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FORESIGHT WORKSHOP, NEW DELHI

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1 INTRODUCTION

On 7 October 2025, the Urban Transitions Mission Centre (UTMC), the Urban Transitions Mission (UTM) and [ICLEI South Asia](#) hosted a regional event dedicated to cities in India. The workshop was organised in collaboration with the [Coalition for Disaster Resilient Infrastructures \(CDRI\)](#), and was designed as an **interactive, future-oriented exercise** to help urban leaders and stakeholders **anticipate long-term challenges, explore emerging trends, and co-develop strategic pathways** for urban climate resilience and climate neutrality.

Rather than focusing on isolated problems, participants explored the **broader transformations** that will redefine urban life over the next decade and sought to pinpoint **areas for collective action and innovation**.

Guided by the central research question — *“What major challenges will the world face, and how will these impact Indian cities on their path toward Net-Zero?”* — the group worked with a **2035 time horizon**. They began by examining the **megatrends already reshaping cities** - from AI-driven hyperconnectivity and demographic transitions to resource scarcity and accelerating climate disruption - while also scanning for **emerging weak signals and potential ‘black swan’ events**.

Building on this analytical landscape, participants co-created a **2x2 scenario matrix** structured around two key uncertainties: **the pace of technology adoption** and **the degree of global collaboration**. Each resulting scenario served as a testbed to **identify city-relevant challenges** and outline **strategic responses**.

Given the diverse representation from **cities across India and South Asia** (including Bangalore, Leh, Vadodara, and Thimphu (Bhutan)), thirty urban experts, city representatives from ministries and municipalities, company representatives and participants from academia, as well as the host and co-host organisations, developed four scenarios around a fictional composite city - **“Indraprastha”** - embodying the complex realities of a typical Indian metropolis. This creative “plot twist” encouraged **cross-city collaboration** and fostered a **more open and imaginative environment** for sharing insights and local expertise.

Ultimately, the workshop sought to generate **strategic insights that are both robust and adaptive** - able to inform **long-term pathways toward Net-Zero** while remaining flexible enough to accommodate multiple possible futures. The outcomes combine **exploratory thinking with directional guidance**, offering a foundation for future dialogue, policy reflection, and collaborative action among participating cities.

Epaminondas Christophilopoulos – Elli Tzatzanis-Stepanovic, in cooperation with Andrada Barață, Kanak Gokarn, Karel Van Oordt, Nicola Iezza, and Rohit Sen.



2 WORKSHOP DESIGN

A tailormade process was designed following the steps briefly described below:

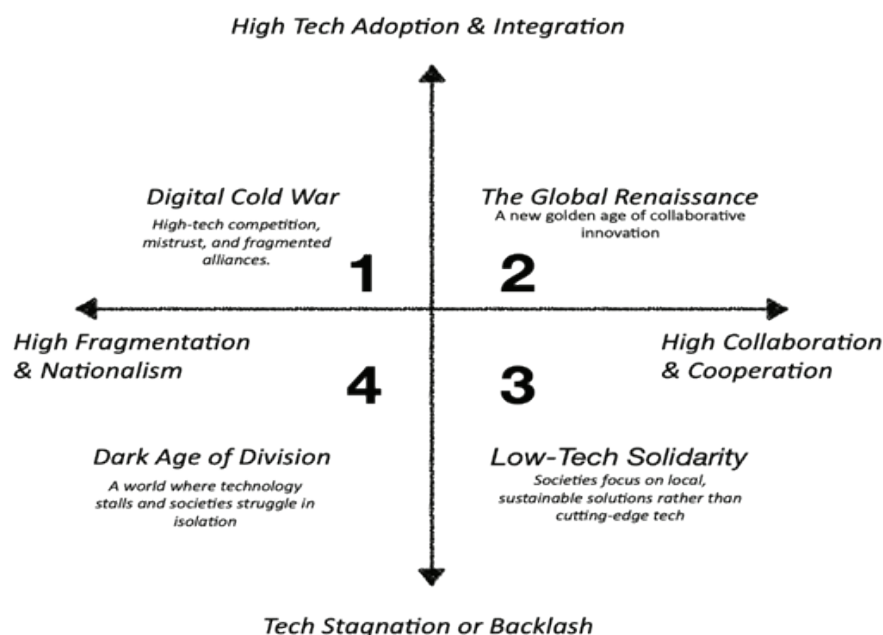
1. Megatrend evaluation. Evaluation of 8 pre-selected key megatrends (ANNEX 1) and identification of direct and indirect impacts on the coaching practice:

- Environmental Degradation/Climate Crisis
- Aggravating Resource scarcity
- Demographics Imbalances
- Growing Urbanization & Consumption
- Exponential Technological Growth
- Changing Nature of Work
- Polarization in societies
- New Governing Systems

2. Trends Identification. Identification of additional trends, weak signals, uncertainties and black swans.

3. Scenario Composition. Composition of alternative future scenarios using as a basis a 2x2 scenario matrix built upon two (pre-selected) “critical uncertainties”:

- **Key Uncertainty 1: *High Tech Adoption & Integration vs. Tech Stagnation***
- **Key Uncertainty 2: *Global Collaboration vs. Fragmentation***



4.Scenarios Flesh-Up. The future reality for each scenario was composed. Random pre-selected incidents (ANNEX 2) have been taken into account in each scenario.

5. Challenges prioritization. Teams suggested the main city challenges towards achieving net-zero for every future, and strategies to address them. The strategies were prioritized through a plenary voting process.

3 MEGATRENDS/TRENDS/WEAK SIGNALS/UNCERTAINTIES/BLACK SWANS

3.1 Megatrends

A megatrend is defined as a major path of development, an identifiable cluster of phenomena with a clear direction of development. By definition, megatrends are usually the main drivers of change although we often misinterpret their impacts or the time horizon.

The workshop participants were provided with a list of 8 preselected megatrends, with the task to analyze their impact on the coaching practice.

Megatrend	Participant-Identified Impacts on Indian Cities
1. Climate Change and Environmental Degradation	<ul style="list-style-type: none"> • Heat, drought, and rising temperatures intensify health risks and energy demand. • Urban flooding and extreme weather strain infrastructure. • Air quality deterioration broadens health and productivity losses. • Solid/liquid waste challenges compound environmental stress. • Biodiversity loss in peri-urban zones; urban heat islands; natural calamities and land loss highlighted as direct city impacts.
2. Aggravating Resource Scarcity	<ul style="list-style-type: none"> • Water stress and groundwater depletion. • Resource scarcity elevates costs for basic services (water, food), reduces access to green space, and magnifies inequality and pushes cities toward circular economy practices. • Migration both a driver and outcome of scarcity; public insecurity and local economic pressures cited.
3. Demographic Imbalances	<ul style="list-style-type: none"> • Youth under/unemployment alongside a potential demographic dividend. • Internal migration drains skills from smaller cities and strains social fabric and governance in larger ones; safety and education capacity under pressure. • Inequality/segregation deepens access gaps to jobs and public resources.
4. Growing Urbanization & Consumption	<ul style="list-style-type: none"> • Service pressures (waste, water/wastewater, housing) and financial burdens on cities. • Forest and land cover depletion, rising energy demand, more cars, and quality-of-life decline. • Some benefits noted (access to education/healthcare), but uneven.
5. Exponential Technological Growth	<ul style="list-style-type: none"> • Opportunities: better service delivery, emissions reduction, local manufacturing; tech-enabled governance and faster information flows. • Risks: digital divide, e-waste, data/AI security, “dumber human being” concern, job displacement, and over-reliance on private platforms.

6. Changing Nature of Work	<ul style="list-style-type: none"> • Gig economy expands flexibility but reduces security and benefits. • Heat/health impacts on outdoor/factory work; potential efficiency gains in services. • Remote work eases traffic for some but reduces social security coverage. • Skills gaps widen; need for reskilling/upskilling.
7. Polarization in Societies	<ul style="list-style-type: none"> • Low-trust environments, civil unrest, identity politics. • Social-media-driven polarization and trolling linked to mental health concerns; regional disparities widen. • Risks of policy paralysis or volatile swings in priorities.
8. New Governing Systems	<ul style="list-style-type: none"> • Trends toward integrated, people-centric, transparent governance and e-governance. • Multi-level governance and local autonomy needed, but fragmentation persists. • Climate finance and PPPs become pivotal.

Furthermore, participants evaluated the overall impact of each megatrend on the coaching profession. The evaluation of all Megatrends is presented in the following image (0 no impact / 10 strong impact) (**Image 1**).

The most important is the Climate Crisis, followed by the Exponential Technological Growth, Urbanization/Consumption and the Resource Scarcity.

How important is the impact of the following megatrends on the future of the Indian cities?

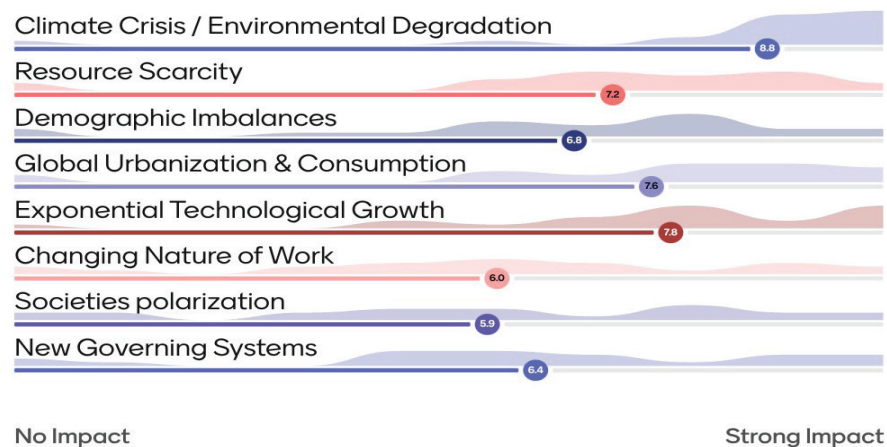


Image 1 - Impact of Megatrends on the future of Indian cities

3.2 Trends & Weak Signals

A **Trend** is long-term change moving in a clearly identifiable direction, similar to the megatrends but with a narrower impact on a specific sector, country, demographic group, etc.

A **Weak Signal** is an event or phenomenon that can be considered a first expression of change or a new trend in development. A weak-signal scan was performed by the participants, collectively and individually (**Image 2**), aiming at identifying first-generation patterns that are barely visible today but could reshape Indian cities by 2035.

Below is a presentation of the “Strong Trends” and the “Weak Signals” by domain identified by the participants.

1. Society & Individual

Strong Trends

- **Individualism and consumerism** are on the rise, particularly among younger generations. Social ties are being restructured, and traditional family or community connections are losing influence.
- Growing **civic awareness and education** are driving environmental campaigns, court petitions, and activism.
- **Social media and digital networks** increasingly shape public opinion, but also deepen polarization and misinformation.
- **Younger demographics** and an expanding middle class are becoming central to social change.
- Heightened **awareness of urban quality of life issues** — air pollution, congestion, safety, and health — is encouraging lifestyle changes and public engagement.

Weak Signals / Uncertainties

- **Internal migration** continues due to unequal opportunities, pressuring cities and altering demographics.
- **Rising social unrest** linked to inequality and exclusion, counterbalanced by a growing number of NGOs and community groups.
- **Polarization vs. collectivism** tension: uncertain whether social cohesion or fragmentation will dominate.
- **Gen Z values and behaviors** (sustainability, inclusivity, work-life balance) remain under-analysed but could redefine civic culture.
- **Virtual relationships** and online debates increase stress and emotional volatility.
- **Education transformation under AI** — automation and access gaps could reshape learning and mobility opportunities.

2. Technology & Innovation

Strong Trends

- **Digitalisation and AI integration** across governance, services, and industry; expanded use of data analytics and IoT.
- **Electric mobility, smart grids, renewable energy, and green procurement** accelerating sustainability transitions.
- **Technology-driven governance:** e-services, fintech (e.g., Unified Payment Interface), and data-driven management.
- Expanding **innovation ecosystems** and **startups** as engines of local change.
- Openness to **green and circular innovations** among youth and educated citizens.
-

Weak Signals / Uncertainties

- **Digital divide:** unequal access to digital and AI tools; risk of social exclusion.
- **Job displacement** from automation, especially among low-skilled workers.
- **Data privacy and AI governance:** uncertainty about ethical frameworks and accountability.
- **Space-based technologies** emerging but with unclear integration into local governance.

- **Green hydrogen** and next-generation clean technologies seen as potential breakthroughs but not yet viable.
- **Traditional knowledge systems** resurfacing as a complement to high-tech sustainability.

3. Economy & Companies

Strong Trends

- **Rising corporate power** and **concentrated wealth** dominate economic landscapes; PPPs and privatization increasingly shape city development.
- Rapid **growth of digital and fintech economies**.
- **Industrialization and local manufacturing** expansion, supported by new technologies and green transition incentives.
- Persistent **financial burdens for cities**, especially around infrastructure and climate adaptation costs.
- **GDP growth focus** continues to overshadow well-being and climate priorities.

Weak Signals / Uncertainties

- **Informal economies** remain resilient yet under-regulated.
- **De-dollarization**, shifting trade dynamics, and **tariff policy changes** may disrupt economic stability.
- **Sub-optimal growth and emigration** trends in smaller cities; uncertain redistribution of opportunities.
- **Participation of private finance in sustainability projects** (green bonds, carbon credits) remains unpredictable.

4. Environment

Strong Trends

- Widespread **climate degradation**: air and water pollution, improper waste management, deforestation, and biodiversity loss.
- Increasing **frequency of climate-related disasters** and pressure on urban ecosystems.
- Growing **renewable energy adoption** (solar, biofuels, EVs), **afforestation**, and **urban greening** initiatives.
- **Circular economy** and environmental responsibility campaigns gaining momentum (e.g., “Mission LIFE”).
- Rising **citizen awareness** about pollution and quality of life; new environmental laws and enforcement in progress.

Weak Signals / Uncertainties

- **Rainwater harvesting** and **community-led greening projects** appear sporadically; uncertain scalability.
- **Clean construction practices** gaining interest but not mainstream.
- **Green hydrogen** potential and **technological uncertainty** for energy storage and decarbonisation.
- **Localized environmental movements**—bottom-up sustainability initiatives in specific neighborhoods.
- **Tree planting campaigns** (“plant a tree in your mother’s name”) show growing symbolic activism.
- **Public participation gaps** may slow large-scale transformation.

5. Politics & Governance

Strong Trends

- Increasing **citizen mobilisation** and local activism in urban planning and climate issues.
- Growth of **integrated and people-centric governance models**, supported by digital tools.
- **Urban issues** now dominate **electoral politics**, especially infrastructure, housing, and climate adaptation.
- Persistence of **fragmented governance structures** and overlapping authorities.
- **“Money and muscle power”** remain influential in local decision-making.
- **Nationalist and development-focused** politics frame many urban interventions.

Weak Signals / Uncertainties

- **Riots and communal violence** remain unpredictable, threatening stability and governance continuity.
- **Changes in political establishment or priorities** could shift climate and development agendas.

3.3 Black swans

A black swan is an unexpected and unlikely factor of change that has significant effects and suddenly pushes a chain of events onto an uncertain path.

Pandemics, AI disruptions, and extreme climate events were the most repeatedly cited across teams, indicating broad perception of vulnerability in health, tech, and environment systems. Also, some participants also pointed to **positive transformative black swans**, such as **reviving rural areas** or **new economic models (universal income)** that could rebalance sustainability.

The identified black swans are the following:

1. Climate and Environmental Disruptions - Key black swans:

- **Extreme heatwaves** and **urban flooding** causing infrastructure collapse, health crises, and migration.
- **Forest dieback** and **species extinction**, leading to loss of ecosystem services and food chain instability.
- **Rising sea levels, glacier depletion**, and **river droughts** triggering large-scale displacement.
- **Resource extinction** and **unproductive land** due to overexploitation.
- **Weakened monsoon systems** and climatic tipping points beyond adaptation capacity.

Potential consequences: *Massive resource shortages, failure of urban systems, food insecurity, and loss of biodiversity.*

2. Technological and AI-related Disruptions - Key black swans:

- **AI-related disruptions:** loss of human agency, large-scale unemployment, cyber-governance failures.
- **Artificial intelligence as government or control system** – emergence of “AI government” scenarios.
- **AI distraction and dependency**, undermining decision-making capacity.
- **Nuclear fission accidents or weaponization** linked to tech misuse.
- **Extraterrestrial contact (ET)** as a symbolic extreme uncertainty in technological evolution.

Potential consequences: *Rapid societal destabilization, erosion of trust in human-led institutions, or ethical collapse in governance and economy.*

3. Geopolitical and Security Shocks - Key black swans:

- **War or Third World War**, including **nuclear conflict** or **war for water/resources**.
- **Political unrest, dictatorships**, or **changes in government** disrupting stability.
- **Genocide** or large-scale ethnic violence driven by geopolitical stress.
- **Energy sovereignty crises, fossil fuel discoveries**, or **resource nationalism** reshaping global alliances.

Potential consequences: *Geopolitical fragmentation, refugee waves, economic sanctions, and redefinition of national priorities away from climate and inclusion goals.*

4. Health and Societal Collapse - Key black swans:

- **Pandemics and epidemics** (multiple mentions across all groups) overwhelming healthcare and disrupting mobility.
- **Drug abuse epidemics** and **weaker social networks**, leading to mental health deterioration and declining civic resilience.
- **Equality shocks** — abrupt societal reactions to inequality, possibly through unrest or systemic reform.
- **Extinction of humans** mentioned symbolically as ultimate outcome of cascading crises.

Potential consequences: Widespread mortality, isolationism, and collapse of global coordination systems (as observed during COVID-19 but potentially worse).

5. Economic and Resource System Shocks - Key black swans:

- **Economic downturn or global depression**, collapsing investment in sustainability.
- **Universal income or alternative economic models** radically reshaping labor markets.
- **Lack of resources for EV transition, green hydrogen failure, and energy scarcity** reversing decarbonisation progress.
- **Population explosion vs. resource limits** producing systemic urban failures.

Potential consequences: Mass unemployment, inflation, collapse of middle-class consumption models, and new economic paradigms.

6. Cultural and Social Transformation - Key black swans:

- **Geographic and cultural diversity turning into political fragmentation.**
- **Revival of rural areas** or decentralised living after urban collapse.
- **Bad social media** environments triggering mass disinformation and civic breakdown.
- **Sex- and gender-related conflicts** as flashpoints for societal redefinition.

Potential consequences: Rapid shifts in value systems, new moral frameworks, or cultural disintegration through polarization and misinformation.

4 SCENARIOS – INDRAPRASTHA 2035

The 6 groups have worked independently for composing alternative future scenarios for the imaginary Indian city of Indraprastha. The composition of the alternative future scenarios using the 2x2 scenario method based upon two (pre-selected) “critical uncertainties”:

Key Uncertainty 1: High Tech Adoption vs. Tech Stagnation

Axis Extremes:

- *High Tech Adoption & Integration:* AI, AR/VR, and data-driven tools become seamlessly embedded in daily life and in coaching practices.
- *Tech Stagnation or Backlash:* Slow digital transformation, regulatory clampdowns on AI, widespread public skepticism about technology in personal development.

Why It Matters: If technology adoption accelerates rapidly, cities might transform into hybrid or AI-augmented organizations. If there's a major backlash or slow uptake, cities sustain a more traditional and face-to-face modus operandi, with less reliance on advanced tools.

Key Uncertainty 2: Global Collaboration vs. Fragmentation

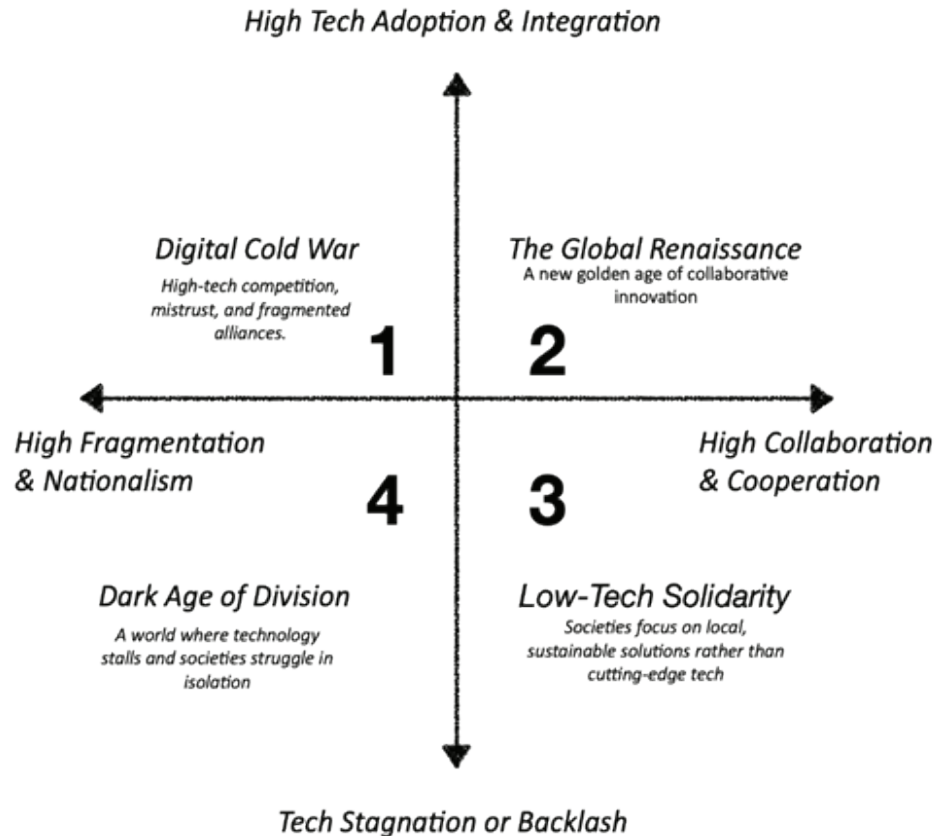
Axis Extremes:

- *High Collaboration & Cooperation:* Nations and organizations coordinate to tackle climate change, health crises, and social issues. There's a resurgence of global coalitions, shared resources, and strong frameworks for conflict resolution.



- *High Fragmentation & Nationalism*: Nations turn inward; global problems receive patchwork solutions, if any. Policies and resources vary dramatically, leading to uneven societal impacts and friction points.

Why It Matters: A collaborative world might create new opportunities for collaboration across cultural and geographical boundaries, as organizations operate in more integrated ecosystems.



As some groups have been working in the same quadrant, the following scenarios constitute a synthesis of the scenarios of each quadrant.

4.1 Indraprastha in the “Digital Cold War” scenario

By the late 2020s, global tensions over technology sovereignty intensify into a **Digital Cold War**, fragmenting data ecosystems and isolating national innovation hubs. India, like many nations, prioritises **digital independence** - enforcing stricter privacy laws, limiting foreign platforms, and investing in local AI governance frameworks. Cities such as Indraprastha adapt to this securitised digital order, relying on domestic technologies for energy, mobility, and public services. However, these systems become increasingly siloed, with limited knowledge sharing and declining interoperability. A small circle of corporations and state actors concentrates control over data and resources, turning innovation into a closed, competitive arena.

By the early 2030s, **trust in AI surpasses trust in institutions**. Algorithmic systems dominate governance and resource management, yet the benefits remain unevenly distributed. Wealth and technical capability concentrate within a few entities, while citizens experience shrinking agency in decision-making. Urban resilience strategies - AI-driven grids, smart water management, predictive planning - are effective but exclusive, accessible mainly to well-resourced districts. As climate impacts worsen, from recurring heatwaves to water scarcity and urban flooding, the city’s adaptive capacity depends increasingly on private platforms rather than

public collaboration.

By 2035, Indraprastha is a **digitally advanced but socially fragmented metropolis**. Cybersecurity and geopolitical risk dominate political discourse, while cultural polarization deepens. Innovation is seen not as a public good but as a strategic asset. Although emissions decline modestly through automation and efficiency, the transition to net-zero slows under fragmented governance, resource constraints, and a growing skills divide. The city faces a paradox: immense technological power but limited collective capability to harness it for inclusive sustainability.



Key Net-Zero Challenges in the Digital Cold War Trajectory

1. **Securing equitable access to innovation:** knowledge and technology are concentrated within a few actors, leaving local governments and citizens dependent on private systems.
2. **Balancing resources across urban services:** financial and material constraints limit investment in renewable energy, mobility, and resilience infrastructure.
3. **Bridging the learning and skills gap:** rapid AI integration outpaces workforce capabilities, requiring large-scale education and capacity-building initiatives.
4. **Ensuring digital and AI security:** cyber threats and data vulnerabilities undermine trust in digital net-zero systems.
5. **Strengthening multi-level governance:** fragmented authority and competing interests hinder coherent, city-wide climate strategies.



4.2 Indraprastha in the “Global Renaissance” scenario

By the mid-2020s, a renewed sense of **global cooperation and technological optimism** begins to reshape cities worldwide. In the aftermath of years of digital fragmentation and economic volatility, nations recognise that climate resilience and sustainable growth demand **shared innovation and transparent governance**. Indraprastha positions itself as a model “Living Lab”, where local governments, universities, and businesses co-create digital and green solutions. **High technological literacy** and **citizen participation** drive the adoption of renewable energy, smart mobility, and circular construction. Cities exchange data and best practices across borders, accelerating climate action through **open knowledge networks** and **climate finance partnerships**.

By the early 2030s, the world enters a “**Global Renaissance**” - an era of connected problem-solving and civic renewal. Artificial intelligence supports climate-responsive design, renewable integration, and real-time environmental monitoring. Citizens trust institutions more, as **transparency and inclusion** become policy norms. Decentralised governance fosters innovation from the ground up, while green R&D investment and digital entrepreneurship spur new jobs and industries. Yet prosperity brings new pressures: **energy demand surges, electronic waste accumulates, and space- and data-intensive technologies** consume growing resources. The challenge shifts from access to technology to **managing its ecological footprint**.



By 2035, Indraprastha exemplifies both the promise and complexity of this cooperative era. The city benefits from international collaboration, high civic awareness, and green infrastructure - but must also balance rapid digital expansion with sustainability limits. In this globally connected world, the pathway to net-zero relies not just on innovation, but on the **capacity to recycle, regulate, and restrain the excesses of progress**.

1. **Electronic waste and resource recovery:** managing growing e-waste streams from widespread digitalisation through circular-economy systems and green procurement.
2. **Rising energy demand:** meeting the power needs of AI, data centres, and electrified infrastructure with renewable sources and efficient grids.
3. **Maintaining international cooperation:** ensuring continued exchange of green technologies and climate finance amid potential geopolitical or “space race” competition.
4. **Preventing compartmentalisation:** promoting transparency, open data, and cross-sector accountability to avoid silos between research, governance, and implementation.

4.3 Indraprastha in the “Low-Tech Solidarity” scenario

In the wake of successive global crises - climate shocks, pandemics, and economic downturns - the 2020s see societies turning inward. By the early 2030s, the world enters a phase of “**Low-Tech Solidarity**”, where communities prioritise **resilience, equity, and measured consumption** over rapid digitalisation. Public backlash against automation, social media manipulation, and AI-driven inequality sparks a movement toward **human-centred, low-tech solutions**. In Indraprastha, social cohesion strengthens as citizens rely on local networks, cooperative economies, and community-led adaptation. While economic growth slows, **collective action and grassroots innovation** help manage essential services like water, waste, and food security more equitably.



Technology does not disappear - it becomes **simpler, slower, and more accessible**. E-governance remains, but social media is regulated and data use restricted. Resource constraints and climate pressures encourage **repair, reuse, and decentralised production**, creating small-scale employment in the circular economy. Climate relocation programmes reshape urban demography, as migration from flooded coastal regions increases population density and stresses housing and infrastructure. Despite these pressures, **trust in institutions and mutual support** grow, replacing the polarisation of the previous decade.

By 2035, Indraprastha stands as a city of modest prosperity and strong social fabric. Its citizens value sufficiency over abundance, community over consumption. Yet, the shift toward low-tech resilience also slows progress toward **net-zero goals**: financing for large-scale renewable projects declines, and innovation pipelines narrow. The challenge becomes sustaining environmental ambition amid economic stagnation and global relocation pressures - pursuing climate justice without losing momentum on decarbonisation.

Key Net-Zero Challenges in the Low-Tech Solidarity Trajectory

1. **Land and urban pressure:** climate-induced migration intensifies competition for land and livelihoods, leading to social tension and higher emissions from unplanned urbanisation.
2. **De-prioritisation of net-zero goals:** limited fiscal capacity and shifting political focus towards social welfare reduce investment in decarbonisation and infrastructure.
3. **Economic slowdown and governance strain:** weaker economic growth constrains innovation and green finance; cities struggle to maintain effective governance and enforcement.
4. **Need for adaptive planning:** balancing adaptation (e.g., relocation, reforestation, water management) with long-term mitigation strategies.
5. **Reskilling for a green economy:** ensuring workforce readiness for renewable energy, sustainable construction, and local circular industries.

4.4 Indraprastha in the “Dark Age of Division” scenario

The 2020s end in a decade of disruption and distrust. Political polarisation, social unrest, and recurring crises - from cyberattacks to climate-driven disasters - erode cooperation at every level. By the early 2030s, India and many other nations adopt more **centralised, security-oriented governance**, prioritising control and self-sufficiency over openness. Social media restrictions and digital surveillance become commonplace after waves of online misinformation and cyber conflicts. In Indraprastha, this new order produces an uneasy mix of **stability and stagnation**: innovation continues under government-funded incubators, yet creativity and civic participation narrow under constant monitoring.

Economic inequality deepens as access to technology and clean energy becomes stratified. Local industries grow, supported by protectionist policies and domestic funding schemes, but the **focus on rapid industrial expansion and energy security** drives up emissions and pollution. The city's infrastructure strains under **rising energy demand, fossil fuel dependence**, and degraded air and water quality. While renewable technologies - solar, biofuels, electric mobility - expand modestly, they coexist with high-carbon systems sustained by political inertia and limited international collaboration.



By 2035, Indraprastha mirrors a divided world: technologically advanced yet socially fragmented, with citizens fatigued by surveillance, activism, and economic stress. Trust in institutions remains low, but local resilience initiatives begin to surface, emphasising **community-level adaptation, gender-inclusive skilling, and citizen-based monitoring**. However, progress toward net-zero remains slow, constrained by financial scarcity, low technical capacity, and weak accountability mechanisms.

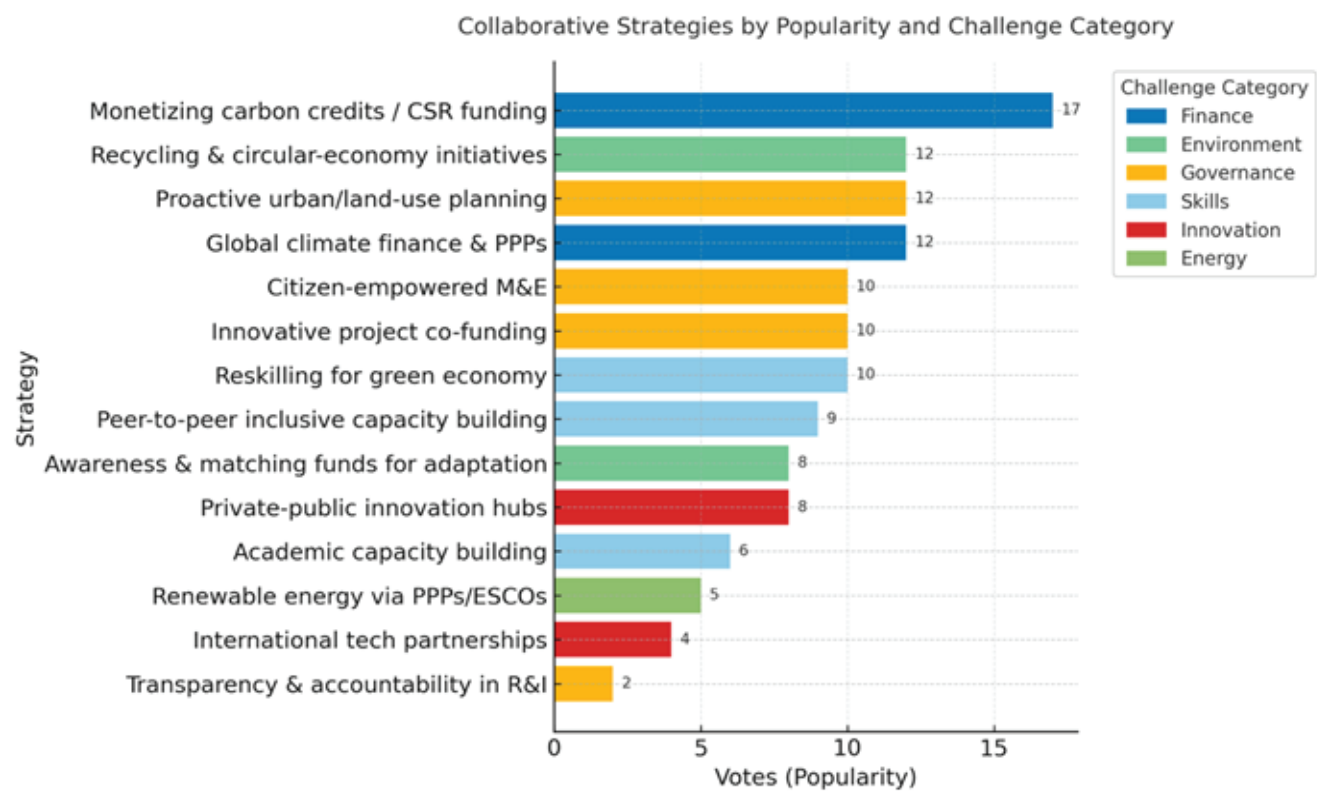
Key Net-Zero Challenges in the Dark Age of Division Trajectory

1. **Access to affordable finance:** limited capital availability for sustainable innovation; reliance on carbon credits and CSR funding to support low-carbon initiatives.
2. **Low technical and administrative capacity:** insufficient reskilling of government staff and a lack of trained professionals to manage green technologies.
3. **Weak monitoring and evaluation:** fragmented governance and poor data transparency hinder progress tracking and policy adaptation.
4. **Erosion of civic trust:** authoritarian governance limits citizen participation, reducing accountability and social buy-in for net-zero initiatives.

5 STRATEGIES

The 6 groups have identified a series of challenges for Indian cities towards achieving Net-Zero and suggested collaborative strategies to address them.

The following table presents all collaborative strategies identified during the foresight workshop, ranked in descending order by popularity (votes). Each strategy is linked to the specific challenge it addresses, showing how participants envision cooperation, innovation, and governance as key enablers of net-zero transitions.



Rank	Strategy	Votes	Challenges Adressed	Explanation / Purpose
1	Monetizing carbon credits as funding / Use of CSR (Corporate Social Responsibility) funds	17	Lack of low-cost capital to finance incubation centers	<ul style="list-style-type: none">Mobilizing alternative finance through carbon markets and CSR partnerships to support innovation and green infrastructure when traditional funding is scarce.
2	Recycling and circular-economy initiatives	12	Electronic waste	<ul style="list-style-type: none">Establishing recycling systems and material recovery schemes to manage e-waste generated by rapid digitalisation and green technologies.
3	Proactive urban and land-use planning / Adaptation investment (e.g., sea walls, reforestation)	12	Land pressure and climate-related conflicts	<ul style="list-style-type: none">Anticipating urban expansion and migration pressures through adaptive land management and ecological restoration to reduce displacement and social tension.

4	Increasing global climate finance flows / PPPs / Creation of new green markets	12	Net-zero deprioritization and reduced financing	<ul style="list-style-type: none"> Securing international and blended climate finance, and fostering public-private partnerships to sustain net-zero efforts despite economic downturns.
5	Citizen-empowered Monitoring & Evaluation (M&E) and incentivized reporting	10	Ineffective monitoring and evaluation systems	<ul style="list-style-type: none"> Engaging citizens in transparent climate progress tracking, using participatory data collection and scientifically based KPIs.
6	Innovative project funding & shared implementation with citizens, private sector, and governments	10	Balancing resources across all urban services	<ul style="list-style-type: none"> Promoting co-investment and co-management frameworks for infrastructure and climate projects, ensuring inclusivity and accountability.
7	Reskilling towards green economy and renewable energy employment	10	Economic slowdown and governance challenges	<ul style="list-style-type: none"> Developing a new workforce capable of maintaining green infrastructure, renewable systems, and sustainable enterprises.
8	Peer-to-peer learning / Human-centered, gender-inclusive digital capacity building	9	Low technical and administrative capacity	<ul style="list-style-type: none"> Strengthening institutional capacity and staff skills through mutual learning networks and inclusive training programs.
9	Awareness raising and matching funds for conservation and adaptation	8	Reduced environmental conservation and funding for adaptation	<ul style="list-style-type: none"> Increasing public and institutional awareness while securing matched funds for conservation, biodiversity, and adaptation programs.
10	Cooperation between private sector & governments through tailored innovation spaces	8	Limited access to innovation for local governments and citizens	<ul style="list-style-type: none"> Creating structured partnerships and innovation hubs that align private R&D with public-sector and city needs.
11	Capacity building programs with academia for technology awareness and green jobs	6	Skills gap in new technologies and jobs	<ul style="list-style-type: none"> Partnering with universities and research institutions to provide targeted training and awareness programs for emerging climate technologies.
12	Renewable energy deployment (RES) and clean energy uptake via PPPs, ESCOs, and viability gap funding	5	Exponential energy demand driven by AI and tech expansion	<ul style="list-style-type: none"> Meeting rising energy demand through renewables, supported by performance-based contracts and public-private energy service models.
13	Knowledge exchange and international partnerships for tech and materials	4	Limited international collaboration and access to green tech	<ul style="list-style-type: none"> Fostering global cooperation for sharing clean technologies and ensuring equitable access to critical raw materials.
14	Transparency and accountability across research and innovation stakeholders	2	Compartmentalization / Silos in R&I	<ul style="list-style-type: none"> Promoting open collaboration, data-sharing, and mutual accountability to avoid policy and research isolation.

ANNEX 1: MEGATRENDS

Sources: JRC Megatrend Hub, Dubai Future Foundation, The Millennium Project

1. Aggravating Resource Scarcity

The Earth's resources are reaching a breaking point. Ecosystems that provide essential materials like food, water, and crucial services such as pollination and climate regulation are under immense strain. Mineral resources, including sand, metals, and rocks vital for industry and construction, are also running low. Human activity has altered 75% of land and 66% of oceans, with only 3% of the ocean remaining unaffected by human pressures. The overuse of resources is most severe in wealthy nations, responsible for 74% of global excess resource consumption, with the U.S. (27%) and EU-28 (25%) leading the way. Lower-income countries primarily strain biodiversity through biomass use. Tackling these issues, including climate change and disaster resilience, requires urgent action. Reducing material consumption, especially in affluent countries, is crucial to ensure intergenerational fairness and global equity while restoring and managing ecosystems for future sustainability.

2. Accelerating Technological Change and Hyperconnectivity

Technological advancements like biotechnology, gene editing, medical innovations, automation, and IoT-enabled wearables are rapidly reshaping society. This evolution brings unprecedented opportunities but also complex risks that cross industries, geographies, and daily life. Hyperconnectivity—the ever-expanding web of devices, computers, and data linked through the internet—is transforming how we learn, socialize, produce, and govern. Scientific discoveries accelerate, revolutionizing systems of management and transforming work environments. The boundary between the physical and digital worlds is blurring, as technology creates entirely new digital realities. The 'metaverse' exemplifies this shift, where virtual spaces offer experiences beyond what is possible in the physical world. While technological progress holds transformative potential, it demands vigilance to manage vulnerabilities and ensure equitable access to its benefits. Understanding and addressing this duality is crucial for shaping a connected and inclusive future.

3. Climate Change and Environmental Degradation

Climate change is an unavoidable reality; even if all human-caused emissions ceased today, climate patterns would still shift. However, without stronger action, greenhouse gas emissions will continue to accelerate global warming, disrupting weather, ecosystems, and societies. Human activities, including pollution, resource exploitation, and environmental degradation, are leading to severe, often irreversible impacts on people, economies, and ecosystems worldwide. Urgent action is critical—not only to mitigate these effects but also to adapt and reduce vulnerability to the changes we cannot prevent. Staying within 'planetary boundaries' demands a profound transformation in how we live and consume resources. Encouragingly, environmental awareness is spurring shifts in societal values and behaviors, pressuring established norms to evolve. Anthropogenic emissions—driven by economic and population growth—must be curtailed to manage warming rates. Decisive, collective action is vital for protecting the planet and building a resilient future.

4. Growing Urbanization and Consumption

By 2030, the global middle class, or consumer class, is expected to grow to 4.8 billion people, driving increased demand and reshaping global production. Rising consumption, driven by middle-class growth and new business models targeting low-income consumers, will spur economic development but also place immense pressure on resources like food, water, and energy. Urbanization, as people seek better job opportunities, services, and education, is intensifying. Cities, which today host more than half the world's population and are projected to reach 5 billion by 2050, concentrate economic activity, contributing 70% of global GDP. However, they are also responsible for over 60% of energy use, 70% of greenhouse gas emissions, and significant waste.

While urban living drives productivity, it also brings challenges, including environmental degradation, public health issues, housing shortages, congestion, and inequality. Digital technologies and local partnerships offer

hope, enabling cities to tackle these challenges through citizen-driven and sustainable solutions.

5. Megatrend Card: Changing Nature of Work

The world of work is rapidly evolving, driven by technological advancements, globalization, and socio-economic disruptions such as the pandemic, climate change, and geopolitical conflicts. Shifting demographics—marked by older generations extending their careers, baby boomers retiring, and younger generations entering the workforce—are reshaping work structures and cultures. Flexible and decentralized work models are gaining prominence, but skills mismatches and shortages persist across sectors.

Automation and new technologies present both challenges and opportunities, potentially replacing routine and cognitive tasks while increasing demand for new technical, social, and digital skills. The rise of the gig economy is reshaping job stability and contributing to wage polarization and employment inequalities. Remote work and virtual leadership, accelerated by the pandemic, offer benefits such as improved work-life balance and reduced office costs, but also risks like social isolation, burnout, and uneven access.

Emerging generations, especially Generation Z, bring fresh perspectives, prioritizing technology, sustainability, and new values in the workplace. Ensuring a balanced, inclusive approach to these changes is essential for fostering resilience and equity in work systems worldwide.

6. Demographic Imbalances

By 2050, the global population is projected to reach 9.7 billion, becoming older and more urban. Demographic shifts will vary across regions; Sub-Saharan Africa and a few low-income countries will see rapid population growth, while many high-income countries face stalled or shrinking populations beyond 2030.

Ageing populations bring challenges such as slower economic growth, increasing inequality, shifting political behavior, changes in geopolitical power, and pressure on public finances due to rising healthcare and pension costs. Conversely, countries with large and growing youth populations face challenges in providing sufficient investment in education, skills, and employment. Failing to meet these needs can lead to discontent, poverty, and high unemployment, potentially destabilizing regions.

Managing these imbalances requires adaptable policies that account for varying needs—balancing support for ageing societies with human capital investment in youth-rich regions, while fostering inclusive growth and equitable opportunities worldwide.

7. Polarization: Widening Inequalities

While extreme poverty has decreased globally, the gap between the wealthiest and poorest is widening. Inequalities persist and are even growing in key areas such as education, the labor market, health, gender, and territorial access. Wealth, income, and the impacts of climate change are unevenly distributed worldwide, with significant disparities remaining despite efforts to reduce them.

Access to quality education, employment, and health remains heavily influenced by factors like gender, age, ethnicity, social class, migration status, and location. Inequality not only hinders economic growth but also poses risks to democracy and social cohesion if concentrated wealth and corporate power continue to dominate societal rules and policies.

The COVID-19 pandemic has magnified preexisting inequalities, highlighting the urgency of addressing these systemic issues. Policymakers and societies are increasingly recognizing the need for inclusive measures to close the gaps and promote equity, social mobility, and sustainable development.

8. New Governing Systems

Governing systems worldwide are undergoing profound changes, influenced by non-state actors, global consciousness, social media, and the internationalization of decision-making. Traditional decision-making structures are giving way to new, multi-layered systems that emphasize participatory governance and the influence of diverse, non-state actors. Digital technologies, while enhancing public administration and government modernity, are also reshaping democracy by altering how citizens engage and governments operate.

Social media platforms, with their wide reach and influence, contribute to the prominence of emotional appeals and personal beliefs over objective facts, increasing societal polarization and posing risks to democratic institutions. While innovative government practices and digital transformation are making governance more inclusive in some areas, a global decline in democratic norms and practices is evident. Navigating these challenges requires fostering transparent, resilient, and inclusive systems that balance citizen engagement with evidence-based decision-making, mitigating risks of division and disinformation.

ANNEX 2: INCIDENTS

Sources: Work/Tech 2050 (The Millennium Project), Global Scenarios 2035 (OECD),

- 1. Global Digital Ecosystems Fragmentation (2030s):** Countries may form separate digital spheres, creating barriers to international collaboration. With differing standards for data, privacy, and cybersecurity, tensions arise as nations vie for technological supremacy. The divergence leads to a “multitrack” world, where bridging competing digital policies and ensuring interoperability become major challenges for international organizations (OECD).
- 2. Rise of Synthetic Biology (Late 2020s-2035):** Synthetic biology revolutionizes multiple sectors—healthcare, energy, agriculture, and manufacturing. Self-assembling microbes clean pollutants, AI-designed organisms produce new materials, and biocomputers proliferate. However, risks of biosecurity threats and unregulated organisms escaping control persist, requiring stringent oversight (The Millennium Project).
- 3. Cyber-Conflict Escalation (2030s):** Hybrid cyber-attacks become routine components of geopolitical confrontation, involving state and non-state actors. Technological and AI-driven advances complicate security dynamics, leading to global collaborations in cybersecurity or escalatory crises where major infrastructures are targets (The Millennium Project & OECD).
- 4. Economic Shift to the East and South (2030s-35):** By 2035, China, India, and other emerging economies further solidify their dominance, with Asia producing over 50% of global GDP. Geopolitical influence shifts, requiring Western nations to recalibrate diplomatic and economic strategies to navigate a multipolar global order (OECD).
- 5. Climate-Induced Global Relocation Initiatives (Mid-2030s):** Rising sea levels and environmental crises drive mass migrations from coastal and vulnerable regions. Global programs, such as reforestation, coastal restoration, and 3D-printed eco-housing, aim to mitigate and accommodate the shifting populations (The Millennium Project).
- 6. Workforce Transformation via AI and Automation (2030s-2035):** AI displaces routine jobs while creating new creative and self-actualization roles. Governments and private sectors collaborate on lifelong learning, but gaps in skills lead to heightened inequalities and societal divisions. Self-employment and gig economies thrive alongside technology-augmented human work (The Millennium Project).
- 7. Universal Basic Income Experiments (early 2030s):** By the mid-2030s, several countries successfully implement universal basic income, supported by taxes on AI, carbon, and financial transfers. This stabilizes economies in regions affected by technological unemployment but raises debates about sustainability and productivity (The Millennium Project).
- 8. New Space Race and Resource Control (2030-2035):** Competition over space resources and supremacy accelerates. Countries deploy satellites, lunar bases, and Mars missions to secure strategic advantage, further straining geopolitical relations and raising questions about space governance (The Millennium Project & OECD).
- 9. Social and Political Polarization Intensifies (late 2020s):** As social media and digital platforms amplify disinformation and emotionally charged narratives, political divisions deepen globally. Traditional democratic systems struggle against populist movements, eroding trust in institutions and impacting governance stability (OECD).
- 10. Green Technology Surge and Carbon Neutrality Efforts (2030s):** Renewed investments in green technology aim to meet climate targets, leading to breakthroughs in carbon capture, hydrogen energy, and sustainable urban designs. Cooperation or conflict emerge around access to these innovations and their equitable distribution (The Millennium Project & OECD).



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