



**FACTOR4**  
DO MORE. WITH LESS.

**REALIGNING OUR  
FOCUS TOWARDS  
ACCELERATING  
SUSTAINABILITY**



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## FOREWORD

Nearly everyone who has thought about sustainability would have, at some stage, encountered the Keeling curve, which measures atmospheric carbon dioxide in parts-per-million-by-volume (ppmv). When we first encountered it, the number was at 350 or so. Now, it has progressed steadily year on year to cross 450. And it would seem, to an alien viewer, that in all the time we have been watching this curve, there is very little that we have done to deter its onward march.

This has been the tragedy of the human response to the growing frailty of the planet. The challenges we face in creating and maintaining a live-able environment for ourselves and for future generations were largely known in the early 1990s. Indeed, to our shame, it could even be said that many of the solutions to the challenges - lesser consumption, more recycling, improvements in materials science, telecommuting, and many others - have also been known for 20+ years. It seems we have progressed in time without being able to progress our capacity to steward the planet responsibly.

That's not to say that there have been no advances. Innovations in every aspect of living are popping up all around us, and the pipeline for these appears very long. In many fields like energy conservation, waste recycling, traffic management, there are constant efforts ongoing to improve life in the cities. And across the world, there are thought leaders, entrepreneurs, architects and urban designers and public officials who can point to successful interventions they have been part of.

What's missing? Speed.

We are surrounded by good ideas that are taking hold slowly. Rain water harvesting in cities - even those that face water deficits - is painfully slow. Switching to energy-efficient devices is similarly gradual. Only a very small portion of urban waste is properly collected and recycled. And tons of goods are wasted because of gaps in supply chains and logistics. In these, and other areas affecting sustainability, the problem is not that we don't know the solutions, but instead we find that the adoption of what is already known is far from what it should be.

If we can bring speed to the learning, adoption and celebration of sustainable living, we would be doing the planet, and our species, a great favour. The question is 'how'? What can we do to bring about a dedicated focus on accelerating sustainability? What will bring "warp speed to zero energy", and dramatically increase the number of people choosing to live and work sustainably?

At Factor4, we will ask these questions, initially with a focus on the 'urban' setting. We are witnessing an unprecedented urbanisation of human life on the planet, and increasingly in the future, cities will be an arena from which large impacts on sustainability will emanate. There is also considerable emerging thought that cities are where we will also find the solutions to the challenges we face. Therefore, we will begin with this focus, while remaining aware that there is much else beyond urban living that must also be addressed for the goals of sustainability to be met.

*-Ashwin Mahesh*



**01**

# **Introduction**

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As we move towards an increasingly urbanizing world, a lot many voices have discussed climate change and its impact. The continued degradation of the urban environment has been caused by a multitude of drivers, including prevailing economic models and patterns of consumption and production and weaknesses in governance. These governance models and their accompanying institutional arrangements have also, in many cases, exacerbated the problem by precluding the prioritisation of sustainable development objectives. Climate change has also brought to the fore other glaring disparities such as inequality, repression of indigenous cultures and extreme corporate strongholds. It is clear that despite those who want to believe that climate change is a fallacy, in order to make our cities more livable, right now we need to make them more sustainable. If that is the aspiration, the question is what are the barriers to achieving this?

What do we need to change to deliver sustainability in an accelerated manner?

## What will this document do towards this urgent need?

This document by Factor 4 Foundation is a roadmap to accelerating sustainability through a canvas of interventions. Factor 4 will take a leadership position with the implementation of this canvas. More importantly, this canvas of interventions not only forms the blueprint of action for the foundation but also defines the foundation and its vision.

We are clearly at a stage where small and scattered efforts are not enough to add up and to invert the externalization of costs incurred by the planet from the current business as usual scenario. It is therefore imperative to consolidate all these independent initiatives and ideas in order to achieve significant change.

At Factor 4, we believe it is time to think radically about accelerating sustainability not by any small piecemeal measures, but by strengthening the democratic processes and re-organising sectors of the economy. We can and MUST work towards an environment that fosters new business models, a pipeline of innovations, new jobs and interventions with



multiple benefits that cut across multiple sectors. This forms the central premise of the proposed canvas of interventions and will be discussed under the following broad thrust areas-

- A. Advocacy and information dissemination**
- B. Proving by Doing**
- C. A Pipeline of Innovations**
- D. Businesses of the future**
- E. Governance for a Livable Future**

The most significant outcome that could be achieved through these interventions is for them to show enough promise for them to become an integral part of political manifestos in the future. For this it is important to work with the idea of the competitive city- one that competes for economic prowess and thereby open up opportunities to steer the economy towards a culture of eco-consumerism.

This document will further demonstrate the applicability of this canvas by outlining a set of goals and providing strategies to achieve these through the canvas across the following sectors-

- Energy
- Water
- Waste
- Food
- Mobility
- Built Form and Open Spaces
- 

The geographic scales at which the canvas of interventions will operate start at the neighbourhood level and move on to the level of the city, city regions and eventually the state. In addition, the role of Factor 4 Foundation with regard to each of these interventions will be outlined in Chapter 3.



**02**

# **Roadmap to Accelerating Sustainability**

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This chapter outlines the roadmap for accelerating sustainable development in four sections-

- Constraints to Accelerating Sustainable Development

*This section outlines the constraints to accelerating sustainable development under the following heads-*

- Constraints from a lack of public awareness/ mind set
- Institutional and organizational constraints
- Human Resources/ skills shortage constraints
- Technical and operational constraints
- Financial constraints
- Policy & legislation constraints

- Identifying Change Agents

*This section identifies three distinct categories of change agents who will play a key role in implementing the canvas of interventions - producers, consumers and regulators & policy makers.*

- The Canvas of Interventions

*This section outlines the canvas of interventions that will define the vision for Factor 4 Foundation. The canvases will be detailed out in terms of its objectives along with a sample set of action items that will fall under this canvas and the incentives for these actions.*

- Measuring the Efficacy of the Canvas of Interventions

*This section identifies a set of sustainable development goals as a benchmark for measuring and evaluating the efficacy of the canvas of interventions towards the acceleration of sustainable development.*

## 2.1 Constraints to Accelerating Sustainable Development

Prior to discussing the canvas of interventions, it is important to acknowledge and understand the constraints that exist in the current framework that hinder our path towards a sustainable future. The constraints are universal across all the sectors discussed in this document and have been broadly categorized and summed up as follows:

### **Constraints from a lack of public awareness/ mind set**

For sustainable development to be accepted as an indispensable concept, the people should first be informed about the merits of such an approach. Without accessible data or information, it is impossible to expect the consumer to make an informed choice. As a result, current choices are based largely on short-term financial gains with no outlook on the longer term impacts on the environment.

### **Institutional and organizational constraints**

Limitations in the powers, roles and responsibilities of our public institutions/ organizations/ agencies have been a serious setback at all levels. All this coupled with the immense pressures of an increasing population and a failure to satisfy the demands that come with it across all sectors have made it difficult for these entities to even achieve a desirable level of efficiency in their day-to-day functions, leave alone look ahead into their future impacts and potentials. Moreover, the fact that the current institutional model vests all the three key governance functions— policy-making, service provision, and regulation—in the hands of state-owned agencies has also led to a lack of accountability.

### **Human Resources/ skills shortage constraints**

In addition to the limitations in the organizational capacity, the lack of adequate man-power, particularly skilled man-power, further hinders the efficiency and upgrading of these systems. Any new strategy for sustainable urban development will be keenly dependent on the people who staff various positions in implementing it. Throughout urban India, and particularly in smaller towns and cities there are countless jobs lying vacant or wrongly staffed because the right people to perform them are simply not available in government.

### **Technical and operational constraints**

In all the sectors, a lacuna exists in the quality of technical and operational systems in that they are seldom updated to match the demands of a growing urban population. The technologies in place in most sectors are either poor matches or are simply outdated. Moreover, without public awareness and the support of policy and legislation measures, these systems have the added pressure to counter the damages as well.



### Financial constraints

It must be accepted that financial constraints further undermine the impacts of all the above constraints. There is a constant restraint on the budgetary allocation towards the services in each of these sectors and there has been very little time and resource spent in identifying other means of making these sectoral operations self-sustaining. Constantly relying on loans and subsidies and other government allocated funding has left these departments impaired for most purposes. There is also a dire need to address the view that the financial status of Urban Local Bodies (ULBs) is precarious and is therefore very high-risk as this prevents participation from the private sector as well.

### Policy & legislation constraints

It is ironic that despite being one of the strongest tools available to effect change in this country, the policy and legislation front has been far from progressive particularly in dictating a shift towards a sustainable path. Even in rare instances when a strong measure has been approved, such as the banning of bore-wells in Delhi in the early 2000s, this ban was recently lifted 'with a few exceptions'. Indeed, the strong arm of the law has seldom managed to show its prowess without the political will to back it.

## 2.2 Identifying Change Agents

Overcoming these constraints at a crucial juncture when the livability of our cities is tied to the speed at which we can accelerate sustainable development is certainly a challenge to our ingenuity and a litmus test for our civilization. This will not be achievable without concerted actions on the part of '**change agents**' across all levels. Change agents include but are not limited to-

- Individuals

- Citizen groups, Resident Welfare Associations, Community action groups

- Businesses and Industry confederations

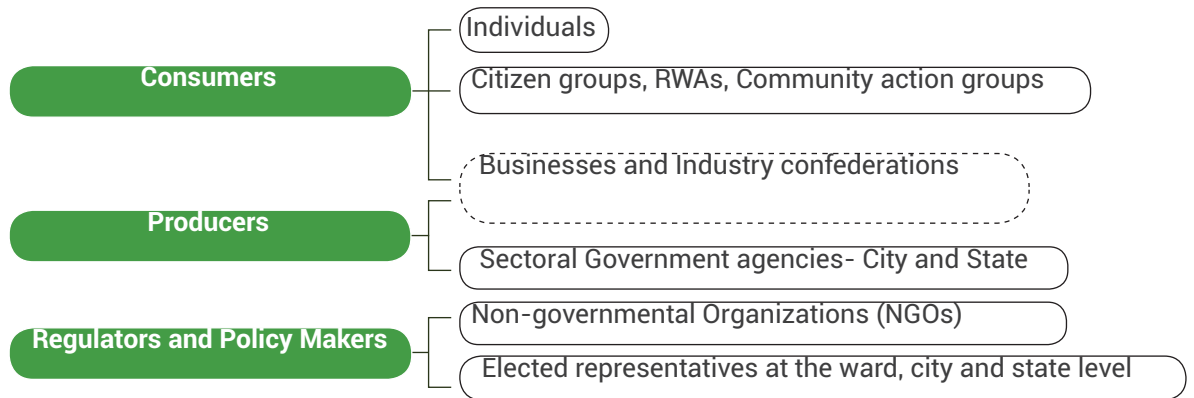
- Non-governmental Organizations (NGOs)

- Sectoral Government agencies- City and State

- Elected representatives at the ward, city and state level

The above listed change agents have been grouped into three categories based on their roles in the sustainable development matrix. These categories are, **producer, consumer and regulators & policy makers** as shown in the diagram.

It is important to note that Factor 4 Foundation will find its role at the intersection of all these change agents along an accelerated path to sustainable development.



## 2.3 The Canvas of Interventions

Given the various constraints, the canvas of proposed interventions to set our cities in accelerated motion towards a sustainable future are-

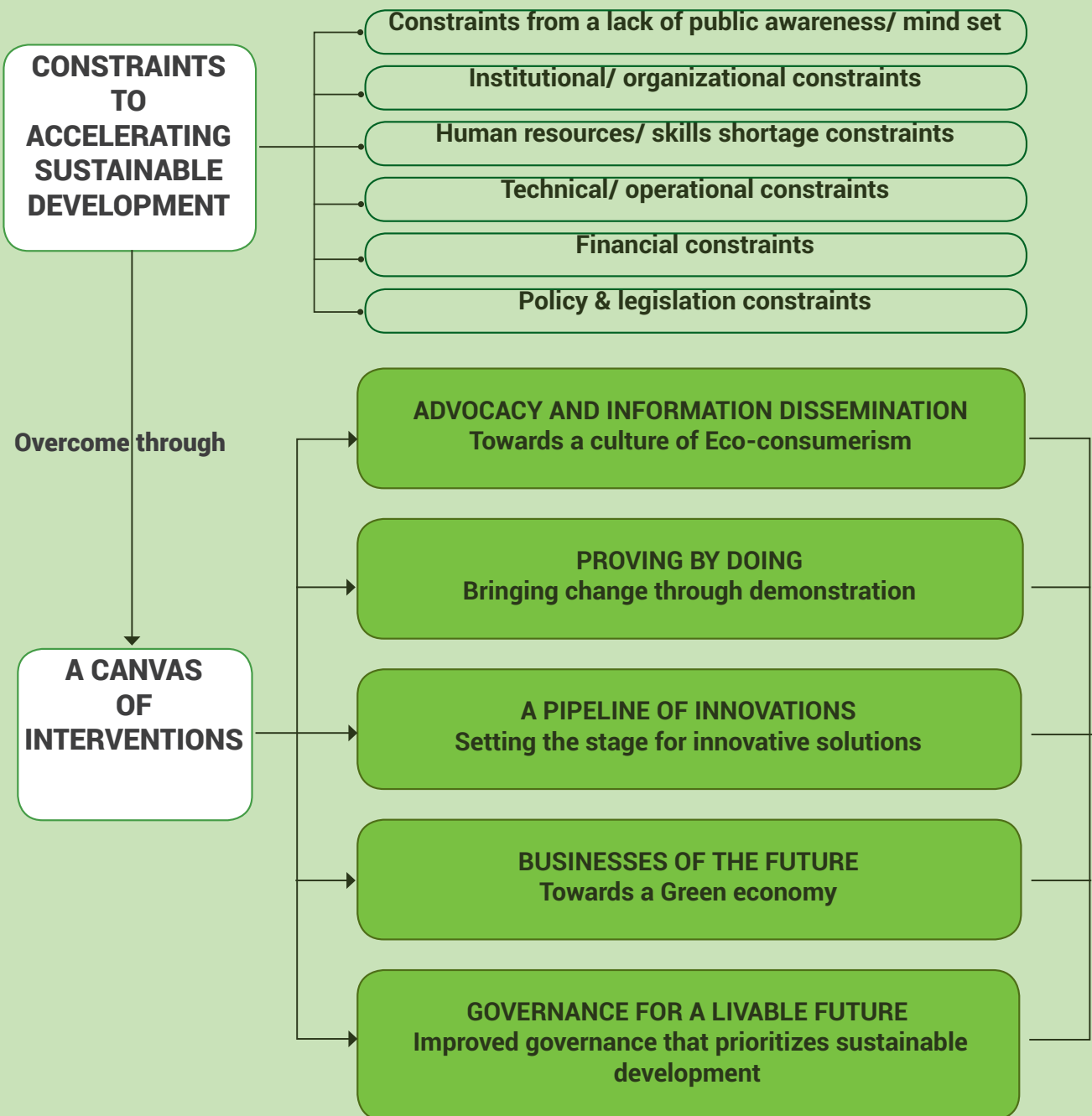
<b>CANVAS 01</b>	<b>ADVOCACY AND INFORMATION DISSEMINATION</b> Towards a culture of Eco-consumerism
<b>CANVAS 02</b>	<b>PROVING BY DOING</b> Bringing change through demonstration
<b>CANVAS 03</b>	<b>A PIPELINE OF INNOVATIONS</b> Setting the stage for innovative solutions
<b>CANVAS 04</b>	<b>BUSINESSES OF THE FUTURE</b> Towards a Green economy
<b>CANVAS 05</b>	<b>GOVERNANCE FOR A LIVABLE FUTURE</b> Improved governance that prioritizes sustainable development

Each canvas is detailed in terms of-

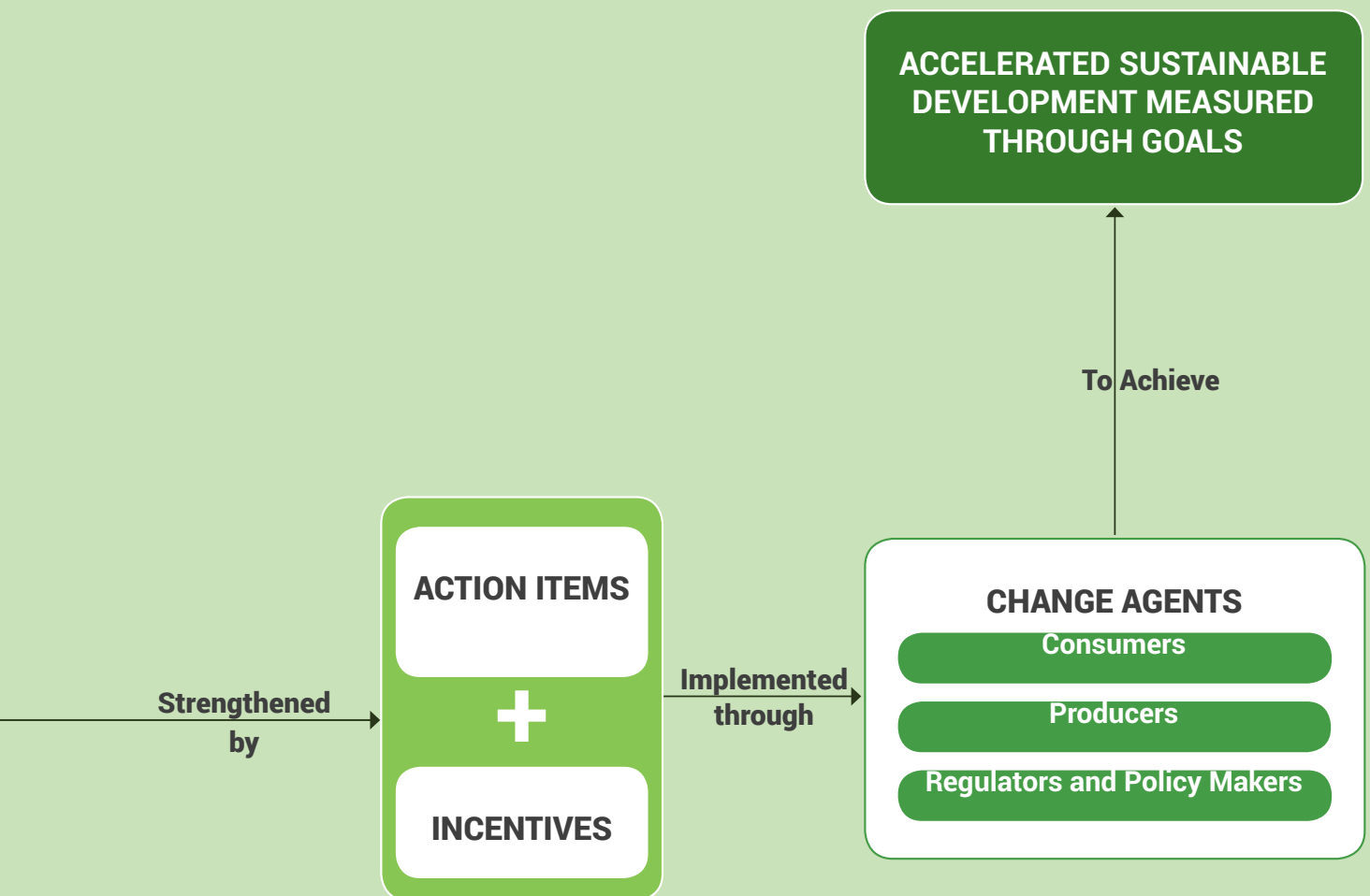
**Objectives-** These define and detail out the functions of each canvas

**A few sample action items** - These demonstrate the possibilities under each canvas coupled with incentives for these actions

This canvas of interventions is designed to be facilitated by Factor 4 Foundation and implemented by the three categories of change agents. Doing so will accelerate sustainable development as measured by a set of sustainable development goals identified for each sector.



## FACTOR 4 FOUNDATION'S ROADMAP FOR ACCELERATING SUSTAINABLE DEVELOPMENT



### 2.3.1 CANVAS 01- ADVOCACY AND INFORMATION DISSEMINATION

Dissemination of best practices and the transfer of knowledge can be very powerful tools in the effort to scale up and accelerate the delivery of sustainable development among all levels of change agents. On the individual end, it can engender a culture of eco-consumerism. Consumers know and make informed choices with regard to products and services they avail. With information, citizen action groups can take cognizance of the combined impact of their area of influence on the environment and make amends





either on their own or seek support from government agencies to do so. Businesses and Industry confederations will be able to take responsibility and collective action to regulate their own practices. Government agencies across all sectors- energy, waste, water, food, mobility and built form and open spaces- will be able to assess and control demand for these resources in a more efficient manner. And elected representatives at the ward, city and state level will be able to take decisions with regard to laws, policies and financial allocations that are more rooted to on-ground realities.



## OBJECTIVES:

Towards this purpose, the canvas of 'Advocacy and Information Dissemination' operates with the following objectives-

### DATA COLLECTION AND RESEARCH

- To identify ways to collect, store and visualize sectoral level data at the city level in such a way that it facilitates planning and policy making
- To identify and list out organizations that may already have collected relevant data and consolidate data from these various sources
- To identify ways to quickly validate the collected data

### OUTREACH AND COMMUNICATION

- To identify ways to engage all change agents in the process of data collection
- To identify ways to maximize the reach of effective communication on environmental issues and the impact of human interventions across all age-groups of change agents – producers, consumers, regulators & policy makers- in a way that ensures their participation and responsibility
- To quantify and communicate effectively to producers, regulators & policy makers how current practices and choices affect business ecosystems and levels of service across all sectors
- To identify ways to generate real public support for sustainable products and services

### SUPPORT AND TRAINING

- To identify ways to bring education on the environment and the impact of human interventions into the social and political debate
- To widen and communicate useful expertise in the domain of environmental education through specific programs such as a 'Green skills' program
- To identify ways to maximize the reach of these education programs to all change agents
- To establish, support and train bodies of individuals to carry out such education
- To find ways to facilitate putting environmental projects into action through these programs

## SAMPLE SET OF ACTIONS ITEMS UNDER THIS CANVAS:

### 1. Create a state-level urban data repository with continuous input from city-level sectoral agencies

A state-level urban data repository is needed to collect, store and visualize data from cities to facilitate planning and policy-making in government. All city-level sectoral agencies such as the electricity boards, water boards etc. shall be obliged to collect data, at specified intervals, and feed into the state-level repository. This repository must be coupled with a Spatial Information Centre whose purpose is to spatially geo-locate this data. The SICs shall also build tools for departments to visualize, analyse and act upon data, thus becoming an effective support environment for cities to visualize their current state, as well as scenarios for their future, and respond to threats and opportunities in a timely manner.

Data collection should be rigorous and continuous and the collected data should be shared in a manner that helps various sectoral departments for their planning needs. Unless specifically authorized otherwise, all of this data should be made public so as to bring accountability into the system.

#### **Incentives:**

*Better management of resources and less spent per capita on infrastructure and utilities; Easy to identify areas of deficit and expend energy and resources in a targeted manner*

### 2. Provide information and consultation on the environment through specific institutional/ organization support

A research cell is needed preferably in collaboration with universities and research organizations across the country with the purpose of continuously collecting, validating and disseminating

- Information on consumption patterns through audits
- Information on new technologies and innovations across all sectors
- Information on the carbon footprints of existing and new products
- Information on new models of financing green energy practices
- Provide knowledge-based consultancy services to public and private enterprises across all sectors for them to achieve sustainability in their practice

These research cells could also serve as support organizations for city and state agencies to collect data and feed into the urban data repository. The research cells could also inform the process of establishing service level benchmarks for services across all sectors.

**Incentives:**

*These research cells could serve as a great support system for city agencies in the business of providing public utilities through research, an activity that is not really in the purview of such agencies. Such a research cell could also come in handy while assessing any private sector involvement in the improvement of services or provision of infrastructure as it would serve as a non-biased way to validate deliverables.*

**3. Set up a 'Green Skills' program for various target groups to provide environmental training and qualifications in a systematic and thorough manner**

The 'Green Skills' training programs will help to proliferate sustainable practices through knowledge of reduction in resource consumption and wastage and also understanding how to reuse and recycle resources. This can be achieved through certified training programs organized possibly in collaboration with universities or relevant research organizations across the country.

- For government officials in the civil services cadre to bring their active cooperation to an initiative, they must be educated and informed. Quick modules for the effective management of resources need to be imparted as crash course to bring them up to speed across the sectors of energy, water, waste, food, mobility and built form & open spaces.
- For practicing professionals and staff from government agencies, training programs need to be conducted to bring them up to speed with the latest products, services and technological advances so that they are able to choose and recommend the correct solutions for the problems they are faced with in their areas of day-to-day work
- A segment of this program must also be dedicated to producing a new crop of barefoot engineers who can fix a variety of challenges and offer solutions for smart management of energy, water, waste and food including urban farming systems. It extends to school dropouts, diploma holders and skilled workers such as electricians and plumbers and offers them a chance at employment, to enhance their current skills or to set up businesses offering sustainable solutions. This segment could also be extended to the general public and representatives of citizen action groups so that they may gain sufficient knowledge to share with their own communities.

**Incentives:**

*Better training leads to better services and better efficiency in delivering sustainable development for government staff and professionals. They need to be incentivised through their annual appraisals to take these training programs.*

*For the barefoot engineers program, the promise of better employment opportunities through a database that lists those who completed this training program should be made possible. It should be possible to reorganize this sector which is mostly informal and operating through word-of-mouth at the moment through this database that*

*allows greater access to their services for a larger set of people.*

#### **4. Ensure participation and responsibility of all individuals concerned from an early age by including sustainability as part of curriculum in schools and colleges**

Education departments of states must be brought into this idea in order to have sustainability included in the curriculum of public schools. In the case of private schools, a pilot project to set up a sustainability lab/ club in their premises could act as a catalyst for other schools to do the same. This lab will anchor various activities such as field visits to best practice sites, education on local flora and fauna, hand-on activities such as community gardens, composting etc.

Professionals in the education sector and sustainability experts from various sectors must be brought to the same table to arrive at a curriculum for sustainability for schools and colleges. This includes the creation of an activity-oriented program along with accompanying literature and teaching aids.

#### ***Incentives:***

*Awareness increases the likelihood of public support for schemes directed towards sustainable development. Greater civic involvement of population will in turn lead to better governance.*

#### **5. Create ecostations or local centres for communication on environment and culture rooted in the idea of 'A Duty to Inform'**

There is a severity threshold that needs to be crossed in order for the general populace to be open to listening to scientific findings on environmental damage, and when it is successfully communicated there can be policy change. But it is impractical to wait for an environmental disaster in order to adopt sustainable practices in our daily lives. Through appropriate and appealing user-interface and user-experience design, these 'ecostations' can serve as a medium to communicate the urgent need to make the shift to sustainable practices without veering towards a scientific or statistical standpoint on why such a shift is necessary.

These ecostations will be stationed at places that receive a high footfall and will offer all-in-one-roof solutions for smart management of energy, water, waste, food, mobility and built form while also highlighting the incentives for adopting these solutions. Some of the functions of the ecostations are-

- To give out information on savings and benefits
- To give out information on new and validated technologies
- To distribute planning and implementation guides for various sustainable practices targetted at consumers



- To help with sourcing of vendors for various technologies and equipment
- To show ways to measure current consumption levels and demonstrate realistic figures for reduced consumption
- To offer financial incentives such as low-interest or zero-interest loans for consumers willing to adopt sustainable solutions in their homes

**Incentives:**

*By familiarizing the public with this kind of information and enabling them to easily adopt sustainable solutions to manage their daily resource consumption, the demand for resources such as energy, water, food is brought down. With reduced demand government agencies can focus their attention on other shortcomings.*

**6. Create a rating system for all consumer goods and services based on its carbon footprint to enable the consumer to make informed choices**

A rating system of this nature will not only help consumers to make informed choices but will also prompt manufacturers and service providers to improve their carbon footprint ratings. Incentives and endorsements need to be provided for consumers to choose a higher rating product over a cheaper yet lower rating product. For instance, zero interest EMIs can be provided for a product with a higher rating as opposed to a product with a lower rating which is offered at a higher interest rate. With a more informed and educated audience, this will slowly but eventually lead to the phasing out of products that do not rank higher on the rating scale.

**Incentives:**

*Customers will be able to choose products and services that consume lesser resources thereby reducing the demand on such resources. This will also create a demand for products and services that have a higher level of efficiency thereby propelling both the innovation sector as well as businesses already involved in providing these products and services. As already mentioned, in the larger scheme of things, products and services that are high on resource consumption will eventually get phased out.*



### 2.3.2 CANVAS 02- PROVING BY DOING

Nothing is as convincing as a demonstration project. This is why it is imperative to execute such projects at a range of scales in a way that is cost-effective and is also able to demonstrate the full potential of adopting, replicating and scaling up such initiatives. These projects also offer the chance to make improvements and correct any errors that may have been encountered during the pilot phase. These improvements can be made across the entire process starting from tendering for a contract, drawing up a contract agreement, designing, procuring, execution, operations and maintenance. This is a





valuable opportunity to test the waters especially when upgrading and adopting newer ways of dealing with the sectors. Pilot projects ensure that public tax money is spent well by testing out an idea as opposed to going ahead full on with large infrastructure projects only to realize later that they never served the purpose they were intended to serve. And lastly, proving by doing provides a chance for the city to function as a progressive laboratory for new and experimental ideas that could positively affect urban livability.



## OBJECTIVES:

Towards this purpose, the canvas of 'Proving by Doing' operates with the following objectives-

### DATA COLLECTION AND RESEARCH

- To identify a list of projects that can become pilot projects for each sector
- To identify the scale and location at which this list of projects can be implemented
- To identify newer ways of managing the sectors
- To identify the costs involved in implementing such pilot projects and be able to validate these costs

### OUTREACH AND COMMUNICATION

- To identify ways to disseminate the learnings of these proven experiments to a larger audience in other cities
- To identify ways to ensure participation of all change agents - producers, consumers and regulators & policy makers to implement these pilot projects
- To identify ways to allow all change agents to witness and experience the benefits of adopting newer ways of managing the sectors thereby encouraging more and more people to adapt what is proven

### SUPPORT AND TRAINING

- To identify the technical skills required to implement these pilot projects as well as the means to bring these skills on board for a pilot project
- To identify avenues for funding these pilot projects

## SAMPLE SET OF ACTIONS ITEMS UNDER THIS CANVAS:

### 1. Pilot projects for all sectors must be implemented for all sectors as an accepted general practice

Government agencies must take on a more enthusiastic role in making these happen in partnership with NGOs or consultancy groups. This level of faith and enthusiasm can be attainable through the aforementioned 'Green Skills' program tailored for officials and staff. Completing this program will give them sufficient knowledge to evaluate and approve an appropriate pilot project.

#### **Incentives:**

*Pilot projects offer a quick way to test out an idea and make improvements before applying them on a large scale. This offers immense savings on public funds and*



*ensures that they are put to use in a more efficient manner. Pilot projects also offer a chance for the public to respond to and participate in the way their cities are built. Increased civic engagement in turn leads to improved governance.*

## **2. Pilot projects must attempt to include the support of faculty and students from universities**

Students and faculty from universities can be included in the city-building process by allowing them an opportunity to address any of the set goals across all six sectors. Doing so will foster a crop of problem-solving graduates as opposed to graduates who are far removed from and unable to apply any of their learnings to real-life challenges.

### ***Incentives:***

*Engaging students through university collaborations for pilot projects will not only give them a chance at some hands-on experience of what it is like to practice in the field and deal with real-life problems but also allow them to familiarise themselves with the institutional systems they will need to navigate in order to implement projects on ground. In addition, it gives the youth of our cities a chance to serve the community and also take pride in their responsibility of doing so.*

## **3. Set up advisory/ consultancy cells outside or within the government agencies to provide support in the execution of pilot projects**

Advisory/ consultancy cells comprised of qualified and certified professionals must be set up either within government agencies or within a university set-up to provide support to the execution and monitoring of pilot projects before they can be approved for scale-up implementation.

Keeping track of tried and tested project prototypes through such cells will also help to expedite the process of finding appropriate solutions to urban problems across the sectors.

### ***Incentives:***

*A cell like this can legitimize the effort that will go into the scaling up of successful pilots for auditing purposes and lead to better accountability. Such a cell also reduces the work load of the government agency involved with the project which can then focus on the faster execution of the project alone.*

## **4. Encourage large groups of consumers (apartment associations, RWAs etc) to adopt sustainable practices en masse through incentives**

Individual consumers or groups of consumers, such as apartment association and resident welfare associations, have the capacity to influence change if provided suitable

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incentives to do so. They can be given financial incentives such as low-interest or zero-interest loans for adopting sustainable solutions in their homes. Providing a higher level of financial incentives to groups of consumers as opposed to individual consumers will prompt them to opt for such solutions en masse. Another way to incentivize large groups of consumers is through awards and recognition. A system should be put in place to monitor the environmental savings and recognition must be awarded to the group of consumers who have the highest savings.

***Incentives:***

*This will have a stronger impact and ripple effect as opposed to one-off consumers reaping the benefits of adopting sustainable solutions. In other words, targeting large groups of consumers will accelerate sustainability at a faster rate.*



### 2.3.3 CANVAS 03- A PIPELINE OF INNOVATIONS

In a post-industrialized era, the services industry stepped in to provide opportunities for innovative ways of conducting business. The present era belongs to sustainability and it is fast emerging as the key driver of innovation.

Traditionally, law and policy have played a key role in pushing the private sector towards innovations by demanding compliance and imposing regulatory frameworks. However, in a competitive business environment, it may not be smart for private enterprises to wait for such enforcements to embark on the path of innovation. A business that is able to act in advance of law and policy frameworks will have the edge of a first-mover advantage. As we move into an era of limited resources, businesses that are able to provide innovative solutions without compromising on comfort levels will emerge as new market leaders.

Innovation labs must be geared to deal with both the incremental end (carbon offsets, recycling programs, product revisions, reducing losses in production and supply chains etc) as well as the disruptive end (new business models, new means for value capture etc.) Innovations are also required for viable financial models for accelerating sustainability.





STAGE 1 Viewing Compliance as Opportunity	STAGE 2 Making Value Chains Sustainable	STAGE 3 Designing Sustainable Products and Services	STAGE 4 Developing New Business Models	STAGE 5 Creating Next- Practice Platforms
<p><b>CENTRAL CHALLENGE</b> To ensure that compliance with norms becomes an opportunity for innovation.</p> <p><b>COMPETENCIES NEEDED</b></p> <ul style="list-style-type: none"> <li>» The ability to anticipate and shape regulations.</li> <li>» The skill to work with other companies, including rivals, to implement creative solutions.</li> </ul> <p><b>INNOVATION OPPORTUNITY</b></p> <ul style="list-style-type: none"> <li>» Using compliance to induce the company and its partners to experiment with sustainable technologies, materials, and processes.</li> </ul>	<p><b>CENTRAL CHALLENGE</b> To increase efficiencies throughout the value chain.</p> <p><b>COMPETENCIES NEEDED</b></p> <ul style="list-style-type: none"> <li>» Expertise in techniques such as carbon management and life-cycle assessment.</li> <li>» The ability to redesign operations to use less energy and water, produce fewer emissions, and generate less waste.</li> <li>» The capacity to ensure that suppliers and retailers make their operations eco-friendly.</li> </ul> <p><b>INNOVATION OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>» Developing sustainable sources of raw materials and components.</li> <li>» Increasing the use of clean energy sources such as wind and solar power.</li> <li>» Finding innovative uses for returned products.</li> </ul>	<p><b>CENTRAL CHALLENGE</b> To develop sustainable offerings or redesign existing ones to become eco-friendly.</p> <p><b>COMPETENCIES NEEDED</b></p> <ul style="list-style-type: none"> <li>» The skills to know which products or services are most unfriendly to the environment.</li> <li>» The ability to generate real public support for sustainable offerings and not be considered as “greenwashing.”</li> <li>» The management know-how to scale both supplies of green materials and the manufacture of products.</li> </ul> <p><b>INNOVATION OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>» Applying techniques such as biomimicry in product development.</li> <li>» Developing compact and eco-friendly packaging.</li> </ul>	<p><b>CENTRAL CHALLENGE</b> To find novel ways of delivering and capturing value, which will change the basis of competition.</p> <p><b>COMPETENCIES NEEDED</b></p> <ul style="list-style-type: none"> <li>» The capacity to understand what consumers want and to figure out different ways to meet those demands.</li> <li>» The ability to understand how partners can enhance the value of offerings.</li> </ul> <p><b>INNOVATION OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>» Developing new delivery technologies that change value-chain relationships in significant ways.</li> <li>» Creating monetization models that relate to services rather than products.</li> <li>» Devising business models that combine digital and physical infrastructures.</li> </ul>	<p><b>CENTRAL CHALLENGE</b> To question through the sustainability lens the dominant logic behind business today.</p> <p><b>COMPETENCIES REQUIRED</b></p> <ul style="list-style-type: none"> <li>» Knowledge of how renewable and nonrenewable resources affect business ecosystems and industries.</li> <li>» The expertise to synthesize business models, technologies, and regulations in different industries.</li> </ul> <p><b>INNOVATION OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>» Building business platforms that will enable customers and suppliers to manage energy in radically different ways.</li> <li>» Developing products that won’t need water in categories traditionally associated with it, such as cleaning products.</li> <li>» Designing technologies that will allow industries to use the energy produced as a by-product.</li> </ul>

Figure 2.8 The five stages that most businesses go through on the path to becoming sustainable

Source: Ram Nidumolu, C.K. Prahalad, and M.R. Rangaswami, *The Harvard Business Review*, September 2009



## OBJECTIVES:

Towards this purpose, the canvas of 'A Pipeline of Innovations' operates with the following objectives-

### DATA COLLECTION AND RESEARCH

- To identify a list of environmental challenges and possibilities to be addressed and thereby keep alive a pipeline of innovations
- To identify a list of products and services that are unfriendly to the environment in order to spark a pipeline of innovations for sustainable offerings

### OUTREACH AND COMMUNICATION

- To question through a sustainability lens the dominant logic behind current business models and seek innovation
- To identify ways to bring together various change agents towards realizing a pipeline of innovations
- To find ways to excite more and more people to be part of the culture of innovations by creating a fostering environment

### SUPPORT AND TRAINING

- To identify ways to catalyse a pipeline of innovations by creating a favourable environment for established and start-up businesses to tread this path
- To identify ways to drive marketing and innovation culture to create new business models, products, and services that deliver new revenue streams and employment opportunities
- To find ways to create an environment where future business and sustainability solutions based on emerging technologies can be ideated, visualised and simulated
- To find ways to channelize funding towards realizing a pipeline of innovations
- To identify expertise to arrive at various action items to foster a pipeline of innovations

## SAMPLE SET OF ACTIONS ITEMS UNDER THIS CANVAS:

1. Set up a state-level CSR hub to function as an advisory body that is able to direct CSR funding to validated projects that have the potential to serve as a best practice model

A recent amendment made in the Companies Act allows Corporate Social Responsibility (CSR) contributions to incubators, thereby providing vital support to for-profit ventures working with social objectives. Setting up a state-level CSR hub linked to a cluster of innovation labs will help identify and connect relevant projects to this avenue of support. Existing CSR wings of established companies must be brought into the fold of this hub. Companies without such wings will be able to enrol in this hub and have their funds managed through it. Individuals or groups can register and send in project applications to the CSR hub where they will be processed. Promising ventures will be mentored, incubated and funded through a common pool of CSR funding.

**Incentives:**

*A state-level CSR hub of this nature will provide more visibility and a level playing field for innovation to be nurtured equally from all parts of the state and not just from major urban centres. Pooling of CSR funds also ensures a steady flow of funding to venture that may require additional funding after the initial stages for them to scale up and grow into viable businesses.*

**2. Government must play a role by enforcing stronger compliance and regulatory frameworks across all sectors**

By imposing stronger compliance and regulatory frameworks, governments will be able to provide a climate for sustainable innovation by reducing the uncertainty that better and alternate solutions will succeed in the market place.

**Incentives:**

*A government-backed fostering of a pipeline of innovations will ensure a steady progress towards accelerating sustainable development.*

**3. Creating sustainability indices within financial markets**

Financial markets have an important role to play in funding and rewarding the more sustainable solutions developed by innovation labs/ companies. Financial rewards from the markets are most likely to come by when there is compelling evidence that such ventures have economic value. Setting up a sustainability index such as the Dow Jones Sustainability Group Index is an important step forward in this direction.

**Incentives:**

*Over time, a sustainability index will outperform general market benchmarks because companies geared towards a sustainability agenda will be able to deliver more reliable and above-average returns as opposed to temporary outsized performances of other company stocks.*



### 2.3.4 CANVAS 04- BUSINESSES OF THE FUTURE

As we aim for a more sustainable future, the focus shifts from what is manufactured to how and where it is manufactured. Businesses of the future will continue to be categorized as product-based and service-based businesses. But what will distinguish them as green businesses is if they are able to prove that they function in a way which minimizes damage to the environment.



The conversation about businesses of the future has two parts to it- one is the impending onus on established businesses to revisit the way they conduct their operations in a manner that brings down their carbon footprint and two is the opportunity for new players to enter the field and provide a new set of products and services that help consumers as well as other businesses to bring down their carbon footprint.





## OBJECTIVES:

Towards this purpose, the canvas of 'Businesses of the future' operates with the following objectives-

### DATA COLLECTION AND RESEARCH

- To define what it means to be a 'Business of the future'
- To identify ways to put together a directory of 'businesses of the future'

### OUTREACH AND COMMUNICATION

- To identify ways to influence established businesses to make an environmental turnaround to their current mode of operations
- To excite more and more entrepreneurs to be part of the green economy by providing the necessary support for them to be nurtured and grow

### SUPPORT AND TRAINING

- To identify and facilitate these businesses of the future by creating a favourable environment for their long-term sustainability and economic viability
- To identify management know-how to scale up the implementation/ manufacture of sustainable products and services
- To identify management know-how to understand which partnerships can enhance the value of offerings
- To find ways to speed up the timeline from idea to prototype to marketplace
- To identify expertise who can synthesize business models, technologies and regulations across all the sectors

## SAMPLE SET OF ACTIONS ITEMS UNDER THIS CANVAS:

### 1. Set up a state-level 'Green Pages' directory

In order to identify and support such green businesses a state-level 'Green Pages' directory can be drawn up which categorizes these businesses under consumer goods and services. They can further be classified under the scale of operations such as businesses for domestic consumers, businesses for industries and so forth.

Businesses can file an application to enrol in this directory and will be enrolled subject to passing a certification process to assess their commitment to sustainability.

**Incentives:**

*Enrolling in the 'Green Pages' directory must be made requisite for a business to qualify for tax breaks. Doing so will play a dual role of both encouraging businesses to enter the green economy as well as making them accessible to the consumer market through the directory.*

## **2. Set up a state-level CSR hub to help identify, mentor, incubate and fund start-ups operating in the green economy**

A recent amendment made in the Companies Act allows Corporate Social Responsibility (CSR) contributions to incubators, thereby providing vital support to for-profit ventures working with social objectives. Setting up a state-level CSR hub in the form of a network of incubation centres and start-up accelerator units will help identify and connect such start-ups to this avenue of support. Existing CSR wings of established companies must be brought into the fold of this hub. Companies without such wings will be able to enrol in this hub and have their funds managed through it. Start-ups can register and send in applications to the CSR hub where they will be processed. Promising ventures will be mentored, incubated and funded through a common pool of CSR funding.

**Incentives:**

*The hub will function as a nodal agency to connect promising new businesses to funding while also serving as a checkpoint for companies to ensure that their CSR funding is utilized appropriately.*

## **3. Offer benefits to large businesses/ industries in order to make them expedite an environmental turnaround to their current mode of operations**

These benefits could be in the form of faster approvals, tax breaks, waivers or subsidies commensurate to the savings realized from their environmental turnaround. Such benefits should be offered for a limited period of time and only businesses/ industries that are able to show a certain level of environmental savings within that time-frame will qualify for such benefits.

**Incentives:**

*Large businesses/ industries can have a significant impact on environmental savings. These savings will not only help to reduce the demand on the urban utilities they avail for their operations but also result in significant savings for themselves too. Giving them an opportunity to expedite their move to making their value chains more sustainable, could give a significant boost to achieving the set sustainable goals.*

### 2.3.5 CANVAS 05- GOVERNANCE FOR A LIVABLE FUTURE

High-level government commitment is essential if policy and institutional changes are to occur, financial resources are to be committed and for there to be clear responsibility for implementation. Sustainable development goals must be fully integrated in current budgeting processes to ensure that the goals can be achieved. Such commitment also needs to be long-term, and should therefore involve longer-term stakeholders such as political parties, general public and younger generations of problem-solvers and decision-makers. This is particularly relevant given that there is the danger of an incoming government to trash the initiatives of the previous government.





In addition, developing a strategy for a sustainable future requires two-way communication between policy-makers and the public. This needs to extend beyond information campaigns and into long-term social interaction to achieve a shared understanding of sustainable development and its implications on urban livability.



## OBJECTIVES:

Towards this purpose, the canvas of 'Governance for a Livable Future' operates with the following objectives-

### DATA COLLECTION AND RESEARCH

- To identify ways to enable the government to be the exemplar with regard to driving and accelerating sustainable development
- To identify ways to eradicate the externalization of costs of vital resources across the sectors of development
- To identify a list of existing laws and policies that need to be strengthened in order to accelerate sustainable development
- To identify a list of new laws and policies that need to be framed in order to accelerate sustainable development

### OUTREACH AND COMMUNICATION

- To identify ways to garner support from change agents in order to strengthen existing law and policy or create new ones to accelerate sustainable developments

### SUPPORT AND TRAINING

- To identify a policy team to work out ways to anticipate and shape regulations
- To provide support to regulators & policy makers through a policy team to frame progressive policies to accelerate sustainable development

## SAMPLE SET OF ACTIONS ITEMS UNDER THIS CANVAS:

### 1. Need to make sustainable development a mainstream agenda by transferring responsibility to a ministry/ department with more authority

Responsibility for sustainable development is usually assigned to environment ministries/ departments which have limited influence in government and on other ministries/ departments. Sustainable development is therefore mostly trying to unfold in isolation owing to a lack of integration with other sectors.

For key finance and economic stakeholders to become major participants in a sustainable development strategy, it is preferable that the responsibility of delivering sustainability is vested with the office of the chief minister or of a ministry/ department with greater authority - such as the finance ministry/department. By doing so, sustainable



development as an agenda gains exposure as a mainstream government initiative and gets strongly linked to important policies and procedures.

**Incentives:**

*Long-term commitment to sustainable development goals tied to financial commitments ensures a more reliable delivery of sustainable development backed by the government*

**2. Need to improve pricing mechanism across all sectors**

Government must ensure through a policy mechanism that energy, water, waste, food, mobility and built form are priced accurately — that the prices we pay for all of these entities reflect their actual production costs including the costs they impose on the planet. The lack of accurate pricing has led us to consume and waste these resources excessively, thereby having a debilitating effect on the environment without necessarily improving our quality of life. All products and services must provide detailed information regarding the break-up of the costs involved from source to consumer and beyond.

**Incentives:**

*The idea of accurate pricing will present a more realistic picture to all the stakeholders. Such transparency in information is required to precede corrective action. Accurate pricing also allows a level playing field to enable more environmentally sound solutions to come to the fore.*

**3. Need to enforce stronger compliance and regulatory frameworks across all sectors**

By imposing stronger compliance and regulatory frameworks for operations across all sectors, government can take a leadership role in driving innovation and improving competencies towards a sustainable future. Government agencies and businesses will be forced to look for alternate solutions without major financial implications.

**Incentives:**

*Stronger compliance will force a balance between the environmental gains and financial gains by fostering a pipeline of innovations. Only then will our cities be able to use less and do more with available resources.*

**4. Establish a state-level secretariat with adequate powers and resources to function as a single point interface for various stakeholders and the government**

The secretariat will function as a nodal agency between stakeholders such as investors, businesses, industry confederations and the government for approvals and monitoring of schemes and initiatives within the sustainability agenda. The secretariat can also be entrusted with the task of reviewing standards/codes of practice that can be used

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to inform regulatory frameworks, taxation models, subsidy and incentive mechanisms for all sectors. Mechanisms for continuous monitoring, environmental auditing and accountability must also be anchored by the secretariat while also identifying possible roles for independent monitoring through NGOs and other citizen action groups.

***Incentives:***

*A secretariat with the aforementioned functions will serve as a clear channel for all stakeholders and players in the green economy to participate with more seriousness and accountability towards sustainable development goals. The existence of an institutional mechanism such as this will also alleviate the fear of risks involved in investing in this direction.*

## 2.4 Measuring the Efficacy of the Canvas of Interventions

This section identifies a set of sustainable development goals as a benchmark for measuring and evaluating the efficacy of the canvas of interventions towards the acceleration of sustainable development. Goals are identified for 6 sectors-

1. Energy
2. Water
3. Waste
4. Food
5. Mobility and
6. Built Form & Open Spaces

### 2.4.1 ENERGY

Within the discourse and practice of sustainable development in India, the energy sector has drawn much attention in recent times mostly because of the crisis arising from shortage and demand management. Per capita energy consumption in India more than doubled between 2000 and 2011<sup>1</sup> India is the fourth-largest energy consumer in the world, trailing only the United States, China, and Russia with its economic growth being the primary driver of its energy consumption.<sup>2</sup>

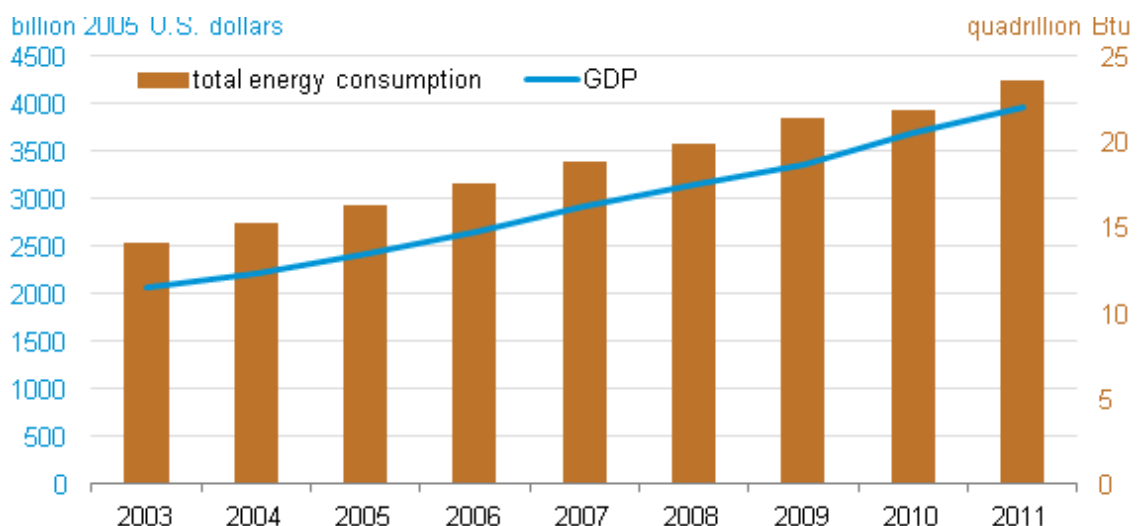


Figure 2.1 Graph showing India's GDP and energy consumption

Source: U.S. Energy Information Administration, International Energy Statistics, and Oxford Economics

<sup>1</sup> Pg.44, Energy Statistics 2013, Central Statistics Office Ministry Of Statistics And Programme Implementation, Government Of India, New Delhi

<sup>2</sup> <http://www.eia.gov/todayinenergy/detail.cfm?id=10611>

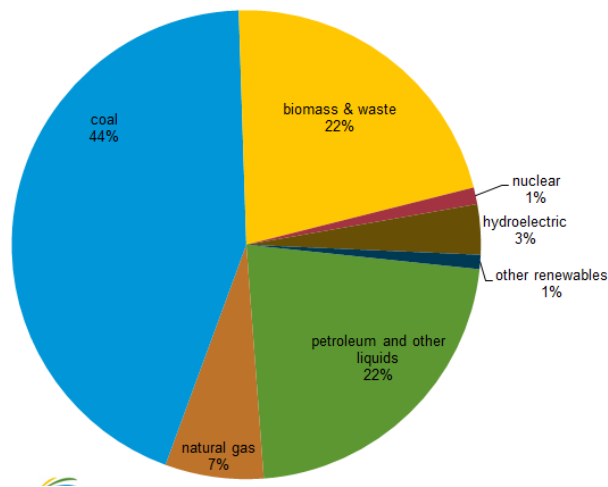


Figure 2.2 Total energy consumption for India split by source

Source: U.S. Energy Information Administration, International Energy Statistics, and BP Statistical review.

India's energy policy is therefore focused on securing adequate energy resources to meet the growing demands of its economy. Most state governments are also choosing to act on this sector through policy and regulation measures particularly with regard to making the shift towards renewable energy. In addition to addressing the depletion of fossil fuels, this shift is paramount to limiting the greenhouse effect and combat global warming. However, in order to accelerate sustainable development, a multi-pronged effort is a must and efforts need to be made in all aspects of the energy cycle- production, supply, distribution, consumption and demand management.

Towards this, the following goals are identified for the energy sector to be achieved by the year 2025 through the implementation of the canvas of interventions-

**GOALS TO MEASURE ACCELERATION OF SUSTAINABLE DEVELOPMENT AS A RESULT OF THE CANVAS OF INTERVENTIONS**

- **40% of energy requirement to be derived from renewable sources**
- **The target for annual energy savings for a city should be about 15% of the estimated demand for the next year**
- **30% private-owned vehicles and 75% public transport to run on clean fuels**
- **At least 15% of a city's overall housing stock must qualify as low-energy homes**

## 2.4.2 WATER

The urban water supply sector in India is plagued by problems such as inadequate coverage, intermittent supply, inequitable access to water, outdated infrastructure, and environmentally unsustainable practices of water supply and distribution that have resulted in dwindling groundwater supplies. In addition to this, water pollution and scarcity shape the lives of millions of Indians every day- limited access to safe drinking water and proper sanitation present major health challenges. The irony of the situation is also that in most cities up to 30% of water extracted from source is lost due to leakage or theft. All of these problems coupled with a growing urban population create a pressing need for increased efficiency in the urban water supply sector.

These problems can be attributed to-

- Inadequacies in the administrative and managerial capacities of urban local bodies (ULBs)
- Inefficiencies with the practice of levying and recovering tariffs leading to poor financial health of the water utilities and the sector
- Inefficient operations and maintenance (O&M) leading to losses and theft of water
- Failure to create/ adhere to norms for benchmarking urban water systems
- Failure to monitor and evaluate the performance of urban water systems



Figure 2.3 Components of a sustainable urban water management system

In the current institutional model, all the three key governance functions— policy-making, service provision, and regulation—are concentrated in the hands of state-owned agencies. These agencies have failed to deliver on techno-economic decisions such as tariffs, investments, and purchases. Additionally, state-owned agencies lack accountability. There are no provisions or mechanisms through which the consumers of the services can directly hold the service-providing agency accountable for the cost or quality of the service provided.

The water sector too operates within the procurement, distribution, consumption and demand management cycle and unless there is a reform in all aspects of this cycle, the impending water crisis in most urban centres will reach a tipping point.

Towards this, the following goals are identified for the water sector to be achieved by the year 2025 through the implementation of the canvas of interventions-

**GOALS TO  
MEASURE  
ACCELERATION  
OF SUSTAINABLE  
DEVELOPMENT  
AS A RESULT OF  
THE CANVAS OF  
INTERVENTIONS**

- **No additional bore-wells from this point onwards**
- **Water losses due to leakage and theft to be brought down to under 10% of water extracted from source**
- **Ground water levels to be restored to levels that were prevalent 20 years ago**
- **10% of overall water demand (or 75% of industrial water demand) must be satisfied by rainwater harvesting**

### **2.4.3 WASTE**

Over 160,000 Metric Tons (MT) of municipal solid waste is generated on a daily basis in the country. Per capita waste generation in cities ranges from 0.2 to 0.6 kg per day and is estimated to increase at 1.33% annually. The total waste quantity generated by the year 2047 is estimated to be about 260 million tons per year. It is estimated that if the waste is not disposed off in a more systematic manner, more than 1400 square kilometres of land, roughly equivalent to the size of Delhi, would be required for its disposal as landfill. The industrial sector in India generates an estimated 100 million tons/year of non-hazardous solid wastes, with coal ash from thermal power stations accounting for more than 70 million tons/ year. Over 8 million tons/year of hazardous waste is generated and about 60% of these wastes, i.e., 4.8 million tons/year is estimated to be recyclable and the

remaining 3.2 million tons/year is non-recyclable.<sup>3</sup>



Figure 2.4 The conceptual model of a 'Zero Waste City' emphasizes recovery of material resources  
Source: Zaman and Lehmann, 2011

Unlike the energy and water sector, the challenges of the waste sector are related to its management across stages of segregation, collection, transportation and disposal. The crisis of waste management has already struck most metropolitan cities in India. In addition, though waste management is largely an urban issue, its consequences have also extended into rural areas because they tend to suffer as 'pollution sinks' for the encroaching urban sprawl. Most local government bodies have neither any capability nor resources for implementing the Municipal Solid Waste Management and Handling (MSWM) Rules, notified by the Ministry of Environment and Forests in 2000. Half-hearted attempts at the 'Reduce, Recycle and Reuse (3R)' mantra on the part of both citizens and cities have also not helped provide better solutions for waste management. The challenges in this sector can be summarized as-

*1. Lack of awareness and mind-set issues towards efficient practices of waste management both on the part of citizens and cities*

A majority of citizens are still largely unaware of the urgent need to segregate and deal with waste effectively. Same goes for cities. Cities still do not allocate for enough human and financial resources in their annual budgets towards waste management. There is a sense of apathy combined with a NIMBY attitude that only further exacerbates the crisis with no one willing to take responsibility for implementing even best practice solutions.

<sup>3</sup> Source: Report on Waste Management in India produced by European Business and Technology Centre (EBTC)- a programme co-funded by the European Union and coordinated by Eurochambers



## 2. Poor approach to waste management as a necessary and viable business

Stemming from the mind-set issues related to waste management, the opportunity for it to take shape as a necessary and viable business has not been cashed. There is also a dire need to continuously monitor and review the waste management process at all stages i.e. segregation, collection and handling. Improper choice of technology has also contributed to under-performing in this sector.

In order to make the shift to a culture of zero waste and thereby accelerate sustainable development, addressing these challenges is a must. Towards this, the following goals are identified for the waste sector to be achieved by the year 2025 through the implementation of the canvas of interventions-

### GOALS TO MEASURE ACCELERATION OF SUSTAINABLE DEVELOPMENT AS A RESULT OF THE CANVAS OF INTERVENTIONS

- **Close all landfills in the country**
- **Achieve effective management of chemicals wastes throughout their life cycle and stop their release into air, water and soil in order to minimize their hazard to human health and the environment**
- **At least 30% of household waste must be recycled after sorting and 20% to be utilized through biological treatment**

## 2.4.4 FOOD

The environmental impact of food production is significant with global production of food being responsible for 80 percent of deforestation, more than 70 percent of fresh water use, and up to 30 percent of greenhouse gas (GHG) emissions<sup>4</sup>. It also is the largest cause of species biodiversity loss<sup>5</sup>. The capacity to produce adequate food in the future is constrained by depleting land resources, declining soil fertility, unsustainable water use, and over-fishing of the marine environment. A healthy, sustainable food system accounts for the public health impacts across the entire life cycle of how food is produced, processed, packaged, labelled, distributed, marketed, consumed, and disposed.

Meeting current and future food needs without compromising on nutrition needs will require the following three approaches:

<sup>4</sup> United Nations Environment Programme. *UNEP Year Book: Emerging Issues In Our Global Environment 2012*.

<sup>5</sup> Nellemann C, MacDevette, M., Manders, T., Eickhout, B., , Svihus B, Prins, A. G., Kaltenborn, B. P. (Eds). *The environmental food crisis – The environment's role in averting future food crises. A UNEP rapid response assessment United Nations Environment Programme, GRID-Arendal; 2009*.

1. Altering dietary choices and patterns to reduce consumer demand for resource-intensive foods to foods that have a lower environmental impact.
2. Developing agricultural and production practices that conserve, protect, and regenerate natural resources, landscapes, and biodiversity and thrives in the face of challenges, such as unpredictable climate, increased pest resistance, and declining, increasingly expensive water and energy supplies.
3. Providing opportunities for farmers and consumers to gain knowledge to understand how food is produced, transformed, distributed, marketed, consumed, and disposed



Figure 2.5 Components of the Food System  
Source: [www.community-food.org](http://www.community-food.org)

A healthy, sustainable food system emphasizes, strengthens, and makes visible the interdependent and inseparable relationships between individual sectors (from production to waste disposal) and characteristics (health-promoting, sustainable, resilient, diverse, fair, economically balanced, and transparent) of the system.

In order to promote a healthy sustainable food system that does not strain existing resources the following goals are identified to be achieved by the year 2025 through the implementation of the canvas of interventions-

**GOALS TO  
MEASURE  
ACCELERATION  
OF SUSTAINABLE  
DEVELOPMENT  
AS A RESULT OF  
THE CANVAS OF  
INTERVENTIONS**

- Reduce consumer demand for resource-intensive foods by 30%
- 10% of per capita food requirement must be produced within a one kilometre radius
- Reduce by 50% the per capita food waste at the retail and consumer levels across the food cycle

## 2.4.5 MOBILITY

With rapid urbanization, mobility has come to take the stage in all urban areas in a make or break role and is a critical part of the future livability of cities. The adverse impacts of fossil-fuel powered motorization—in economic, environmental, and social terms—are ruining the quality of life in our cities and are impacting climate change directly through greenhouse gas emissions. An urgent need for a change in approach is looming upon us especially because mass motorization is projected for enormous growth in future years. The problems of traffic growth are summarized in this table-

<b>Economic</b>	Increase in congestion in urban areas
	Increasing motorization and trip lengths
	Mobility barriers
	Accident damages
	Infrastructure Facility costs
	Consumer costs from increasing private car use
	Depletion of non-renewable resources
<b>Social</b>	Inequity of impacts
	Mobility disadvantages
	Negative health impacts
	Increase in social exclusion
	Decrease in community livability
	Poor aesthetics
<b>Environmental</b>	Air and water pollution
	Increasing CO2 emissions
	Habitat loss
	Hydrologic impacts
	Increase in consumption of land resources
	Depletion of non-renewable resources

These problems in turn breed a vicious circle of transport decline in our cities as elucidated in this diagram-

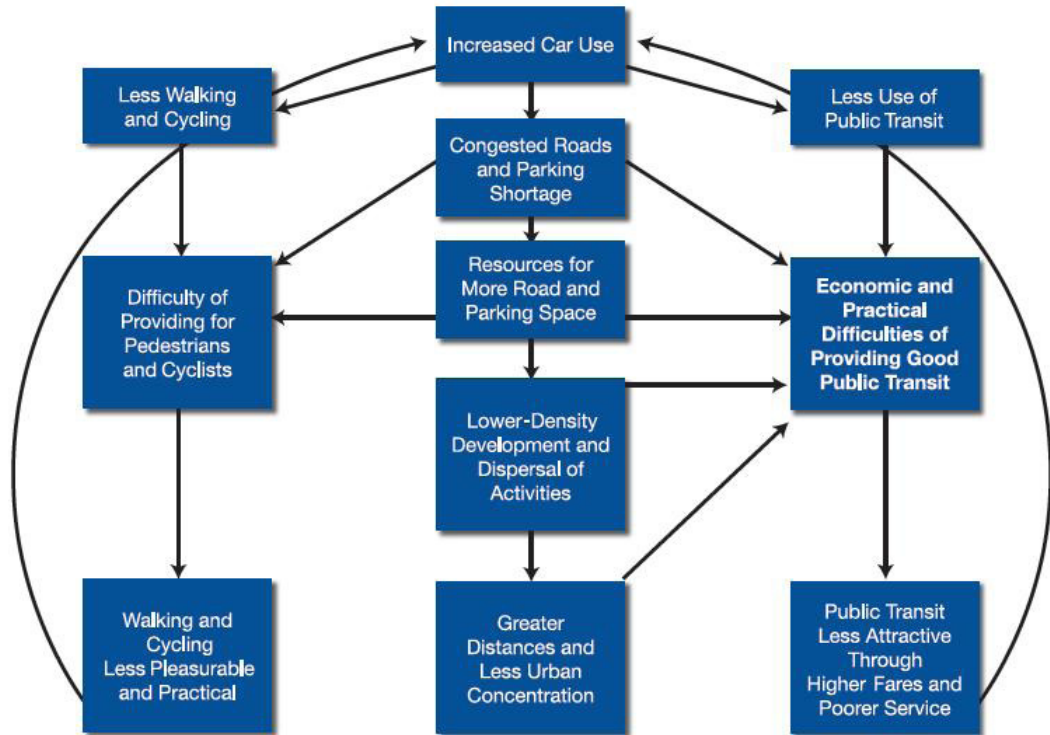


Figure 2.6 The vicious circle of transport decline

Source: T. Pharoah. 1992. *Less Traffic, Better Towns*. London: Friends of the Earth.

So far, in India's cities, the dominant investment in the mobility sector has been in building roads and highways. A revised approach entails that transport system should be designed and operated in a way that supports sustainable urban living. This calls for a shift in focus in both policy and investment towards the following-

- Strategies for traffic demand management
- Provision of high quality systems and infrastructure for public transport such as mass rapid transit, light rapid transit and bus rapid transit
- Provision of improved facilities for non-motorized transit (walking & cycling)
- Low-emission vehicles and alternative fuels
- Strategies for freight planning, and
- Urban planning to support transport

In view of these issues, challenges and requirements, the following goals are identified for the mobility sector to be achieved by the year 2025 through the implementation of the canvas of interventions-

**GOALS TO  
MEASURE  
ACCELERATION  
OF SUSTAINABLE  
DEVELOPMENT  
AS A RESULT OF  
THE CANVAS OF  
INTERVENTIONS**

- **Reduce transport-related fossil fuel consumption and CO2 emissions by 50%**
- **Reduce transport-related GHG emissions at source by 70%**
- **Reduce per capita vehicle kilometres travelled by 50%**
- **Increase public transit ridership by 50% in the overall modal split for a city**
- **Only 12% of urban land area is consumed for transport infrastructure**
- **Improve freight management efficiency by 50%**

## **2.4.6 BUILT FORM & OPEN SPACES**

Shelter being one of the basic necessities and with demands from a growing urban population, the construction sector poses a major challenge to the environment. Globally buildings are responsible for at least 40% of energy use. Buildings consume an estimated 42% of the global water supply and account for 50% of the global raw materials consumption when taking into account the construction and operational period of buildings. In addition, building construction contributes an estimated 50% of the world's air pollution, 42% of greenhouse gases, 50% of all water pollution, 48% of solid wastes and 50% of all CFCs to the environment.

On the larger scale, buildings and open spaces constitute urban agglomerations. The trend towards rapid urbanization only means that these numbers are going to get compounded if unchecked. Starting from a single building to a neighbourhood, and stretching across a city and all the way up to a region, this sector is bound to cause most damage to the environment if there are no serious reforms. The relationship between these man-made constructs and the natural systems of the land, particularly how each influences the other to arrive at an urban form that respects the ecology and the value of natural systems is a key determinant of how sustainable that development is.

In order to understand the impact of this sector on the environment, it may be useful to start by listing some of the characteristics of good urban form from the perspective of sustainable practices in city planning-

- Good urban form enables a high degree of walkability and connectivity through a dense networks of streets and paths that are highly permeable to pedestrians,

- bicycles and transit and also disperses traffic
- Good urban form ensures an optimal balance of mixed building uses and open spaces as well as a diversity of people - of ages, classes, cultures, and races- within neighbourhoods, within blocks, and also within buildings
- Good urban form integrates land use and transport so that more buildings, residences, shops, and services are closer together for ease of walking, and to enable a more efficient use of services and resources
- Good urban form prioritizes public open space and favours quality architecture & urban design that is more importantly also context sensitive to ensure minimal environmental impact of development and its operations. This can be achieved by incorporating infrastructure that works with nature and not against it as part of the site layout- transportation, wastewater treatment, solid waste management, rain water harvesting and eco-friendly technologies as well as by encouraging local production and sourcing of materials.
- And finally, at the largest scale i.e. the regional scale, it is crucial to ensure that regional form is the product of transit accessibility and environmental constraints. Major natural resources, such as rivers, bays, ridge lands, agriculture and sensitive habitat should be preserved and enhanced. As much as possible, commute distances across the region need to be minimized by creating smaller self-sustaining settlements.

The challenges to sustainable city planning arise from a shortage of land resources, an increasing demand to provide housing and employment at a pace fuelled by both migration and population growth and most importantly the greed for quick returns on investment. Real estate development has come to be perceived as the propeller of growth for the Indian economy and has emerged as one of the significant contributors to the country's GDP.

On the policy level, the liberalization era enabled multinational companies to seek cheaper, cost-effective locations thereby leading to the emergence of new business districts/ employment quarters in all the major cities in India. The roots of the high appreciation rates on India's property market can be attributed to the reduction of interest rates during the NDA Government regime. This opened up the housing market for a very wide section of the society to purchase homes and also created a demand for such investment. With the state giving up on its mission to provide housing, over the years, the private developer has had an increasingly large role in shaping the urban form of the city. This is particularly true in the case of fringe areas where it is cheaper to procure large expanses of rural lands and build gated-communities or business parks. Such developments are also heavily catalyzed by the construction of roadway infrastructure by the city/state departments therefore leading to the proliferation of developments predominantly dependent on private motorized transport. With no regulatory pressure on sustainable development practices either at the



scale of a single building or at the scale of large developments, developers have been left free to milk the new cash cow dry with reduced emphasis on quality of the public realm and no respect for the ecology or natural systems within these developments.

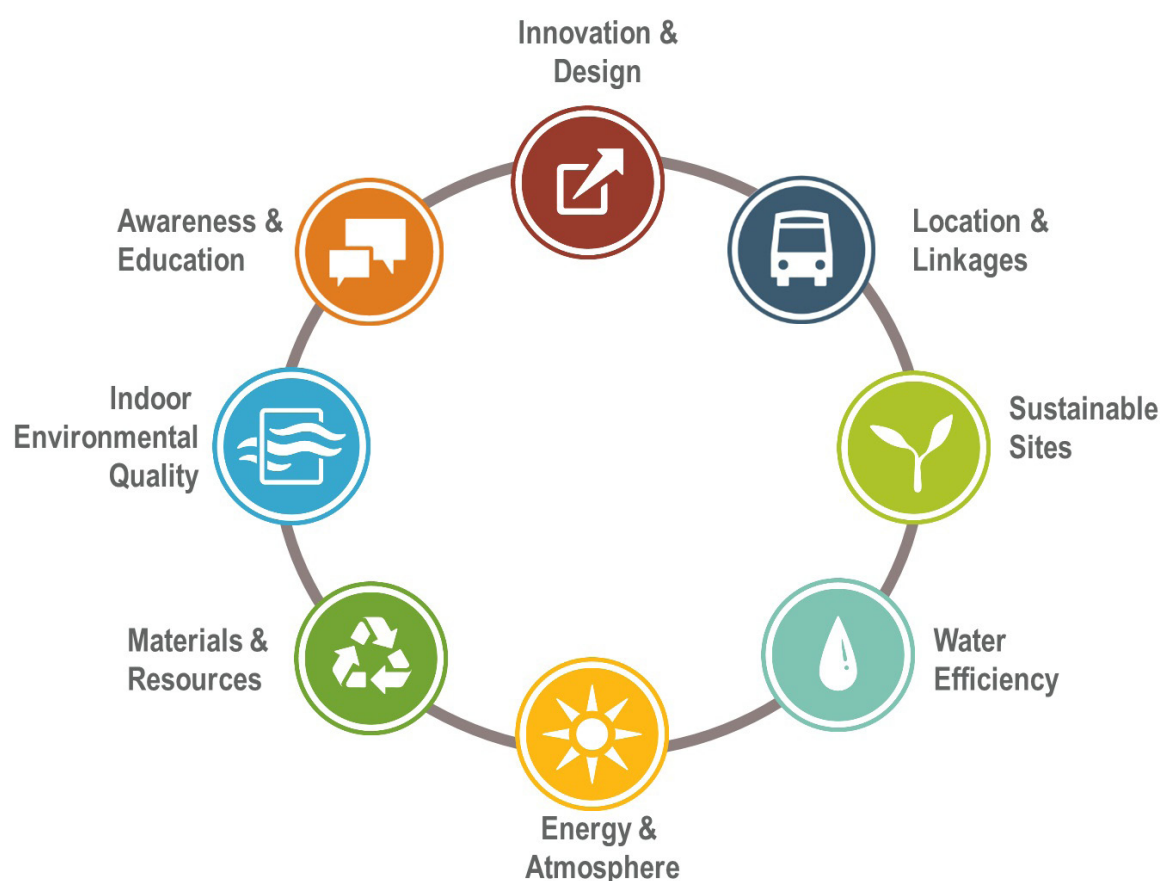


Figure 2.7 The various aspects of a green building  
Source: <http://greenlivingllc.com/>

On the consumer end, affordability has been a crucial deciding factor in the quest to own a house. The lack of awareness on what to look for beyond affordability has also contributed to the proliferation of new developments that offer very less in terms of quality of life apart from the satisfaction of owning a house.

Therefore, in order to effect reforms in this sector towards the acceleration of sustainable development, the following goals are identified to be achieved by the year 2025 through the implementation of the canvas of interventions-

**GOALS TO  
MEASURE  
ACCELERATION  
OF SUSTAINABLE  
DEVELOPMENT  
AS A RESULT OF  
THE CANVAS OF  
INTERVENTIONS**

- At least 30% of square footage of built area in a city must qualify to be platinum green-rated (IGBC/ GRIHA standards)
- The environmental footprint of all new construction must be reduced to half of current levels- All new development/ layouts to satisfy IGBC/ GRIHA standards; The environmental impact of construction and demolition related activities must reduce by 50%
- At least 60% existing developments must be retrofitted to satisfy better access criteria to public transport
- 90% of all urban streets must support walking, cycling and public transport
- Per capita green space in a city must increase by 50%
- No more rural lands on the periphery of cities to be permitted for urbanization

# GOALS TO MEASURE ACCELERATION OF SUSTAINABLE DEVELOPMENT AS A RESULT OF FACTOR 4 FOUNDATION'S CANVAS OF INTERVENTIONS

## ENERGY

- 40% of energy requirement to be derived from renewable sources
- The target for annual energy savings for a city should be about 15% of the estimated demand for the next year
- 30% private-owned vehicles and 75% public transport to run on clean fuels
- At least 15% of a city's overall housing stock must qualify as low-energy homes

## WATER

- No additional bore-wells from this point onwards
- Water losses due to leakage and theft to be brought down to under 10% of water extracted from source
- Ground water levels to be restored to levels that were prevalent 20 years ago
- 10% of overall water demand (or 75% of industrial water demand) must be satisfied by rainwater harvesting

## WASTE

- Close all landfills in the country
- Achieve effective management of chemicals wastes throughout their life cycle and stop their release into air, water and soil in order to minimize their hazard to human health and the environment
- At least 30% of household waste must be recycled after sorting and 20% to be utilized through biological treatment

**FOOD**

- Reduce consumer demand for resource-intensive foods by 30%
- 10% of per capita food requirement must be produced within a one kilometre radius
- Reduce by 50% the per capita food waste at the retail and consumer levels across the food cycle

**MOBILITY**

- Reduce transport-related fossil fuel consumption and CO<sub>2</sub> emissions by 50%
- Reduce transport-related GHG emissions at source by 70%
- Reduce per capita vehicle kilometres travelled by 50%
- Increase public transit ridership by 50% in the overall modal split for a city
- Only 12% of urban land area is consumed for transport infrastructure
- Improve freight management efficiency by 50%

**BUILT FORM & OPEN SPACES**

- At least 30% of square footage of built area in a city must qualify to be platinum green-rated (IGBC/ GRIHA standards)
- The environmental footprint of all new construction must be reduced to half of current levels- All new development/ layouts to satisfy IGBC/ GRIHA standards; The environmental impact of construction and demolition related activities must reduce by 50%
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# 03

## The Role of Factor 4



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On the organizational front, each intervention under the proposed canvas becomes a vertical for Factor 4 Foundation and will require qualified staff to form the team working under that vertical. The various objectives under each intervention will translate into specific activities that the team will engage in as part of that vertical.

Presented here in this chapter is a table that outlines

1. The staffing requirements for Factor 4 under each vertical
2. Factor 4's role towards each objective and
3. Potential collaborators

## CANVAS 01- ADVOCACY AND INFORMATION DISSEMINATION

Initial staffing requirements for Factor 4 for this vertical (starting now and over the next 2 years):

*Researchers- 6 nos.*

*Trainers- 12 nos.*

*Field workers- 3 nos.*

*Consultants- 3 nos.*

*Managerial position- 1 nos.*

Objectives:

Factor 4's role to facilitate this action item in terms of specific activities

Potential collaborators

### DATA COLLECTION AND RESEARCH

- 1 To identify ways to collect, store and visualize sectoral level data at the city level in such a way that it facilitates planning and policy making
- 2 To identify ways to engage all change agents in the process of data collection

### OUTREACH AND COMMUNICATIONS

- 1 To identify ways to maximize the reach of effective communication on environmental issues and the impact of human interventions across all age-groups of change agents – producers, consumers, regulators & policy makers- in a way that ensures their participation and responsibility

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2 To quantify and communicate effectively to producers, regulators & policy makers how current practices and choices affect business ecosystems and levels of service across all sectors

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3 To identify ways to generate real public support for sustainable products and services

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## **SUPPORT AND TRAINING**

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1 To identify ways to bring education on the environment and the impact of human interventions into the social and political debate

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2 To widen and communicate useful expertise in the domain of environmental education through specific programs such as a 'Green skills' program

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3 To identify ways to maximize the reach of these education programs to all change agents

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4 To establish, support and train bodies of individuals to carry out such education

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- 5 To find ways to facilitate putting environmental projects into action through these programs

## CANVAS 02- PROVING BY DOING

Initial staffing requirements for Factor 4 for this vertical (starting now and over the next 2 years):

*Consultants for each sector- 6 nos.*  
*Field workers- 6 nos.*  
*Managerial position- 1 nos.*

Objectives:

Factor 4's role to facilitate this action item in terms of specific activities

Potential collaborators

### DATA COLLECTION AND RESEARCH

- 1 To identify a list of projects that can become pilot projects for each sector
- 2 To identify the scale and location at which this list of projects can be implemented
- 3 To identify newer ways of managing the sectors
- 4 To identify the costs involved in implementing such pilot projects and be able to validate these costs

### OUTREACH AND COMMUNICATIONS

- 1 To identify ways to disseminate the learnings of these proven experiments to a larger audience in other cities



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2 To identify ways to ensure participation of all change agents - producers, consumers and regulators & policy makers to implement these pilot projects

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3 To identify ways to allow all change agents to witness and experience the benefits of adopting newer ways of managing the sectors thereby encouraging more and more people to adapt what is proven

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#### **SUPPORT AND TRAINING**

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1 To identify the technical skills required to implement these pilot projects as well as the means to bring these skills on board for a pilot project

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2 To identify avenues for funding these pilot projects

## CANVAS 03- A PIPELINE OF INNOVATIONS

Initial staffing requirements for Factor 4 for this vertical (starting now and over the next 2 years):

*Business administration specialist (finance)- 1 nos.*  
*Managerial position- 1 nos.*

Objectives:

Factor 4's role to facilitate this action item in terms of specific activities

Potential collaborators

### DATA COLLECTION AND RESEARCH

- 1 To identify a list of environmental challenges and possibilities to be addressed and thereby keep alive a pipeline of innovations
- 2 To identify a list of products and services that are unfriendly to the environment in order to spark a pipeline of innovations for sustainable offerings

### OUTREACH AND COMMUNICATIONS

- 1 To question through a sustainability lens the dominant logic behind current business models and seek innovation
- 2 To identify ways to bring together various change agents towards realizing a pipeline of innovations

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- 3 To find ways to excite more and more people to be part of the culture of innovations by creating a fostering environment
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#### **SUPPORT AND TRAINING**

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- 1 To identify ways to catalyse a pipeline of innovations by creating a favourable environment for established and start-up businesses to tread this path
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- 2 To identify ways to drive marketing and innovation culture to create new business models, products, and services that deliver new revenue streams and employment opportunities
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- 3 To find ways to create an environment where future business and sustainability solutions based on emerging technologies can be ideated, visualised and simulated
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- 4 To find ways to channelize funding towards realizing a pipeline of innovations
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- 5 To identify expertise to arrive at various action items to foster a pipeline of innovations
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## CANVAS 04- BUSINESSES OF THE FUTURE

Initial staffing requirements for Factor 4 for this vertical (starting now and over the next 2 years):

*Business administration specialist (finance)- 1 nos.*  
*Economics specialist- 1 nos.*  
*Managerial position- 1 nos.*

Objectives:

Factor 4's role to facilitate this action item in terms of specific activities

Potential collaborators

### DATA COLLECTION AND RESEARCH

1 To define what it means to be a 'Business of the future'

2 To identify ways to put together a directory of 'businesses of the future'

### OUTREACH AND COMMUNICATIONS

1 To identify ways to influence established businesses to make an environmental turnaround to their current mode of operations

2 To excite more and more entrepreneurs to be part of the green economy by providing the necessary support for them to be nurtured and grow

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**SUPPORT AND TRAINING**

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- 1 To identify and facilitate these businesses of the future by creating a favourable environment for their long-term sustainability and economic viability
- 2 To identify management know-how to scale up the implementation/ manufacture of sustainable products and services
- 3 To identify management know-how to understand which partnerships can enhance the value of offerings
- 4 To find ways to speed up the timeline from idea to prototype to marketplace
- 5 To identify expertise who can synthesize business models, technologies and regulations across all the sectors

## CANVAS 05- GOVERNANCE FOR A LIVABLE FUTURE

Initial staffing requirements for Factor 4 for this vertical (starting now and over the next 2 years):

*Policy specialist- 1 nos.*  
*Economics specialist- 1 nos.*  
*Managerial position- 1 nos.*

Objectives:

Factor 4's role to facilitate this action item in terms of specific activities

Potential collaborators

### DATA COLLECTION AND RESEARCH

- 1 To identify ways to enable the government to be the exemplar with regard to driving and accelerating sustainable development
- 2 To identify ways to eradicate the externalization of costs of vital resources across the sectors of development
- 3 To identify a list of existing laws and policies that need to be strengthened in order to accelerate sustainable development
- 4 To identify a list of new laws and policies that need to be framed in order to accelerate sustainable development



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#### **OUTREACH AND COMMUNICATIONS**

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- 1 To identify ways to garner support from change agents in order to strengthen existing law and policy or create new ones to accelerate sustainable developments

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#### **SUPPORT AND TRAINING**

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- 1 To identify a policy team to work out ways to anticipate and shape regulations
  - 2 To provide support to regulators & policy makers through a policy team to frame progressive policies to accelerate sustainable development
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