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# Republic of Yemen

## Restoring and Expanding Energy Access

### Power Sector Reengagement Note

June 2, 2017

GEE05

MIDDLE EAST AND NORTH AFRICA



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## Acronyms

ACG	Arab Coordination Group
DNA	Damage and Needs Assessment
EU	European Union
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
HFO	Heavy Fuel Oil
IsDB	Islamic Development Bank
kW	Kilowatt
kWh	Kilowatthours
MEE	Ministry of Electricity and Energy
MENA	Middle East & North Africa
MW	Megawatt
PCNA	Post-Conflict Needs Assessment
PEC	Public Electricity Corporation
PMU	Project Management Unit
PWP	Public Works Project
REAP	Rural Energy Access Project
SEDF	Small and Micro Enterprises Development Fund
SFD	Social Fund for Development
SMEPS	Small and Micro Enterprise Promotion Service
UN	United Nations

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## 1. Background

1. **Already before the conflict, much of Yemen's population was deprived of basic electricity services.** Even before the conflict, Yemen was considered the least electrified country in the MENA region, with a pre-crisis access rate from all sources of only 55 percent. The country's per capita electricity consumption stood at 243 kWh in 2013, almost one-sixth of the regional average (The World Bank Group, 2016). Electricity supply and demand were seriously out of balance. Installed generation capacity was about 1,300 MW in 2015—20% short of peak demand—giving only about half the population access to (often unreliable) electricity. The remainder of the population lacked any form of electricity access, with severe consequences for socioeconomic development and poverty.
2. **There had been little progress in the electricity sector over the last decade.** The sector made little progress on improving operational efficiency and quality of service or in reducing high electricity losses, while costing the country over 10 percent of its GDP annually through direct and indirect subsidies (The World Bank, 2013). The country was neither getting the affordable, reliable and sufficient electricity needed to power economic growth, nor was it able to sustainably increase electricity service to more rural areas for poverty reduction. No major infrastructure was completed in the electricity sector since the gas-fired Marib power plant, which was contracted in 2005 and came online in 2009 (The World Bank, 2013). With the exception of the Marib plant, all electricity was generated by old and inefficient HFO/diesel fired plants owned by the Public Electricity Corporation (PEC) and small diesel units contracted through short-term rentals with the private suppliers. In 2010, HFO and diesel fired-power plants accounted for about 70 percent of grid-connected generation. In addition, there are millions of small diesel units owned by industry, commercial establishments and households to combat the frequent blackouts of the lack of access to the grid-connected electricity. The key feature of the HFO/diesel dominated power generation systems is the associated high electricity costs and heavy pollution. Despite an average consumer tariff of about US\$8 cent/kWh, which is higher than the consumer prices in most MENA countries, revenues covered only about 25 percent of the economic cost of supply. Even in Sana'a, the service quality was poor with typically 2-3 outages per day for over 4 hours. Most of the grid-connected consumers in other parts of the country suffered from more frequent daily load shedding of longer hours (The World Bank, 2013).

## 2. Conflict-related damages and challenges

3. **The ongoing conflict has significantly worsened the electricity supply situation from an already low level, with severe impact on health, education, water and sanitation, and the private sector, which all rely heavily on a functioning power supply.** As documented in the World Bank's Damage and Needs Assessment (DNA Phase I) and the multi-agency DNA (World Bank, UN, EU and IsDB), the ongoing conflict has significantly impacted Yemen's electricity infrastructure and cut off most of Yemen's population from PEC's services. Public electricity supply has been completely shut down in most populated areas and PEC has become virtually bankrupt. The current supply of public power capacity is averaging 200–250 MW, most of which is supplied to the port cities Aden and Al-Mukalla in the South (PEC, 2015). The capital Sana'a, which has a demand of around 500 MW, is barely supplied by 40 MW for a few hours a day (The World Bank, 2016a). The rest of the country, including the port city Al Hodeida, is lacking access to any reliable public energy services. Using fuel sales to electricity plants as an indicator, total power generation in 2015, including from PEC and private generators, dropped by 77 percent compared to 2014 (MOPIC, 2016).
4. **The top-down model of service delivery has been replaced by a combination of locally managed urban public services and a private-sector driven bottom-up model.** The almost complete collapse of public electricity supply and limited fuel availability for diesel generators has spawned a booming industry for small to medium-scale solar systems, especially since 2015. A recent market assessment commissioned by the World Bank estimates that over the last five years, around 1 billion USD has been invested into solar PV systems for the residential sector in Yemen. Based on interviews, the report estimates the market penetration of PV systems may have reached up to around 50% of households in rural areas and 75% in urban areas. The market is entirely driven by the private sector, with a supply chain that ranges from trading houses that import panels, control units and batteries from the GCC to small-scale electronics retailers that expanded their business to solar panels. In the capital Sana'a alone, over 170 such retailers registered with the Government to enter the solar market over the period 2014 to 2016. While a supply shortage limited growth until the second quarter of 2015, prices have come down significantly since Q3 2015 as supply has caught up with demand (RCREEE, 2016).
5. **The poor have limited access to solar so far, and there are concerns about the quality of the installed technology.** The market assessment found that almost all systems are paid in cash and that debt finance is not readily available to most households. While several financial institutions offer loans for solar systems, these are often mainly targeted at government employees and costumers able to provide guarantees. This suggests that access to solar is so far limited for the lower quintiles of the population,

especially in rural areas. Furthermore, the market assessment many household solar installations suffer from high failure rates due to improper system design, poor quality components, and a lack of after-sales service. Households that gain access to electricity through solar are thus at a risk of losing it again in case the system fails (RCREEE, 2017).

### 3. Lessons learned & key principles for reengagement

6. **Because the limited functionality of the energy sector has severe consequences for other sectors and the overall Yemeni economy, restoring electricity supply will be a priority for any in-conflict or post-conflict engagement.** Reestablishing access to electricity will be a highly visible contribution to restoring public service delivery and critical for restoring peace and revitalizing economic activity. Moreover, it is likely to contribute to a decrease in productivity, deterioration of the business environment, and reduction in the country's gross domestic product. Assisting Yemen early on in the reconstruction of Yemen's electricity system will lay the foundation for long-term engagement to improve governance and resilience in the energy sector, support to livelihoods' stabilization and recovery, and expand access to sustainable energy.
7. **A recent review of the World Bank's interventions<sup>1</sup> over the last 15 years in the energy sector concluded that alternative models for procurement and/or project implementation may be needed for in-conflict or post-conflict interventions.** The World Bank's interventions over the last 10 years in the energy sector have been largely unsuccessful, in part due to what turned out to be a mismatch between the Bank's strategy and the governance and institutional capacity in Yemen (The World Bank, 2016b). Progress was sluggish despite significant lending made available and technical assistance to the PMUs in the form of engineering consultants hired to support decisions and the procurement process. The current conflict has led to further weakening of the sector institutions, fragmentation of institutional authority and deteriorated capacity. The development of the sector more broadly mirrors the Bank's experience, with only one power plant constructed over the past 10 years (The World Bank, 2016c). There are four overarching lessons:
  - a. **Any new intervention needs to be grounded in a deeper understanding of the institutional capacity to implement and the political economy of the sector.** Most recommendations of previous analytical assessments turned out to be out of sync with the Government's implementation capacity and failed to take into account diverging interests between ministries (e.g., in the case of gas-to-power).
  - b. **Building bulky, large-scale electricity infrastructure in Yemen within the existing institutional framework is close to impossible.** The World Bank's strategy in Yemen's electricity sector in the past decade had been to finance large-scale, public-sector owned infrastructure jointly with other donors, including from Gulf

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<sup>1</sup> The Bank approved three IPFs with a total volume of US\$90mn between 2006 and 2012. Disbursement for all three projects was very slow as decision making in the sector institutions, especially in procurement, took much longer than expected. None of the projects delivered much in terms of measurable outcomes.



States, the European Union and international finance institutions. However, even before the conflict, the main public institutions in the energy sector, specifically PEC and MEE, did not have adequate institutional capacity to implement large investments with multiple contracts in a timely manner even before the conflict. Progress was mainly hindered by: limited capacity of sector institutions to prepare financeable projects; inability to make timely procurement decisions; and poor execution and supervision of contracts. In all likelihood, the situation has worsened since the outbreak of conflict.

- c. **New, project-specific public sector institutions created for the purpose of infrastructure development were no panacea.** Examples of such new public sector institutions in the energy sector include institutional vehicles created for implementation of the Rural Energy Access Project (REAP) (The World Bank, 2009) and the Mocha Wind Project (The World Bank, 2014), which faced the same capacity and procedural constraints as PEC and MEE.
  - d. **Distributed infrastructure investments, while also not as successful as anticipated, tended to work better.** The distribution grid component of the Power Sector Project, managed by the regional offices of PEC, was the only component of the project that showed some (limited) results (The World Bank, 2016c). Community-led ownership and management of energy infrastructure, e.g., as attempted under the REAP, can improve responsiveness to local needs but there is no one-size-fits-all institutional model that works across all communities in Yemen. Under such an arrangement, the learning process that is needed to adapt models to local circumstances may slow down a rollout to a national level. No Bank investments directly supported the private sector.
8. **This means that there may be a need to explore alternative models of procurement and financing energy infrastructure investments.** Any alternative institutional options for project management should adhere to the following principles:
- a. **Simplicity.** In view of the limited government capacity – and institutions that make very little use of the capacity that does exist – complex institutional arrangements are unlikely to work. If a set of options is pursued in parallel, the portfolio of options has to be assessed in aggregate so as to not overburden the Government.
  - b. **Flexibility.** Interventions should seek to map institutions to solutions, rather than pursuing a one-size-fits all approach. Rigidity should be avoided to ensure the institutional arrangement can be adapted to changing realities on the ground.

- c. **Service delivery.** Interventions should focus on critical public services, including health services, water supply, street lighting, electricity and fuel supply and schools.
- d. **Pro-poor.** Interventions should prioritize services that target poor urban households and rural communities.
- e. **Innovation.** Interventions should make realistic and practical use of the Bank's new procurement framework, specifically donor-led procurement and hands-on extended implementation support (HEIS).

## 4. Options for implementation arrangements

9. **The main risks to any intervention** relate to (a) the political and security situation, which if it changes significantly may reverse any gains made; (b) the fiduciary and technical capacity of the implementation partners, which may limit the pace at which intervention can be implemented; and (c) the political economy of the sector, as issues such as the non-payment of salaries may limit the pace at which any intervention can be implemented.
10. **The institutional arrangements in particular would require careful consideration.** The experience from the Bank's recent engagement suggests that better delivery channels will be necessary to improve the performance of the energy sector in Yemen. Many recommendations of previous analytical assessments turned out to be out of sync with the GoY's implementation capacity. The lending projects for alternative generation sources – mostly grant-financed – were closed largely undisbursed, despite the country's low generation capacity and the fact that most existing plants run on hugely expensive imported diesel.
11. **Alternative institutional options for project preparation, procurement decisions and execution/contract management for reconstruction of infrastructure projects include:**
  - a. *Centrally coordinated project management* by a cross-sectoral PMU, which like the Executive Bureau is integrating functions across line ministries, but whose mandate would include not only planning but also project identification, preparation, appraisal and procurement. Such a 'reconstruction agency' would be a transitional structure with a limited mandate (e.g., three-years).
  - b. *Donor-led project management*, where Government is involved in prioritization but donors prepare projects, procure on behalf of the Government and execute/manage contracts directly; hand-over could happen either directly after construction or after a certain time of asset operation (illustrations range from the recently approved emergency project of World Bank managed by UNDP or potential management of projects by donors from Gulf countries).
  - c. *Private sector led project management*, where the Government or donors would specify general project requirements and institutionalize the fund allocation process but would leave delivery to the local private sector. This could work well in sectors that thrived despite the conflict, such as solar energy, and where there is a strong business case post-conflict.
  - d. *Community-led project management*, where the Government or donors would specify general project requirements and institutionalize the fund allocation

process but would leave project management to the local communities. The most obvious channel for such an approach would be to expand funding to, and broaden the scope of eligible infrastructure projects of the Social Fund for Development.

- e. *Sector-led project management with implementation support*, where the traditional public sector institutions (ministries, SOEs) take responsibility but are supported by internationally funded project management staff that are seconded to the institutions.

**12. The advantages and limitations of the different options are summarized in Table 1 below.**

**Table 1: Alternative options for infrastructure project management**

Option	Advantages	Limitations
A Centrally coordinated project management	<ul style="list-style-type: none"> <li>• Could enable high-level coordination to match donor funds and priority needs</li> <li>• Could build on experiences/institutional setup of Executive Bureau</li> <li>• Could be targeted at the poorest citizens</li> <li>• Possibly preferable to some donors</li> </ul>	<ul style="list-style-type: none"> <li>• May not be suitable for country with multiple power centers, as likely in post conflict Yemen</li> <li>• Possibly difficult to coordinate with / ensure smooth hand-over to line ministries</li> <li>• Low responsiveness to local needs</li> <li>• Mandate too short for greenfield projects</li> <li>• Mandate too short for asset ownership / supervision</li> </ul>
B Donor-led project management	<ul style="list-style-type: none"> <li>• High capacity to restore infrastructure services rapidly across procurement cycle</li> <li>• Suitable for large infrastructure</li> <li>• Potentially quick restoration of infrastructure</li> <li>• Fits in economic and industrial strategy of some of key donors, may therefore be preferred by donors and lead to greater mobilization of donor resources</li> <li>• Could be targeted at the poorest citizens</li> </ul>	<ul style="list-style-type: none"> <li>• Political acceptability within Yemen may be low, especially linked to specific donors</li> <li>• Donor coordination may be difficult</li> <li>• Possibly lower accountability and transparency, depending on donor systems</li> <li>• Sustainability of efforts post construction may be difficult to ensure</li> </ul>
C Private sector-led project management	<ul style="list-style-type: none"> <li>• Resources can be mobilized rapidly</li> <li>• High responsiveness to demand</li> <li>• Strengthening of private sector, provision of employment and diversification of economy as associated benefits</li> </ul>	<ul style="list-style-type: none"> <li>• May not reach those with least ability to pay without significant grant support</li> <li>• Lack of local capacity in many fields</li> <li>• May not be suitable for larger or greenfield infrastructure</li> </ul>
D Community-led	<ul style="list-style-type: none"> <li>• High responsiveness to local needs</li> </ul>	<ul style="list-style-type: none"> <li>• May not be suitable for larger</li> </ul>

<p>project management, e.g., through the Social Fund for Development or a comparable institution</p>	<ul style="list-style-type: none"> <li>• Could build on existing institutional setup of SFD</li> <li>• Could be targeted at the poorest citizens</li> </ul>	<p>infrastructure</p> <ul style="list-style-type: none"> <li>• Existing institutions such as PWP and SFD may be overloaded if tasked with reconstruction work across all sectors</li> <li>• Possible conflicts of interest with formal government institutions, as institutions such as PWP and SFD currently exist outside of the formal government structure</li> <li>• Coordination to match donor funds and priority needs possibly more difficult</li> </ul>
<p>F Sector-led project management with implementation support</p>	<ul style="list-style-type: none"> <li>• Capacity building would happen in critical sector institutions</li> <li>• Could be targeted at the poorest citizens</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of institutional capacity, especially in the energy sector, make this approach unsuitable for large projects with many contracts</li> <li>• May not be suitable for country with multiple power centers</li> </ul>

**13. The current status of Yemen’s energy sector suggests that a portfolio of options would be most suitable for re-engagement:**

- a. Option C (private sector-led) would be most suitable for **in-conflict interventions** to scale up distributed energy services using solar energy, building on the existing, private-sector driven delivery channels. These could be supported through external funding provided to consumers through one or several financial intermediaries (private sector or NGOs). The financial intermediaries could be selected from the commercial banks and NGOs that already provide financing for solar systems, including the CAC Bank, the Yemen International Bank, the Yemen Commercial Bank, the National Microfinance Foundation, the Al-Kuraimi Islamic Microfinance, Amal Microfinance and the Small and Micro Enterprises Development Fund (SEDF) (or other relevant national or international NGOs).
- b. Option D (Community-led project management) would be suitable for **in-conflict or post-conflict intervention** to scale up distributed energy services if the program can build on proven, widely adopted institutional model, such as the SFD or the PWP.
- c. Option B (donor-led) could be an alternative for **larger-scale infrastructure post conflict** as the donor-led project management could compensate for the sector institutions’ lack of implementation capacity. Procurement of the equipment would be done on behalf of the client, either by the Bank or by one of the member institutions of the Arab Coordination Group (ACG). Upon delivery, the local implementation partners would install the equipment where needed. The local implementation partners would be the respective regional divisions of PEC, where these are still functional, or otherwise the municipal authorities.

- d. Option F (Sector-led project management with implementation support) would be suitable for **larger-scale infrastructure post conflict**, however only with extensive implementation support, as the post conflict capacity of PEC and ministry is likely to be further constrained compared to pre conflict.

**14. Further considerations:**

- a. Monitoring and evaluation (M&E) could be arranged through a third party, such as a local or international NGO active in the targeted areas or a private contractor. This would be particularly relevant for in-conflict interventions.
- b. Post-conflict interventions would have to be consistent with (or done as part of) the government's Post-Conflict Needs Assessment (PCNA).
- c. Procurement under any of the post-conflict options also has to be consistent with Yemen's legal framework, which has, among others, relatively stringent requirements for procurement approval.
- d. Ultimately, the choice of institutional arrangement for post-conflict infrastructure investment has to be made by the Government. However, donors can facilitate decision by fleshing out technically sound options.

## 5. The way forward: Restoring electricity services in Yemen

15. **The current status of information on the electricity sector and the sector institutions suggests that interventions to restore access to affordable electricity should be prioritized as follows:**

- a. **Immediate term (3 months and more):** Expand access to privately-supplied, distributed energy services, especially solar; Restore electricity services to critical facilities in health, water and agriculture sectors, even if rudimentary
- b. **Short term (1 year and more):** Restore public electricity supply in selected urban grids; Strengthen capacity of public institutions on a municipal/regional level to provide electricity services
- c. **Medium term (5 years and more):** Restore functionality of national grid; Strengthen capacity of national electricity sector institutions, including the Public Electricity Company, to provide electricity services.

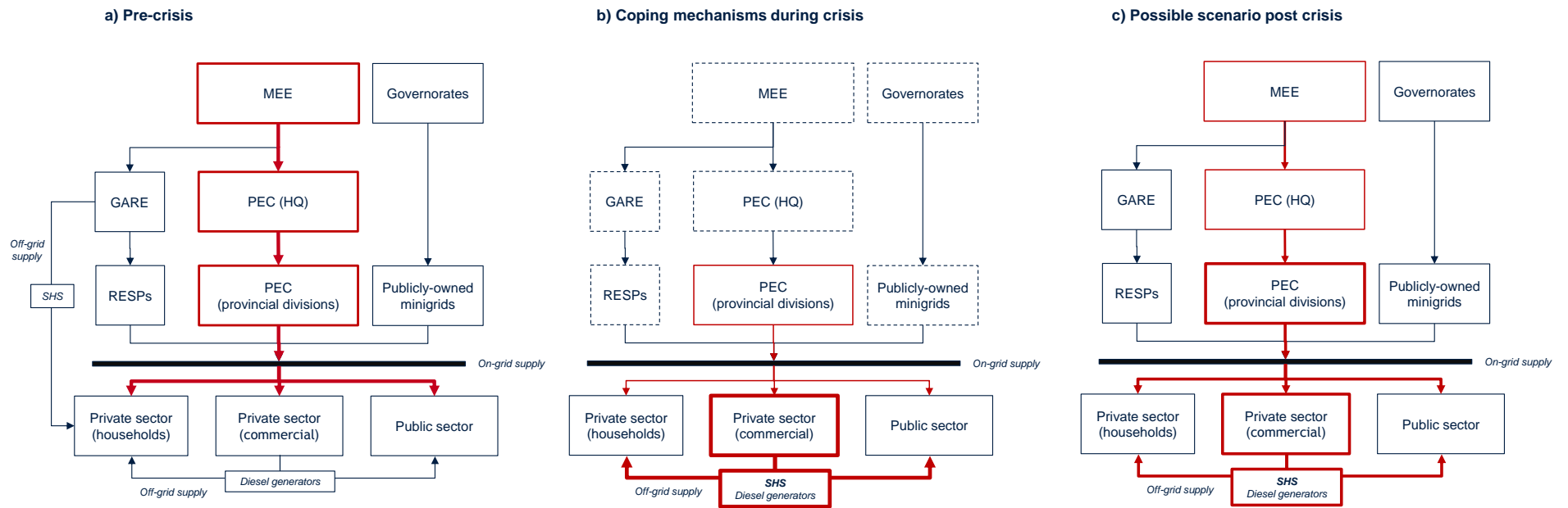
16. **The proposed priorities represent sequential steps the electricity system is re-built from the bottom up, both technically and institutionally.** Physically, the approach would prioritize in the immediate term technical solutions that already work on the ground (solar) and then move to increasingly ambitious solutions (from small off-grid systems, to urban/regional grids, to a national grid). This approach is based on the evidence about the current state of the infrastructure (mostly small off-grid systems and some public supply within sub-national grids), which will take time to rebuild. Institutionally, the priority would be to focus in the immediate term on the supply chains that have emerged as coping mechanisms during the conflict and only gradually move towards institutionally more difficult solutions: i.e., moving from (i) working with the current bottom-up, private-sector driven solution gradually towards (ii) involving municipal and regional public authorities and eventually (iii) working with the national public utility (PEC).

17. **The proposed priorities and sequencing are underpinned by a vision for Yemen's power sector that involves a stronger role for the private sector and more decentralized service provision.** Service delivery in Yemen's power sector has traditionally been public-sector driven and centrally coordinated (see Figure 1 for a stylized illustration). The conflict has turned this picture upside down, as the population's coping mechanisms are decentralized and to a significant extent driven by the private sector. The proposed approach for reengagement would focus on strengthening the decentralized service delivery models that have emerged during the

conflict, with a view to gradually complementing decentralized service supply with nation-wide service supply from PEC (Figure 1c).



**Figure 1: Service delivery channels in Yemen's electricity sector. The proposed sector interventions in the immediate to medium-term would focus on strengthening the decentralized service delivery model that has emerged during the conflict (marked in red in figure b).**



**Legend:**

- Sector entities
- Service provision
- Main entities/channels
- ⋯ Current role unclear

GARE: General Authority for Rural Electricity  
 MEE: Ministry of Electricity and Energy  
 PEC: Public Electricity Corporation  
 RESP: Rural electricity service provider  
 SHS: Solar home systems

Source: Authors' elaboration.

18. **Implementation of the immediate and medium-term priorities is proposed through two interventions supporting existing supply chains in the private sector (solar) and public sector (urban public grid supply).** *First*, to expand access to solar energy for the rural and urban population by leveraging the private sector supply chain that has emerged during the conflict. *Second*, to provide funding and advice to what were the former regional offices of PEC (municipal level) to repair and reconstruct the heavily damaged urban electricity systems. A strong emphasis would be on restoring the quality of public services such as street lighting, water pumping, telecommunications, government services, health, education, etc.

***Expanding access to solar power through the private-sector***

19. **Given the difficulties in developing new generation assets or expanding energy access over last decade, there is an opportunity to take advantage of the emerging solar supply chain to provide decentralized power under a model driven by local citizens and private sector.** Distributed solar has been one of the few thriving industries in Yemen during the past two years and is a rare success story for the private sector in the conflict. However, access has been uneven, with most systems being owned by better-off households in urban areas.
20. **The intervention would aim to expand access to electricity to low-income households and providers of critical public services.** The first supported product range would be small-scale systems for low-income households. These systems suffice for lighting, phone charging and a few simple appliances. In other regions, the Bank has had good experiences with pre-selected and vetted suppliers and technical specifications. The proposed project would aim to replicate this experience in Yemen. The second supported product range would be slightly larger systems for providers of critical service providers. Only relatively few public service providers have so far adopted solar systems, with many relying on diesel despite the shortages of fuel. The proposed intervention would aim to use solar to expand electricity access for public services such as street lighting, water pumping, telecommunications, government services, health and education. Most of these would require slightly larger systems, either with larger batteries or designed as solar-diesel hybrids.
21. **The project would provide funding to the supply chain and consumers through one or several financial intermediaries.** The financial intermediaries would be selected from the commercial banks and NGOs that already provide financing for solar systems, including the CAC Bank, the Yemen International Bank, the Yemen Commercial Bank, the National Microfinance Foundation, the Alkurami Islamic Micro Finance, Azal Micro Finance and the Small and Micro Enterprises Development Fund (SEDF) (or other relevant international NGOs). Monitoring and evaluation (M&E) would be arranged

through a third party, such as a local or international NGO active in the targeted areas or a private contractor.

22. **Expanding and sustaining access to solar power could be part of a “new social compact” in the electricity sector and contribute to building more inclusive, bottom up service delivery driven by the private sector.** Expanding distributed energy creates jobs, strengthens the private sector, provides a more resilient energy infrastructure and reduces the need for fuel import, refining and transport. It could also reduce costs: While electricity from distributed renewable energy sources would initially be costlier than national grid-electricity tariffs in Yemen, it is more affordable than electricity from the informal system of diesel generators, which is the only real alternative for most people in low-access regions.

### ***Urban grid rehabilitation through the public sector***

23. **Many of the major transmission linkages in the country are damaged, suggesting that grid-based electricity supply has to be restored on a regional level first before moving to the national level.** Government reports indicate that all surveyed transmission lines in the country had suffered at least partial damage by October 2015. It is very likely that the situation has only deteriorated since then. Experience from the Power Sector Project suggests that restoring interregional transmission will require international contractors as local firms do not have enough capacity. These will be hesitant to return to Yemen even after peace is restored. The only feasible approach to restoring grid-based power supply may therefore be to start from municipal ‘island grids’ and then gradually expand the reach of supply through interconnections.
24. **The DNA also points to severe damage to the urban electricity systems, which suggests that all major cities require significant reconstruction and rehabilitation efforts to restore urban power supply.** The DNA only contains information on the status of the distribution substations in Aden, Taiz, and Sana’a, but this information offers insights into the status of the distribution grid overall. In Aden, Taiz, and Sana’a, 25 percent, 50 percent, and 37 percent, respectively, of the surveyed distribution substations are known to have suffered partial or complete damage as of October 2015.
25. **Municipal authorities will need material and equipment to rehabilitate the heavily damaged urban distribution networks.** Providing these materials would allow grid-based electricity supply to be restored within specific parts of the country, as a precursor for a broader effort to restore supply across the transmission grid. The focus should be on standardized grid components and material that can be procured rapidly. Components to be supplied include but are not limited to (a) mobile, ‘plug and play’ 33/11 kV substations; (b) distributed generation sets, including solar-diesel hybrid systems; (c) overhead line hardware; (d) compact distribution transformers and low-

voltage substations; (e) switchgears, lighting arrestors, and fuses; and (f) aluminum and copper conductors. In general, these components are relatively easy to move around, as even the larger components such as substations are available in skid-mounted or containerized designs. However, substations would still require relatively good roads to be supplied to the target destination. Hence the focus in the short-term should be on ports to facilitate rapid delivery of the material to the implementing agencies. Yemen's distribution grid is relatively standardized across the country, with most regions relying on 33/11 kV voltage levels.

26. **A strong emphasis should be on restoring the electricity supply to critical public services such as street lighting, water pumping, telecommunications, government services, health and education.** This would be achieved by prioritizing those districts and parts of the grid that offer the highest dividend in terms of restoring public services, e.g., circuits that connect hospitals or water infrastructure.
27. **Strengthening service delivery on a municipal level would contribute to a more decentralized service delivery model and build capacity that is critical for the reconstruction phase.** Yemen's authorities have struggled for decades to expand energy access through the expansion of the national grid, and recurring conflicts have repeatedly set back whatever small progress was being made. A protracted conflict would mean that a centralized, nation-wide electricity grid is a distant prospect and electricity supply would for a foreseeable future be provided through a mix of private sector driven distributed energy, in particular solar and diesel, and smaller 'island' grids in urban population centers that are operated by what are now the regional units of PEC. Strengthening the service delivery capacity of these units—both technically and institutionally—will be critical to restore electricity supply over the coming years.

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