

Recycling Analysis in the Puget Sound area and Amsterdam:

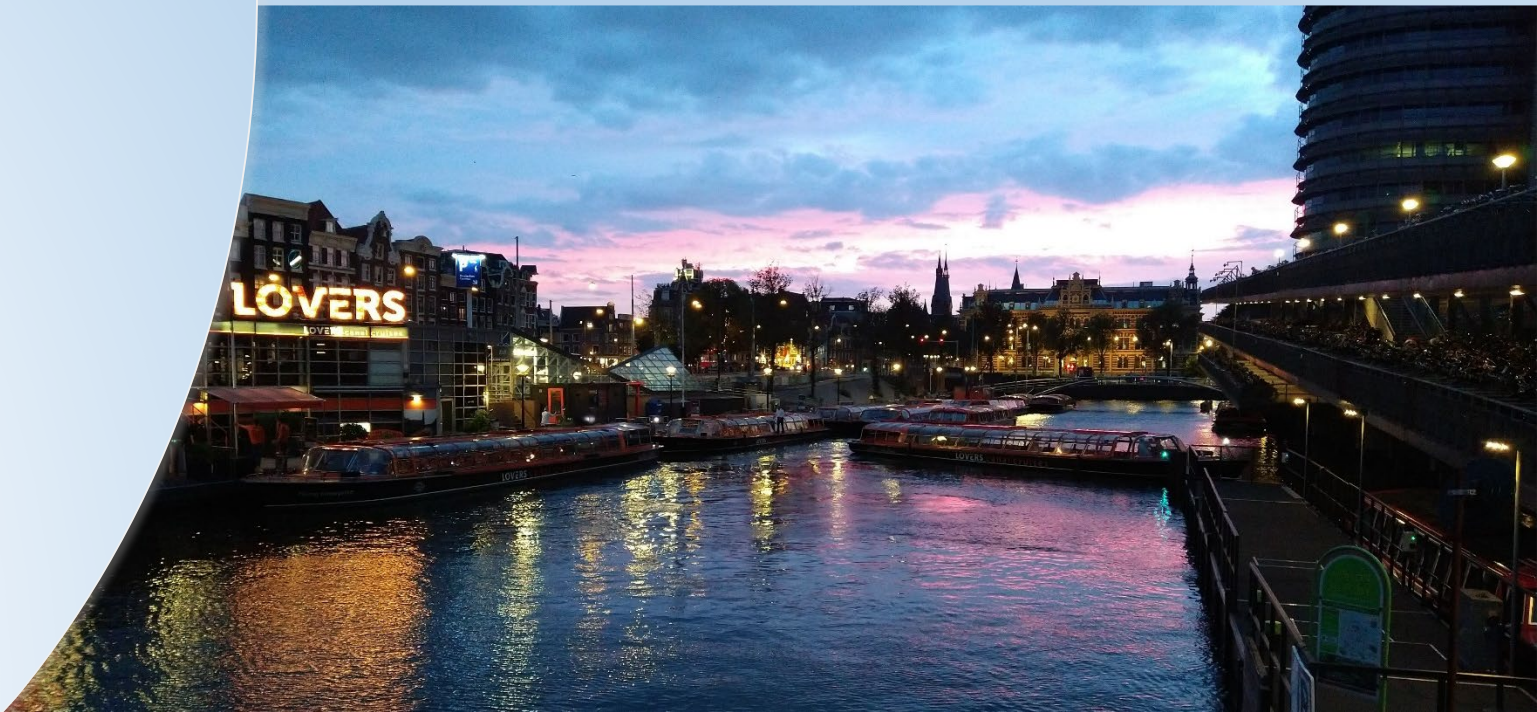
What can we learn from comparing these two cases to increase the recycling rate?

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Recycling Analysis in the Puget Sound area and Amsterdam:

What is recycling? Why does it matter?



62k sq. mi

Great Pacific garbage patch covers

Mainly made up with plastics, evidence shows that improper waste disposal and recycling contributes to the patch

62k sq. mi is only **20%** of all ocean debris
The rest 80% sank to the bottom

80%

People in EU and US believe recycling is real and necessary

All people in Tacoma and Amsterdam I interviewed responded that they believe in recycling

19%

World Average recycling rate



EU: 46%



US: 32%



Netherlands: 60%



Washington: 50%

1970s

Recycling program founded aims at environmental protection

EPA was founded in **1970** in the US;

Regional environmental agencies in Europe were established in the 1970s, and became a part of EEA when EU formed in **1993**

9.3%

Plastic waste being recycled in US

75.4% Landfill

15.3% Incineration

2%-3% plastic were illegally dumped

1 Million

US exported recycle materials (2017, ton)

US and EU are the **1st** and **2nd** with respect to recycled material exporting in total/per capita in the world

Most exported recycled materials ends up in Asia. Today, mixed paper recycling still rely on exporting to Asia for the US and EU.

Recycling Analysis in the Puget Sound area and Amsterdam:

Individual participation What is Significant?



Drop off container:
Amsterdam

Curbside container:
Puget Sound



Convenience is the key
to increase individual recycling participation

Every extra mile spent on recycling,
reduced the chance by **1%**

Every extra minute spent on recycling,
reduced the chance by **3.7%**

In the US, curbside recycling will potentially increase overall recycling rate by **15%** compared to the drop-off method

In Amsterdam, there are more than **4,000** recycling drop-off containers across the city, with an average accessibility of **4-minute** walk

Recycling Analysis in the Puget Sound area and Amsterdam:

Economics and the free market

What might be the problem



Higher Profit or **Savings** from recycling can incentivize the extraction of more recyclables from disposal

In general:

Recycling profit in Tacoma(2020): **-\$115** per ton

In 2017(prior to the Chinese recycling import ban): **+\$35** per ton in Tacoma

Compared to:

Landfill tipping fee in Washington: **-\$96** + processing

Landfill tipping fee in Mississippi (Cheapest State): **-\$30+** processing

Landfill tipping fee in the Netherlands: **-€140 (\$156)** + processing

Specific to material:



Melting point: 2600 °F

Hold 1.8 L liquid per kg

Shattered glass might be dangerous, and degrade mixed recycle quality



Melting point: 1220 °F

Hold 23.5 L liquid per kg

High value, easy sorting
Perfect recycling



Melting point: 500 °F

Hold 50 L liquid per kg

Have various type;
Value depends on types.

Recycling Analysis in the Puget Sound area and Amsterdam:

Policy and regulation

What can the government do?



Ban or restrict on Global waste trading

- Basel Treaty 1989 and 2019 revision
- Promote environmental justice for developing countries

Decentralized vs. Centralized management

- US: decentralized, local-based recycling program
 - EPA only requires minimum recycling requirements
 - Enforcing, managing power belongs to local recycling management program
- EU centralized, EU-based recycling enforcement
 - Mandatory recycling requirement, strictly set improvement rate, requires innovation.

Enforcing power

- EU: Mandatory 60% recycling rate for each member country by 2030, countries already reach 60% are required to aim 65%.
- US: General 50% overall country wide recycling rate, did not specify requirements for each state.

Solution and Recommendation

What could be better?

Individual & Personal Perspective

- Increase self-awareness of recycling
- Make recycling more convenient

Market and Economics Perspective

- Support recycling industries, support using products made with recycled materials
- Decrease use of “low-recycling-efficiency” materials, such as glass

Government Perspective

- Enforce global recycling trading, support local recycling processing
- Set specific targets and goals for local recycling program; require improvement rates

Thank you

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