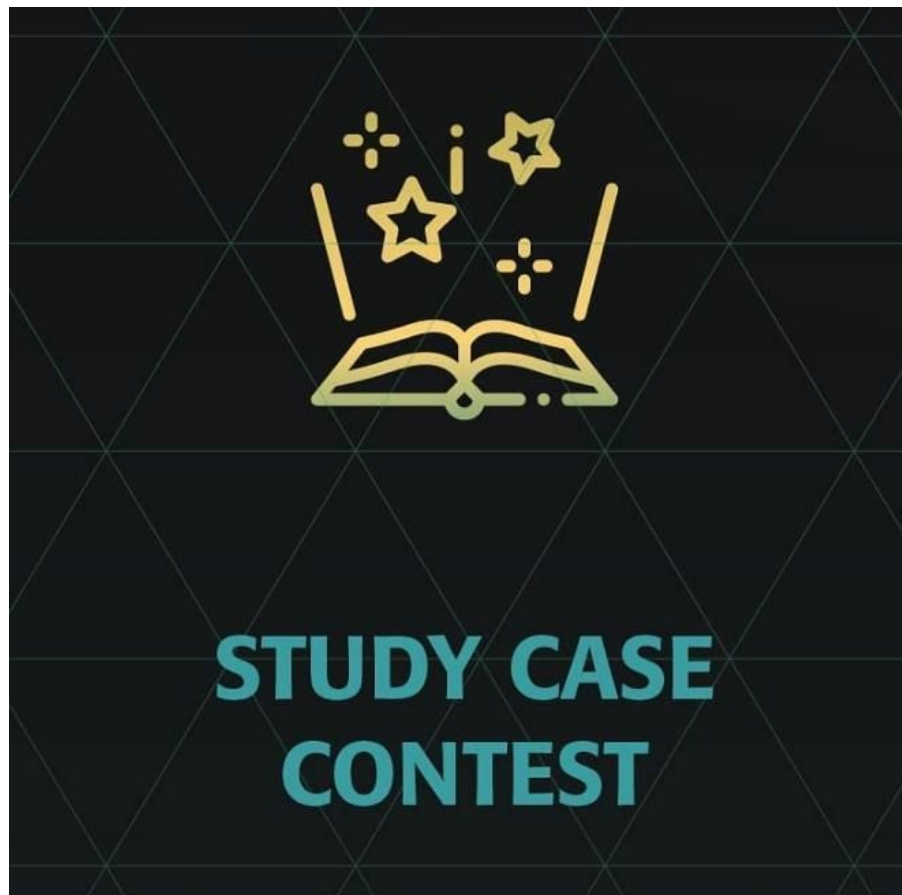

Answering the SDG's goals by using technological innovation for a better humanity



CASE

Answering the SDG's goals by using technological innovation for a better humanity.

The 2030 Agenda for Sustainable Development provides a global blueprint for dignity, peace, and prosperity for people and the planet, now and in the future. The purpose of SDG must be achieved by technology that will affect humanity and can be applied (applicable). This case needs to be answered by an innovation that has background problems and is supported by valid/reliable data, explains the existing barrier, and steps to applying the innovation itself. The sub-themes from this case are:

- **Case 1:**



According to Air Visual, Jakarta ranked 10th as the worst air polluted city in World Air Quality Report 2018. The WHO recommends an annual mean exposure threshold of $10 \mu\text{g}/\text{m}^3$ to minimize the risk of health impacts from PM 2.5. In 2018, Jakarta's average PM 2.5 is $45.3 \mu\text{g}/\text{m}^3$ and the US Air Quality Index is 125. From January to 25 June 2019, the average PM 2.5 was $42.4 \mu\text{g}/\text{m}^3$ with AQI was at 118. They indicate that Jakarta's air was "unhealthy for sensitive groups". Jakarta's low air quality can cause many health issues ranging from breathing disorders to death. According to the WHO, more than two million people die prematurely each year due to the effects of poor air quality. Mortality rates increase by 0.3 percent each day for every $10 \mu\text{g}$ particles/ m^3 increase in the pollution within a region. The WHO estimates that cities with relatively high levels of pollution have a 15-20 percent higher rate of mortality than cities with relatively low levels of pollution. Thus, there is a need to increase Jakarta's air quality so people can breathe healthy air.

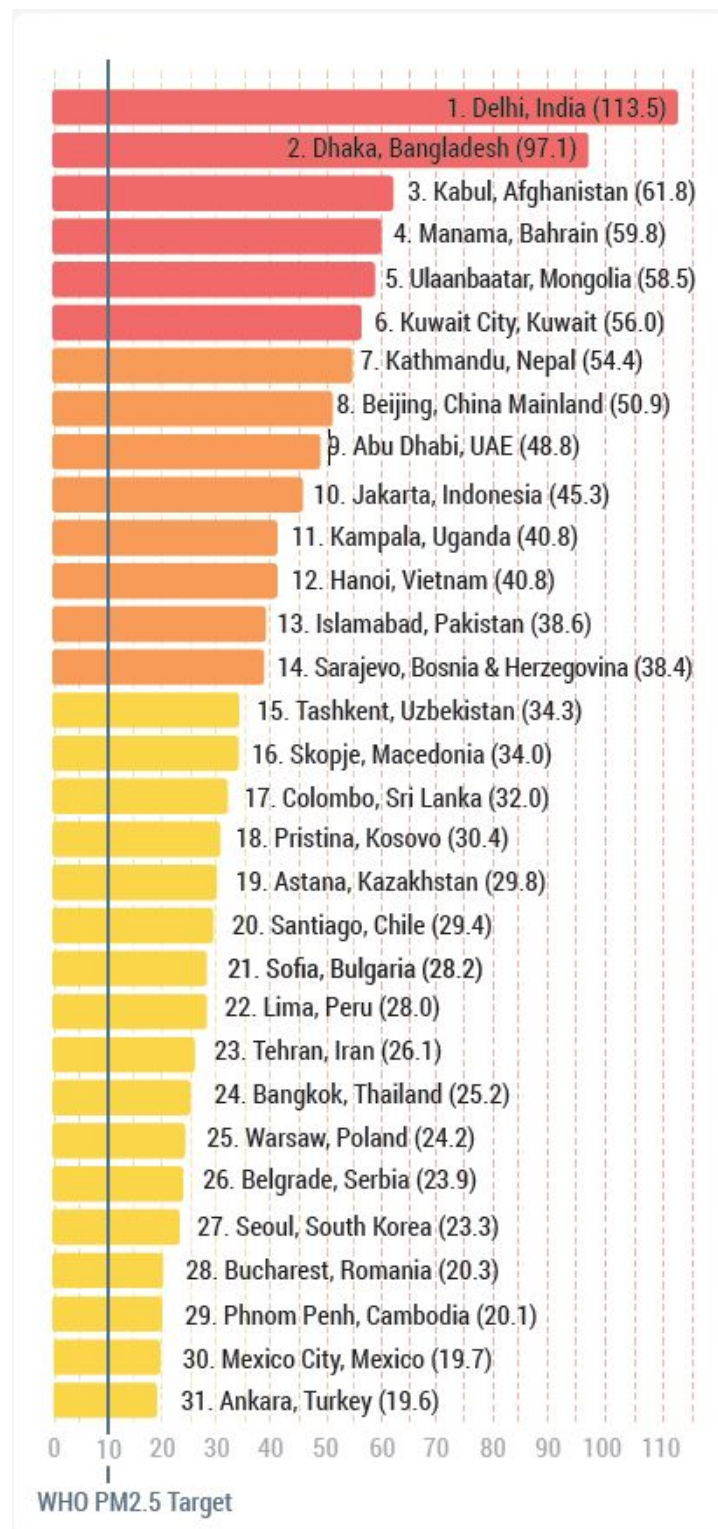
World country/region ranking

Sorted by estimated average PM2.5 concentration ($\mu\text{g}/\text{m}^3$)

1	Bangladesh	97.1	26	Chile	24.9	51	Puerto Rico	13.7
2	Pakistan	74.3	27	South Korea	24.0	52	Belgium	13.5
3	India	72.5	28	Serbia	23.9	53	France	13.2
4	Afghanistan	61.8	29	Poland	22.3	54	Germany	13.1
5	Bahrain	59.8	30	Croatia	22.2	55	Japan	12.0
6	Mongolia	58.5	31	Turkey	21.9	56	Netherlands	11.7
7	Kuwait	56.0	32	Macau	21.2	57	Switzerland	11.6
8	Nepal	54.2	33	Mexico	20.3	58	Russia	11.4
9	United Arab Emirates	49.9	34	Czech Republic	20.2	59	Luxembourg	11.2
10	Nigeria	44.8	35	Hong Kong	20.2	60	Malta	11.0
11	Indonesia	42.0	36	Cambodia	20.1	61	United Kingdom	10.8
12	China Mainland	41.2	37	Romania	18.6	62	Spain	10.4
13	Bosnia & Herzegovina	40.9	38	Israel	18.6	63	Portugal	10.3
14	Uganda	40.8	39	Taiwan	18.5	64	Ireland	9.5
15	Macedonia	35.5	40	Slovakia	18.2	65	USA	9.1
16	Uzbekistan	34.3	41	Cyprus	17.6	66	Canada	7.9
17	Vietnam	32.9	42	Lithuania	17.5	67	New Zealand	7.7
18	Sri Lanka	32.0	43	Hungary	16.8	68	Norway	7.6
19	Kosovo	30.4	44	Brazil	16.3	69	Sweden	7.4
20	Kazakhstan	29.8	45	Austria	15.0	70	Estonia	7.2
21	Peru	28.0	46	Italy	14.9	71	Australia	6.8
22	Ethiopia	27.1	47	Singapore	14.8	72	Finland	6.6
23	Thailand	26.4	48	Philippines	14.6	73	Iceland	5.0
24	Bulgaria	25.8	49	Ukraine	14.0			
25	Iran	25.0	50	Colombia	13.9			

Most polluted countries in 2018 (based on average PM 2.5 concentration).

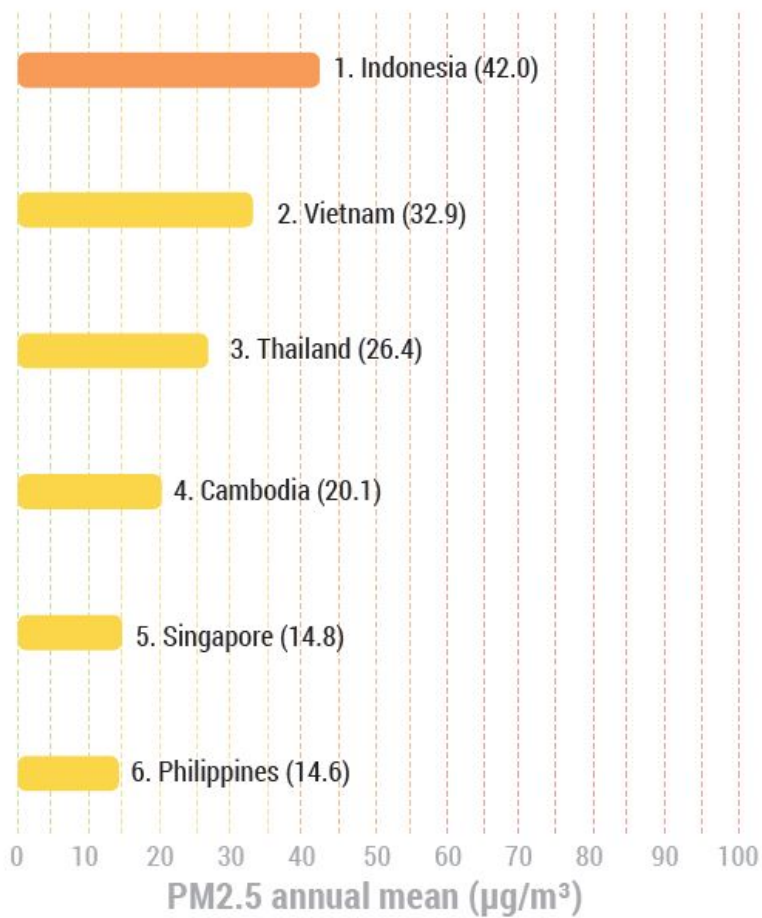
Source: AirVisual Annual World Air Quality Report 2018.



Most polluted capital cities in 2018 (based on average PM 2.5 concentration).

Source: AirVisual Annual World Air Quality Report 2018.

Country/Region Ranking



Southeast Asia's most polluted countries in 2018.

Source: AirVisual Annual World Air Quality Report 2018.

Most Polluted Regional Cities

Rank	City	2018 AVG
1	 Jakarta, Indonesia	45.3
2	 Hanoi, Vietnam	40.8
3	 Samut Sakhon, Thailand	39.8
4	 Nakhon Ratchasima, Thailand	37.6
5	 Tha bo, Thailand	37.2
6	 Saraburi, Thailand	32.6
7	 Meycauyan City, Philippines	32.4
8	 Samut Prakan, Thailand	32.2
9	 Ratchaburi, Thailand	32.2
10	 Mae Sot, Thailand	32.2
11	 Caloocan, Philippines	31.4
12	 Si Maha Phot, Thailand	30.9
13	 Pai, Thailand	29.4
14	 Chon Buri, Thailand	27.3
15	 Ho Chi Minh City, Vietnam	26.9

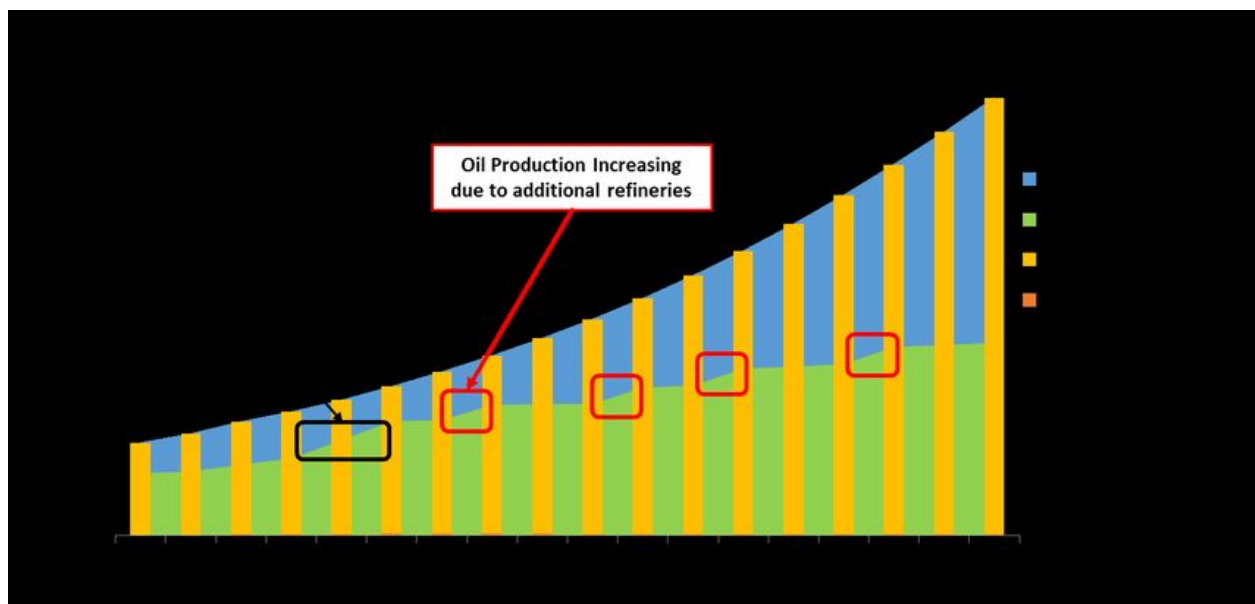
Southeast Asia's most polluted cities in 2018.

Source: AirVisual Annual World Air Quality Report 2018.

- Case 2

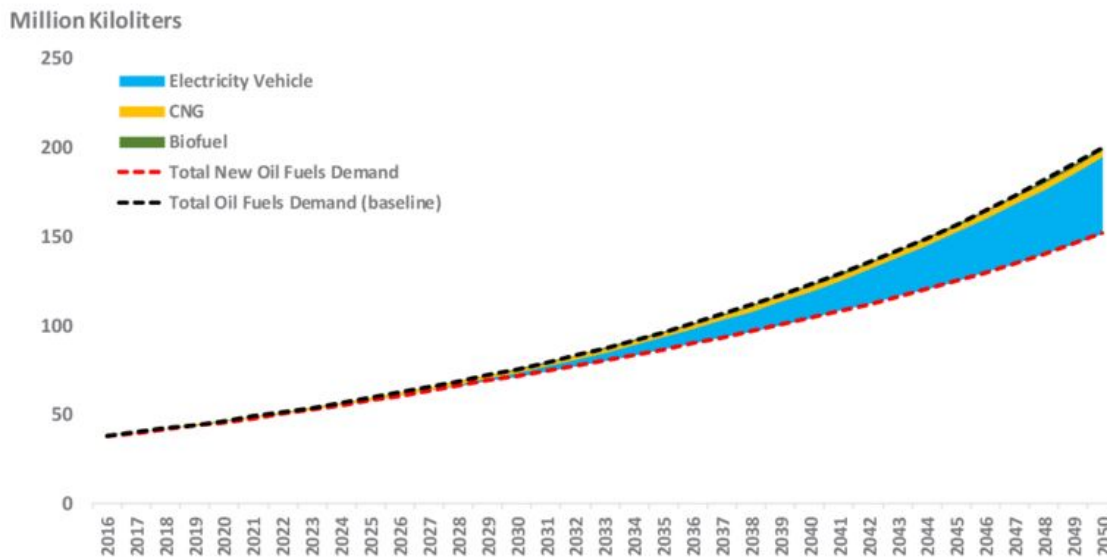


Coal is one of Indonesia's biggest energy supply. Moreover, Indonesia's total coal reserves reached 37 billion tons. Until the end of 2017, the coal-fired power station produces more than 55% of Indonesia's electricity. However, coal usage generates many problems throughout the process. Coal mining can cause environmental issues such as deforestation, topography alteration, and groundwater contamination. Coal combustion emits many toxic gasses that can cause health issues, some of this gas also cause global warming. Therefore a new method is needed to create a sustainable, affordable, and clean energy source to fulfill Indonesia's energy demand.



Oil production and demand. (production is marked in green and demand in blue)

Source: https://www.researchgate.net/figure/Gambar-54-Kebutuhan-energi-untuk-kasus-substitusi-BBM-Figure-54-Energy-demand-for-the_fig2_327904911



Energy demand for the case of oil fuels substitution

Source:

https://www.researchgate.net/figure/Gambar-54-Kebutuhan-energi-untuk-kasus-substitusi-BM-Figure-54-Energy-demand-for-the_fig2_327904911



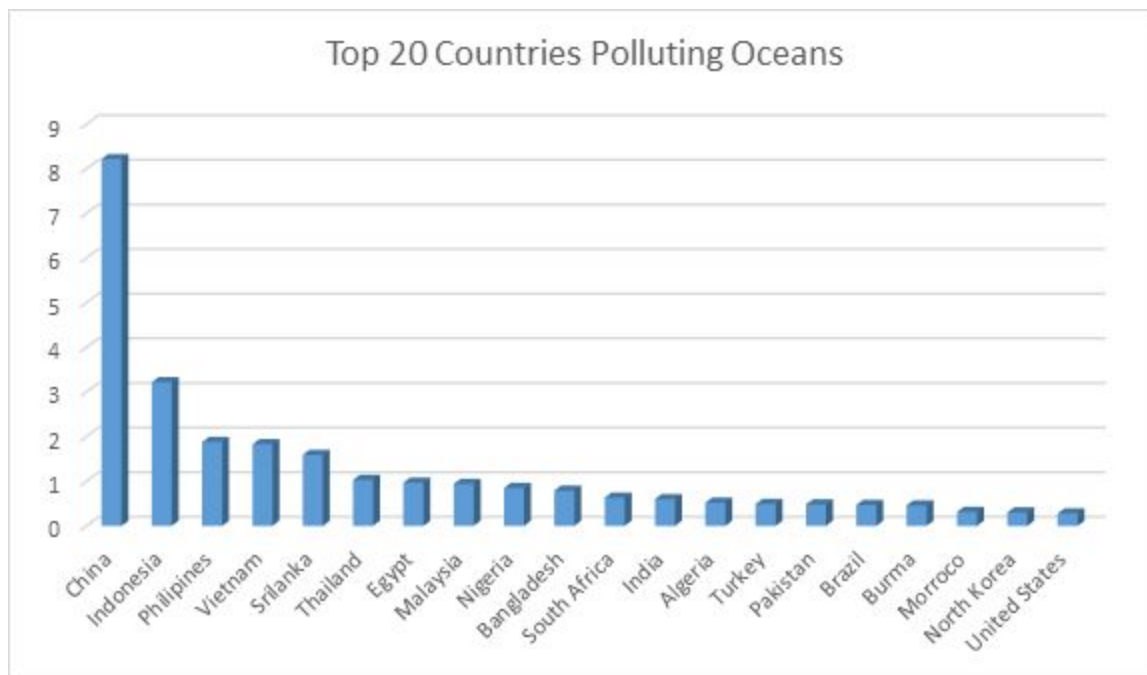
- **Case3:**

Plastic Waste has been a major environmental problem in many countries, especially Indonesia. Indonesia is the second-largest contributor to plastic pollutants in the oceans after China. Annually, there are 3.22 million metric tons of plastic waste thrown into the Indonesian ocean. With a total population of 267 million people, Indonesia is estimated to produce 25,000 tons of plastic waste per day. These plastics can take up to 1,000 years to decompose. Plastic waste can cause environmental issues for instance flood, water pollution, and soil pollution. On top of that, plastic also disturbs the food chain. Many animals, especially marine animals, died with plastics found inside their bodies. These plastics can break down to small molecules called microplastic. Microplastic can bind many toxic compounds and enters the food chain. If people consume fish that have accumulated

microplastic, the microplastic then enters the human body. So plastic waste should be eliminated by prudent methods.

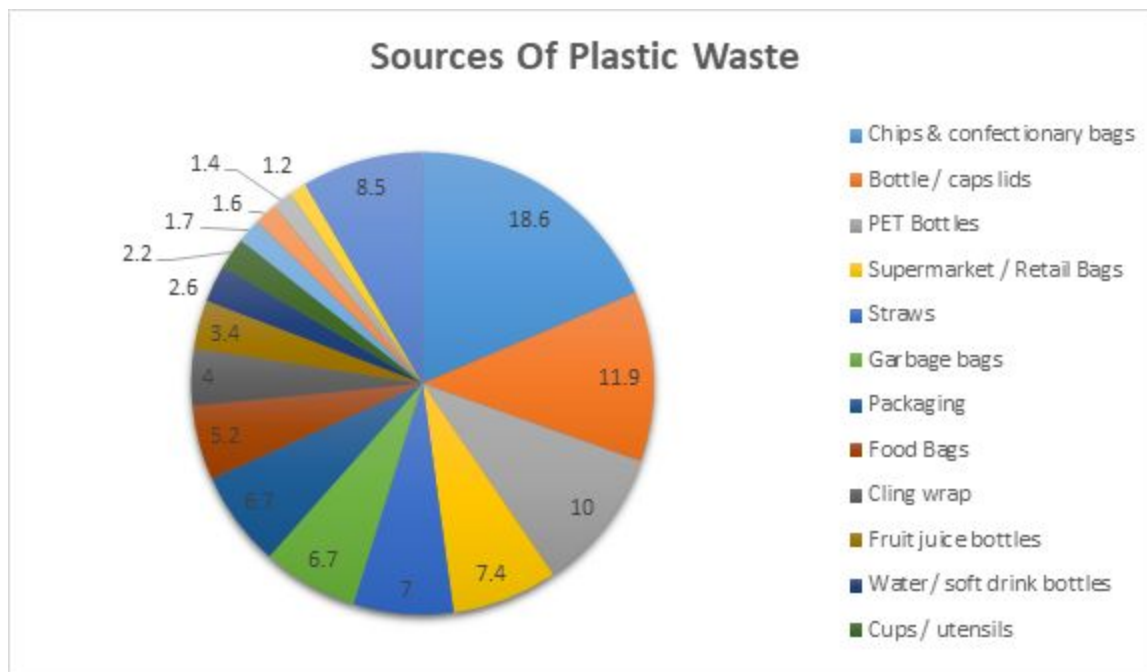
Rank	Country	Waste Generation Rate	% of Waste that Is Plastic	% Mismanaged Waste	Plastic Waste	% Mismanaged Plastic Waste	Marine Debris
		[kg/ppd]			[MMT/yr]		[MMT/yr]
1	China	1.10	11	76	8.82	27.7	1.32-3.53
2	Indonesia	0.52	11	83	3.22	10.1	0.48-1.29
3	Philippines	0.5	15	83	1.88	5.9	0.28-0.75
4	Vietnam	0.79	13	88	1.83	5.8	0.28-0.73
5	Sri Lanka	5.1	7	84	1.59	5.0	0.24-0.64
6	Thailand	1.2	12	75	1.03	3.2	0.15-0.41
7	Egypt	1.37	13	69	0.97	3.0	0.15-0.39
8	Malaysia	1.52	13	57	0.94	2.9	0.14-0.37
9	Nigeria	0.79	13	83	0.85	2.7	0.13-0.34
10	Bangladesh	0.43	8	89	0.79	2.5	0.12-0.31
11	South Africa	2.0	12	56	0.63	2.0	0.09-0.25
12	India	0.34	3	87	0.60	1.9	0.09-0.24
13	Algeria	1.2	12	60	0.52	1.6	0.08-0.21
14	Turkey	1.77	12	18	0.49	1.5	0.07-0.19
15	Pakistan	0.79	13	88	0.48	1.5	0.07-0.19
16	Brazil	1.03	16	11	0.47	1.5	0.07-0.19
17	Burma	0.44	17	89	0.46	1.4	0.07-0.18
18*	Morocco	1.46	5	68	0.31	1.0	0.05-0.12
19	North Korea	0.6	9	90	0.30	1.0	0.05-0.12
20	United States	2.58	13	2	0.28	0.9	0.04-0.11

Table: (Jambeck, J. R., et al. "Plastic Waste Inputs from Land into the Ocean." Science, vol. 347, no. 6223, 13 Feb. 2015, pp. 768-771., doi:10.1126/science.1260352). Waste estimates for 2010 for the top 20 countries ranked by mass of mismanaged plastic waste (in units of millions of metric tons per year). Interpretation of characters in the table: Mismanaged waste is the sum of inadequately managed waste plus 2% littering. Total mismanaged plastic waste is calculated for populations within 50 km of the coast in the 192 countries considered. ppd, person per day; MMT, million metric tons. If considered collectively, coastal European Union countries (23 total) would rank eighteenth on the list.



Source :

<https://www.earthday.org/2018/04/06/top-20-countries-ranked-by-mass-of-mismanaged-plastic-waste/>



Source : JaveriyaSiddiqui/slideshare.net

STORYBOARD REQUIREMENTS

Below are the requirements if the storyboard you will have to submit:

1. Your storyboard must be in the PDF
2. Your storyboard must contain Minimum 5 chartss
3. Your storyboard must comprise Maximum 30 pages including cover page
4. Your storyboard include references as closing page
5. Refer to the following link to have a view of storyboard sample: bit.ly/StoryboardExp
6. Once you are finished with your storyboard and submit it to our website :
<http://ieee-itb-sb.com>

PROBLEM

1. Choose: Select one out of the three themes of SDGs
2. Gather: Gather sources of data from reliable sources and research information
3. Work: Working on your data and make it visual (chart, bar, pattern, etc.)
4. Create: Propose your idea or innovation to answer the SDG's goal and make your storyboard.