

Before Starting...



If you want to see our PPT, codes or plots,
QR code or https://github.com/kdh-yu/group11_dsp
Presentation>ppt

Manufacturers should reduce production of Non-Recyclable Plastics

Our approach to the resource problem



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What is the Resource Problem?

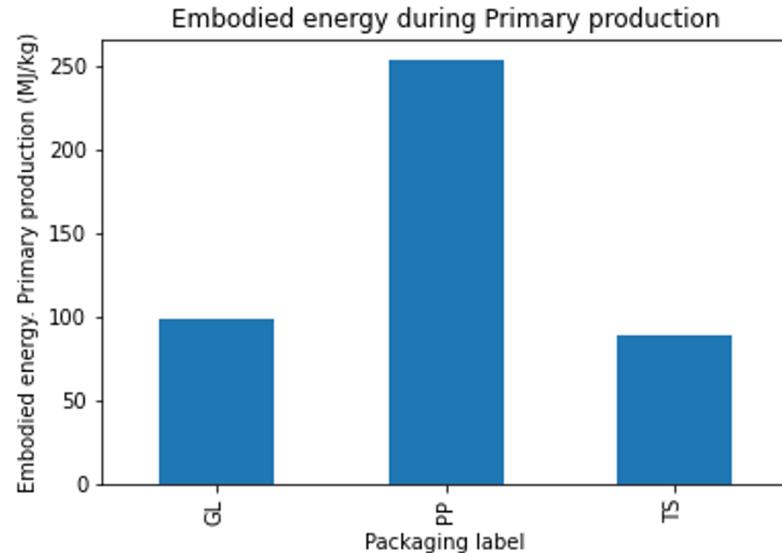
“The global resource problem is that people consume without any limitation, and deplete the reserves of natural elements of the planetary ecosystem, the components of organic and non-organic life, and the conditions for the existence of ... people and society.”

Source: Planetary Project

literature review

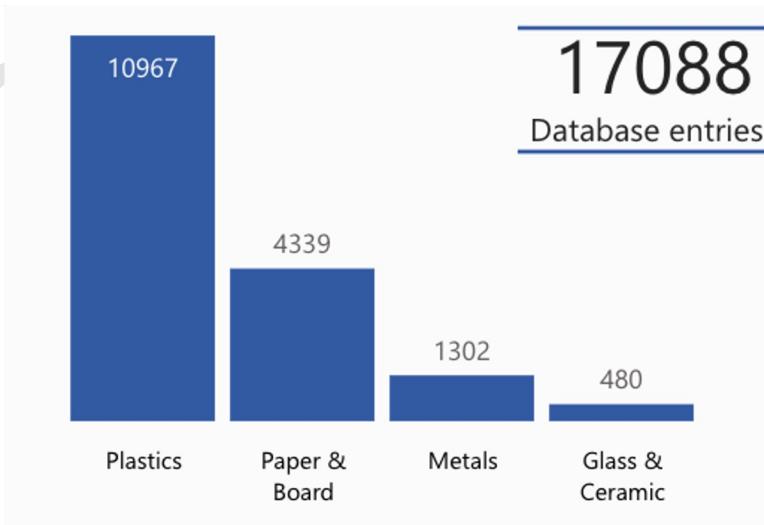
Supply is not enough to meet growing demand

Why Plastic?

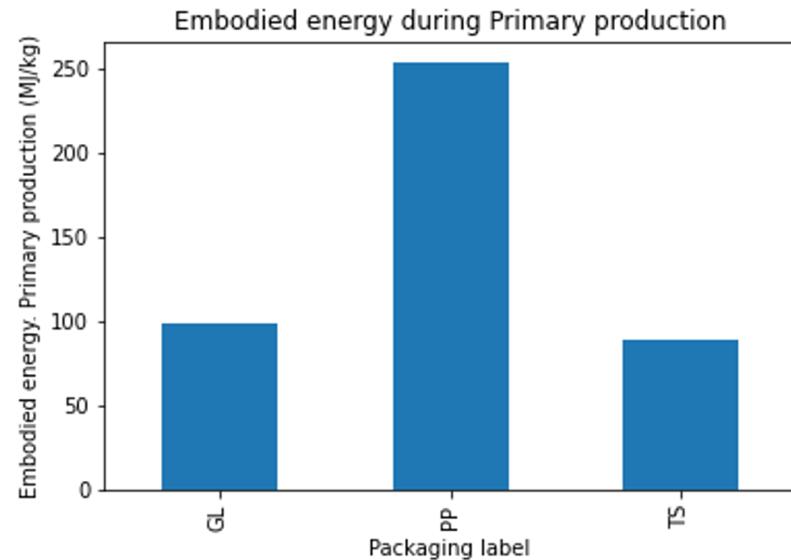


Embodied energy: a calculation of all the energy that is used to produce a material or product, including mining, manufacture and transport.
(yourhome.au)

Why Plastic?



Source: Food Packaging Forum



Source: Ingarao, et al. (2017).

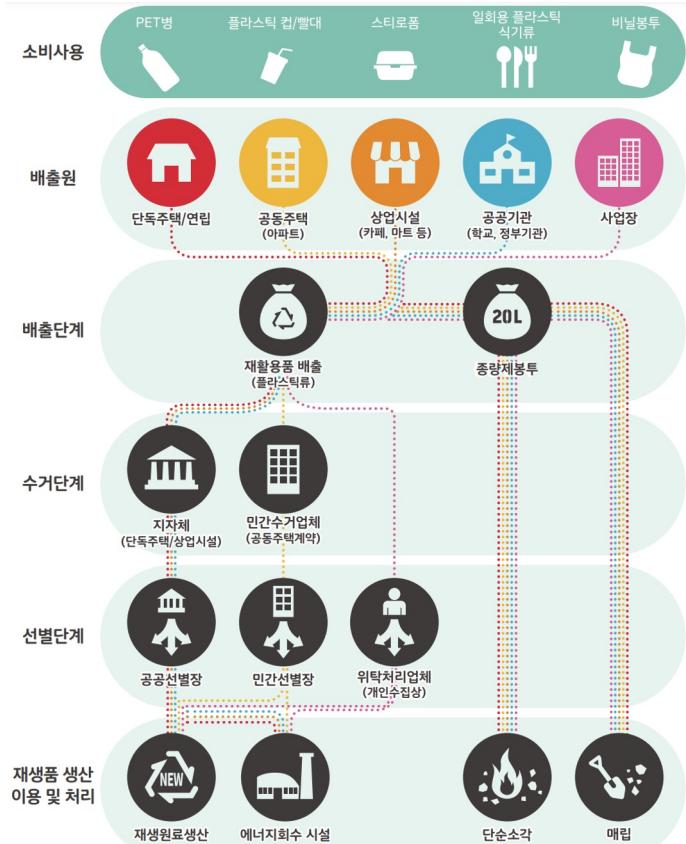
Plastic is a significant consumer of energy in its production

Why can't we just recycle all plastic?

제품	용도 및 내용물	합성수지의 종류(주로 사용되는 것)
커피, 차, 벌꿀	원두커피	PE, Other(비닐류)
	커피믹스	PE
	벌꿀	PET, HDPE, PP
음료수, 물, 주류	음료수	PET, 뚜껑: PP, HDPE, 라벨: PET, PP
	물	PET, 라벨: PP, PET, 뚜껑: HDPE
	액주, 막걸리, 소주	PET, PP, HDPE, 라벨: Other(비닐류), OPP, PET, PP
유제품	우유, 두유	용기: PE, PP, PET, 뚜껑: PE, EVA
	푸딩, 요거트, 요구르트	용기: PS, PP, PE, 뚜껑: PE, EVA, PS
	설탕, 소금, 깨, 후추, 다진 마늘	Other(비닐류), PE, PET, PP, PS
조미료	생강가루	Other(비닐류), 내캡: LDPE, 외캡: ABS
	율리고당	용기: PET, 뚜껑: PP/HDPE, 라벨: Other(비닐류), 하캡: LDPE, 상캡: PP
	미림, 까나리	용기: PET, 뚜껑: LDPE, 라벨: PP/Other(비닐류)
장류	홍초, 셀러드드레싱	용기: PET, 뚜껑: HDPE, PE, 내캡: LDPE, 외캡: PP, 라벨: Other(비닐류)
	된장	용기: PET, 뚜껑: PP, 라벨: PP
	고추장	용기: PP, 리드: Other(비닐류)
식용유	간장	용기: PET, 뚜껑: LDPE, 라벨: Other/PP, 손잡이: PP
	식용유	용기: PET, 뚜껑: LDPE, 라벨: PP
	라면, 당면	PP, Other(비닐류)
과자류	컵라면	용기: PE, PS, 뚜껑: PE, Other, 외장필름: PP
	시리얼	Other(비닐류)
	봉지 과자	Other(비닐류), PP
가공식품	젤리, 사탕, 초콜릿	Other(비닐류), PS, PE, PP, PET
	카레, 짜장, 스프, 즉석식품, 찌개	Other(비닐류), PP
	통조림(캔)	라벨: PP
신선식품	김	용기: PET 내면: PP
	과일, 채소	PET, PE
	생선, 육류, 것갈	PS, PE, Other(비닐류)
냉동식품	두부, 순두부	용기: PP, PE 리드: PE, 이너씰: PE, PP
	계란	PET
	만두, 너겟	PP, PE, 라벨: PET
세면용품	아이스크림	용기: PE, PP 리드: EVA
	바디로션, 바디워시, 샴푸, 린스	용기: PET, HDPE, Other(비닐류)
	세제	무겁: PE, PP 라벨: PE, PP
위생용품	세제, 섬유유연제	용기: HDPE 뚜껑: PP
	기저귀, 생리대	LDPE

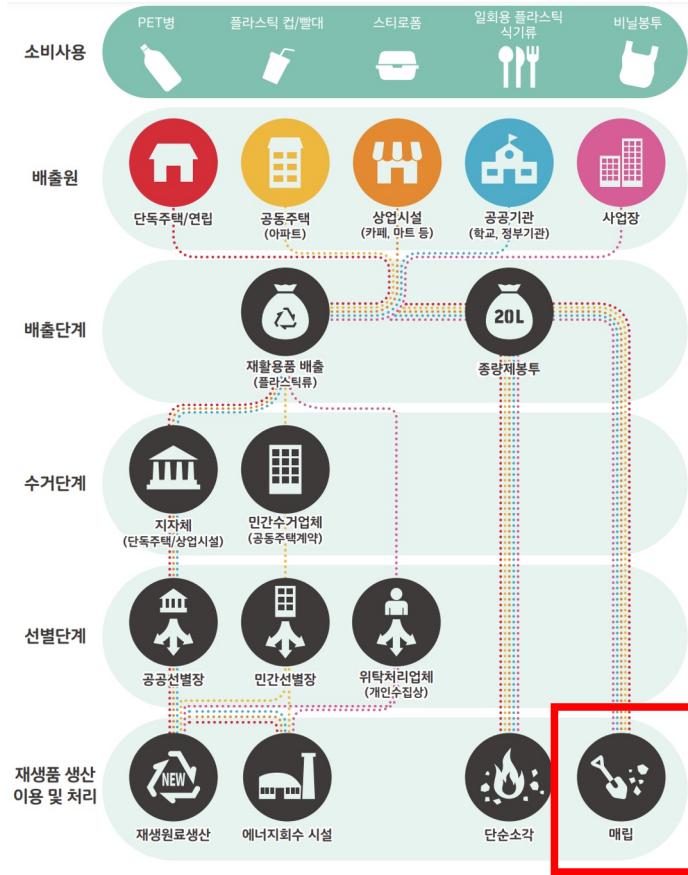
제품	PE	Other(비닐류)	HDPE	PP	OPP	PET	EVA	PS	LDPE	ABS
0 원두커피	1	1	0	0	0	0	0	0	0	0
1 커피믹스	1	0	0	0	0	0	0	0	0	0
2 벌꿀	0	0	1	1	0	1	0	0	0	0
3 음료수	0	0	1	1	0	1	0	0	0	0
4 물	0	0	1	1	0	1	0	0	0	0
5 액주, 막걸리, 소주	0	1	1	1	1	1	0	0	0	0
6 우유, 두유	1	0	0	1	0	1	1	0	0	0
7 푸딩, 요거트, 요구르트	1	0	0	1	0	0	1	1	0	0
8 설탕, 소금, 깨, 후추, 다진 마늘	1	1	0	1	0	0	0	1	0	0
9 생강가루	0	1	0	0	0	0	0	0	1	1
10 율리고당	0	1	1	1	0	1	0	0	1	0
11 미림, 까나리	1	1	0	1	0	0	0	0	1	0
12 홍초, 셀러드드레싱	1	1	1	1	0	0	0	0	1	0
13 된장	0	0	0	1	0	1	0	0	0	0
14 고추장	0	1	0	1	0	0	0	0	0	0
15 긁창	0	1	0	1	0	1	0	0	1	0
16 식용유	0	0	0	1	0	1	0	0	1	0
17 라면, 당면	0	1	0	1	0	0	0	0	0	0
18 컵라면	1	1	0	1	0	0	0	0	1	0
19 시리얼	0	1	0	0	0	0	0	0	0	0
20 봉지 과자	0	1	0	1	0	0	0	0	0	0
21 젤리, 사탕, 초콜릿	1	1	0	1	0	1	0	1	0	0
22 카레, 짜장, 스프, 즉석식품, 찌개	0	1	0	1	0	0	0	0	0	0
23 통조림(캔)	0	0	0	1	0	0	0	0	0	0
24 김	0	0	0	1	0	1	0	0	0	0
25 과일, 채소	1	0	0	0	0	1	0	0	0	0
26 생선, 육류, 것갈	1	1	0	0	0	0	0	1	0	0
27 두부, 순두부	1	0	0	1	0	0	0	0	0	0
28 계란	0	0	0	0	0	1	0	0	0	0
29 만두, 너겟	1	0	0	1	0	1	0	0	0	0
30 아이스크림	1	0	0	1	0	0	1	0	0	0

Trash disposal process



김 이서. (2019, December). *플라스틱 대한민국 - 일회용의 유혹*. Greenpeace Korea | 그린피스. Retrieved from

If they are not disposed separately...



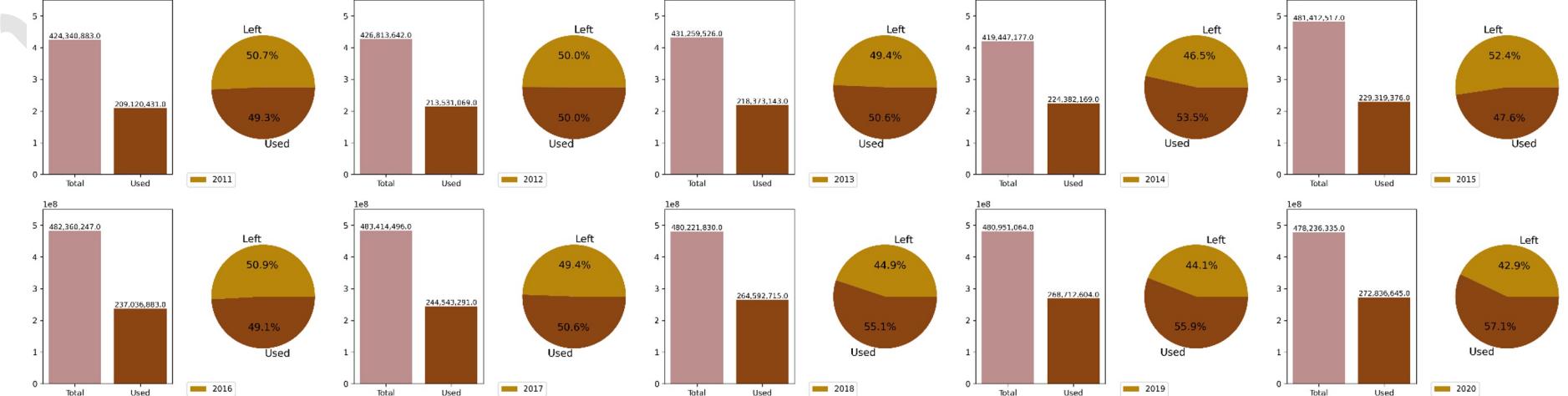
김 이서. (2019, December). *플라스틱 대한민국 - 일회용의 유혹*. Greenpeace Korea | 그린피스. Retrieved from

If they are buried...

Material	Estimated Decomposition
Cigarette butts	5 years
Plastic bags	20 years
Plastic-lined coffee cups	30 years
Plastic straws	200 years
Soda can rings	400 years
Plastic bottles	450 years
Toothbrushes	500 years
Disposable diapers	500 years
Styrofoam	500 years
Fishing line	600 years
Glass	Unknown

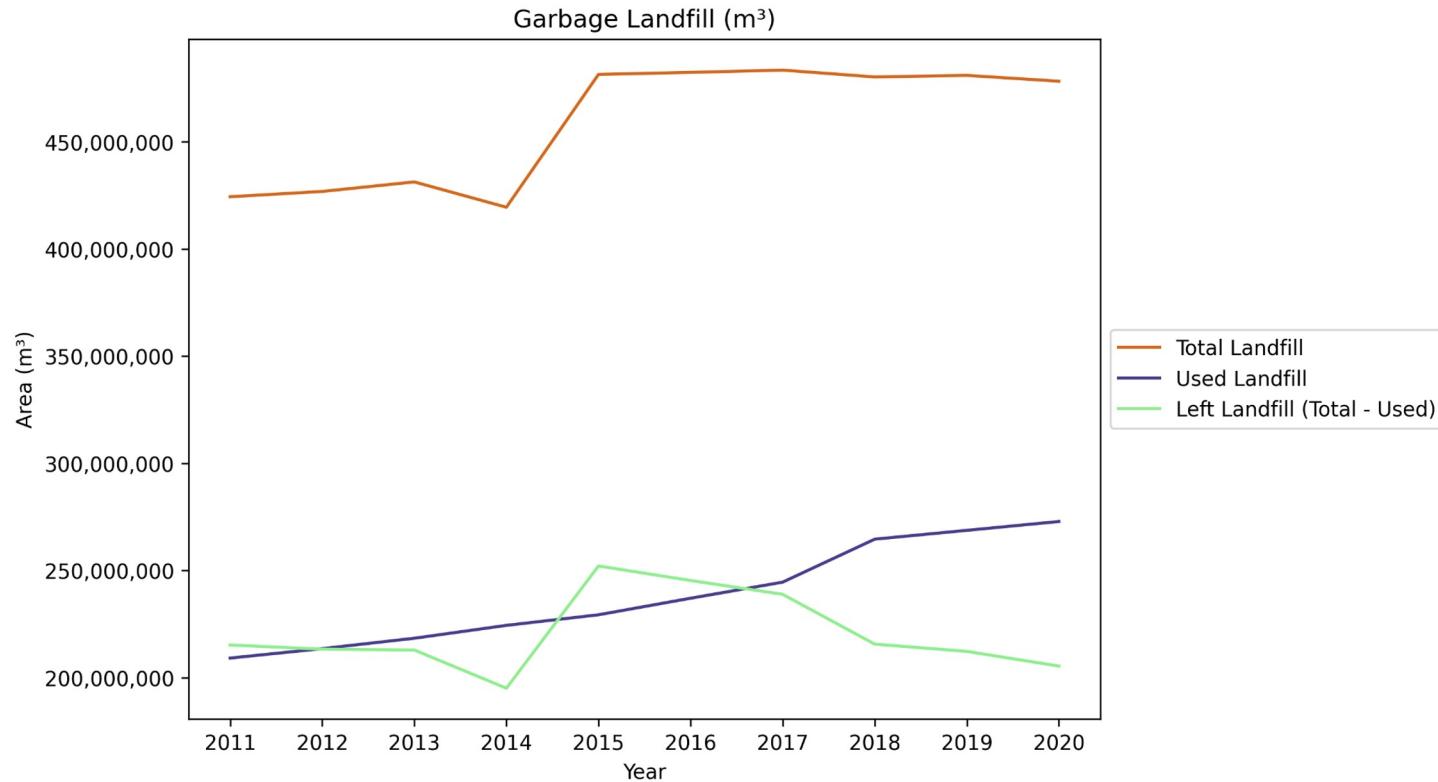
How long does it take for plastic to decompose? Chariot Energy. (2022, October 20). Retrieved December 14, 2022, from <https://chariotenergy.com/blog/how-long-until-plastic-decomposes/>

If they are buried...

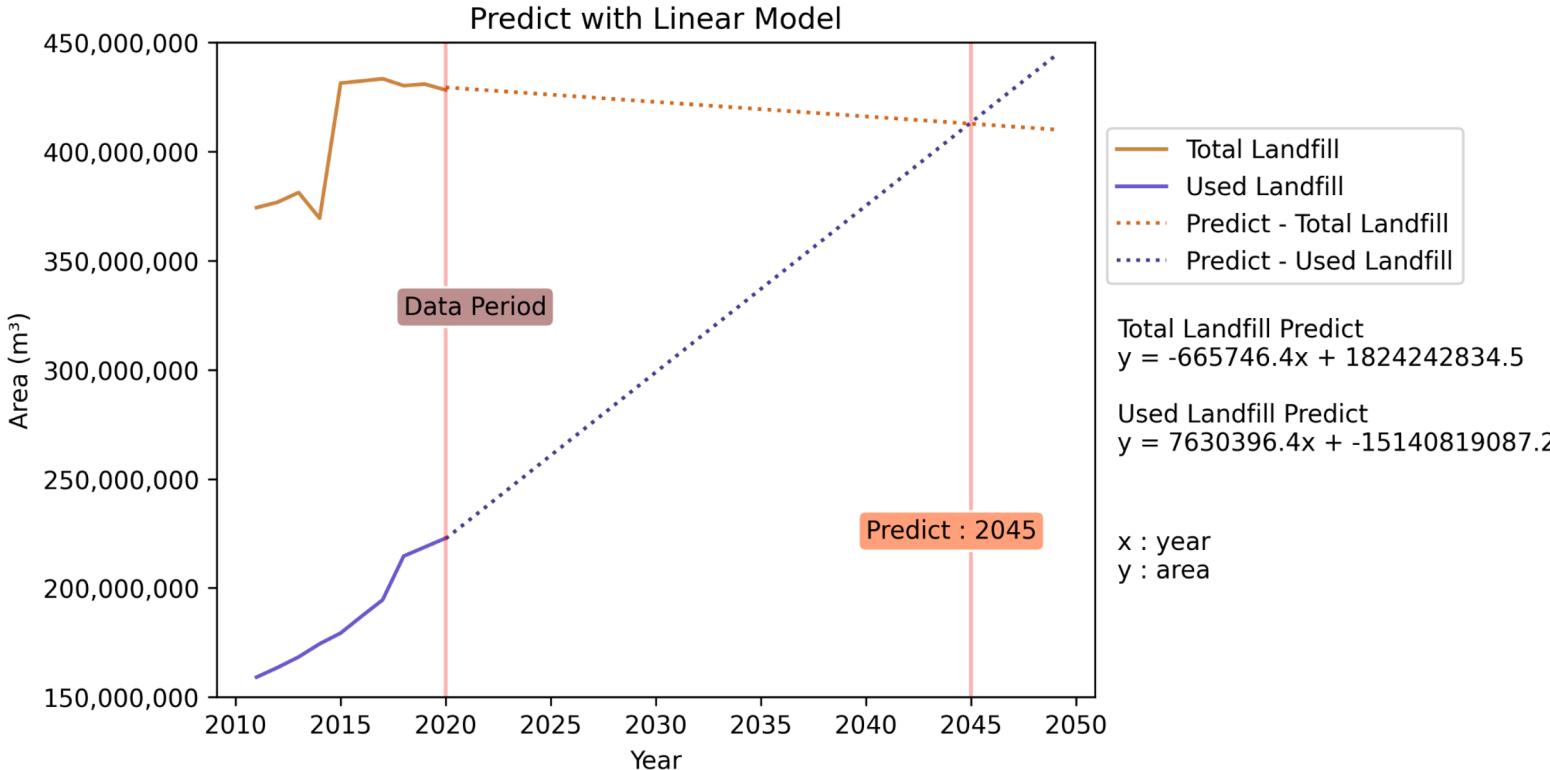


환경부, 「전국폐기물 발생 및 처리현황」, 2020,
2022.12.14, 지방자치단체 폐기물 처리시설 현황_매
리지션

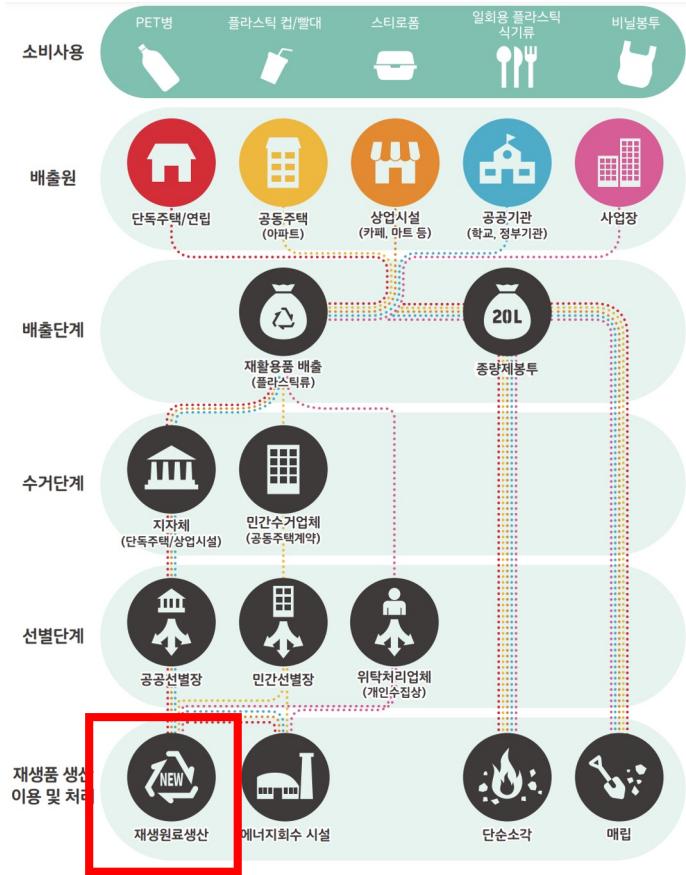
Garbage Landfills (Korea nationwide)



What will happen at Garbage Landfills in the future?



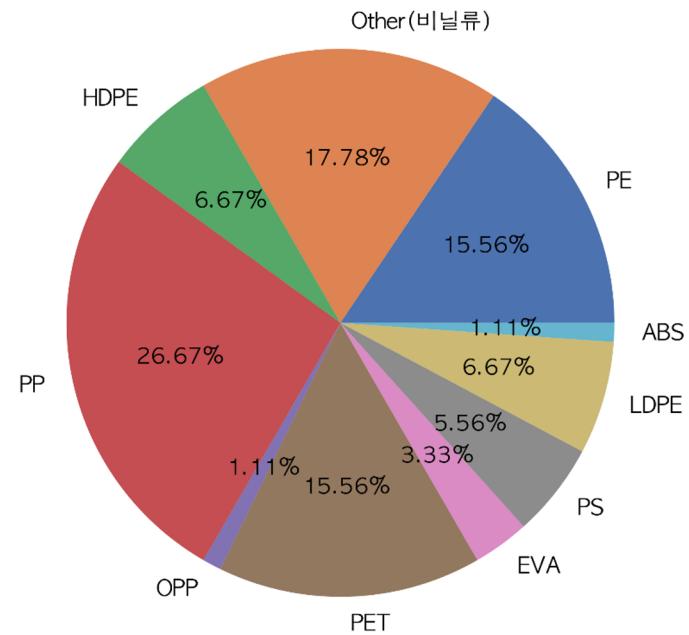
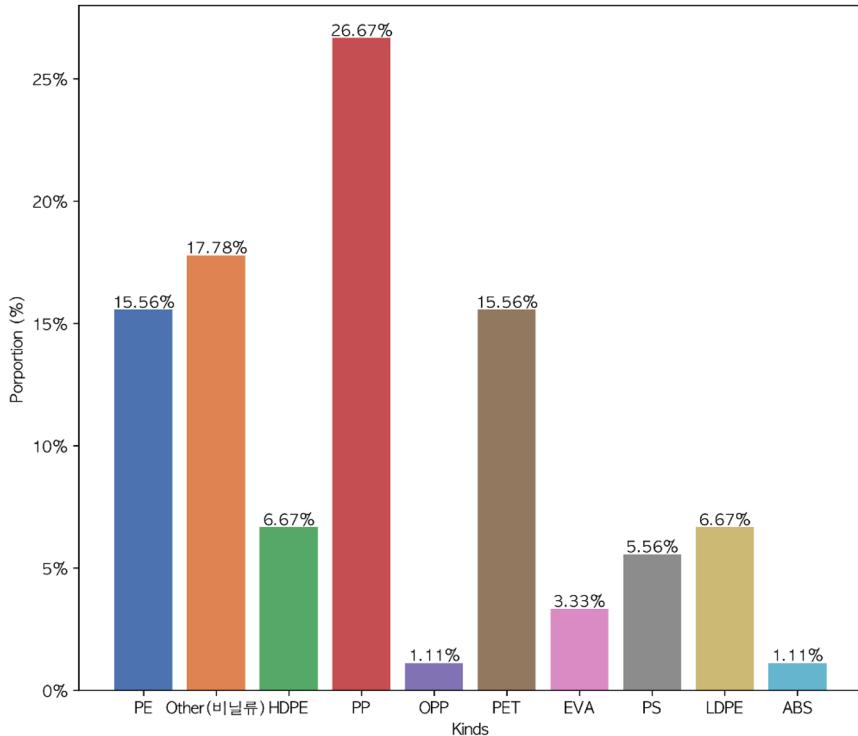
Then, if they are disposed well...?



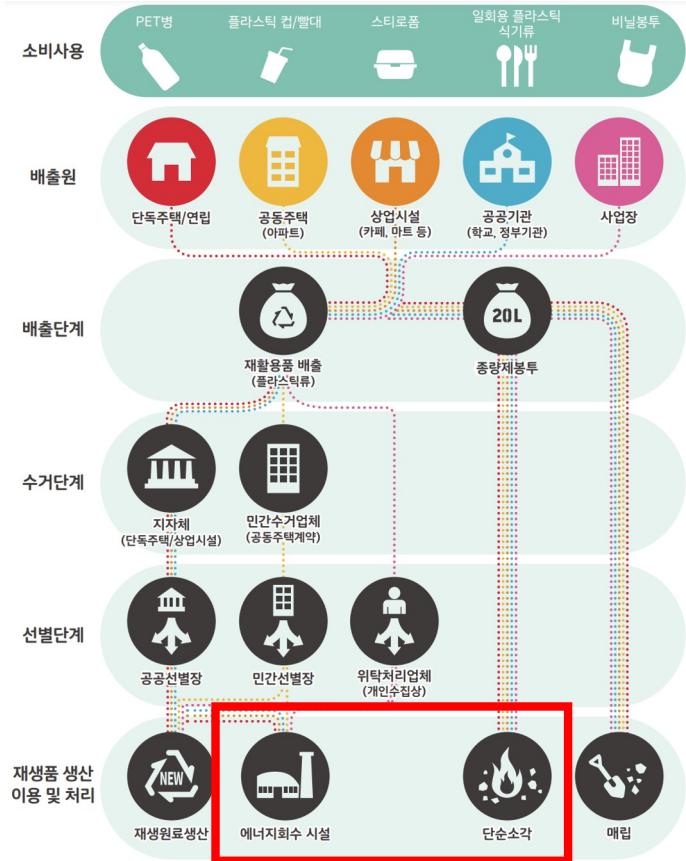
김 이서. (2019, December). *플라스틱 대한민국 - 일회용의 유혹*. Greenpeace Korea | 그린피스. Retrieved from

Why can't we just recycle all plastic?

Frequency of each plastic used in 30 kinds of products

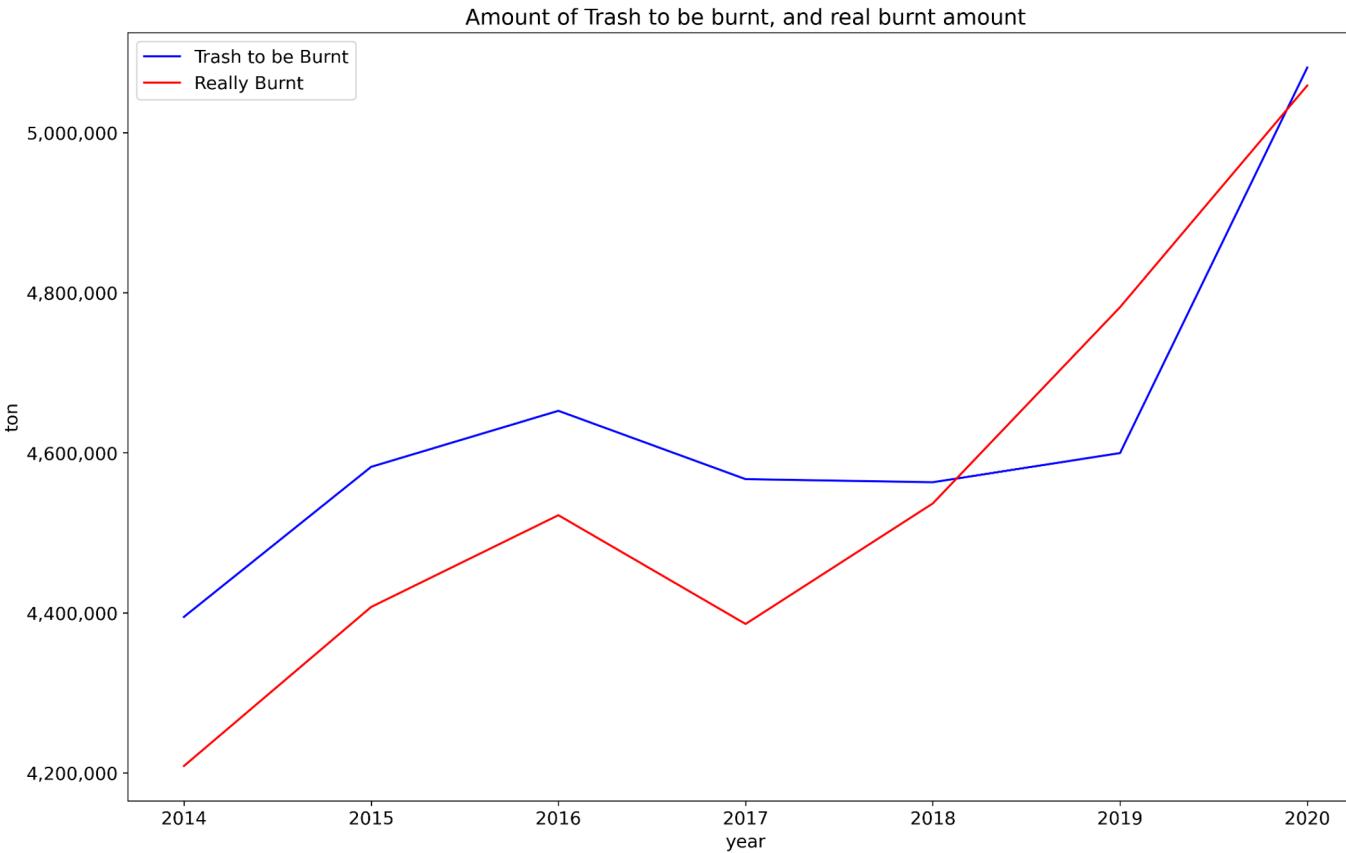


Oh, then we can burn them!



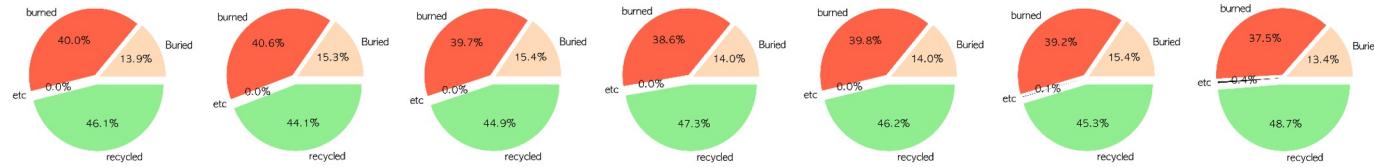
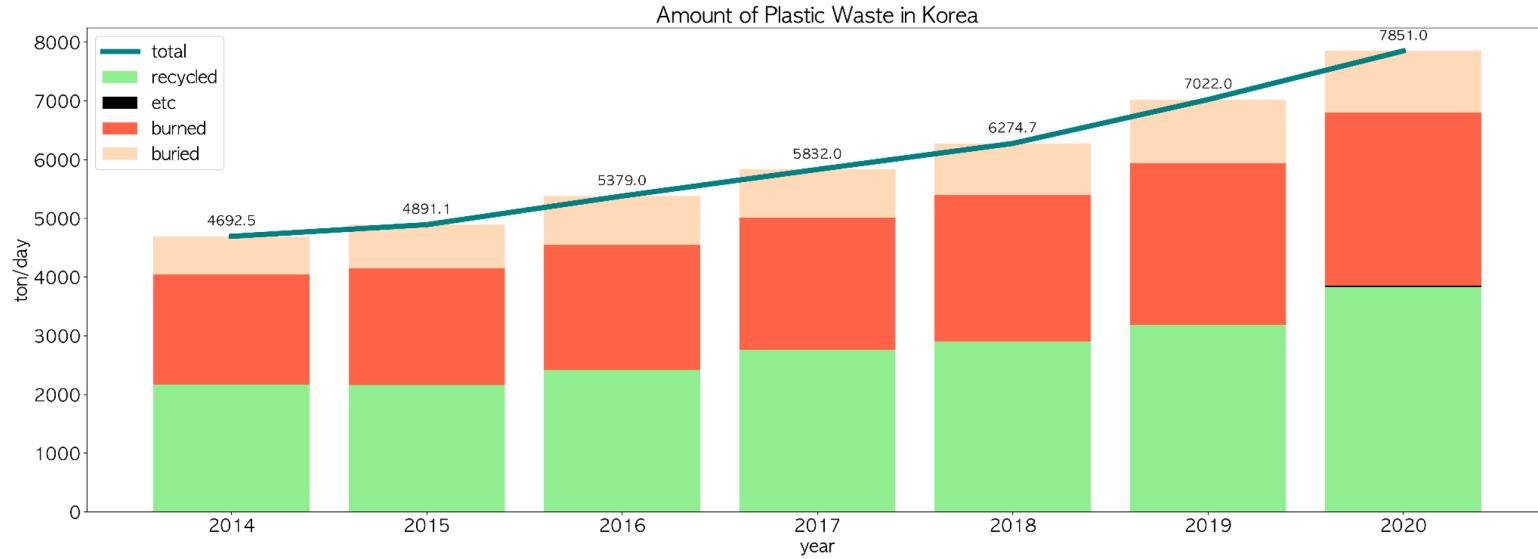
김 이서. (2019, December). *플라스틱 대한민국 - 일회용의 유혹*. Greenpeace Korea | 그린피스. Retrieved from

Is it possible to burn all of them?



환경부, 「전국폐기물 발생 및 처리현황」, 2020, 2022.12.14, 지방자치단체 폐기물 처리시설 협회 조간시설

Amount of Plastic Waste in Korea



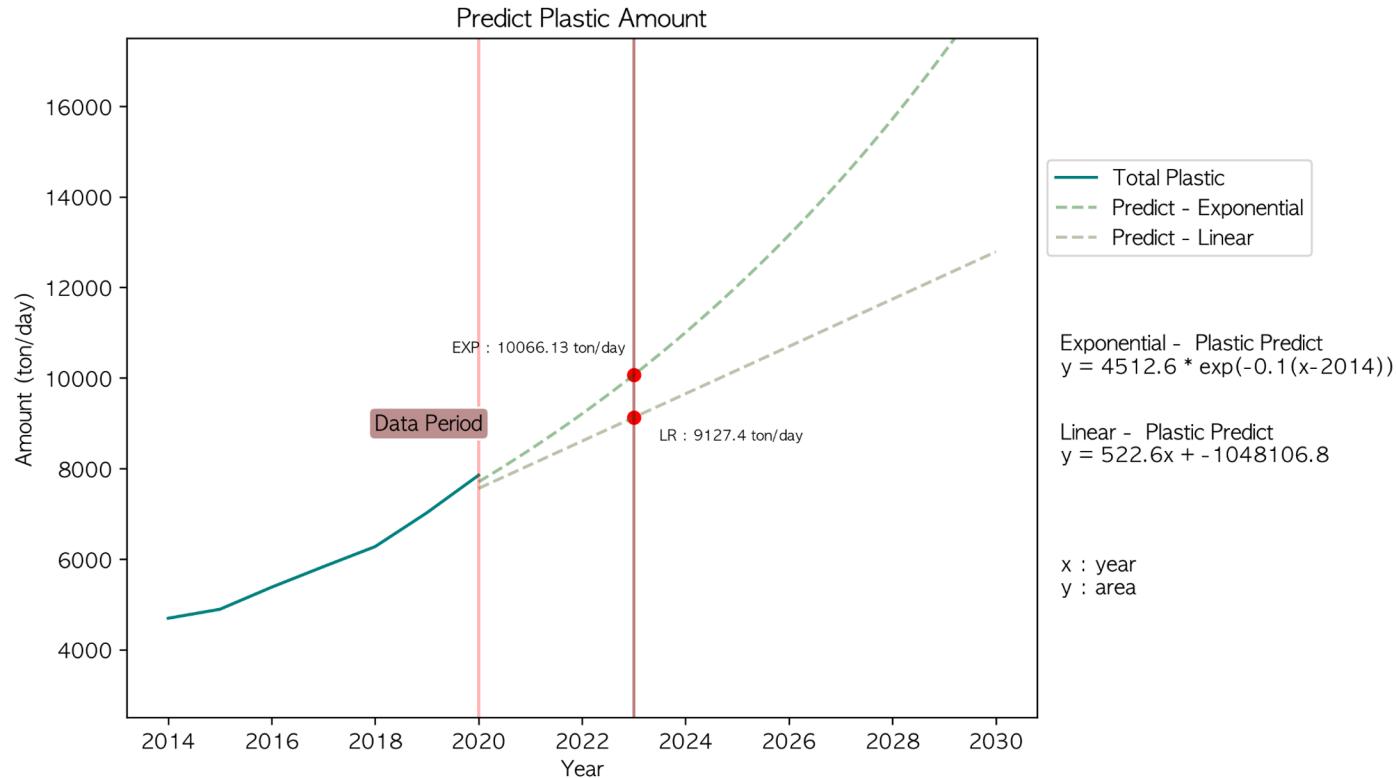
Amount of Plastic Waste in Korea



2020 : 7851 ton/day
Which means... we can make 2L pet...

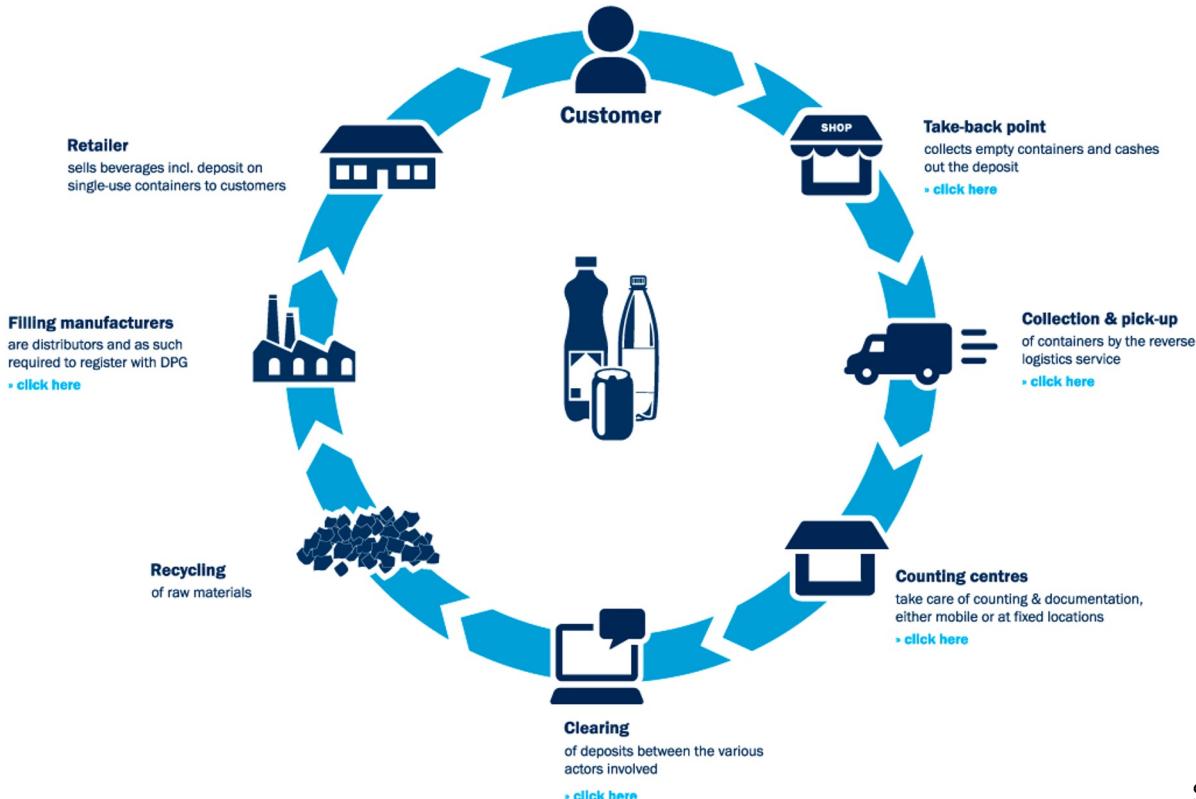
× 233,967,312..... per day

Future of Plastics....



Our Proposal :
We need to reduce amount of non-
recyclable plastics,
Not only at consumers' step,
But also at MANUFACTURERS' STEP!

Deposit Return System (DRS)



Source: Economia (2020)

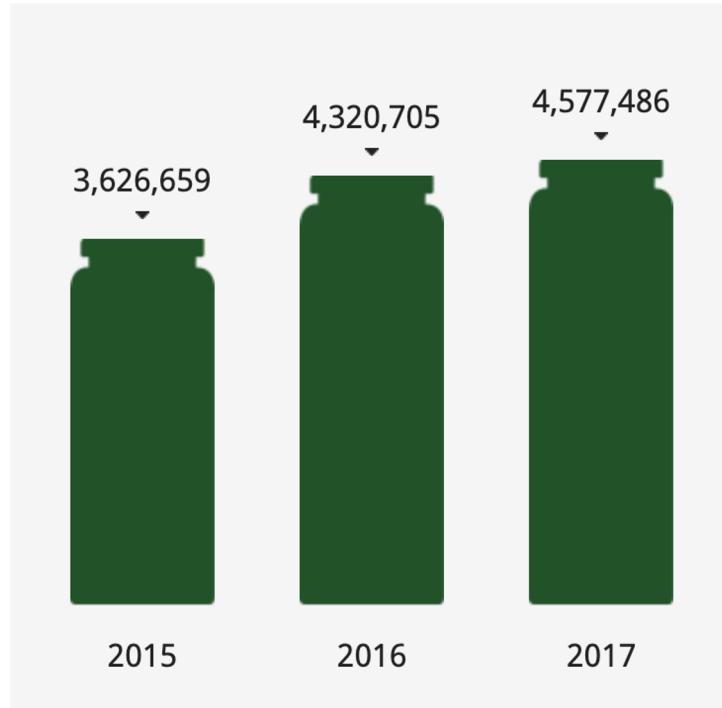
In Practice



Germany



Source: EURACTIV



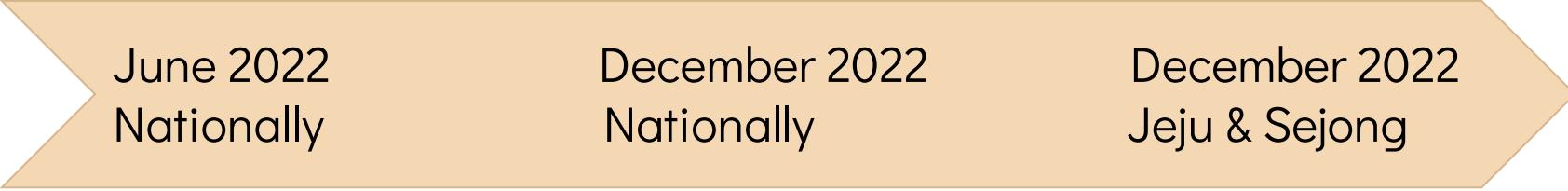
Innisfree

Source: innisfree Korea

Target



Source: aflnews



June 2022
Nationally

December 2022
Nationally

December 2022
Jeju & Sejong

Currently



- A small amount of cafes were the target.
 - Collection box was only in the cafe.
 - Returnable only at the store where you purchase it.
 - There is no legal basis.
- A less deposit.

DRS (Deposit Return System)

- A small amount of cafes are the target.
- Collection box in the cafe & outside.
- Establish Container Deposit System Management Organization(COSMO).
- An increased deposit.



Extended Producer Responsibility (EPR)



Extended Producer Responsibility is a **policy tool** that makes producers legally and financially responsible for mitigating the environmental impacts of their products and packaging.

Without EPR

Producers bear no responsibility for the waste created by the products they make and profit from



With EPR

Producers are required to be responsible for waste recovery and recycling



Source: Upstream

Currently

EPR (Extended Producer Responsibility)

- Small amount of plastic applied
- Many types of plastic in the mix
- Companies not subject to EPR
- Disposable cups are excluded

Solution



Complement the DRS + EPR

- Put collection box outside the cafe.
- Every cafe participates in DRS -> all become collection points.
- Add a disposable cup of cafe in EPR.
- Plastic type unification.

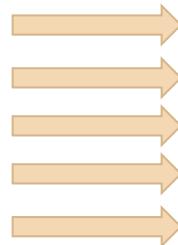


Intended Outcomes

wavy
problems

- Small amount of cafes
- Responsibility of plastic cups
- Hygiene problem in cafe
- Crowded cafe
- Cost of collection box

solved



- Every cafe is collection point
- EPR
- Collection box located outside
- Collection box located outside
- Government

People's perception

■ 일회용컵 보증금 제도 기대 효과

대상 점포 수	3만8000개
대상 일회용컵	23억개
경제적 편익	445억원
온실가스 발생	소각 대비 66%↓

[자료 | 환경부]

■ 소비자 환경 인식 (단위 : %)

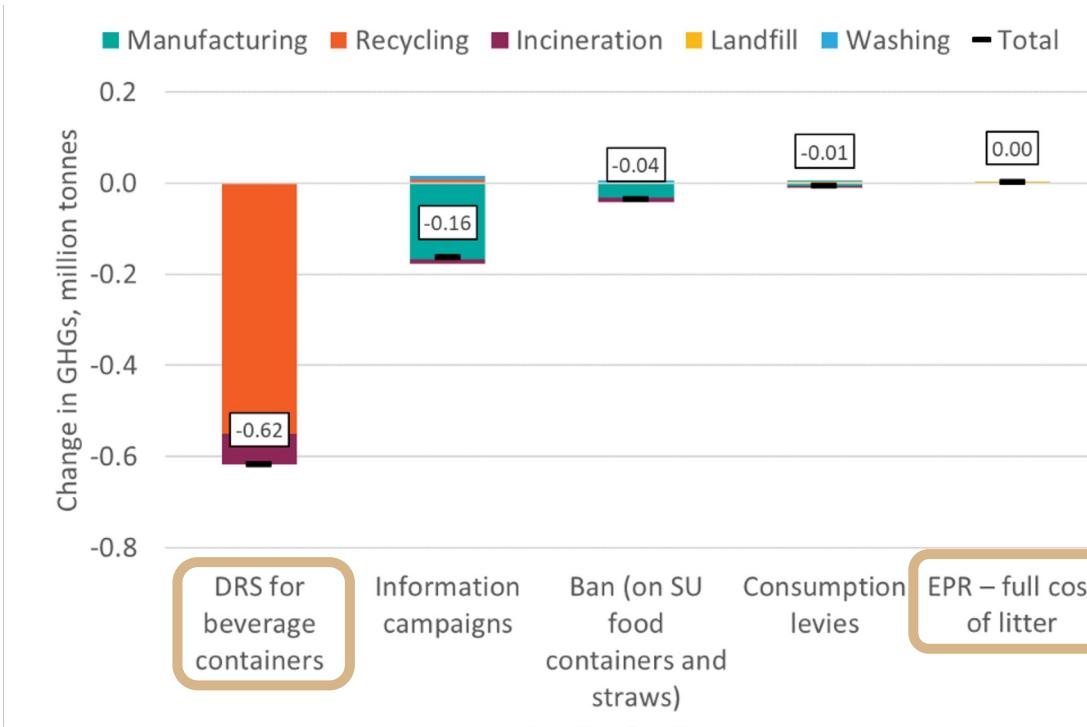
환경보호 위해선 불편 감수해야	86.4
친환경 기업 제품 소비 증가할 것	79.7
플라스틱 사용 금지 강제성 낮은 수준	73.9
과대 포장 제품, 소비자의 외면 받을 것	71.4

[자료 | 트렌드모니터. 참고 | 복수응답]



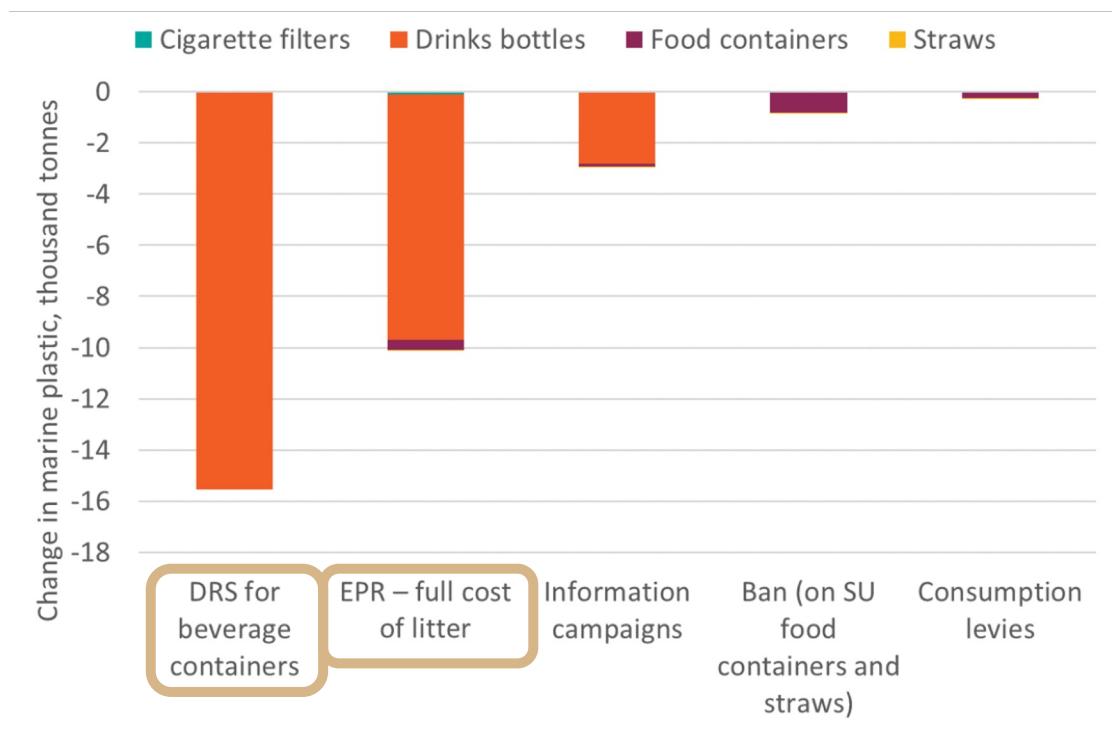
Source:thescoop

Impact on GHG Emissions (2030 model)



Source: Eunomia Research & Consulting

Impact on Marine Litter (2030 model)



Source: Eunomia Research & Consulting

NORWAY



Since 1999, a national deposit and recycling system for non-refillable plastic beverage bottles and cans has been operated by Infinitum.

Infinitum is a non-profit organization owned by Norwegian bottlers and retailers.



**RESULT: 95% return
rate**

EPR

The Norwegian Government imposes a tax.

Industry collectively decided that the most cost-effective option was to establish a DRS.

Producers who are part of the scheme must report to Infinitum every month. Those producers who do not sign up to the Infinitum scheme pay a fixed environmental fee.

Conclusion

Based on our research, we believe that reducing the number of non-recyclable plastics produced can contribute significantly to solving the resource problem. We suggest implementing a DRS+EPR system in order to get local food packaging producers on board.



THANK YOU! :)

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