Climate Action Network

Position: Energy Efficiency and Conservation

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Climate Action Network (CAN) is the world's largest network of civil society organizations working together to promote government action to address the climate crisis, with more than 1300 members in over 120 countries.
www.climatenetwork.org

Why energy efficiency matters

Despite the limited support it has historically received in government policies or corporate action, energy efficiency is a prerequisite for achieving the Sustainable Development Goals in a carbon-free future. CAN strongly supports energy efficiency, combined with speedily growing sustainable renewables globally and the principle of sufficiency by the global middle- and higher-income classes, as a substantial cornerstone for deep energy decarbonisation, limiting average global warming to 1.5°C, an equitable and just transition, and the shift to societies that protect people and nature. Like clean renewable energy, and when they are delivered appropriately, energy efficiency and conservation account for more than one-third of any strategy for deep decarbonisation by mid-century, in line with a 1.5°C pathway.

CAN urges all jurisdictions, agencies, financial institutions, industries and private consumers in all sectors of society to more than triple their investments in energy efficiency and conservation in the next decade, to remain on a trajectory consistent with the targets in the Paris Agreement. Public budget expenditure and public procurement for all government services must follow the "Best available and most efficient technology" (BAT) approach.

CAN expects all governments to implement ambitious energy efficiency and conservation measures, policies, regulations, standards, and support mechanisms covering all aspects of manufacturing and energy-consuming products, including housing, transport, appliances, and industry, in order to meet the 1.5°C objective.

The sample of energy efficiency programs and strategies highlighted in this paper spans a wide range of settings and contexts and contributes to tackling energy poverty. But they all drive toward three conclusions:

- That the tools and techniques to achieve the ambitious energy efficiency goals set out by CAN and supported in high-level modelling are practical, affordable, reduce greenhouse gas (GHG) emissions and other toxic pollution significantly, and are ready for universal implementation;
- That action on energy efficiency is an essential step in alleviating energy poverty for more than a billion people who live in inefficient or unsafe housing, including 940 million with no access to electricity;

- That jurisdictions often take the initiative to set high-level objectives, run demonstration projects, or conduct limited rollouts, but are less likely to follow through on society-wide implementation and dissemination.

Efficiency and 100% Renewable Energy

There is huge untapped potential to reduce energy demand. The global move to a 100% renewable energy economy by mid-century in line with a 1.5°C trajectory is technologically easier and more cost-effective when paired with significantly strengthened energy efficiency in all sectors. Scientific analysis shows that a reduction of roughly half the primary energy demand compared to a business-as-usual pathway by 2050 and by about 15 to 25% compared to today is possible without reducing energy security, still delivering essential energy services to all in the richer nations and providing significantly more and badly-needed energy services to the poorer parts of the global population.[1]

CAN calls urgently for accelerating energy efficiency investments by all actors, including through mandatory legislation to drastically reduce energy consumption in buildings, strengthen product and process standards and increase reliance on public freight and passenger transport. This basket of measures must be a top priority for governments delivering on the objectives of the Paris Agreement and the associated Nationally Determined Contributions (NDCs), the Sustainable Development Goals, the Convention on Biological Diversity and other treaties—-not only to reduce pollution, but to reduce the high cost of energy imports.

More specifically, CAN demands that all countries, particularly the large energy and raw material consumers, triple their average annual investments in energy efficiency in all economic sectors through 2030 and embark on a speedy pathway to a truly circular economy. *This is broadly consistent with the recommendations of the Energy Efficiency Global Alliance,[2] and with initial pledges by some but not nearly enough high-consuming countries.*

Efficiency and climate action

Though neither organisation has presented a 100% renewable energy scenario for 2050, the International Energy Agency (IEA) and the International Renewable Energy Agency (IRENA) have both shown that deep decarbonisation scenarios require almost a tripling of average annual energy efficiency expenditures through 2030. The IEA's Sustainable Development Scenario[3] calls for annual efficiency investments to more than double, from about USD 250 billion on average between 2015 and 2019 to about USD 520 billion annually from 2020 to 2030, and to more than triple to USD 810 billion per year between 2031 and 2040. IRENA's Transforming Energy Scenario[4] requires an average of more than USD 1 billion per year from 2016 to 2050. In addition to providing a cornerstone for a 1.5°C future, these investments deliver a powerful economic payback across all economic sectors, from buildings to industry to transport: over a

[1] Teske et al, 2019: Achieving the Paris Climate Agreement Goals; Springer 2019; https://link.springer.com/book/10.1007/978-3-030-05843-2

[2] https://eeglobalalliance.org/three-percent-club

[3] World Energy Outlook 2020, IEA 2020, pp: 412, 413.

[4] IRENA 2020, Global Renewables Outlok https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Apr/IRENA_Global_Renewables_Outlook_2020.pdf

period of years, they return two to 10 times the original investment depending on the product, the amount of energy conserved, and its market cost.

And yet, the last three years of analysis suggest energy efficiency activity world-wide is slowing down, at just the moment when it needs to accelerate. In 2018[5] and 2019,[6] the IEA concluded that momentum for reducing global primary energy intensity (energy use per unit GDP, an indicator for economic energy efficiency) was declining. In its Energy Efficiency 2020 report, the IEA projected efficiency investments declining 9% and energy intensity improving only 0.8% for the year, due to the combined impact of the COVID-19 pandemic and low fossil energy prices. That intensity improvement, far short of the already inadequate gains of 1.5% in 2018 and 1.6% in 2019, fell "well below the level needed to achieve global climate and sustainability goals," the agency warned. The IEA found that conclusion "especially alarming" given the expectation that energy efficiency will deliver 40% of the energy-related greenhouse gas (GHG) reductions over the next 20 years under its Sustainable Development Scenario.[7]

But with measures that can be implemented swiftly and at scale and deliver major short-term energy and greenhouse gas reductions, energy efficiency is a leading tool to combat climate change, build resilience, help all countries boost their economies, significantly reduce air pollution, improve energy security, and free up scarce financial resources in a moment of multiple, intersecting global crises. Appropriate design of large-scale building retrofit programs is a precondition for successful electrification across the wider economy, with heat pumps reducing demand sufficiently to leave renewable grid capacity available for other essential uses. More broadly, by contributing to a circular economy, the effort to maximize resource as well as energy efficiency and deploy sustainable, renewable energy will help reduce and avoid toxic and other waste, promote recycling and resource optimization, limit fresh water consumption, and reduce the often detrimental impacts of mining for energy and other mineral resources.

An essential enabler for the UN Sustainable Development Goals

As a practical, local solution for countries, communities, and households that can least afford the cost of energy and basic energy services, efficiency is also an essential enabler for CAN's commitment to energy and climate equity. Beyond its obvious, intrinsic importance to United Nations Sustainable Development Goal 7, *ensuring access to affordable, reliable, sustainable and modern energy for all*, efficiency is a promising pathway to the development, social and economic justice, human rights and equity objectives behind multiple other SDGs. A few examples among many:

- Permanently reducing energy demand and consumption is a powerful lever for resource and ecosystem efficiencies. Essentially preventing new energy demand before it has to be met by new supply of any kind:
    - Reduces the need for raw materials that would be required to build new generation facilities or distribution networks;
    - Helps undercut projected demand growth for natural gas development and the methane emissions that accompany it;

[5] https://www.iea.org/reports/energy-efficiency-2018
[6] https://www.iea.org/reports/energy-efficiency-2019
[7] https://www.iea.org/reports/energy-efficiency-2020#

    - Slows the rising demand for rare earths and precious metals whose supply chains are often characterized by child labor and other human rights abuse and geopolitical uncertainty;
    - Reduces or prevents the community and ecosystem devastation and human rights violations that too often accompany large energy and mining megaprojects (SDGs 9, 10, 11, 12, 14, 15, 16).

- It is a massive, decentralized engine for local employment, relying on labor-intensive activities that create an exceptionally wide array of jobs wherever the work is done and drive a continuing need for trades and post-secondary education and K-12 schooling (SDGs 1, 4, 5, 8, 9, 10, 11, 12).
- It is an essential step to reverse pervasive inequities in access to energy and related amenities, and in the impacts of climate change and other forms of energy-related pollution (SDGs 5, 10).
- By delivering permanent cost savings for households, energy efficiency is a key tool in fighting energy poverty and boosting affordability (SDGs 1, 3, 5, 10, 11).
- Government energy subsidies to low-income households impose a significant burden on state budgets in some countries. Converting these subsidies into energy efficiency investments contributes to overcoming energy poverty, and to increasing energy security and economic development (SDGs 1, 3, 8, 10, 11).
- As a practical, affordable tool to shave peak electricity demand, replacing or offsetting future demand for expensive, generally fossil-based generation sources, energy efficiency helps boost utility system reliability, reduce power bills, and drive the transition to renewable and/or decentralized generation (SDGs 1, 9, 11).
- By demonstrating that wealthier households and communities in the over-consuming countries can live better by living more simply, energy efficiency also points to a clear-eyed view of sufficiency, helping to counter a consumerist culture that drives inequality between rich and poor at the individual, household, neighbourhood, national, and international levels (SDGs 1, 8, 9, 10, 12).

All of these factors are conventionally seen as “co-benefits” of taking action on climate change, energy, or energy efficiency. But to the people and communities involved, these *direct benefits* may often be more tangible and immediate than addressing the climate crisis itself. That makes energy efficiency an important lever to shift the climate change conversation out of the “bubble” and into the mainstream, by discovering where people not already engaged with the climate crisis will find their own reasons to cut GHGs by saving energy.

The story so far: More potential than progress

For decades, energy efficiency has been widely recognized but not widely enough deployed as the “biggest resource we don’t use”. Energy efficiency potential is “fundamentally undervalued” and underestimated, Rocky Mountain Institute Co-Founder and Chief Scientist Amory Lovins argued (again) in 2018, not least by focusing efficiency policies and programs on individual technologies rather than whole systems. Yet decarbonisation researcher Sven Teske, among many others, identifies energy efficiency as one of an

essential suite of approaches to limit average global warming to 1.5° to 2.0°C without resorting to "unproven, dangerous" geoengineering technologies.

The theoretical and practical potential of energy efficiency has been documented by a parade of agencies and organisations, among them the Intergovernmental Panel on Climate Change in the Summary for Policymakers of its special report on 1.5° pathways, REN21, and the energy efficiency hub for the SEforALL initiative. The American Council for an Energy-Efficient Economy reported that efficiency on its own would be sufficient to halve U.S. greenhouse gas emissions in transportation, buildings, and industry by 2050. The International Renewable Energy Agency, in a joint study with the International Energy Agency, found that energy efficiency and electrification could deliver 45% of energy-related GHG reductions through 2050. The Clean Energy Ministerial determined that organizations can achieve net cost savings of 10% or more with low- or no-cost measures, by adopting the Energy Management System standard.

The International Energy Agency's Efficient World Strategy, released in October 2018, called for a 3% annual increase in energy efficiency world-wide. The IEA calculated that "efficiency gains alone could allow the world to extract twice as much economic value from the energy it uses compared to today", save consumers around the world $500 billion per year, lower energy imports, and reduce air pollution.

Unfortunately, while many promising practices have been developed and demonstrated in small, often local initiatives, countries and institutions have failed to systematically deliver on an ambitious set of energy efficiency targets. As noted above, recent trends indicate global energy efficiency performance slowing down, just as a decarbonisation agenda demands that it accelerate. This needs to change in order to reduce greenhouse emissions and move to a fully renewable energy system in line with a 1.5°C trajectory.

Energy efficiency in action

A sampling of current policy instruments and initiatives demonstrates the potential to transform the theoretical possibilities for rapid, deep energy efficiency improvements into practical results. But as noted immediately above, that's just the potential: Proven practices must be mainstreamed—quickly, effectively, and extraordinarily widely—to maximise benefits for people, the economy, and the environment.

- **Buildings**
    - The international Passive House certification presents itself as the world's leading standard for energy-efficient construction, with ambitious maximum thresholds for space heating and cooling, primary energy demand, airtightness, and thermal comfort.
    - The European Commission's Energy Performance of Buildings Initiative mandates ambitious long-term renovation strategies with decadal milestones in 2030, 2040, and 2050, and requires all new buildings in the EU to attain a nearly net-zero target as of 2021.
    - Norway's Powerhouse standard sets the pace for a "future-proof" building that must "during its lifetime produce more renewable energy than it uses for materials, production, operation, renovation, and demolition."

- The Energy Step Code developed by the Canadian province of British Columbia charts a gradual course for homebuilders to exceed Building Code standards for new homes, in preparation for a 2032 target date to make all new homes net-zero.
- The NYStretch Code adopted in 2020 by the New York State Energy Research and Development Authority (NYSERDA) aims to accelerate energy savings and GHG reductions achieved through local building codes.
- Nearly a decade ago, the NowHouse demonstration project in Windsor, Ontario, Canada showed the potential to drastically reduce the cost of energy retrofits by planning and organising them in large volume, rather than as one-off projects. Canadian low-carbon modeller Ralph Torrie is calling for a national program of mass, deep retrofits that are 100 times faster, 1,000 times wider, and three to four times cheaper than business as usual,[8] using residential heat pumps to dramatically reduce heating and cooling demand and free up renewable electricity for the coming surge in electric vehicle charging.

➢ **Devices and Appliances**

- The European Commission's Ecodesign Directive sets minimum, EU-wide rules for the environmental performance of consumer products, information and communication technologies, and a variety of other devices, aiming to eliminate the poorest performers while driving design innovation.
- Japan's Top Runner Programme has set performance standards for 23 categories of energy-intensive products, from home appliances to motor vehicles, since its inception in 1999.

➢ **Industrial Process Efficiencies**

- As one significant example, China has long been recognized as a global leader in increasing energy efficiency in industry, with efficiency identified as an emerging high-growth sector as far back as 2008.[9] Industry accounted for about 70% of the country's end-use energy consumption, but also delivered the largest share of its 30% improvement in energy efficiency between 2000 and 2015. That activity was driven by investments of ¥846.6 billion (USD 135 billion) in energy savings and emission reductions during China's 11th Five-Year Plan between 2006 and 2010, and more than ¥2,000 billion (USD 317 billion) during the 12th.[10] In 2018, the IEA reported that China accounted for 80% of the energy efficiency gains between 2000 and 2017 across its six-country Energy Efficiency in Emerging Economies programme, and for half of the potential savings in the agency's Efficient World Strategy through 2040.[11]

[8] https://theenergymix.com/2020/09/27/ottawa-needs-wide-ranging-programs-to-match-big-picture-throne-speech-torrie-says/
[9] https://www.wri.org/publication/chinas-booming-energy-efficiency-industry
[10] https://dialogochino.net/en/climate-energy/11152-can-other-emerging-economies-follow-chinas-industrial-energy-saving-success/
[11] https://www.iea.org/articles/energy-efficiency-in-china