Energy Access Theme Report[1]

1. Goal [1,000 words]

1.1 What are we trying to achieve?

- The goal of this report is to present targeted action-oriented and operational-focused recommendations for achieving the 2025 interim milestones, the SDG7 targets by 2030 aligned with net-zero emissions by 2050.
- The world remains far off track to meet SDG7 targets by 2030 and net-zero emissions by 2050.
- The Covid-19 pandemic threatens to reverse progress and further exacerbates inequalities. The recovery phase presents a unique opportunity to build back stronger systems by focusing stimulus packages on interventions with strong economic multiplier and spillover effects.

1.2 What is the size of the gap?

- **Population to receive 'affordable, reliable and modern energy services' by 2030.**
    - [estimates coming from new SDG7 report]
    - Data issue. To date, the SDG 7.1.1 and 7.1.2 is measured through a binary indicator. Although convenient, this indicator does not report on the affordability and reliability aspects of access, leading to a discrepancy between the definition of the goal and the indicator used. The MTF approach can complement binary data to provide more nuanced energy access data, including reliability and affordability aspects that Governments and stakeholders can use to inform policy and investment decisions. For the clean cooking, MTF provides nuanced data on cooking preference such as affordability, accessibility, and use of multiple cooking devices.
- **Population to be electrified by 2030.**
    - About 800 million people [to be confirmed] need to be electrified between now and 2030.[2] A mix of solutions, including grid densification and extension, mini grids and off-grid solar technologies is needed to address the challenges. A large proportion of these new connections will need to be realized through decentralized renewable energy technologies, including mini grids and individual off-grid solar systems. For example, IEA estimates that XX new connections will need to be realized by mini grid and off-grid solar technologies.[3] ESMAP estimates

[1] Draft outline for review by TWG members. Made available on 11 March 2021.
[2] Reference to be added.
[3] Reference to be added.

that once reaching the scale, mini grids could serve half a billion people by 2030, while off-grid solar solutions, already serving 420 million people today, could serve over 600 million people by 2030.
    - [Regional breakdown]

- **Number of health and education facilities to be electrified by 2030.**
- **Access to cooling.**
- **Population to access clean cooking technologies and fuels by 2030.**
    - In 2018, around 3 billion people lacked access to clean cooking technologies.[4] If clean cooking remains low on the political agenda, 2.3 billion people in 2030 will still be relying on traditional uses of biomass, kerosene, or coal for cooking, according to IEA's Stated Policies Scenario.
    - [Regional breakdown]
    - [Regional breakdown]

1.3 How much will it cost to reach the targets?

- **Investment needs to reach electricity targets by 2030.**
    - Total investment amount will ultimately depend on the final breakdown between grid, mini grid and off-grid access.
    - Most investments needed in Africa (cost estimates based on GEP), where private capital flows are still vastly insufficient, and most utilities are not financially sustainable.
    - Grid. [not only connections but also cover upstream investments to ensure reliability].
    - Mini grid. Connecting 490 million people to mini grids by 2030 will require more than 210,000 mini grids and almost $220 billion in investment. Hybridizing existing diesel-powered mini grids will cost between US$ 8-23 billions.
    - The off-grid solar sector could serve over 600 million people with Tier 1+ access through quality-verified off-grid solar products by 2030. This in turn would require between $6.6 billion to $11 billion in additional financing. Of this total need, US$ 6.1 to 7.7 billion comprises required external investment into OGS companies, and up to US$ 3.4 billion represents public subsidies to bridge the affordability gap. These funds will need to be raised between now and 2030 to unlock commercial opportunities, as well as to reach the poorest people.
    - [Regional breakdown]
- **Investment needs to reach cooking targets by 2030.**
    - An estimated annual investment of USD XX billion is required to close the clean cooking access gap internationally by 2030.[5]
- **Global fossil fuel subsidies could finance the global energy access funding gap 7.5 times over.** In 2019, consumption subsidies for fossil fuels amounted to US XX. To reach universal access to energy, countries need to invest an estimated US$ XX billion per year (IEA scenario).[6]

[4] SDG7 Tracking report 2020.

[5] The total cost of transitioning to universal access to MECS by 2030 is estimated at approximately US$1.5 trillion (or US$148–156 billion per year over the next 10 years) and $10 billion annual cost is required to achieve universal access to improved cooking services by 2030. The majority of expenditure would be concentrated in the Sub-Saharan Africa and South Asia regions.

[6] Tracking SDG7: The energy progress report.

2. Context

[to be updated with Tracking SDG7 numbers]

Electricity access [500 words]

- **Status of electricity access**. The share of the global population with access to electricity reached 90% in 2018. The population still without access to electricity was 789 million in 2018. Major disparities in access to electricity are also seen between urban and rural areas. The unserved rural population of 668 million made up 85 percent of the global access deficit. In urban areas, access is already close to universal (97 percent in 2018), but growth in access barely kept up with population growth. The world's access deficit is increasingly concentrated in Sub-Saharan Africa, where the access rate reached 47%.
- **Important progress has been made in the last decade thanks to technology and enabling policy environment.** Nearly half a billion people were electrified between 2014 and 2017. Progress has been so far driven by a handful of countries, mostly in South Asia and East Africa[7]. Country successes were driven by political commitment and use of integrated approaches combining grid, mini grid and off-grid technologies.
- **But a significant electricity gap still needs to be closed.** Under current and planned policies before the start of the COVID-19 crisis, it is estimated that about 620 million people will remain without access in 2030, 85 percent of them in Sub-Saharan Africa. [8]
- **Moreover, the socio-economic benefits of electrification have not been fully realized.**
    - Even among electrified populations, levels of electricity consumptions and ownership of appliances vary dramatically. [9]
    - The provision of reliable electricity service to health and education facilities remains dire, especially in SSA where over one million health and education facilities lack reliable electricity supply. Nearly 25% of the health facilities have no electricity access at all and only 28% of connected healthcare facilities benefit from reliable electricity. Two-thirds of schools do not have reliable electricity either.
    - Access to electric cooking.
    - Access to cooling. The use of energy for space cooling is growing faster than for any other end use in buildings.[10]
- **Nonetheless, scope of improvement still exists.**
    - [RISE scores].
    - Recent rise in the rollout of comprehensive, large-scale national programs for electrifying rural populations, seeking to incorporate mini grids and off-grid technologies as complementary solution to grid extensions, guided by integrated energy plans.
    - Further acceleration is feasible, thanks to technology and business model innovations and improving enabling environment.

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[7] Countries with the fastest gains in electrification between 2010 and 2018 include Bangladesh, Cambodia, India, Kenya, Myanmar, Nepal, Rwanda, and Tanzania.

[8] The majority of the 20 high impact countries are not on track to achieve universal electricity access by 2030. To achieve the 2030 SDG7 target, 120 million people need to be electrified each year. The remaining unelectrified population is increasingly rural, remote, poor and affected by fragility, conflict and violence (FCV). In 2018, 85% of the remaining population was rural, 25% lived in FCV countries. The majority of the 71 million displaced people do not have reliable and sustainable electricity access.

[9] Many electrified households and businesses do not utilize electricity beyond basic services such as lighting and phone charging.

[10] IEA. 2018. The future of Cooling. Opportunities for energy-efficient air conditioning.

- **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 4-5) for both households and productive uses. Mini grids have recently started to scale up, driven by technology advances of solar PV, batteries, and energy efficient appliances, as well as improvements in smart meters, remote monitoring and planning tools. Most mini grids investments, however, have not reached scale yet.
- **Off-grid solar technologies and business models provide the fastest and lowest cost path for closing the electricity access gap.** They can reach the most remote populations, while satisfying varying needs of energy consumers – from basic electricity services for the poor to larger systems and appliances for productive uses. Already in 2020, 420 million people used off-grid solar products. The off-grid solar sector has expanded into a $1.75 billion annual market serving 420 million users over the past decade and continues to grow. However, the majority of the systems are small (<Tier 1) and not quality verified. The SHS market is growing fast thanks to PAYG and other innovations. Three key trends: cost reductions, digital revolution and innovative business models.
- **Covid-19.**
    - The Covid-19 crisis demonstrated the importance of access for emergency response, inclusion and resilience, and accentuated the urgent need to electrify health facilities for testing, treatment of patients, and deployment of cold chains to deliver vaccines.
    - All market segments of the energy sector have been adversely impacted by the economic downturn following the outbreak of the COVID-19 pandemic.

Clean Cooking [500 words]

- **Status of access to clean cooking.** Globally, 2.8 billion people still cook with traditional polluting fuels and technologies. Moreover, 4 billion people—more than half the world's population—do not have access to efficient, clean, convenient, safe, affordable, and reliable methods of cooking, or modern energy cooking services (MECS) while around 1.25 billion are considered in transition with access to improved cooking services[11]. Sub-Saharan Africa has the smallest share of people with access to MECS, at 10 percent, while Latin America and the Caribbean and East Asia have the highest shares, at 56 percent and 36 percent, respectively.
- **Poor political commitment, poor results.**
    - To date, progress on access to clean cooking has been stymied by lack of high-level political commitment and lack of investments. The level of funding and investment in the clean cooking sector has not matched the global magnitude of the challenge. Funding has stagnated in the range of tens of millions of dollars per year,[12]

[11] Using Multi-Tier Framework (MTF) for cooking, a household is considered to have access to modern energy cooking services (MECS) when their cooking practices meet the MTF Tier 4 or above. A household whose cooking practices meet MTF Tier 2 or 3 is considered as being in transition with access to improved cooking services. MTF is a multidimensional, tiered approach to measuring household access to cooking solutions across six technical and contextual attributes—convenience, affordability, safety, fuel availability, exposure, and efficiency, ranging from Tier 0 (no access) to Tier 5 (full access).

[12] CCA industry snapshot.

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.

3. Challenges

Electricity access [1,000 words]

- **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-to-reach households.**
    - Grid densification. Need to understand and address constraints of low-income under-the-grid households (financial and other)
    - Mini grid.
    - Off-grid solar. Uneven distribution across countries (e.g. concentration in East Africa and large markets like Nigeria), and within countries (concentration non

[13] State of the Global Mini-grids Market Report 2020. Trends of renewable energy hybrid mini-grids in Sub-Saharan Africa, Asia and island nations. https://minigrids.org/wp-content/uploads/2020/06/Mini-grids_Market_Report-20.pdf

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

- **End users ability to pay.** The ability to pay for energy services and end-user credit risk remain an important limiting factor for the private sector to scale up investment for energy access, especially for mini grid developers and PAYG companies.
- **Financing challenge for private sector** – mini grid and off-grid companies still unable to access commercial funding, e.g. local commercial banks, since viewed still nascent and risky.
    - Mini grid. The majority of rural mini-grids range from just 10 to 100kW. Private financiers tend to favour larger deals that allow them to amortize transaction-related costs over larger volumes of capital (and, in many cases, earn larger fees). As a result, many are unwilling to invest the time and effort required to conduct due diligence and provide financing for projects that may require as little as USD 1 million or less.[14]
    - Off-grid solar. Industry nascent and most companies even before COVID still struggled to reach profitability.
- **The level and pace of uptake of productive uses often lags far behind expectations,** leading to unviable electrification interventions and limited transformational impact of electricity access. Poor quality and reliability of grid electricity service, insufficient data on value chains and demand, consumption patterns, income level, lack of understanding of market barriers for income-generating appliances, and limited multi-disciplinary expertise to build complex ecosystems required for productive use stimulation explain limited intervention in this area.
- **Sustainable cooling services.**
    - The challenges of scaling up or investing in sustainable space cooling practices can be fundamentally attributed to a lack of market demand for sustainable space cooling.[15] Multiple market barriers.
- **Electrifying health and education facilities.** Such facilities, especially in rural areas, are commercially unattractive for utilities, and sustainable off-grid electrification has been impeded by lack of data on electrification and expected demand, insufficient financial resources, limited role of private sector in service provision, insufficient attention to long-term O&M arrangements and undeveloped performance monitoring mechanisms.
- **Gender equality.** Benefits of energy access are not equitably distributed between gender; the energy needs of men and women differ as a result of pre-existing social norms. However, energy policies, programs and projects often remain gender-neutral.
- **Electrifying displaced people and those living in FragileConflictViolence (FCV) contexts.** The proportion of unelectrified people living in FCV contexts is growing. Traditional electrification approaches do not work in the displaced people context. Current electrification efforts are mostly short-term measures in the humanitarian and host communities context; diesel systems or solar PV without any sustainability plan. All above

[14] State of the Global Mini-grids Market Report 2020. Trends of renewable energy hybrid mini-grids in Sub-Saharan Africa, Asia and island nations. https://minigrids.org/wp-content/uploads/2020/06/Mini-grids_Market_Report-20.pdf

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

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.

Clean Cooking [1,000 words]

[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 part from the "human factor", i.e., considerations around economic models, politics, traditions, education and the overall culture of energy, as well as behavioral change aspects.
- **Additional challenges in FCV contexts.**
- **Measuring challenge**. Consider aspects such as user behaviour, cooking conditions, use of multiple cooking solutions, etc.
- **An increasingly urban issue.** Lack of access to cooking will increasingly intensify in urban areas over the coming decades.
- Absent external support, **COVID-19** will push poorer households further down the energy ladder, forcing them to rely on traditional and polluting cooking practice and further exacerbating adverse effects on health, gender equity, and the environment.

4. Recommendations/Plan of Action [5,000-6,000 words]

4.1 Actions

- **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 capacity building and job creation.**
    - Strengthen professional capacities. Supporting training and skills-building not just for engineers but also for bankers, regulators, policymakers, and other critical stakeholders.
    - Enhance consumer and stakeholders awareness. For RE, sustainable cooling services, etc.
    - Maximize local job generation, in particular in rural areas, and for women and youth.

- **Improve performance of national utilities, leveraging digital and other innovations.** Need to take actions to improve financial performance and invest in improved reliability and quality of service. Utilities can adopt innovations that other service providers are embracing, such as digitization and decentralized energy resources. Successful electrification drive may require distribution utilities to go beyond delivery of electrons (e.g. demand stimulation, appliance provision, etc.). Need for innovative partnerships between utilities and other service providers, e.g. to better deliver specialized services to consumers.
- **Greening the on-grid generation mix.** Potential for both large-scale and distributed RE on the grid, energy efficiency. Renewable energy sources are now cheap enough to not require subsidies (IRENA) they can be put on the grid much more quickly and effectively than has traditionally been the case (e.g. South African Auctions). Renewables kept grids going during COVID when fossil fuel plants had to shut down (IRENA).
- **Mobilize public and private investments**, through PPPs, risk mitigation instruments, new financing structures such as social impact bonds, Results-Based Financing (RBF), etc. Level-playing field to support grid, mini grid and off-grid solutions (e.g. technology neutral funding). Mobilize long-term, sustainable sources of funding. Tap into domestic sources of funding (e.g. commercial banks, pension funds). Adapt financing instruments to ensure that local companies are adequately supported.
    - Mini grid.
        - Government and development partners develop support packages. Constructing comprehensive financial packages that consist of equity, debt, performance-based grants, and risk-sharing mechanisms
        - A portfolio approach would be beneficial to make financing attractive for commercial project finance investors, and to distribute risks.[18]
    - Financial solutions for cooling services.[19], [20]
    - Cooking: Expand the availability of grant resources to monetize public benefits and catalyze private investments. Leverage impact funding for climate, gender, and health co-benefits through results-based financing. Results-Based Financing (RBF)

[18] State of the Global Mini-grids Market Report 2020. Trends of renewable energy hybrid mini-grids in Sub-Saharan Africa, Asia and island nations. https://minigrids.org/wp-content/uploads/2020/06/Mini-grids_Market_Report-20.pdf

[19] Chilling prospects. 2020.

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

has been demonstrated as an effective approach for using public resources to incentivize the private sector for market development.
    - Smart strategies for fossil fuel subsidy reform can reallocate funding to boost sustainable energy access.
- **Put in place innovative end-users financing mechanisms to accelerate affordable connections and energy-efficient appliances** (technology neutral RBF, targeted end user subsidies to bridge affordability gap, PAYG/on-bill financing for appliances, collaboration with MFIs, revolving fund, automated micro savings and layaway accounts), leveraging fintech innovations (mobile money, mobile wallets, etc.)Considerations for vulnerable populations, including female-headed households.
- **Create environment that supports continued business model, financing and technology innovations.**
    - **Leverage technology advances.** Hardware – solar PV and batteries - Third generation mini grids. Off-grid systems for productive uses. EE appliances. Continued digitization. Fintech innovations. Data and tools. Technology solutions for sustainable cooling.
    - The off-grid solar sector has demonstrated tremendous innovation potential to deliver electricity solutions meeting demands of off-grid users. Zoom on PAYG, addressing affordability constraints, allowing households to access larger systems and a pathway for financial inclusion. Role of last mile distributors and need for better support for local entrepreneurs.
    - Mini grids have also piloted new business models and ways of commercialising energy services (by bundles of services and appliances as opposed to charging per kwh) and supporting productive uses to support income growth of customers that underpins future viability of the sector. Fostering partnerships and deal-making between local developer-operators and international developers and EPC companies
    - Utilities should begin adopting some of these innovations from mini grid space or partnering with mini grids to extend access.
    - Including sustainable cooling services
    - Build policy and regulatory environment and financing designs that allow and incentivize further innovations (avoid lock-in in the current state-of-the-art technology/business models)
- **Integrate demand stimulation and productive use as a key element of electrification efforts.** Productive use stimulation requires integration of electrification in broader development strategy, public awareness, availability and affordability of appliances, access to finance, information on value chains, engagement with local communities, access to market and other infrastructure services, knowledge and skills development, gender specific interventions.
    - Scaling up access to machines, equipment, and appliances that generate income for end users, as well as the needed microfinancing to unlock demand from entrepreneurs and MSMEs
    - Engaging with communities to increase demand for high-quality electricity services
    - Include sustainable cooling services.

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

5. Impacts

Electricity access [500-1,000 words]

- **Impacts and costs** in terms of economic productivity, opportunities for income generation, job creation; human capital; health; education; agriculture, water availability. Economic development
- Role of universal access for economic recovery and job creation
- Women's economic empowerment, skills development, maternal care, safety.
- **Environmental impact/emissions.**
    - Mechanisms that will be used in pursuit of net-zero emissions by 2050.
    - Third generation solar mini grids and other distributed renewable energy technologies powering productive uses are to result in significant positive environmental impacts.
    - Linking grid expansion with the renewable energy and battery storage on-grid expansion
    - Potential of energy efficiency, including EE appliances
- **Impact in terms of resilience in the face of increasing disruptions from climate change, natural disasters and other shocks including pandemics.**
    - Mini grids.
    - Demand for off-grid systems went up in many countries during COVID

Clean Cooking [500-1,000 words]

- 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 environmental degradation and adverse climate impacts, estimated at US$0.2 trillion per year.
- Impacts of fuel stacking and particularly the health effects of continuing use of biomass even amongst those claiming that their primary fuel is cleaner.
- Role of cooking as a revenue path for women, and a healthier home life.
- Changing the way families cook their food each day will slow climate change, drive gender equality, reduce poverty and provide enormous health benefits.
- Modern renewable energy cooking solutions will be available at scale to contribute to the net zero carbon target.

6. References

[References will be added here in the final draft. For the time being they appear as footnotes for convenience]