STANDARDS (MEPS) FOR HEATING AND COOLING EQUIPMENT

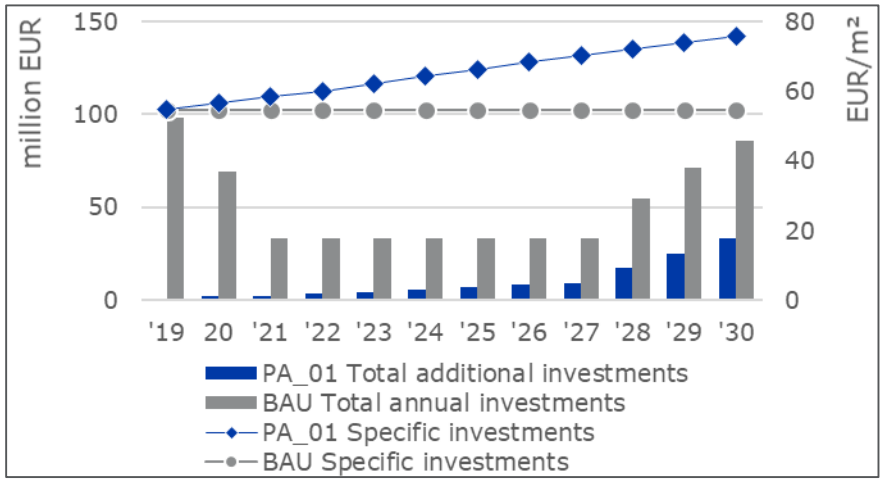
Total (left) and specific (right) final energy demand per year



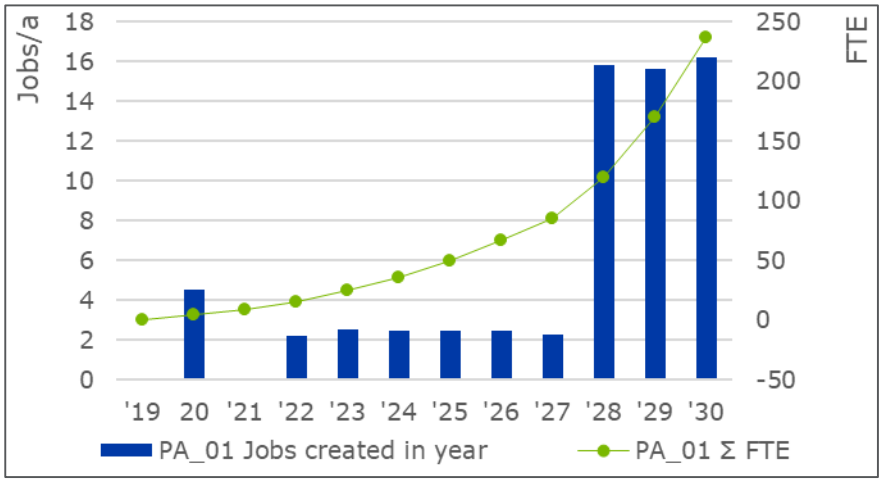
Accumulated avoided emissions and additional accumulated investments



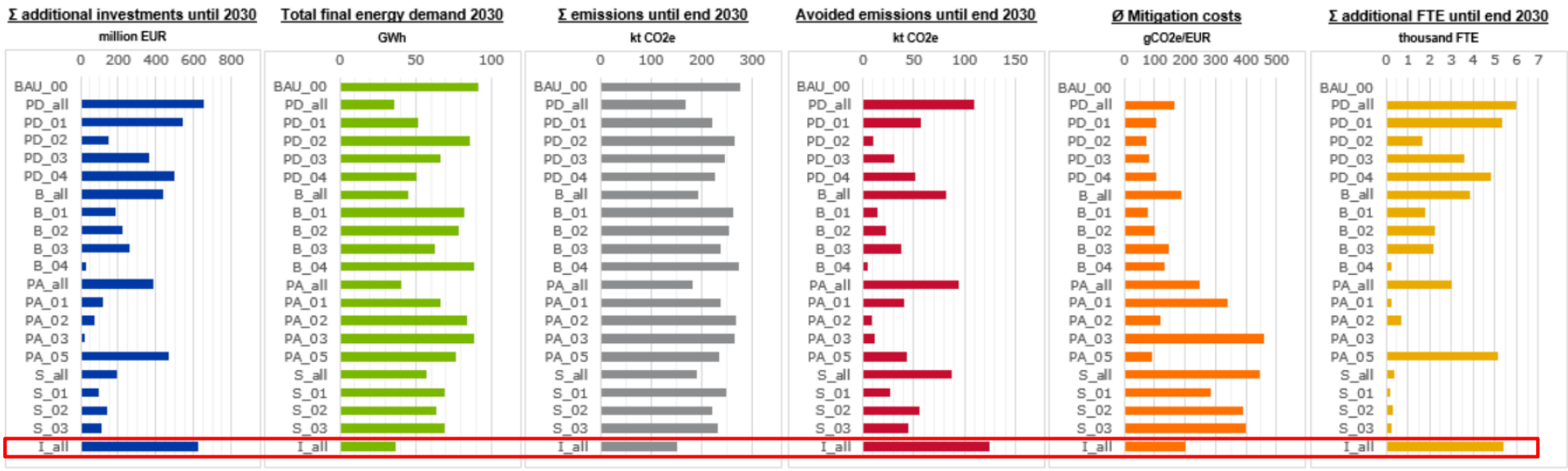
Total (left) and specific (right) investments per year



Newly created jobs per year (left) and accumulated (right)



OVERVIEW RESULTS LEBANON



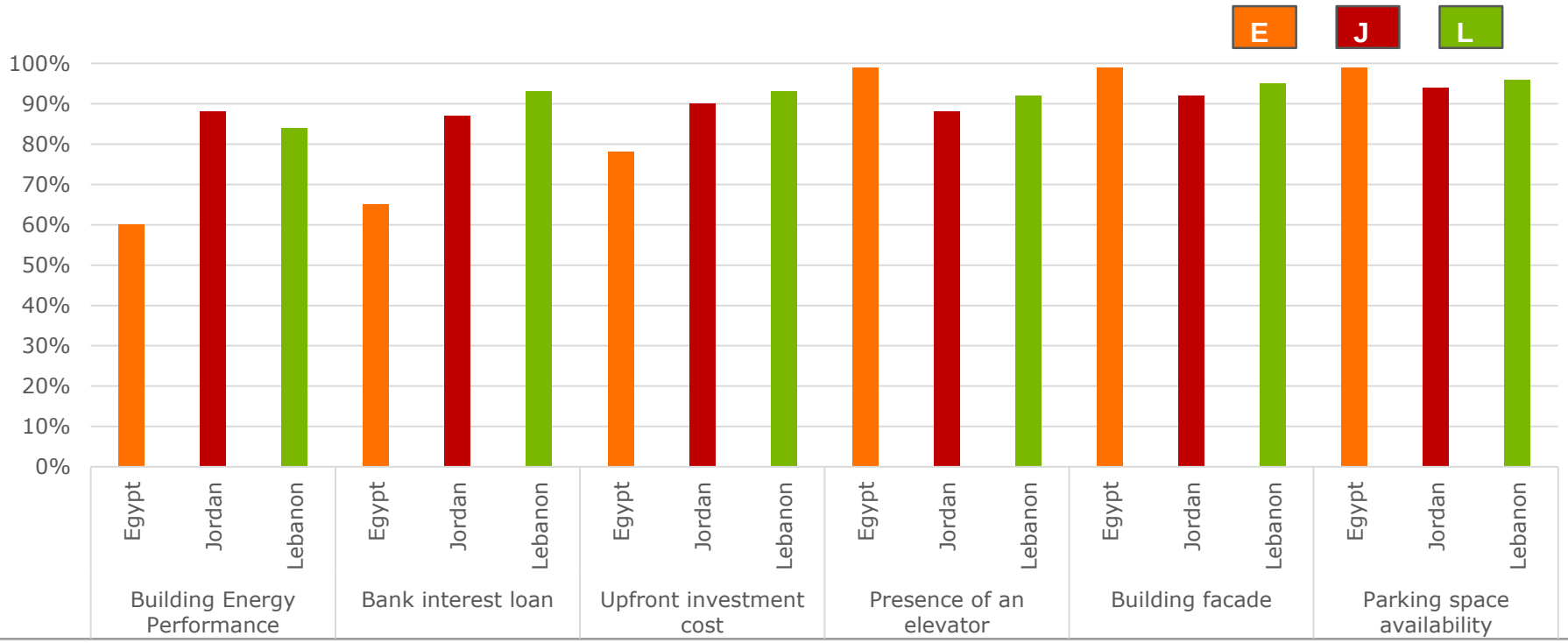
- A first indication of an integrated policy module shows potential final energy savings of ~60% and emission reductions of ~45%.
- This potential is realisable with additional investments of ~65€/m² new building floor space
- ~5,500 jobs can be created by 2030.

Owners/consumers & Suppliers and Banks

INVESTMENT PRIORITIES CAN DIFFER ACROSS THE REGION

- Parking space was the number one priority when purchasing a new house
- With very low energy prices in **Egypt**, Building Energy Performance had the lowest priority
- With existing financial support mechanism in **Lebanon and Jordan**, the bank interest loan was a relatively decisive factor in the owner decision to purchase a new house

GFK Consumer survey: Egypt (n=500), Jordan (n=300), Lebanon (n=300)

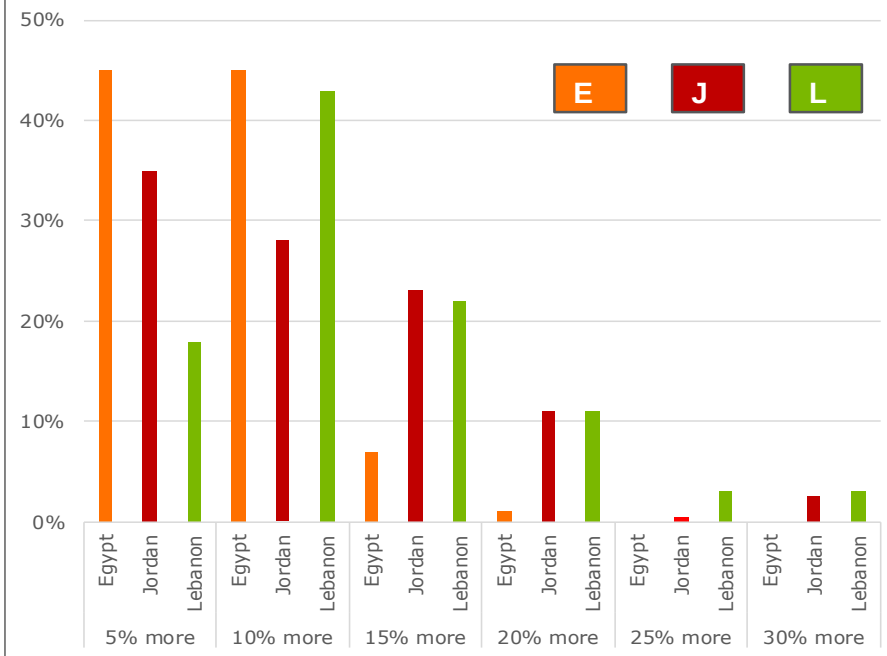


SIMILARLY TO THE WILLINGNESS TO PAY & WAIT FOR PAYBACK

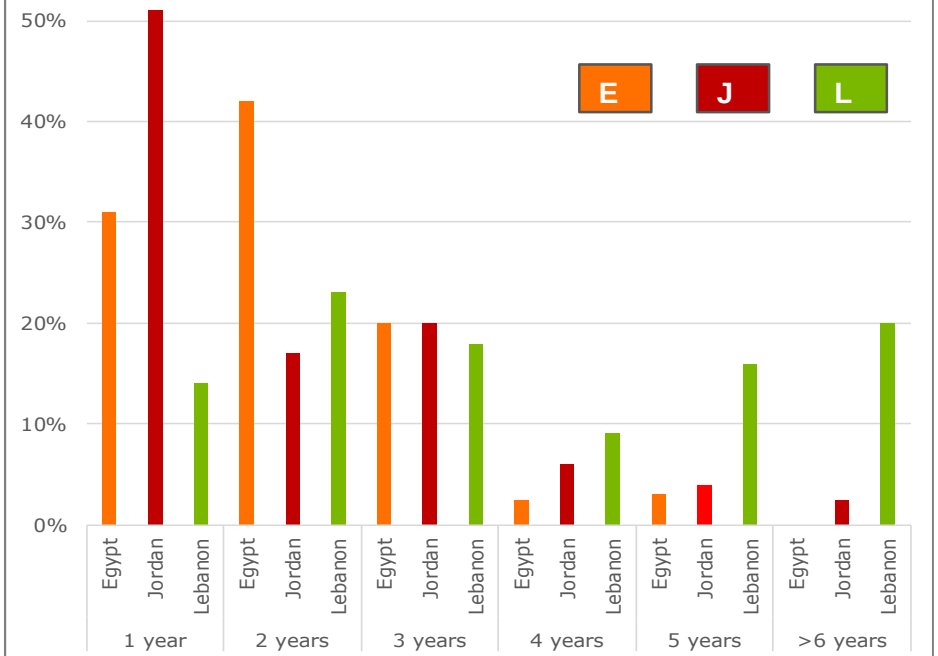
- With a margin for additional upfront investment of 10-20% and willingness to wait for payback of 3-5 years, market conditions for energy efficiency are good enough in **Lebanon**
- Low income & other spending priorities limit consumers in **Egypt and Jordan** to spend more than 5-10% and wait for more than 2 years to recoup the investment

GFK Consumer survey: Egypt (n=188), Jordan (n=194), Lebanon (n=161)

Owner willingness to invest more in EE heating & cooling



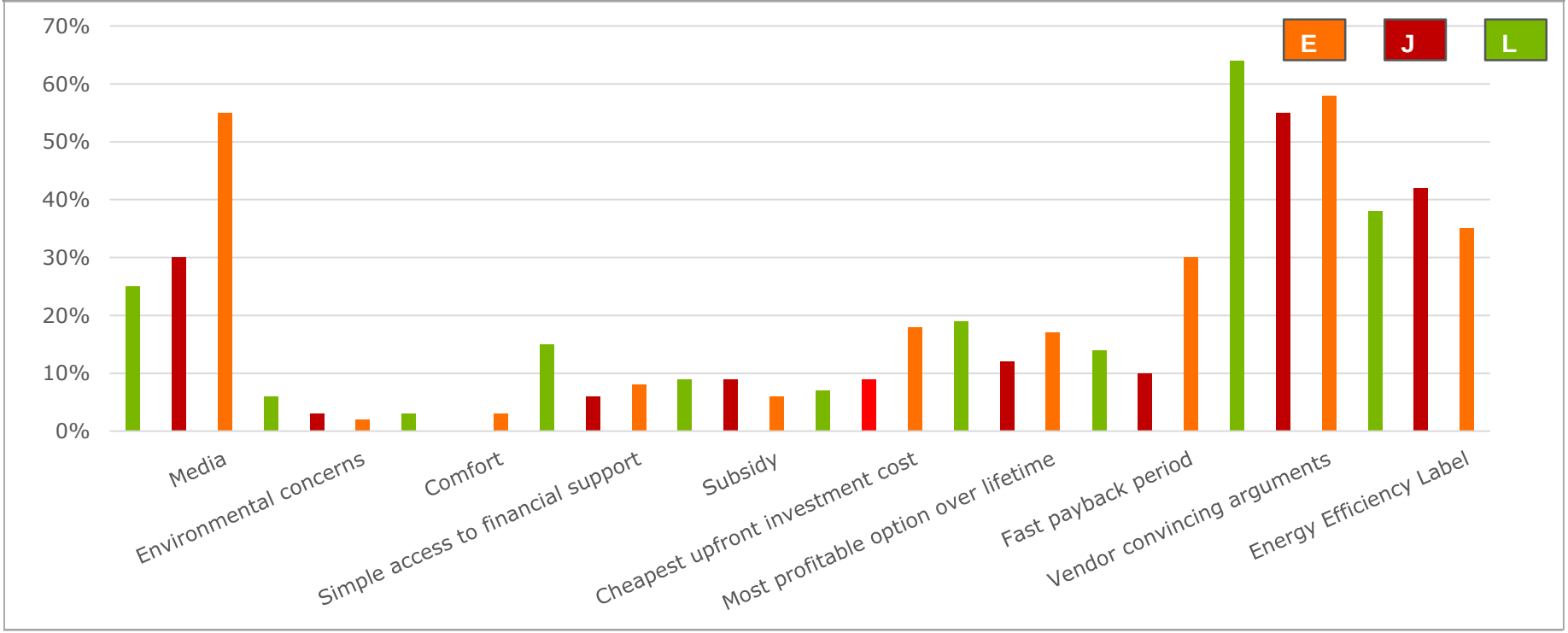
Owner willingness to wait for payback



THREE KEY DRIVERS TO INCREASE CONSUMER AMBITIONS

- Differences in energy prices and purchasing power in the region, yet drivers for higher energy efficient heating and cooling equipment were similar
- **Media, energy labels and convincing vendors** are decisive factors to trigger the demand side of energy efficiency products for consumers

GFK Consumer survey: Egypt (n=188), Jordan (n=194), Lebanon (n=161)



POLICY RECOMMENDATIONS

SUPPLIERS OF LEBANON, EGYPT AND JORDAN

Goal: **Incentivize local manufacturing and imports of energy efficient products and strengthen a) testing laboratory capacities b) sales expert capabilities**

Recommendations

- **Reduce energy subsidies** to increase consumer awareness on energy bill
- Enforce **mandatory energy performance requirements** for heating and cooling technologies, mandating the use of **energy labels** to guide the consumer in his purchase.
- Provide **financial incentives to suppliers importing energy efficient products** e.g. insulation, double glazed window, solar air collectors, high COPs AC/Chillers.
- Strengthen the **capacities of testing laboratories** and **supplier staff** through training and information.

Expected Impact

- **Shift in consumer mindset** from low to high awareness on energy spending
- **Eliminate the fear of suppliers in losing competitive edge**, ensuring same level playing field and a minimum level of energy efficiency in the market
- **Shift in government expenditure** from subsidizing energy consumption to energy saving
- Better **enforcement of existing rules** to bring effective standards to the level of legal requirements.

POLICY RECOMMENDATIONS

BANKS OF LEBANON, EGYPT AND JORDAN

Goal: **Provide financing options for energy efficiency and create awareness and greater demand for energy efficient heating and cooling**

Recommendations

- (Egypt) **Establish an Energy Efficiency Fund** to provide access to energy efficiency finance
- Share **best practice examples** nationally and internationally (MENA region)
- Provide **training** for financial institutions on energy efficiency financing.
- Increase **speed of approval** process
- (Lebanon) Provide **incentives to purchase an energy efficient house**, on the condition that project developer did not benefit from a NEEREA loan

Expected Impact

- Favorable conditions, such as low interest rates and long pay-back periods will **make energy efficiency investments economically viable**
- Training will enable banks to provide **innovative financing instruments, opening new markets, and reduce risks**
- **Increase demand and offers** for energy efficient buildings and technologies

OWNERS, SUPPLIERS, BANKS

CONCLUDING KEY RECOMMENDATIONS

Empower consumers through awareness, information and incentives

→ Media campaigns, Energy Labelling, Vendor training

Increase supply of highly efficient products through standards

→ MEPS, Testing labs, Financial incentives

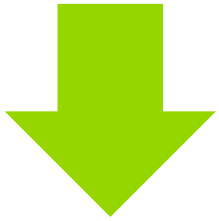
Create demand for financing instruments for energy efficiency

→ Energy Efficiency Fund, Best practice, Capacity building

Project Developers

OBJECTIVES OF WP2 – IKI PILOT PROJECTS

Understand the challenges/opportunities to utilize energy efficiency (EE) and renewable energies (RE) in buildings [“bottom up” analysis]



1. Determine the technical potential to conceive a nZEB (nearly Zero Energy Building)

2. Define financial feasibilities of EE/RE measures in the specific countries

3. Link the „bottom-up“ findings of pilot projects with the interviews of stakeholder group

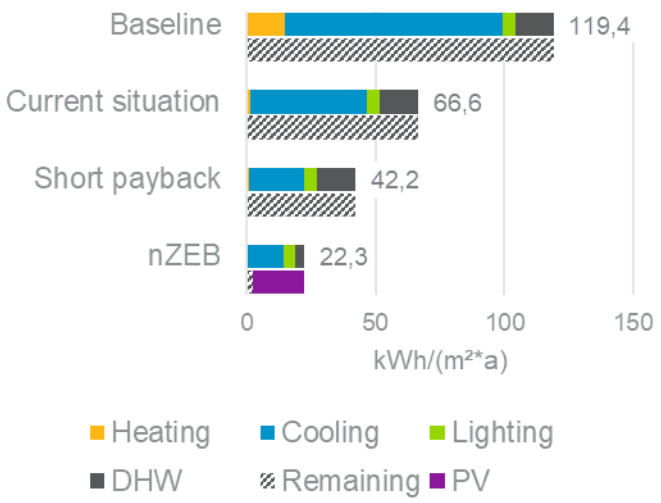
IKI PILOT PROJECTS - OVERVIEW

PRELIMINARY RESULTS – TECHNICAL POTENTIAL

Overview of the potential CO_2 Savings of the IKI pilot projects (PP)

PP	Low cost variant	nZEB variant
JOR 1		76%
JOR 2	29%	78%
LEB 1	17%	90%
LEB 2	37%	98%
EGY 1	6%	100%
EGY 2	58%	100%

Example of variants results



Simulations have shown that significant savings are technically possible, low cost packages are able to save in average up to 25% of CO_2 emissions. While nZEBs are able to save up to 76-100% CO_2 emissions.

PRELIMINARY RESULTS – ECONOMIC POTENTIAL

PP	Energy cost savings [%]		Incremental costs [%]		PBP [in years]	
	Low cost	nZEB	Low cost	nZEB	Low cost	nZEB
JOR 1		79%		7,8%		8,3
JOR 2	29%	78%	0,1%	3,1%	below 1	7
LEB 1	23%	89%	0,0%	6,0%	below 1	11,2
LEB 2	40%	100%	-0,8%	8,2%	below 1	10,3
EGY 1	10%	100%	5%	10%	4	12,6
EGY 2	58%	100%	1%	5%	below 1	16

Simulations have shown that significant savings are technically possible, low cost packages (PBP lower than 2 years) are able to save in average 30% energy costs. While „nZEB variants“ are able to save up to 80-100% energy costs, with an average PBP of around 15 years.

LINK INTERVIEWS WITH PILOT PROJECT FINDINGS

Goal: **Link the „bottom-up“ findings of pilot projects with the interviews of stakeholder group**

Identified barriers via interviews

1. Awareness

- Project developers do not consider the energy efficiency of heating and cooling appliances in their buildings (EGY/JOR).

2. Capacities

- Economic viability assessment are rare and simplistic, leading to sub-optimal decisions (ALL)
- Mandatory re-examination of engineers and architects to the reviewed energy efficiency code

3. Ownership

- Lack of responsibility and demand as apartment owners are in charge the supply system (EGY/JOR)

4. Financing

- Perceived high upfront costs and not known incentive programs (ALL)

Recommendations

1. Awareness

- Disseminate findings of pilot project results

2. Capacities

- Gather cost data and train staff on economic and technical assessment tools

3. Ownership

- Improve the building shell and raise awareness of energy efficient heating and cooling supply systems (for end user)

4. Financing

- Investigate cost-benefit analysis of PPs and inform yourselves on criteria´s of your national incentive program (LEB:NEEREA, JOR:JREEF, EGY: GEFF)

RECOMMENDATIONS – IKI PILOT PROJECTS

1. Technical

a) Reduce energy demand by implementing passive measures and high efficiency HVAC
b) Solar energy technologies are getting mature in the market
c) nZEB solutions are promising in all three countries

2. Financial

a) nZEB solutions could be financial attractive
b) Low cost solutions can save costs immediately or have PBP of lower than one year
c) Make use of available national incentive programs

3. Process

a) Select experienced project team
b) Gather investment cost data and elaborate low hanging fruits measures
c) Be frontrunner in sustainability and differentiate your portfolio with the offering of nZEBs

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MINISTERIAL PANEL

ACCELERATING ZERO-EMISSION BUILDING SECTOR AMBITIONS IN THE MENA REGION

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4 JULY 2018

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JORDAN
POLICY RECOMMENDATIONS: ROUNDTABLE RESULT

Draft Recommendation	Expected Impact
Mandatory re-examination of the knowledge of all mechanical and civil engineers regarding the Jordanian energy efficiency building code and introduction of 1-week trainings to update knowledge	**Fortify the missing link between** the Jordanian Energy Efficiency Building **code** and the **application** of the code
Computerizing permitting process and **enforcing severe penalties** for non-compliance in the design and construction phase at the level of **municipalities –** transfer best practice for incentives in GAM	**Fill the capacity gap** at the Order of Engineers to inspect applications and **revive responsibilities** of **municipalities** in enforcing law of order
Raise awareness of end-user on benefits of EE and **existing financial incentives** (JREEF)	**Increase market demand** for EE products triggering developers to adapt to customer wish
Establish an Energy Efficiency Council as a platform between governmental and non-governmental association	**Connecting the dots** between the different stakeholder in the public and private sector to ensure monitoring, verification and knowledge dissemination of EE measures in the country

Recommendations in order of importance following stakeholder round tables

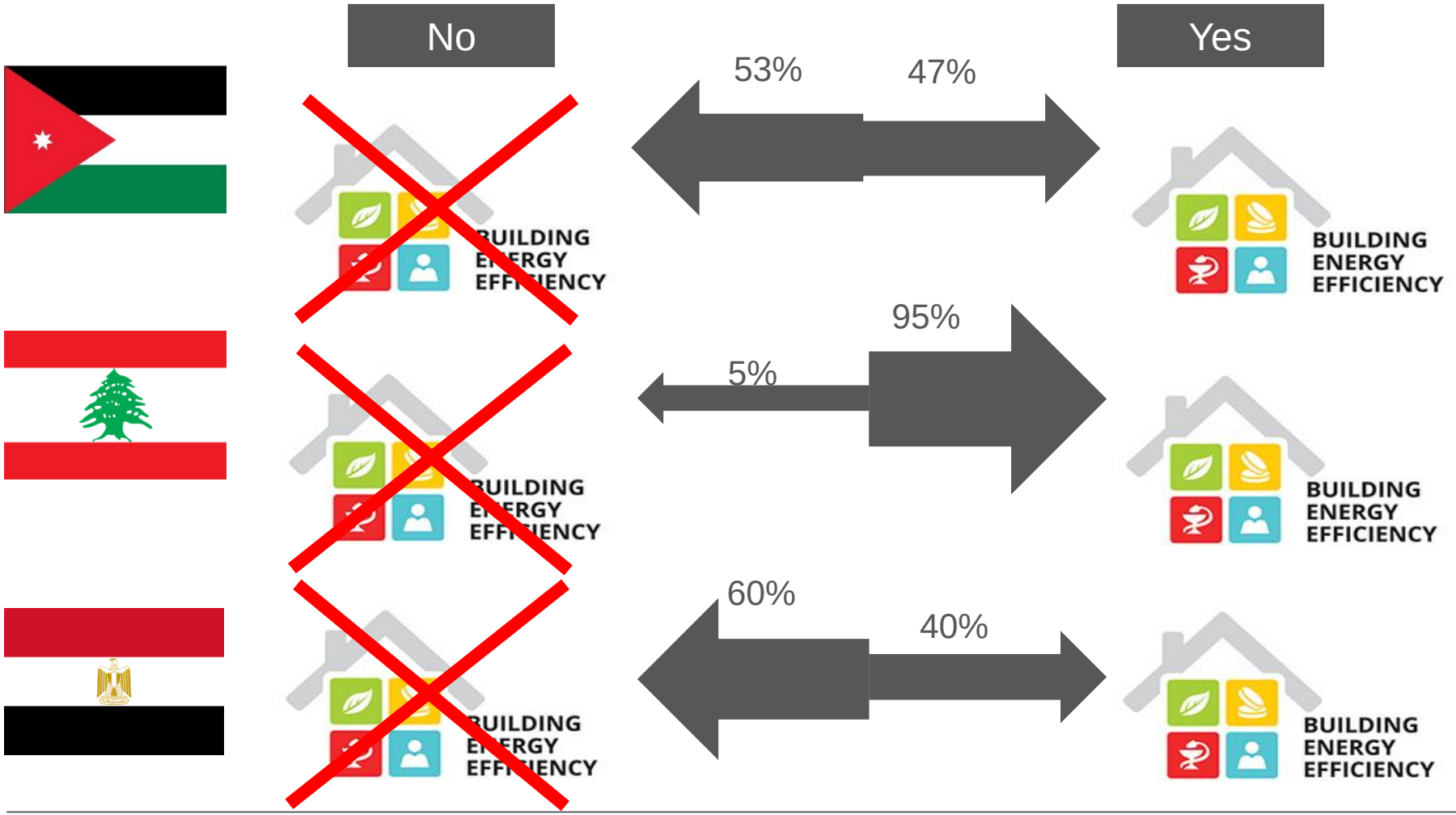
LEBANON
DRAFT RECOMMENDATIONS FOR ROUNDTABLE

Draft Recommendation	Impact
Gradually increase electricity tariffs to reflect cost of utility	**Reduce public budget spent on subsidies** and **transform the business case** of EE measures outside of Beirut from non-to profitable
Raise awareness of end-user on micro and macro benefits of EE and **extend financial incentives to the end-user**	**Increase market demand** for EE products in all income classes triggering any developers to adapt to customer wish
Computerize permitting process and **enforcing severe automated penalties** for non-compliance in the design phase	**Reduce irregularities** and weak enforcement hindering the market to move forward with EE solutions
Strengthen enforcement capacities of municipalities to inspect compliance of buildings in the **construction phase**	**Prohibit deviations** of project developers **from planning** which impact EE gain estimations and statistics in the country
Develop Solar Thermal Ordinance mandating engineers to integrate solar water heaters in their design in accordance to rooftop availabilities	**Boost local manufacturing of solar water heaters** resulting in social, economical and environmental benefits in the country

EGYPT
DRAFT RECOMMENDATIONS FOR ROUNDTABLE

Draft Recommendation	Impact
Create a regulatory framework for commercial banks to offer credit lines with low interest rates to manufacturers and end-users for EE&RE products	**Boost local manufacturing,** reducing costs of EE&RE products and driving customer market demand for local products
Increase **ambition of EE national targets** and roll out **strict implementation in public sector**	**Provide the market push to** increase the appetite of the private sector in investing in EE solutions
Development of a roadmap prioritizing the actions and responsibilities of public and private stakeholders in achieving the new EE target	**Increases transparency between stakeholders** and **enables accountability** for inaction in achieving the new EE target
Development and **implementation** of a **benchmark system** for the building inventory	**Provision of standards** for developers to benchmark their design to a baseline
Incentivize project developers to opt for EE solutions, e.g reduction cost of land, tax benefits, increase of floor to area ratio in new buildings	**Boost business case of EE solutions** in the country
Improve permitting procedure for EE buildings by offering premium service in a one stop shop and fast processing of applications	**Boost implementation of EE solutions** in the country

DO PROJECT DEVELOPERS CONSIDER THE ENERGY EFFICIENCY OF HEATING AND COOLING APPLIANCES IN THEIR BUILDINGS?



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ECONOMIC VIABILITY ASSESSMENT ARE RARE AND SIMPLISTIC, LEADING TO SUB-OPTIMAL DECISIONS

Economic Assessment

80% 20%

Static payback period

0%

Net Present Valuation

Economic Assessment

40%

30%

Static payback period

Net Present Valuation
(NEEREA obligation)

30%

Economic Assessment

50% 40%

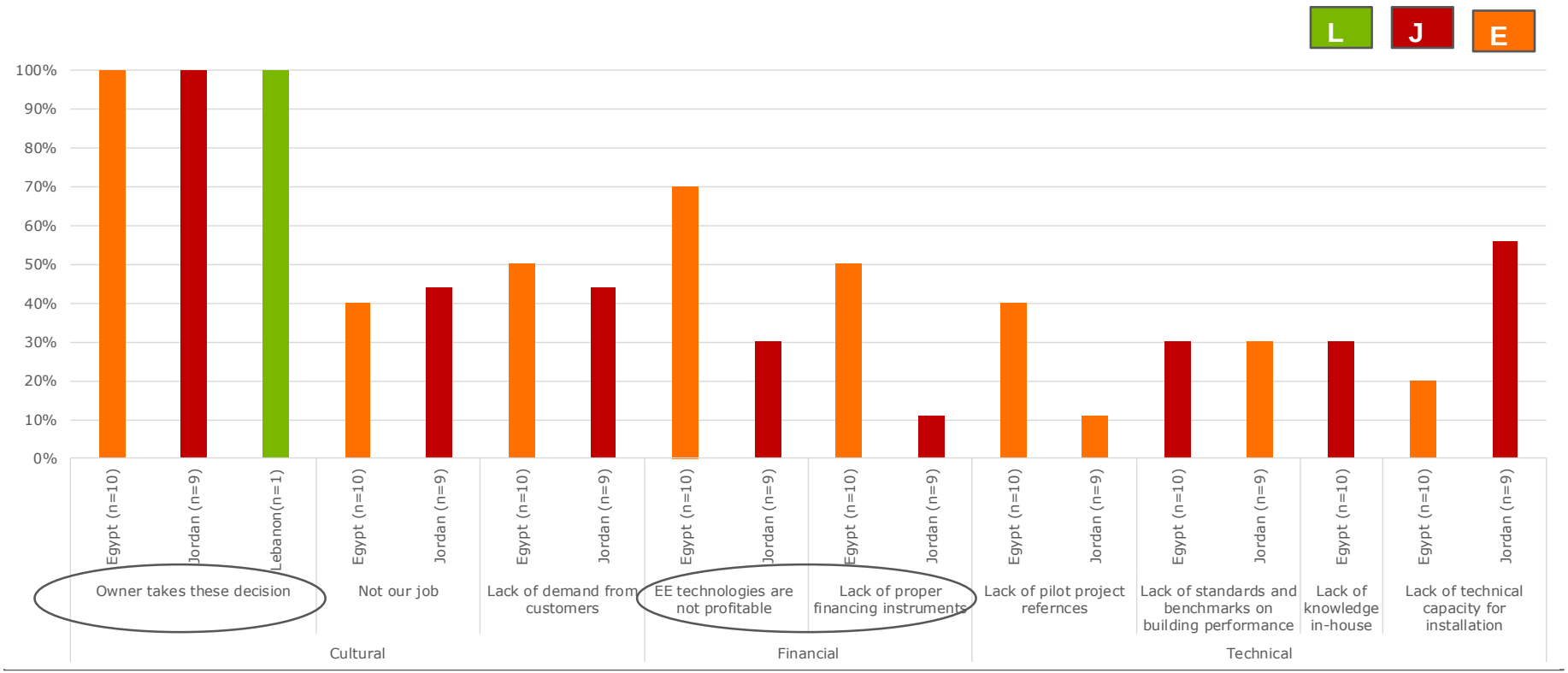
Static payback period

Net Present Valuation

10%

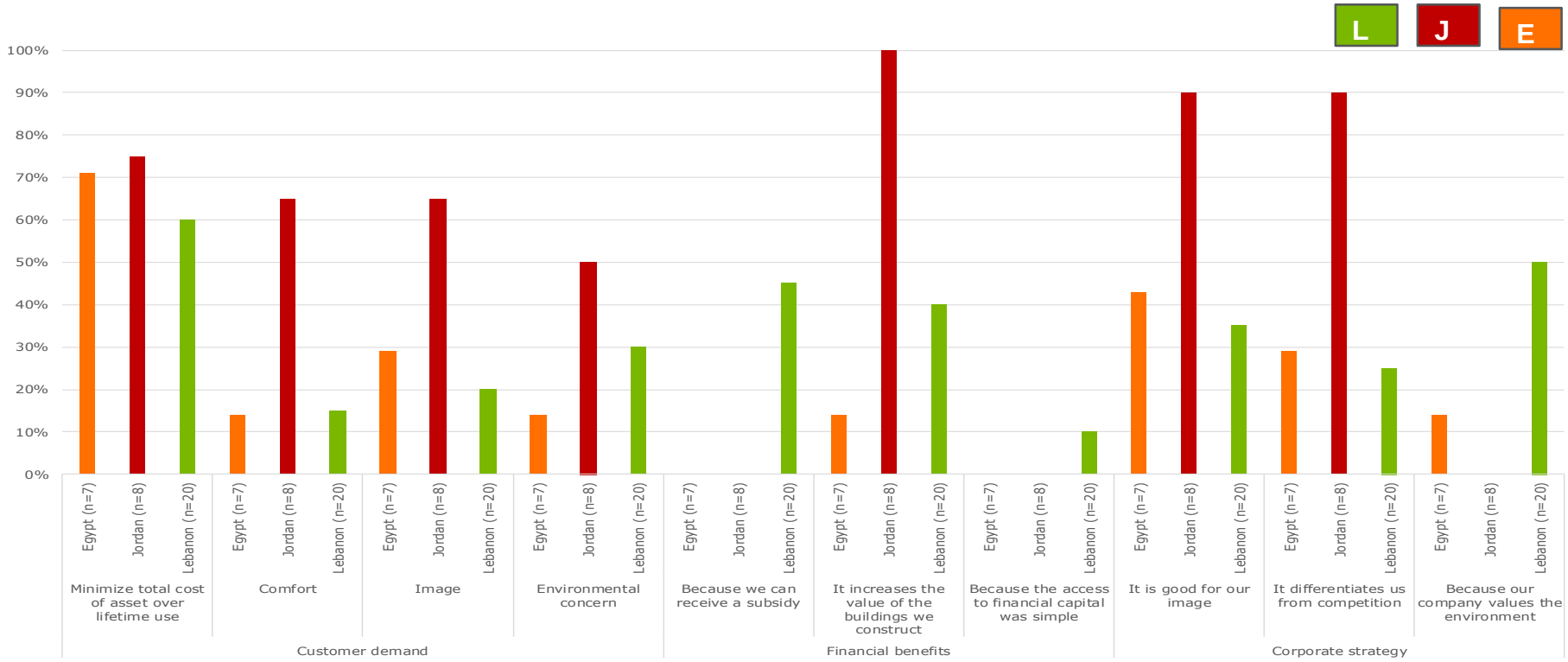
LACK OF RESPONSIBILITY AND DEMAND: BARRIERS FOR PROJECT DEVELOPERS

- Decision lies with owners, recommendations more often given in Lebanon
- low energy prices & lack of financing instruments in Egypt, business case for EE is weak
- Financial barriers are least apparent in Jordan, but technical knowhow is lacking
- Financial conditions and technical knowhow in Lebanon are reap for EE technologies



FINANCES AND IMAGE: DRIVERS FOR PROJECT DEVELOPERS VARY ACROSS COUNTRIES

- Most Lebanese project developers see NEEREA loans as main drivers
- Financial incentives also important in Jordan (JREEEF)
- Image more important comparatively in Egypt
- Cost of asset minimization relatively strong factor across countries



ENERGY CHALLENGES IN JORDAN, LEBANON AND EGYPT

	Energy System	Economics	Building stock
Status Quo	**Dependency on fossil fuel imports** (30%-97%) **High demand growth** (3%/a – 10%/a) **Old infrastructure and insufficient generation**	**Debt to GDP:** (95%-150%) **Energy subsidies** (8%-17%) GDP **Electricity price** 3-15 c€/kWh	**Share in electricity** 30-50 % (residential) **New construction** 2.6%/a – 5%/a **Heating & cooling** 50-60% in consumption
Challenge	**Volatility of oil prices** can drain state budget Very **fast demand growth** (+refugees) **High risk shortages**	**Loss making utility** (~1–3 billion €/a) **Struggle to improve public services** **Low purchasing power**	**Very high urbanization rate** (> 10,000 p/km^2) **Low willingness** to further spend on housing **Rising living standards**

