NEPAL RENEWABLE ENERGY PROGRAMME

Gap analysis on distributed renewable energy to attract private sector investment compared to Nepal specific RISE indicators

Submitted: March 2021

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Gap analysis on distributed renewable energy policies to attract private sector investment compared to Nepal specific RISE indicators

1st Version submitted to UKAID: March 2021

Acronyms

RISE	**Regulatory Indicators for Sustainable Energy**
RE	Renewable Energy
EE	Energy Efficiency
GoN	Government of Nepal
PV	Photovoltaic
MRV	Monitoring, reporting and verification
avg	Average
PPA	Power Purchase Agreement
SAIFI	System Average Interruption Frequency Index
SAIDI	System Average Interruption Duration INdex
GHG	Green House Gas
HVAC	Heating, ventilation and air conditioining
LEED	Leadership in Energy and Environmental Design
FI	Financing INstitution
TOU	Time of Use
C&I	Commercial and Industrial
kWh	Kilowatt hour

1. RISE framework, pillars and indicators

RISE primarily uses 31 indicators across electricity access, clean cooking, renewable energy and energy efficiency to compare policy and regulatory frameworks of 138 countries, accounting nearly 98 % of the population, and use scores to assess the country's readiness in achieving the Sustainable Development Goal 7. The RISE indicators are expected to support policy makers to bench mark their national energy framework against other countries and increase their readiness in attracting investment in their energy sector. For private sector, RISE provides an illustration on the attractiveness of country's policy for private sector involvement. The latest RISE covers the duration from 2010 to 2019.

The RISE framework constitutes four pillars- electricity access, clean cooking, renewable energy, and energy efficiency, as shown in the table 1. The RISE scores are categorized in three policy readiness categories- i) scores from 67 to 100 indicate advanced policy framework, ii) scores from 33 to 67 indicate intermediate policy framework with rooms for improvement and iii) scores from 0 to 33 indicate an early stage for policy adoption or undeveloped policy framework. Indicators in each pillar are scored between 0 and 100 and are weighted to reach a score for the pillar.

Pillars	**Indicators**			
Electricity Access	Electrification Plan	Framework for standalone systems	Scope of the electrification plan	Consumer affordability
	Grid electrification framework	Utility transparency and monitoring	Framework for mini grids	Utility creditworthiness
Clean Cooking	Planning	Scope of planning	Standards and labelling	Incentives for clean cooking solutions
Renewable Energy	Legal framework for renewable energy	Network connection and use	Planning for RE expansion	Counterparty risk
	Incentives and regulatory support for RE	Carbon pricing and monitoring	Attributes of financial and regulatory incentives	
Energy Efficiency	National EE planning	Transport sector	Energy labelling system	Financing mechanisms for EE
	Incentives and mandates: Public sector	Energy efficiency entities	Carbon pricing and monitoring	Building energy codes
	Minimum energy performance standards	Incentives and mandates: Utilities	Incentives and mandates: Industrial and commercial end users	

Table 1: RISE pillars and indicators

2. Global RISE scores 2020

RISE measured policy evolutions of 138 countries between the period of 2015 and 2019. In 2017, 57 countries had already built advanced policy frameworks into their regulatory systems and 65 countries in 2019 were able to do the same. However, the pace of policy improvement slowed down from 2017 to 2019. Based on RISE, the global annual average score was increasing by 3.2 RISE score per year between 2015 and 2017 while this score reduced to 1.9 RISE score per year from 2017 to 2019.

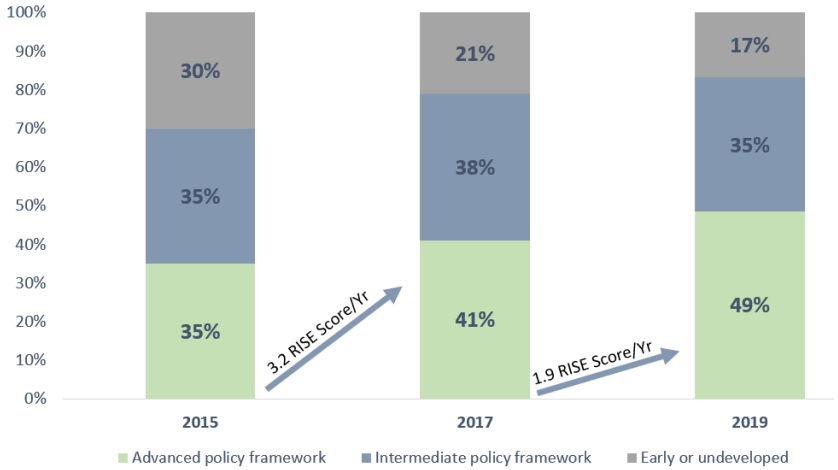


Figure 1: Change in global RISE scores across three policy readiness categories

Policy frameworks for energy efficiency (EE) and renewable energy (RE) improved slowly in the period of 2017 to 2019. Amongst EE and RE, standards for heating and cooling were amongst the fastest growing policies while building codes, carbon pricing and monitoring slowed down. Frameworks for clean cooking slowed from 3.2 RISE score per year during 2015-17 to 2.8 RISE score per year in 2017-19. The largest increase in policy framework was in energy access as it increased annually by 5 points during 2017-19 compared to 4 points per year during 2015-17. As of 2019, the global average score across all four pillars was only 48 which is still below the minimum score required for advanced policy.

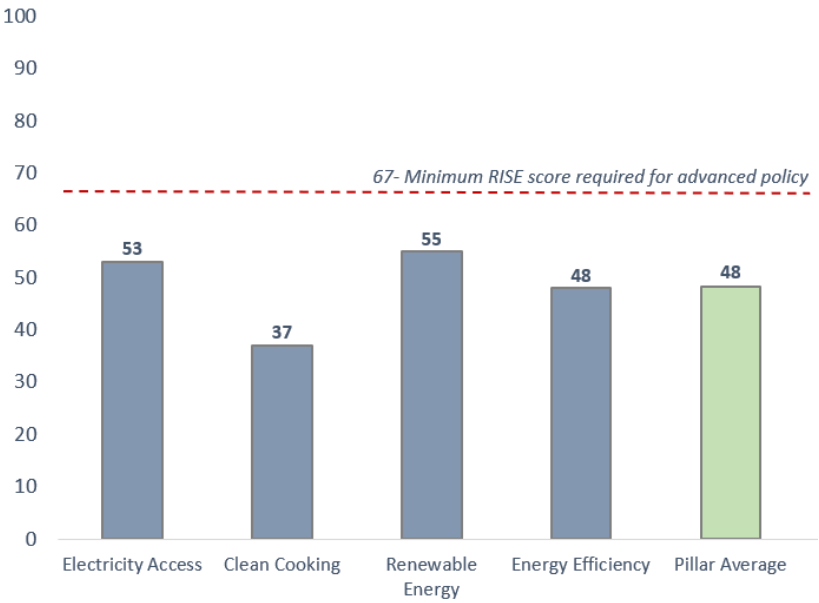


Figure 2: Global average RISE score for each pillar

3. Specific progress by indicator for each pillar

1. Electricity Access

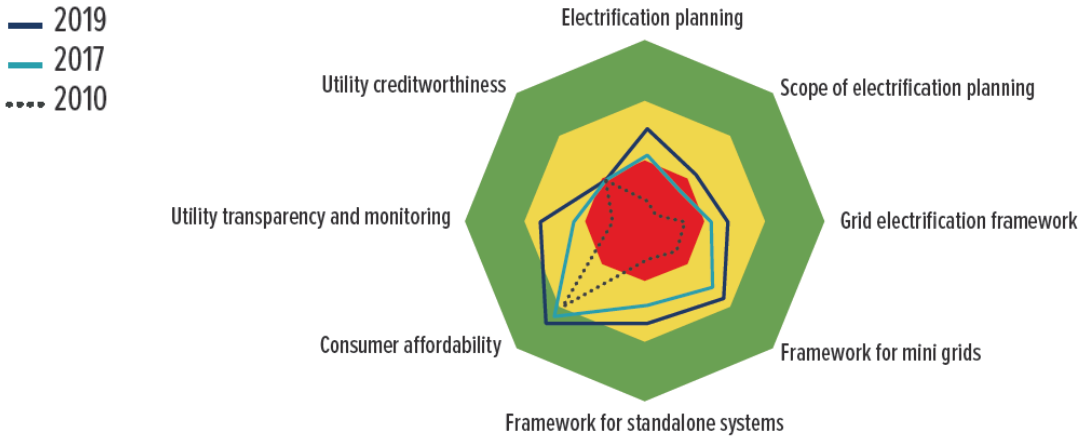


Figure 3: Progress across electricity access

As of 2019, 25 percent of the countries have reached advanced level of policy framework for electrification while 54 percent of the countries have reached intermediate and 20 percent are still at an early or undeveloped stage of policy. Frameworks for mini grid and stand-alone system is growing fast and have an intermediate status. Consumer affordability has reached advanced level for most of the countries. Grid electrification is moving slowly and so is electrification planning and the scope of electrification planning. The biggest lag is in utility creditworthiness. The South Asia region has the highest score while East Asia and Pacific made the greatest improvement. Bangladesh had the most comprehensive enabling environment- both in designing and implementing policies.

2. Clean Cooking

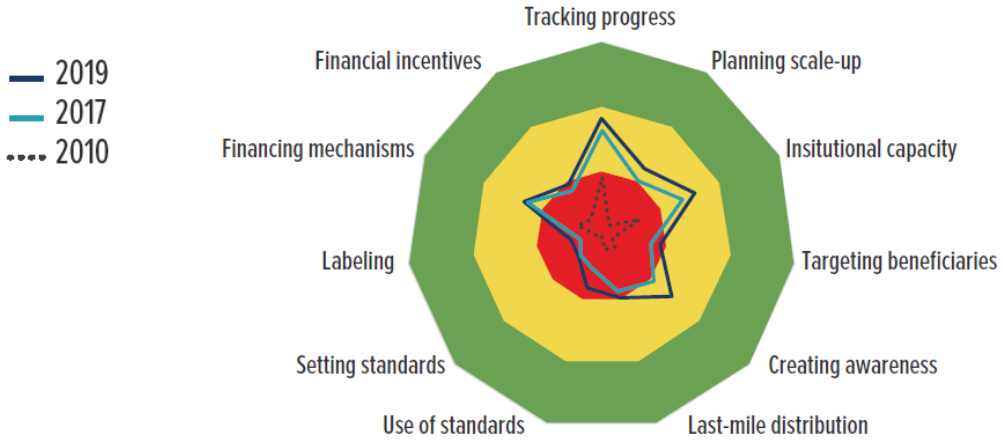


Figure 4: Progress across clean cooking

The number of countries with advanced policy framework rose from zero in 2010 to eight in 2019, contributing to 15 percent of access deficit countries in advanced level. 25 countries made moderate progress and 25 countries still have undeveloped policy for clean cooking. Framework for awareness, institutional capacity, tracking progress and planning have progressed moderately. Framework for targeting beneficiaries and financial incentives have seen low progress while frameworks governing labelling, standards and their utility have been extremely low. Countries with best clean cooking policy were able to track household level access, establish institutional capacity with action plans, science-based standards, adoption tracking and increase uptake through adequate advocacy and awareness. South Asian countries are leading on policy and regulatory frameworks with Bangladesh, India and Nepal driving the overall region's progress.

3. Renewable Energy

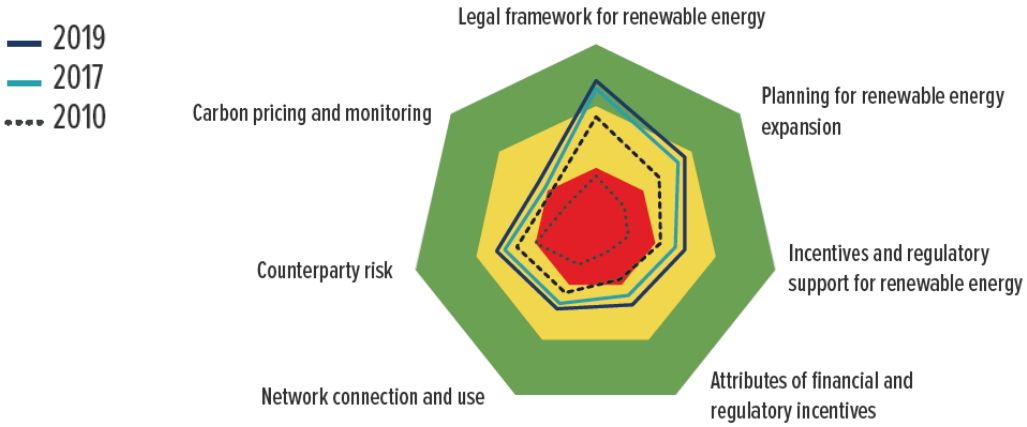


Figure 5: Progress across renewable energy

Renewable energy policies experienced major improvements between 2010 and 2017 but reduced by almost half during the period of 2017-19. By 2019, a third of countries had developed legal frameworks for RE out of which 33 percent have advanced level frameworks, 45 percent have intermediate and 22 percent still are in early stage of development. Latin America and the Caribbean countries had the most progressive RE policies with Columbia achieving the highest score. The country sets RE targets in electricity, offers small scale producers for long-term PPA for RE and provides direct fiscal incentives for RE. The incoming policy has designed to bring similar measures for clean powered transport system. Chad and Tanzania became progressive countries in Sub-Saharan Africa with action and targets for integrating RE into the generation and transmission planning. Globally, the policy framework for utility scale RE are better developed than those of small-scale producers and grid flexibility and forecasting are improving slowly.

4. Energy Efficiency

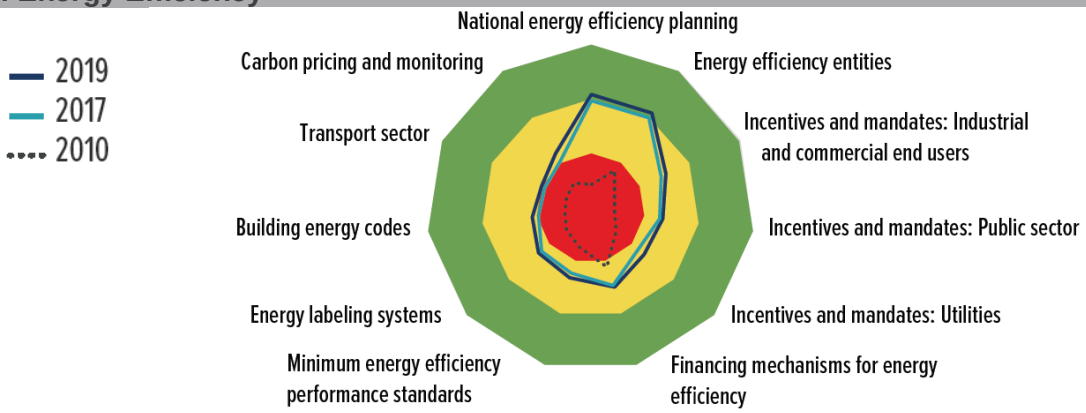


Figure 6: Progress across energy efficiency

EE shows the slowest rise amongst the four pillars as most of the actions can be inferred to have take between 2010 to 2017 where complex policies were built, implemented, invested, and developed. In 2010, 29 percent of the countries have advanced EE policy framework and 35 percent have moderate while 36 percent are undeveloped. In context where policies have reached advanced or intermediate, policy improvement is still insufficient in building and transport sector. EE based pricing, incentives, and mandates for public and utilities are lower than industrial and commercial end users. Improvements in labelling, minimum energy efficiency performance standards and carbon pricing and monitoring can significantly improve the RISE indicator. Latin America and the Caribbean and Sub-Saharan Africa had the fasted improvement in 2017-19 with Panama amongst the fastest countries enabling implementation, measurement, mandates, energy saving obligation covering buildings, water supply, municipal solid waste, street lighting, transportation and heat supply.

4. Nepal in RISE 2020

In 2019, Nepal scored 52 out of a total 100 RISE scores and stood 90th amongst the 138 RISE partner countries. It shares the same position with Cameroon and one score less than Tanzania and one more than Kyrgyz Republic. In South Asia Region, Nepal has the exactly the same as the average regional score of the region. India has the highest score of 86 and Afghanistan has the lowest score of 24. India remains the most advanced country in the region across all four pillars with rising scores through the period of 2010-19 in specific indicators such as RE, counterparty risk, carbon pricing and Monitoring, reporting and verification (MRV) for emission. Nepal has exceeded both regional and global average in two pillars- electricity access and clean cooking, while scores for RE and EE remains lower than both regional and global average.

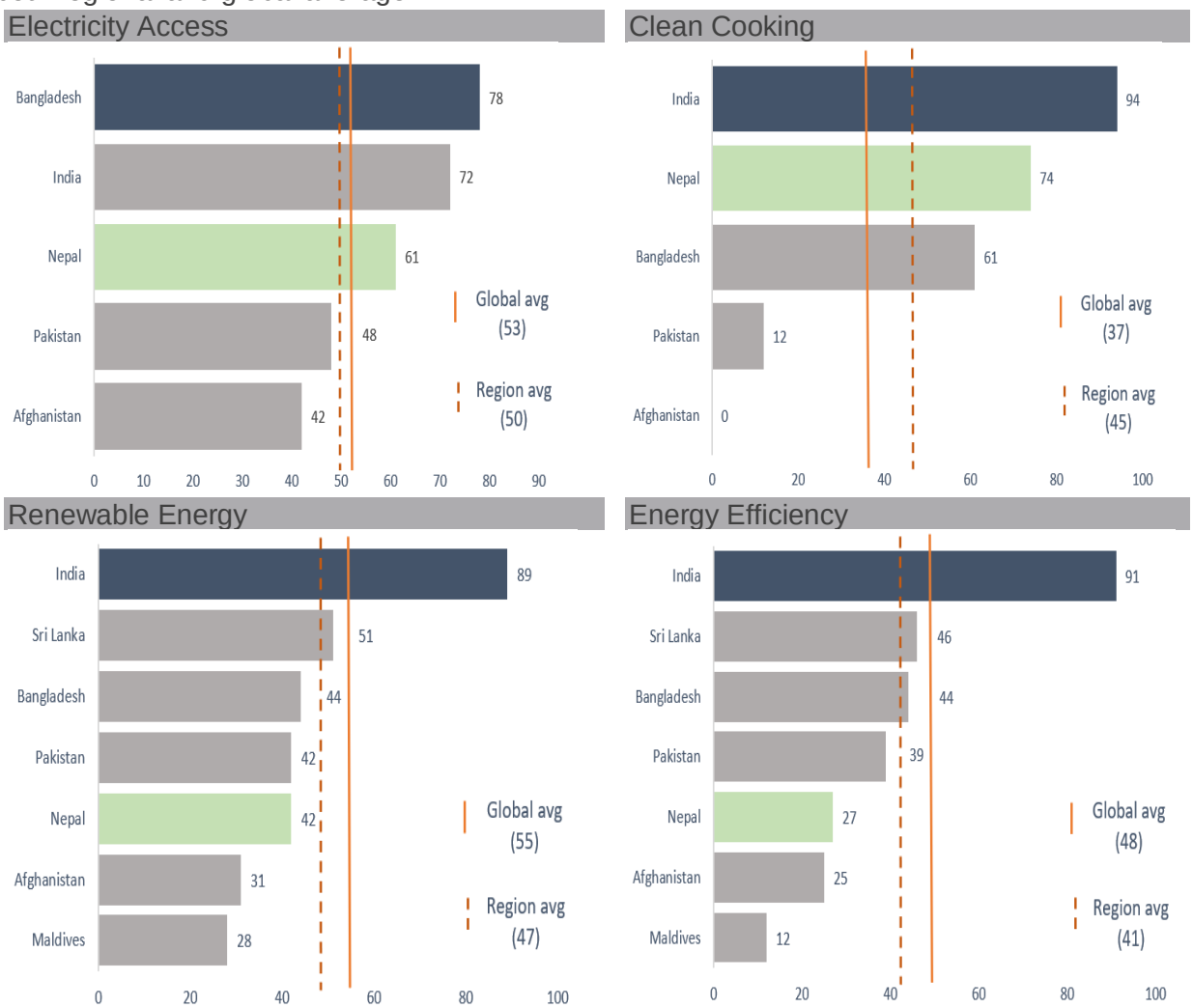
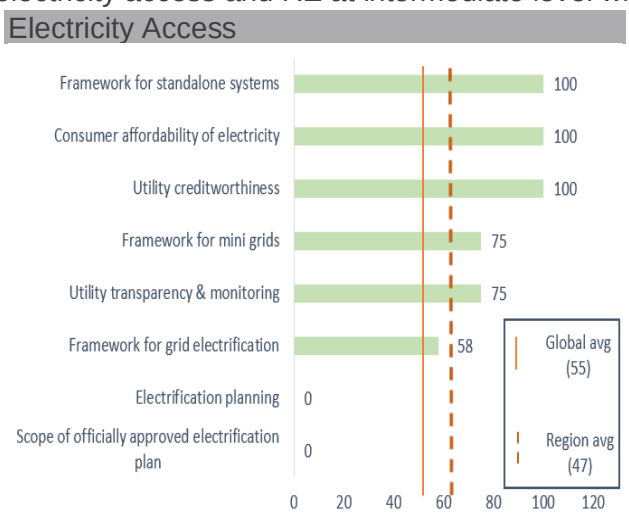


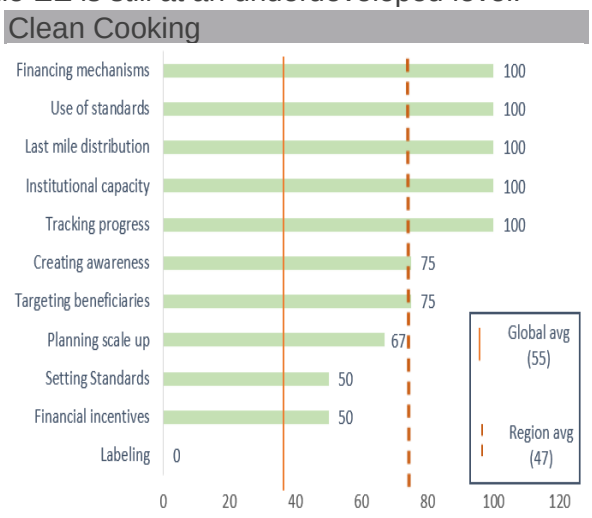
Figure 7: RISE scores of Nepal across 4 pillars

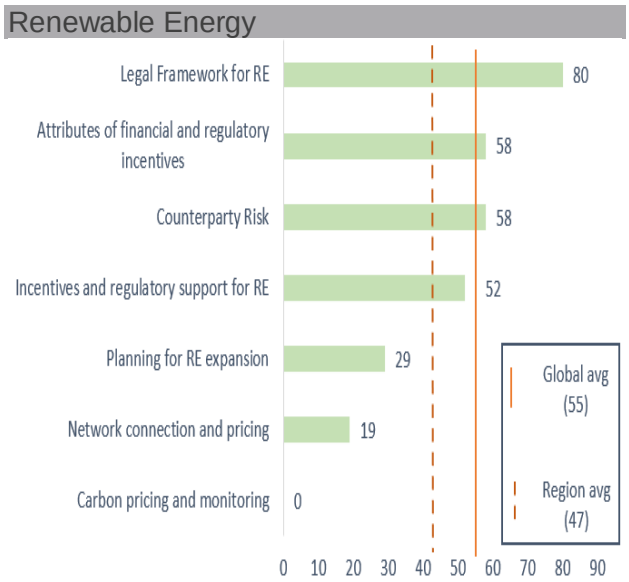
Based on the available data, Nepal scored higher than the global and regional average for electricity and clean cooking and securing 3rd and 2nd position in South Asia for these two pillars respectively. However, the scores for both RE and EE pillars remained lower than both global and regional average and also secured 5th position in South Asia for these two pillars. in theAt a regional level, South Asia scored 9 points lower than the global average in 2019. Most of the country scores indicated intermediate level of policy and regulatory framework with only India with the advanced policy framework.

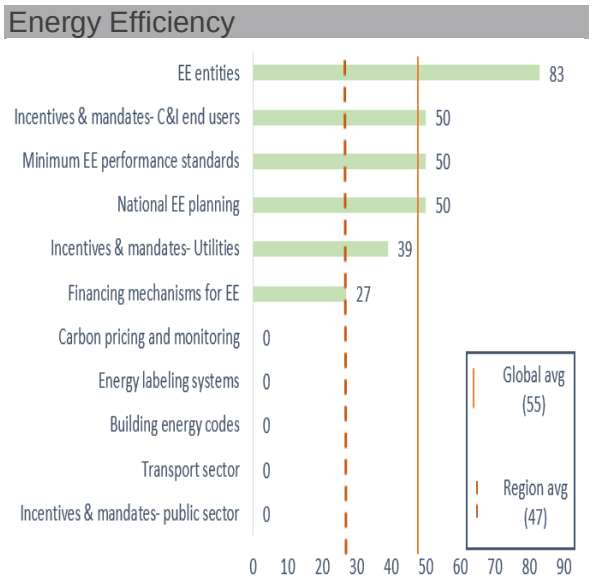
5. Specific progress by indicator

In 2019, the RISE score on policy framework for clean cooking reached 74 which is double the average score of all 138 RISE partner countries. Nepal is second to India in South Asia region having advanced framework for all 10 indicators out of 11. Both countries scored low in labelling with Nepal having no or underdeveloped policy framework and India at an intermediate level to advance labelling. For electricity access, Nepal received 64 RISE score with 5 indicators having advanced framework while framework for grid electrification is only intermediate. The framework for electrification planning and scope of official approved electrification plan is underdeveloped. Renewable energy received 42 RISE score with only one indicator, i.e. the legal framework for RE, reaching its advanced form while three indicators, i.e. attributes of financial and regulatory incentives, incentives, and regulatory support for RE and counterpart risk, at an intermediate level. Three indicators, i.e. planning for RE expansion, network connection and pricing, and carbon pricing and monitoring, are at underdeveloped level. Overall, the policy framework for clean cooking has reached advanced level and electricity access and RE at intermediate level while EE is still at an underdeveloped level.









6. Gaps by indcator

The gaps were identified based on the score achieved by each sub-indicator associated with their indictors and their pillars. Following the scores of RISE, sub-indicators which have reached or exceeded 67 have been excluded as RISE infers that they are already reached advanced level. Only the sub-indicators receiving 66 and below are considered for gap analysis. Based on RISE colour code, score from 0-33 is red and 34 to 66 is yellow. The table below lists specific gaps that requires actions in order for the sub-indicators to reach the advanced level.

Pillars	RISE score	Gaps associated with sub-indicators scoring 66 and below
Electricity Access	0	Electrification Planning Existence: • Unavailability of officially approved national electrification plan or plan based on demand assessment • Lack of public consultations during planning • No provisions for periodic evaluation of plan Public availability of electrification plan • Unavailability of electrification related plan in public domain and lack of electricity access target in the national electrification plan Targets and implementation • Limited tracking due to lack of national electrification plan Institutional Set-up • Specific institution undefined for setting electrification strategy, setting milestones and deadlines
	0	Scope of officially approved electrification plan Service level target • The measurement of targeted service levels such as power availability, number of guaranteed hours of power supply, etc are unavailable due to unavailability of officially approved electrification plan Inclusion of off-grid solutions • The measurement of off-grid solutions either/or both mini grids, standalone systems etc are unavailable due to unavailability of officially approved electrification plan Inclusion of community and productive services • The measurement of productive use such as agriculture, commercial or industrial and community facilities such as health centres, schools, administrative buildings are unavailable due to unavailability of officially approved electrification plan

		Inclusion and gender sensitivity • The measurement of electricity access with female-headed households and informally settled people/groups are unavailable due to unavailability of officially approved electrification plan Geospatial mapping • Geospatial maps conveying the timeframe of planned grid extension is not publicly available due to unavailability of officially approved electrification plan
	58	Framework for grid electrification Funding support for consumer connections • Consumer financing mechanisms such as utility loans, bill financing, micro loans etc and/or direct subsidies to support payment of connection fees by consumers are not available • Tariff was recently reduced for low-energy consuming categories but consumer financing mechanisms for targeting low-income households is not available Standards of performance on quality of supply • Specific government standards on performance of reliability such as number of guaranteed hours of supply per day, duration of the electricity, frequency of outages etc are not available
Clean Cooking	50	Standards and Labelling Monitoring and verification • Mandatory standards verification and enforcement procedure was limited or undeveloped • Proper accreditation of stove testing facility or lab was not found Labelling • Labelling schemes related to efficiency and emission for clean cooking products was limited or undeveloped
Renewable Energy	0	Carbon Pricing and Monitoring • GHG emission coverage was not found due to limited or undeveloped carbon pricing mechanism • Adequate monitoring, reporting and verification system for GHG emission was limited or undeveloped
	19	Network connection and use Connection and cost allocation • Measures or standards addressing variable RE in grid code was not found • Rules defining allocation of connection costs was not found • The type of the connecting cost allocation policy was not found

		Network usage and pricing • There are no rules that allow electricity consumers to purchase directly from third party such as an entity other than the designated utility in a service area • There are limited rules defining size and allocation of costs for use of the transmission and distribution system such as wheeling charges, locational pricing, etc Renewable grid integration • Nepal has not carried out specific assessment of the flexibility of the electricity grid and the issues relating to RE integration • There is no information on RE projects selling as a balancing or ancillary service • There is limited information on rules for exchanging power between balancing areas that penalize variable RE such as through imbalance penalties • There is limited information on provisions in the power exchange rules that allow for plant forecasting • The country has not integrated high quality forecasting for variable RE either through subscription service or provided y national agencies into their dispatch operations
	29	Planning for RE expansion Electricity- targets and plans • Specific target for RE in electricity is only limited to the overall energy mix and explicit targets in utility is missing Heating and Cooling- targets and plans • Specific target for RE in heating and cooling is missing Transport- targets and plans • Assessment related to need for RE based or powered transport is not available • Specific target for RE in transport is missing Institution and meeting targets • Although periodic reporting mechanism for RE progress and deployment is available, there is limited mechanism for adjusting the plan based on the actual report or the performance of the deployment RE in generation and transmission planning • Generation and transmission planning are not integrated • Dispatch is not included in generation and transmission plans • Generation plan does not include RE development • Information related to probabilistic approach and its use in generation plan are not available • The current transmission plan/document does not have information related to RE scale up

		Resource data and siting • The country has carried limited geospatial planning for producing RE zones for commercial development of RE resources • There is limited information related to practices regarding RE zoning being undertaken as part of strategic environmental and social assessment
	52	Incentives and regulatory support for RE Electricity grid access and dispatch • The country has no prioritization access provisions to the grid for RE • There is no provision of RE projects in dispatch • Information related to compensation due on curtailment are not available Financial and regulatory support for transport • There is no specific policy for transport sector to adopt biofuel, electric, hydrogen etc • Specific financial support and regulatory measures are not readily available for electric/hybrid, biofuels, hydrogen, or electric public transportation Financial and regulatory support for heating and cooling • There is no specific regulatory measured designed to encourage use of RE in heating and cooling sectors
	58	Attributes of financial and regulatory incentives Auctions • There is limited information on schedule for future bids or auctions available for investors Fixed tariff for small producers • Contracts with fixed tariff is not available for small residential and commercial rooftop PV and other RE generations. Although provision for net-meter through net-payment facility is available but are also under revision • There is no schedule or clear rules such as capacity based limits for adjusting tariff level over time • There is no mechanism to control the capacity built under each tariff but only a capacity cap for RE integration at the substation • Tariffs are not indexed, in part of the whole, to any international currency or to inflation
	58	Counterparty risk Payment risk mitigation

		• There are limited underwritten government guarantee for ensuring credit worthiness through letter of credit, escrow account, payment guarantee etc • There is limited information on bankability of standard PPAs Measurement of System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI) • There is limited information on recording measurements related to SAIFI and SAIDI and reporting to regulatory body and also making those available in public
Energy Efficiency	0	Carbon pricing and Monitoring • GHG emission coverage was not found due to limited or undeveloped carbon pricing mechanism • Adequate monitoring, reporting and verification system for GHG emission was limited or undeveloped
	0	Energy labelling systems EE labelling schemes • EE labelling schemes are not available and data of labels for refrigerators, HVAC, lighting, industrial electric motors, transports, and other industrial/domestic equipment/appliances are not readily available Mandatory vs voluntary labelling system • There are no mandatory or well-defined voluntary labelling system for refrigerators, HVAC, lighting, industrial electric motors, transports, and other industrial/domestic equipment/appliances
	0	Building energy codes New residential and commercial buildings • There are no EE codes for new residential or commercial buildings • As there are no EE codes, there are no EE standards requirement related to updating system reflecting technological advances and changes in best practices Compliance system • There is no requirement for EE during commissioning final building acceptance documentation • There is no requirement for periodic reporting to verify compliance with building EE requirements • There are no third part for verification purposes Renovated buildings • There is no requirement for EE for renovated buildings or any need for period reporting to verify compliance related to EE

		Building energy information • There is no mandatory standardized rating or labelling system for energy performance of existing buildings • Commercial and residential buildings do not require to disclose property energy usage at point of sale or when leased • Large commercial and residential buildings are not required to disclose property energy usage annually Building energy efficiency incentives • There are no mandates or targets for new building stocks to achieve any high-quality EE certifications such as LEED
	0	Transport sector Planning • There is no national database or national reporting system to periodically track and report transport efficiency metrics such as fuel per mile driven, average distance travelled per vehicle, distance travelled by public transit as a share of total passenger distance travelled, vehicle miles travelled per capita, etc. Private transport • There are no mandates or incentives program to support reduction of transport demands or shift to more energy efficient modes of transport for personal use such as regularly scheduled teleworking, bicycle and/or other non-motorized schemes, car sharing, public transit subsidies for consumers, congestion charges, electric vehicle programs etc • There is no requirement for periodic reporting to verify compliance or progress of any mandates or programs Commercial and/or industrial transport • There are no mandates or incentives program to support reduction of transport demands or shift to more energy efficient modes of transport for commercial and/or industrial use such as heavy-duty vehicle fuel economy standards, freight fuel economy standards, municipal bus fleets, commercial/ industrial vehicle fleets etc. (rail and train has been excluded for Nepal, unless it is a priority) • There is no requirement for periodic reporting to verify compliance or progress of any mandates or programs
	0	Incentives & mandates for public sector Obligations for public infrastructure • There are no binding energy savings obligations for public buildings and/or other public facilities such as water supply, wastewater services, municipal solid waste, street lighting, transportation, and heat supply

		Tacking and enforcement of obligations • There is no reporting mechanism to track and enforce energy savings in public sector facilities either in house or by a third party Public procurement of EE products • There are no specific policies or mandated guidelines for public procurement of EE products and services at national, provincial, or local level • There are no specific guidelines or tools to help identify EE options for procurement such as EE calculators, technical specifications, or product rating catalogues. Ability to retain energy savings • There are no specific public budgeting regulations and practices for public entities to retain energy savings at national, provincial or local level.
	27	Financing mechanisms for EE Financing mechanisms available in each sector • Financing mechanisms such as Discounted 'green' mortgages, on-bill financing/ repayment, credit lines and/ or revolving funds with banks, energy services agreements such as pay-for-performance contracts, green or EE bonds, vendor credit and/ or leasing for EE, partial risk guarantees, etc for residential, commercial and industrial sector are not available. • FIs or non-FIs have no financial products for EE investment in residential sector with limited products for commercial and industrial sector
	39	Incentives & mandates for Utilities Utility EE Programs • There are no specific penalties in place for non-compliance with EE requirements for generators although utilities carry out EE related activities • There are no specific penalties in place for non-compliance with EE requirements for transmission and distribution networks although utilities carry out EE related activities • There are no specific penalties in place for non-compliance with EE requirements for demand side management/ demand response although utilities carry out EE related activities • Mechanisms such as public budget financing, consumer surcharge and decoupling are not available for utilities to recover costs associated with or revenue lost from mandated EE activities Utility Consumer Pricing and Information • For residential sector, Time-of-Use (TOU) rate structures are not available

		• For commercial and industrial sector, 3 TOU rates structure-variable peak pricing, critical peak pricing, and peak time rebates and/or time of day tariff available but real time pricing and seasonal rates are not available. • Features to compare bills in the same region and/or usage class for residential, commercial, and industrial customers are not available • Over time bill energy usage are not reflected in the bills for any sector •
	50	Incentives & mandates for C&I end users Mandates for large consumers • Although there are audits and energy management system such as computer technologies for large energy users, but specific in-house energy managers and facility targets for kWh savings or lower energy intensity or carbon dioxide reductions are not available • There are no penalties in place for non-compliance with EE programs for large energy users • There is no specific measurement and verification program in place Incentives for commercial and industrial consumers • There are no programs for publicly recognizing end users who have achieved significant energy savings measures • There are limited awareness programs or publicized case study examples of significant energy saving measures
	50	Minimum EE performance standards Verification and penalties for non-compliances • Information related to mandatory standards, periodic reporting, verification of compliances, penalty for non-compliance and periodic updates of standards are not available for refrigerators, HVAC, lighting, industrial electric motors, transports, and other industrial/domestic equipment/appliances
	50	National EE planning Sub-sectoral targets • There are no specific targets defined for residential, commercial, transport, industrial or power sector Scope of targets • There is limited analysis on derivation of targets or EE status that are publicly available

7. Way forward

The document presents specific gaps across the four pillars of RISE. Each sub-sector is listed with sets of actions and activities that needs to be fulfilled in order to reach the advanced level. Based on RISE, enabling these sub-indicators to reach the advanced level will increase the attractiveness of private sectors to invest. The way forward is to develop a detail issue logs and using it to either reform the existing policies or to introduce a new policy as a whole. It is also recommended to develop an action plan to reflect these according to timeline, preferably as a short (1 year), medium (1-3 years) and long (above 3 years).