



RESTORING AND EXPANDING ENERGY ACCESS IN FRAGILE AND CONFLICT COUNTRIES THROUGH DECENTRALIZED SOLAR SOLUTIONS

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Context of Resilience in Crisis: Case of Yemen where access to electricity has precipitously declined since the outbreak of the conflict, from an already very low level

**Fuel consumption
for electricity
2014→15**



**Access to regular
public electricity supply
(% of population, estimated)**

55% → 10%

2014

2016

Findings: Lessons learned from past experience and the current status of the sector suggest that the Bank needs to **rethink engagement approach**

Retrospective of WB engagement in Yemen during 2000-2015

Assessment of current status of energy sector

Analysis of different institutional options for reengagement

- **Mismatch** between the Bank's expectations & advice and the sector's implementation capacity in the past
- **Focus on large-scale electricity infrastructure yielded limited tangible results** despite \$90m in lending since 2006
- **Distributed infrastructure investments** by the public sector worked slightly better (though also not as anticipated)

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- **Building large-scale power sector infrastructure within the existing limited institutional framework not feasible** due to security situation and institutional capacity
- In-conflict engagement should **prioritize private sector or community-led implementation in first phase**
- **Rebuilding the national electricity infrastructure** should be pursued in phased approach, from smaller to larger investments building on local institutions

Findings: While public supply collapsed, a sprawling supply chain for solar has emerged to fill the gap, one of the few bright stories in today's Yemen

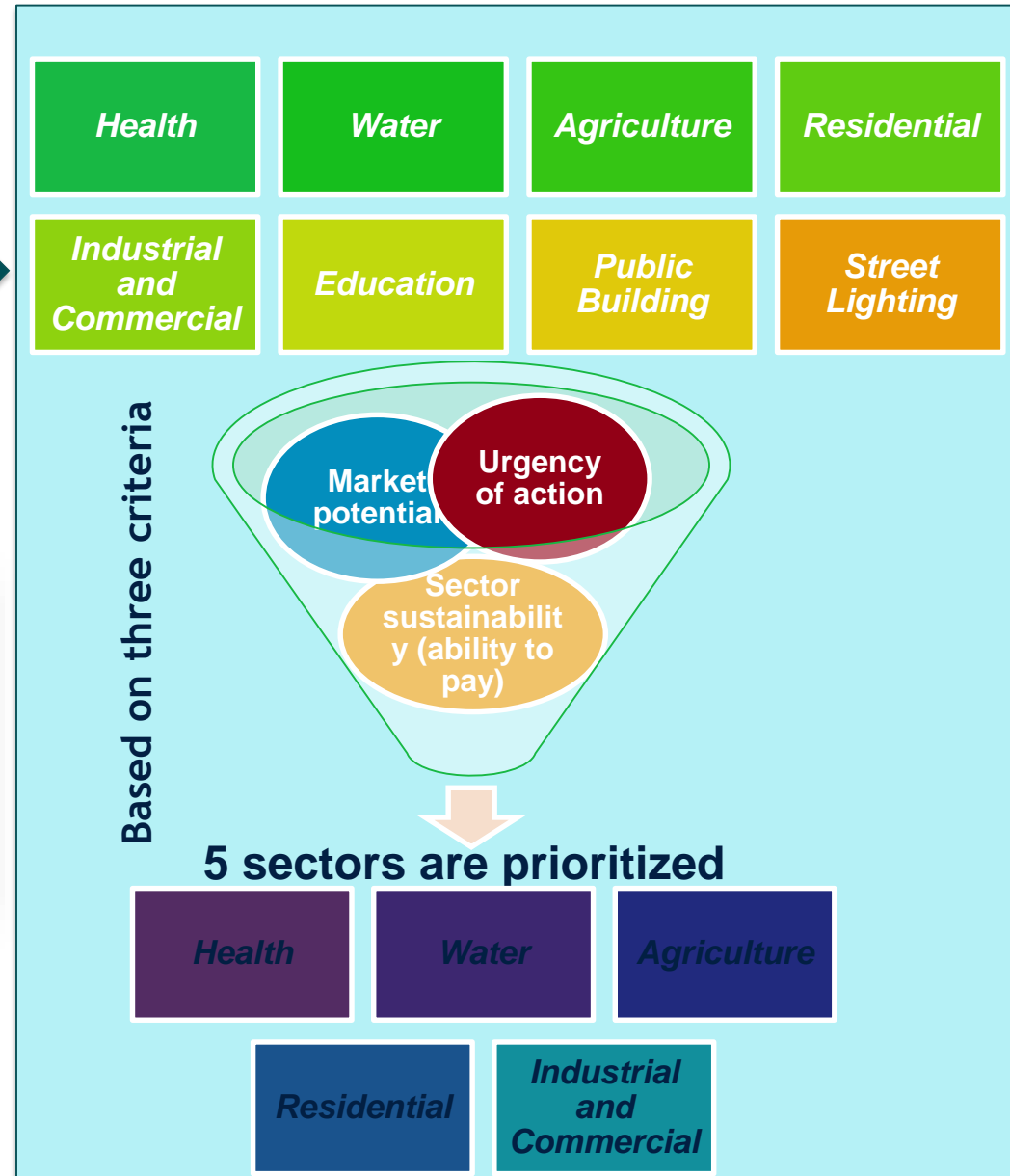
	Analysis	Finding
Phase I	<p>On-the-ground assessment of recent developments in Yemen's solar PV sector since the onset of the conflict</p>	<p>>US\$200 million per year investment in residential off-grid sector since outbreak of conflict</p> <p>Private sector-owned supply chain, from large trading houses to electronics retailers</p>
Phase II	<p>Identification of sectors with highest potential to benefit from solar energy</p> <p>Analysis of business models for rolling out solar programs</p>	<p>Households, health, WASH, agriculture would benefit most from solar energy</p> <p>Access to finance key barrier</p> <p>Technical quality a concern</p>

Prioritize sectors for DRE based on speed and development footprint

To provide a reliable foundation for this study, *eight sectors* have been investigated, of which *five sectors* were prioritized based on a defined set of criteria.

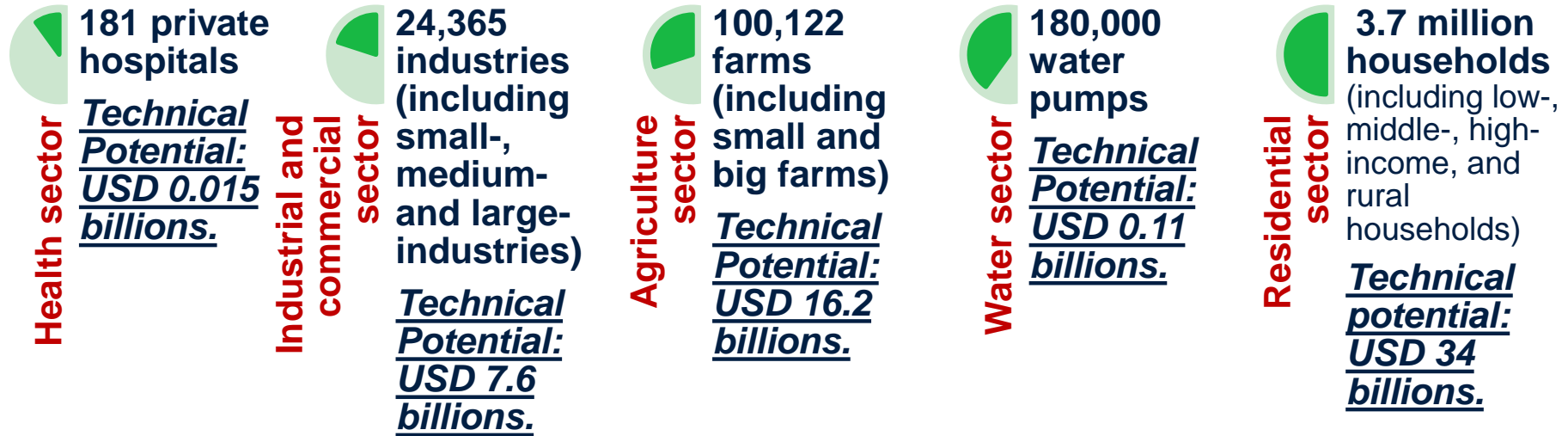


Shops selling PV systems in the Yemeni capital, Sana'a. Source: RCREEE



Followed by break up of potential amongst each of the sectors

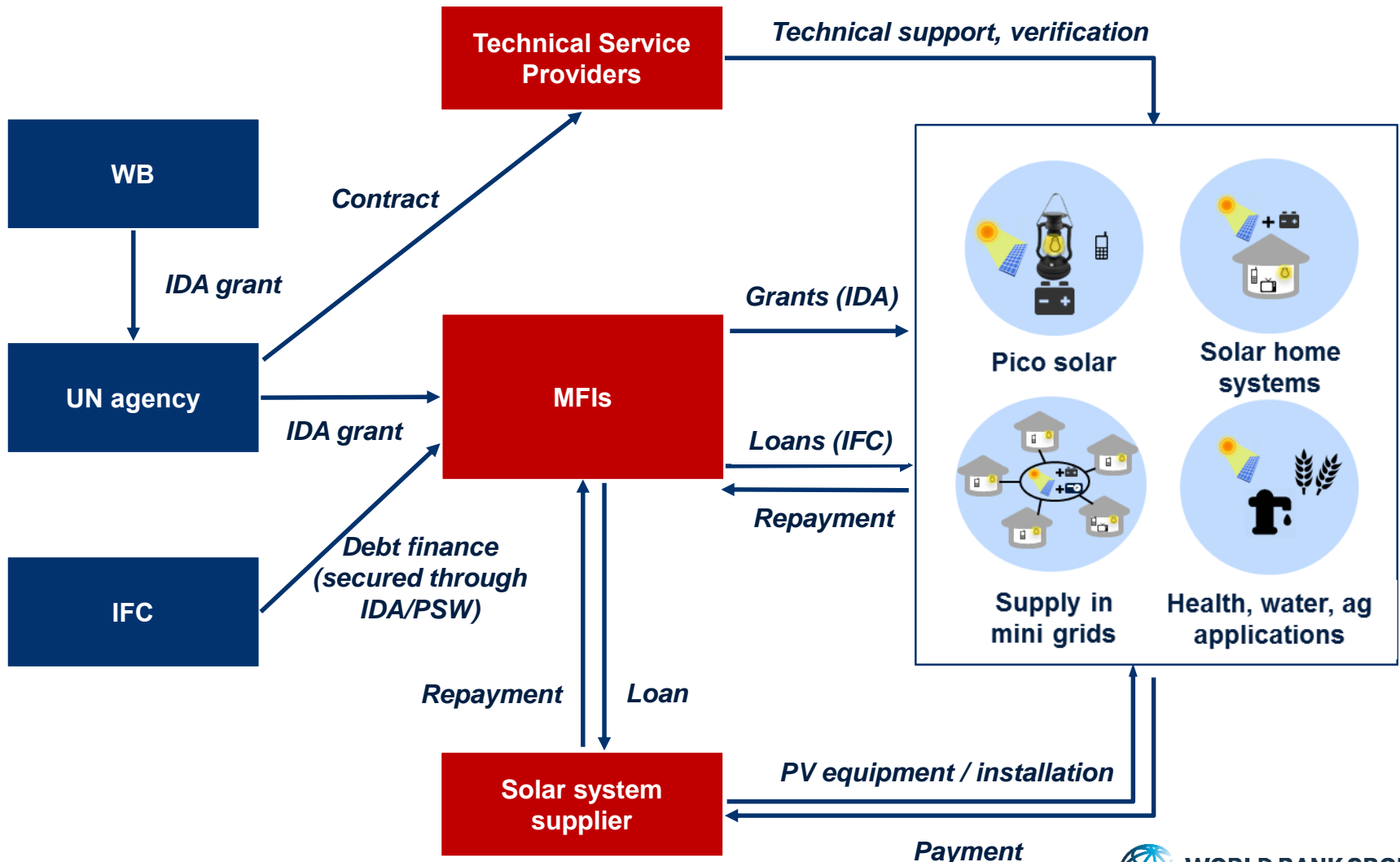
In terms of market potential, as it is of paramount significance, there are:



- The analysis shows that the technical potential of solar PV market in various sectors in Yemen could trigger a multibillion market, sustaining the PV business for at least two decades to come.
- Additional benefits would be the large job creation potential (solar PV suppliers, technical experts, capacity building, maintenance and operation, etc.) and the consolidation of the sector's value chain.

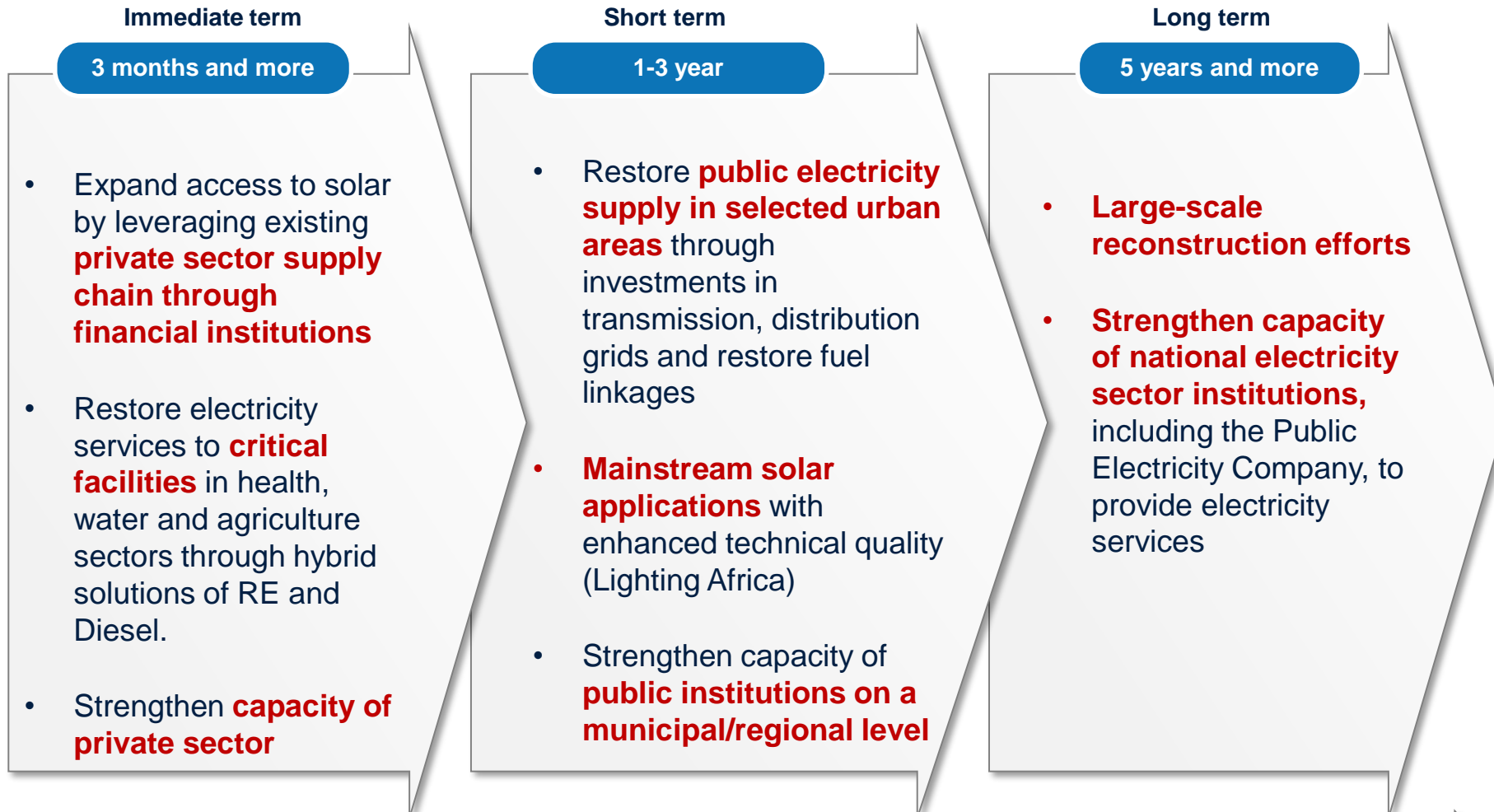
Sustainable Institutional Model for provision of DRE in case of Yemen :

Proposed emergency intervention aims to support private-sector owned solar solutions through financial intermediaries



Intervention for DRE to be part of Sector wide Resilient Strategy:

Phased approach to re-engagement, gradually moving from decentralized solutions to restoration of national grid and institutions



Restoring, expanding, and sustaining energy access as part of the reconstruction and recovery of Yemen's economy

Need to redefine energy security for Fragility, Conflict and Violence prone nations with Decentralized Renewable Energy as Energy Backbone

Need for a radical rethink on need for traditional large generation plants based grid across FCV countries : DRE facilitates decentralized solutions in provision of energy that g

DRE provides a reengagement through the private sector and financial institutions, that is job intensive

Start with countries with low resources base of oil and gas (like Yemen), but economic rational increasingly stronger for other FCV countries like Libya and Syria?

Thank you! شكراً

