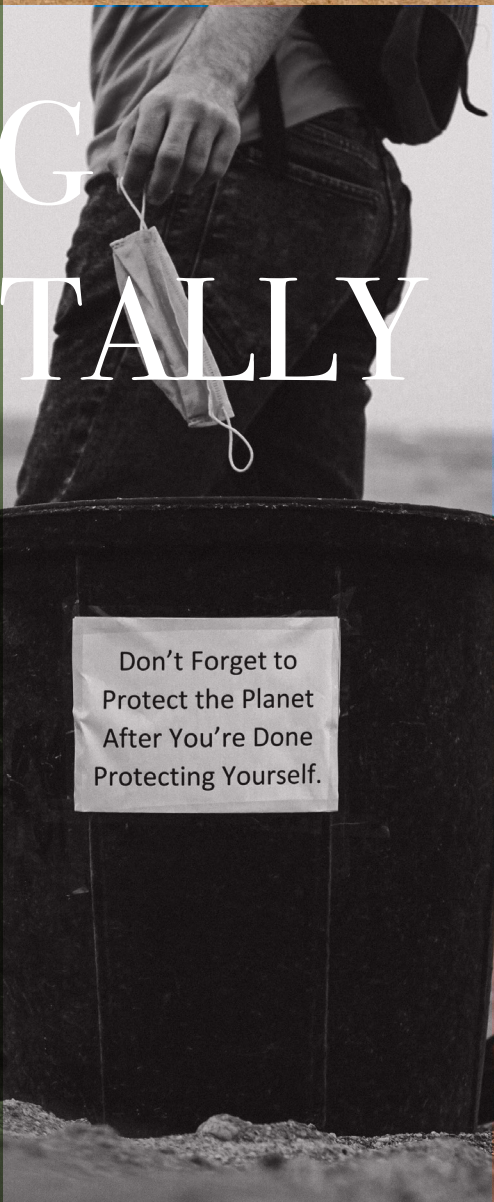


ENCOURAGING ENVIRONMENTALLY RESPONSIBLE BEHAVIOURS



Don't Forget to
Protect the Planet
After You're Done
Protecting Yourself.

2023

URBAN 20

White Paper.

Disclaimer

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Abbreviations

BRT	Bus Rapid Transit
CII	Confederation of Indian Industry
CO2	Carbon Dioxide
DCR	Development Control Regulations
ERB	Environmentally Responsible Behavior
ESG	Environmental, Social and Governance
G20	Group of Twenty
GDP	Gross Domestic Product
GHG	Greenhouse Gas
HERs	Home Energy Reports
IoT	The Internet of Things
IPCC	The Intergovernmental Panel on Climate Change
JPY	Japanese Yen
KPI	Key Performance Indicator
LEED	Leadership in Energy and Environmental Design
LiFE	Lifestyle for Environment
MSME	Micro, Small and Medium Size Enterprise
NIUA	National Institute of Urban Affairs
NRW	Non-revenue Water
OECD	Organisation for Economic Co-operation and Development
PwD	Persons with Disabilities
R&D	Research and Development
RWAs	Resident Welfare Associations
SDGs	Sustainable Development Goals
TESTS	Target, Explore, Solution, Trial, and Scale
TOD	Transit Oriented Development
UN	United Nations

01/

Setting the context

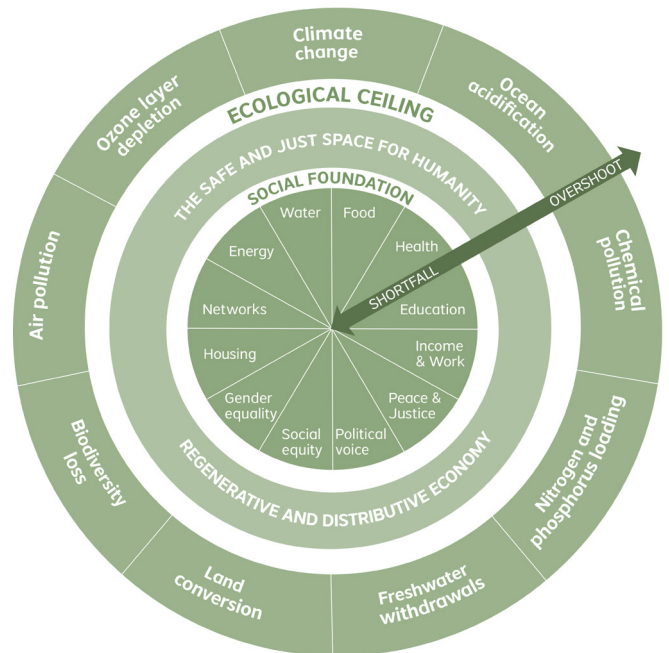
In our rapidly evolving world, the urgency to address the climate crisis has never been more pressing. The consequences of our actions, carbon emissions, land degradation and overconsumption, have taken a toll on the planet's delicate ecosystems. Cities, being the concentration points of economic activity, are responsible for most of this consumption and more than two-thirds of global emissions (Trotta, 2022). The world is also rapidly urbanising and it is expected that 70% of the world's population will live in urban areas by 2050, making them the key stakeholders likely to experience the highest impacts of climate change.

The 1.5°C target set by the Paris Agreement calls for countries to take concerted climate action to reduce greenhouse gas emissions to limit global warming. The statement from IPCC (2022) highlights a sobering reality. It points out how human activities have profoundly impacted the planet, leading to transformations that have left lasting damage to communities and ecosystems. It adds how global emissions continue to rise, and current carbon-cutting efforts are insufficient to prevent climate catastrophe, and calls for a focus on behavioural reforms alongside technological development (IPCC, 2018). This need for behavioural change has been further highlighted by the Lifestyle for Environment (LiFE) global mission (NITI Aayog, 2021), a clarion call given by the Indian Prime Minister in 2021, which seeks individual and collective action for a pro-planet lifestyle. The mission envisions replacing the 'use-and-dispose' economy with a circular economy, defined by 'mindful and deliberate utilisation'.

These treaties and the LiFE mission serve as reminders that we are at a critical juncture where holistic, decisive and collective action in urban areas is imperative. There is an urgent need for individual, societal, and systemic transformation rooted in the understanding that 'environmental problems are phenomena created by human behaviour and, therefore, can be resolved by it' (Staats, 2004). It is critical that cities foster environmentally responsible behavioural change by effectively implementing appropriate nudges that ensure fairness, equity and just transitions while moving towards sustainable futures.

The definition of 'environmentally responsible behaviour', most contextual to this paper, is by Kollmuss & Agyeman (2010), who define it as 'behaviour that consciously seeks to minimise the negative impact of one's actions on the natural

and built world'. Society's actions towards the environment can be significantly influenced by the integration of nature within everyday lives. The best way to influence individual decision-making is to 'make the responsible choice the most straightforward choice'. Responsible behaviours are easier to adopt if they are easy, pleasurable and have no (or minimal) additional associated costs. Embedding environmental responsibility in the default choice can contribute significantly to making cities sustainable. Beyond such self-motivated behaviours, there will need to be different levels of legislative and financial pushes to ensure compliance. The push for behavioural change must, therefore be complemented with the development of an ecosystem that will enable such changes. To avoid negative externalities, particularly for vulnerable groups, the systems, products and services enabling such transitions must first be in place before behavioural change nudges, particularly those involving legislative or financial pushes, are introduced.



Doughnut Economic Model

Source: Author's Depiction with reference to 'Doughnut Economics: Seven Ways to Think Like a 21st Century Economist' by Kate Raworth

The Doughnut Economic Theory (Kate Raworth 2012) provides a succinct framework for visualising ERB in the context of cities and understanding the spectrum of themes/ sectors where actions may be required. This sustainable economic model postulates that a thriving human existence is only possible by considering available resources. The doughnut represents a "safe and just space" for humanity within planetary boundaries and aims to balance people's defined socio-physical needs with nine planetary (environmental) boundaries. Simply put, the idea is that while all human beings have the right to life's essentials, it is a collective responsibility to curtail the ecological overshoots. It is also essential that the responsibility gets justly distributed and does not compromise and impact the sustainable development goals (SDGs), especially for vulnerable groups.

While the role of ERB in establishing pro-planet environmental actions to limit global warming is clear, matters such as the human cost of climate injustice will also need to be addressed. To promote justice and equity, it is necessary to embed these principles within social, legal, and financial frameworks that support ERB in cities. By examining correlations between these different principles and actions, we can develop effective tools and policies that ensure fairness and inclusivity, considering the needs and perspectives of vulnerable communities. While the existing literature on just transitions has centered on the conflicts between jobs and the environment, Climate Justice in its most total sense should go beyond this (McCauley & Heffron, 2018). It should combine procedural, distributive, and restorative justice elements to address various socio-economic issues and historical injustices.

While cities and policymakers plan their ERB actions, it is important to have a global birds-eye view of where countries globally stand on emission levels and how they balance their social and planetary obligations as part of just transitions. A global comparison of how countries are faring in terms of maintaining the balance prescribed in the Doughnut Model, indicates that there are substantial differences across nations and between the developed and developing economies; the former having achieved much higher social standards while transgressing planetary boundaries. While the behavioural changes and actions will remain similar across nations, cities based in the Global North may consider adopting more aggressive commitments and targets. Besides vulnerable nations and countries in the Global South will have to be supported financially through various climate finance avenues and sustainability funds to drive timely and comprehensive actions and transitions to ERBs, while improving their social standards.

Nudging behavioural change for the environment is one of the most important yet complex challenges that policymakers and governments face. While there are no definitive solutions that assure the required pro-planet output and impact, this white paper makes an attempt to identify key 'nudge areas' that can provide large scale impact. While many of the suggested nudges are driven by the government, a complementary bottom-up process, incorporating participatory planning and involving multiple stakeholders in cities will be critical for ensuring environmentally responsible behaviours across the urban ecosystem.

02/

Key stakeholders and sectors for driving ERB

Four distinct stakeholder groups can be identified for driving ERB, namely A) the public sector, B) the private sector, C) the scientific community, and the general population (given that the scientific community is likely to support ERB by informing the policies and strategies of the government, it has been merged with the public sector for the sake of this paper).

A. Public Sector

- State (Sub-National) Governments
- Local Government - Concerned Urban Authority / Integrated Departments
- Academic institutions and scientific community

B. Private Sector

- Businesses and Corporations
- Private Utilities and Service Providers
- Professional Associations and Industry Groups
- PR & Marketing Agencies
- Micro, Small and Medium Enterprises / Startups

C. People

- Civil Society/ Community Organisations/ Associations
- Non-Governmental Organisations
- Personalities and Individuals
- Local Youth and Gender Organisations/ Groups

While indicators for urban sustainability may vary between geographies, a study by Michalina et al. (2021) on 50 existing urban sustainability indicator frameworks, highlighted water (water use, consumption, quality, and management), mobility and transport, waste (responsible or material consumption), and energy as key sectors that could be

targeted. Additionally changes in industry practices will also have a significant impact on meeting sustainability outcomes. These have therefore been identified as the focus sectors for this paper, where urban ecosystems that encourage responsible behaviours can be developed.

I A. Energy

The energy supply sector (electricity, heat, and other energy) accounts for 35% of global GHG emissions (United Nations, n.d.). Of this, cities account for two-thirds of global energy consumption (IEA, 2021a), with domestic and commercial usage forecasted to increase by 15% through 2050 (Exxon Mobil, 2022). Given that energy consumption, to a large extent, is linked to individual behaviour, it is critical to create an enabling ecosystem to encourage energy-efficient behaviours. This paper will focus on two aspects of energy-related behavioural change - (i) incorporating energy-efficient infrastructure and (ii) developing energy-conserving habits. While the former will be critical to ensure that the quantum of energy that will be required for meeting the needs of the projected growth of population are met sustainably, the latter will be a tool to pull back from the high per capita energy consumption lifestyle while simultaneously ingraining low energy use practices. Incorporating energy-efficient infrastructure will require upfront capital investments, and hence the burden must be on the owners/developers of properties with suitable subsidies provided by the state. On the other hand, energy-conserving practices will have to be inculcated more universally. Following key action areas have been identified for the sector:

Objective	Outcome	Stakeholder group	Action area
Ensuring Energy Efficient buildings	Creating and retrofitting buildings with Energy Efficient Infrastructure	Property Owners (Residential and Commercial as well as Public buildings)	Enable individual property owners to incorporate energy-efficient infrastructure.
Household energy reduction	Shifting behaviours and practices for minimising household energy consumption	All stakeholders	Enabling energy conservation by users

B. Transportation

Accounting for 37% of all CO₂ emissions and a quarter of all GHG emissions from end-use sectors, transportation is one of the most significant contributors to climate change (Akenji et al., 2021). Cars are responsible for nearly 50% of transport-related emissions, and, along with motorcycles, they play a major role in increasing carbon footprints in developing countries (Akenji & Bengtsson, 2022). Further, the lack of infrastructure to support such a growth in personal motor vehicles will lead to escalating road congestion leading to a decline in effective speed and an increase in fuel consumption (Kumar et al., 2021).

There is a need to make an ecosystem-level shift that prioritises and incentivises the adoption of public transportation. Behaviour change efforts will need to focus on private vehicle users and incorporate actions that will minimise the gaps in convenience between the two modes. While mainly targeting existing/ aspiring private vehicle owners, the benefits of these actions will have significant positive spillover effects on all public transportation users, particularly vulnerable groups. Such transitions from private to public transportation can reduce about one-third (2.2 tonnes) of the annual per capita CO₂ emissions, thus aligning with SDG 11 and the universal human right to “access to a clean and healthy environment” as declared by the UN (SuM4All, 2022).

Transportation is also one of the sectors where systemic disadvantages of vulnerable groups like women and Persons with Disabilities (PwDs) come to the fore. Women, who have more caring responsibilities, are hampered by the limitations of public transportation, particularly the lack of accessibility, the difficulties in first and last-mile connectivity, and safety concerns (UN-NIUA Dialogue, 2023). Similar barriers extend to PwDs in their access to public transportation. Hence there is a need to integrate universality at an ecosystem level and develop urban infrastructure that is accessible, equitable and inclusive to all. Further, several roadblocks cause a pushback against the shift towards public transportation (Batty et al., 2015), particularly in developing countries. The biggest among these is the requirement for significant upfront capital to implement the ecosystem-level changes required to mainstream public transportation. Given the additional 14 million buses, 340 million kilometres of bus lanes, and 1.4 million kilometres of safe bike lanes required globally to achieve sustainable urban mobility, in addition to investments in urban rail systems, there is a need for significant reallocation of funds from car-oriented infrastructure to public transportation (ITDP, 2021). Following key action areas have been identified for the sector:

Objective	Outcome	Stakeholder group	Action area
Increasing Uptake of Public Transport	Moving from Private to Public Transport	All stakeholders	Encouraging and facilitating the shift of private vehicle owners to use public transport

C. Waste

Globally, cities generate 2.1 billion tonnes of solid waste annually (The World Bank, n.d. -b). Only 19% of this is recovered through recycling and composting, while 11% is incinerated. The rest is mainly disposed through landfills or open dumping. It is further estimated that 1.6 billion tonnes of CO₂ equivalent is released annually from solid waste treatment and disposal. (The World Bank, n.d. -b). Given the population growth rate and likely increase in consumption, this is estimated to increase by 70% over the next 30 years (Kaza et al., 2018). Uncollected and improperly disposed waste can further lead to major health (through contamination of soil and water) and environmental (impacting marine life and natural ecosystem) issues and

the cost of coping with these impacts may surpass the cost of having an effective waste management system (The World Bank, 2018a).

Source segregation can be an easy and effective way to manage waste, particularly in middle-income countries where basic collection infrastructure is already established. Source segregation will reduce the cost of recycling (The World Bank, 2018a), increase material recovery, and lower waste disposal in landfills (NITI Aayog, 2021). Given the low cost of actions and the vast benefits, there is a strong need for developing an enabling ecosystem that would enable source segregation. Following key action areas have been identified for the sector:

Objective	Outcome	Stakeholder group	Action area
Effective Waste Management	Facilitating Solid Waste Segregation at Source	All stakeholders	Creating systems for effective segregation of solid waste at source

D. Water

Universal and equitable access to water, sanitation and hygiene infrastructures are among the key global priorities highlighted by the Global Commission on the Economics of Water (2023). For every 1°C increase in global average temperature, a 20% loss of renewable water sources is projected (IPCC, 2014). Consequently, by 2030 water demand is expected to outstrip supply by 40% (Harvey, 2023) and nearly half of the global urban population is projected to face water scarcity by 2050 (He et al., 2021). Households currently account for 10% of the total global water demand, and this is likely to increase exponentially. For instance, it is

expected that water demand will increase by 300% in cities in Africa and Asia and by 200% in cities in South America (Boretti & Rosa, 2019). It is critical to address the domestic overuse of water to ensure adaptation to current shortfalls and mitigate future water poverty.

Enabling ERB to ensure water savings at the household level, particularly in the case of high consumers can help reduce scarcity. The nudges will have to target overconsumption while ensuring that they do not inadvertently penalise the achievement of basic standards of water provision. Following key action areas have been identified for the sector:

Objective	Outcome	Stakeholder group	Action area
Ensuring Water Savings	Reducing water usage	All stakeholders	Minimising water usage to enable water savings at the household level

E. Industry

Industrialisation is essential to economic development (Zodape et al., 2015), particularly for emerging economies where tertiary industries are not too prevalent. The industrial sector accounts for the largest share of energy consumption of any end-use sector - more than half the total energy used globally (Kahan, 2019). The energy use by this sector is estimated to increase by a further 30% by 2050 - almost all of it coming from non-OECD countries (Kahan, 2019). Micro, Small and Medium Enterprises (MSMEs), as a business segment account for 90% of all businesses globally (World Trade Organization, n.d.). These MSMEs also provide livelihood opportunities for 60 to 70% of the workforce (United Nations, n.d. - b) and contribute over 40% to the GDP of emerging economies (The World Bank, n.d. - a). Given that MSMEs constitutes around 90% of all global businesses and directly and indirectly contribute to about 80% of all emissions (World Trade Organization, n.d. - a), it is extremely critical to shift them away from the current carbon-intensive models.

This must involve a transition of both internal production processes and products they produce since MSMEs constitute the supply chain for most industries and sectors. While such green transitions can be easier achieved in bigger industries, the lack of capital and capacity makes it significantly harder for MSMEs. Globally, 40% of the MSMEs have a funding deficit, cumulatively coming to an unmet funding demand of \$5.2 trillion, or 1.4 times the amount of global MSME lending (The World Bank, n.d. - a). Providing them with the skill, technical and financial assistance to achieve these transitions will be critical. Further, integrating MSMEs into the broader R&D ecosystem can facilitate early-stage engagement in environmentally responsible business practices. Following key action areas have been identified for the sector:

Objective	Outcome	Stakeholder group	Action area
Creating sustainable industries	Shifting towards creating sustainable products and processes	MSMEs	Encouraging transitions among MSMEs towards sustainable products and processes

03/

Designing nudges for behavioural change

Introduced in 2008 by social scientists Richard Thaler and Cass Sunstein, 'nudging' was defined as 'any aspect of the choice architecture that predictably alters people's behaviour without forbidding any options or significantly changing their economic incentives'. In the case of nudges related to ERB, they will need to adhere to the principles of climate justice and be built on the model of Doughnut Economics elaborated in earlier sections. The design of

the nudges will aim at minimising overconsumption at an individual level while simultaneously trying to ensure that everyone achieves minimum standards of living. The nudges can be classified as social, regulatory or financial nudges and comprise upstream (policy), midstream (process) and downstream (project) level interventions (Ho et al., 2022). The details of each of these nudges vis-a-vis the three stakeholder groups, have been detailed in the table below.

Stakeholder being impacted by the nudge strategy	Social Nudges	Regulatory Nudges	Financial Nudges
All stakeholders	Strategies and policies that affect all stakeholders		
Public sector including scientific community	Interventions to allow the states and cities to move towards more responsible actions in their own functioning thereby setting an example and taking the lead in adopting ERB. Here political leadership plays a big role.	Modifications in government laws, rules and processes to enable an environment for the ecosystem-level promotion of responsible actions.	Financial allocations and incentives for creating an ecosystem conducive to responsible behaviours.
Private sector	Increasing the public visibility of environmentally responsible practices to help create positive reputations for companies that comply.	Mandates around the minimum sustainability standard or a minimum quantity of sustainable goods and services provided. These nudges must be crafted to ensure that there are minimal or no negative externalities for smaller producers.	Financial assistance (subsidies) and/or guarantees to producers for transitioning towards more sustainable services. While guarantees can be universal, the subsidies should be targeted at smaller producers who will otherwise not be able to make the transitions.



People

A combination of awareness building through social campaigning/ education and increasing public visibility of individual actions (while maintaining basic standards of privacy) to create social pressures and modify public perceptions in favour of individuals undertaking responsible behaviours.

Individual level mandates and rules against engaging in environmentally irresponsible behaviours. Efforts should be made to ensure that such mandates do not make it harder for individuals/ groups to meet minimum living standards.

Financial penalties for engaging in environmentally irresponsible behaviours. This would tap into basic human feelings around loss aversion. This can also be complemented with financial rewards for ERB. The penalties may be targeted at over-consumers and should not be universal.

In the absence of comprehensive evidence on the efficacy and, more importantly, on the externalities of nudging strategies, it would be prudent to set up an institutional mechanism for regular monitoring and review of the performance of the actions implemented. Blind spots in the implementation may also occur or be compounded as most city governments might not have extensive experience initiating behavioural changes through financial and legal mechanisms.

The Target, Explore, Solution, Trial, and Scale' (TESTS) guide by Kettle & Persian (2022) can be an effective tool to mitigate these issues. The framework links policy objectives with targeted behaviours and can help tune and adjust nudges to suit local requirements. It also offers flexibility for improvements and iteration after examining the experiences and outcomes of executing proposed interventions. Monitoring and evaluation can further be linked to the targets of existing sustainability indicator frameworks like SDGs.

04/

Nudging behavioural change - Energy

Key action area 1: Enable property owners to incorporate energy-efficient infrastructure:

Stakeholder being impacted by the nudge strategy	Social Nudges	Regulatory Nudges	Financial Nudges
All property owners		<p>Minimum Compliance with Green Building Norms</p> <p>Modification of building codes/ Development Control Regulations/ Zoning Ordinances to mandate compliance of all new developments (whether greenfield or brownfield) with green building codes (like LEED). These mandates can initially be made for larger sites and progressively expanded to all new constructions and redevelopments.</p> <p>Fast-Tracking Construction Clearance</p> <p>Setting up processes to ease and accelerate approvals at various stages of building construction for buildings meeting comprehensive green building standards.</p>	<p>Enabling Rooftop Solar Adoption through Public Funding Schemes</p> <p>Subsidies for Solar Rooftop installation through public schemes with robust supply chain of vendors/contractors to meet demand</p>
Public Sector including scientific community	<p>Competition amongst cities for promoting energy-efficient infrastructure.</p> <p>Intercity challenges with rewards/ incentives (linked to central grants, schemes, etc.) to improve key energy related indicators. Indicators could focus on green buildings, renewable energy mainstreaming, sustainable retrofitting and reuse of built stock, etc. Such competitive frameworks can also be established between or within government departments and administrations.</p>	<p>Energy Efficient Infrastructure compliance in all Public Projects</p> <p>Mandating that all public infrastructure projects, including public housing, be built with energy-efficient infrastructure and comply with minimum green standards. These mandates will have to reflect in the designs, tenders and budgetary allocations of any new project undertaken by the government.</p>	<p>Innovation Funds</p> <p>An R&D ecosystem needs to be established for furthering innovations for energy-efficient infrastructure within academia. A percentage of public funds can be directed towards the creation of public grants, scholarships, and fellowships which probe potential solutions.</p>



Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
Public Sector including scientific community			<p>Financing the installation of energy-efficient infrastructure in government buildings</p> <p>Creation of a dedicated fund to retrofit existing government buildings with energy-efficient infrastructure. This can also be used to provide viability gap funding for installing such infrastructure in new projects.</p>
Private sector	<p>Rewards and Ranking for Best Practices</p> <p>Initiating an open ranking and certification system of developers who promote energy-efficient construction. This could also be augmented with annual awards in collaboration with Industry associations. Such a system would increase their market visibility, boost their business and nudge competitors to also align with greener construction practices.</p>	<p>Energy performance rating disclosures</p> <p>Mandating the disclosure of building energy performance ratings and the long-term energy cost implications by developers/ owners at the time of sale of property. This would allow buyers to make more informed choices and increase the demand, and consequently value of green buildings.</p> <p>Gradually Phasing Out Energy Intensive products</p> <p>Mandates for the gradual phasing out of manufacturing of non-energy efficient fittings and fixtures. Such mandates could commence with certain easy-to-transition products and be gradually expanded to all sectors.</p>	<p>Incentives to boost manufacturing of energy-efficient fittings</p> <p>Manufacturers can be nudged to increase the production of energy-efficient fittings (like hermetically sealed windows) by providing production-linked incentives. The increased production can help reduce the cost of such products and make them more affordable.</p>
People	<p>Behavioural Change Campaigning</p> <p>Campaigns targeting buyers to educate them on potential long-term benefits and cost savings associated with energy-efficient buildings and products. This will help nudge the demand side of the market to be more energy efficient. These campaigns can be run by NGOs or by industry associations.</p>	<p>Retrofits of existing buildings</p> <p>Mandates for property owners to retrofit existing buildings for energy efficiency. These mandates must be brought in very gradually, giving sufficient time for compliance so as to not overburden homeowners.</p>	<p>Disincentives for energy-inefficient buildings</p> <p>Tax incentives/ disincentives can be developed in the form of penalties for property owners of energy-inefficient buildings or tax rebates for those who have made the transition. These must be applied through property taxation rather than electric billing as the latter might only affect the residents of the building who might not be the owner and consequently powerless to make any changes.</p> <p>Financial support for individual transition</p> <p>The government can provide subsidies for homeowners to undertake energy efficient retrofitting and upgradation (including in informal settlements).</p>

I Good Practices

Green Roofing for Informal Settlements | Ahmedabad, India

Nudge: Financial support for individual transition

Case overview: In 2013, the Mahila Housing Trust team, an NGO supported by the Self-Employed Women's Association (SEWA) did a citywide pilot project called "cool roof" aimed at converting 500 traditional roofs in informal settlements to cool roofs. Cool roofs reflect and emit heat, lowering indoor temperatures by 2 to 5 degree celsius. They installed their first modular roof as a pilot project, raising funds internally. The pilot aimed to assess demand and efficiency, monitoring temperature regularly in the installed homes. Data showed a significant temperature decrease of 7-8 degrees celsius. This feedback allowed the team to refine and customise the roofs. With increasing demand, they have installed over 250 roofs, creating resilient living environments for slum dwellers. The success of the pilot led to an expansion plan to convert over 3,000 homes from informal settlements.

Increased Property Rates | Denmark

Nudge: Energy performance rating disclosures

Case overview: Denmark's introduction of building energy ratings in 1997 made a major dent in the market only fourteen years later, with the introduction of Article 13 of the EU Directive that mandated advertisement of building energy performance during sales. This increased the value of high energy-rated homes much to the benefit of property owners.

I Key action area 2: Enabling energy conservation by users

Stakeholder being impacted by the nudge strategy	Social Nudges	Regulatory Nudges	Financial Nudges
All stakeholders		<p>Increasing urban green cover to regulate temperatures</p> <p>Stronger legal mandates within urban planning regulations to ensure minimum per capita green cover to prevent development of urban heat islands. This will help to regulate microclimates and reduce the demand for cooling energy.</p>	<p>Financing for Heat Mitigation</p> <p>Investments in urban cooling (or heating) projects such as district cooling to reduce premise-level energy demand.</p>
Public Sector including scientific community	<p>Showcasing best practices in energy efficiency by the government</p> <p>Public challenge-based model, with attached rewards, to inculcate energy conservation habits within the government ecosystem. Can be used to showcase government leadership and prompt citizens to replicate.</p>	<p>Energy efficient fixtures in government housing</p> <p>Mandate installation of energy-efficient fixtures in public and staff housing projects constructed by the government.</p>	<p>Incentives for Innovation</p> <p>Provide financial support for Research and Development on energy-efficient products.</p>



Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
Private sector	<p>Public database of energy-efficient products</p> <p>Comprehensive public database analysing the energy efficiency potential of various products by different manufacturers allowing for comparison and transparency to end users. This would reduce instances of greenwashing and reward energy-efficient product manufacturers.</p>	<p>Building Materials Policy</p> <p>Establish minimum thermal and insulation standards for materials used in construction. This would reduce the demand for heating/cooling energy within buildings.</p> <p>Increase Manufacture of Energy Efficient Fixtures and Appliances</p> <p>Gradually phase out manufacturing of appliances with low energy efficiency. This could also be accompanied by mandates on appliance manufacturers to produce a fixed fraction (which gradually increases) of energy-efficient appliances.</p> <p>Appliance energy ratings and long-term cost savings</p> <p>Mandates for displaying the energy ratings for appliances and comparison of the associated energy costs for similar utilisation of appliances across different energy ratings. This would allow users to factor in long-term cost savings while making purchase decisions.</p>	<p>Financial assistance for transition:</p> <p>Provide financial support to MSMEs to help them transition towards manufacturing energy-efficient products. This could also take the form of production-linked incentives for medium and large companies.</p>
People	<p>Comparison-based Consumption Reporting</p> <p>Developing a framework for energy use reporting that would allow users to see their consumption levels compared to neighbourhood and city level averages. This would gently nudge people to change their consumption patterns.</p> <p>Education for Energy Savings</p> <p>Raising awareness on energy conservation through education and awareness building among youth. Behavioural change amongst younger generations can ensure long term behavioral change in the society.</p>	<p>Establishing maximum thresholds for consumption during periods of peak demand</p> <p>Mandating maximum energy consumption limits for users. These can be developed at a per unit area rate for every property and can be based on neighbourhood-level averages. These mandates can come into effect during periods of high energy demand - like summer.</p>	<p>Non-Linear (Increasing Block) Pricing</p> <p>Establishing a system for non-linear energy pricing that can impose high financial costs on overconsumption. The additional revenue from this can be used to subsidise energy costs for lower energy users.</p> <p>Purchase Subsidies for Energy Efficient Products</p> <p>Providing subsidies to users to purchase energy-efficient appliances. The subsidy can help bridge the cost gaps between high and low energy rated appliances prompting user choices towards the former.</p>

I Good Practices

'Schools4energy Initiative' | Italy

Nudge: Education for energy savings

Case overview: The Schools4energy initiative was created within the 'Interreg Mediterranean PrioritEE' (Prioritise energy efficiency) project in the Province of Potenza, Italy. The primary objective was to enhance energy efficiency in public buildings by raising energy awareness in schools and highlighting the achievements of students engaged in promoting energy conservation. In the academic year 2018-2019, 4 primary and middle schools of Potenza Municipality were involved in 3 sets of activities to promote energy-conscious behaviour, following which the energy consumption data by source was monitored and analysed. A significant decline in energy consumption across all schools was observed. The engagement highlighted the considerable impact of educational programs in fostering behavioural change.

Lei do Bem | Brazil

Nudge: Incentives for innovation

Case overview: Brazil has taken some initiatives to encourage the renewable energy sector. One such incentive is the Lei do Bem (Good Law). This program provides tax benefits and exemptions for companies that invest in R&D projects focused on innovation, including technologies aimed at reducing environmental impacts. These incentives help companies allocate resources towards developing and implementing sustainable technologies and solutions. Benefits include recovering 20.4% to 27.5% of RD&I expenses and a 50% reduction in Federal Excise tax. In addition to tax incentives, Brazil has established research funding programs to support R&D in renewable energy, clean technologies, and environmental conservation.

OPOWER, USA and Japan

Nudge: Comparison-based Consumption Reporting

Case overview: In 2009, a company called OPOWER started the practice of sending Home Energy Reports of residential power usage to its consumers. When evaluated with a series of programs involving 6,00,000 households across the United States, it was found that this program reduced energy consumption by 2%. This proves that non-price interventions can impact consumer behaviour efficiently and successfully. The results of the programme are comparable to a temporary 11% to 20% increase in electricity prices. On average, users who received the reports experienced savings ranging from 0.3% (lowest consumption group) to 6.3% (highest consumption group) compared to the control group that did not receive the reports. Similarly, in 2017, Japan's Ministry of Environment commissioned OPOWER energy-efficient cloud services to send the Home Energy Reports (HERs) to consumers. The results in 2018 showed that there was a decline in average energy usage of 2% in the houses that received HERs. It is estimated that this 2% if achieved all over the country, can make a significant impact equivalent to replacing 26 million refrigerators, with an estimated cost of 3 trillion JPY.

05/

Nudging behavioural change - Mobility

Key action area: Encouraging and facilitating private vehicle owners to shift to using public transport

Stakeholder being impacted by the nudge strategy	Social Nudges	Regulatory Nudges	Financial Nudges
All stakeholders		<p>Developing a Public Transport Policy A public transport policy can be developed covering the following components:</p> <ol style="list-style-type: none"> 1. Establishment of minimum service levels for public transportation. 2. Mandating Transit-oriented development (TOD) concepts that increase walkability, mixed-use, etc. 3. Establishing Car-free or Low Emission zones with restricted access to private vehicles. In addition to improving the uptake of public transportation, these measures can help to improve life on the street and promote local businesses. 4. Establishment of standards for bus lanes, footpaths, cycle tracks etc, through statutory urban design guidelines to transition street space allocation away from cars. 5. Mandating periodic route rationalisation to improve efficiency, reduce costs and increase user convenience. 6. Prioritising accessibility and ensuring that the diverse needs of user groups with varying disabilities are met. <p>Digitalisation of mobility services Digitalisation and use of IOT, applications and data analytics can significantly improve public transport efficiency user, comfort and accessibility thereby encouraging people to use public transportation.</p>	<p>Financing public transport investments Allocate dedicated funding sources for low carbon mobility initiatives such as urban rails, bus systems, cycling and walking infrastructure. Funding and prioritisation should be based on a comprehensive and inter-modal mobility strategy focused on reducing emissions and should include funding for TOD planning, public space development, last mile improvement, etc.</p>



Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
Public sector including scientific community	<p>Encouraging use of public transport by Government Employees</p> <p>Promoting Public Transport use by government employees through incentives and development of dedicated public transport routes wherever possible between governance hubs and housing for public employees.</p>	<p>Reform planning education</p> <p>Reform planning curricula to encourage planning for net-zero development, including concepts such as compact mixed-use development, transit orientation, public space development and integration of land use and public transportation</p>	<p>Investing in fleet improvement</p> <p>Periodic investments in increasing bus fleet and route sizes are required to attract and maintain ridership of public transportation. Regular investments can also help keep the fleet up to date, providing comfort for the users and reducing operational costs through fuel efficiency. Investments in urban rails may also be considered wherever ridership is conducive for such large investments.</p>
Private sector	<p>Recognition of Companies Reducing Transport Emissions</p> <p>Tax rebates and other incentives can be offered to companies that put in place policies and services to encourage shared travel and use of public transport by employees. This can be counted as part of the ESG requirements and can potentially create financial benefits both for the employer and employees.</p>	<p>Develop share of private operators in public transport</p> <p>To increase the overall service levels of public/ shared mobility, policies can be introduced to ease restrictions around the entry of private sector operators into public mobility. These operators can be encouraged to operate certain routes with performance-based monitoring. Such initiatives can provide higher comfort in service thereby attracting higher-income car users to make the switch to public transportation.</p>	<p>Gap funding for private investors</p> <p>Policies can be developed for supporting private investments in public transport through models such as viability gap funding, hybrid-annuity, etc. Appropriate convergence between financial considerations and planning outcomes such as higher densities around transit can be achieved through appropriate financial structuring of projects.</p> <p>Larger and longer-term contracts to vendors</p> <p>Manufacturers of rolling stock (buses, feeder units etc.) can be offered longer-term contracts by to help increase supply, and reduce costs for purchasing by the state. Lower costs can significantly improve the ability of cities to maintain and renew public transport fleets.</p> <p>Incentivise Last Mile Service providers</p> <p>Financially incentivise individual last mile transportation solution operators like shared autorickshaws, feeder buses etc., through initial low/zero interest loans and other purchasing subsidies.</p>



Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
People	<p>Behavioural Change Campaigns</p> <p>Campaigns targeting car users by communicating the financial and time benefits of using public transportation. These campaigns can tap into the loss aversion mindset of the target audience to get them to switch (at least partially) to public transportation.</p> <p>Campaigns for Periodic Reduction of Cars on Road</p> <p>Successful campaign designs which call for intermittent closing of streets to cars (Car-free days) and expanding similar campaigns for public transport uptake can help boost social interaction, local business and provide space for creative public interventions that can make ROWs more green and accessible to different age groups, especially children and youth.</p>	<p>Easy multimodal access</p> <p>Establishing systems for easier access to different modes of public transportation through</p> <ol style="list-style-type: none"> 1. Single payment systems for all modes of transportation 2. Flexible charging for trips based on travel time rather than on the number of stops or switches between modes of transportation. 3. Physical design interventions to ease last mile connectivity and connections between different modes of transportation. 	<p>Congestion and Parking Charges</p> <p>Charging car users for access to certain zones of the city which are easily accessible by public transportation. The charging can be steep to dissuade the use of cars in these regions, but exceptions will need to be made for vulnerable groups like PwDs. The collections can be used to subsidise/ fund other initiatives to improve public transportation.</p> <p>Subsidise Public Transport</p> <p>Low costs associated with public transport can be a major factor for people when they are making a choice. Free public transportation may be considered for vulnerable groups, women and PwDs to increase their uptake of public transit. Such pricing strategies will increase the ridership of public transportation. While this can strain transportation budgets, the long-term savings w.r.t. improved health outcomes, reduced pollution etc., are likely to outweigh the costs.</p> <p>Disincentivise Multiple Car Ownership</p> <p>Increasing taxes and charges on purchasing more than one car per family unit. The cost increase can be steep and will nudge against purchasing a second car.</p>

I Good Practices

Electronic Road Pricing System | Singapore

Nudge: Congestion Charging

Case overview: Nearly half a century ago, Singapore introduced congestion pricing to reduce congestion in the central business district. While implementing the Area Licensing Scheme in 1975 led to a 20% reduction in congestion, complications arose due to the flat fee and manual collection of fees. To address these issues, the Electronic Road Pricing system was introduced in 1998, which determined chargeable rates based on location, time, vehicle type, and real-time speeds. Singapore further enhanced its transportation network by merging congestion pricing and public transit investments, augmenting cycling infrastructure, and leveraging TOD, all of which led to increased public transport usage and reduced emissions.

Route Prioritisation, Bus Rapid Transit System | Curitiba, Brazil

Nudge: Route Rationalisation

Case overview: Curitiba is widely recognised as an exemplary model of sustainable urban transportation due to its efficiently planned and rationalised bus rapid transit (BRT) system. This system prioritises efficient routes and integration with other transportation modes resulting in reduced congestion and improved travel efficiency. This also led to a shift in people's behaviour to choose public transport, reducing their dependence on private vehicles. Furthermore, in 2010, a work program was initiated to improve exclusive lanes by creating a 'non-stop' third lane with overtaking areas at intermediate station points. The Boqueirão Axis is a good example which indicates reduced travel time.

TOD | Curitiba, Brazil

Nudge: Transit Oriented Development

Case overview: During the 1960s, Curitiba faced the challenges of urbanisation and an increasing reliance on private vehicles. However, the city seized the opportunity to tackle these challenges by adopting an integrated approach to land use and transport planning, and adopted a Transit Oriented Development (TOD) strategy, which involved creating vibrant, mixed-use communities along major public transport corridors. The implementation of TOD had several positive outcomes for Curitiba, such as alleviating traffic congestion in the downtown area, curbing urban sprawl, improving access to public spaces and creating pedestrian-friendly streets. These measures helped improve the quality of life of the residents of Curitiba.

The Suica Card System | Japan

Nudge: Easy multimodal access

Case overview: Suica is a contactless smart card system introduced almost two decades ago by the East Japan Railway Company (JR East). This card can be used not only for JR East trains but also subways and buses. It has become one of Japan's most popular and widely accepted forms of electronic payment due to its convenience, versatility, compatibility, integration with mobile devices and continuous innovation.

Free PT (Buses and Trains) at Targeted Locations | Australia

Nudge: Subsidise Public Transport

Case overview: Perth, Fremantle and Joondalup are among the first cities that offer fare-free bus and train services in specific city zones. Central Area Transit buses provide frequent and complimentary service in the central business district and other densely populated areas. Perth also introduced electric buses over a year ago, which was well received by commuters. Over 50 European cities and towns have also implemented free public transportation to move towards environmental sustainability and social equity

06/

Nudging behavioural change- Waste Management

Key action area:

Creating systems for effective segregation of solid waste

Stakeholder being impacted by the nudge strategy	Social Nudges	Regulatory Nudges	Financial Nudges
All stakeholders		<p>Provide 'industry status' to solid waste management</p> <p>Obtaining an Industry status provides several advantages for private actors, including easier access to loans with lower interest rates, the opportunity to attract significant investors as financing partners, and the ability to refinance existing obligations in the sector. Moreover, it facilitates the flow of international green finance into the industry.</p>	
Public Sector including scientific community	<p>Strengthening leadership in waste management</p> <p>Prioritisation of waste management, particularly segregation, by the topmost political and administrative levels within all levels of government has a trickle-down effect.</p>	<p>Systems of data collection around waste</p> <p>Establishing systems to collect and analyse data around waste segregation, types and volumes to optimise solid waste collection processes. Such data collection would also help better design the monetary and business systems around waste.</p> <p>Parallel systems could be established to collect disaggregated data on those involved in the waste collection ecosystem. This would allow for the identification of various vulnerable groups, including women involved in the process, so that targeted welfare policies can be devised for them.</p>	<p>Incentive-linked KPIs for staff working in the segregation of waste</p> <p>Accountability and reward mechanisms should be set for those directly involved with day-to-day operations related to waste, like sanitary inspectors. They should be financially rewarded for improving waste segregation standards and measurable impact. This could be built into the staff's annual key performance indicators (KPIs).</p>



Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
Private sector	<p>Forging partnerships and collaborations for segregation</p> <p>Effective waste segregation requires collaboration and partnership between government and private entities. These stakeholders can pool their resources, expertise, and infrastructure to implement comprehensive waste management systems. This can result in higher recycling rates, reduced landfill waste, and a more sustainable approach to waste management overall.</p>	<p>Making segregation mandatory for waste-collection contractors</p> <p>Tipping fee linked contracts in waste collection tend to disincentivise waste segregation. It is critical to put in place guidelines and protocols as part of waste collection contracts to ensure effective segregation.</p>	<p>Incentivising start-ups and new enterprises</p> <p>Given the latent financial potential in the solid waste sector, incentives can be set up to encourage new businesses to enter into waste management operations. These incentives can be in the form of viability gap funding or subsidised land leasing. The entry of the private sector would reduce the burden on the state for waste management operations and allow it to focus on critical components of the process like managing low-value waste, in which the private sector will not be able to contribute.</p>
Private sector	<p>Developing human capital</p> <p>Investing in upskilling waste management staff can enhance their capabilities for waste management. This will give them necessary skills to implement and manage techniques like vermiculture, composting, and biogas projects, leading to more efficient waste diversion and resource recovery.</p> <p>Providing social benefits and required upskilling can further improve the efficiency of workers (including informal sector workers) and ensure fairness and justice.</p>	<p>Policies for supporting the informal waste management economy</p> <p>Policies must be put into place to enhance informal segregation and waste recovery practices through provision of safety gear, recognising and providing space for material recovery and supporting the informal recycling economy.</p>	<p>Guarantees on buybacks of processed waste</p> <p>New private sector enterprises in waste management can be given buy-back guarantees by the state for purchasing processed waste at fixed prices. This will increase the market confidence to increase investments in this sector and help ensure the initial viability of the industries. The guarantees can be for an initial fixed period from the setting up of the enterprise.</p>



Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
People	<p>Positive Reinforcement of segregation practices</p> <p>By using influential personalities or authority figures as role models or spokespersons, social norm techniques can effectively influence individual behaviour. When individuals see someone they admire or trust endorsing certain positive behaviours, they are more likely to perceive those behaviours as socially desirable and feel motivated to follow suit.</p> <p>Creating E-waste inventories with buy-back standardisation</p> <p>Buy-back programs involve offering incentives to consumers or businesses to return their used electronic devices for recycling or proper disposal. Standardisation could ensure that the terms and conditions of buy-back programs are consistent across different locations or organisations, creating a streamlined process for both consumers and waste management entities.</p>	<p>Mandating no collection of unsegregated solid waste</p> <p>By mandating households to segregate their waste into recyclables, organic matter, and non-recyclable waste, the policy will improve the efficacy of source segregation. Mandates against the collection of unsegregated waste will help ensure compliance.</p>	<p>Monetary compensation for segregated waste</p> <p>Resident welfare associations (or other forms of neighbourhood associations) can be monetarily compensated for the segregated waste collected from their local neighbourhood. While these compensations might be relatively small amounts at the household level to attract interest, at the neighbourhood level, they can pay for a variety of services offered by the RWAs, including costs associated with procurement of separate waste bins, educational campaigns, or training programs etc.</p>

I Good Practices

The 'Bin Free in 2003' Campaign | Municipal Corporation of Panaji, Goa, India

Nudge: Mandating no collection of unsegregated solid waste

Case overview: The campaign demonstrated the value of stakeholder integration and involved stakeholders from the local body, Resident Welfare Associations, school and college students and faculty, as well as eminent personalities. The strategy involved providing separate bins at subsidised cost, setting up material recycling stations, setting up of a governance mechanism to ensure segregation and intensive monitoring. While initially the segregation was in terms of wet and dry wastes, the system has been subsequently enhanced, and segregation at source is currently undertaken in eight different streams with designated colour coding. Key outcomes included the complete collection of segregated

household waste, market creation for improving recycling efficiency, minimal waste reaching the landfill, as well as active engagement of woman volunteers, ragpickers, and self-help groups.

Sahbhagita Scheme | Municipal Corporation of Delhi, India

Nudge: Monetary compensation for segregated waste

Case overview: Under the scheme, if an RWA achieves 90% property tax compliance, then 10% of this collection can be utilised as a capped incentive for development work. Additional 5% can be availed as an overhead incentive if the following solid waste management measures are met: complete segregation at source, composting of wet waste, and recycling of dry waste with remainders handed to the municipal corporation. Implementation of the scheme is overseen by the Sahbhagita cell along with other officers within the local body.

07/

Nudging behavioural change - Water

Key action area: Minimising Water Usage to Enable Water Savings at Household

Stakeholder being impacted by the nudge strategy	Social Nudges	Regulatory Nudges	Financial Nudges
All stakeholders		<p>Amending Development Control Regulations</p> <p>The DCR or equivalent land-related regulations should be modified to incorporate low flow/use fixtures and dual water systems (blue/grey) in new and existing constructions. Minimum standards for water saving at the household level, practices such as reusing grey water in landscaping and other purposes should be included. Adoption of green building norms can also help maximise water efficiency.</p>	
Public sector including scientific community		<p>Minimising Non-Revenue Water</p> <p>Enforcing the implementation of advanced metering technologies, regular leak detection and repair programs, and robust monitoring systems, thereby reducing non-revenue water levels. Substantial water savings can also enhance the financial viability of water utilities, promote water conservation practices, and safeguard water availability, especially in scarce areas.</p> <p>Compulsory Water Metering</p> <p>Currently, water charges are primarily calculated on plot size, and water meters can help understand consumption and savings. Coupled with volumetric tariffs this can be a deterrent to wasteful usage of water and enhance the water revenue at local government levels.</p> <p>Mandate water-saving fixture compliance in all projects</p> <p>Mandating that all public infrastructure projects, including housing, be built with water-saving fixtures and comply with minimum green building standards. These mandates will have to reflect in the designs, tenders and budgetary allocations of any new project undertaken by the government.</p>	<p>Non-Linear (Increasing Block) Price</p> <p>Adopt tariff systems where, the tariff increases telescopically for different consumption blocks, thereby acting as a deterrent for overconsumption. This also helps increase revenue collection.</p>



Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
Private sector	<p>Database of water-efficient products</p> <p>Showcasing brands manufacturing water-efficient fixtures on a public database which allows for comparison between different products. This can also be linked to a marketplace for purchasing these products. This can significantly reduce instances of greenwashing and would reward water-efficient product manufacturers.</p>	<p>Create a Star Rating System</p> <p>Having a star rating system/ equivalent labelling schemes for water appliances/ fixtures, similar to electronic appliances, can help users in making sustainable choices. Such fixtures can save water and energy due to the overall reduction in pumping, transportation and purification.</p> <p>Increase manufacturing of Water Efficient Fixtures and Appliances</p> <p>Mandates for manufacturing low-flow fixtures and appliances, and incorporating saving modifications to existing products wherever feasible can create a larger enabling environment for consumers.</p> <p>Efficiency Disclosure in Advertising and Marketing of Star-rated Products</p> <p>Mandates to disclose water savings/loss on all marketing and advertising content released by brands for water fixtures and appliances. This can not only help boost conservation behaviours but also create competition between brands and increase the choices for purchasing water efficient products.</p> <p>Mandatory water saving and reuse features</p> <p>Mandatory dual piping, grey water treatment and recycling features to be mandated for all new developments</p>	<p>Subsidising water-efficient equipment manufacturing</p> <p>Providing incentives and subsidies to incentivise manufacturers to gradually transition their product lines towards water efficiency. These incentives can initially be targeted at smaller manufacturers and can be accompanied by technical support required to make these transitions.</p>
People	<p>Behavioural Change Campaigns</p> <p>Campaigns targeting domestic, commercial and bulk water consumers should be undertaken. Schools, youth groups can play a major role in ensuring household user behaviour. Easy to understand FAQs and 'how to' guides can also be a strong nudge towards enabling conservation behaviour.</p> <p>Real-time neighbourhood-level dashboards</p> <p>Publicising water use levels can apply social pressure on consumers to reduce their water use footprint. Public dashboards of neighborhood-level comparison on water use per capita (including in billing)/ water use mapping platforms/ daily water dashboards can be effective tools.</p>	<p>Rules for Preventing the Unproductive Use of Water During Emergencies</p> <p>Given the potential impact of climate change on urban water scarcity, enforcement of protocols and rules for sustainable management during periods of stress must be enlisted by city governments to make the most efficient use of available supply. This can help reduce inequity while ensuring fairness in access for poor and marginalised groups in cities.</p>	<p>Purchase Subsidies for Water-Efficient Products</p> <p>By offering subsidies, governments can make water saving products and fixtures more affordable and accessible to consumers. Consumer demand will further enhance the supply through manufacturing.</p>

I Good Practices

Water Efficiency Labelling System | Singapore

Nudge: Star Rating for Appliances

Case overview: The Singapore government has actively promoted water conservation by encouraging the use of water-efficient appliances and fittings. This includes implementing maximum flow rates for taps and mixers, as well as maximum flushing capacities. The Water Efficiency Labelling Scheme called for the use of water efficiency labels for various fixtures and appliances commonly used at the household level. This labelling scheme helps consumers make informed choices and encourages suppliers to introduce more water-efficient options to the market.

Reduced NRW | Manila

Nudge: Minimising Non-Revenue Water

Case overview: Manila Water has successfully managed to reduce the level of Non-revenue water (NRW) which represents the water lost due to leaks or illegal connections that is not accounted for in billing. The World Bank sets a standard of 25% or lower for NRW while Manila Water maintained an average NRW of just 12.69% in 2022, which was among the lowest among Asian countries. Since 1997, Manila Water has been focusing on reducing non-revenue water loss through measures such as network reconfiguration, measuring supply volumes accurately, leakage control and repairs, supply and pressure management, and meter management programs. Leaks and illegal connections are overcome through active engagement with communities, and undertaking maintenance and rehabilitation of aging primary lines to minimise system failures.



08/

Nudging behavioural change - Industry

Key action area: Encouraging MSMEs to transitions towards sustainable products and processes

Stakeholder being impacted by the nudge strategy	Social Nudges	Regulatory Nudges	Financial Nudges
All stakeholders	<p>Creating an ecosystem for Green Entrepreneurs</p> <p>Creating a platform for green entrepreneurs to interact and learn from each other, with technical and financial assistance for establishing or transitioning to green businesses. The platform will also need to be gender-responsive to address the specific challenges faced by women entrepreneurs.</p>		
Public Sector including scientific community		<p>Priority for green entrepreneurs in government procurement</p> <p>Systems can be set up to give priority to green entrepreneurs in government procurements and tenders. This would help boost their business, help initial viability and give increased visibility to their products.</p>	<p>R&D on green technologies</p> <p>Governments can fund an R&D ecosystem for green products and manufacturing processes. Breakthroughs in this can be directed to MSMEs through resource centres or be directly incorporated into Business-in-a-Box models.</p>
Private Sector	<p>Green Entrepreneurs Resource Centers</p> <p>Establishing a green entrepreneurship resource centre which can aid new and transitioning entrepreneurs. These centres can be used to provide resources and information, and facilitate procurements of new entrepreneurs looking to set up green businesses.</p>	<p>Business-in-a-Box model</p> <p>Formulating business-in-a-box models that can have standard business plans, financial projections, marketing strategies and other support material for setting up green businesses. The government could also set up a simplified/ single window clearance system pertaining to setting up such predefined businesses.</p>	<p>Priority funding for green enterprises</p> <p>Priority funding support may be provided to industries engaged in the manufacturing of green products or engaging in green manufacturing processes. This funding assistance could be provided as startup capital or for expansion and transition.</p>



Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
Private Sector	<p>Green rating system for MSMEs</p> <p>Establish a green business rating system to recognise and reward green entrepreneurs. This could be done by the government or industry associations. The rating systems can be linked to annual awards and recognitions, which can help boost the profile of best-performing enterprises and increase competition in green transitioning.</p>	<p>Mandates, for green transitioning</p> <p>The government could mandate gradual green transitioning of enterprises. Such mandates should be applied in a phased manner on medium and small enterprises, giving them sufficient time to transition. This transition could also be aided by providing funding through zero-interest loans or grants to enterprises and the drafting of Standard Operating Procedures that would simplify the process.</p> <p>Green minimums for new enterprises</p> <p>Establishing mandates for minimum requirements of green processes for the setting up of new enterprises. These mandates can initially begin with medium enterprises and gradually be expanded to small enterprises. It might not be advisable to mandate these for micro-enterprises till the development of an ecosystem for green processes, as the initially high capital investments for green technologies might become prohibitive to setting up new enterprises.</p>	<p>Subsidising purchase of green machinery</p> <p>Establishing a subsidy or rebate scheme to offset cost differentials between conventional and green equipment might encourage more entrepreneurs to opt for the purchase of the latter.</p>
People	<p>Development of an online marketplace for green products</p> <p>Establishing an online marketplace would help with the promotion of green products to consumers. This would also ease the comparison between various green products and help minimise greenwashing by companies.</p> <p>Increasing awareness on the potential and future of green businesses</p> <p>Youth enrolled in various education (high school/ university) or vocational training programs can be made aware of the future potential of the green sector and of green transitioning within each sector. This might help nudge their early career decisions towards these industries.</p>	<p>Green Education</p> <p>Education, skilling and capacity development programs should start incorporating green transitioning within their training modules. This would help create a workforce that is knowledgeable in these processes.</p>	<p>Rebates on purchase of green products</p> <p>Establishing a rebate scheme for enterprises that purchase green products from recognised green enterprises. This system could help in setting up a steady demand and encourage more enterprises to transition towards green products.</p> <p>Scholarships for Green Education</p> <p>Scholarship programs could be established for students opting for programs/ degrees/modules pertaining to green transitions and green economies. This could help nudge choices in favour of these subjects.</p>

Conclusion

In order to enable pro-planet and environmentally responsible behaviours, robust environmental policies need to be enacted and enforced, mandating policy nudges to come in at all levels - upstream, midstream, and downstream. Only then can an ecosystem-level behavioural change take place. It will also be essential to setup monitoring, evaluation, and feedback mechanisms to measure the effectiveness of environmental initiatives and policies. This, along with transparent data and information sharing, can enable accountability and informed decision-making.

This paper has recommended key nudge areas that can help to mainstream environmental concerns across various stakeholder groups and encourage whole-of-system behavioural change.

- A. Strengthen and upgrade legislations and policies:** Enact and enforce robust environmental policies that incentivise, mandate and inculcate responsible behaviour at all levels. This includes regulations on carbon emissions, waste management, water scarcity, sustainable resource use, and conservation measures. Such legislation must account for the adoption of new innovations, technologies and systems.
- B. Monitor, Evaluate, and Rebuild:** Establish monitoring mechanisms to assess the effectiveness of initiatives and policies, regularly evaluate progress towards environmental targets, and adjust strategies as needed. Share data and information transparently to promote accountability and inform decision-making.
- C. Capacity building and upskilling across levels:** Several eco-centric nudges hinge on whether people are skilled and understand the implications of climate action. Investing in education and training programs for policymakers, government officials, and professionals working in relevant sectors can enhance their understanding of environmental issues and their ability to develop and implement effective policies.
- D. Matching funds with policy commitments:** By matching funds with decisions, governments can demonstrate their commitment to action by matching resources to support efforts by various stakeholders. This becomes a powerful incentive for stakeholders, including the private sector, to engage in environmentally responsible behaviours and projects.
- E. Incentivising and subsidising manufacturers and consumers for positive action:** Offering financial incentives, tax breaks, and subsidies for environmentally responsible practices can be a powerful motivational tool and make it economically viable for individuals and businesses to make sustainable choices. Research and Development in sustainable technologies, green infrastructure, and eco-friendly products can also be supported to maximise options and choices.
- F. Foster Collaboration and Partnerships:** Encouraging collaboration between governments, businesses, NGOs, and communities to work together towards common environmental goals. Fostering partnerships to develop innovative solutions, share best practices, and implement sustainable initiatives can ensure inclusive decision-making and collective action.
- G. Harnessing the power of women and youth-led change:** It is important to mainstream the role of women and young adults in championing environmentally responsible behaviours as leaders, facilitators, and nudgers. Governments can create platforms and opportunities for women and youth to participate in decision-making, policy formulation, and implementation.
- H. Investing in an enabling environment for climate change start-ups:** Governments should foster a vibrant start-up ecosystem and support the growth of enterprises in the environmental sector. This can be achieved by providing financial incentives, incubation programs, and regulatory support. Encouraging innovation and entrepreneurship in this sector can lead to ground breaking solutions and disruptive technologies that address environmental challenges.

I. Institutionalise pro-planet systemic changes across government departments: Governments should embed sustainability principles into the DNA of their operations, ensuring that environmental considerations are consistently integrated into decision-making, policy formulation, and program implementation across all government departments. This approach helps create a culture of sustainability within the government and sets a positive example for other stakeholders to follow.

J. Raising Awareness and Education: Implement comprehensive awareness campaigns to educate the public about environmental issues, their impact, and the importance of responsible behaviour. Promote environmental education in schools, universities, and citizen community centres to foster a culture of sustainability and empower individuals with knowledge.

By implementing these measures, we can create green pathways that embrace an ecosystem approach towards environmentally responsible behaviour.

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