ENCOURAGING ENVIRONMENTALLY RESPONSIBLE BEHAVIOURS

2023

URBAN 20

White Paper.

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Encouraging Environmentally Responsible Behaviours

White Paper

UCLG
United Cities
and Local Governments

National Institute of Urban Affairs
Technical Secretariat for Urban 20

Table of Contents

01 Setting the context

02 Key stakeholders and sectors for driving ERB

03 Designing nudges for behavioural change

04 Nudging behavioural change - Energy

05 Nudging behavioural change - Mobility

06 Nudging behavioural change - Waste Management

07 Nudging behavioural change - Water

08 Nudging behavioural change - Industry

09 Conclusion

10 Bibliography

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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	4GZOUTGR /TYZOZ[ZK UL ;XHGT '}GOXY
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/

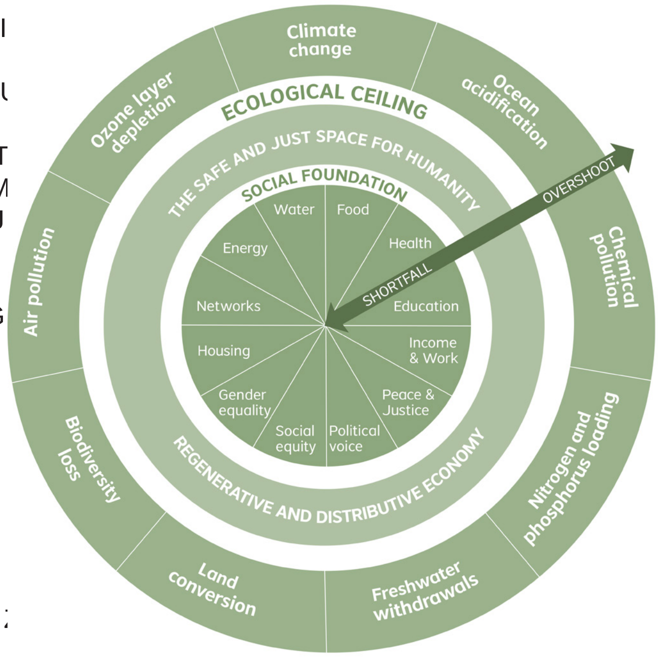
Setting the context

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
:XUZZG :NK]UXRJ OY GRYU
K^VKIZKJ ZNGZ UL ZNK]UXRJYY
GXKGY H_ SGQOTM ZNKS ZNK
experience the highest impacts of climate change.

:NK t) ZGXMKZ YKZ H_ ZNK 6GXOY
countries to take concerted climate action to reduce greenhouse gas emissions to limit global warming. The
YZGZKSKTZ LXUS /6)) NOMNROMNZY
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
IGXHUT I[ZZOTM K}UXZY GXK OTY[€I
catastrophe, and calls for a focus on behavioural reforms
GRUTMYOJK ZKINTURUMOIGR JK\KR
need for behavioural change has been further highlighted
H_ ZNK 2OLKYZ_RK LUX +T\OXUTSKT
4/:/ 'G_UM G IRGXOUT IGRR M
3OTOYZKX OT]NOIN YKKQY OTJ
for a pro-planet lifestyle. The mission envisions replacing the 'use-and-dispose' economy with a circular economy,
JK~TKJ H_ XSOTJL[R GTJ JKROHKXG

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'
9ZGGZY /Z OY IXOZOIGR ZNG
XKYVUTYOHRK HKNG\OU[XGR INGTM
appropriate nudges that ensure fairness, equity and just transitions while moving towards sustainable futures.

:NK JK~TOZOUT UL XKT\OXUTSKTZGRR_ XKYVUTYOHRK HKNG\OU[XY
SUYZ IUTZK^Z[GR ZU ZNOY VGVKX OY H_ 1URRS[YY 'M_KSGT
]NU JK~TK OZ GY XHKNG\OU[X ZNGZ IUTYIOU[YR_ YKKQY ZU
minimise the negative impact of one's actions on the natural and built world'. Society's actions towards the environment
IGT HK YOMTO~IGTZR_ OT•[KTIKJ H_ ZN
]OZNOT K\KX_JG_ RO\KY :NK HKYZ]G_
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
TU UX SOTOSGR GJJOZOUTGR GYYUIO
environmental responsibility in the default choice can
VUTZGTKU[YR_ GJUVZ KT\OXUTSKTZGR
Beyond such self-motivated behaviours, there will need
ZU HK JO}KXKTZ RK\KRY UL RKMOYRGZ
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
S[YZ ~XYZ HK OT VRGIK HKLUXK HKNG\
VGXZOI[RGXR_ ZNUYK OT\UR\OTM RKMO
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

:NK *U[MNT[Z +IUTUSOI :NKUX_ 1GZK 8GC]UXZN 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 GOSY ZU HGRGTIK VKUVRKY JK~TK]OZN TOTK VRGTKZGX_ KT\OXUTSKTZGR 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 9*-Y KYVKIOGRR_ LUX \[RTKXGHRK

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, GTJ ~TGTIOGR LXGSK]UXQY ZNGZ Y K^GSOTOTM IUXXKRGZOUTY HKZ]KK GTJ GIZOUTY]K IGT JK\KRUV K}KI ensure fairness and inclusivity, considering the needs and perspectives of vulnerable communities. While the existing ROZKXGZ[XK UT P[YZ ZXGTYOZOUTY between jobs and the environment, Climate Justice in its most total sense should go beyond this (McCauley & .K}XUT /Z YNU[RJ IUSHOTK VXU 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 P[YZ ZXGTYOZOUTY ' MRUHGR IUSVGXO faring in terms of maintaining the balance prescribed in the Doughnut Model, indicates that there are substantial JO}KXKTIKY GIXUYY TGZOUTY GTJ HKZ] 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 ZNXU[MN \GXOU[Y IROSGZ 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 alike. While there are no 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

FU[X JOYZOTIZ YZGQKNURJKX MXU[JXO\OTM +8(TGSKR_ ' ZNK V[HR YKIZUX) ZNK YIOKTZO~I IUSS[TOZ_ VUV[RGZOUT MO\KT ZNGZ ZNK YIO support ERB by informing the policies and strategies of the government, it has been merged with the public sector for ZNK YGQK UL ZNOY VGVKX

A. Public Sector

- 9ZGZK 9[H 4GZOUTGR -U\KXTSKTZY
- 2UIGR -U\KXTSKTZ V)UTIKXTKJ ;X
  Integrated Departments
- 'IGJKSOI OTYZOZ[ZOUTY GTJ YIOK

B. Private Sector

- Businesses and Corporations
- 6XO\GZK ;ZOROZOKY GTJ 9KX\OIK
- 6XULKYYOUTGR 'YYUIOGZOUTY GT
- 68 3GXQKZOTM 'MKTIOKY
- Micro, Small and Medium Enterprises / Startups

C. People

-)O\OR 9UIOKZ_)USS[TOZ_ 5XMG
- Non-Governmental Organisations
- Personalities and Individuals
- Local Youth and Gender Organisations/ Groups

While indicators for urban sustainability may vary between MKUMXGVNOKY G YZ[J_ H_ 3OINGR urban sustainability indicator frameworks, highlighted]GZKX]GZKX [YK IUTY[SVZOUT W mobility and transport, waste (responsible or material IUTY[SVZOUT GTJ KTKXM_ GY QK_

ZGXMKZKJ 'OJKZOUT-GRRUXNGTMKY OT GRIYUKNZUK G YZNKTOXIGZKOSVGIZ UT S U[Z IUSKY ZNK YKIZUXY ZNGZ ZNK XKLUXK HKKT focus sectors for this paper, where urban ecosystems that encourage responsible behaviours can be developed.

A. Energy

The energy supply sector (electricity, heat, and other KTKXM_ GIIU[TZY LUX UL MRUHGR -
4GZOUTGR ZNK 5L ZNOY IOZOKY GIIU[
KTKXM_ IUTY[SVZOUT /+' G]OZN
IUTY[SVZOUT ZU INGTMK LUXKIGYZKJ ZU OTI
+^^UT 3UHOR -O\KT ZNGZ KT
to a large extent, is linked to individual behaviour, it is critical to create an enabling ecosystem to encourage KTKXM_ K€IOKTZ HKNG\OU[XY :NOY VG Z]U GYVKIZY UL KTKXM_ XKRGZKJ HKNG OTIUXVUXGZOTM KTKXM_ K€IOKTZ OTLX 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 VXGIZOIKY /TIUXVUXGZOTM KTKXM_ K€ 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 [TO\KXYGRR_ ,URRU]OTM QK_ GIZOUT for the sector:

Objective	Outcome	Stakeholder group	Action area
Ensuring Energy +€IOKTZ H[ORJOTMY	)XKGZOTM GTJ XKZXU H[ORJOTMY]OZN KTKXM_ K€IOKTZ Infrastructure	Property Owners (Residential and Commercial as well as 6[HROI H[ORJOTMY	Enable individual property owners to incorporate KTKXM_ K€IOKTZ infrastructure.
Household energy reduction	Shifting behaviours and practices for minimising household energy consumption	'RR YZGQKNURJKXY	Enabling energy conservation by users

B. Transportation

'IIU[TZOTM LUX UL GRR)5 KSOYYOUTY G TJ G W[GXZKX UL
all GHG emissions from end-use sectors, transportation is
UTK UL ZNK SUYZ YOMTO~IGTZ IUTZXOH[ZUXY ZU IROSGZK INGTMK
'QKTPO KZ GR)GXY GXK XKYVUTYOHRK LUX TKGXR_ ZNK
transport-related emissions, and, along with motorcycles,
they play a major role in increasing carbon footprints in
JK\KRUVOTM IU[TZXOKY 'QKTPO (KTMZYYUT [XZNKX ZNK
lack of infrastructure to support such a growth in personal
motor vehicles will lead to escalating road congestion
RKGJOTM ZU G JKIROTK OT K}KIZO\K YVKKJ GTJ GT OTIXKGYK OT LKR
IUTY[SVZOUT 1[SGX KZ GR

There is a need to make an ecosystem-level shift
that prioritises and incentivises the adoption of public
ZXGTYVUXZGZOUT (KNG\OU[X INGTMK K}UXZY]ORR TKKJ ZU LUI[Y
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
U]TKXY ZNK HKTK~ZY UL ZNKYK GIZOUTY]ORR NG\K YOMTO~IGTZ
VUYOZO\K YVORRU\KX K}KIZY UT GRR YKIZOUTY UL YUIOKZ_
particularly vulnerable groups. Such transitions from
private to public transportation can reduce about one-third
ZUTTKY UL ZNK GTT[GR VKX IGVOZG)5 KSOYYOUTY ZN[Y
aligning with SDG 11 and the universal human right to
“access to a clean and healthy environment” as declared by
ZNK ;4 9[3 'RR

Transportation is also one of the sectors where systemic
disadvantages of vulnerable groups like women and
6RXYUTY]OZN *OYGHOROZOKY 6]*Y IU
who have more caring responsibilities, are hampered by
the limitations of public transportation, particularly the
RGIQ UL GIIKYYOHOROZ_ ZNK JO€I[RZ
IUTTKIZO\OZ_ GTJ YGLKZ_ IUTIKXTY ;4
9OSORGX HGXXOKXY K^ZKTJ ZU 6]
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
ZNK YNOLZ ZU]GXJY V[HROI ZXGTYVUXZ
particularly in developing countries. The biggest among
ZNKYK OY ZNK XKW[OXKSKTZ LUX YOMT
to implement the ecosystem-level changes required to
mainstream public transportation. Given the additional
SORROUT H[YKY SORROUT QORUS
GTJ SORROUT QORUSKZXKY UL YGLK
globally to achieve sustainable urban mobility, in addition
to investments in urban rail systems, there is a need
LUX YOMTO~IGTZ XKGRRUIGZOUT UL L[
OTLXGYZX[IZ[XK ZU V[HROI ZXGTYVUXZGZOUT [YKXY
QK_ GIZOUT GXKGY NG\K HKKT OJKTZO

Objective	Outcome	Stakeholder group	Action area
/TIXKGYOTM ;VZGQK UL Public Transport	Moving from Private to Public Transport	'RR YZGQKNURJKXY	Encouraging and facilitating the shift of private vehicle owners to use public transport

C. Waste

-RUHGRR_ IOZOKY MKTKXGZK HORRUOT ZUTTKY UL YUROJ]GYZK
GTT[GRR_ :NK =UXRJ (GTQ T J H 5TR_ UL ZNOY OY
XKIU\KXKJ ZNXU[MN XKI_IROTM GTJ IUSVUYZOTM]NORK OY
OTIOTKXGZKJ :NK XKYZ OY SGOTR_
or open dumping. It is further estimated that 1.6 billion
ZUTTKY UL)5 KW[O\GRKTZ OY XKRKGYKJ GT T[GR R_ LXUS YUROJ
]GYZK ZXKGZSKTZ GTJ JOYVUYGR
Given the population growth rate and likely increase in
IUTY[SVZOUT ZNOY OY KYZOSGZKJ ZU OTIXKGYK ZU
TK^Z _KGXY 1G`G KZ GR
disposed waste can further lead to major health (through
IUTZGSOTGZOUT UL YUOR GTJ]GZKX GTJ KT\OXUTSKTZGR
OSVGIZOTM SGXOTK ROLK GTJ TGZ[XGR KIUY_YZKSY OYY[KY GTJ

the cost of coping with these impacts may surpass the cost
UL NG\OTM GT K}KIZO\K]GYZK SGTGMK
=UXRJ (GTQ G
9U[XIK YKMXKMGZOUT IGT HK GT KGY_
manage waste, particularly in middle-income countries
where basic collection infrastructure is already established.
Source segregation will reduce the cost of recycling (The
=UXRJ (GTQ G OTIXKGYK SGZKXOG
]GYZK JOYVUYGR OT RGTJ~RRY 4/:/ 'G
IUYZ UL IGZOUTY GTJ ZNK \GYZ HKTK~Z
;TURRKIZKJ GTJ OSVXUVKXR
for developing an enabling ecosystem that would enable
source segregation. Following key action areas have been
OJKTZO~KJ LUX ZNK YKIZUX

Objective	Outcome	Stakeholder group	Action area
+}KIZO\K =GYZK Management	Facilitating Solid Waste Segregation at Source	'RR YZGQKNURJKXY	YKGZOTM Y_YZKSY LUX segregation of solid waste at source

D. Water

;TO\KXYGR GTJ KW[OZGHRK GIIKYY ZU]GZKX YGTOZGZOUT GTJ hygiene infrastructures are among the key global priorities highlighted by the Global Commission on the Economics UL =GZKX ,UX K\KX_ tI OTIXKGYK OT MRUHGR G\KXGMK ZKSVKXGZ[XK G RUYY UL XKTK]GHRK]GZKX YU[XIKY OY VXUPKIZKJ /6)))UTYKW[KTZR_ H_]GZKX JKSGTJ OY K^VKIZKJ ZU U[ZYZXOV Y[VVR_ H_ .GX\K_ GTJ nearly half of the global urban population is projected to LGIK]GZKX YIGXIOZ_ H_ .K KZ GR .U[YKNURJY I[XXKTZR_ GIIU[TZ LUX UL ZNK ZUZGR MRUHGR]GZKX JKSGTJ and this is likely to increase exponentially. For instance, it is K^VKIZKJ ZNGZ]GZKX JKSGTJ]ORR OTI OT 'LXOIG GTJ 'YOG GTJ H_ OT IOZ (UXKZZO 8UYG /Z OY IXOZOIGR 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. ,URRU]OTM QK_ GIZOUT GXKGY NG\K HK sector:

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

E. Industry

Industrialisation is essential to economic development @UJGVK KZ GR VGXZOI[RGXR_ LUX KSKXMOTM KIUTUSOKY 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 ZUZGR KTKXM_ [YKJ MRUHGRR_ 1GNGT ZNOY YKIZUX OY KYZOSGZKJ ZU OTIXKGYK H_ G L[XZNKX – almost all of it coming from non-OECD countries (Kahan, 3OIXU 9SGRR GTJ 3KJO[S +TZKXVXOYKY 393+Y GY G H[YOTKYY YKMSKTZ GIIU[TZ LUX UL GRR H[YOTKYYKY MRUHGRR_ =UXRJ :XGJK 5XMGTO`GZOUT T J :NKYK 393+Y GRYU VXU\OJK RO\KRONUUJ UVVUXZ[TOZOKY LUX ZU UL ZNK]UXQLUXIK ;TOZKJ 4GZOUTY T J H ZU ZNK -*6 UL KSKXMOTM KIUTUSOKY :NK =UXRJ (GTQ T J G -O\KT ZNGZ 393+Y IUTYZOZ[ZKY GXU[TJ UL GRR MRUHGR businesses and directly and indirectly contribute to about UL GRR KSOYYOUTY =UXRJ :XGJK 5XMGTO`GZOUT T J G OZ 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 YOMTO~IGTZR_ NGXJKX LUX 393+Y -RU NG\K G L[TJOTM JK~IOZ I[S[RGZO\KR_ L[TJOTM JKSGTJ UL ZXORROUT UX MRUHGR 393+ RKTJOTM :NK =UXRJ (GT ZNKS]OZN ZNK YQORR ZKINTOIGR GTJ 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 OJKTZO~KJ LUX ZNK YKIZUX

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

ITZXUJ[IKJ OT H_ YUIOGR YIOK)GYY 9[TYZKOT XT[JMOTM]GY J the choice architecture that predictably alters people's HKNG\OU[X]OZNU[Z LUXHOJJOTM GT 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 over-consumption at an individual level while simultaneously trying to ensure that everyone achieves minimum standards of living. The nudges TGTUHKOIRGYYOX~KOMGYO~UGTOGR_ XKM[RG GTJ IUSVXOYK [VYZXKGS VUROI_ SOJ JU]TYZXKGS VXUPKIZ RK\KR OTZKX\KT 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
'RR YZGQKNURJKXY	9ZXGZKMOKY GTJ VUROIOKY ZNGZ G}KIZ GRR YZGQKNURJKX		
Public sector including YIOKTZO~I IUSS[TOZ_	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.	3UJO~IGZOUTY OT K\OYZOTM 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 Y[HYOJOKY GTJ UX M[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	' IUSHOTGZOUT UL G]GXKTKYY building through social campaigning/ education and increasing public visibility of individual actions (while maintaining basic standards UL VXO\GI_ ZU IXKGZK YUIOGR pressures and modify public perceptions in favour of individuals undertaking responsible behaviours.	Individual level mandates and rules against engaging in environmentally irresponsible HKNG\OU[XY +}UXZY YNU[RJ 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 ~TGTIOGR XK]GXJY LUX penalties may be targeted at over-consumers and should not be universal.

/T ZNK GHYKTIK UL IUSVXKNKTYO\K JGZG UT ZNK KLLKIZY 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 OTOZOGZOTM HKNG\OU[XGR INGTMK YZXGZKMOKY mechanisms.

:NK JKIOYOUT ZXKK +^VRUXKKI 9_UR[ZOUT :XOG M[OJK H_ 1KZZRK 6KXYOGT IGT H to mitigate these issues. The framework links policy objectives with targeted behaviours and can help tune GTJ GJP[YZ T[JMKY ZU Y[OZ RUIGR XKW •K^OHOROZ_ LUX OSVXU\KSKTZY GTJ O 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

1K_ GIZOUT GXKG +TGHRK VXUVKXZ_ U]TKXY Z infrastructure:

Stakeholder being impacted by the nudge strategy	Social Nudges	Regulatory Nudges	Financial Nudges
'RR VXUV[...] owners		Minimum Compliance with Green Building Norms 3UJO~IGZOUT UL H[ORJOTM IUJKY Development Control Regulations/ Zoning Ordinances to mandate compliance of all new developments]NKZNKX MXKKT~KRJ UX HXU]T~KRJ]OZN MXKKT H[ORJOTM These mandates can initially be made for larger sites and progressively expanded to all new constructions and redevelopments. Fast-Tracking Construction Clearance Setting up processes to ease and accelerate approvals at various stages of building construction for buildings meeting comprehensive green building standards.	Enabling Rooftop Solar 'JUVZOUT ZNXU[MN 6 Funding Schemes Subsidies for Solar Rooftop installation through public schemes With robust supply chain of vendors/contractors to meet demand 2++*
Public Sector including YIOKTZO~ community	Competition amongst cities LUX VXUSUZOTM KTKXM_ KL~IOKTZ infrastructure. Intercity challenges with rewards/ incentives (linked to IKTZXGR MXGTZY) to improve key energy related indicators. Indicators could focus on green buildings, renewable energy mainstreaming, Y[YZGOTGHRK XKZXULOZ[TM, reuse of built stock, etc. Such competitive frameworks can also be established between or within government departments and administrations.	+TKXM_ +€IOKTZ /TLXGYZX[IZ[XK Compliance in all Public Projects Mandating that all public infrastructure projects, including public housing, HK H[ORZ]OZN KTKXM_ KL€IOKTI_ YZGTJGXJY Infrastructure and comply with minimum green standards. These SGTJGZKY]ORR NG\K Z designs, tenders and budgetary allocations of any new project undertaken by the government.	Innovation Funds 'T 8 * KIUY_YZKS TKK to be established for furthering innovations LUX KTKXM_ KL€IOKTZ infrastructure within GIGJKSOG ' VKXIKTZ of public funds can be directed towards the creation of public grants, scholarships, and fellowships which probe potential solutions.

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Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
Public Sector including YIOKTZO community			Financing the installation of KTKXM_ K€IOKTZ OTLXGYZX[I government buildings)XKGZOUT UL G JKJOIGZKJ L[existing government buildings with KTKXM_ K€IOKTZ OTLXGYZX[I also be used to provide viability gap funding for installing such infrastructure in new projects.
Private sector	Rewards and Ranking for Best Practices Initiating an open XGTQOTM GTJ system of developers who promote KTKXM_ K€IOKTZ 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.	Energy performance rating disclosures 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. Gradually Phasing Out Energy Intensive products Mandates for the gradual phasing out of manufacturing UL TUT KTKXM_ K€IOKTZ ~ZZOTMY GTJ ~^Z[XKY 9[IN SGTJGZKY could commence with certain easy-to-transition products and be gradually expanded to all sectors.	Incentives to boost manufacturing of KTKXM_ K€IOKTZ ~ZZOTMY Manufacturers can be nudged to increase ZNK VXUJ[IZOUT UL KTKXM_ K ROQK NKXSKZOIGRR_ YKGRK providing production-linked incentives. The increased production can help reduce the cost of such products and make them SUXK G}UXJGHRK
People	Behavioural Change Campaigning Campaigns targeting buyers to educate them on potential long-term HKTK~ZY GTJ IUYZ savings associated]OZN KTKXM_ K€IOKTZ buildings and products. This will help nudge the demand side of the market to be more KTKXM_ K€IOKTZ :NKYK campaigns can be run by NGOs or by industry associations.	8KZXU~ZY UL K^OYZOTM H[OR JOTMY Mandates for property owners ZU XKZXU~Z K^OYZOTM H[OR JOTMY LUX KTKXM_ K€IOKT mandates must be brought in MXGJ[GRR_ M time for compliance so as to not overburden homeowners.	OTIKTZO\KY LUX KTKXM_ buildings Tax Incentives/Disincentives can be developed in the form of penalties for VXUVKXZ_ U]TKXY UL KTKXM_ 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 SOMNZ UTR_ G}KIZ ZNK XKYO building who might not be the owner and consequently powerless to make any changes. Financial support for individual transition The government can provide subsidies for homeowners to undertake energy K€IOKTZ XKZXU~ZZOTM GTJ [OTIR[JOTM OT OTLUXSGR YK

Good Practices

-XKKT 8UU~TM LUX /TLUXSGR 9KZZRKSKTZY b 'NSKJGHGJ /TJOG

Nudge: Financial support for individual transition

)GYK U\KX\OK] /T ZNK 3GNORG .U[YOTM :X[YZ ZKGS GT 4-5 Y[VVUXZKJ H_ ZNK 9KRL +SVRU_KJ =USKTYY 'YYUIOGZOUT 9+=' JOJ G IOZ_]OJK VORUZ VXUPKIZ IGRRKJ [IUUR XUUL\ GOSKJ GZ IUT\KXZOTM ZXGJOZOUTGR XUULY OT OTLUXSGR YKZZRKSKTZY ZU IUUR XUULY)UUR XUULY XK•KIZ GTJ KSOZ NKGZ RU]KXOTM OTJUUX ZKSVKXGZ[XKY H_ ZU JKMXKK IKRYO[Y :NK_ OTYZGRRKJ ZNKOX ~XYZ SUJ[RGX XUUL GY G VORUZ VXUPKIZ XGOYOTM L[TJY OTZKXTGRR_ :NK VORUZ GOSKJ ZU GYYKYY JKSGTJ GTJ K€IOKTI_ SUTOZUXOTM temperature regularly in the installed homes. Data showed G YOMTO~IGTZ ZKSVKXGZ[XK JKIXKGYK UL JKMXKKY IKRYO[Y :NOY LKKJHGIQ GRRU]KJ ZNK ZKGS ZU XK~TK GTJ I[YZUSOYK the roofs. With increasing demand, they have installed over XUULY IXKGZOTM XKYOROKTZ RO\OTM KT\OXUTSKTZY LUX YR[S dwellers. The success of the pilot led to an expansion plan to IUT\KXZ U\KX NUSKY LXUS OTLUXSGR YKZZRKSKTZY

/TIXKGYKJ 6XUVKXZ_ 8GZKY b

Nudge: Energy performance rating disclosures

Case overview: Denmark's introduction of building energy XGZOTMY OT SGJK G SGPUX JKTZ O LU[XZKKT _KGXY RGZKX]OZN ZNK OTZ ZNK +;*OXKIZO\K ZNGZ SGTJGZKJ GJ\K energy performance during sales. This increased the value UL NOMN KTKXM_ XGZKJ NUSKY S[IN ZU owners.

Key action area 2: Enabling energy conservation by users

Stakeholder being impacted by the nudge strategy	Social Nudges	Regulatory Nudges	Financial Nudges
'RR YZGQ		Increasing urban green cover to regulate temperatures 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.	Financing for Heat Mitigation Investments in urban IUUROTM UX NKGZO projects such as district cooling to reduce premise-level energy demand.
Public Sector including YIOKTZO~ community	Showcasing best practices OT KTKXM_ K€IOKT government Public challenge-based model, with attached rewards, to inculcate energy conservation habits within the government ecosystem. Can be used to showcase government RKGJKXYNOV GTJ VXUSVZ IOZO`KTY to replicate.	+TKXM_ K€IOKTZ ~^Z[XKY OT housing ZNK 3GTJGZK OTYZGRRGZOUT UL KTKXM_ K€IOKTZ ~^Z[XKY OT V[HROI GTJ YZGZK NU[YOTM projects constructed by the government.	Incentives for Innovation 6XU\OJK ~TGTIOGR support for Research and Development UL KTKXM_ K€IOKTZ VXU

Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
Private sector	Public database of KTKXM_ K€IOKTZ VXUJ[IZY Comprehensive public database analysing the KTKXM_ K€IOKTI_ of various products by JO}KXKKTZ SGT[LGIZ[XKXY allowing for comparison and transparency to end users. This would reduce instances of greenwashing and reward KTKXM_ K€IOKTZ VXUJ[IZ manufacturers.	Building Materials Policy Establish minimum thermal and insulation standards for materials used in construction. This would reduce the demand for heating/ cooling energy within buildings. Increase Manufacture of Energy +€IOKTZ ,O^Z[XKY GTJ 'VVROGTIKY Gradually phase out manufacturing of GVVROGTIKY]OZN RU] KTKXM_ K€IOKTI_ This could also be accompanied by mandates on appliance SGT[LGIZ[XKXY ZU VXUJ[IK G ~^KJ LXGIZOUT]NOIN MXGJ[GRR_ OTIXKGYKY UL KTKXM_ K€IOKTZ GVVROGTIKY 'VVROGTIK KTKXM_ XGZOTMY GTJ long-term cost savings Mandates for displaying the energy ratings for appliances and comparison of the associated energy costs for similar utilisation of appliances across JO}KXKKTZ KTKXM_ XGZOTMY :NOY]U[RJ allow users to factor in long-term cost savings while making purchase decisions.	Financial assistance for transition: 6XU\OJK ~TGTIOGR Y[VVUX to help them transition towards SGT[LGIZ[XOTM KTKXM_ K€ products. This could also take the form of production-linked incentives for medium and large companies.
People	Comparison-based Consumption Reporting 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. Education for Energy Savings 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.	Establishing maximum thresholds for consumption during periods of peak demand 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 OTZU K}KIZ J[XOTM VKXOUJY UL NOMN energy demand - like summer.	4UT 2OTKGX /TIXKGYOTM Pricing Establishing a system for non-linear energy pricing that IGT OSVUYK NOMN ~TGTIO overconsumption. The additional revenue from this can be used to subsidise energy costs for lower energy users. Purchase Subsidies for Energy +€IOKTZ 6XUJ[IZY Providing subsidies to users ZU V[XINGYK KTKXM_ K€IO appliances. The subsidy can help bridge the cost gaps between high and low energy rated appliances prompting user choices towards the former.

Good Practices

'Schools4energy Initiative' | Italy

Nudge: Education for energy savings

)GYK U\KX\OK] :NK 9INUURY KTKXM_ OTOZOGZO\K [GY IXKGZKJ
within the 'Interreg Mediterranean PrioritEE' (Prioritise
KTKXM_ K€IOKTI_ VXUPKIZ OT ZNK 6XU\OTIK UL 6UZKT`G /ZGR_
:NK VXOSGX_ UHPKIZO\K]GY ZU KTNGTIK KTKXM_ K€IOKTI_
in public buildings by raising energy awareness in schools
and highlighting the achievements of students engaged
in promoting energy conservation. In the academic year
VXOSGX_ GTJ SOJJRK YINUURY UL 6UZKT`G
3[TOIOVGROZ_]KXK OT\UR\KJ OT YKZY UL GIZO\OZOKY ZU VXUSUZK
energy-conscious behaviour, following which the energy
consumption data by source was monitored and analysed.
' YOMTO~IGTZ JKIROTK OT KTKXM_ IUTY[SVZOUT GIXUYY GRR
schools was observed. The engagement highlighted the
considerable impact of educational programs in fostering
behavioural change.

Lei do Bem | Brazil

Nudge: Incentives for innovation

)GYK U\KX\OK] (XG`OR NGY ZGQKT YUSK OTOZOGZO\KY ZU
encourage the renewable energy sector. One such incentive
OY ZNK 2KO JU (KS -UUJ 2G] :NOY VXUMXGS VXU\OJKY ZG^
HKTK~ZY GTJ K^KSVZOUTY LUX IUSVGTOKY ZNGZ OT\KYZ OT 8 *
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.
(KTK~ZY OTIR[JK XKIU\KXOTM ZU UL 8* / K^VKTYKY
GTJ G XKJ[IZOUT OT ,KJKXGR +^IOYK ZG^ /T GJJOZOUT ZU ZG^
OTIKTZO\KY (XG`OR NGY KYZGHROYNKJ XKYKGXIN L[TJOTM VXUMXGSY
to support R&D in renewable energy, clean technologies, and
environmental conservation.

OPOWER, USA and Japan

Nudge: Comparison-based Consumption Reporting

)GYK U\KX\OK] /T G IUSVGT_ IGRR
the practice of sending Home Energy Reports of residential
power usage to it's consumers. When evaluated with a
YKXOKY UL VXUMXGSY OT\UR\OTM
ZNK :TOZKJ 9ZGZKY` OZ]GY LU[TJ ZNGZ
KTKXM_ IUTY[SVZOUT H_ :NOY VXU\K
OTZKX\KTZOUTY IGT OSVGIZ IUTY[SKX H
successfully. The results of the programme are comparable
ZU G ZKSVUXGX_ ZU OTIXKGYK OT
On average, users who received the reports experienced
YG\OTMY XGTMOTM LXUS RU]KYZ IU
NOMNKYZ IUTY[SVZOUT MXU[V IUS
MXU[V ZNGZ JOJ TUZ XKIKO\K ZNK XKVU
Japan's Ministry of Environment commissioned OPOWER
KTKXM_ K€IOKTZ IRU[J YKX\OIKY ZU YKT
8KVUXZY .+8Y ZU IUTY[SKXY :NK XKY[
ZNGZ ZNKXK]GY G JKIROTK OT G\KXGM
ZNK NU[YKY ZNGZ XKIKO\KJ .+8Y /Z OY
GINOK\KJ GRR U\KX ZNK IU[TZX_ IGT S
KW[O\GRKTZ ZU XKVRGIOTM SORROUT
KYZOSGZKJ IUYZ UL ZXORROUT 06?

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
'RR YZGQ		**Developing a Public Transport Policy** ' V[HROI ZXGTYVUXZ VUROI_'GT HK developed covering the following components: 1. Establishment of minimum service levels for public transportation. 3GTJGZOTM :XGTYOZ UXOKTZKJ JK\KRUVSKTZ :5* IUTIKVZY ZNGZ increase walkability, mixed-use, etc. +YZGHROYNOTM)GX LXKK UX 2U] +SOYYOUT `UTKY]OZN XKYZXOIZKJ GIIKYY ZU JVXO\GZK vehicles. In addition to improving the uptake of public transportation, these measures can help to improve life on the street and promote local businesses. +YZGHROYNSKTZ UL YZGTJGXJY LUX bus lanes, footpaths, cycle tracks etc, through statutory urban design guidelines to transition street space allocation away from cars. 3GTJGZOTM VKXOUJOI XU[ZK XGZOUTGROYGZOUT ZU OSVXU\K K€IOKTI_ reduce costs and increase user convenience. 6. Prioritising accessibility and ensuring that the diverse needs of user groups with varying disabilities are met. **Digitalisation of mobility services** Digitalisation and use of IOT, applications and data analytics can YOMTO~IGTZR_ OSVXU\K V[HROI ZXGTYVUXZ K€IOKTI_ [YKX IUSLUXZ GTJ GIIKYYOHOROZ_ thereby encouraging people to use public transportation.	**Financing public transport investments** 'RRUIGZK JKJOIGZKJ L[T 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.

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Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
Public sector including YIOKTZO~I community	Encouraging use of public transport by Government Employees 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.	Reform planning education Reform planning curricula to encourage VRGTTOTM LUX TKZ `KXU including concepts such as compact mixed-use development, transit orientation, public space development and integration of land use and public transportation	/T\KYZOTM OT •KKZ OSV Periodic investments in UTIK\KRUVSKTZ[Y •KKZ G YO`KY GXK XKW[OXKJ ZU and maintain ridership of public transportation. Regular investments can also help QKKV ZNK •KKZ [V ZU JG providing comfort for the users and reducing operational IUYZY ZNXU[MN L[KR K€ Investments in urban rails may also be considered wherever ridership is conducive for such large investments.
Private sector	Recognition of Companies Reducing Transport Emissions Tax rebates and other OTIKTZO\KY IGT HK 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 VUZKTZOGRR_ IXKGZK HKTK~ZY HUZN LUX ZNK employer and employees.	Develop share of private operators in public transport 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.	Gap funding for private investors Policies can be developed for supporting private investments in public transport through models such as viability gap funding, hybrid-annuity, etc. 'VVXUVXOGZK IUT\KXMK HKZ]KKT ~TGTIOGR considerations and planning outcomes such as higher densities around transit can be achieved through appropriate ~TGTIOGR YZX[IZ[XOTM projects.
			Larger and longer-term contracts to vendors Manufacturers of rolling stock H[YKY LKKJKX [TOZY K U}KXKJ RUTMKX ZKXS IU by to help increase supply, and reduce costs for purchasing by the state. Lower costs can YOMTO~IGTZR_ OSVXU\K of cities to maintain and renew V[HROI ZXGTYVUXZ •KKZ
			Incentivise Last Mile Service providers Financially incentivise individual last mile transportation solution operators like shared autorickshaws, feeder buses KZI ZNXU[MN OTOZOGR interest loans and other purchasing subsidies.

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Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
People	**Behavioural Change Campaigns** Campaigns targeting car users by communicating ZNK ~TGTIOGR GTJ ZOSK HKTK~ZY UL [YOTM V[HROI transportation. These campaigns can tap into the loss aversion mindset of the target audience to get them to switch (at RKGYZ VGXZOGRR_ ZU V[HROI transportation. **Campaigns for Periodic Reduction of Cars on Road** Successful campaign designs which call for intermittent closing of streets to cars (Car-free JG_Y GTJ K^VGTJOTM 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 GTJ GIIKYYOHRK ZU JO}KXKTZ age groups, especially children and youth.	**Easy multimodal access** Establishing systems for easier access to JO}KXKTZ SUJKY UL V[HROI ZXGTYVUXZGZOUT through 1. Single payment systems for all modes of transportation ,RK^OHRK INGXMOTM LUX ZXOVY HGYKJ UT travel time rather than on the number of stops or switches between modes of transportation. 6N_YOIGR JKYOMT OTZKX\KTZOUTY to ease last mile connectivity and IUTTKIZOUTY HKZ]KKT JO}KXKTZ SUJKY UL transportation.	**Congestion and Parking Charges** Charging car users for access ZU IKXZGOT `UTKY UL Z 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. **Subsidise Public Transport** 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. **Disincentivise Multiple Car Ownership** 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.

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
'XKG 2OIKTYOTM 9INKSK OT RKJ ZU G XKJ[IZOUT OT
IUTMKYZOUT IUSVROIGZOUTY GXUYK J[K ZU ZNK •GZ LKK GT]
manual collection of fees. To address these issues, the
+RKIZXUTOI 8UGJ 6XOIOTM Y_YZKS]GY OTZXUJ[IKJ OT
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
ZU OZY K€IOKTZR_ VRGTTKJ GTJ XGZOUTGROYKJ H[Y XG VOJ ZXGTYOZ
(8: Y_YZKS :NOY Y_YZKS VXOUXOZOYKY K€IOKTZ XU[ZKY GTJ
integration with other transportation modes resulting in
XKJ[IKJ IUTMKYZOUT GTJ OSVXU\KJ ZXG\KR K€IOKTI_ :NOY
also led to a shift in people’s behaviour to choose public transport, reducing their dependence on private vehicles.
,[XZNKXSUXK OT G]UXQ VXUMXGS]GY OTOZOGZKJ ZU
improve exclusive lanes by creating a ‘non-stop’ third lane with overtaking areas at intermediate station points. The
(UW[KOX§U '^OY OY G MUUJ K^GSVRK]NOIN OTJOIGZKY XKJ[IKJ
travel time.

TOD | Curitiba, Brazil

Nudge: Transit Oriented Development

)GYK U\KX\OK] *[XOTM ZNK Y)[XOZOHG LGIKJ ZNK
challenges of urbanisation and an increasing reliance on
VXO\GZK \KNOIRKY .U]K\KX ZNK IOZ_ YKO`KJ ZNK UVVUXZ[TOZ_ ZU
tackle these challenges by adopting an integrated approach to land use and transport planning, and adopted a Transit
5XOKTZKJ *K\KRUVSKTZ :5* YZXGZKM_]NOIN OT\UR\KJ
creating vibrant, mixed-use communities along major public transport corridors. The implementation of TOD had several positive outcomes for Curitiba, such as alleviating
ZXG€I IUTMKYZOUT OT ZNK JU]TZU]T GXKG I[XHOTM [XHGT
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
8GOR]G_)USVGT_ 08 +GYZ :NOY IGXJ
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
ZNK ~XYZ IOZOKY ZNGZ U}KX LGXK LXK
OT YVKIO~I IOZ_ `UTKY)KTZXGR 'XKG
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
XKIKO\KJ H_ IUSS[ZKXY 5\KX +[XUVK
have also implemented free public transportation to move towards environmental sustainability and social equity

06/

Nudging behavioural change- Waste Management

Key action area:
)XKGZOTM Y_YZKSY LUX K}KIZO\K YKMXKMGZOU

Stakeholder being impacted by the nudge strategy	Social Nudges	Regulatory Nudges	Financial Nudges
'RR YZGQ		**Provide 'industry status' to solid waste management** Obtaining an Industry status provides several advantages fo private actors, including easier access to loans with lower interest rates, the opportunity ZU GZZXGIZ YOMTO GY ~TGTIOTM VGX GHOROZ_ ZU XK~T obligations in the sector. 3UXKU\KX OZ LGIO UL OTZKXTGZOUTG into the industry.	
Public Sector including YIOKTZO~ community	**Strengthening leadership in waste management** Prioritisation of waste management, particularly segregation, by the topmost political and administrative levels within all levels of government NGY G ZXOIQRK	**Systems of data collection around waste** 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. Parallel systems could be established to collect disaggregated data on those involved in the waste collection ecosystem. This would allow LUX ZNK OJKTZO~IGZOUT UL \GXOU[Y vulnerable groups, including women involved in the process, so that targeted welfare policies can be devised for them.	**/TIKTZO\K ROTQKJ 16/Y LUX in the segregation of waste** 'IIU[TZGHOROZ_ GTJ XK]GXJ should be set for those directly involved with day-to-day operations related to waste, like sanitary inspectors. :NK_ YNU[RJ HK ~TGTIOGRR_ for improving waste segregation standards and measurable impact. This IU[RJ HK H[ORZ OTZU ZNK YZ VKXLUXSGTIK OTJOIGZUXY

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Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
Private sector	Forging partnerships and collaborations for segregation +}KIZO\K]GYZK 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 RGTJ~RR]GYZK GTJ G SUXK sustainable approach to waste management overall.	Making segregation mandatory for waste-collection contractors 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 IUTZXGIZY ZU KTY[XK KLLKIZO\K segregation.	Incentivising start-ups and new enterprises -O\KT ZNK RGZKTZ ~TGTIOGR 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.
Private sector	Developing human capital Investing in upskilling waste management YZG} IGT KTNGTIK ZNKOX capabilities for waste management. This will give them necessary skills to implement and manage techniques like vermiculture, composting, and biogas projects, RKGJOTM ZU SUXK K€IOKTZ waste diversion and resource recovery. 6XU\OJOTM YUIOGR HKTK~ZY and required upskilling can further improve the K€IOKTI_ UL]UXQKXY (including informal sector]UXQKXY GTJ KTY[XK fairness and justice.	Policies for supporting the informal waste management economy 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.	Guarantees on buybacks of processed waste New private sector enterprises in waste management can be given buy-back guarantees by the state for purchasing VXUIKYYKJ]GYZK GZ ~^KJ VX]ORR OTIXKGYK ZNK SGXQKZ increase investments in this sector and help ensure the initial viability of the industries. The guarantees can be for GT OTOZOGR ~^KJ VKXOUJ L up of the enterprise.

Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
People	**Positive Reinforcement of segregation practices** (_ [YOTM OT•[KTZOGR personalities or authority ~M[XKY GY XURK spokespersons, social norm ZKINTOW[KY IGT OT•[KTIK OTJO\OJ[GR 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.	**Mandating no collection of unsegregated solid waste** By mandating households to segregate their waste into recyclables, organic matter, and non-recyclable waste, the policy will improve ZNK K€IGI_ UL YUXIK segregation. Mandates against the collection of unsegregated waste will help ensure compliance.	**Monetary compensation for segregated waste** Resident welfare associations (or other LUXSY UL TKOMNHU[XNUUJ G 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 YKX\OIKY U}KXKJ H_ ZNK 8=' costs associated with procurement of separate waste bins, educational campaigns, or training programs etc.
	Creating E-waste inventories with buy-back standardisation Buy-back programs involve U}KXOTM OTIKTZO\KY ZU 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 GIXUYY JO}KXKTZ RUIGZOUTY or organisations, creating a streamlined process for both consumers and waste management entities.		

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 RUIGR HUJ_ 8KYOJKTZ =KRLGXK 'YYUIOGZOUTY students and faculty, as well as imminent 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 OT KOMNZ JO}KXKTZ YZXKGSY]OZN outcomes included the complete collection of segregated household waste, market creation for improving recycling K€IOKTI_ SOTOSGR]GYZK XKGINOTM Z active engagement of woman volunteers, ragpickers, and self-help groups.

Sahbhagita Scheme | Municipal Corporation of Delhi, India

Nudge: Monetary compensation for segregated waste

)GYK U\KX\OK] :TJKX ZNK YINKSK OL G VXUVKXZ_ ZG^ IUSVROGTIK ZNKT be utilised as a capped incentive for development work. 'JJOZOUTGR IGT HK G\GORKJ GY GT 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 U\KXYKKT H_ ZNK 9GNHNGMOZG IKRR G 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
'RR YZGQ		'SKTJOTM *K\KRUVSKTZ)UTZXUR UTY The DCR or equivalent land-related regulations should HK SUJO~KJ ZU OTIUXVUXGZK RU Z[XKY J[GR]GZKX Y_YZKSY HR[K MXK_ J K^O constructions. Minimum standards for water saving at the household level, practices such as reusing grey water in landscaping and other purposes should be OTIR[JKJ 'JUVZOUT UL MXKKT H XSY I SG^OSOYK]GZKX K€IOKTI_	
Public sector including YIOKTZO~ community		Minimising Non-Revenue Water 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 YG\OTMY IGT GRYU KTNGTIK ZNK utilities, promote water conservation practices, and safeguard water availability, especially in scarce areas. Compulsory Water Metering Currently, water charges are primarily calculated UT VRUZ YO`K GTJ]GZKX SKZKXY IGT NKRV [TJKX consumption and savings. Coupled with volumetric ZGXO}Y ZNOY IGT HK G JKZKXXKTZ ZU]GYZKL[R [Y and enhance the water revenue at local government levels. 3GTJGZK]GZKX YG\OTM ~^Z[XK IUSVROGTIK OT GI Mandating that all public infrastructure projects, OTIR[JOTM NU[YOTM HK H[ORZ]OZN]GZKX YG\OT and comply with minimum green building standards. :NKYK SGTJGZKY]ORR NG\K ZU XK•KIZ OT ZNK JKY tenders and budgetary allocations of any new project undertaken by the government.	Non-Linear /TIXKGYOTM (RU Price 'JUVZ ZGXO} systems where, ZNK ZGXOL OTIXK telescopically LUX JO}KXXKTZ consumption blocks, thereby acting as a deterrent for overconsumption. This also helps increase revenue collection.

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Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
Private sector	*GZGHGYK UL]GZKX K€IOKTZ products Showcasing brands manufacturing]GZKX K€IOKTZ ~^Z[XKY UTK G public database which allows for comparison between JO}KXKTZ VXUJ[IZY be linked to a marketplace for purchasing these products. This IGT YOMTO~IGTZR_ XKJ[IK OTYZGTIKY of greenwashing and would XK]GXJ]GZKX K€IOKTZ VXUJ[IZ manufacturers.	Create a Star Rating System Having a star rating system/ equivalent labelling schemes for water appliances/ ~^Z[XKY YOSORGX ZU KRKIZXOIOZ_ GVVROGTIKY help users in making sustainable choices. 9[IN ~^Z[XKY IGT YG\K]GZKX GTJ KTKXM_ due to the overall reduction in pumping, ZXGTYVUXZGZOUT GTJ V[XO~IGZOUT /TIXKGYK SGT[LGIZ[XOTM UL =GZKX +€IOKTZ ,O^Z[XKY GTJ 'VVROGTIKY 3GTJGZKY LUX SGT[LGIZ[XOTM RU]_~U] ~^Z[XKY GTJ GVVROGTIKY GTJ OTIUXVUXGZOTM YG\OTM SUJO~IGZOUTY ZU K^OYZOTM VXUJ[IZY wherever feasible can create a larger enabling environment for consumers. +€IOKTI_ *OYIRUY[XK OT 'J\KXZOYOTM GTJ Marketing of Star-rated Products Mandates to disclose water savings/loss on all marketing and advertising content released H_ HXGTJY LUX]GZKX ~^Z[XKY GTJ GVVROGTIKY This can not only help boost conservation behaviours but also create competition between brands and increase the choices for V[XINGYOTM]GZKX K€IOKTZ VXUJ[IZY Mandatory water saving and reuse features Mandatory dual piping, grey water treatment and recycling features to be mandated for all new developments	Subsidising]GZKX K€IOKTZ equipment manufacturing Providing incentives and subsidies to incentivise manufacturers to gradually transition their product lines towards water K€IOKTI_. :NKYK incentives can initially be targeted at smaller manufacturers and can be accompanied by technical support required to make these transitions.
People	Behavioural Change Campaigns 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 ,'7Y GTJ XNU] ZUY M[OJK also be a strong nudge towards enabling conservation behaviour. Real-time neighbourhood-level dashboards 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 OT HORROTM]GZKX [YK SGVVOTM platforms/ daily water dashboards IGT HK K}KIZO\K ZUURY	8[RKY LUX 6XK\KTZOTM ZNK +^IKYYO\K ;YK UL Water During Emergencies 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 SUYZ K€IOKTZ [YK UL G\GORGHRK]GZKX help reduce inequity while ensuring fairness in access for poor and marginalised groups in cities.	Purchase Subsidies LUX =GZKX +€IOKTZ Products (_ U}KXOTM Y[HYO governments can make water saving VXUJ[IZY GTJ ~^Z[XKY GLLUXJGHRK and accessible to consumers. Consumer demand will further enhance the supply through manufacturing.

Good Practices

=GZKX +€IOKTI_ 2GHKRROTM 9_YZKS| Singapore

Nudge: Star Rating for Appliances

Case overview: The Singapore government has actively promoted water conservation by encouraging the use UL]GZKX K€IOKTZ GVVROGTIKY GTJ ~ZZOTMY .NOY OTIR[JKY OSVRKSKTZOTM SG^OS[S •U] XGZKY LUX ZGVY GTJ SO^KXY GY]KRR GY SG^OS[S •[YNOTM IGVGIOZOKY .NK =GZKX +€IOKTI_ 2GHKRROTM 9INKSK IGRRKJ LUX ZNK [YK UL]GZKX K€IOKTZ RGHKRY LUX \GXOU[Y ~^Z[XKY GTJ GVVROGTIKY IUSSUTR_ [YKJ GZ the household level. This labelling scheme helps consumers make informed choices and encourages suppliers to OTZXUJ[IK SUXK]GZKX K€IOKTZ UVZOUTY ZU ZNK SGXQKZ

Reduced NRW | Manila

Nudge: Minimising Non-Revenue Water

Case overview: Manila Water has successfully managed ZU XKJ[IK ZNK RK\KR UL 4UT XK\KT[K]G represents the water lost due to leaks or illegal connections that is not accounted for in billing. The World Bank sets G YZGTJGXJ UL UX RU]KX LUX 48=]N SGOTZGOTKJ GT G\KXGMK 48= UL P[YZ]NOIN]GY GSUTM ZNK RU]KYZ GSUTM 'Y 9OTIK 3GTORG =GZKX NGY HKKT LU non-revenue water loss through measures such as TKZ]UXQ XKIUT~M[XGZOUT SKGY[XOTM 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	**Creating an ecosystem for Green Entrepreneurs** Creating a platform for green entrepreneurs to interact and learn from each other, with technical a assistance for establishing or transitioning to green businesses The platform will also need to be gender-responsive to address the specific chall women entrepreneurs.		
Public Sector including scientific community		**Priority for green entrepreneurs in government procurement** 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.	**R&D on green technologies** 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.
Private Sector	**Green Entrepreneurs Resource Centers** 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.	**Business-in-a-Box model** Formulating business-in-a-box models that can have standard business plans 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	**Priority funding for green enterprises** 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.

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Stakeholder	Social Nudges	Regulatory Nudges	Financial Nudges
Private Sector	**Green rating system for MSMEs** 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 IGT NKRV HUUYZ ZNK YXUROKL best-performing enterprises and increase competition in green transitioning.	**Mandates, for green transitioning** The government could mandate gradual green transitioning of enterprises. Such mandates should be applied in a phased manner on medium and small enterprises, MO\OTM ZNKS Y[€IOKTZ ZOSK ZU transition. This transition could also be aided by providing funding ZNXU[MN `KXU OTZKXKYZ RUGTY to enterprises and the drafting of Standard Operating Procedures that would simplify the process. **Green minimums for new enterprises** 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.	**Subsidising purchase of green machinery** Establishing a subsidy or rebate scheme to U}YKZ IUYZ JO}KXKTZ between conventional and green equipment might encourage more entrepreneurs to opt for the purchase of the latter. UX MXGTZY
People	**Development of an online marketplace for green products** 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. **Increasing awareness on the potential and future of green businesses** Youth enrolled in various education (high school/ [TO\KXYOZ_ UX \UIGZOUTGR ZXGOTOTM 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.	**Green Education** 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.	**Rebates on purchase of green products** 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. **Scholarships for Green Education** 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.

09/

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 ZU SKGY[XK ZNK K}KIZO\KTKYY UL KT\OXUTSKTZGR OTOZOGZO\KY 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 RebuildEstablish monitoring SKINGTOYSY ZU GYYKYY ZNK K}KIZO\KTKYY UL OTOZOGZO\KY 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 levelsSeveral eco-centric nudges hinge on whether people are skilled and understand the implications of climate action. Investing in education and training programs for VUROI_SGQKXY MU\KXTSKTZ U€IOGRY GTJ VXULKYYOUTGRY working in relevant sectors can enhance their understanding of environmental issues and their ability ZU JK\KRUV GTJ OSVRKSKTZ K}KIZO\K VUROIOKY

* 3GZINOTM L[TJY]OZN VUROI_ IUSSOZ By matching funds with decisions, governments can demonstrate their commitment to action by matching resources to Y[VVUXZ K}UXZY H_ \GXOU[Y YZGQKN a powerful incentive for stakeholders, including the private sector, to engage in environmentally responsible behaviours and projects.

E. /TIKTZO\OYOTM GTJ Y[HYOJOYOTM SG IUTY[SKXY LUX VUYOZO\K GIZOUT 5}KXOTM ~TGTIOGR 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. .GXTKYYOTM ZNK VU]KX UL]USKT GTJ 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. /T\KYZOTM OT GT KTGHROTM KT\OXUT INGTMK YZGXZ[VY Governments should foster a vibrant start-up ecosystem and support the growth of enterprises in the environmental sector. This can be GINOK\KJ H_ VXU\OJOTM ~TGTIOGR O programs, and regulatory support. Encouraging innovation and entrepreneurship in this sector can lead to ground breaking solutions and disruptive technologies that address environmental challenges.

/ /TYZOZ[ZOUTGROYK VXU VRGTKZ Y_YZKSOI IN'[GXKTYK YYKPZ J[IGZOUT government departments: Governments should KSHKJ Y[YZGOTGHOROZ_ VXOTIOVRKY 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.

8. 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, GTJ IOZO`KT IUSS[TOZ_ IKTZXKY ZU L 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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5JKN 2 + ' IUSVGXGZO\K GTGR_YOY UL MRUHGR TUXZN GTJ MRU
*K\KRUVSKTZ OT 'LXOIG <UR[SK 4U

5+)* T J =GZKX GTJ GMXOI[RZ[XK 5KIJ UXM NZZVY]]] UKIJ UXM G

5TUJ[MU < ' +`KGJOINOK 4 . ,[Z[XK 6RGTTOTM UL -RUHGR 9U
-XU]ZN OT 6KXYVKIZO\K 9[YZGOTGHOROZ_ OT ;XHGT 6RGTTOTM GTJ *KYOM

5YSGT +RGYNG (=USKT /T :NK 9NGJU] UL)ROSGZK)NGTMK ;TO
article/womenin-shadow-climate-change

6GXOY 'MXKKSKTZ ZU ZNK ;TOZKJ 4GZOUTY ,XGSK]UXQ)UT\KTZOUT UT)
process-and-meetings/the-paris-agreement

6ºXZTKX . 5 8UHKXZY *) :OMTUX 3 6URUI`GTYQG + 9 3OTZKTH
9 3ºRRKX < 5QKS ' 8GSG ( )ROSGZK)NGTMK /SVGIZY 'J
UL =UXQOTM -XU[V // ZU ZNK 9O^ZN 'YYKYYSKTZ 8KVUXZ UL ZNK /TZKXMU\K
UXM

61. 6XUMXGSSK ; 4 + +TGHROTM 9[YZGOTGHRK 2OLKYZ_RKY OT G)
policy-and-strategy/enabling-sustainable-lifestyles-climate-emergency

8GO 1 1 3G_ :GYQLUXIK 3KKZOTM A6KXYUTGR IUSS[TOIGZOUTC

8KT+TKXM_ 0[R_ =NGZ OY ZNK *U[MNT[Z +IUTUS_ GTJ NU] JUKY
renenergy.co.uk/insight/what-is-the-doughnut-economy-and-how-does-it-apply-to-climate-change/

9GJN[QNGT ('VXOR :GYQLUXIK 3KKZOTM A6KXYUTGR IUSS[TO

9NXKKYZNG (:O]GXO 9 8 (GPXGINGX_G 9 (1KOZYIN 3 3 8OPG
6KXYVKIZO\K OT .U[YKNURJ +TKXM_ 9G\OTM (KNG\OUX GTJ +TKXM_ :XGTYO
NZZVY JUO UXM +4

66. 9NXKKYZNG (:O]GXO 9 8 (GPXGINGX_G 9 (1KOZYIN 3 3 8OPG
6KXYVKIZO\K OT .U[YKNURJ +TKXM_ 9G\OTM (KNG\OUX GTJ +TKXM_ :XGTYO
NZZVY JUO UXM +4

67. 9N[QRG 6 8 9QKG 0 9RGJK 8 1NU[XJGPOK ' 'R *OKSKT 8 \GT 3
8 (KRQGIKSO 3 .GYOPG ' 2OYHUG - 2[` 0 3GRRK_ 0)ROS
)UTZXOH[ZOUT UL =UXQOTM -XU[V /// ZU ZNK 9O^ZN 'YYKYYSKTZ 8KVUXZ UL
JUO UXM

9ZGGZY . 6XU KT\OXUTSKTZGR 'ZZOZ[JKY GTJ (KNG\OUXGR)NGT
:NXKK <UR[SK 9KZ V NZZVY JUO UXM (

9[3 'RR .U] ZU [TRUIQ V[HROI ZXGTYVUXZ LUX IROSGZK GTJ Y[Z
9[YZGOTGHRK 3UHOROZ_ LUX 'RR 9[3 'RR /TOZOGZO\K NZZVY]]] Y[S GR
IROSGZKEGTJEY[YZGOTGHRKEJK\KRUVSKTZ YO^EGXKGYELUXEGIZOUT VJL

:NGRKX 8 . 9[TYZKOT) 8 4[JMK /SVXU\OTM *KIOYOUTY GHU

71. :NK =UXRJ (GTQ G 9KVZKSHKX -RUHGR =GYZK ZU -XU] H_ 6KX
World Bank Report. World Bank.

NZZVY]]]]UXRJHGTQ UXM KT TK]Y VXKYY XKRKGYK MRUHGR
unless-urgent-action-is-taken-world-bank-report

:NK =UXRJ (GTQ H 9KVZKSHKX =NGZ G =GYZK 'T ;VJGZKJ 2UUQ
World Bank.
NZZVY]]]]UXRJHGTQ UXM KT TK]Y OSSKXYO\K YZUX_]NGZ G]
ture-of-solid-waste-management
:NK =UXRJ (GTQ T J G 9SGRR GTJ 3KJO[S +TZKXVXOYKY 93+Y ,OTG
]]]]UXRJHGTQ UXM KT ZUVOI YSK~TGTIK
76. :NK =UXRJ (GTQ T J H :XKTJYOT 9UROJ =GYZK 3GTGMKSKTZ :NK =UX
]NGZ G]GYZK ZXKTJYEOTEYUROJE]GYZKESGTGMKSKTZ NZSR
77. :OGT . 2O[> 6XU +T\OXUTSKTZGR (KNG\OUX 8KYKGXIN :NKUX
0U[XTGR UL +T\OXUTSKTZGR 8KYKGXIN GTJ 6[HROI .KGRZN NZZV
:XUZZG *)OZOKY IG[YK IROSGZK INGTMK .U] IGT ZNK_ NKRV YUR
]KLUX[S UXM GMKTJG IOZOKY JXO\OTM IROSGZK INGTMK H[Z VGXZ UL
:X[IUYZ 6 2) 4GZ[XGR)GVOZGR 'Z 8OYQ :NK :UV +^ZKXTGRO
resources/ecosystem-services.
:_RKX : 8 2OTJ + ' 6XUIKJ[XGR 0[YZOIK .GTJHUUQ UL 0[YZOI
UXM E
;4+9)5 :NK ;TOZKJ 4GZOUTY =UXRJ =GZKX *K\KRUVSKTZ 8KVUXZ
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#.USK KTKXM_
;TOZKJ 4GZOUTY T J H 8KYOROKTIK GTJ 8KH[ORJOTM 393+Y LUX Y[Y
HKZZKX GTJ YZXUTMKX LXUS ZNK OSVGIZY UL ZNK)5</* VGTJKSOI IROS
[T UXM KT UHYKX\GTIKY SOIXU YSGRR SKJO[S H[YOTKYYKY JG_ d ZK^Z#39
=GTM +XRGTJYYUT 2 :UHOGT ' \GT JKX +TZ 8 0 ,KZ`KX / ZK =OK
. 9OTMN) -XK\K 6 -KXZKT * 1K_Y 6 = -RKKYUT :)UXTKRR 9 +
VRGTKZGX_ HU[TJGX_ LUX MXKKT]GZKX 4GZ[XK 8K\OK]Y +GXZN GTJ +T\OX
9
=ORROGSY 0 ,KHX[GX_ =NOIN IU[TZXOKY GXK]OZNOT ZNK JU[
XKVUXZ]NOIN IU[TZXOKY GXK]OZNOT ZNK JU[MNT[Z
=UXRJ :XGJK 5XMGTO`GZOUT T J 93'22 (;9/4+99 '4*)2/3':+).'4-+ NZZV
SYSKYEK KXYJEXKYKGXINETUZK EYSGRREH[YOTKYYEGTJEIROSGZKEINGTMK
@UJGVK . 6GZOR 6 ; 8GT\KKX ' 9[YZGOTGHRK /TJ[YZXOGR
'VVROKJ 9IOKTIK +TMOTKKXOTM :KINTURUM_ >//