Looking beyond the ACs: Hidden causes of high domestic energy consumption

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As the hotter months approach, we often hear the Ministry of Environment, URA, and utility companies urging the public through television and other media outlets to conserve electricity. Yet, year after year, household electricity consumption continues to rise—rarely returning to previous levels. According to utilities and relevant authorities, a significant share of this consumption is driven by cooling loads.

Despite repeated appeals, the message often fails to resonate. This is largely because ambient temperatures in the Maldives continue to increase annually, making air conditioning a necessity rather than a luxury. Many people struggle to understand how rising outdoor temperatures directly affect the performance and efficiency of their AC units, and as a result, they rarely adjust their usage patterns accordingly.

The issue of high electricity bills has now become a socio-political concern, with politicians frequently making it a key campaign promise to reduce or resolve these costs. However, lowering tariffs or subsidizing electricity without addressing the underlying causes ultimately places a substantial financial burden on the government.

A more effective solution requires shifting from simply urging reduced usage to implementing sustainable, long-term measures that target the root of the problem. By understanding and tackling the fundamental contributors to rising consumption, we can move toward long-term energy efficiency and financial stability. One of the most critical areas to address is building energy efficiency.

Major causes of high domestic energy consumption

1. Higher cooling demand

Maldives' hot, humid climate means air-conditioning is one of the largest energy consumers in homes, hotels and offices. Without good passive design, occupants run ACs for long hours. Studies on tropical climates show passive cooling and shading can greatly reduce cooling loads, and when absent, electrical cooling dominates energy use.

2. Inefficient building envelope

Many new and existing buildings have poorly insulated roofs and walls, excessive solar gains through glazed facades, or lack shading/overhangs — all of which increase indoor overheating and AC run-time. Even though there are guidelines by Maldivian authorities emphasizing on designing envelopes for natural ventilation, shading and thermal performance, it is usually not followed to avoid initial building cost.

3. Operational and behavioral factors

Poor operational behavior such as setting AC setpoints too low, simultaneously using heating and cooling and leaving lights on, and lack of energy monitoring/metering make waste hard to detect and correct.

4. Proliferation of Low quality & Inefficient Air conditioners

The market is saturated with inexpensive, low-efficiency air conditioners. Many consumers focus on the initial price rather than long-term operating costs, efficiency ratings, or durability. Some units are not designed for the Maldives' climate and may operate at maximum capacity when faulty, resulting in unexpectedly high electricity bills. In addition to this many consumers do not perform routine maintenance or cleaning of the ACs which further contributes to reduced inefficiency and increased energy bills.

What could be the consequences if this goes unchecked?

Simple. Pressure on national finances and lower energy security. The country relies heavily on diesel-powered generation, one of the most expensive forms of electricity production. Fuel imports require foreign currency, which in itself is a challenge, and expose the local economy to global market volatility.

In addition to this this continually increasing demand for places a significant strain on the local grids requiring heavy investment new generation and distribution every year to keep up with the peak demand driven by such loading. This significantly increases Maldives' carbon foot print at a time Maldives is aiming to go carbon neutral.

Why fixing building inefficiency is hard? challenges designers and contractors face

- **Limited regulations and enforcement:** Although Maldives now has building energy efficiency guidance, there is no regulation or law that mandates energy efficiency measures in the buildings, and effective enforcement and integration of such measures into planning approvals, procurement and contracting is still evolving.
- **Upfront cost sensitivity:** Making a building or a home energy efficient comes with a cost – a cost that most clients are not willing to pay for since its is not mandatory. A building is usually built at the least upfront cost possible and all costs associated with living, no matter how costly, is for the occupants to be borne. This stems usually from the need to build at a low cost and a reduced sense of responsibility towards making a positive long term life cycle impact. Hence, energy efficient designs by architects and engineers are usually met with rejection from the clients.
- **Retrofit complexity:** Many high-impact measures (improved insulation, glazing upgrades, upgraded cooling systems) are disruptive and costly in occupied buildings. Contractors and engineers must balance phased works, temporary services, and client willingness to invest.
- **Limited or Weak measurement and verification culture:** Without metering, sub-metering and post-installation performance checks, it's hard to prove savings. Clients may be reluctant to pay for measures whose savings cannot be clearly demonstrated or guaranteed. Guidance documents recommend M&V but implementation lags.

What are the possible practical fixes?

- **Passive design and shading:** orientation, overhangs, louvers, reflective roofs and wall treatments reduce solar gains and cooling hours. Passive measures are often the most cost-effective first step. Passive strategies can cut cooling demand significantly in tropical climates.
- **Improve envelope performance:** add roof insulation, reduce direct glazing exposure, use higher-performance glazing or shading devices. The Maldives Energy Efficiency Guideline also highlights envelope improvements as high-impact measures.
- **Right-sized, efficient HVAC and controls:** choose appropriately sized ACs, use inverter technology, and implement setpoint management and scheduling. Commission systems so they operate efficiently. Efficient AC plus controls typically deliver large bill reductions.
- **LED lighting and efficient appliances:** switching lighting and common appliances to efficient models is low cost and quick to implement. United for Efficiency assessments show significant national savings potential by replacing inefficient lighting and cooling devices.
- **Monitoring, maintenance and behavior:** sub-metering, energy dashboards, preventative maintenance and occupant engagement (setpoints, simple behaviour changes) are low-cost measures that reduce waste and sustain savings.

Overcoming barriers – Recommendation to policy makers, designers and contractors

For Policymakers: Introduce incentives such as subsidies, rebates, or low-interest financing for energy-efficient building improvements. Mandate minimum energy performance standards, particularly for larger developments, with clear compliance mechanisms.

For Designers and Contractors: Apply the Maldives Energy Efficiency Guideline from the earliest project stages, emphasizing passive design, envelope performance, and accurate HVAC sizing. Encourage whole-life costing in procurement rather than relying on lowest initial bid.

For Project Owners: Begin with no- and low-cost interventions such as shading improvements, LED upgrades, and temperature setpoint adjustments. Require proper commissioning and insist on a performance validation period before project handover.

What is the bottom line?

For Maldives households and public buildings, addressing building inefficiency is one of the most direct ways to reduce electricity bills, cut vulnerability to fuel price shocks, and lower emissions. Pleading the public to reduce consumption alone would not suffice or yield expected results. Evidence from Maldives guidance and global studies on tropical buildings shows a mix of passive design, better envelopes, efficient equipment and strong operation/maintenance can reduce electricity use substantially (up to 50%), translating directly into lower monthly bills and smaller peak capacity needs for island power systems. Implemented at scale, these measures improve affordability and resilience for island communities and a lower financial burden to the government.