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# Smart Cities

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## ABSTRACT

A smart city is an urban area where technology and data collection help to improve quality of life as well as the sustainability and efficiency of city operations. Smart city technologies used by local governments include information and communication technology (ICT) and the Internet of things (IoT). A city becomes smarter when it updates its systems and structures to incorporate ICT, IoT and other smart technologies to play increasing and important roles as well as in transportation, energy and infrastructure. Data collection by technology, which includes real-time data, are central to smart city initiatives and the benefits inherent to help local governments improve urban planning and the deployment of city services, ranging from waste management to public transportation, street lights, excellent drainages, and so on leading to better quality of life for residents. Smart cities can also reduce carbon emissions, thereby assisting to address climate change and improving air quality. An efficient city services can be an engine for driving economic growth and better infrastructure and technological innovation that would encourage job creation and business opportunities. The paper delves into the benefits, challenges or probable bottlenecks and the ways forward towards the development of sustainable smart cities.

***KEYWORDS:*** *Smart city, sustainable smart cities, information technology (ICT), Internet of Things (IoT), climate change, technological innovations, job creation, sustainable infrastructure, connectivity, ecological footprint, smart mobility, citizen engagement, intelligent cities, cybersecurity, dynamic resilient grid, smart cards, knowledge economy*

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## INTRODUCTION

A smart city is an urban area that makes use of digital technology to collect data and to operate/provide services [1-3]. Applications include traffic and transportation systems [4], power plants, utilities, urban forestry [5], water supply networks, waste disposal, criminal investigations, information systems, schools, libraries, hospitals, and other community services [6, 7].

The foundation of a smart city is built on the integration of people, technology, and processes, which connect and interact across sectors such as healthcare, transportation, education, and infrastructure, etc. [8], as shown in Figures 1 and 2. In smart cities, the sharing of data extends to businesses, citizens and other third parties who can derive benefits from using the data [9, 10]. The three largest sources of spending associated with smart cities as of 2022 were visual surveillance, public transit, and outdoor lighting [11], as shown in Figure 3.

Integrated with smart cities are ICT and IoT networks so as to optimize city services and connect to citizens [12, 13]. ICT is used to enhance the quality, performance, and interactivity of urban services, to reduce costs and resource consumption, and as well as to increase contact between the citizens and the government [14]. Smart city applications also manage urban flows and allow for real-time responses [15], with quick responses to challenges than one with a conventional "transactional" relationship with its citizens [16, 17].

According to Deakin and AI Waer, the following four factors contribute to the definition of a smart city [18, 19]:

- The application of a wide range of electronic and digital technologies
- Use of ICT in living and working environments
- Use of ICT in government systems
- The territorialization of practices that brings ICT and people together to enhance innovation and knowledge

Topping most lists when it comes to smart cities and in the order of ranking are: 1. Singapore, 2. Helsinki, Finland, 3. Zurich, Switzerland, 4. Oslo, Norway, 5. Amsterdam, the Netherlands, 6. New York, United States, and 7. Seoul, South Korea [20] – which was according to the 2020 Smart City Index, cum the annual report conducted by the Institute for Management Development with Singapore University for Technology and Design (SUTD), based on economic and technological data, along with their citizens' perceptions of how "smart" their cities are.

## HISTORY ON SMART CITIES

Predecessors of smart cities can be found in utopian works such as New Atlantis (1626) [21], and Ebenezer Howard's 1898 concept of Garden Cities – these were dense, size-limited cities founded in rural areas by private groups, combining the benefits of the city and the country. Included were the conceptions of Edward Bellamy, Frank Lloyd Wright, and Le Corbusier [19].

The concept of "smart cities" emerged from global cities' recent adoption of information and communications technologies for urban use, which can be used to improve efficiency, sustainability, and livability in urban environments [22]. Some of the earliest interventions in urban planning include the use of computational statistical analysis by the Community Analysis Bureau in Los Angeles in the late 1960s [23] and the establishment by Singapore of the National Computer Board in 1981 [24]. The smart city concept has experienced a major surge around 2005, as tech companies have sought to create information systems to enhance operational efficiency for cities [25].

To this effect, IBM in 2008 launched its Smarter Planet marketing initiative, which included the IBM Smarter Cities Challenge [26]. Furthermore, Cisco Systems in 2010, with $25 million from the Clinton Foundation, established its connected Urban Development program in partnership with San Francisco, Amsterdam, and Seoul. In 2011, a Smart City Expo World Congress in Barcelona attracted 6000 people from 50 countries. The European Commission in 2012 established the Smart Cities Marketplace, a centralized hub for urban initiatives in the European Union [27]. The 2015 Chancellor's Budget for the United Kingdom proposed to invest 40 million pounds in smart cities and IoT, 600 million pounds investment in freeing up spectrum to be used for wireless broadband and 7.5 million pounds to provide Wi-fi access for libraries in England [28].

The smart city competitions were launched in the 2010s by Bloomberg Philanthropies, the Rockefeller Foundation, and the United States Department of Transportation. In 2016, AT&T launched an alliance with Cisco, Deloitte, Ericsson, General Electric, IBM, Intel, and Qualcomm, with municipal partners Atlanta, Georgia, Chicago, Illinois, and Dallas, Texas [19].

## CHARACTERISTICS OF INNOVATIVE URBAN ENVIRONMENTS

Some of the key characteristics that define innovative urban environments include [29]:

- *Connectivity:* IoT networks collect and transmit data from sensors throughout the urban environment, as shown in Figure 4.
- *Data-driven decision making:* Advanced analytics and artificial intelligence enable more informed and responsive governance.
- *Sustainable infrastructure:* Energy-efficient buildings, renewable energy, and intelligent transportation, as shown in Figures 5 and 6.
- *Urban optimization:* Reduce resource usage, reduce ecological footprints, and enhance living standards to create more environmentally responsible urban spaces.
- *Citizen engagement:* Facilitate communication between residents and government, promoting participation in urban planning and decision-making processes.
- *Smart mobility*: Integrate public transit, bike-sharing, and autonomous vehicles, aim to reduce congestion and improve accessibility, as well as analyzing mobility behavioral patterns of citizens to improve services and optimize the city infrastructure, as shown in Figures 7 and 8.
- *Enhanced public services:* Improve the delivery of essential services.

## METHODS FOR ADOPTING SMART CITIES

These are the ways to take towards ensuring the smooth take-off for developing smart cities.

Required for smart cities are information and communications technologies to:

1. Make more efficient use of physical infrastructure such as roads, built environment and other physical assets through artificial intelligence and data analytics so as to support a strong and healthy economic, social, cultural development.
2. Engage effectively with local governance by use of open innovation processes and e-participation, improving the collective intelligence of the city's institutions through e-governance, with emphasis placed on citizen participation and co-design.
3. Learn, adapt and innovate and thereby respond more effectively and promptly to changing circumstances by improving the intelligence of the city [15].

All of these will lead to a strong integration of all dimensions of human intelligence, collective intelligence, and also artificial intelligence within the city [30], culminating in the effective combination of digital telecommunication networks (the nerves), ubiquitously embedded intelligence (the brain), sensors and tags (the sensory organs), and software (the knowledge and cognitive competence) [31]. The latest developments in telecommunications, robotics, IoT, and various connected technologies can be deployed to support both human capital and productivity [32, 33].

*Forms of intelligence for smart cities:* The three ways or forms of smart cities intelligence are:

1. *Orchestration intelligence:* Orchestration intelligence is a business strategy that integrates data, processes, technology, and operations to create a seamless system for customer interactions. It can also be referred to as the use of intelligent orchestration to improve security, or automate data collection, transformation, and analysis.
2. *Empowerment intelligence:* In this case, cities provide open platforms, experimental facilities and smart city infrastructure in order to cluster innovation in certain districts e. g as in the Kista Science City in Stockholm, the Cyberport Zone in Hong Kong, in Melbourne, and Kyiv [34].
3. *Instrumentation intelligence:* City infrastructure is made smart through real-time data collection, with analysis and predictive modeling across city districts, e. g as implemented in Amsterdam [35].

Smart cities also require energy usage for the employment of smart technologies for more efficient application of integrated energy technologies in the development of more self-sustaining areas. A smart city is powered by "smart connections" for various items such as street lighting, smart buildings, distributed energy resources (DER), data analytics, and smart transportation. For these reasons, utility companies play a vital role in smart cities. Electric companies, working partnership with city officials, technology companies and a number of other institutions, were among the major players that helped accelerate the growth of America's smart cities [36]. Hence, a smart city must have these two key elements i. e. an integrated communications platform and a "dynamic resilient grid," as shown in Figure 9 [37].

*Data management:* For the growth and security of smart cities, they must manage the enormous amount of data collected via embedded devices and systems in its environment. Since smart cities aims are to encourage innovations and improve citizens' quality of life, hence, they must ensure data security and privacy measures, as this would relate with utilities, health, transportation, entertainment and government services [38, 39]. Electronic cards, also known as smart cards is another common component in smart city context, having a unique encrypted identifier that allows the owner to log into a range of government provided services (or e-services) without setting up multiple accounts – as implemented in Southampton [18]. Cognitive technologies, such as artificial intelligence (AI) and machine learning (ML), can be trained on the data generated by connected city devices to identify patterns. The efficacy and impact of particular policy decisions can be quantified by cognitive systems studying the continuous interactions of humans with their urban surroundings [40].

*Transportation:* Bicycle-sharing systems are an important element in smart cities [41]. Intelligent transportation systems and CCTV systems are also being developed [42]. Retractable bollards are to restrict access inside city centers (i.e. to delivery trucks resupplying outlet stores). Opening and closing of such barriers is traditionally done manually, through an electronic pass [43], but can even be done by means of ANPR cameras connected to the bollard system [44].

*Human factors:* The smart city initiatives have measurable positive impacts on the quality of life of its citizens and visitors [45]. The human framework of a smart city – its economy, knowledge networks, and human support systems – is an important indicator of its success [46]. Common areas of focus are arts and culture initiatives in the planning of a smart city [47]. Innovation is associated with intellectual curiosity and creativeness, and various projects have demonstrated that knowledge workers

participate in a diverse mix of cultural and artistic activities [48, 49].

The learning capacity of a city will include its education system, as well as available workforce training and support, and its cultural development and exchange [50]. There is need for focus on soft infrastructure development, such as the increase in accessing voluntary organizations and designated safe zones [51]. The focus on social and relational capital means diversity, inclusion, and ubiquitous access to public services worked into city planning [33]. The development of a knowledge economy is central to smart city projects. Therefore, smart cities that want to be hubs of economic activity in emerging tech and services sectors must stress the value of innovation in city development [52].

*Enabling technologies:* Smart cities leverage a number of technologies that include:-

- Mobile devices such as smartphones and tablets, connecting citizens to smart city services
- Smart homes and specifically, the technology used in them, as shown in Figure 10.
- Digital libraries for the dissemination of information within and across cities
- Additional supporting technology and trends include remote work, telehealth, the blockchain, and online banking technology.

A "ubiquitous city" (also called U-city) is a concept of a smart city that provides access to public services through any connected device, bringing easy accessibility to every infrastructure, as shown in Figure 11 [53].

## CHALLENGES FACING SMART CITIES

Some of the challenges facing smart cities include [54]:

1. *Lack of adequate infrastructure:* Smart cities rely on the support of both physical and IT infrastructure. Both types of infrastructure need be scalable to keep up with the expansion and development of a smart city, the evolving needs of the residents, and the capacity to deal with the flow of data. The funding for new infrastructure projects is slow and taking years to approve.
2. *Transparency and data privacy:* Interconnectivity of smart cities relies heavily on technology that monitors, records, and exchanges massive amounts of data, for a variety of purposes. This can make citizens feel uneasy when it comes to their privacy and data, however, major cities must strike a balance between quality of life and invasion of privacy. People want to in a convenient, peaceful, and healthy environment without being constantly watched or monitored.
3. *Coordination between private and public sectors:* The intrusiveness with regards to data-sharing policies can prevent fundamental cross-collaboration which aims to prevent terrorist attacks, improve local drinking water, garbage collection, and reduce noise, light pollution, and climate change (reduce/eliminate carbon emission), as shown in Figure 12. Unhindered flow of data sharing between both sectors should be by convincing them about the benefits of cooperating rather than retaining information. Required is a satisfactory relationship and coordination between government and private sectors essential for creating efficient and sustainable programs within a smart city.
4. *Insufficient capacity for implementation of smart city initiatives:* This mainly has to do with financial capabilities, capacity for data processing, and efficiency and energy. The funding and budget to cover the costs for the need of physical and IT infrastructure for these technologies, labor, experience, and the expertise of specifically trained professionals that are competent in these fields – the funds may not be available. Moreover, the ability to fund smart city projects and finding multiple stakeholders can be a difficult task for both the public and private sector.
5. *Capacity for data processing and efficiency:* There is need for smart cities to have a reliable and efficient way to process and analyze tremendous amounts of data, safely, securely, and efficiently.
6. *Energy:* A reliable energy source is of fundamental importance to an entire smart city ecosystem since smart tech relies on energy to function. Hence, the need for stable and regular energy supply and there must be an alternative source (such as solar, wind or hydropower) in case of power shortage or failure.
7. *Concerns regarding cybersecurity:* This calls for strict protocols and security measures to ensure that collected data is protected from potential cyber-attacks that can involve extremely sensitive data like health status of patients, financial and personal information, etc.

## CONCLUSION

Despite the challenges that may confront smart city projects, with smarter technologies, greater innovations and government commitment in the future, all of the challenges will be removed or reduced to the barest minimum. Smart cities are a concept that makes use of digital technologies to

create more efficient and sustainable urban environments. Smart cities help to improve the quality of life for citizens, promote economic growth or prosperity, and reduce the environmental impact of cities by embracing IoT technologies.

The benefits of smart cities include improved quality of life i.e. providing citizens with a higher quality of life through better services and infrastructure via use of internet-enabled technologies to improve operations, maintenance, planning, and power supplies; ensures economic growth by improving the efficiency of services and infrastructure for the benefit of inhabitants and business; enhances environmental sustainability by helping in combating climate change and air pollution through better waste management and sanitation; help to reduce infrastructure costs by improving the efficiency of services and infrastructure (efficient public utilities e. g transportation, etc); and ensuring increased workforce.

More information on the challenges and a review on IoT-based smart city development and management can be found in the books [55, 56].

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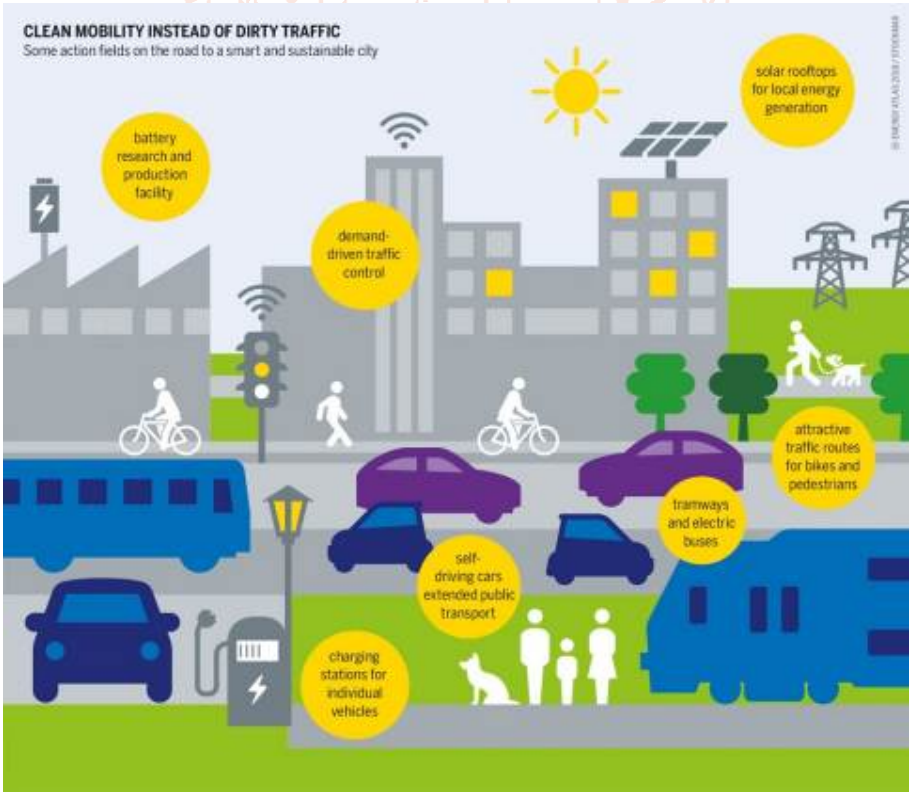


**Figure 1. Smart city**

Source:https://www.google.com/search?sca_esv=f46199300327ecbd&sxsrf=ADLYWIIy71RNtYJd0oCbOrepIYdGeSvv_Q:1736534279263&q=images+on+smart+cities+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JzWreY9LW7LdGrLDAFqYDH32tgteNhtZOxnGezgnEGc8k4dQgIn4td5_IKOvJAVYNMpBG_vzv09_z3ozdsV1574v_l4gmjMdaDFLpg9ELpUCM3lLnYw1mpVTSmqh03mtH24pA&sa=X&ved=2ahUKEwjx3Oum5uuKAxXEYEEAHZYCLjMQtKgLegQIFBAB&biw=1036&bih=539&dpr=1#vhid=5UJf15RmjqyhXM&vssid=mosaic

**Figure 2. List of smart cities**

Source:https://www.google.com/search?sca_esv=f46199300327ecbd&sxsrf=ADLYWIIy71RNtYJd0oCbOrepIYdGeSvv_Q:1736534279263&q=images+on+smart+cities+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JzWreY9LW7LdGrLDAFqYDH32tgteNhtZOxnGezgnEGc8k4dQgIn4td5_IKOvJAVYNMpBG_vzv09_z3ozdsV1574v_l4gmjMdaDFLpg9ELpUCM3lLnYw1mpVTSmqh03mtH24pA&sa=X&ved=2ahUKEwjx3Oum5uuKAxXEYEEAHZYCLjMQtKgLegQIFBAB&biw=1036&bih=539&dpr=1#vhid=P2bPuujoEDcJAM&vssid=mosaic

**Figure 3. Smart environment**

Source:https://www.google.com/search?sca_esv=f46199300327ecbd&sxsrf=ADLYWIIy71RNtYJd0oCbOrepIYdGeSvv_Q:1736534279263&q=images+on+smart+cities+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JzWreY9LW7LdGrLDAFqYDH32tgteNhtZOxnGezgnEGc8k4dQgIn4td5_IKOvJAVYNMpBG_vzv09_z3ozdsV1574v_l4gmjMdaDFLpg9ELpUCM3lLnYw1mpVTSmqh03mtH24pA&sa=X&ved=2ahUKEwjx3Oum5uuKAxXEYEEAHZYCLjMQtKgLegQIFBAB&biw=1036&bih=539&dpr=1#vhid=fEDpMaH5U5xmFM&vssid=mosaic

**Figure 4. Urbanization**

Source:https://www.google.com/search?sca_esv=f46199300327ecbd&sxsrf=ADLYWIIy71RNtYJd0oCbOrepIYdGeSvv_Q:1736534279263&q=images+on+smart+cities+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JzWreY9LW7LdGrLDAFqYDH32tgteNhtZOxnGezgnEGc8k4dQgIn4td5_IKOvJAVYNMpBG_vzv09_z3ozdsV1574v_l4gmjMdaDFLpg9ELpUCM3lLnYw1mpVTSmqh03mtH24pA&sa=X&ved=2ahUKEwjx3Oum5uuKAxXEYEEAHZYCLjMQtKgLegQIFBAB&biw=1036&bih=539&dpr=1#vhid=vcwYC5I7RplwZM&vssid=mosaic

**Figure 5. Infrastructure**

Source:https://www.google.com/search?sca_esv=f46199300327ecbd&sxsrf=ADLYWIIy71RNtYJd0oCbOrepIYdGeSvv_Q:1736534279263&q=images+on+smart+cities+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JzWreY9LW7LdGrLDAFqYDH32tgteNhtZOxnGezgnEGc8k4dQgIn4td5_IKOvJAVYNMpBG_vzv09_z3ozdsV1574v_l4gmjMdaDFLpg9ELpUCM3lLnYw1mpVTSmqh03mtH24pA&sa=X&ved=2ahUKEwjx3Oum5uuKAxXEYEEAHZYCLjMQtKgLegQIFBAB&biw=1036&bih=539&dpr=1#vhid=zoyD2bq7OTTP2M&vssid=mosaic


**Figure 6. Sustainable city**

Source:https://www.google.com/search?sca_esv=f46199300327ecbd&sxsrf=ADLYWIIy71RNtYJd0oCbOrepIYdGeSvv_Q:1736534279263&q=images+on+smart+cities+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JzWreY9LW7LdGrLDAFqYDH32tgteNhtZOxnGezgnEGc8k4dQgIn4td5_IKOvJAVYNMpBG_vzv09_z3ozdsV1574v_l4gmjMdaDFLpg9ELpUCM3lLnYw1mpVTSmqh03mtH24pA&sa=X&ved=2ahUKEwjx3Oum5uuKAxXEYEEAHZYCLjMQtKgLegQIFBAB&biw=1036&bih=539&dpr=1#vhid=_2GSLfalXc3HJM&vssid=mosaic

**Figure 7. Intelligent transport**

Source:https://www.google.com/search?sca_esv=f46199300327ecbd&sxsrf=ADLYWIIy71RNtYJd0oCbOrepIYdGeSvv_Q:1736534279263&q=images+on+smart+cities+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JzWreY9LW7LdGrLDAFqYDH32tgteNhtZOxnGezgnEGc8k4dQgIn4td5_IKOvJAVYNMpBG_vzv09_z3ozdsV1574v_l4gmjMdaDFLpg9ELpUCM3lLnYw1mpVTSmqh03mtH24pA&sa=X&ved=2ahUKEwjx3Oum5uuKAxXEYEEAHZYCLjMQtKgLegQIFBAB&biw=1036&bih=539&dpr=1#vhid=CN3oMEatHee6pM&vssid=mosaic

**Figure 8. Road**

Source:https://www.google.com/search?sca_esv=f46199300327ecbd&sxsrf=ADLYWIIy71RNtYJd0oCbOrepIYdGeSvv_Q:1736534279263&q=images+on+smart+cities+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JzWreY9LW7LdGrLDAFqYDH32tgteNhtZOxnGezgnEGc8k4dQgIn4td5_IKOvJAVYNMpBG_vzv09_z3ozdsV1574v_l4gmjMdaDFLpg9ELpUCM3lLnYw1mpVTSmqh03mtH24pA&sa=X&ved=2ahUKEwjx3Oum5uuKAxXEYEEAHZYCLjMQtKgLegQIFBAB&biw=1036&bih=539&dpr=1#vhid=oeeyaURh2POOHM&vssid=mosaic

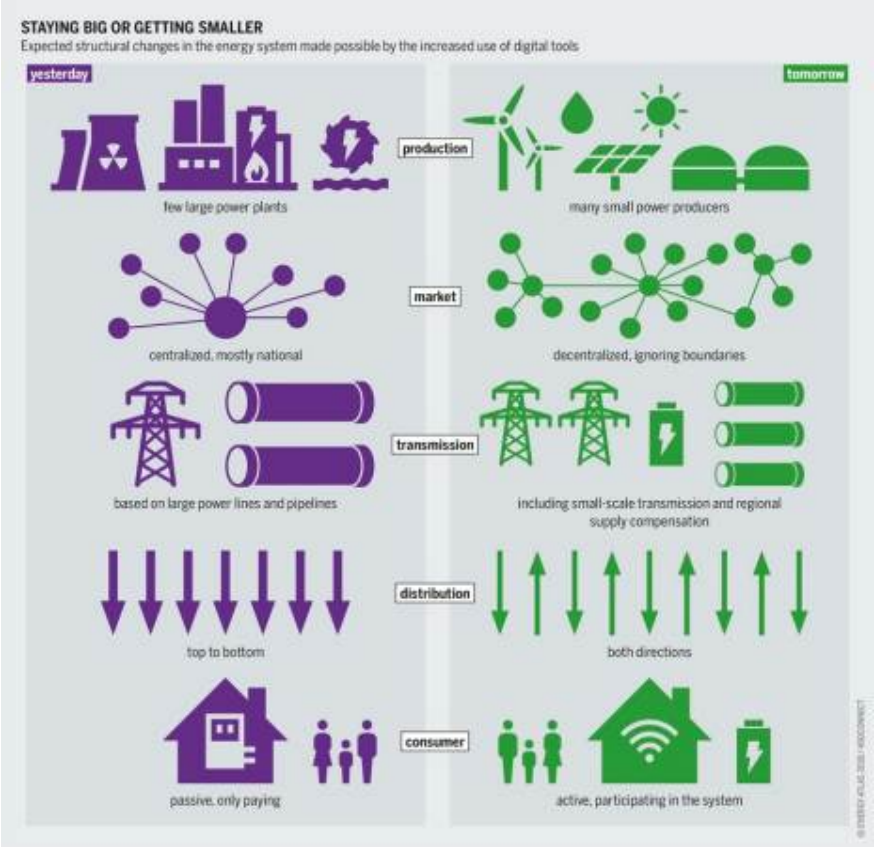


**Figure 9. Smart grid**

Source:https://www.google.com/search?sca_esv=f46199300327ecbd&sxsrf=ADLYWIIy71RNtYJd0oCbOrepIYdGeSvv_Q:1736534279263&q=images+on+smart+cities+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JzWreY9LW7LdGrLDAFqYDH32tgteNhtZOxnGezgnEGc8k4dQgIn4td5_IKOvJAVYNMpBG_vzv09_z3ozdsV1574v_l4gmjMdaDFLpg9ELpUCM3lLnYw1mpVTSmqh03mtH24pA&sa=X&ved=2ahUKEwjx3Oum5uuKAxXEYEEAHZYCLjMQtKgLegQIFBAB&biw=1036&bih=539&dpr=1#vhid=hjSEDBDf88ngLM&vssid=mosaic

**Figure 10. Home automation**

Source:https://www.google.com/search?sca_esv=f46199300327ecbd&sxsrf=ADLYWIIy71RNtYJd0oCbOrepIYdGeSvv_Q:1736534279263&q=images+on+smart+cities+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JzWreY9LW7LdGrLDAFqYDH32tgteNhtZOxnGezgnEGc8k4dQgIn4td5_IKOvJAVYNMpBG_vzv09_z3ozdsV1574v_l4gmjMdaDFLpg9ELpUCM3lLnYw1mpVTSmqh03mtH24pA&sa=X&ved=2ahUKEwjx3Oum5uuKAxXEYEEAHZYCLjMQtKgLegQIFBAB&biw=1036&bih=539&dpr=1#vhid=zctA41uxevStbM&vssid=mosaic


**Figure 11. Sustainable Development Goal 11**

Source:https://www.google.com/search?sca_esv=f46199300327ecbd&sxsrf=ADLYWIIy71RNtYJd0oCbOrepIYdGeSvv_Q:1736534279263&q=images+on+smart+cities+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JzWreY9LW7LdGrLDAFqYDH32tgteNhtZOxnGezgnEGc8k4dQgIn4td5_IKOvJAVYNMpBG_vzv09_z3ozdsV1574v_l4gmjMdaDFLpg9ELpUCM3lLnYw1mpVTSmqh03mtH24pA&sa=X&ved=2ahUKEwjx3Oum5uuKAxXEYEEAHZYCLjMQtKgLegQIFBAB&biw=1036&bih=539&dpr=1#vhid=JlvNoXIsew3j2M&vssid=mosaic

**Figure 12. Zero-carbon city**

Source:https://www.google.com/search?sca_esv=f46199300327ecbd&sxsrf=ADLYWIIy71RNtYJd0oCbOrepIYdGeSvv_Q:1736534279263&q=images+on+smart+cities+by+wikipedia&udm=2&fbs=AEQNm0Aa4sjWe7Rqy32pFwRj0UkWd8nbOJfsBGGB5IQQO6L3JzWreY9LW7LdGrLDAFqYDH32tgteNhtZOxnGezgnEGc8k4dQgIn4td5_IKOvJAVYNMpBG_vzv09_z3ozdsV1574v_l4gmjMdaDFLpg9ELpUCM3lLnYw1mpVTSmqh03mtH24pA&sa=X&ved=2ahUKEwjx3Oum5uuKAxXEYEEAHZYCLjMQtKgLegQIFBAB&biw=1036&bih=539&dpr=1#vhid=1r9AHtOPtDHwHM&vssid=mosaic