UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

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energy, water and sanitation

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NOTE

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I. INTRODUCTION

The International Covenant on Economic, Social and Cultural Rights[1] recognizes that "the ideal of free human beings enjoying freedom from fear and want can only be achieved if conditions are created whereby everyone may enjoy economic, social and cultural rights, as well as civil and political rights". In 2010, the United Nations General Assembly explicitly recognized the human right to safe drinking water and sanitation and acknowledged that these are essential to the realization of all human rights.[2] In 2015, the General Assembly identified clean water and sanitation as Sustainable Development Goal 6 and affordable and clean energy as Sustainable Development Goal 7 of the 2030 Agenda for Sustainable Development. [3]

Also in 2015, the United Nations General Assembly adopted the revised United Nations guidelines for consumer protection (the guidelines), [4] which are universally recognized as a valuable set of principles for setting out the main characteristics of effective consumer protection legislation, enforcement institutions and redress systems. They aim to assist interested United Nations Member States in formulating and enforcing domestic and regional laws, rules and regulations that are suitable to their own economic, social and environmental circumstances, while encouraging the sharing of experiences in consumer protection.

The first two "legitimate needs" recognized by the guidelines in paragraph 5 are "access by consumers to essential goods and services" and "the protection of vulnerable and disadvantaged consumers". Paragraph 77 recommends that Member States "should promote universal access to public utilities and formulate, maintain or strengthen national policies to improve rules and statutes dealing with provision of service, consumer information, security deposits and advance payment for service, late payment fees, termination and restoration of service, establishment of payment plans and dispute resolution between consumers and utility service providers, taking into account the needs of vulnerable and disadvantaged consumers."

The guidelines are the only international instrument agreed at the global level on consumer protection and, although not binding in the legal sense, they carry the moral authority derived from their adoption by consensus in the General Assembly and have been widely implemented by UNCTAD member States.[5] The fifth session of the Intergovernmental Group of Experts on Consumer Protection Law and Policy, convened by UNCTAD and held on 5 and 6 July 2021, discussed the consumer protection needs of vulnerable and disadvantaged consumers in connection with public utilities. Those discussions were supported by an UNCTAD secretariat note under the same name, which informs the present report. [6]

The coronavirus disease (COVID-19) crisis highlighted the importance of consumer policies to protect citizens from vulnerability and exclusion. In April 2020,[7] UNCTAD gathered evidence of initiatives from consumer protection agencies in the first wave of the pandemic. Many countries suspended the payment of public utility bills, energy and water, for vulnerable consumers, such as those who lost their jobs because of the pandemic. Examples include Argentina, Brazil, France, Portugal and Spain the last two having widened suspension of service cuts for non-payment still further, including fixed and mobile telephony, Internet and cable television. Gentilini U et al. (2021) recorded the "waiving or postponing payments for utilities and other financial obligations adopted in an astounding 701 cases across 181 countries".[8]

Government intervention is clearly proving necessary to meet consumer needs in public utilities, and its extent is an implicit global recognition of their importance. This recognition has grown during the COVID-19 crisis as the health risks of confinement have become more apparent even when not directly related to actual infection. The Sustainable Development Goal 6 tracking report for 2018 stated that "handwashing with soap and water is widely recognized as a top priority for reducing disease transmission". It further reported that: "Poor WASH (water supply, sanitation and hygiene) contributes to undernutrition, which is endemic among the poor in sub-Saharan Africa and Asia, where many people live in insanitary conditions and do not get enough calories, protein, and micronutrients in their diet." Sadly, only 27 per cent of the population in least developed countries had access to such basic handwashing facilities.[9]

COVID-19 has rendered network extension more difficult. The 2021 Energy Sustainable Development Goal 7 tracking report notes that "the COVID-19 crisis

threatens progress in some parts of the world. In sub-Saharan Africa, the number of people without access to electricity most likely grew in 2020". There alone, 85 million people will need to be connected each year for universal access to be achieved by 2030. [10]

The present report aims to provide policy makers with background on the emerging trends and considerations as well as policy options, focusing on the key requirements for inclusive and affordable access. Following this introduction, chapter two provides an overview of the international policy frameworks, namely the guidelines and the Sustainable Development Goals. Chapter three describes the features of the network services of water and sanitation, and energy, and places them in the consumer protection framework of inclusivity, affordability, and rights. Chapter four considers the role to be played by competitive markets and the interplay of competition policy and the regularization of the informal sector. Chapter five contains several policy options in the light of sustainability, including demand and supply-side efficiencies and fiscal options for demand reduction. A brief conclusion follows with a summary of policy considerations.

II. INTERNATIONAL POLICY FRAMEWORKS

The importance of lifeline services such as water and energy is the focus of many resolutions and declarations at the highest level, including the current Sustainable Development Goals.[11] In 2010, the United Nations General Assembly explicitly recognized the human right to safe drinking water and sanitation and the Human Rights Council reaffirmed this recognition. [12] Since 2006, there have been 12 resolutions of the Human Rights Council and four resolutions of the General Assembly on access to water and sanitation as a human right.[13] In 2016, a High-Level Panel on Water was convened by the United Nations and the World Bank and its Action Plan was presented to the United Nations General Assembly, and 'wholeheartedly endorsed' by the Secretary General of the United Nations and the President of the World Bank in 2016. The first headline recommendation was: "At local, country and regional levels: ensure universal access to safe water and sanitation. Address gaps in service delivery models, technology and behaviour change which limit access to sustainable drinking water and sanitation for all – including the needs of women, girls, people with disabilities, and communities in vulnerable situations, recognizing access to safe drinking water and sanitation services as a fundamental human right".[14]

Regarding energy, 'Universal access to modern energy by 2030' was proposed as one of the three key pillars of the Sustainable Energy for All programme, launched in 2011 by the United Nations Secretary General. [15] More recently, Sustainable Development Goal 7 has raised the profile of energy in the United Nations. Energy was not specifically named as a goal at the outset of the monitoring of progress towards the earlier Millennium Development Goals of 2000–2015.[16] Sanitation was also underemphasized.[17] Both sectors are fully recognized by the Sustainable Development Goals, whose detailed targets covering quality and safety correspond with the consumer protection dimensions set out in the guidelines.

An apparent paradox is that the promotion of access can seem to be incompatible with resource constraints, (particularly in water), and with the need to take urgent measures to prevent further climate change. It can also be argued that such a binary choice is a false one, but that nevertheless, users of these services, particularly in the richer countries, have an important contribution to make towards protecting the environment including the climate. As already mentioned, COVID-19 has shown that it is in the interests of all to protect the health and welfare of those still unserved. The Sustainable Development Goals add a welcome coherence to this debate by fitting these vital sectors into a generic framework, which includes both sustainability and universal coverage. The last revision of the United Nations guidelines for consumer protection in 2015 reinforced this trend.

This chapter sets out the general standing of public utility services within the United Nations. Together, the guidelines for consumer protection and the Sustainable Development Goals form a wide policy foundation for consumer protection. In this regard, the guidelines follow their earlier versions, which, in 1985 and 1999, also referred to international targets such as the objective of universal service set for the International Drinking Water Supply and Sanitation Decade which ran from 1981 to 1990, a later version running concurrently with the Millennium Development Goals until 2015. Alignment with international goals has thus been a feature of the guidelines since their first version in 1985.

A. THE UNITED NATIONS GUIDELINES FOR CONSUMER PROTECTION

The United Nations guidelines for consumer protection contain recommendations that directly address public utilities. Paragraph 69 of the guidelines includes water, energy and public utilities as "areas of essential concern for the health of the consumer".[18] The guidelines are applicable irrespective of whether a public utility service provider is publicly or privately owned. As stated in paragraph 2, they apply to "business-to-consumer transactions, including the provision of goods and services by State-owned enterprises to consumers".

Box 1 contains the relevant text of the guidelines. In respect of energy, Member States are encouraged to "promote universal access to clean energy and formulate, maintain or strengthen national policies to improve the supply, distribution and quality of affordable energy to consumers according to their economic circumstances" (paragraph 76). The reference to universal access is widened in paragraph 77 to public utilities. A degree of pragmatism is expressed about both water and energy services in terms of "the choice of appropriate levels of service, quality and technology", issues which feature in this paper, and which have taken on greater significance in the context of climate change.

BOX 1
Extracts from the **United Nations guidelines for consumer protection**, 2015 version

"Legitimate needs". The most frequently quoted of the guidelines is paragraph 5, which sets out the eleven "legitimate needs" of consumers, widely referred to as the "consumer rights" although that term does not actually appear in paragraph 5, which sets out: "The legitimate needs which the guidelines are intended to meet" The most relevant of the legitimate needs is 5 a): "Access by consumers to essential goods and services";

Section V: Guidelines; subsection K: "Measures relating to specific areas". Paragraph 69 indicates that "Member States should, where appropriate, give priority to areas of essential concern for the health of the consumer, such as food, water, pharmaceuticals, energy and public utilities". The utility sectors are addressed in section K as follows:

Water (paragraph 72): "Member States should… formulate, maintain or strengthen national policies to improve the supply, distribution and quality of water for drinking. Due regard should be paid to the choice of appropriate levels of service, quality and technology, the need for education programmes and the importance of community participation".

Paragraph 73 refers to the wider economic and environmental role of the water sector: "Member States should assign high priority to the formulation and implementation of policies and programmes concerning the multiple uses of water, taking into account the importance of water for sustainable development in general and its finite character as a resource".

Energy (paragraph 76): "Member States should promote universal access to clean energy as well as formulate, maintain or strengthen national policies to improve the supply, distribution and quality of affordable energy to consumers according to their economic circumstances. Consideration should be given to the choice of appropriate levels of service, quality and technology, regulatory oversight, the need for awareness raising programmes and the importance of community participation".

Public utilities (paragraph 77): Member states are asked to "promote universal access to public utilities". The French and Spanish versions use the terms '*services publics/servicios públicos*', which have long referred to utility services provided by private companies through concession arrangements. Therefore, the interpretation of the above should be that the endorsement of universal access in Section K applies to both energy and water services (including sanitation also mentioned in paragraph 72), publicly or privately provided.

Governments are also called upon in paragraph 77, to "formulate, maintain or strengthen national policies to improve rules and statutes dealing with provision of service, consumer information, security deposits and advance payment for service, late payment fees, termination and restoration of service, establishment of payment plans, and dispute resolution between consumers and utility service providers, taking into account the needs of vulnerable and disadvantaged consumers" (considered in section III E).

Source: A/RES/70/186.

B. SUSTAINABLE DEVELOPMENT GOALS

The preamble to the United Nations General Assembly on Consumer Protection of 22 December 2015, adopting the revised guidelines refers to the Sustainable Development Goals and the preceding Millennium Development Goals specifically "recalling the objectives…in the pursuit of development and the eradication of poverty". This paper focuses on the following Sustainable Development Goals: 6 on water and sanitation and 7 on energy.

Each of the 17 Sustainable Development Goals is monitored by a group of nominated 'custodians' with sectoral expertise, carrying out regular progress reports. In the case of Sustainable Development Goal 6, the process is led by United Nations Water's Integrated Monitoring Initiative on Sustainable Development Goal 6 and the custodians come from a wide range of United Nations agencies, including Regional Economic Commissions and other bodies devoted to specific groups such as UNICEF (the United Nations Fund for Children), or relevant thematic bodies such as the Environment and Human Settlement Programmes. Other bodies include the World Bank Group, the World Health Organization, and the World Meteorological Office. Member States' returns are included in the tracking reports where possible. [19]

The tracking report for Sustainable Development Goal 7 describes the process as a "global dashboard to register progress on energy access, energy efficiency, renewable energy and international cooperation to advance Sustainable Development Goal 7".[20] Progress is assessed by each country on each of these four targets. The relevant international custodian agencies are the International Energy Association and the International Renewable Energy Association alongside the broader expertise of the World Health Organization, the World Bank and the United Nations Statistics Division. As with Sustainable Development Goal 7, each of the 17 Sustainable Development Goals has a set of targets and each target has one or more indicators.

Sustainable Development Goal 6 is to "Ensure availability and sustainable management of water and sanitation for all" has a drinking water 'access target' 6.1 which is: "By 2030, achieve universal and equitable access to safe and affordable drinking water for all (100 per cent)." Target 6.1 is measured by Indicator 6.1.1: Proportion of population using safely managed drinking water services. [21]

For sanitation, target 6.2 reads: "By 2030, achieve access to adequate and equitable sanitation and hygiene for all (100 per cent) and end open defecation (0 per cent), paying special attention to the needs of women and girls and those in vulnerable situations." This is measured by Indicators 6.2.1a): "proportion of population using safely managed sanitation services", and 6.2.1b): "proportion of a population with a hand-washing facility with soap and water available at home". Further targets and indicators cover vital consumer issues including water quality, water use efficiency and community participation in water and sanitation management. The qualifiers regarding safety and affordability, reflect the refinement of targets are refined over the years.

For Sustainable Development Goal 7: "Ensure access to affordable, reliable, sustainable and modern energy for all", the first access target, 7.1 is: "By 2030, ensure universal access to affordable, reliable and modern energy services".[22] Again, the qualifiers regarding affordability and safety are significant. Indicator 7.1.1 is a simple: "proportion of population with access to electricity", but indicator 7.1.2 moves on to: "proportion of population with primary reliance on clean fuels and technology". The remaining targets and indicators cover the share of renewable energy in the mix, the progress of energy efficiency and relevant technology transfer.

III. FEATURES OF NETWORK SERVICES

This chapter describes the features of energy, water and sanitation and their implications for the improvement of access in the framework of the guidelines and the Sustainable Development Goals, bearing in mind that objectives go further than simple measures of access as the Sustainable Development Goals recognize. It begins with the intrinsic characteristics of the services and then moves to a discussion of the transversal issues of access and inclusivity, affordability, generally accepted consumer rights and principles for the provisions of public services.

While superficially comparable as network services, the two sectors have very different demand profiles and industry structures, and so common assumptions can be misleading. There are significant differences in their business structures. The largest cost item for energy is power generation, while for water it is network infrastructure (rather than production). Another key difference is in the mix of consumers. The United Nations/World Bank High Level Panel referred to earlier, estimates that agriculture commonly uses 70–90 per cent of freshwater resources in most countries, giving agriculture a far higher customer prevalence in water than in electricity.[23] Nevertheless, both sectors transform their product before final distribution, from high to low voltage for electricity and through purification for drinking water.

The two sectors have different urgencies. The potability of water has direct and immediate implications for human health, and consumers of water are extremely sensitive to the quality of the product they receive. This introduces a major element of public health policy. Consuming unclean water, contaminated with faecal pathogens or other pollutants, causes diarrhoea and other ailments. In 2016, diarrheal diseases were the second leading cause of death in low-income countries, killing nearly 60 out of every 100,000 people. [24]

To some extent, drinking water can be stored, although the conditions for its storage are important for safety reasons. In contrast, electricity is rarely stored, although battery technology is developing to ease that constraint. This constraint is a vital difference between the sectors as electricity utilities must balance supply and demand in real time if continuous service is to be maintained. One of the advantages of gas is that it too can be stored, although when it is used as fuel for electricity the 'real time' constraint remains regarding final delivery.

Despite their differences, the two sectors are closely intertwined, as the two resources are now more interconnected than ever – significant amounts of water are needed in almost all energy generation processes, from generating hydropower, to cooling and other purposes in thermal power plants, to extracting and processing fuels. Conversely, the water sector needs energy – mainly in the form of electricity – to extract, treat and transport water.

A. ENERGY

The traditional model of electricity contains four dimensions: generation – high voltage transmission – local low voltage distribution – commercial supply to customers. Of these activities, high and low voltage transmission and distribution are natural monopolies, operating through physical networks, while generation and supply are at least potentially competitive, the former feeding the high voltage grids, the latter taking the form of agreements with the final consumers. Regulation is thus complex in that the sector divides into natural monopolies and (potentially) competitive subsectors.

However, the quadripartite model is starting to be questioned as technology evolves to allow micro-production, in which the roles of consumers and producers overlap (typically with household based solar energy) and micro-networks in which distribution from high voltage grids may not be necessary. Such changes are in part motivated by the need to reduce the use of fossil fuels and the recognition of advantages to be drawn from decentralized systems, such as reduction of transmission losses and use of local natural sources such as hydro and solar energy.

The prevalence of networked energy varies by region according to economic development. In Sub-Saharan Africa, for example, 40 per cent of electricity consumption is by residential consumers, whereas about 31 per cent of consumption is by industries and an additional 22 per cent by commercial consumers, such as offices and shops.[25] This would seem to suggest that household consumption dominates, but this picture is incomplete because network coverage

is so low. Some fuel will be gathered manually, such as firewood, some bought from vendors who may be formalized, such as kerosene, or informal and sometimes illegal. Increasingly, some will operate from highly localized mini grids. All are at least potential customers for the energy utilities. Globally, there is a more significant proportion of consumption coming from domestic households than the lower figure for water (less than 16 per cent – see below). The European Union, for example, estimates that in 2019, its households accounted for 26 per cent of final energy consumption.[26]

B. WATER AND SANITATION

The water and sanitation supply sector has the character of natural monopoly in as much as it is provided through a network that would be too expensive to duplicate. Furthermore, unlike electricity, the potential sources are specific (i.e. a given body of water) and so wholesale competition makes less sense. It therefore operates under systems of price regulation, whether by administered prices or by contractual obligation. [27]

The share of withdrawals of fresh water accounted for by household consumers served by networks is part of, and thus estimated to be less than, the 16 per cent accounted for by local municipalities (a figure which includes other services) and is modest compared with the global share of agriculture: 72 per cent. (Industry, including power generation, accounts for 12 per cent).[28] The sector is characterized by natural resource constraints which become increasingly severe as demand increases because of increased population and rising usage. 2.3 billion people lived in water-stressed countries and 721 million in highly and critically water-stressed countries in 2017.[29] Constraints apply both to drinking water and to sanitation as the latter frequently uses significant quantities of water. For example, in the United States of America, around 30 per cent of piped water is used for toilet flushing. [30]

(a) Sanitation, pollution and water quality

Sanitation is important not only in its own right, but also in as much as its absence or its malfunctions are potential hazards to drinking water. Indeed, investment in drinking water networks can be undermined by cross-contamination between sewerage and drinking water. Only 24 of the 75 predominantly high-income countries reported in the 2021 Sustainable Development Goal 6 tracking report reached 50 per cent of safely treated household wastewater flows.[31] In short, the joint service can potentially pollute itself.

The problems of water quality are wider than contaminants related to sanitation. The Sustainable Development Goal indicators draw upon a wider range of pollutions, including nitrogen, salinity, and biological oxygen. Damania R et al. (2019) warned against adopting the "environmental Kuznets curve hypothesis, which posits that pollution eventually declines with prosperity". Further: "Not only does pollution not decline with economic growth, but the range of pollutants tends to expand with prosperity. The United States alone receives notices for the release of more than 1,000 new chemicals into the environment each year—or around three new chemicals per day". They also point to agricultural subsidy to nitrogen fertiliser more than half of which leaches into water or the air, resulting in the case of water, in 'dead zones' arising from a lack of dissolved oxygen in "water that may take centuries to recover". [32]

Furthermore, the above report found that: "More than 80 per cent of the world's wastewater – and more than 95 per cent in some developing countries – is still released into the environment without treatment." Preventing this pollution would naturally incur short term costs. However, it would not only protect the environment and health, but also increase the availability of water resources available for the relatively low use of fresh water by households, thus returning to them their investment.

The sanitation sector is highly concentrated on households and costs are thus likely to rise rapidly as household connections increase, especially bearing in mind that indoor toilets are often paid for by families.[33] This financing reinforces an already existing imbalance in the water and sanitation sector in that not only is drinking water more prestigious, but the balance of legal obligations may favour it compared with sanitation where consumers are often meant to assume a legal responsibility, one which poor families find hard to do. [34] The much-neglected sanitation sector thus has many hidden costs concealed in the wider water sector financial allocations (even though many sanitation systems may be 'dry'), or by the prevalence of open defecation, whose real costs do not show up on balance sheets.

One element of that neglect has been the pre-conception that sewerage-based systems are the goal to which one should aspire. In fact, comprehensive

sewerage is unattainable in many regions of water scarcity and is extremely expensive and disruptive to build. Whatever the merits of different designs, the facts are that the numbers of people using sewer connections and those using on-site sanitation are equal, each standing at 38 per cent of global population in 2017.[35] Only three per cent of the populations of the Least Developed Countries (LDCs) use sewer connections, compared with 88 per cent in Australia and New Zealand and 83 per cent in Europe and North America. Indeed, none of the regions listed by UNICEF/World Health Organization (WHO) in the Sustainable Development Goal 6 synthesis report for 2018, reached 90 per cent in 2017. In addition to water constraints, the need to 'start from where we are' is a powerful argument for supporting decentralized sanitation systems.

(b) Cost recovery

Many systems worldwide operate with tariffs that seldom cover operational costs, let alone capital costs.[36] The results of the International Benchmarking Network for Water and Sanitation Utilities (IBNET) survey of 1549 utilities were reported in 2019 by the World Bank: "Only 14 per cent of the utilities listed... generate enough revenue to cover the total economic costs of service provision, while only 35 per cent of the utilities are able to cover, at a minimum, the O and M costs of service provision". This is a serious matter in an industry where capital costs are relatively high and operational costs relatively low.

The above report set out the specifics. "Around 65 per cent of the cost of supplying piped water, and 80 per cent of the cost of sewerage systems, is for long-lived capital assets (which are likely to last 20–40 years in the case of water, and 40–60 years for sewerage). This means that in the short to medium term, utilities may be able to function with a pricing structure that does not cover the full costs of capital and neglects the maintenance of assets, a common occurrence in political environments where subsidies take the place of full cost recovery".

As greater attention is being paid to environmental effects, pressure on capital costs (e.g. construction of purification plants) and on operational costs (e.g. maintenance and repair) is likely to increase even without network extension. Adding network extension to the mix is a double dose of cost increase which will focus more attention on tariff policy. It could also lead to conflict between existing customers and previously unserved populations about to become new customers, especially if widening the customer base pushes up against the limits of what is affordable on current costs. Given that the cheapest source will usually be the first to be exploited, the marginal cost will rise as the network expands. Expansion does not necessarily mean 'more of the same'.

C. ACCESS AND INCLUSIVITY

In 2021, an UNCTAD secretariat note identified access[37] as the most important need of consumers of public utility services. In the area of such utilities as energy, water and sanitation, access relates primarily to the inclusion of those who do not yet benefit from the service in question.

(a) Access to water and sanitation

Progress has been achieved but may be overstated, especially when measured against the earlier Millennium Development Goals targets. For example, by the Millennium Development Goals target date of 2015, 91 per cent of the global population was using an 'improved' drinking water source, compared to 76 per cent in 1990.[38] Globally, 147 countries met the target to halve, by 2015, the proportion of people without sustainable access to safe drinking water and 95 countries met the analogous sanitation target and 77 countries met both. 2.1 billion people gained access to improved sanitation and the proportion of people practicing open defecation fell by almost half since 1990. [39]

While these trends indicated progress, one should guard against too much optimism for several reasons. The now elapsed Millennium Development Goals were set from 2000, not 1990, from when the above starting figures derive. Furthermore, the targets could be said to have been too conservative, being to connect half of the unconnected populations, so that a country with 90 per cent connectivity would only need to connect a further five per cent for the target to be achieved. The Sustainable Development Goals are rather more ambitious aiming at 100 per cent coverage by 2030 in improved water and sanitation. But measurement is complicated because data is so hard to gather. For example, the 2021 Sustainable Development Goal 6 tracking report depends on 2017 data.

Perhaps most difficult of all to grasp is that population movements result in local retrograde trends where urbanization outpaces network coverage. The

Sustainable Development Goal 6 tracking report for 2021 reports that the number of city inhabitants lacking safely managed drinking water increased by over 50 per cent since 2000. [40]

The UN-Water 2021 tracking report states that "the world is not on track to achieve Sustainable Development Goal 6". [41] In 2017, 2.2 billion lacked safely managed drinking water, 4.2 billion lacked access to safely managed sanitation and 673 million still practiced open defecation.

(b) Access to clean energy

In 2019, 759 million people were without access to electricity, according to the 2021 Sustainable Development Goal tracking report.[42] By 2019, global electrification stood at 90 per cent, up from 83 per cent in 2010. [43] However, much of this connectivity was intermittent and unreliable. Crude access figures often paint too optimistic a picture. [44] In any event, the 2021 Sustainable Development Goal 7 Tracking Report concludes that: "The latest available data and selected energy scenarios reveal that at today's rate of progress, the world is not on track to achieve Sustainable Development Goal 7". [45]

If the current connectivity is 90 per cent, then with eight years to go to until 2030, an increase of coverage of just over one per cent per year may not seem unlikely. However, if the experience of network roll-out is to be repeated, the last per centages may be the hardest to achieve especially as the lack of coverage is increasingly concentrated on sub-Saharan Africa, where rapid urbanization makes it difficult to keep pace.

Sustainable Development Goal 7 refers to 'energy' rather than electricity even though its indicator 7.1.1 refers to electricity connectivity. Focus on simple electrical grid connectivity falls into what the Energy Sector Management Assistance Program (ESMAP) refers to as: "Binary metrics for tracking access to household electricity' which 'fail to capture the multifaceted nature of access to electricity".[46] ESMAP goes on to explain: "poor electricity supply from the grid may limit its usefulness. Use of electricity may also be constrained by its affordability. Illegal connections may cause significant financial losses to the utility, while also increasing the risk of accidents".

Other indices show modest improvements but not sufficient to reach the Sustainable Development Goal targets. The population with access to clean cooking fuels and technologies was 66 per cent in 2019 leaving 2.6 billion in 2019 (3 billion in 2010). That projects to only 72 per cent access by 2030.[47] The bulk of the population at risk from the widespread use of polluting fuels and technologies for cooking is distributed across Asia and Africa. If the world is to reach the Sustainable Development Goal 7 target, that is universal access to clean fuels and technology for cooking by 2030, an immediate acceleration is needed in the annual access rate to 3 percentage points, that is, three times higher than the one percentage point annual increase seen in the period 2010–2019.

The energy mix is changing, a trend which could accelerate with the move towards renewables, which are the focus of Sustainable Development Goal target 7.2 which aims at a substantial increase in their share of total final energy consumption. However, the 2021 Sustainable Development Goal 7 tracker report points to a share of 17.4 per cent in 2018, only slightly more than 2010 (16.4 per cent).[48] It should also be noted that the share calculation includes traditional biomass, which, unfortunately, is often a danger to its users and still accounts for much heating and cooking.[49]

(c) Universal service obligations

Some high-income countries such as Switzerland and member States of the European Union have imposed universal access obligations on service providers, which entail that all citizens must have the option of joining a public utility service and at a reasonable cost.[50, 51] This general obligation is contained in legislation setting out the rights and obligations of market actors, in particular consumers and service providers. Developing a suitable legal framework is a key step towards ensuring that universal access transits from aspiration to reality. Box 2 contains the example of the obligations set upon businesses that provide services of general interest.

Box 2 Services of general economic interest

The importance of particular services to an inclusive social fabric has been recognized by the United Nations through the UNCTAD Model Law on Competition.[52] Chapter VII – "The relationship between the competition authority and regulatory bodies, including sectoral regulators", addresses the "Protection of general interest" (point IV), setting out that: "Irrespective of their nature and of their relation to the market, some service activities performed by private or government-owned firms can be considered by Governments to be of general interest. Accordingly, the providers of services of general interest can be subject to specific obligations, such as guaranteeing universal access to various types of quality services at affordable prices. These obligations, which belong to the area of social and economic regulation, should be set out in a transparent manner".[53]

The European Union goes further and identifies Services of General ***Economic*** Interest. The status of SGEI is recognized by Article 36 of the European Charter of Fundamental Rights: "The Union recognizes and respects access to services of general economic interest as provided for in national law and practices, in accordance with the Treaty (...) in order to promote the social and territorial cohesion of the Union." The concept of general interest operates in both the European Union and in the UNCTAD Model Law on Competition as a kind of regulatory bargain in which selected sectors and /or companies, (typically the incumbents), undertake certain obligations such as universal service, including responsibility for the most marginalised consumers, and in return are exempted from certain aspects of competition law. The principles governing SGEIs also allow for compensation mechanisms for states to recognize financially or through other means, such as privileged market access or dominance, the central role played by the service providers.[54]

Article 3 of the European Union Directive 2009/72/EC concerning common rules for the internal market in electricity sets out the obligation of universal service: "Member States shall ensure that all household customers (…) enjoy universal service, that is the right to be supplied with electricity of a specified quality within their territory at reasonable, easily and clearly comparable, transparent and non-discriminatory prices. To ensure the provision of universal service, Member States may appoint a supplier of last resort. Member States shall impose on distribution companies an obligation to connect customers to their network".

Source: UNCTAD.

Overall, there is a trend away from regarding access as a simple matter of connectivity and towards a fuller appreciation of wider issues of affordability and quality – continuity, safety, and sustainability, for example. The concept of universal access itself is open to interpretation. The Energy Sector Management Assistance Program make the point for energy that: "the access challenge is not just limited to the households that lack electricity connections. It is as much a challenge for the hundreds of millions of households around the world with poor and unreliable electricity supplies. The goal of universal access must also cover energy for household cooking and heating and for productive engagements and community facilities."[55]

In developing countries, one of the most fundamental problems is that of recognition of consumers as being entitled to access. This applies both to remote areas, for reasons of technical and economic feasibility but also to urban and peri-urban slums for more complex legal and political reasons. Having residence permits or legal tenure of a dwelling may be prerequisites to becoming a recognized customer. The resultant challenge to the goal of inclusivity has been expressed by the International Institute for Environment and Development (IIED): "All informal settlements have some aspects of illegality, but they cannot be considered marginal or exceptional when they house between one-third and two-thirds of the population of so many cities… A lack of documentation serves as an excuse for government agencies not to provide infrastructure and services. It also means that there is no counter to politicians' or civil servants' claims that those living in informal settlements are law breakers or unemployed migrants who, they suggest, should go back to rural areas". [56] Such restrictions on groups of consumers may be reinforced by monopoly status granted to formal suppliers, or a legal imposition of responsibility for 'self-provision' as mentioned earlier in the case of sanitation.

D. AFFORDABILITY

Problems of affordability cannot be avoided when a service is essential and is intended to be universal. Many countries have tried to bridge the gap between financial viability of a utility under universal service and affordability for the poorest, without leading to excessive losses to be covered by government funds. The earlier discussion of cost recovery in the water sector indicates that in practice this has proved to be very difficult to resolve.

Easing problems of consumer affordability can be approached in two ways, which are:

- Social provision: means tested or otherwise targeted financial assistance from the state to individuals;
- Commercial provision: such as tariff structures which it is hoped will benefit the poor.

These approaches have been criticized for two complementary defects, namely 'errors of inclusion', where the help goes to people not defined as needy, and 'errors of exclusion', where eligible consumers are not assisted by the schemes intended to help them. [57]

Taking the latter first, 'lifeline tariffs', namely low or zero tariffs for the first tranche of consumption, are common to both electricity and water, subject to metering. The theory is that as poor consumers use less of both, then applying a low or zero tariff to initial consumption targets help towards them, even though larger consumers also pay the lifeline tariff for their first tranche of consumption. The theory then envisages higher block tariffs recovering the revenue from the larger consumers.[58] The practice does not always reflect the theory. The IIED study cited above pointed to widespread evidence of families paying more than 20 per cent of available income on energy, coming from urban locations as varied as cities in Brazil, Thailand, and Kenya. They found that the structure of rising block tariffs had the perverse effect of classifying families in multi-occupied dwellings as large consumers, because of their combined total consumption.[59] The same effect has been observed among poorer families in relatively high-income Hong Kong (China) by the Hong Kong Consumer Council regarding electricity prices. [60]

UNCTAD (2006) warns that electricity 'lifeline rates' used to protect "low-income captive end users who cannot afford to pay at full cost" may end up increasing inequality "as benefits were captured by the already well off rather than the poor". [61] In the water sector, World Bank (2019) finds in 10 countries studied, that the richest 20 per cent of consumers received 56 per cent of the subsidies, (an error of inclusion) while the poorest 20 per cent received only 6 per cent. [62]

The 'social provision' option using means tested assistance is often seen as a way of taking care of the poor without interfering with 'rational' pricing structures. However logical this may seem from a distance; the evidence is that it seldom works in practice. This is largely because the consumers in question often hate having to apply for a benefit which is a mark of poverty.

In Serbia, a World Bank study found only 20 per cent take up of help with fuel bills by eligible consumers in the category of extreme need, thus leading to errors of exclusion of 80 per cent. In contrast, it also found that the electricity tariff structure with a low consumption discounted lifeline tariff had worked rather well in shielding the poor from price rises.[63] That was because electricity was universal in Serbia, multi-occupation relatively rare and richer families used gas for heating and cooking, so that an electricity lifeline was well focused on low-income consumers. Thus, errors of inclusion were modest, often involving consumers just above the poverty line. The specific conditions of the Serbian market made this approach suitable.

The problems faced by low-income consumers in paying their bills can be seem very unfair compared with their higher income peers. However, differentials are even more dramatic between the connected and non-connected populations in developing countries, especially those in the recently grown and ill-served slum settlements. The literature on this subject is extensive and specialized and the UNCTAD 2017 Consumer Protection Manual [64] pointed to this as a clear example of the 'poor pay more' syndrome which has several dimensions:

- The off-network poor pay more per unit (e.g. per litre or KwH) because they depend on high-cost small scale independent providers;
- The better off often receive a subsidy from below cost network prices from which the poor are excluded;
- The poor may pay for those subsidies as taxpayers; (for example value added tax)

- Connection charges go up to (compensate for loss of) revenue when networks run below costs thus making it even more difficult for the poor to gain access;
- The off-network poor waste time fetching and carrying;
- The quality of alternative services to the poor will often be low and even dangerous.

The poor frequently pay high unit prices to informal providers which calls into question the model of regressive subsidies to the better off paired with no services for the poorest. The Africa Infrastructure Country Diagnostic concluded based on its massive survey of African infrastructure,[65]: "If provided with access to utility networks, even at cost recovery prices, poor households would still be better off than they are today using alternative service. This suggests that ultimately, subsidization of connection costs may be a more equitable and cost-effective way of targeting public resources." Eberhard A, et al. (2011) concluded for example, that in seeking universal service over a 20-year period for electricity, a one-off US$200 subsidy would be almost two thirds cheaper than an ongoing universal subsidy of US$2 per household per month.[66] The widespread policy of subsidizing consumption rather than connection would appear to have been the wrong strategy.

To enhance access and ensure affordability, countries as varied as Bahrain, Bulgaria, Ethiopia, Portugal and the United States of America offer payment flexibility or subsidize public utility services.[67] Although this is fully justified for consumers who are vulnerable and disadvantaged, it may not be justified in the case of subsidies to all consumers. As noted in the UNCTAD Manual on Consumer Protection, blanket subsidies tend to favour the better off, who are already connected to services, over those who do not yet have access and are therefore excluded.[68] An analysis by the Africa Infrastructure Country Diagnostic project found that "if provided with access to utility networks, even at cost recovery prices, poor households would still be better off than they are today using alternative services. This suggest that ultimately, subsidization of connection costs may be a more equitable and cost-effective way of targeting public resources".[69]

As, hopefully, the world moves towards full network coverage, the 'poor pay more' syndrome described above may fade, but another may appear namely that of newly connected poor consumers who cannot afford their bill. Andres et al. (2019) reported that: "even where poor households could connect to a network, many do not do so because they cannot afford the connection and/or consumption charges".[70] Some successful expansion programmes, such as Phnom Penh, have seen cost recovery pricing used as the default for new networks, with carefully graded assistance with connection charges according to family circumstances.[71] Nevertheless, unsubsidized cost recovery pricing may see people drop out of using service as has been reported where fuller coverage has included the poor. Each 'solution' has its own problems. There will always be some people who are so poor that they need help, and this should not be overlooked, even accepting the need to rationalize subsidies.[72]

E. CONSUMER RIGHTS

Consumers of essential services of energy, water and sanitation, provided by formalized networks have rights that are usually enshrined in law, be that general consumer protection or sectoral. As already mentioned, the guidelines contain "legitimate needs", usually recognized as consumer rights (box 3). Some of these are particularly relevant to public utilities, including access, the promotion and protection of consumers' economic interest, information, education, dispute resolution and redress, freedom to form consumer groups, sustainable consumption and privacy.

Box 3 Legitimate needs of the United Nations guidelines for consumer protection

The legitimate needs which the guidelines are intended to meet are the following:

(a) Access by consumers to essential goods and services;

(b) The protection of vulnerable and disadvantaged consumers;

(c) The protection of consumers from hazards to their health and safety;

(d) The promotion and protection of the economic interests of consumers;

(e) Access by consumers to adequate information to enable them to make informed choices according to individual wishes and needs;

(f) Consumer education, including education on the environmental, social and economic consequences of consumer choice;

(g) Availability of effective consumer dispute resolution and redress;

(h) Freedom to form consumer and other relevant groups or organizations and the opportunity of such organizations to present their views in decision-making processes affecting them;

(i) The promotion of sustainable consumption patterns;

(j) A level of protection for consumers using electronic commerce that is not less than that afforded in other forms of commerce;

(k) The protection of consumer privacy and the global free flow of information.

Source: A/RES/70/186.

(a) Education and information

Paragraphs 42 to 49 of the guidelines advise Member States on the development of education and information programmes, which should also take in the efficient use of resources such as energy, and water. Bahrain, Brazil, the Dominican Republic, Sweden, the United States and Zambia, all reported in 2021 various priority intervention measures, including information and awareness-raising campaigns on consumer rights in public utilities among vulnerable and disadvantaged populations.[73] Sweden produced informative videos. Zambia translated information and education materials into local and braille languages to educate school children, the elderly, and people with low literacy and from rural areas.74 In the United States, State-level Attorney General offices engaged in consumer education.

(b) Dispute resolution and redress

Regarding the availability of effective consumer dispute resolution and redress, across all sectors, the guidelines request Member States to encourage the development of fair, transparent, and impartial mechanisms to address consumer complaints administratively, judicially or by means of alternative dispute resolution (paragraphs 37 to 41) and other out of court mechanisms.[75] In the case of public utilities, Governments and sectoral regulators have instituted ombudsmen to provide for speedy dispute resolution. For example, Australia instituted the Energy and Water Ombudsman to ensure access to dispute resolution and redress. The Dominican Republic facilitated online claim filing and online dispute resolution. Globally, the good practice trend is towards more autonomous dispute resolution, while improving internal complaints mechanisms to resolve issues before they attain the status of disputes.

(c) The scope for enforcement

Paragraph 15 of the guidelines asks Member States to work towards ensuring that consumer protection enforcement agencies have the necessary human and financial resources to promote effective compliance and to obtain or facilitate redress for consumers in appropriate cases. This should also be applicable to

public law enforcement in public utilities. In the United States, State-level attorneys general protect consumers in public utilities by enforcing States' consumer protection acts. This can result in investigations and fines against service providers that act in deceptive or unfair ways. State-level attorneys general also protect consumers against deceptive promotion of alternative suppliers, and work to resolve consumer complaints informally.[76]

One limitation of the consumer protection-based approach to promote and protect consumer rights in developing countries is that consumers are only protected when they become connected. To be connected they need to be registered and identified as discussed above under 'access and inclusivity'. These are not in themselves unreasonable requirements, but they convert into obstacles to connecting, such as needing legal title to the property they occupy. Gulyani S et al. (2010) found continuity of tenancy was a major explanatory variable access of regarding different levels of service in African cities. [77] This syndrome is likely to continue for as long as informal settlements do and it is significant that Sustainable Development Goal 11 takes account of water, sanitation and waste disposal services.[78]

Where principles conflict, in this case the right to service and the requirement to prove identity and tenure, it is difficult to resolve issues by legislation. For this situation, the secretary to ISO Consumer Policy Committee proposed the use of standards in her presentation to the UNCTAD expert meeting of July 2019. [79] Her indication of a possible role for ISO standards in furthering the achievement of the Sustainable Development Goals 6 and 7 is supported by ISO standards 24510 (water and sanitation) and ISO 50007 (energy) both of which include very explicitly the need for service to the non-connected populations. The logic is spelt out by ISO 24510 as follows:[80] "Access to service means not only connection to networked drinking water and wastewater systems, but also, if these are not available, access to other means of service. For drinking water supply, options, such as wells, mobile water delivery, regulated bottled water vendors and drinking water points, can be used. For wastewater service, it could include septic tanks, pit latrines, composting toilets and other forms of disposal".

Building on this concept of service to the non-connected, the more recent ISO 50007 (2017) defined energy services to include regulated fuel vendors, battery chargers, user-sited renewable energy sources as well as energy efficiency services. [81]

ISO 50007 enjoins signatories to use "applicable guidelines such as those for consumer protection." Consumer information runs through both standards in terms of service agreements (as in contracts) and service information (as in current service continuity or safety) as well as detailed matters such as billing. To this end, Article 7 of the European Union Electricity Directive requires Member States to "ensure high levels of consumer protection, particularly with respect to transparency regarding contractual terms and conditions, general information and dispute settlement mechanisms".

(d) Payment methods

The two ISO standards also cover ease of payment, the lack of which may lead to major problems not just for consumers but also for service providers themselves. In this regard, ISO 50007 and ISO 24510 use the same wording: "poorer customers often prefer to make frequent payments of small amounts and adjust the billing systems to accommodate this preference, if possible".

Improved payment methods may make an important contribution to raising payment levels and thus reducing risk of default and disconnection. Over a decade ago, Kenya Light and Power introduced a system of payment through M-Pesa, the well-known mobile phone-based service for sending and storing money offered by Safaricom, the largest mobile service provider of Kenya.[82] More recently, also in Kenya, the M-KOPA system of roll out of home solar energy is based on a daily payment from a mobile money account over the course of a year.[83] If the customer falls behind on payments, then the system shuts down. This is a very demanding requirement and a severe sanction, and consumers could fall prey for example to system breakdown. This means that consumer safeguards need to be built in.

The Energy Sector Management Assistance Program (ESMAP) reports that: "innovations in telecommunications (…) enabled the rise of the Pay as you Go model for electricity access" in the context of mini-grid development. They report: "Significant consumer data that emerged from the mobile money and the 'pay as go you' revolution provided lenders and investors with more confidence regarding the credit risk of the end users, enabling them to raise more capital and consequently expand their services." [84] Relevant authorities, including those charged with data protection and privacy, will certainly need to defend

user privacy in the context of data on creditworthiness passing between commercial bodies.

The reference by ESMAP to 'pay as you go' is well-founded as the impressive development of mobile telephony in Africa operated almost entirely through SIM-card purchase advance payment.[85] Many consumer associations have expressed strong opposition to pre-payment requirements, (often described as 'self-disconnection' when consumers run out of money). And this is an undeniable risk confirmed by the description of the schemes as 'shutoff technology', with potentially serious consequences for both water and electricity.

It should be kept in mind that the non-connected are forced to prepay already when using vendors rather than networks. In their study of Fintech in the water sector, Ikeda and Liffiton found that: 'pay as you go' enhancements are particularly promising for prepaid standpipes, which bring access to clean water to the poorest and often replace higher-cost options from informal providers'. [86] This has indeed been demonstrated in case studies by Heymans C et al. (2014). [87] It may therefore appear less onerous in such circumstances if the outcome is easier integration into the networks. Nevertheless, where pre-payment meters are installed for either water or electricity there needs to be a guarantee that the tariffs are not discriminatory. This has been an issue in the United Kingdom of Great Britain and Northern Ireland, where pre-payment electricity meters may be imposed as a condition of avoiding disconnection. [88] As such meters are associated with higher tariffs then such powers can have a discriminatory effect in price terms and indeed in the British market the price differential has been traced by consumer associations from the 1970s to the present century. [89]

Under the terms of Annex 1 of the European Union Electricity Directive of 2009, "Measures on consumer protection", Para 1.d) states that consumers should be "offered a wide choice of payment methods, which do not unduly discriminate between customers. Prepayment systems shall be fair and adequately reflect likely consumption. Any difference in terms and conditions shall reflect the costs to the supplier of the different payment systems".

(e) Interruption and termination of service

The importance of continuous service is highlighted in Sustainable Development Goal 7.[90] For instance, although global electrification is rising, one third of "access deficit" countries faced more than one weekly disruption of electricity supply during 2017.[91] Similarly, unreliable water pressure and inconsistent quality pose challenges not only to living standards but also for public health, which has been noted by the World Bank from observations of parts of urban Africa.[92]

There is, therefore, a need for clear procedures to protect consumers from arbitrary disconnection and with restoration of service and the need to distribute planned interruptions in an equitable manner – a major issue in the former Soviet Union during the transitional period of economic disruption. In Spain, a disconnection protection measure in Catalonia prohibits the disconnection of electricity, gas and water supplies for vulnerable households, as certified by local social services.[93] The measure also applies a precautionary principle according to which utility companies are obliged to check first with local services whether a consumer in arrears is vulnerable or not.

The importance of such mechanisms has come to the fore during periods of economic disruption, as arrears arising from affordability problems can lead to widespread retaliation from service providers and thus to infringement of consumer rights. This was found during the transitional period of the 1990s in Eastern Europe where households dropped out of district heating schemes to economize. This left their paying neighbours responsible for financing the system which in turn led to further withdrawals as their charges rose in turn. This could lead to refusal to pay, followed by collective cut-offs and so to a downward spiral of revenue starvation and breakdown. The practice of collective cut-offs was bitterly contested by consumer associations and sometimes by regulators and consumer protection agencies too. [94]

(f) The protection of vulnerable and disadvantaged consumers

Consumers deemed to be vulnerable are protected against disconnection in many jurisdictions. Article 7 of the European Union Electricity Directive states that "in critical times (…) Member States shall take appropriate measures to protect final customers, and shall, in particular, ensure that there are adequate safeguards to protect vulnerable customers… each Member State shall define the concept of vulnerable customers which may refer to energy poverty and, inter alia, to the prohibition of disconnection of electricity to such customers in critical times." This has been a particular area of interest in the context of the COVID-19 crisis.

As a general principle, the guidelines require Member States to take special care to ensure that measures for consumer protection are implemented for the benefit of all sectors of the population, particularly the rural population and people living in poverty (paragraph 8). According to academic research, specific groups in China, such as women, children, the elderly, people with disabilities, ethnic minorities and people in poor areas, are given special protection by means of various laws and regulations.[95] Malaysia requires special services to be provided for people with disabilities who have long-term physical, mental, intellectual or sensory impairments, as they may not enjoy full participation in society due to various barriers.[96] In South Africa, Consumer Protection Act 68 of 2008 aims at promoting the welfare of people on low incomes, minors, seniors and people living in remote areas and with limited abilities.[97] In the United Kingdom, legislation makes protecting consumers in vulnerable situations a statutory duty of regulators,[98] so that vulnerable groups can remain a key priority for regulators' mandates.[99] Thus, there are several government measures, which relate to support, protection and prevention, that directly address vulnerable and disadvantaged consumers and which can be used in the context of vital services.

Support measures can include both financial and non-financial measures. In Portugal,[100] a form of public funding known as a social tariff is used to provide financial assistance for households to pay energy and water bills. Since 2016, it is automatically awarded to households that receive certain social benefits and to low-income households. Around 14 per cent of all Portuguese households benefit from this measure: 786,000 households receive the social tariff for electricity and 34,000 households, for natural gas. In Croatia, vulnerable consumers are entitled to receive allowances for electricity costs up to a certain limit.[101] The discussion of Affordability in Section D earlier dealt with the risk of errors of exclusion and of inclusion connected with social tariffs. Their efficacy can depend on local conditions and the example given of Serbia had proved to be relatively positive.

However, investing in the physical condition of dwellings can yield longer term benefits than subsidizing consumers to pay for inefficient energy use. In France,[102] the 'Living Better' programme aims to provide financial support to renovate dwellings of low-income households to improve energy efficiency. Such an approach can benefit the wider society and pass on such benefits to future generations.

(g) Business engagement

The promotion and protection of the economic interests of consumers requires the active participation of businesses, which in this case are providers of public utilities. The 2015 revision of the guidelines saw the inclusion of a new section IV on **"**Good Business practices" (addressed to business) covering such widely accepted concepts as:

(a) Fair and equitable treatment: [...] particularly with respect to vulnerable and disadvantaged consumers.

(b) Commercial Behaviour: [...] illegal, unethical, discriminatory, or deceptive practices,

(c) Disclosure and transparency: [...] information regarding the goods and services, terms, conditions, applicable fees, and final costs.

(d) Education and awareness raising: [...] programmes [...] to assist consumers to develop the knowledge and skills… to access competent and professional advice and assistance [...]

(e) Protection of privacy: mechanisms relating to the collection and use of their personal data.

(f) Consumer complaints and disputes: businesses should [...] consider subscribing to domestic and international standards, [...].

Further to the good business practices contained in the guidelines, in 2021 UNCTAD identified several "Principles for the provision of public utilities".[103] Given that State-owned enterprises (SOEs) are now covered by the guidelines as explicitly stated in paragraph 2, it should be assumed that all public utilities be expected to conform to the above provisions, and they could come within the supervision of the consumer protection agencies. The guidelines also set out for Governments, under paragraph 14, "National policies for consumer protection" covering similar ground.

In Australia, pre-emptive measures are taken to protect people from unfair business practices, such as poor quality of products or services and market design, that would render them vulnerable in the first place. It is more effective for Governments, regulators, community organizations and industry to prioritize early and intervene pre-emptively wherever possible, rather than to focus on "bottom-of-the-cliff" measures that imply waiting for problems to emerge or until problems have worsened.[104]

IV. COMPETITIVE MARKETS

This chapter considers the role that competition policy and the regularization of the informal sector can play in helping promote universal access to essential services for household consumers. Definitions of competition often divide into competition for the market (as in concession agreements) and competition in the market taking in retail competition at the consumer interface. In the public utilities sectors, there is a long tradition of State-owned enterprises (SOEs), corresponding with the natural monopoly status of water, sewerage, electricity transmission and distribution, and fixed line telephony. In such systems, SOEs could subcontract, or public authorities could delegate, service delivery to the private sector through monopoly contracts awarded through processes of competition for the market. With the advent of mobile telephony, that sector has passed from a natural monopoly under fixed lines, to competitive markets providing mobile services.

Retail competition in the market has been introduced in energy, where its benefits are hotly debated. This is not the case for water, where provision by public entities or by the private sector through competition for the market remain the dominant models. The same is true for sanitation based on sewerage, but non-sewer systems can be flexibly managed, an option which is quite widespread but has rarely featured in policy debates until recently.

There is a generic reference to competition in the United Nations consumer protection guidelines where paragraph 22 asks Member States to "develop, strengthen or maintain […] measures relating to the control of restrictive and other abusive business practices." The text refers to competition policy, reminding member states of their "commitment to the Set of Multilaterally Agreed Equitable Principles and Rules for the Control of Restrictive Business Practices", widely known for the sake of brevity as 'the United Nations Set on Competition'. [105]

The Set does not elaborate about public utilities, although its article 4 provisions regarding predatory behaviour, discriminatory pricing, linked purchases, unjustified refusal to supply and other such practices are certainly relevant to the retail interface with consumers. Article 3 lists practices which: "through formal, informal, written or unwritten agreements or arrangements (…) limit access to markets or otherwise unduly restrain competition" and includes in the list under 3, b): "Collusive tendering". (This is also ruled out in almost identical terms by the UNCTAD Model law on Competition). [106] In referring to the Set which in turn refers to both forms of competition, the guidelines can therefore be considered to address competition policy within the public utility sectors.

A. COMPETITION IN THE MARKET

This section concentrates on energy as that is where competition currently exists, both upstream in generation and more recently introduced, downstream in the retail market, emanating from the United Kingdom towards the end of the last century and adopted by the European Union through the energy directives. This followed on from the process of unbundling, which separated out the constituent parts of the energy sector into production, transmission, distribution and supply, the latter including retail transactions with household consumers. The aim was for competition to benefit households in the same way as it had brought benefits to much larger industrial and commercial customers. So far, the results have fallen short of these intentions.

According to CEER (2017), by 2016, retail markets remained highly concentrated.[107] The European average national market share of the three largest suppliers in the respective retail electricity household segments only fell from 84.3 per cent to 80.6 per cent reflecting a level of concentration between 2011 and 2016 that was higher than hoped. The evolution of the markets in Europe is an important signal for other regions.

For households, by 2017, 11 countries in the European Union still had some sort of price regulation for electricity whereas 12 countries still regulated prices for gas.[108] In France, where price regulation remained for household customers, the number of customers that changed their supplier and got a contract at a market price with an alternative supplier, stood at 14 per cent. In contrast, the number of household customers with a supplier different from the incumbent in the United Kingdom, where retail prices were not regulated in 2017, was 69 per cent. Price caps were re-introduced in the United Kingdom market in 2017 for supplies through prepayment meters and in 2019 for 'standard variable tariffs.'

Repeated studies of the British market have found that while large numbers shifted, the results were far from delivering good value to all consumers. Despite about half of households initially switching providers after 1998, by 2005 less than one eighth of consumers who switched chose the supplier who gave them the best deal.[109] More recent figures have shown a similar pattern with 40 per cent of consumers making the 'wrong' decision, by which they ended up with a higher bill than if they had stayed with their previous supplier.[110] Further, the United Kingdom government commissioned a report on fuel poverty published in 2012, concluded that 50 per cent of poor households that switched supplier under the influence of 'doorstep selling' ended up with more rather than less expensive deals.[111] Several suppliers, indeed all of the then 'Big Six' companies, were fined for irregular sales practices, despite years of discussion of sales practices and attempts to stamp out abuse.[112]

An UNCTAD paper in 2012 commenting on the results of switching by that date found that: "Despite "mystery shopping" revealing significant savings from switching, consumers who did switch saved little. Electricity markets were liberalized to increase competition, although little switching suggests that competition has not been as dynamic as perhaps expected in this case." [113] Among the questions to be asked, following the development of retail competition is how meaningful the concept of retail competition can be in a service which delivers identical product, namely electrons, or cubic metres of gas. However, sophisticated the market mechanisms, there is, in any case, bound to be a limit to competition in the retail market when the bulk of costs lie upstream in production, bulk transport and distribution.

Retail competition can cause considerable, administrative costs since the cost of implementing switching operations, (often not published at company level), can turn out to be high. In 1990 before retail competition for small customers was allowed in the United Kingdom, only 5 per cent of domestic consumers bills went to meet supply costs such as billing and meter reading. By mid-way through the first decade of this century, the level was 30 per cent.[114] Effectively, those who stay with their existing suppliers are cross-subsidising those who switch and gain. The gains from switching, even when it happens, are proving to be elusive for many and even negative for sizeable numbers of consumers.

(a) Upstream competition

As pointed out above, the distribution, transmission and supply functions represent a minority of the total costs in most conventional electricity services. The largest single item is that of electricity production or generation. This is increasingly the focus of discussion over climate change and the development of decentralized generation, using renewables. Consequently, there are changes to be expected to the classical model with its quadripartite structure. However, despite these trends there are three issues to consider while the traditional structure remains in place.

First, arguably no wholesale electricity market appears to meet three criteria that any commodities market should meet if it is to be considered a well-functioning market. These conditions are that: it should set the price at which most of the wholesale power is traded; it should be liquid enough for new entrants to be able to enter the market avoiding the risk that the market become an oligopoly of existing companies; and it should provide price signals to guide levels of new capacity to be built. Currently, much new capacity in Europe is intended for self-supply, that is by generators to sell to distributors within the same vertically integrated companies, thus bypassing the wholesale market.

Second, the space for competition between generators is shrinking as renewable power sources take over from fossil fuel sources. Most new capacity must use renewables if climate change objectives are to be met and experience so far suggests that these will only be built if they are covered by long-term power purchase agreements, between distributors and generators at prices not related to any market price. In other words, even though in theory power generation is not a natural monopoly, in practice only a small and diminishing percentage of power generated is sold on through an open market.[115]

Thirdly, there is a movement towards capacity payments. Accordingly, a generator is paid just to act as a guaranteed supplier and generate whenever called on (for example, during peak demand periods). If these capacity payments cover fixed costs, generators cannot make losses, this providing generators with security.[116] Typically, capacity payments are being given to sufficient dispatchable capacity to meet peak demand to ensure security of supply. This limits the scope for renewables to compete in the markets as

they are not eligible for and cannot receive capacity payments because they are seldom 'dispatchable', that is able to come on stream at short notice. They are designed to generate whenever the resource (wind or sun) is available. As systems move increasingly towards wind and solar, capacity payments will not be able to ensure security of supply as there will not be a sufficient dispatchable generation guaranteed to be available to meet peak demand.

The fear that competitive markets would not be able to provide enough income to peaking plant (often required for only a few hours per year) to ensure they are profitable enough to remain in service has led to the introduction of capacity payments. These amount in effect, to the price we pay for reliability during a time of energy transition.

If the above conditions for wholesale markets are not being met in the large mature markets European markets, as suggested by studies by the Energy Community and other academic studies,[117] it is fair to question their appropriateness for developing countries, where systems are often relatively small, demand is typically growing rapidly, power shortages are common and new capacity has hitherto relied on long-term power purchase agreements with independent power producers. Successful emulation of the recently restructured liberalized markets seems unlikely even when competition policy remains important.

B. COMPETITION FOR THE MARKET

During the often fierce debates over private sector participation, it is sometimes forgotten that the public sector dominates not only ownership and delivery of infrastructure services but also their financing. According to the World Bank based Trust Fund the Public Private Infrastructure Advisory Facility, (PPIAF) "Public funding of infrastructure – through budget allotments and retained earnings of State-owned enterprises – in developing economies accounts for about 70 per cent of total infrastructure expenditures".[118] Around 20 per cent was estimated to come from private sources and 10 per cent from development agencies.

Concern has grown among public finance specialists, that many public–private partnerships (PPPs) are conceived to remove public expenditure from government balance sheets, creating a false impression of reduced government liabilities. This happened in response to the hesitancy of financial markets to provide nonrecourse financing for water projects, thus requiring that financing be backed by the public bodies' balance sheets. [119] Delmon sounded a warning in 2014: "PPP involves important government liabilities that must be managed carefully to avoid exposing the public accounts to undue risks. While PPP debt is generally off-balance sheet for the government, it creates important fiscal risks that Government must assess monitor, report and manage."[120] In reality, any form of partnership in a lifeline service represents fiscal risk for government as service collapse should be unthinkable. The nature of government is that it accepts responsibility as a last resort. This observation should cut through the debates about terminology around acceptance of commercial risk for example, which is often considered to be the defining characteristic of concessions. [121]

Delmon defines PPPs more generally: "PPP in its most inclusive form, (can) mean any contractual or legal relationship between public and private entities aimed at improving and/or expanding infrastructure services."[122] This definition takes in the full range of contracts from conceptually simple task-based management contracts such as a leakage repair programme or a reform of payment methods and arrears reduction, all the way through the spectrum of leases and long-term concessions. The underlying point is the uniform application of the principles of public procurement.

(a) Public procurement:

The contribution of publicly procured services to economic activity is highly significant and goes much wider than public utility services. The Organisation for Economic Co-operation and Development (OECD) reported in 2016 that public procurement accounted for 13 per cent of the GDP of member States for example, (higher outside of the OECD) and 29 per cent of government expenditure. [123] It is consequently not surprising that it has given rise both to a World Trade Organization (WTO) Agreement but also to a United Nations Model Law as well as to numerous national laws. [124]

The basic principles of public procurement are integrated into the OECD Recommendation (2015) on public procurement, with some elaborations.[125] Equal treatment is spelt out as requirements to "treat bidders, including foreign suppliers, in a fair, transparent, and equitable manner, considering Adherents' international commitments (e.g. WTO (see below), the European

Union Procurement Directives, and bilateral or multilateral trade agreements)". Transparency includes "free access…for all stakeholders, including potential domestic and foreign suppliers, civil society and the general public, to public procurement information". This extends to "fostering transparent and effective stakeholder participation, especially when formulating changes to the public procurement system". The recommendation encourages the development of e-procurement to encourage first time bidders (who may be local bidders in developing countries) and promotes the adoption of risk management and value-for-money assessment.

(b) World Trade Organization Government Procurement Agreement

The WTO Government Procurement Agreement (GPA) is long standing, first agreed in 1994, under the pre-existing GATT arrangements and revised in 2014.[126] It is plurilateral, which means that WTO members sign up on a voluntary basis, but once they are signatories, then they are legally bound. There are currently 48 members worldwide with prospective new members (including China and the Russian Federation) currently considering accession. The GPA commits members to principles of transparency and non-discrimination and to ensure the availability of dispute resolution mechanisms. The agreement also allows for declared local preference thresholds, to protect small and medium-sized enterprises or emerging national enterprises. One of the major objectives of the GPA is to consolidate procedures by making international commitments but also to reassure investors and operators that they will not be treated arbitrarily.

The GPA rules do not automatically apply to all procurement activities of each party. Rather, the coverage schedules play a critical role in determining whether a procurement activity is covered by the Agreement or not. Only those procurement activities that are carried out by included entities (such as national or regional governments) purchasing listed goods or services of a value exceeding specified threshold values are covered by the Agreement. This positive listing procedure is like that undertaken in the WTO General Agreement on Trade in Services (GATS) where only listed sectors are covered by national schedules to the agreement.[127] This ensures that the power of decision on which sectors to open to foreign participation rests with Member States.

(c) United Nations Commission on International Trade Law

The model law devised by the United Nations Commission on International Trade Law (UNCITRAL) adopts many of the principles discussed above and puts forward the: "rejection of abnormally low submissions" (Article 20) one of the features associated with bid rigging (see below). It allows for elaborations of the basic 'lowest bidder' convention based on price, by allowing for *competitive negotiations* (Article 51) through which initial bids can be shared publicly in order to stimulate improved offers[128] and reverse auctions which are defined as: "online real-time purchasing technique …presentation by suppliers… successively lowered bids….automatic evaluation of bids.." and have been used successfully in order to bid down levels of subsidy for access to a 'difficult' market (for example service coverage in remote areas with sparse populations).

(d) Bid rigging

In 2009, the OECD issued a guide to fighting bid rigging in public procurement as have many national jurisdictions. [129] The guide recommends reducing the cost of bidding to open the market to less experienced operators and to prevent collusion between pre-qualified service providers. "The fewer the number of sellers, the easier it is for them to reach an agreement on how to rig bids".[130] One could say that the guide recommends introducing more competition into competition procedures.

The UNCTAD Model Law on Competition, Part 2 commentary on chapter III ("Restrictive agreements or arrangements") describes the elaborate forms taken by bid rigging: "Collusive tendering is inherently anti-competitive, since it contravenes the very purpose of inviting tenders, which is to procure goods or services on the most favourable prices and conditions. Collusive tendering may take different forms, namely: agreements to submit identical bids, agreements as to who shall submit the lowest bid, agreements for the submission of cover bids (voluntary inflated bids), agreements not to bid against each other, agreements on common norms to calculate prices or terms on bids, agreements to "squeeze out" outside bidders, agreements designating bid winners in advance on a rotational basis, or on a geographical or customer allocation basis. Such agreements may provide for a system

of compensation to unsuccessful bidders based on a certain percentage of profits of successful bidders to divide among unsuccessful bidders at the end of a certain period". [131]

As recommended by OECD, the principle of "accountability throughout the public procurement cycle", includes "appropriate complaint and sanctions processes". Given that the leaders of rigged bids can be large enterprises, and the contracts very substantial and for long periods, the fines imposed in several jurisdictions can be high, especially in small economies where a rigged bid can be seriously detrimental. [132]

(e) Public service obligations and State aids

Terms of reference of public tenders can spell out targets for specific programmes, licensing requirements and qualification assessments for operators. These can include or take the form of Universal Service Obligations (USOs) as described in the UNCTAD 2006 paper as "minimum performance requirements which the State imposes on service providers". That paper envisages that such obligations may include coverage and pricing and may take the form of non-commercial obligations and incentive mechanisms such as subsidies to householders or to operators in cases of high cost of provision exceeding affordability, with funding coming from Governments, universal access funds (which can be topped up through a variety of sources, including general company levies), or cross subsidies from other consumers as discussed earlier.[133] USOs often underpin licensing of providers (or potential providers seeking to bid in competitive tenders).

The use of such State support is subject to constraints in the European Union and elsewhere. The Treaty on the Functioning of the European Union for example states in Article 107 (previously 87) states: "Any aid granted by a Member State… which distorts or threatens to distort competition by favouring certain undertakings… shall, in so far as it affects trade between Member States, be incompatible with the internal market".

However, the Altmark case of 2003 resulted in the drawing up of conditions of compatibility of 'compensations' with European law.[134] The European Court of Justice held that public service compensation (i.e. remuneration) does not constitute State Aid within the meaning of Article 107 of the Treaty on the functioning of the European Union provided that four cumulative criteria are met. In summary these are:

- clearly defined public service obligations;
- objective and transparent parameters as the basis of compensation;
- compensation not more than the costs incurred in discharging the obligations, including a reasonable profit;
- compensation determined on the basis a typical well run undertaking. [135]

While bid rigging and laxity in dispensing State aids and outright corruption should be suppressed, there are nevertheless weaknesses in the classical model. The Public–Private Infrastructure Advisory Facility toolkit for private participation states that "Competitive bidding may encourage 'lowballing' or underbidding". Delmon describes the 'Trojan horse' syndrome for a World Bank publication: "the bidder, in its desire to win the project, may agree to strictly uncommercial or unreasonable terms".[136] There is a long list of case studies of collapsed or distressed contracts dating from the late twentieth/early twenty-first centuries in which such allegations have been made. [137] Such landmark cases suggest that it may be a strategic error to award concessions systematically to the lowest tariff bidder while retaining high connection charges for the unserved. The UNCITRAL model law provisions on competitive negotiations could allow a move away from price as a single indicator and allow for more public participation in setting project objectives such as network extensions.

Competition policy tools, such as public procurement protocols, are drafted to contribute to achieving value for money from projects. To operate them well, 'expert commissioners' are required. That is the public authority personnel responsible for issuing tenders and evaluating bids need to be approaching the level of expertise of the bidders themselves, at least to the extent of being able to interrogate them. The costs of preparation of projects in the main infrastructure sectors comes to 10 per cent of total project costs, a figure which indicates the complexity of the job that the commissioning authorities must do.[138] It is therefore important that PPPs do not develop a separate status, taking them away from established public procurement disciplines, resulting in less public understanding and control.

C. REGULARIZATION OF THE INFORMAL SECTOR

Public procurement is a formal process. Hence, although there are a few examples of incorporation of small-scale informal providers, they often only feature negatively in competition policy in the sense that they are outside the recognized market and indeed may be rendered illegal by the conferring of monopoly status on the formal public services. This situation ill serves the hundreds of millions of people living in informal settlements or rural areas away from networks. One lesson from the history of the informal settlements and the vacuum of provision that existed for many of their residents, is the impossibility of suppressing demand for services such as energy and water which are life and death requirements.

Informality is difficult to track. Slum dwelling acts to some extent as a proxy estimate and the 2021 Sustainable Development Goal Report chapter on human settlement clearly acknowledges the inadequate access to infrastructure services. The report estimates that the proportions of the urban populations living in slums in 2018 were 56 per cent in sub-Saharan Africa, 21 per cent in Latin America and the Caribbean, 31 per cent in Central and Southern Asia, and 27 per cent in East and South-East Asia.[139] The report notes that from 2014 to 2018 the proportion of urban population living in slums worldwide rose from 23 to 24 per cent.

A World Bank report in 2017 revealed that the public provision of piped water on household premises is declining proportionately as countries struggle to keep up with population growth. It reported that in Nigeria, coverage fell from 29 per cent in urban areas in 1990 to less than 10 per cent by 2015. Similarly, in the Democratic Republic of the Congo, piped connections dropped from 48 per cent of the urban population in 1990 to only 17 per cent in 2015. Haiti, the United Republic of Tanzania and the Occupied Palestinian Territory also suffered declines in urban areas during this period. "In the face of service delivery failures, households take matters into their own hands, sinking private wells if they can afford to (and thereby straining the local aquifer) or buying from unregulated private providers that charge three to four times what public providers do."[140]

In the above scenario, the informal sector 'gets a bad press'. Yet surveys carried out for the Public Private Infrastructure Advisory Facility (PPIAF) and the World Bank during the first decade of this century showed that many small scale providers supplied as good a service as municipal counterparts when like-to-like comparisons were made, and, for a given service, their prices may even have been comparable despite the absence of public subsidy.[141] Although this seems at first sight to contradict the price comparisons, in fact they can be explained by the absence of subsidy for informal providers, its presence for the formal networks and the higher costs for the informal ones. Furthermore, in contrast to the formal networks, they often did not charge a connection fee for access to informal networks, or at least not one that covered costs.

Attitudes towards informal providers have shifted somewhat since those early surveys and there have been some successful efforts to incorporate them and raise standards, and above all to move them away from the black market. They have sometimes been described as present by 'default or design'. There is some shift towards the latter as small operators are increasingly being seen as operating small systems serving the public and need to expand or improve. Very small networks may be run by user associations. Cooperatives have been developed from such origins in the Plurinational State of Bolivia, Mexico and Viet Nam. A World Bank toolkit noted the role played by small scale providers in Manila, where, having first operated exclusively, two concession contracts allowed for third party provision and effectively encouraged it in certain cases. This resulted in numerous housing associations, community groups and at least one local company buying water in bulk and reselling it to consumers.[142] There will be no perfect solution to the problems posed by informal operations, but ignoring those problems is not going to work – the number of consumers who are their customers is simply too vast.

V. RECONCILING ACCESS AND SUSTAINABILITY

The guidelines indicate an intention to promote universal access to essential services, with protections for those who need them most and efforts for those who currently do not have access. This is very much in keeping with the almost simultaneous development of the Sustainable Development Goals, which raises two questions: firstly, whether consumer protection policies are well-equipped to respond to these developments; and secondly, whether it is feasible to attain universal access in the light of climate change and the increasing fragility of natural resources.

As noted earlier, several targets are not on track towards being met. At the local and sub-national levels, access has retreated in places where rates of urbanisation outpaced the speed of infrastructure development. This will remain a problem for policymakers across the world. In 2018, 55 per cent of the global population lived in urban areas and it is projected that the proportion will reach 68 per cent by 2050.[143] By then, the urban population of Africa is projected to triple and that of Asia to rise by over 60 per cent [144] This chapter addresses the policy options for coping with such global challenges in the sectors of energy, water and sanitation.

A. ELECTRICITY

1. Supply side structural options

The energy sector is seeing particularly rapid flux in development of models as technology evolves. Large-scale, high voltage networks are under challenge as small-scale generators can serve localities without resort to the high voltage transmission system with its associated charges.[145] The Energy Sector Management Assistance Program (ESMAP) report states: "While our understanding of the universal energy access challenge has expanded, so has our understanding of what's needed to meet this challenge".[146] This includes not only "new household electricity connections and delivery of clean cookstoves, but other projects such as power generation, transmission, gas pipelines, liquefied petroleum gas (LPG) bottling, mini-grid systems, solar home systems, biogas projects, fuel-wood plantations and briquette manufacture, among others".

The Sustainable Development Goal 7 tracking report for 2019 identified the need for "Holistic programs that make the most of both decentralized and centralized solutions, including transparent grid extension plans and regulatory frameworks that protect against financial losses if the grid arrives in areas connected via decentralized modes". [147]

Faced with these challenges, competition policy in this domain should adapt. Public procurement rules need to be applied, indeed strengthened, where existing networks are to be extended or 'densified'. But networks will have to evolve as decentralized systems develop, so that they can accept 'exportable' output, such as rooftop solar powered electricity which is surplus to household requirements. In that case the key competition principle will be right of access to the low voltage local distribution systems. That in turn will raise questions about the need for standby systems, particularly needed in electricity because of its non-storable nature.

The 2019 Sustainable Development Goal 7 tracking report sets out its list of '*least cost solutions for universal access to electricity by 2030'.* [148] It reports that of the 1.2 billion people who need access by 2030 as per Sustainable Development Goal 7, over half (over three quarters in rural areas) could be electrified on a least-cost basis through clean decentralized systems. They make the caveat that grid-based systems remain essential offering a least-cost solution for 42 per cent of the population to be connected. However, of these, on-grid renewables comfortably surpass fossil fuels in providing new connections.

Increasingly the non-electrified population is concentrated in Africa. It is therefore significant that the new generation of 7,500 mini grids reported in 2019 by ESMAP will be focused on Africa. [149] The eventual aim is to arrive at a global total of 490 million people to be covered by 210,000 mini-grids, mostly using solar hybrid technology. It is important to draw the distinction between mini-generation and mini-grids. ESMAP reports a global total of around 47 million people served by 19,000 mini-grids, using mostly hydro and diesel. Such systems are essentially vertically integrated, incorporating both small scale generation and localized low voltage distribution. A new generation of solar hybrid mini grids has emerged typically using solar panels, batteries, and smart meters. They are increasingly designed to be able to interconnect with main grids (possibly after the passage of time in remote areas) although

such interconnection is described by ESMAP as an *'operational challenge'.*

Mini-generation, such as household solar panels, unlike mini-grids, will often develop within an established grid network, thus increasing overall capacity and potentially displacing existing electricity supply transmitted through the high voltage grids. That kind of nested mini-generation needs mechanisms for access to local distribution networks, so that they can feed in surplus electricity to finance themselves and to reduce carbon emissions where pre-existing power is generated using fossil fuels.

Utilities can both sell energy to and buy energy from consumers on the grid – two-way grid services. Apart from the legal and policy issues linked to the evolution of the networks away from their existing status, there are considerable technical problems around the transition, notably metering issues such as the need to measure two-way flows in preference to 'net' flows without incurring the cost of two meters.

As solar panels are adopted by very small units, including households, this raises the prospect that in due course the grid-based system will become residual, catering for 'down time' during repair and maintenance and for those periods when solar production dips or fails to cope with demand and catering for those consumers who cannot afford to install solar. There is a danger however, that as the industrial/corporate sector and many better off consumers move towards self-provision, low-income consumers could be left dependant on the old systems with higher prices, especially if carbon taxes are levied on fossil fuels-based electricity to provide incentives to renewables. This could develop into a new version of the stubborn 'poor pay more' syndrome. The ESMAP vision of an integrated approach is to proceed, there will be a need for consumer protection bodies to balance the interests of the different groups of consumers and for the competition authorities to mediate the need for continuity (and thus for the working of the grids) and rights of access for the new small-scale producers.

2. Demand reduction through energy efficiency

The difficulty of aiding low-income consumers to meet their energy requirements by tariff-based measures or by variants of social security policy was discussed. There are further options which can achieve the desired result without the problems of invasive identification. The Hong Kong Consumer Council review of its electricity sector in 2014 indicated a promising direction of travel to avoid such dilemmas. The Council concluded: "Given the limitations of a tariff based approach' (to help for low income consumers)[150] 'and an income support approach', (with all its problems of means-testing) 'the Council suggest that one measure to deal with this issue should undoubtedly be a well-targeted energy efficiency programme so that low income households can receive the energy service they need but for a lower consumption of power, rather than just be compensated for, and thus locked into, inefficient systems". The Council went on to recommend targeting such energy efficiency schemes at low-income habitations, thus keeping down overall energy consumption and reducing the need for expensive peak power. [151]

One of the advantages of this approach is that it brings a tangible long-term benefit, even if the targeting may be inexact in terms of income levels. For there will be an efficiency gain and a reduction in emissions regardless of the precise status of residents of the dwellings targeted or the consumers buying the efficient appliances.

To achieve such an orientation within the power sector, Goldstein pointed out that the business model for utilities will need to change, evolving from energy vendors to energy service providers offering help to consumers seeking improvements in energy efficiency.[152] Utilities will need to shift towards selling 'negawatts' as opposed to 'megawatts', a reversal of their traditional retailing role and one which requires decoupling energy sales from revenues thus recasting the incentives built into their current business model. This approach is built into the ISO standard 50007. "The energy service providers, (as well as relevant authorities) should all seek to ensure that a satisfactory level of energy efficiency service is available to all users, providing general information on the efficiency opportunities available, their costs and benefits, where they can be acquired, and incidental benefits or conditions, and furthermore, financial incentives or financing services that may be available to the user."[153] The standard does not envisage a monopoly of advice, or of sales of energy efficient appliances, but the energy service provider is expected to be the 'first port of call' for such advice and could offer financial incentives for consumers to buy efficient equipment, even if purchased elsewhere. The consumer protection agencies and competition authorities could play an important role in ensuring the coherence of such arrangements.

The paradigm could be to make utilities neutral as to whether they sell energy or save it. In regulated systems, this could be done by allowing them to put investments in energy efficiency into their regulated asset base so that they would make the same rate of return as if they invested in new supply. This is often known as 'least cost planning' with the aim that investments should be made, either for supply or demand reduction, in a way that minimizes the cost of service to consumers. Having the utilities leading the process could generate economies of scale.

However, the introduction of retail competition means that the retailer does not have a regulated asset base against which to set returns, as the sales function is 'asset light'. There may then be a conflict between retail competition and energy efficiency based on least cost planning. If that were the case, it would be hoped that market-based instruments to promote efficiency can still be used to implement statutory (or licence-based) obligations such as certification programmes requiring energy suppliers to deliver specified energy efficiency savings, and/or auctions, where companies or service providers bid for government funds to support the implementation of energy efficiency measures.

Experiences of negative auctions in the public procurement field (referred to earlier) suggest that these options could be effective, if backed up by impact assessment. Efficiency drives at consumer level can prove effective, especially during times of crisis. In California, the 'Millennium' electricity crisis necessitated not just a 40 per cent electricity price rise, due to the cost of commissioning new capacity following black outs, but also led to new appliance and equipment standards and other efficiency incentives. Contrary to conventional economic logic, the tariff increase was followed by a five year rise in consumption, while consumption fell prior to the price rise and in parallel with the efficiency programme. [154]

The Sustainable Development Goal target 7.3 is to increase the global rate of improvement of energy efficiency by 2020 to 2.6 per cent annually thus doubling the 1.3 per cent rate which was achieved between 1990 and 2010. The Sustainable Development Goal 7 Tracking report for 2021 reports that using the measurement of energy intensity, by 2018, the annual improvement had in fact reduced to 1.1 per cent, judging nevertheless that 3 per cent was well within reach.[155]

The Californian experience suggests that there is scope for mandatory policy to improve market performance. The 2019 Sustainable Development Goal 7 tracking report backs this up stating that: "over 32 per cent of global final energy use was covered by mandatory energy efficiency policies. Coverage rose consistently after a marked increase in 2011 following the implementation of new measures in China. This growth reflects the replacement of old energy-using equipment, appliances, and vehicles with new models".[156] Coverage of only 32 per cent suggests that there is much scope for improvement, while the Chinese experience confirms the often-stated point that such programmes can create employment, while reducing energy demand.

The Sustainable Development Goal tracking report for 2019 pointed out that "Energy efficient appliances are essential to provide more substantial energy services with off-grid electricity supply," while making the point that they "could reduce electricity demand for typical energy services by up to two-thirds".[157] For example, a refrigerator designed as part of a service program could be built to keep food at healthy temperatures even without electricity for a certain number of hours, and thus operate exclusively on local wind and solar to save costs. This responds to the often-repeated fear that meeting the future demand for electricity of consumers in developing countries is incompatible with efforts towards conservation and mitigation of climate change.

Such energy efficiency development also helps to overcome problems faced when previously unserved communities are connected for the first time, but with limited capacity. This is most common in rural areas, using grid-based technology and has involved a choice of service levels, (such as hours of service, voltage of electricity) which might enable some service to be provided when otherwise none is on offer. This has been offered based on village level consultation in remote areas of Eastern Senegal for example.[158] Improved energy efficiency gives greater flexibility in this regard and may avoid awkward choices about hours of supply.

This corresponds with the United Nations guidelines where they envisage different levels of service in guidelines 72 and 76 covering water and energy, which both call for "consideration" or "due regard" to be given to "appropriate levels of service, quality and technology". Guideline 76 calls for consideration "according to their economic circumstances".

The invisible nature of unused energy (negawatts) results in a tendency to under-rate it. Even if improvements such as the two thirds reduction in electricity demand referred to above were adopted and aggregate bills were to fall, could there be a "bounce back" of consumption? Goldstein argues that: "credible observations of backfire, if any, are very rare, and backfire is theoretically dubious and empirically unprovable".[159] It would be an extreme position to argue that no consumer will ever increase consumption if bills fall, but the key point is that the unit price can remain the same or increase and thus the incentive to economize is maintained even if the bill falls. If low-income consumers in cold climates see their bills decline with greater efficiency, then if that allows them to afford higher comfort levels for the same bill or even for less than before, then that will be a welcome improvement. The same applies to children able to read for their homework after dark. It must not be forgotten that some people need to consume more, or at least to better effect.

B. WATER AND SANITATION

The global demand for water is projected to increase between 30 and 50 per cent by 2050.[160] The traditional models are struggling to keep pace and the task of serving the 'last billion' or so of unserved consumers is proving stubbornly difficult. Increasingly, questions are being raised about the technical feasibility of network extensions. For example, Western-style sewerage systems require volumes of water which are simply not available in many underserved areas such as the Sahel where aquatic resources are becoming scarcer under climate change, while demands for sanitation are getting larger, due to population increase. Supplying drinking water is already a major challenge without using so much potable water for toilet flushing. That is one form of water 'expenditure' which could be avoided through supply and demand side efficiencies as well as supply-side structural options.

1. Supply-side efficiency

A form of water 'expenditure' is leakage, not discussed in the preceding chapters, indeed not sufficiently discussed in wider policy debates. Yet its reduction could be equivalent to major new water sources. Leakage reduction seems a mundane activity, less eye-catching than water transfer schemes or storage projects, but with fewer consequences in terms of local hydrology, agriculture, wildlife, and microclimates. Furthermore, the water in question has already been captured by the system, only to be lost again. The United Nations Water reports that "an estimated 30 per cent of global water withdrawals are lost through leakage". Faced with the forecast by the fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC) that for each degree of global warming, approximately 7 per cent of the global population will face an almost 20 per cent decrease in renewable water resources, leakage reduction serves both adaptation to climate change and mitigation of water shortages.[161]

Sometimes the solutions to problems are relatively simple, (that does not mean easy) and this is a case in point. Leakage reduction programmes can go a long way to easing the dilemmas. However, they are not cheap, involving as they do, major reconstruction works which can be very disruptive of daily life and therefore unpopular. Short term expenditures can bring major long-term gains, to consumers through future supplies being more assured and to the environment as abstractions from nature are reduced. There are proposals to redesign 'non-revenue water' reduction programmes (including not only leakage but also measures against theft), replacing payments to contractors for inputs (for example, number of connections replaced) by performance-based contracts which pay the contractor f*or* "outputs, such as amount of water saved, number of illegal connections detected, or number of customers receiving 24/7 service".[162] It is crucial that local consumer associations cooperate with such programmes, for the cost to the consumer from leakage repair will be far less in the long run than the costs associated with water losses and contamination due to decaying pipes.

The inclusion of new Sustainable Development Goal targets covering wastewater treatment and water efficiency is an indication of progress, consistent with extending the notion of access to include safety, quality, and environmental protection.[163] So many of the costs associated with provision of clean water and decent sanitation are still being identified let alone met. So even in the richer countries there is still a long way to go and cost increases will be needed. Parallel approaches to industry and agriculture are needed. Cleaning up domestic pollution will be undermined, and its costs largely wasted if unregulated industrial and agricultural waste continue.

2. Demand-side efficiency

Sustainable Development Goal 6 target indicator 6.4.1 tracks the change in water use efficiency over time, including leakage. The 2021 Sustainable Development Goal 6 tracking report estimated that between 2015 and 2017 efficiency increased by about 4 per cent globally, including jurisdictions with large populations such as China, the European Union and North America. Regrettably, efficiency decreased in 20 countries, including large populations such as Brazil, the Russian Federation and South Africa. These estimates are based on only 88 countries representing 59 per cent of the global population and lack of data remains one of the main constraints to assess water-use efficiency.[164]

The figures above do not break down into domestic, industrial and agricultural use. The greatest scope for improvement is likely to be in agriculture as by far the largest user. However, many agriculturalists have very few resources to devote to this issue while, in contrast, as incomes rise so does household water consumption and so consumers have a role to play There are widespread examples of improved appliance efficiency, for example, reductions in toilet flush volumes. However, improved efficiency in water use does not necessarily translate into reduced consumption of water. Leakage reduction is clearly an efficiency measure at the 'upstream' level, but progress at the level of the domestic consumer is not yet well accounted for.

3. Supply-side structural options

To achieve universal access to safely managed sanitation, countries will need to look at non-network options. As indicated earlier, it already exists on a very large scale, on some estimates as widely as sewerage-based systems. A report by Citywide inclusive sanitation is critical of the conventional 'Business as usual' model in urban sanitation with its primary focuses on centralized/conventional infrastructure, which only benefits a small percentage of the population. The report criticizes this model because it "doesn't consider incrementalism… Providing access to a toilet, a latrine or a sewer connection is only part of the solution. The Sustainable Development Goals now require that human waste is conveyed, treated and reused/disposed of safely and sustainably. The full sanitation service chain needs to be sustainably managed". Only 37 per cent of urban excreta is safely managed globally.[165]

Similar critiques are being mounted regarding drinking water networks, especially in slum settlements. Misra and Kingdom (2019) criticize the 'laissez-faire attitude' which "prevails in the sector, leaving off-grid customers to fend for themselves". They go on to argue that: "Traditional (piped) solutions alone will not achieve Sustainable Development Goal 6.1 by 2030 in providing safely managed water that is accessible at the household level and is affordable to customers. It is critical to re-examine the traditional focus on adding piped connections. Policymakers and others in the sector should explore how off-grid solutions could be "reimagined" as a complementary solution". [166] They identify three possible models:

- **Standalone:** "providers would be licensed and regulated from source to tap to ensure good quality of water supply and of service". This is not unlike the suggested licensing model as described in the above section on competition.
- **Complementary off-grid:** "off-grid providers would be responsible for distribution in those areas without piped connections, and the utility would be responsible for ensuring availability of sufficient quantity and quality of water in convenient locations for the off-grid providers. This would reflect some of the arrangements in cities today in which the utility provides supplies to tankers and to local distributors". There are analogies here with the wholesale/retail split and with the transmission/distribution split in electricity.
- **Integrated off-grid:** "the utility would enter into service contracts with the off-grid providers for the delivery of services to those without a piped connection. The off-grid activities would be a part of an integrated set of service provision arrangements for which the public utility is responsible". This has been practised in some concessions.

In all these models, the overall service delivery and tariff regulation will be the responsibility of the government (or an independent regulator, if established) and the recognized providers may be eligible for subsidy. The concept has the merit of realism in that it takes what exists already on a massive and underrecognized scale and plays to its strengths, thus holding out hope of integrating the informal sector.

C. FISCAL OPTIONS FOR DEMAND REDUCTION

Reference has already been made to progress towards the Sustainable Development Goal 7 targets and the unfortunate finding reported in the 2021 reports for energy, water and sanitation that, as things stand, neither Sustainable Development Goal 6 (water and sanitation) nor Sustainable Development Goal 7 (clean energy) will be achieved by 2030. The question arises whether a more repressive approach based on carbon taxes for example is needed, bearing in mind that existing tariffs for energy services are frequently provided at below cost prices. For example, only two out of 39 utilities in Africa surveyed by Energy Sector Management Assistance Program (ESMAP) operate at cost-recovery tariffs. [167]

The International Monetary Fund points to the likely impact of carbon taxes and the need to implement them in a "fair and growth-friendly way". "To limit global warming to 2°C or less, large emitting countries need to take ambitious action. For example, they should introduce a carbon tax set to rise quickly to $75 a ton in 2030…This would mean household electric bills would go up by 43 per cent cumulatively over the next decade on average—more in countries that still rely heavily on coal in electricity generation, less elsewhere." *[168]*

Many theoretical models have promoted the use of carbon taxes to differentiate between the acceptability of different fuels. However, considering the above calculations and others still more dramatic, it would be unwise to ignore the prominence of basic service tariff increases in the grievances leading to the recent unrest that has disturbed countries at very varied levels of economic development, during the past few years, including medium and high-income countries such as Chile, France and Jordan and the emerging problems of energy prices during late 2021. [169] Relatively modest levies can be used to generate significant revenue for energy saving measures such as insulation or building design. But the potential consequences of meaningful tax levels sufficient to impact demand could be very serious and suggest that without efficiency savings to reduce consumption volumes and therefore keep down bills, a tariff-based strategy will not work.

D. THE HUMAN RIGHTS APPROACH

Consumer associations and development bodies have been vocal in arguing that access to water, sanitation and energy services are a human right. The 2006 UNCTAD paper discusses regulation of essential services in the context of which '*they may be considered human rights'* thus leading to the "widely recognized importance of the role the public sector should play in their provision – either as regulator, provider or both". *[170]*

Transposing the language of human rights to practical issues around infrastructure can be problematic. Concepts based on human rights often apply to non-material rights such as freedom of speech or of assembly around which associated resolutions can ask governments to 'cease and desist' from their denial, with immediate effect. In theory a resolution which is passed in that regard could take effect the next day. But in water and sanitation and energy, the development of physical networks, may take years, even though the development of standalone off-grid systems may mitigate that problem.

The South African constitution and Bill of Rights (Section 27) contains provisions requiring access to water and other essential public services, a provision which is widely admired. The South African Human Rights Commission is mandated to promote constitutional rights and is entitled to demand reports to that effect. The state has an obligation to "respect, protect, promote and fulfil" these rights, following principles laid out in the constitution. [171]

In a long and complex case brought in the name of consumers against the installation of pre-payment meters as part of a general improvement programme, the South African Constitutional Court confirmed that the state should take "reasonable legislative and other measures to seek the progressive realization of the right", but also stated that it was "implicit in 'progressive realization' that it will take time before everyone has access to sufficient water".[172] The legal action did then have an initial effect in that the Supreme Court of Appeal struck down the installations, only for that judgement to be reversed by the Constitutional Court. Although great progress has been made in connectivity since the post-apartheid South African constitution, many households remain underserved. The human rights approach may help to underpin progress and create wide political support, but it does not of itself provide a practical framework for policy to develop.

VI. CONCLUSION AND POLICY CONSIDERATIONS

Ensuring access by consumers to essential goods and services, such as energy, water and sanitation, as well as enhancing their protection is a common priority for all UNCTAD member States. The current United Nations frameworks of the 2030 Agenda for Sustainable Development and the guidelines for consumer protection converge in encouraging Governments, international organizations, business groups and civil society to work together towards this goal. The present report highlighted some of the most salient issues regarding the protection of consumers and users of energy, water and sanitation. By providing background considerations and policy options to increase consumers' welfare in these public utilities, it aims to contribute to an inclusive and affordable access to these essential services, considering consumers' rights and interests. The following paragraphs summarize the findings and provides some policy considerations.

(a) International policy frameworks

The fact that the guidelines address the access by consumers to the most essential utility services, along with the development of the Sustainable Development Goals, reflects a deepening of its consideration at the global level, moving from plain connectivity, a simplistic measure of access, to an appreciation of wider issues of quality such as continuity, safety and sustainability, all of which require the interaction of competition, consumer protection, environmental, sectoral and fiscal policies.

The importance of these sectors to a wide range of development objectives is increasingly recognized because of the COVID-19 crisis. The Sustainable Development Goal 6 tracking report for 2018 reported that: "Estimates suggest that every US$1 invested in water supply, sanitation and hygiene (WASH) yields a US$5 return, considering all social and economic benefits. Inequalities must be eliminated, and rates of progress increased for those furthest behind, if WASH targets are to be met by 2030". [173]

This means there is scope for beneficial impact in other policy areas not dealt with in detail in this report. According to the above report, women in particular, "are often critically exposed to unsafe water and are most affected by the lack of adequate sanitation facilities and/or sufficient wastewater management." That report goes on to argue for their involvement in important practical decisions such as "location, design and management of water points and toilet facilities". In this simple way this infrastructure service can contribute to Sustainable Development Goal 5 which aims to "achieve gender equality and empower all women and girls". [174] Such community participation is also encouraged by the United Nations guidelines for consumer protection in paragraphs 72 and 76 dealing with water and energy.

To take another example, the knock-on effects of polluted drinking water have serious implications for Sustainable Development Goal 2 (Zero hunger) and Sustainable Development Goal 3 (Good health and well-being). Chase et al. point out in a 2019 study for the World Bank: "Water determines disease environments and therefore the ability to physically utilize nutrients for healthy growth; water impacts the supply of food and nutrients that people have access to in their homes".[175] This in turn links to Sustainable Development Goal 12 on "responsible consumption and production". And so again the Sustainable Development Goal framework links to the United Nations guidelines for consumer protection.[176]

(b) Features of network services

The energy sector faces massive structural changes. The proportion of consumption of energy taken up by households is far greater than that for water and thus the potential impact by and on consumers is that much greater. Disentangling the output of public utilities (gas, electricity, and district heating) from general energy use by households is problematic, especially when consumption is not based on formal networks. However, integrating all consumers into traditional quadripartite networks is being overtaken as a policy by the development of decentralized systems, which have the potential to give many consumers a role as producers. In any case, this should not detract from the need to develop universal supply networks, albeit of a more flexible nature.

Regarding water consumption, the prevalence of agriculture and industry and their contribution to untreated waste require an integrated approach to resource management and a logical attribution of

costs. Households will need to play their part in meeting costs especially as sanitation costs mount. Sectoral authorities should bear the same responsibility as exists for drinking water supply, to provide sanitation services, including for sanitation not connected to a sewerage network. This is a vital public health function and needs to be accompanied by commensurate resources.

Access to water and sanitation services measured by numbers of consumers connected to networks, as expressed in Sustainable Development Goal 6, is improving at the global level, albeit not fast enough to meet the Sustainable Development Goal targets. However, the headline figures can mask localized deterioration. Moreover, there is no clear evidence that overall improvements are taking place in wastewater management and water use efficiency which indeed could be worsening in terms of pollution.

It appears that the world is on its way to fall short of the targets for Sustainable Development Goal 7 on affordable and clean energy. The volatile nature of the energy mix and the multi-dimensional nature of energy, now expected to be affordable, reliable, sustainable and modern, go beyond the traditional focus on high voltage grid-based distribution of electricity, with off-grid systems and mini-generation yet to have their full impact. There is scope for optimism regarding energy efficiency, in which consumers must play a central role.

To promote access and inclusivity, the United Nations has adopted the notion of 'General Interest' and UNCTAD Model Law on Competition allows for obligations to be imposed on named service providers. The European Union similarly allows for certain exemptions from competition law in exchange for the assumption of universal service obligations, usually taken on by incumbent providers. This can work when there are mature networks functioning across a territory. It may be less successful in countries with less comprehensive networks. Universal service obligations may be difficult to fulfil for technical reasons and may be handicapped or restricted if the legitimacy of consumers as registered customers faces legal and political obstacles. Commercial logic can conflict with universal service obligations and other legal obligations, in which case standards negotiated with the involvement of industry and consumers may offer pragmatic solutions, including to the difficult issues around informal settlements. One option is to extend the notion of 'General Interest' to previously informal providers who may be incorporated to assume more formal obligations to provide service in such locations.

Regarding affordability, where many people are not served at all, the justification for tariff subsidies is weak because the service is provided predominantly to the better off. However, as coverage approaches the Sustainable Development Goal objective of 100 per cent, mechanisms will be needed to protect the connected poor. Tariff subsidies are more justifiable when networks are complete, connection subsidies are more effective where they are incomplete.

Further, as costs increase, for example to implement safeguards for water resources and protect the environment from pollution, there is likely to be a knock-on effect on consumers who are already connected but with low incomes. The extension of networks to reach those consumers hitherto underserved or unserved will increase costs. This strengthens the case for cost-recovery prices and has implications for affordability and subsidies.

It should not be concluded, however, that all forms of subsidy are counterproductive and provide a regressive subsidy to the better off, even though that is often the case. In the energy and water sectors in developing countries, existing subsidies often take the form of below cost tariffs which exclude the non-connected poor, who are paying high prices for off-network services, such as bottled water and firewood. The main obstacle to service is thus not the tariff but obstacles to connection. Subsidies should therefore be diverted towards support for connection of the non-connected populations.

Regarding consumer rights and welfare, the logic of public utilities operating more like businesses and moving towards charging cost-based prices, is that they should also raise their standards of customer care to the standards expected in other sectors, including the avoidance of unfair commercial practices. This should also extend to widely applied consumer protection mechanisms such as clarity and fairness of service conditions, non-discriminatory treatment of consumers, service information, dispute resolution and ease of payment. Many of these issues could be addressed by consumer protection rather than sectoral regulators, to ensure greater independence.

Pre-payment systems have brought positive results in previously unserved areas. Special protections may

be needed against disconnections, (not only arbitrary ones) of vulnerable and disadvantaged consumers. In such cases, consumer debts can be pursued through conventional legal means as with other commercial sectors.

(c) Competitive markets

Choice as an instrument of regulation of market conduct entails serious limitations. Indeed, the intended remedy – switching – has become part of the problem. Rather than transfer to consumers the burden of regulating the behaviour of suppliers, UNCTAD argued in 2012 that: "by prohibiting (abusive) forms of conduct, consumer policy improves the ability of consumers to make decisions that more accurately reflect their underlying preferences, thereby enhancing their market power: It is therefore, at this level, a microcompetition policy".[177] In other words, competition is not a substitute for regulation of conduct regarding the treatment of consumers.

Establishing wholesale markets in electricity under unbundled structures has proven difficult and is likely to prove even more complex in the context of diversification into renewables. Beyond a certain point in the balance between fossil fuels and renewables, and between high voltage grids and mini-grids, reliability of revenue for service providers becomes difficult to guarantee. Given that reliability of supply is largely about meeting peak demand, for which standby capacity payments are required for using plant, which is redundant for much of the time, an alternative approach could be to try to 'flatten the peaks' rather than scale them. Energy efficiency including at household level, has a role to play in this regard.

Competition in the market in the electricity sector has not yielded the expected increased consumer welfare results that were hoped for, even in countries with complete networks. One can therefore raise questions as to how appropriate this model would be for countries whose networks are not complete. There may be more scope for co-existence among providers as decentralized production develops alongside the 'traditional' grid-based systems and starts to feed into them. That process may involve non-State actors, sometimes private sector companies and sometimes cooperatives and other non-profit models. Whatever the precise model, it will require access to distribution networks to be allowed, and in principle that is a matter for competition policy.

However, equitable treatment of off-grid providers in developing countries is proving to be an uphill task given the historic dominance of centralized grids in attracting financial flows for network extension, as reported in 2020 by the International Institute for Environment and Development.[178] IIED reported in 2016 that only three per cent of approved international public climate finance in the energy sector was allocated to decentralized energy between 2005 and 2015.[179] And yet it has been widely argued that decentralized services hold great promise, while centralized grids still leave many unserved.

Public investment remains crucial nevertheless, especially in view of the smaller scale and volatility of private investment and its relative weakness in less profitable markets and sectors. In sectors as important as water and energy, the assumption of risk solely by the private party is neither desirable nor feasible as it is inconceivable that the services should disappear. Public involvement, including as guarantor, is unavoidable.

Regarding competition for the market, there is a wide consensus on the need for rigorous public procurement mechanisms in the light of the scale of the resources involved and their strategic importance. Systems are becoming more flexible and such mechanisms as negative auctions, competitive negotiations and helping first time bidders through e-procurement are emerging.

Underbidding is a risk which arises from excessive reliance on tariff levels as the deciding factor. A more multi-variate approach including network extensions and connection charge reduction would be more appropriate for developing countries. Bidding too low to enter a market is not only an exercise of abusive practices, but also fails to guarantee financial stability without which universal service cannot be achieved.

Progress is being made in developing criteria for public service compensation which allows orthodox competition policy to be put to one side. There are paradoxes here. While application of the principle of services of general interest leads to incumbents being compensated, those same incumbents are likely to have to allow off-grid operators and 'self-supplying' consumers, to use the incumbent network. This applies predominantly to electricity, but also has its equivalents in sanitation for example and varies between countries. In the longer term, as services become more decentralized, the pre-existing networks risk becoming the providers of last resort for the least

profitable parts of the market. In that case, there will be a need to prevent new forms of the 'poor pay more' syndrome which could occur if decentralized systems and their consumers, 'defect' from the grids.

The above trends could bring moves towards regularization of the informal sectors, on which the UNCTAD Manual on Consumer Protection recommends that: "opening markets and accepting a plurality of service providers (including informal ones) is crucial for the wellbeing of consumers. Indeed, imposing exclusivity could have the perverse effect of reducing standards".[180] Users of lifeline services will always seek out supply, and crude suppression of the informal sector will not resolve the access problems.

(d) Reconciling access and sustainability

Much remains to be done to roll out non-networked sanitation and on applying the same off-grid logic to potable water services for the 'last billion', the inhabitants of remote rural areas and fast-growing slums. Leakage reduction and control of industrial and agricultural wastewater are both essential tools of resource management and comparable in potential beneficial impact on consumers, to major engineered water projects, while being far less disruptive to the environment.

Demand reduction through energy efficiency has been under-estimated and may require existing utility services to change their business model away from dependence on energy sales and towards energy efficiency based on least cost planning. This may conflict with retail competition under existing conventions of asset-based regulation, but other more statute-based mechanisms may be used. Energy efficiency measures may be more efficient than financial aid to subsidize the consumption by low-income consumers which is very difficult to design without perverse effects. Energy efficiency can also have more long-lasting beneficial effects for future generations.

Fiscal measures to influence demand seems less promising than energy efficiency-enhancing measures. Demand reduction through taxation cannot realistically achieve the required reduction in emissions even when accompanied by other mechanisms. It may have a role, but the simple assumption that price increases lead to demand reduction is under challenge, in as much as such measures cannot bring about the necessary radical reductions without a degree of upheaval that is unlikely to be acceptable. This is more so considering the likely cost increases to provide for climate resilience and environmental sustainability. The 2020 global review of public infrastructure funds carried out by the World Bank and others, estimates that previously unbudgeted cost increases regarding these factors raise infrastructure costs by between 9 and 27 per cent.[181]

The imposition of universal access to essential services such as water and electricity by legal edict based on access as a human right is not likely to yield immediate results by itself because of the lead times needed for provision to be effectively implemented. The concept is however useful as a basis for governments to set priorities and allocate the necessary measures, whose effects will be felt in the long-term.

Consumer protection agencies, competition authorities, sectoral regulators and other interested government authorities must play an important role in pulling together the various strands of a policy for sustainable access. In many instances this will entail raising standards of customer care, so that consumers have access to a decent standard of service for which they are willing to pay.

Although this discussion may still be unfamiliar to consumer protection agencies, for whom consumer rights relate to existing served consumers and the terms and quality of their service, it gives them a vital potential role in the expansion of services, for adequate consumer care is an essential element of consumer responsibility and loyalty – consuming with restraint and paying bills. Responsibilities for consumer protection in energy, water and sanitation are shared between consumer protection agencies and sectoral regulators. Their cooperation in promoting consumer welfare in these essential services is more important than ever.

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NOTES

[1] General Assembly resolution 2200 A (XXI) of 16 December 1966, annex.

[2] Resolution adopted by the General Assembly on 28 July 2010, 64/292: The human right to water and sanitation.

[3] General Assembly resolution 70/1.

[4] General Assembly resolution 70/186.

[5] Report of the Eighth United Nations Conference to Review All Aspects of the Set of Multilaterally Agreed Equitable Principles and Rules for the Control of Restrictive Business Practices (TD/RBP/CONF.9/2), 2020.

[6] Note by the UNCTAD secretariat, Consumer protection needs of vulnerable and disadvantaged consumers in connection with public utilities (TD/B/C.I/CPLP/22), 2021.

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[14] World Bank and United Nations (2018) High level panel on water, *Making every drop count: an agenda for water action*.

[15] SE4All, see www.seforall.org .

[16] United Nations (2015) *Millennium Development Goals Report, 2015: Time for global action*.

[17] Water and sanitation were included as Target 7C of the Millennium Development Goal 7 '*Ensure environmental sustainability*'. Access to 'improved sanitation', which was defined as hygienically separating human excreta from human contact, was devised by the Joint Monitoring Programme for Water supply and sanitation of UNICEF and the World Health Organization (WHO) in 2002 as an indicator to help monitor Millennium Development Goal 7 process.

[18] Public utilities and the promotion of universal access are highlighted in paragraph 77 of the guidelines generically, thus including water, sanitation and energy, emphasising vulnerable and disadvantaged consumers.

[19] UN-Water (2021) *Summary progress update 2021: [Sustainable Development Goal] SDG 6-water and sanitation for all*.

[20] International Energy Agency et al. (2021) Tracking *[Sustainable Development Goal] SDG 7: The energy progress report. 2021*.

[21] UN-Water (2021) Summary progress update 2021: *[Sustainable Development Goal] SDG 6-water and sanitation for all*.

[22] International Energy Agency et al. (2021) *Tracking [Sustainable Development Goal] SDG 7-The energy progress report, 2021*. Table 7.1.

[23] High Level Panel on Water (2017) *Water use efficiency for resilient economies and societies: roadmap*. para 22.

[24] World Bank, Water global practice (2019) Chase C et al. *Water and Nutrition: a framework for action*. 1.

[25] World Bank Water Global Practice Energy and Extractives Global Practice (2016) *Improving the Performance of Electricity and Water and Sanitation Utilities in Sub-Saharan Africa*, 2.

[26] Eurostat statistics explained. See https://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_consumption_in_households, accessed June 2021.

[27] There is, however, scope for competition through tendering for the market and this is explored later.

[28] UN-Water (2021) *Summary Progress Update 2021 [Sustainable Development Goal] SDG 6 – Water and sanitation for all*. 23 The decline in the industry shares from 19 per cent reported in the 2018 Sustainable Development Goal 6 tracking report (p.26) may reflect the rise in household consumption of food and water as networks extend and agricultural production increases with population.

[29] UN-Water (2021) *Summary Progress Update 2021 [Sustainable Development Goal] SDG 6 – Water and sanitation for all*. 7

[30] Alliance for water efficiency (2019) Homewater works. Chicago. Estimate of 31 per cent. The Santa Cruz Water Department in California estimates that toilet usage of water has diminished by a factor of four since 1982.

[31] UN-Water (2021) Summary Progress Update 2021, *[Sustainable Development Goal] SDG 6 - Water and sanitation for all* 7.

[32] Damania R et al. (2019) *Quality Unknown: the invisible water crisis*. World Bank. xii and xiii.

[33] Tremolet S (2012) *Small-scale finance for water and sanitation*, European Union Water Initiative, Share, 6.

[34] Tremolet S and Muruka G (2013) *Evaluating the potential of micro-finance for sanitation in Tanzania*, Water Aid, International institute for environment and development, London school of tropical hygiene and medicine. "Although the municipal Health departments are responsible for the enforcement of the law that implies that every house in Tanzania must have a toilet, enforcement is not strictly applied as households are not deemed able to pay the fine and invest in an improved latrine (or adequate emptying) simultaneously. In addition, adequate emptying services are very limited, due to inadequate technology".

[35] UN-Water (2018) *The [Sustainable Development Goal] SDG 6 Synthesis Report on Water and Sanitation 2018*, 49.

[36] World Bank Water global practice (2019) Andres L et al. *Doing more with less: Smarter Subsidies for Water Supply and Sanitation*, Overview. 3. "O and M" = operation and maintenance.

[37] Note by the UNCTAD secretariat, Consumer protection needs of vulnerable and disadvantaged consumers in connection with public utilities, (TD/B/C.I/CPLP/22), 2021.

[38] According to the WHO/UNICEF Joint Monitoring Programme, https://washdata.org/monitoring/drinking-water, an 'improved drinking water source' is one which by nature of its design or construction has the potential (emphasis added) to deliver safe water. Improved sources include piped water, boreholes or tubewells, protected dug wells, protected springs, rainwater, and packaged or delivered water. Improved sources are divided into 'safely managed' 'basic' and 'limited'. To be considered 'safely managed' a drinking water service should meet 3 criteria: accessible on premises, available when needed, free from contamination. If one criterion is not fulfilled, then the service is classified as 'basic' if involving a round trip of less than 30 minutes. These distinctions are important as they show how the above figure for 'improved water source' may contain some very poor access such as 'limited' which requires a round trip more than 30 minutes to and from an improved source. See: UN-Water 2018, *[Sustainable Development Goal] SDG 6 Synthesis Report 2018 on Water and Sanitation*, 37.

[39] As with drinking water supply, there is a ladder of quality for sanitation, the lowest level being open defecation and the highest 'safely managed'. The definition of access to safely managed sanitation is: "*use of improved facilities* (improved facilities include flush/pour to piped sewer systems, septic tanks or pit latrines; ventilated improved pit latrines, composting toilets or pit latrines with slabs) *that are not shared with other households and where excreta are safely disposed of in situ or transported and treated offsite'.* (UN-Water 2018, Sustainable Development Goal 6 Synthesis report. 45.) Three intermediate categories are based on exclusive use by households, and treatment and disposal of excreta. As with water,' improved' sanitation may include some very limited service involving multiple sharing. https://washdata.org/monitoring/sanitation.

[40] UN-Water (2021) *Summary Progress Update 2021: [Sustainable Development Goal] SDG 6: Water and sanitation for all,* 12.

[41] UN-Water (2021) *Summary Progress Update 2021: [Sustainable Development Goal] SDG 6: Water and sanitation for all*, 7–9.

[42] International Energy Agency et al. (2021) *Tracking [Sustainable Development Goal] SDG 7. The energy progress report. 2021*, 1.

[43] IEA et al. (2021) *Tracking [Sustainable Development Goal] SDG 7. The energy progress report 2021, Executive summary,* 4.

[44] Intermittency and unreliability are two different things. Unreliability means that the consumer cannot know in advance whether (and when) there will be power. Intermittency may mean there is power when the sun shines, (and more if there are no clouds). Intermittent supply can also be reliable in the sense that rotas allow for supply at certain times. This allows consumers to plan to charge laptops or phones and quite possibly to store food safely. For many remote rural areas, continuous electricity supply is unaffordable, so intermittency may be a first step to sustainability.

[45] IEA et al. (2021) *Tracking [Sustainable Development Goal] SDG 7. The energy progress report 2021, Executive summary*, 1.

[46] ESMAP (2015) *Beyond connections: Energy access redefined. Executive summary,* 4.

[47] IEA et al. 2021. *Tracking [Sustainable Development Goal] SDG 7. The energy progress report. 2021*, 53.

[48] IEA et al. (2021) *Tracking [Sustainable Development Goal] SDG 7 The energy progress report*, 2.

[49] To address this problem, ISO 50007 on energy services created a category called "clean renewable energy", "whose direct or indirect emissions of greenhouse gases, other gases with adverse impacts on human health, water pollutants or other toxic releases and whose impacts on ecosystems are substantially lower than those of conventional alternatives." ISO 50007, *Energy services — Guidelines for the assessment and improvement of the energy service to users*, first edition 2017.

[50] Switzerland, RS 784.10, Loi du 30 avril 1997 sur les télécommunications, available at https://fedlex.data.admin.ch/filestore/fedlex.data.admin.ch/eli/cc/1997/2187_2187_2187/20210101/fr/pdf-a/fedlex-data-admin-ch-eli-cc-1997-2187_2187_2187-20210101-fr-pdf-a.pdf.

[51] Developed countries, such as Finland and the United Kingdom, have shown that vulnerable consumers, especially those with low incomes, are likely to pay a larger percentage of their income on annual energy costs than people with a higher income. See European market survey on vulnerable consumer needs, 2018, available at https://www.assist2gether.eu/documenti/risultati/european_market_survey_on_vulnerable_consumer_needs.pdf.

[52] The UNCTAD Model Law on Competition comprises a Part 1 on Substantive Possible Elements for a Competition Law, Commentaries and Alternative Approaches in Existing Legislation, and a Part 2 on Commentaries, references to cases and bibliography, regularly updated thanks to member States and relevant stakeholders' contributions. See https://unctad.org/webflyer/model-law-competition.

[53] Model Law on Competition (2017) – Revised chapter VII* (TD/B/C.I/CLP/L.7), 17 May 2017.

[54] The actual designation of specific sectors as having SGEI status is a matter for European Union member States. As a matter of course it includes energy and water services.

[55] Energy Sector Management Assistance Program (2015) *Beyond Connections: Energy Access Redefined. Executive summary*.

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