Forum: Special Conference on Sustainable Cities

Issue: Reducing energy consumption and air pollution in sustainable cities

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INTRODUCTION

The United Nations recently published a report, which states that the future of the world is going to be a short one if we do not act now to better the current situation as far as our environment is concerned. This highlights why sustainability is important since it is the only long term solution, which can enable humanity to continue existing on earth. In order to achieve sustainability, there are multiple actions, which are to be taken, two of the most prominent ones being reducing energy consumption and air pollution.

However, with the exception of achieving sustainability, there are also multiple reasons why energy consumption should be limited. First and foremost, it is important, from an environmental perspective, to minimize it because of global warming. The usage of certain energy sources leads to the emission of greenhouse gasses, which further worsen the current situation, not to mention the fact that many of the earth's resources are limited, which adds to the need to find renewable energy sources. Moreover, each household can benefit economically by limiting the energy it uses. Finally, the reduction of energy also enhances in the long run the quality of life. When saving energy, there is higher air quality and the world's resources are in a better condition.

Air pollution is an issue that is also essential to tackle, seeing as it has created a variety of problems. In most developing cities, the quality of air is much worse than the World Health Organization's standards define as healthy. More specifically, in recent years, the situation is gradually becoming critical, seeing as it is now causing almost four million premature deaths.

Air pollution and the reduction of energy in sustainable cities are more closely linked than it seems on the surface, because of the fact that

air pollution is often a result of the excessive usage of energy, which means that minimizing the latter would aid in the minimization of air pollution. In any case, it is imperative to find a solution to both of these problems.

DEFINITION OF KEY-TERMS

Sustainability

Sustainability is a production model, through which future generations will be able to profit from institutional, environmental, technological and economic growth in the same manner as the people nowadays do. Through this method, any kind of resource is maintained at the desired level. Formerly, sustainability used to solely refer to the usage of renewable energy sources that people could depend upon for years to come.

Ecologically, sustainability is explained by achieving a balance between everything that exists in nature. Ergo, a balance between species and the environment. In order to maintain this, the “environment” (energy sources, plants, etc.), must not be utilized at a faster rate than it is regenerated.

Renewable Energy

Renewable energy is the energy, which comes from renewable sources, meaning sources that can be continuously used for a long time without ceasing to exist. There are many types of renewable energy sources, such as solar energy, wind energy, hydroelectric power, biomass energy, and geothermal energy.

Air Pollution

There are two kinds of air pollution

1. Indoor Air Pollution

   Indoor air pollution is manifested inside people’s homes as a result of fuel combustion, usually of heating, and lighting technologies.

2. Outdoor Air Pollution

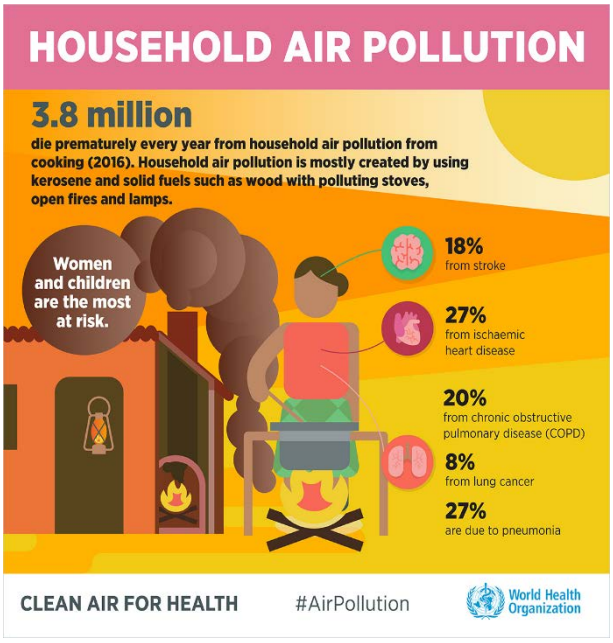
Outdoor air pollution affects people who reside near or in urban areas and therefore the majority of the population.

Sustainable Cities

Sustainable cities, or eco-cities, are cities developed with the aim of creating a habitat, in which the environmental, economic, and social repercussions that may arise are taken into consideration so that future generations will be able to enjoy similar privileges to those of the inhabitants of the current cities.

A sustainable city depends exclusively on its own resources. Its land is used effectively so that minimal assistance from outside sources is needed. Moreover, the desired effect is to create the smallest possible ecological footprint, which is "the amount of the environment necessary to produce the goods and services necessary to support a particular lifestyle."[1]

BACKGROUND INFORMATION



Urban Health and Air Pollution

In recent years, the world population has gradually moved to more urban areas resulting in the increase of the inhabitants of cities. It is estimated that 68% of the world population are living nowadays in cities. The problem of urbanization, however, does not follow from the larger population residing in cities but rather from the repercussions that come with it. Urban health is slowly but steadily deteriorating. The aforementioned fact is important, because one of the major causes of the decline of urban health is the increase of air pollution.

[1] "Ecological Footprint." *WWF Conserves Our Planet, Habitats, & Species Like the Panda & Tiger | WWF*, wwf.panda.org/knowledge_hub/teacher_resources/webfieldtrips/ecological_balance/eco_footprint/.

Image 1: World Health Organization

The air pollution affects immensely life conditions in urban areas. There are a lot of different sources, both stable and mobile, which cause outdoor air pollution, but the most important ones are the fumes that factories and cars emit. The World Health Organization has tested the air in several cities and has come to find that the vast majority of them is unable to comply with the 'healthy air guidelines' that have been set. Concerning indoor air pollution, the necessity of fossil fuel usage inside people's homes is the main reason for this phenomenon.

To sum up, air pollution has worsened people's health and consequently played a critical role in deteriorating the life in general of the urban population.

Air Pollution and Excessive Energy Consumption Effects

While air pollution has many long-lasting effects, there are three main problems that arise, namely the damage to the environment that may prove to be irreversible, the increase in global warming, and the harm done to the human health. As far as the environment is concerned, air pollution can cause a lot of harm. Firstly, it may disrupt the natural process of photosynthesis, which essentially means that the polluted air cannot be cleaned. Secondly, acid rain and, in some cases, fog and snow are the results of air pollution. Regarding global warming, air pollution once again plays a big part. The carbon dioxide that exists in the air is one of the causes of the greenhouse effect. The excessive concentration of greenhouse gases in the atmosphere is one of the leading agents of climate change. Human health is at risk because of the exposure of people to polluted air as well. More specifically, it can cause allergies, cardiovascular diseases, and lung damage.

As reported by the World Health Organization, air pollution is to be credited for:

- 29% of all deaths from lung cancer
- 17% of all deaths from acute lower respiratory infection
- 24% of all deaths from stroke
- 25% of all deaths from ischemic heart disease
- 43% of all deaths from chronic obstructive pulmonary disease[2]

Excessive consumption of non-renewable energy sources increases the carbon footprint, intensifies climate change and at the same time leads for certain to the ending of those resources. Any fossil-fuel generated energy can contribute to strengthening the greenhouse effect, and, in addition to increasing the carbon footprint damaging irreversibly the environment.

[2] "Ambient Air Pollution: Health Impacts." *World Health Organization*, www.who.int/airpollution/ambient/health-impacts/en/.

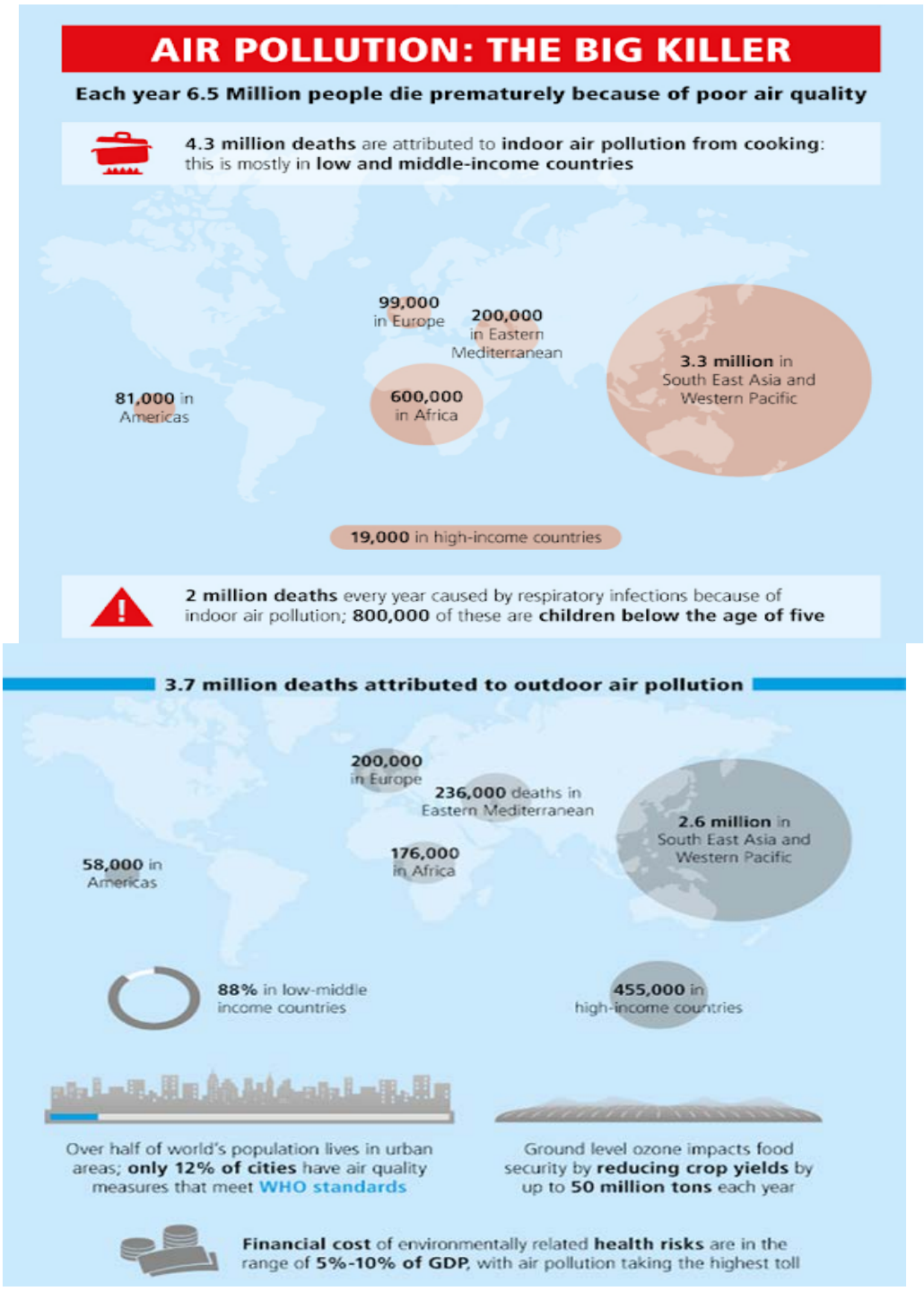


Image 2: World Health Organization Report on poor air quality effects

Circularity

1. Circular Flow Land Use Management

   Circular Flow Land Use Management is a sustainability concept that has mostly been introduced in Central European countries. According to this, land, which was previously disregarded, is used in a constructive manner. It aims at improving inner development more thoroughly than outer development and it usually follows the pattern of “reduce-recycle-avoid”.

   Even though it was introduced quite recently, it could potentially lead to long term changes in land usage and has the power to drastically improve living conditions and help making cities sustainable.

2. Circular Economy

   Circular Economy is an economic system with two main goals: minimizing waste and taking the most advantage of resources. It is the most environmentally friendly system, as it protects resources and minimizes the harm to the environment. However, the circular economy, albeit aiding sustainability, sometimes is regarded as an over-simplistic approach.

Leadership in Energy and Environmental Design

Leadership in energy and environmental design (LEED) is a method of assessment of the environmental performance of buildings, neighbors and infrastructure areas. It aims at protecting the environment during both the construction and the operation of the building. It has been a stepping stone for ‘green’ business practices worldwide and now is regarded as an important certification.

One of the requirements for obtaining the LEED certification is the usage of renewable energy sources, which is why it is also becoming increasingly commercial. As it was previously noted, less energy equals less air pollution.

Millennium Ecosystem Assessment

The Millennium Ecosystem Assessment (MEA) was an evaluation of the human impact on the environment, which was requested by the then

Secretary-General of the United Nations, Kofi Annan. It focused on drawing some conclusions about the ecosystem of the time, with the findings being published in 2005.

The conclusions of the MEA were separated into four main remarks. To begin with, humans have altered most ecosystems in the shortest period of time in the world history, because of their increased need for resources, which has also decreased the diversity of life. Additionally, some of the benefits the current generations have will cease to exist in the future if the dominant system does not change. Furthermore, in order for the large-scale variations to be prevented, it is important that drastic policies are enacted and the current situation is improved.

All in all, after the MEA, it became obvious that action had to be taken, because otherwise the present standard of living would not be considered “standard” for future generations, and that changes need to be made as soon as possible. Something else that has been highlighted by the MEA is that multiple problems, such as the overconsumption of natural resources, will be tackled in order for the sustainability to be achieved in cities.

Sustainable Cities Initiative

The Sustainable Cities Initiative (SCI), launched by the World Bank, intends to make every city sustainable and focuses on implementing its program through research and engaging the communities in European and Central Asian countries. This program adjusts to the need of each separate city to becoming sustainable in order for it to be as efficient as possible and proposes the most effective approach.

The SCI has four main objectives: the Applied Knowledge Framework, which consists in raising awareness about the importance of sustainability and the immediate need for the implementation of it, the development of the necessary facilities and equipment, the enactment of new policies and, ultimately, change and support throughout the whole process.

One of the most significant steps towards the implementation of the program is minimizing the usage of energy and at the same time maximizing the usage of renewable energy sources. Generally, the way

that cities are developed and constructed has a big effect on how much or the kind of energy is used. So, through the SCI, a reform of cities may be launched with the overall goal of making them more sustainable.

Carbon Trust

Carbon Trust is a company, which helps corporations and states diminish their carbon emissions and take more advantage of their resources using them more efficiently. The intention is for all of the organizations involved to go green and, finally, reach a low carbon sustainable economy.

The Carbon Trust has set some environmental standards with which the abovementioned organizations should comply in order to be considered green and environmentally friendly. As of 2019, a lot of work has been done towards minimizing the usage of carbon in many companies, which choose to comply with these standards showcasing their Corporate Social Responsibility. Ultimately, not using as much carbon does not only lessen the unnecessary usage of non-renewable energy but is also an important step towards cleansing the air.

City Development Strategy

City Development Strategy is a method for cities to profit from urbanization providing all their citizens with equal opportunities and growing equitably. It offers them long-term solutions not only to achieve sustainability but also maintain it.

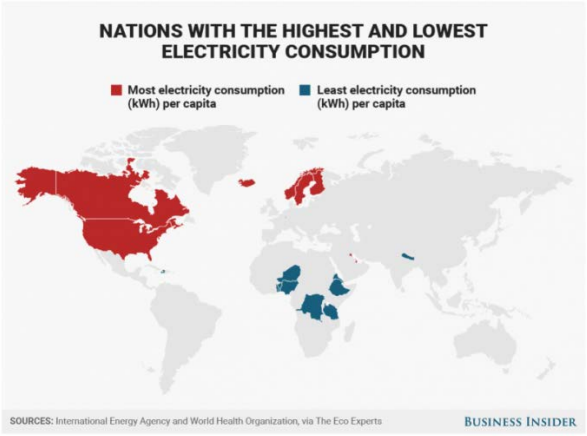
Phase 1 of CDS	Evaluating the current situation.	Firstly, the city has to agree to the CDS process, since it is voluntary. Afterward, it is vital that the situation in each city must be analyzed.
Phase 2 of CDS	Prospective goals the city wants to reach.	Then, realistic goals have to be set as far as time and capability are

		concerned.
Phase 3 of CDS	Ways to reach the goals.	An action plan is formulated, whilst once again respecting the feasibility of those goals.
Phase 4 of CDS	Monitoring and evaluating whether the current policy is working.	Constant monitoring and frequent evaluations take place in order for the CDS to be considered the normal practice.

Obstacles towards achieving the reduction of energy and air pollution

In theory, there would be no problem with reducing energy usage and air pollution, but, in practice, there are some obstacles hindering the accomplishment of these two goals. Firstly, there is not a specific set of actions every city can take, since each one of them has been constructed differently and has different needs and wants. Secondly, corporations, which are responsible for higher percentages of carbon emissions and energy usage, often benefit economically and, as a result, they cannot see or simply ignore the big picture. Thirdly, the average citizen is not aware of the harm he/she is causing to the environment by taking some actions daily, and, due to ignorance, overuses energy and pollutes heavily the air.

MAJOR COUNTRIES AND ORGANIZATIONS INVOLVED



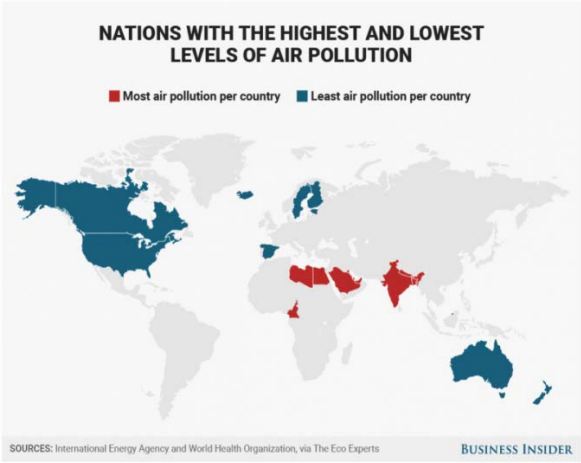


Image 3: Nations with the highest and lowest energy consumption	Image 4: Nations with the highest and lowest levels of air pollution

India

India is one of the most polluting countries in the world. There has been a law implemented since the 1980s, which aims at combating air pollution· however, due to its massive population, it is responsible for the consumption of an extreme amount of fossil fuels and the release of huge carbon dioxide emissions.

China

China is a deeply industrialized country and that, along with its population, which is the largest in the world, are the two main factors, which make it the country with the most carbon dioxide emissions and the subject of many environmental red flags.

United States of America (USA)

The United States of America is one of the biggest commercial powers in the world and the country, which has proposed the most drastic measures in order to combat climate change. However, after a change of government, the US has seemed to ignore the climate change threats and has stopped working as hard in order to reverse the climate change and achieve sustainability. For that reason, it has decided to withdraw from the

Paris Agreement. Apart from that, it is estimated that more than 2 billion dollars' worth of energy is wasted for outdoor lighting each year.

Sweden

Since 2015, Sweden has set as a goal to eliminate all fossil fuel-generated energy by 2040 and has invested in renewable forms of energy aiming to be the first fossil fuel-free nation. If Sweden attains this goal, it will be playing a massive role in minimizing air pollution and working towards overall sustainability.

Denmark

Denmark gets over half of the energy it uses from renewable sources, which is actually something no other country has managed to achieve up to now. Similarly to Sweden, it aims at eliminating all fossil fuel-generated energy by 2050. Furthermore, most Danish companies are working towards becoming 'green'.

World Health Organization (WHO)

The World Health Organization has worked a lot towards raising awareness about the problems that air pollution has caused in many countries creating multiple reports to highlight how reduction of energy and minimization of air pollution could greatly benefit society, especially from the point of view of people's health. Moreover, the World Health Organization has set some standards, which cities should comply with in order to be environmentally friendly.

United Nations Environmental Program (UNEP)

The United Nations Environmental Program has been working towards sustainability for many years and is taking some of the most prominent actions for the purpose of both informing the public of the effects of air pollution and extravagant energy usage and delving into extensive research in order to help countries achieve sustainability goals.

TIMELINE OF EVENTS

DATE	DESCRIPTION OF EVENT
1962	"Silent Spring", a report on ecology considering the possible environmental problems that could arise, if the current energy usage is not lowered.
1971	The International Institute for Environment and Development is created in the United Kingdom for the purpose of finding ways to foster economic growth without harming the environment in the process.
1972	The United Nations Environmental Program is established.
1993	The first meeting of the United Nations Commission on Sustainable Development is held.
1994	China creates "Agenda 21", which proposed a plan to establish sustainable development.
2005	The Millennium Ecosystem Assessment is published and it becomes apparent that action needs to be taken in order to preserve the environment.

2008	It is reported that more than 50% of the world's population lives in cities.
2009	The G20 Summit asks for measures, which will help to implement sustainability globally and reduce the usage of fossil fuels.
2015	The Sustainable Development Goals are set by the United Nations highlighting the importance of renewable energy sources.

RELEVANT UN RESOLUTIONS, TREATIES AND EVENTS

United Nations Environmental Assembly 1 Resolution 7 on Air Quality

Adopted by the United Nations Environmental Assembly, this resolution aims at bettering the air quality globally.

The Convention on Long-Range Trans Boundary Air Pollution

Through this, 8 protocols for minimizing air pollution have been drafted.

United Nations Framework Convention on Climate Change (UNFCCC)

Firstly, this recognizes that Climate Change is a very real threat and actions need to be taken. Secondly, it proposes measures to tackle it.

Sustainable Development Goals

The SDGs highlight the importance of some goals for the UN members, with the ones relevant to the issue at hand being goals 3,7,11, and 13.

PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

There have been attempts for both eliminating air pollution and reducing the usage of energy. Many European countries are promoting the usage of bicycles creating special roads for them and the public transport systems, which are cheaper, faster and more environmentally friendly. Moreover, many programs have been devised with the intention to eliminate fossil-fuel generated energy and make countries entirely depended on renewable energy sources. Furthermore, there have been significant attempts, such as the Sustainable Cities Initiative, which aim at reducing energy usage and air pollution, or the Urban Health Initiative by WHO. Additionally, the International Energy Agency has worked closely with countries and has widely informed the public of steps they must take in order to minimize air pollution and energy consumption.

POSSIBLE SOLUTIONS

Informing the public

Informing the public has been implemented very poorly even though it is one of the most important steps to be taken. A lot of people are actually not aware of the effects air pollution can have on their well-being and the health of our planet. While there are still people, who deny threats like climate change, it is vital that the public is informed of the fact that actions taken now may have an everlasting impact on the prosperity of the world. Moreover, aside from informing the public about the looming threats the increased energy usage and air pollution pose, it is important for them to be informed of how they can stop both.

Combatting Air Pollution

Combatting air pollution is not a simple task; however, it is worth it. The first and most drastic step is eliminating all fossil fuel-generated energy

and using different renewable energy sources. Furthermore, it is important to create green buildings for the purpose of eliminating any carbon footprints. However, large-scale changes depend, first and foremost, on the ways individuals change their everyday lives and the pressure they put on their governments to implement environment-friendly policies.

Minimizing Energy Usage

Energy is essential to our everyday life, which is why it can only be reduced up to a certain amount. It is vital that clean energy is being produced, especially by using more efficient devices. In order for that to happen, businesses would like to be able to profit from it, because the idea of saving the planet for free is not enough for them; which is why governments could provide grants for businesses who choose to make environmentally friendly products. Furthermore, the expansion of public transport system could also greatly benefit people.

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