that once reaching the scale, mini grids could serve half a billion people by 2030,

Grid densification and expansion remains the least-cost solution for a significant portion of the unelectrified population. Some countries have succeeded in increasing the pace of grid connections, in other countries grid connections have stagnated (especially in FCV). Mini grids have the potential to electrify close to half a billion people by 2030. They have demonstrated that they can provide reliable and quality electricity (Tier 4

significantly below what the IEA estimates will be needed to achieve universal access to clean cooking by 2030.

- According to RISE 2020, clean cooking is the most often overlooked when it comes to policy making and only 15% of the clean cooking access deficit countries have achieved advanced policy frameworks.

The Opportunity for Transformation. Recent trends in designing more effective strategies for clean cooking interventions are gaining momentum. There is growing consensus on the importance of the cooking sector and increasing policy prioritization at global and country levels, particularly due to adoption of the SDGs.

The COVID-19 crisis has magnified household preferences for convenience and affordability, presenting challenges as well as opportunities for the transition to clean cooking fuels. The pandemic is nudging middle-income households with less severe affordability constraints to switch to clean cooking fuels.

- Implementation delays and changed priorities.

The public sector struggles to accelerate access, unable to rapidly scale up electricity access, while improving reliability to existing customers. Utilities in SSA are challenged by poor planning, weak financial positions and struggle to undertake new investments and at the same time service existing debt obligations and meet operating costs. This situation together with increasing fiscal constraints post-COVID hinders a rapid expansion of reliable grid-connected electricity access.

Weak regulatory/enabling environment.

- Fragility of rural electrification agencies and other key Government institutions (such as policy making and regulatory bodies), which are all needed for a successful electrification push.
- Grid.
- Mini grid. Need to reach the required scale. Acceleration requires continued improvements in policy and regulatory framework. Lack of flexibility in setting mini-grid tariffs, and complex and lengthy licensing processes.[13] Lack of data, especially on demand. Still perceived as high risks by investors.
- Off-grid solar.
    - While improving, the policy environment is still not adequate and needs evolving (e.g. multi-sector policy/regulations for PAYG).
    - Most systems sold are still under Tier 1 and low-quality systems are still prevalent in most markets.

Reach the poor, remote and other hard-t 233.18 Tm0 g0 G[(M)-4(ost)-6)-8(sy)4(st)-3(ems)-8(38 8e 0 0 -2

peri-urban and not so distant rural households; need to reach remote population including the poor and vulnerable segments of the populations..

challenges – weak institutions, affordability, lack of investment environment compounded, plus security issues increasing the costs and risks.

Covid-19. Risk of plunging into darkness the most vulnerable populations as a result of the economic downturn. Uncertainty with respect to future demand in the short and medium term, affordability of the poor being further hampered. Increasing fiscal constraints post-Covid.

[ensure that key technologies/fuels (incl. gas) are adequately mentioned in the section]

Limited political commitment. Access to clean cooking cuts across multiple sectors but is not a priority for any of them and generally lacks institutional champions.

Limited demand due to lack of awareness and poor knowledge of negative impacts. Many households are unaware of the impacts of HAP and are not motivated to invest in cleaner solutions, making the sector unattractive for investors and policy makers. Households do not internalize public benefits such as climate change, health, and gender equality in their decision-making to prioritize clean cooking which makes the sector less attractive for private investments. Moreover, women and children particularly from poor households are the most affected by lack of access to clean cooking, but they lack voice and the means to make a change.

Cooking and heating solutions are highly contextual, with no one-size-fits-all solution, involving incremental costs and high transaction costs. Complex and fragmented supply and demand.

Limited access to finance for businesses.

Limited end user affordability and weak consumer finance.

Lack of adequate enabling environment

Technology related challenges (availability of fuels, local cooking habits)

The human factor. The access challenge goes far beyond technology and finance – often the main areas of focus – and results for a large pars

Governments to develop and implement national strategies and integrated least-cost planning, to guide grid extension and densification, investments in mini grid and off-grid technologies, and formalize cooling and cooking energy demand.

- Strategies to be data driven, include geospatial planning models, based on consultation with key stakeholders, and incorporate monitoring and evaluation of progress mechanisms.
- Good practices of other components to include cross-section with benefits such as productive uses, gender and technological solution to provide energy to vulnerable population i.e. leaving no one behind.
- Develop least-cost, best-fit strategy that reflects diverse users' needs, local market conditions, and national comparative advantages on energy resources; incorporate cooking loads into grid extension planning, using high-efficiency cooking appliances, and digital and pay-as-you-go technologies.
- Prioritize clean cooking and embedding clean cooking access targets in the broader national agenda such as nationally determined contributions (NDCs), national climate adaptation action plans, and COVID economic recovery plans.

Ensuring that a workable institutional and regulatory environment is in place focusing on all three markets segments (grid densification/extension, mini grids, off-grid technologies and electric cooking) to ensure deployment at scale.

- Use RISE scores to highlight policy areas that need most improvements.
- Focus on regulatory reforms to create the adequate level playing field for the emergence of small-scale distributed generation alongside existing utilities, hence improving the electricity service of current and future electricity customers.
- Rethinking the way public subsidies are allocated to promote the most adapted (efficient, feasible) model of service delivery and ensure progressive allocation across income groups.
- Incentivize further innovations (e.g. not too prescriptive regulatory or funding eligibility requirements).
- Designing and implementing innovations to create enabling business environments, such as e-Government initiatives and online platforms like Odyssey to manage national mini grid and off-grid programs.
- Mini grid. Subsidies, licensing, tariff setting and grid arrival. Regulations to protect mini-grid asset cash flows.
- Enabling environment that supports further innovations in the off-grid sector, including for PAYG business models.
- Policies to support sustainable cooling services.[16], [17]
- Cooking: policies to promote de-risking instruments to attract private sector investments and promote market development; budgetary support for poorer

[16] Chilling prospects. 2020.

[17] ESMAP. 2020. Primer for Space Cooling. Energy Sector Management Assistance Program (ESMAP) Knowledge Series 030/20. Washington, DC: World Bank.

households to access clean cooking in social protection programs through conditional or unconditional cash transfers.

Support Human Capital with a focus on

Accelerate electrification of public institutions, while improving its sustainability. Public institutions should be integrated in national electrification plans, as well as healthcare and education planning, underpinned by data and optimized design. Sustainable off-grid solutions including private sector-led long-term service provision remains priority. Robust performance monitoring mechanisms should be in place. A holistic approach should be adopted that integrates energy efficiency consideration and enhances social impacts. Improve coordination between energy, health and education sectors.

Tailor solutions and approaches to the needs of the poor and vulnerable households to leave no one behind.

- Pro-poor targeting. Understand the needs and affordability of the poor and design interventions accordingly. Market based solutions can expand access rapidly, but the poor may not benefit from them, unless targeted support is provided. Innovations in business models and subsidies to bridge the affordability challenges of the poor (e.g. demand-side subsidies, social impact bonds).
- Gender. Integrate approaches for closing gender gaps around access to finance, female entrepreneurship and employment, to maximize the economic and human development impact of electricity access.
- Targeted and inclusive electrification approaches to reach displaced people and populations living in FCV contexts. Adequate business models. Integrate support into the national electrification strategies and plans. Governments, humanitarian and development organizations to work together.

Robust Robusten Covid-19. Include access to electricity and clean cooking as part of the stimulus/response packages and economic recovery plans.

Not progressing beyond the status quo is costing the world more than US$2 trillion each year. The health-impact portion alone is estimated at US$1.4 trillion per year. Women bear a disproportionate share of the cost of inaction in the form of poor health and safety, as well as lost productivity, which is estimated at US$0.8 trillion annually. In addition, cooking with high-emissions stove technologies with fuels sourced from non-renewable biomass contributes to envive42.04 re1 12 7(n)-4(t)-4(ri)9(b)- 0 1 9-4(es)--4(e)4(es)-121i( )-143(a)9(