

ENERGY SAFETY NETS

A GUIDE FOR POLICYMAKERS



ENERGY SAFETY NETS

The principle of "leave no one behind," which is inherent to the Sustainable Development Goals, means that even the poorest and most disadvantaged people in the world should have access to modern energy services.

Research partners:



FACULTY OF ECONOMICS AND BUSINESS
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PROCESS MAP FOR BUILDING AN ENERGY SAFETY NET

START HERE

THRESHOLD stage:
Are energy safety nets needed in my country?

Are any poor and vulnerable populations unable to afford any household energy services at market prices?

Based on the data collected, can the program be refined and made more sustainable?

Repeat steps to ensure the Energy Safety Net program continues to support access to modern energy services for the poor and vulnerable.

PLANNING stage:
How to plan a strong energy safety net program

Once ANSWERED, proceed to **PLANNING**

Identify existing databases to target households that cannot afford essential energy services.

Who should be eligible for public support? What are the characteristics of this population - geographically, demographically, etc.?

What will the support go toward? Electricity access or clean cooking access? Capital cost (connections) or ongoing use (consumption)?

RESOURCES stage:
What financial and administrative resources are required?

IF CONNECTIONS:
What is the necessary equipment? What does it cost? What is the investment/ installation cost? What is affordable by the target population?

What partnerships are needed within the government (among ministries, for example) to make this program successful?

IF CONSUMPTION:
What is the right level of consumption to support? What is the market cost? What is affordable by the target population?

Which entity(ies) will oversee and/or deliver the program?

Once ANSWERED, proceed to **RESOURCES**

Is there a way to make this program gender-responsive? Does it contribute to reducing long-standing social and economic inequalities between men and women?

Which delivery mechanism makes sense for support? Is there a mechanism already in place?

- Connections
- Waiver fees
 - Grants in-kind
 - Cash grants
 - Concessionary credit
- Consumption
- Waiver fees (lifeline tariff/ reduced prices)
 - Grants in-kind
 - Cash transfer

EVALUATION stage:
How to track and evaluate program impact

What data is needed to understand and enhance the impact of the program on an ongoing basis? Is there a monitoring plan to track this data?

IMPLEMENTATION stage:
How to optimally deploy the program

Once ANSWERED, proceed to **IMPLEMENTATION**

What public outreach is needed to make the target population aware of this program?

Who will conduct this outreach?

INTRODUCTION

We use the concept of an **Energy Safety Net (ESN)** as an umbrella term for government-led approaches to support very poor and vulnerable people to access essential modern energy services, defined as electricity and clean fuels and technologies for cooking, by closing the affordability gap between market prices and what poor customers can afford to pay. ESNs can make physical access (i.e. connections) to electricity or clean fuels affordable or they can make the unit price of electricity or fuel affordable to consume. ESNs include some form of targeting or eligibility criteria to direct benefits to those who need them.

This guide is based on experience with ESN measures in six countries spanning three continents.ⁱ

Governments across the world provide support to citizens who are vulnerable or living in conditions of poverty or deprivation, to ensure their basic needs are met and to protect them from social, economic and environmental disasters, such as droughts. This social assistance is a 'social safety net', which the World Bank defines as 'non-contributory transfers designed to provide regular and predictable

support to targeted poor and vulnerable people.' These mechanisms typically offer support for such things as nutrition, education, and housing, but are rarely designed to provide for essential energy needs (Scott and Pickard 2018).

An ESN serves the same purpose as a *social* safety net, but with respect to people's access to essential *energy* services, which are distinct from social services. An ESN can make physical access (i.e. connections) to electricity or clean fuels affordable for poor and vulnerable people, or it can make the unit price of electricity or fuel affordable to consume.

An ESN incorporates the targeted character of a social safety net; it has neither the economic disadvantages of an economy-wide energy subsidy nor the disadvantages, in terms of excluded populations, of purely market-based delivery of energy services.

This Policy Guide is intended to support policymakers who aim to establish a policy framework that will help ensure universal access to affordable, reliable, sustainable and modern energy services. Section 2 describes the different types of ESN policymakers should consider. Section 3 provides guidance on the critical questions policymakers should consider when designing ESNs.

ⁱ See Sustainable Energy for All (SEforALL) 2020. Energy Safety Nets: Using Social Assistance Mechanisms to Close Affordability Gaps for the Poor.

TYPES OF ENERGY SAFETY NETS

There are many ways to provide support to poor and vulnerable people to enable them to access and use electricity or clean fuels and technologies. Resource transfers can be monetary or in-kind; they can be channelled directly to eligible households or through energy service providers; they can be specific to one kind of energy or offer general support for energy usage.

It is important to consider separately ESNs that provide *connections* to energy and ESNs that support energy *consumption*. The former are one-off resource transfers and the latter are recurring.

CONNECTIONS

Physical access to an electricity supply can be provided through connection to the national grid or to a mini-grid or an off-grid household solar PV system.

Connections to grid electricity

The costs of connecting a house to the electricity grid include the cost of extending wires from the existing grid, which may involve erection of poles,

meters and other fittings. The distance of the house to the nearest point of the grid is a key determinant of the cost. For long distances, additional electrical equipment, such as voltage transformers, may be necessary. Connection costs charged by distribution companies vary in how they are calculated and how much of the total cost is recovered from the customer.

Grid connections for poor and vulnerable households can be provided free of charge, at a reduced rate, or with a concessional loan (for all or part of the cost). When a loan is provided by the utility company, repayment can be made through monthly bills or instalment programs.

Connections to mini-grids can be supported in a similar way. When connections are made during the construction and installation of a mini-grid, the costs can be incorporated into the overall capital cost and financed as part of the investment.

The total costs of installing an electricity connection, via grid or mini-grid, include internal wiring ('behind the meter') in the house. These costs are often borne by the household. Utility companies

Energy Access: Connections	Energy Use: Consumption
Physical connection to an energy supply	Ongoing consumption of energy
Metric: Number of connections	Metric: Quantity of energy used in a time period
Upfront capital investment financed by savings, grants or credit	Recurring costs financed by income, savings or transfers



may set standards for internal wiring, for safety and reliability reasons, which increase the cost to the household and may make a connection unaffordable. Policymakers need to consider the effect of such standards and other utility company requirements (e.g. proof of legal residency) on the effectiveness of support for connections.

Connections to off-grid electricity

Stand-alone household electricity systems are likely to use solar photovoltaic (PV) technology and include solar home systems and solar lamps. Access to these may be supported through in-kind or cash transfers, reduced prices and concessional loans, or a combination (e.g. an in-kind transfer for part of the cost and a loan to cover the balance). While solar household systems do not have significant operating costs, they may need maintenance, repairs and parts replacement (e.g. batteries). Policymakers should consider how these recurring costs will be met by poor and vulnerable households when designing ESNs for access to off-grid

energy technologies, to ensure continued reliable access to electricity.

Connections for clean cooking

Physical access to liquefied petroleum gas (LPG) for clean cooking requires a (filled) gas cylinder, an appropriate stove or burner, a regulator and hose pipe. As with solar household systems, access to this equipment may be supported through in-kind or cash transfers, reduced (subsidized) prices and concessional loans, or a combination of these. The size of the cylinder (measured in kilograms of LPG) is a key consideration. Smaller cylinders (e.g. 3 kg or 5 kg) may be more affordable for poor and vulnerable households.

Access to improved (biomass) cookstoves (ICS) can generally be supported through in-kind or cash transfers and reduced prices. Credit from stove suppliers or financial institutions, on concessional terms, may be appropriate for more expensive models.

CONSUMPTION

Support for electricity consumption

Electricity consumption can be supported through reduced-price tariffs for eligible households. This can be for electricity supplied by a distribution company on the national grid or by a mini-grid operator. In many countries, electricity tariffs have an increasing block tariff (IBT) or volume differentiated tariff (VDT) structure, with a reduced-price tariff for the first block of consumption (e.g. the first 50 kWh consumed per month). This is often called a lifeline or social tariff. In some places (e.g. South Africa) and for some social groups (e.g. in Brazil), this lifeline block is provided to eligible households free of charge.

Under an IBT scheme, all consumers pay the same reduced-price tariff up to the given volume threshold of the lifeline block and pay a higher price per

kWh for consumption that exceeds that threshold. In a VDT system, a higher price is paid for every kWh once consumption exceeds the lifeline block threshold, not only the consumption that occurs above the threshold, as with IBT. In some systems, more than one consumption block has a reduced-price tariff, with decreasing levels of subsidy in successive blocks.

It is assumed that households below the poverty line will consume no more than the maximum of the first block. Eligibility criteria can be used to decide which households can receive the reduced-price tariff, such as the level of expected consumption or being a registered recipient of social assistance.

Many electricity consumers are required to pay a monthly standing charge to cover fixed costs associated with the supply (e.g. maintenance and depreciation of infrastructure). For consumers who use small quantities of electricity each month, these



Box 1: Simple and complex electricity tariffs

Simple

In 2018, residential electricity tariffs were revised in Kenya, introducing a block for very low consumers, raising the threshold of the lifeline block and eliminating fixed monthly standing charges.

	Tariff	kWh	\$ per kWh	
	DC1	11-100	0.10	
	DC2	>100	0.16	

Note: Using \$ exchange rate of June 2019 and rounded to two decimal places.

Complex

Mexico has eight different residential electricity tariffs. Seven of these are subsidized tariffs (1 to 1F in the table below) each with three volume differentiated blocks. The threshold for the second and third block varies by geographical zone and the average temperature of the region. There are also different subsidized tariffs in summer months to reflect higher ambient temperatures.

The tariff for residential high consumers (DAC: *tarifa doméstico de alto consumo*) is unsubsidized and has a monthly fixed charge in addition to unit price. The DAC tariff also varies by geographic zone.

Non-Summer Tariffs							
Tariff	1 st Block		2 nd Block		3 rd Block		Average temp.
	kWh	\$	kWh	\$	kWh	\$	
1	0-75	0.04	76-140	0.05	141-250	0.15	<25°C
1A	0-75	0.04	76-150	0.05	151-300	0.15	25°C
1B	0-75	0.04	76-175	0.05	176-400	0.15	28°C
1C	0-75	0.04	76-200	0.05	201-650	0.15	30°C
1D	0-75	0.04	76-200	0.05	201-1000	0.15	31°C
1E	0-75	0.04	76-200	0.05	201-2000	0.15	32°C
1F	0-75	0.04	76-200	0.05	201-2500	0.15	33°C
DAC	\$ 0.22 – \$ 0.25 per kWh plus \$5.58 fixed charge						
Summer Tariffs							
Tariff	1 st Block		2 nd Block		3 rd Block		Average temp.
	kWh	\$	kWh	\$	kWh	\$	
1	0-75	0.04	76-140	0.05	141-250	0.15	<25°C
1A	0-100	0.04	101-150	0.04	151-300	0.15	25°C
1B	0-125	0.04	126-225	0.04	226-400	0.15	28°C
1C	0-150	0.04	151-300	0.04	301-450	0.06	30°C
1D	0-175	0.04	176-400	0.04	401-600	0.06	31°C
1E	0-300	0.03	301-750	0.04	751-900	0.05	32°C
1F	0-300	0.03	301-1200	0.04	1201-2500	0.05	33°C
DAC	\$ 0.22 – \$ 0.25 per kWh plus \$5.58 fixed charge						

Note: Using \$ exchange rate of June 2019 and rounded to two decimal places.



standing charges can be a significant share of the total bill and make the unit cost of their electricity higher than that of large consumers of electricity. Their monthly outlay for electricity therefore may not vary noticeably with consumption and the standing charge is a bigger factor for affordability. Integrating the standing charge with the per kWh price in the tariff structure can help to overcome the affordability barrier for low-income consumers.

Support for LPG consumption

In a similar way, the regular consumption of LPG can be supported by enabling households below the poverty line to purchase reduced-price gas when they refill their cylinder. In this case, the resource transfer can be to the household (e.g. a cash transfer or voucher) or to the LPG distributor (e.g. when they sell to eligible households at a reduced price). Under one scheme in India, for example, the transfer is deposited directly into the bank accounts of beneficiaries (see Box 4).

An important factor for the effectiveness of an ESN for LPG consumers is the reach and efficiency of the distribution network. Poor and vulnerable people often live in remote and rural areas that may not be well-served by LPG distributors. They may have to travel considerable distances to refill their gas cyl-

inder, adding to the overall cost of their fuel, and LPG may not always be in stock. Investment in the distribution network may be necessary to achieve the aims of the ESN.

Support for unspecified energy consumption

Finally, policymakers also have the option to provide an ESN to poor and vulnerable households in the form of a cash transfer that is not tied to the consumption of a particular kind of energy. This could be a transfer that is additional to other social assistance benefits and explicitly allocated for energy costs (e.g. the Energy and Cash Plus initiative in Kenya) or it could be integrated with other social assistance transfers (e.g. *Bolsa Família* in Brazil).

Policymakers need to specify and define the intended target population for an ESN when it is designed. As well as the criteria for identifying who should receive support from the ESN, policymakers need to decide whether the ESN is intended to enable physical access (connection) to electricity or clean fuels and technologies, or access to sustained consumption of electricity or clean fuel.

This section outlines the key questions that policymakers should ask when designing an ESN. These

KEY CONSIDERATIONS FOR DESIGNING ENERGY SAFETY NETS

questions relate to how and to whom the support will be targeted, the level of energy consumption that will receive support and how this support will be delivered to beneficiaries. Policymakers should also consider how citizens will be informed about the ESN, and how to obtain their support, how the ESN will address gender differences in energy access and use, and how it will be financed.

TARGETING APPROACH

A defining characteristic of an ESN is that it is intended to support access to energy for a specified, target population. ESNs can use many ways to define the target population. These could include:

- *Geographic Targeting* – specifying the target population by location, which may be through administrative boundaries, climatic zones, settlement type, distance from existing services, or incidence of poverty
- *Social Characteristics* – targeting social, cultural, ethnic or religious groups who are vulnerable or deprived
- *Economic Characteristics* – defining the target population in terms of income level (e.g. in relation to a poverty line), expenditure on energy (or share of household expenditure on energy), quantity of energy consumed and occupation
- *Demographic Characteristics* – defining the target population in terms of the elderly, veterans, widows, female-headed households, and family size.

A combination of targeting approaches can also be used, for instance, first specifying a geographical

area and then the population within it that is below the poverty line.

While there is no perfect targeting mechanism for an ESN, its design should seek to avoid obvious pitfalls. Each approach to defining the target population for an ESN can include people who are not poor or vulnerable or exclude people who are. Targeting based on physical measures of energy consumption (e.g. kWh) risks inclusion errors if the level of consumption is set too high, or exclusion errors if too low. Inclusion or exclusion errors can be small with categorical targeting, such as by geography or social characteristics, when the category is strongly correlated with poverty or vulnerability. However, geographical targeting may include everyone in the area who is poor or vulnerable but may also include people who are not. An ESN for consumption excludes those who do not have physical access. Means testing—using an income level criterion or an appropriate proxy—tends to increase the share of total support that is received by poor or vulnerable people, but inclusion and exclusion errors can occur if the classification of people (or households) is inaccurate or inefficient. Means testing can also entail significant administrative costs, including keeping registers up-to-date.

The targeting criteria to ensure a safety net reaches poor or vulnerable people may be different for electricity and clean fuels, and for connections and consumption. Policymakers will need to consider whether support to achieve their access to energy objectives will require one or more targeting approach and one or more ESN measure. Support for connections may be a necessary first step but does

not guarantee energy will be consumed by the target population.

In the design of an ESN, consideration needs to be given to how targeting criteria will be applied. In some cases, the target population may self-select. For instance, when targeting is through the quantity of energy eligible for subsidy (e.g. the lifeline block in an electricity tariff or small LPG cylinders), consumers may decide to consume this quantity or less – the assumption being that low-income consumers do not consume above this level. When targeting is geographical, some people in the area may not register to receive the benefit of an ESN, although this can be due to lack of awareness. Self-selected targeting occurs when potential beneficiaries choose to benefit from an ESN, for example, by managing their energy consumption to be eligible for a lifeline tariff. The opposite of self-selected targeting is also found, when people choose not to receive an energy subsidy, such as India's 'Give it Up' scheme that encourages wealthy households to voluntarily forego the LPG subsidy.

The identification and registration of people eligible to receive the benefit of an ESN entails administrative costs. There are costs to establish the administrative system and to update it regularly to reflect changing demographics, and these costs can be significant. A unified register for all safety nets, energy and social, would have lower total costs than separate administrative systems and help ensure there is targeting consistency between different safety net measures. However, this requires harmonization of targeting criteria across different safety nets and the involvement of different line ministries (e.g. education, health, social welfare, food and energy).

LEVEL OF ENERGY CONSUMPTION

The purpose of an ESN is to enable poor or vulnerable people to access enough energy to meet their essential needs. Policymakers need to consider how much energy this should be in physical terms (e.g. in kilowatt hours, kilograms or joules), taking into account all the energy services (i.e. lighting, space

Box 2: Indonesia's unified database

Indonesia's *Basis Data Terpadu* (BDT) is an electronic database containing social, economic and demographic information from census data. It is used to conduct a proxy means test to identify and classify the poorest 40 percent of the population. The proxy means test includes indicators such as household characteristics, and demographic, employment, housing, asset ownership, education, health, and social assistance membership information.

The database has been updated several times since its inception in 2005, most recently in 2015 when it was renamed BDT. There are now 25.7 million households classified as the poorest 40

percent of the population. For the next update, local governments will be involved in the registration and verification of new and existing poor households in their regions.

The BDT unified database is under the supervision of the Ministry of Social Welfare and was initially only used to identify eligible beneficiaries for social assistance programs. Since 2017 it has also been used to identify households eligible for targeted energy subsidies by *Perusahaan Listrik Negara* (PT PLN), the national electricity utility company. By matching the BDT database with its customer database, PT PLN has been able to reduce the number of customers paying concessional tariff rates.

heating/cooling, cooking, communications and motive power) that people need.

The quantities of electricity and clean fuel necessary to meet essential needs will not be the same for all poor or vulnerable households. Households vary in size and composition; they live in a variety of locations with different climates; they may be in rural, urban or peri-urban settlements; and they have different social and economic contexts and behavior. Energy needs can also vary seasonally.

To determine the quantity of energy that should be supported by an ESN, policymakers should consider the quantities of energy actually consumed by households above and below the poverty line that have access to electricity and clean fuels and technologies for cooking. The criteria used to decide the level of consumption to be supported by an ESN should be clear and transparent.

Unfortunately, data on the quantity of energy consumed by households are rarely captured by national household surveys. Utility companies may have data on electricity consumption by their consumers, but a high incidence of multiple occupancy, shared meters and prepaid meters may affect their reliability. Similarly, LPG distributors may have data on the consumption (purchases) of individual consumers, but this will depend on the administrative system used.

The Multi-Tier Framework (MTF) for measuring energy access, developed by the World Bank, can also be used to provide guidance on the quantity of energy that should be supported by an ESN. Tier 3 (see Box 3 for a more detailed description of the MTF), equivalent to about 30 kWh per month, is widely regarded as the level of household electricity consumption necessary to meet essential needs and achieve a dignified standard of living. This is within the maximum quantity of lifeline tariff consumption in many countries (Komives et al. 2005).

Subsidies and social assistance, which entail a transfer of resources to poor and vulnerable people, are

usually measured in monetary terms. Determining the level of support (the size of the resource transfer) for energy access that an ESN should provide in monetary terms alone may affect the safety net's effectiveness. For example, if the level of support has a fixed value (e.g. dollars per month), any energy price increase, perhaps in response to a change in international energy prices, would affect its real value and the quantity of energy that can be consumed by its recipients. If energy prices vary by location within a country, reflecting distribution costs, the real value of the safety net to recipient households will be different in different districts or settlements.

Policymakers need to consider the trade-off between the sophistication of an ESN scheme that will match the potentially wide variety of circumstances of poor and vulnerable people, and the additional costs of administering it, compared to a simple scheme providing a more uniform level of support. Consultation with the public about this is recommended to enhance acceptance of the ESN scheme.

DELIVERY OF THE SUBSIDY

Policymakers must also consider how an ESN will transfer resources to the target population. The options will differ depending on the kind of energy to be supported (i.e. electricity or clean fuel) and whether a resource transfer is intended to support connections or recurring consumption.

Cash transfers, which are commonly used in social assistance schemes, can put necessary financial resources into the hands of poor and vulnerable households, allowing them to purchase energy services in existing markets. The design of the ESN will need to consider how the cash is to be delivered to eligible households. Do recipients collect it in person from a government office or agent? If it is to be transferred to a personal bank account held by a member of the household, are banking services easily accessible (e.g. in thinly populated rural districts)?

Box 3: The Multi-Tier Framework

The Multi-Tier Framework (MTF) was developed as a way to measure access to energy that recognizes different levels of access (Bhatia and Angelou 2015). Having a connection to an energy supply is not the same for every household. The MTF distinguishes levels of access to energy services for household, productive and community use, and in terms of electricity, cooking and heating. Qualitative dimensions, listed below, are also used at different tiers of access.

Electricity	Cooking
Peak capacity	Indoor air quality
Availability	Availability of primary fuel
Reliability	Cookstove efficiency
Legality	Convenience
Health and safety	Safety of primary cookstove
Affordability	Affordability
Quality	Quality of primary fuel

For electricity access, the MTF considers lighting, entertainment and communications, space cooling and heating, refrigeration, mechanical loads, product heating and cooking. Levels, or tiers, of access are defined in terms of the power requirement of appliances and hours of daily use. This provides a minimum monthly electricity consumption figure for each tier of access, shown in the table below.

	Tier 0	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
Monthly consumption		≥ 0.4 kWh	≥ 6 kWh	≥ 30 kWh	≥ 104 kWh	≥ 250 kWh
Energy services		Task lighting Phone charging	General lighting Television Fan	Tier 2 and medium-powered appliances	Tier 3 and high-powered appliances	Tier 4 and very high-powered appliances

For clean fuels and technologies for cooking and heating, the MTF does not distinguish tier access by quantity of energy consumed but rather presents them as successive steps. This reflects variety in the fuels that can be used and recognizes that many households use multiple fuels and stoves.

The MTF provides a more informative measure of access to energy than the number of connections. However, it is information-intensive and complex to use in practice and the benchmarks for each tier may not be universally applicable (Pelz et al. 2017).

For further information see: www.esmap.org/node/55526

Cash transfers can also be delivered as vouchers that can be redeemed at the energy service provider. Electronic vouchers (codes) can be sent to the mobile phone of a household member or directly to the service provider. Similarly, vouchers can be used for in-kind transfers (e.g. LPG refills or solar household systems). Assets (equipment) and fuel can also be delivered directly to eligible households.

Reduced prices for energy services (connections and recurring consumption) purchased in the market require a system for eligible consumers to be recognized by energy service providers. This can include evidence of registration for social assistance or an electronic voucher (code). The design of the ESN will need to consider how service providers are to be reimbursed.

Resource transfers can be made directly to energy service providers and suppliers to enable them to sell at reduced prices to all consumers. Volume differentiated pricing (e.g. lower unit prices for smaller quantities) can help ensure the benefit reaches the target population. Smaller volumes (e.g. smaller LPG cylinders) may be more affordable for poor households but do not necessarily reduce the unit cost of energy.

The effective delivery of ESNs requires a robust administration to minimize leakage of benefits and prevent malpractice. Synchronizing the systems used by consumers and distributors with electronic databases and communications technology can help to reduce administrative costs. India's 'Know Your Customer' program, for example, allows businesses to electronically verify the identity of their clients. The use of established financial institutions can contribute to objectives for financial inclusion.

EDUCATION AND AWARENESS

To ensure the effectiveness of ESNs and achieve the goal of universal access to electricity and clean fuels and technologies for cooking, citizens who have not used these forms of energy before need to be in-

formed and educated about them. The benefits to them may not be obvious; they may have concerns about safety and affordability; they may not know how to use them to their full advantage; and there may be strong cultural attachment to existing energy use behavior, such as fuel preference for some types of cooking. Similarly, they may not be aware of the harmful effects of using fuels such as kerosene and fuelwood. Lack of knowledge and awareness is likely to be greater among vulnerable and deprived social groups – the targeted beneficiaries of ESNs.

When an ESN scheme is introduced, potential beneficiaries should be informed about how to apply or register for the support it provides, as well as the benefits of access to electricity and clean fuels. The coverage of the safety net (the share of the total eligible population who receive the benefit) can be affected by levels of awareness, including understanding the scheme's administrative procedures (bureaucracy). Potential beneficiaries can be informed by media campaigns and outreach by agents of the government and energy service providers, before and after the introduction of the ESN.

Communication to inform citizens about the benefits of modern energy services and availability of ESNs should be appropriate to the target audience. For example, using broadcast television announcements to inform people without access to electricity may not be effective. Communication should consider education and literacy levels in poor and vulnerable social groups. In some places, face-to-face social marketing, practical demonstrations, or the use of established communications channels (such as village meetings) may be required.

GENDER

The design and implementation of an ESN should consider the gendered nature of energy management within the household. Traditionally, women manage domestic energy for cooking and/or heating and are responsible for collecting fuelwood and tending fires. When electricity or clean fuels such as

Box 4: Direct Benefit Transfer of LPG, India

At the beginning of 2013, the Government of India introduced the Direct Benefit Transfer scheme, reforming the delivery mechanism of existing welfare schemes. By transferring subsidies directly to the bank accounts of beneficiaries, the government aimed to improve the efficiency, effectiveness, transparency and accountability of welfare schemes. Direct Benefit Transfer has now been implemented for over 450 social safety net schemes across 56 ministries.

When the Direct Benefit Transfer scheme for LPG, also known as *Pratyaksh Hastantarit Labh* (PaHaL), was launched in 2013, over 40 million duplicate, inactive or 'ghost' connections were removed from the LPG subsidy scheme. Under PaHaL, subsidies for LPG consumption are transferred directly into the bank accounts of customers registered with a state-owned oil marketing company. To avoid diversion of the subsidy at the distributor, the market price for the cylinder is charged to beneficiaries and the subsidy is trans-

ferred to their bank accounts within four to five days of a cylinder being bought.

To mitigate the difficulty for households below the poverty line to pay the market price for the first cylinder, the government provides a one-time advance payment when they first register for the scheme. This ensures consumers have the cash necessary to pay for the first cylinder refill.

Under PaHaL, the government transfers about USD 4 billion a year to over 220 million LPG consumers. On average, each beneficiary household receives USD 17 to purchase LPG, which is enough for five refills but not enough to meet the needs of a household dependent on LPG as a primary fuel. A greater proportion of the subsidy goes to households that consume more LPG, not necessarily those who can least afford it. There remains a need therefore to continuously revise the scheme to improve its efficiency and effectiveness.

LPG are adopted, men sometimes assume a larger role in decision-making about energy, for example, how electricity is used and what appliances to purchase. ESNs can be designed, or complemented with other initiatives, to ensure women's empowerment in energy management is protected or enhanced, by targeting resource transfers to women. Instances of gender-responsive ESNs are rare, however, and their design is a challenge for policymakers to address.

Policymakers must consider how wider social barriers to women's empowerment, such as access to land and other assets, financial services, communi-

cations and education, may affect the implementation of an ESN. Households headed by widows or divorcees are more likely to be poor and vulnerable than households headed by married men, so provisions must be made to intentionally reach them and address their needs. Access to electricity and clean fuels can make a significant difference to women's lives by making time available for other activities and reducing household air pollution, but women may have difficulty accessing financial services and energy distributors, which warrants additional intervention. The design stage of an ESN should comprehensively assess how gendered social norms will affect their uptake and effectiveness.

FINANCING THE SUBSIDY

A key consideration for policymakers is how subsidies provided by ESNs will be financed. Connections, which are mainly one-off investments, and energy use, which is a recurring cost, have different financing needs and can be financed through different mechanisms. There are three main financing options: government expenditure, cross-subsidy, or grants and concessional loans from development cooperation partners.

Governments can use public finance to cover the costs of ESNs. Investments in connections may be treated differently, or sourced from different budgets, from finance for the recurring costs of support for energy use. Political factors can influence annual budget allocations and changes in ESN implementation (e.g. during electoral periods).

Cross-subsidization occurs when other consumers (usually those who consume more electricity)

pay an additional amount to cover the costs of an ESN supporting poor and vulnerable consumers. This is usually done through the tariff and billing system. For example, in Kenya, all electricity consumers pay a surcharge, which is used to pay for connections in rural areas. In an IBT tariff structure, the price per kWh for higher consumption blocks should be set to ensure the overall revenue from tariffs covers the subsidy for lifeline blocks. Cross-subsidy may not be feasible for individual mini-grids because the pool of consumers is relatively small.

Support from international donors has been used by many governments for programs and projects to extend connections to households without access to electricity or, less commonly, clean fuels and technologies. Donors have also supported the operation of social safety nets. International donors may be open to supporting the design and establishment of an ESN, including piloting schemes to trial targeting and delivery options.



EVALUATION AND LEARNING

Implementation of an ESN should be reviewed continuously to evaluate and improve its effectiveness. Any ESN will also need to respond to changing social and economic conditions, as well as to new knowledge about the essential energy needs of poor and vulnerable people and changes in technology for energy or information management.

Assessment of the effectiveness of an ESN should consider three critical questions.

- **How well targeted is the scheme?** What share of the total value of the benefits is received by people in the target population? If there is significant leakage or diversion of benefits to people who are not living in poverty, the design or administration of the scheme should be changed.
- **How well is the scheme reaching the target population?** What proportion of the total eligible population is receiving support from the ESN? Review of an ESN's implementation should consider why people eligible for its benefits are not registered for or receiving them.
- **How well are the target population's essential energy needs being met?** Do recipients of support from the ESN consume enough electricity or clean fuel to meet their needs? What share of their total energy expenditure does the ESN provide? What share of total household expenditure is given to the purchase of electricity or clean fuel (including repayment of loans)?

Reviews of the effectiveness of ESNs should be informed by an understanding of household-level energy consumption behavior, including differences within households. This will require data from household surveys and may call for additions or changes to existing periodic household surveys. Information can also be sought from energy service providers.

Policymakers can learn from the experience of other countries while tailoring the design of ESNs to the needs of their own countries. Knowledge exchange between countries implementing ESNs could be facilitated through its inclusion on the agendas of international and regional forums concerned with energy access and social assistance.

POLICY FRAMEWORK

A high-level policy commitment to universal energy access, with national targets, will provide a basis for the development of specific measures to achieve it, including ESNs. The commitment should go beyond targets for connections and include energy consumption to meet essential needs. For example, under the 2019 Energy Act, the Government of Kenya has a statutory obligation to facilitate the provision of affordable energy services to all persons in Kenya.

The design and implementation of an ESN should also reflect social protection policy. ESNs are a form of social assistance, focused on one form of consumption, and should be consistent with and supportive of national social assistance objectives. ESNs can also be integrated with social assistance through, for example, unified registers of recipients and the delivery of resource transfers.

The design and implementation of effective ESNs will require coordination and collabora-

tion between ministries of energy and ministries responsible for social protection. In some countries, coordination with state or provincial governments will also be necessary. A high-level political champion can strengthen inter-ministerial collaboration.

The implementation of ESNs will require sustained, long-term policy commitment. It may take several years to build the administrative and institutional infrastructure to deliver support to poor and vulnerable households efficiently. Capacity to implement ESNs is likely to improve, but their effectiveness could be affected by policy variation. Poor and vulnerable households dependent on an ESN for essential energy consumption also rely on sustained policy implementation. Policymakers need to regard the design and implementation of ESNs as an evolutionary process that can begin at limited scale, expanding and adapting over time.



CONCLUSION

The goal of universal access to affordable, reliable, sustainable and modern energy services is incorporated in Sustainable Development Goal 7 (SDG7). Access to energy was recognized in the SDGs as being essential for individual well-being and opportunities for people to improve their productivity and earn higher incomes. Access to electricity expands opportunities and the use of clean fuels and technologies improves health. Initiatives to make these modern energy services available are increasing levels of access—920 million people have gained access to electricity since 2010—but almost 3 billion people continue to live without electricity or clean fuels (IEA et al. 2019) and only a very small share of the finance for energy overall is directed towards meeting basic energy needs (SEforALL 2019).

Even if modern energy services are physically available, their affordability may be a barrier to access

for people with very low incomes, as highlighted in the six case studies. For women, men and children living in extreme poverty, access to adequate energy services, such as electricity and clean fuels and technologies for cooking, is essential for daily life and to escape poverty. The principle of 'leave no-one behind', which is inherent to the Sustainable Development Goals, means that even the poorest and most disadvantaged people in the world should have access to modern energy services.

ESNs are a policy tool to enable poor and vulnerable people to achieve access to modern energy, in terms of connections and consumption. With 10 years remaining to reach the global goal of sustainable energy access for *all*, the time is now for governments to design ESNs that best address energy poverty in their countries, drawing upon the experience of other countries and a supportive international community of practice.

GLOSSARY

Cash transfer	Payment of money to individuals or households
Increasing block tariff	A tariff structure that has a higher unit price (USD per kWh) for each successive consumption block, for all customers
Energy safety net	A social assistance mechanism targeted to enable poor and vulnerable people to access and use modern energy
Lifeline tariff	A subsidized tariff for low-consumption blocks in increasing block or volume differentiated tariff systems
Effectiveness	A measure of the performance of a policy in terms of achievement of policy objectives
Efficiency	A measure of the performance of a policy in terms of the resources required to achieve its objectives
Social assistance	Resource transfers in cash or near-cash targeted to individuals or households living in poverty. A non-contributory system. Also called a social safety net.
Social safety net	Resource transfers in cash or near-cash targeted to individuals or households living in poverty. A non-contributory system. Also called social assistance.
Subsidy	A government regulation or financial contribution that alters the price of goods or services.
Volume differentiated tariff	A tariff structure that charges a different unit price (USD per kWh) depending on the level of total consumption. For each customer, all units are charged at the same price.

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