

Belgian Environmental Economics Day  
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# Addressing Uncertainties in Plastic Flows

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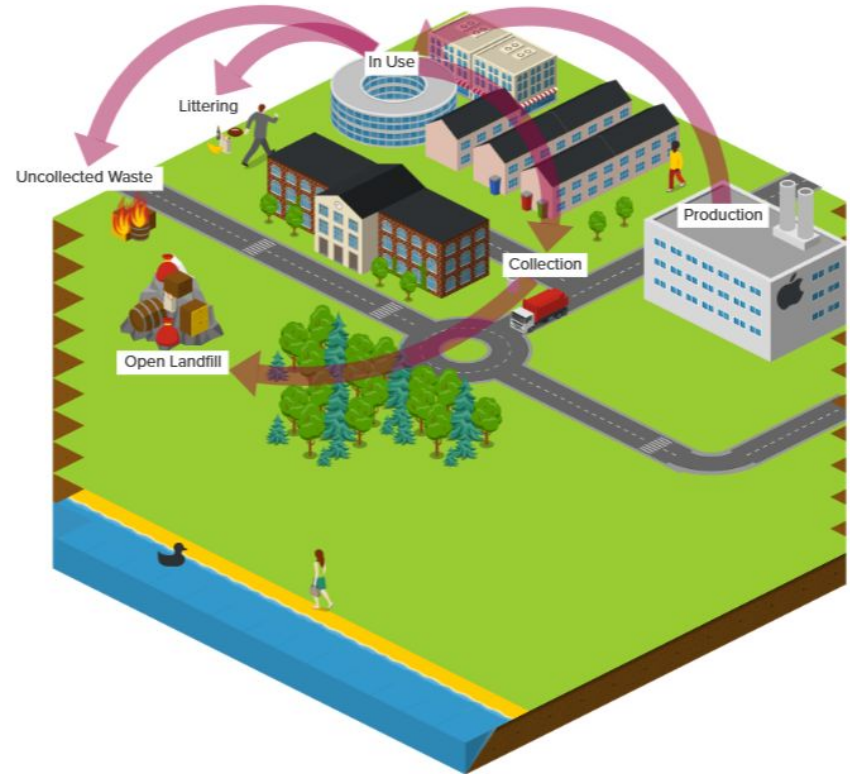
A photograph of a waste recycling facility. In the foreground, there are several large, blue metal chutes or conveyor belts filled with a large volume of waste, including plastic bags, paper, and other debris. The facility has a high ceiling with large windows and industrial structures. A yellow safety railing is visible in the lower-left corner. A large, semi-transparent white circle is overlaid in the center of the image, containing the text "Introduction".

# Introduction

# EU Policy and the History of Plastics

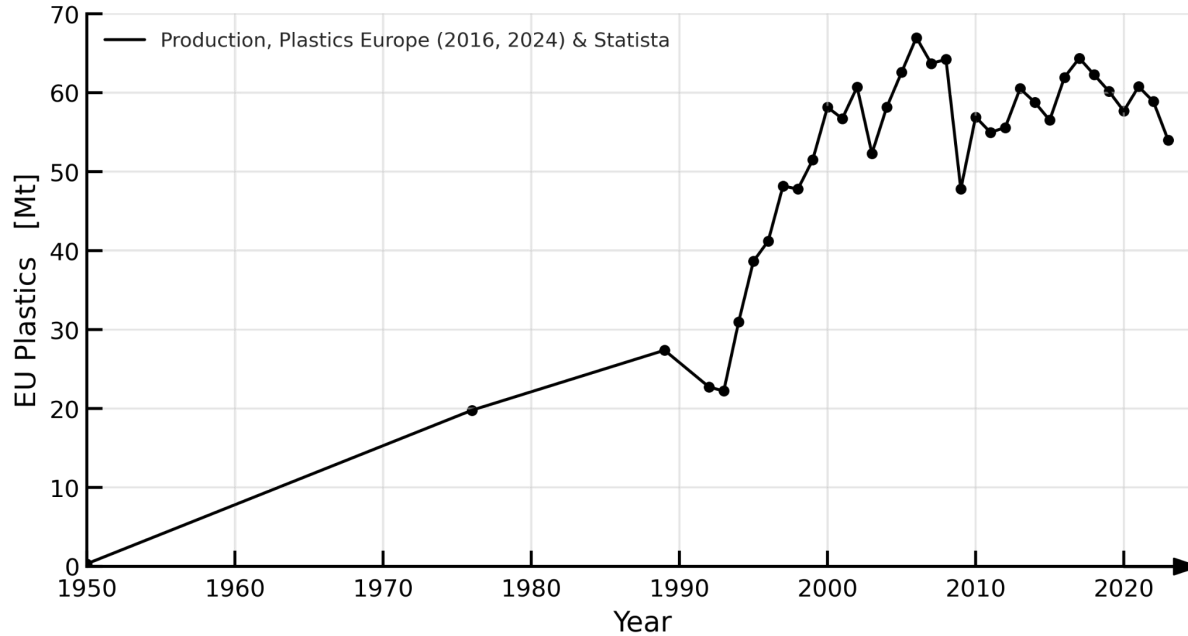
## The Beginning (1950)

- 1950 considered starting year of plastics mass production
- Widespread landfills of mixed and hazardous wastes
- Incineration was unpopular due to costs and pollution



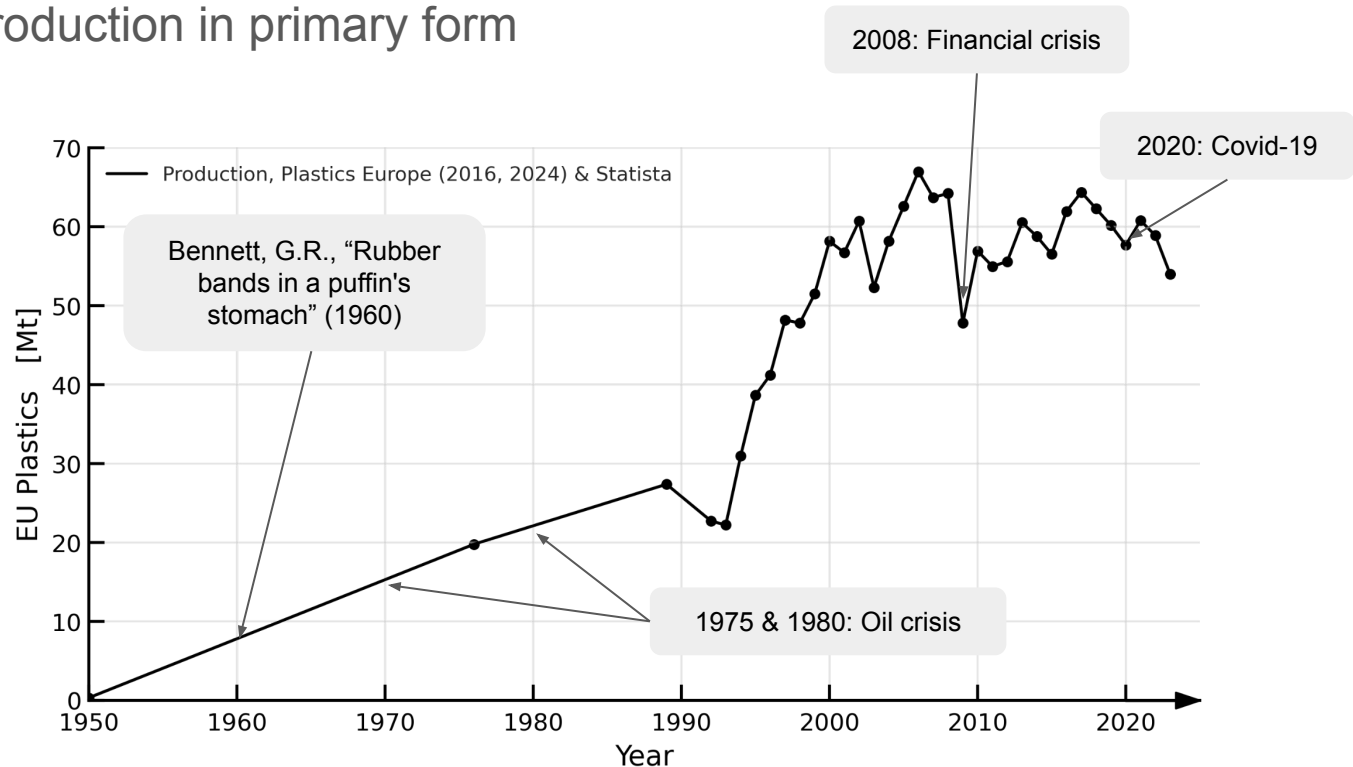
# EU Policy and the History of Plastics

EU plastic production in primary form



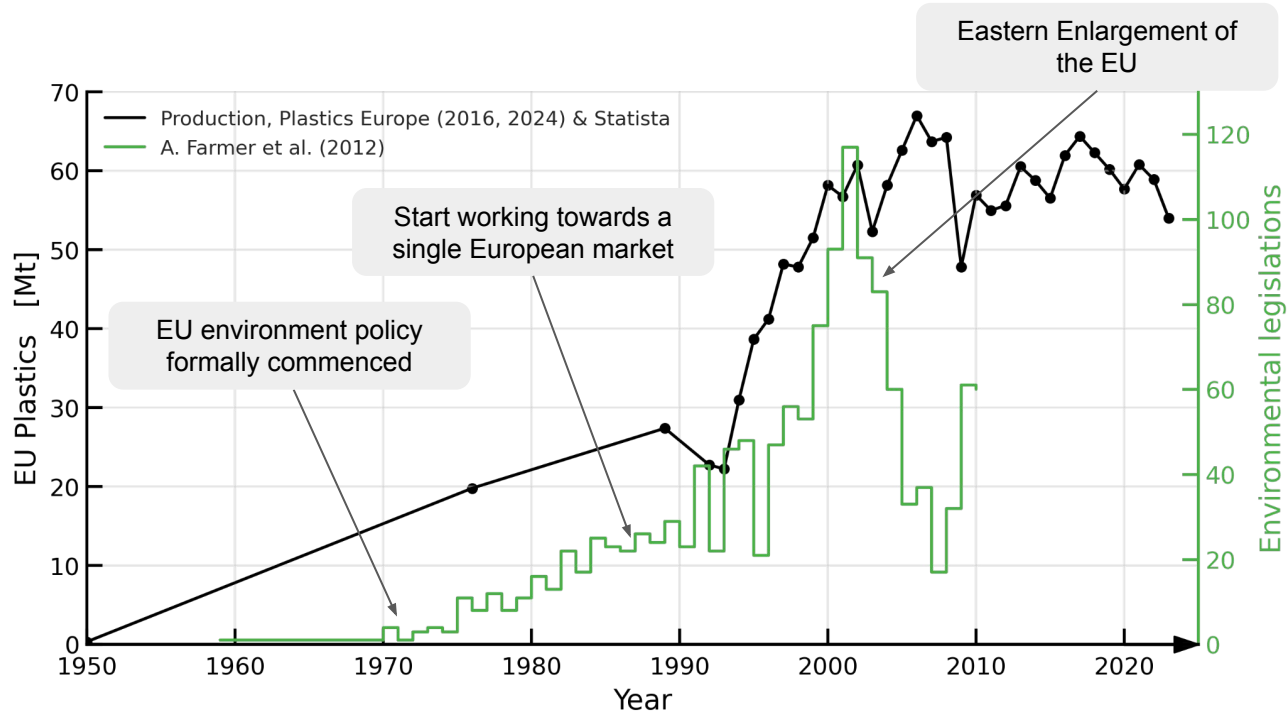
# EU Policy and the History of Plastics

## EU plastic production in primary form



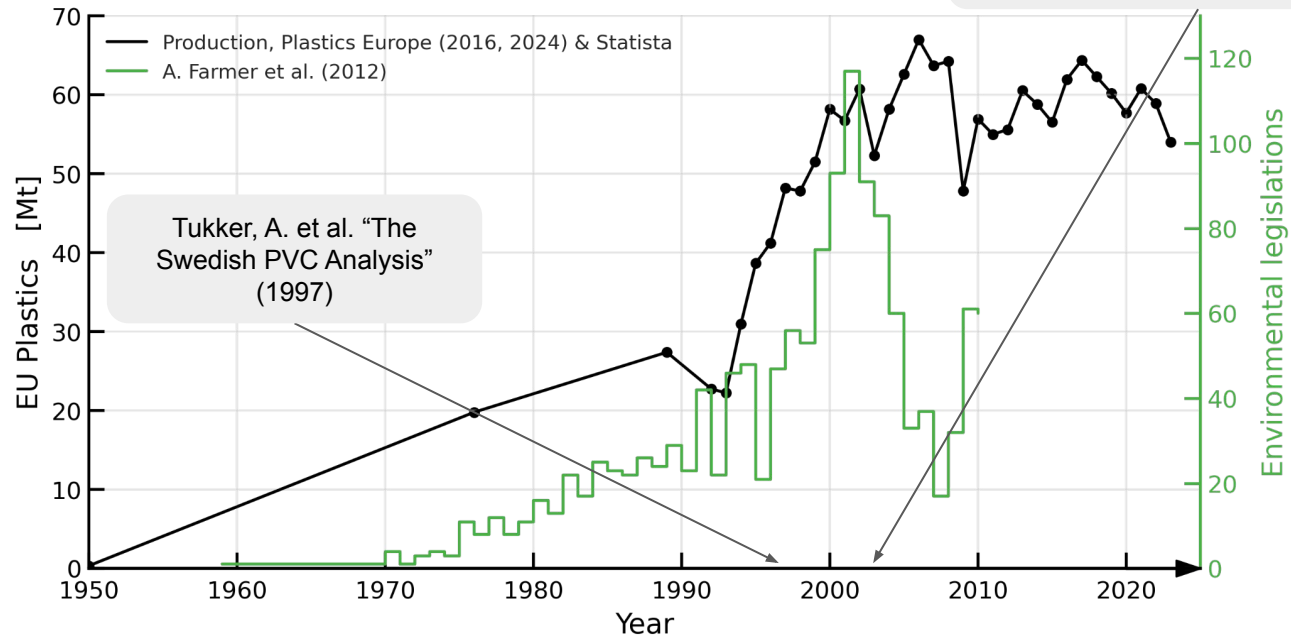
# EU Policy and the History of Plastics

## EU environmental policy



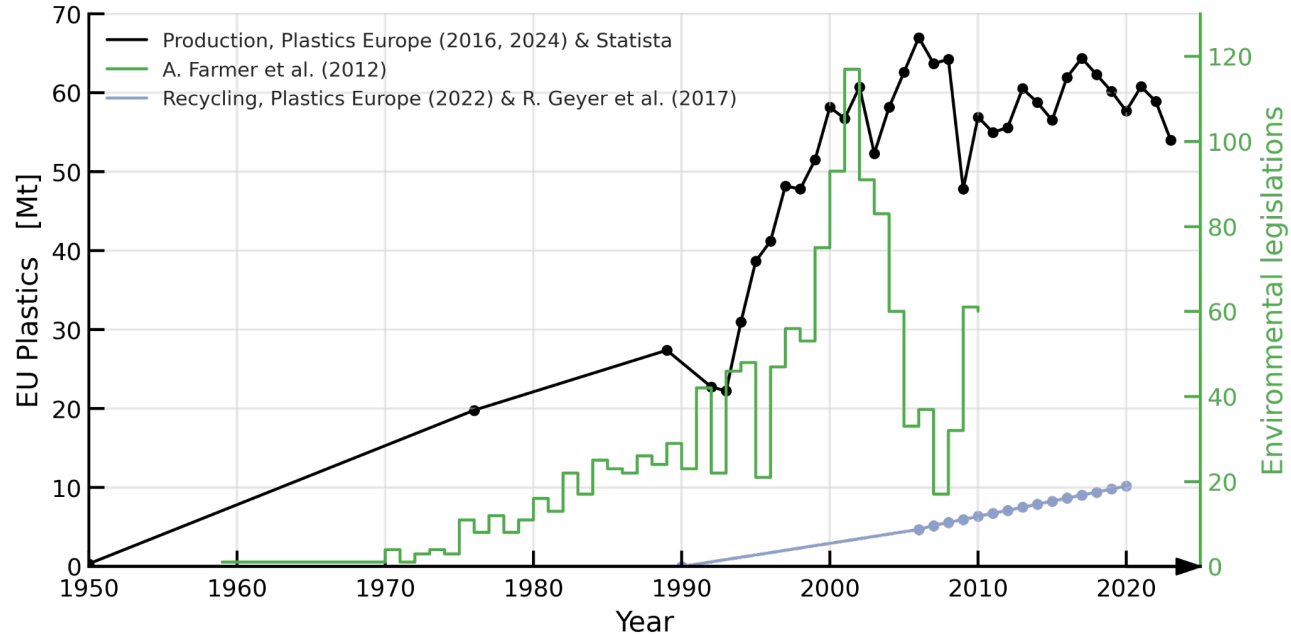
# EU Policy and the History of Plastics

## Retrospective Plastic Flow Modelling



# EU Policy and the History of Plastics

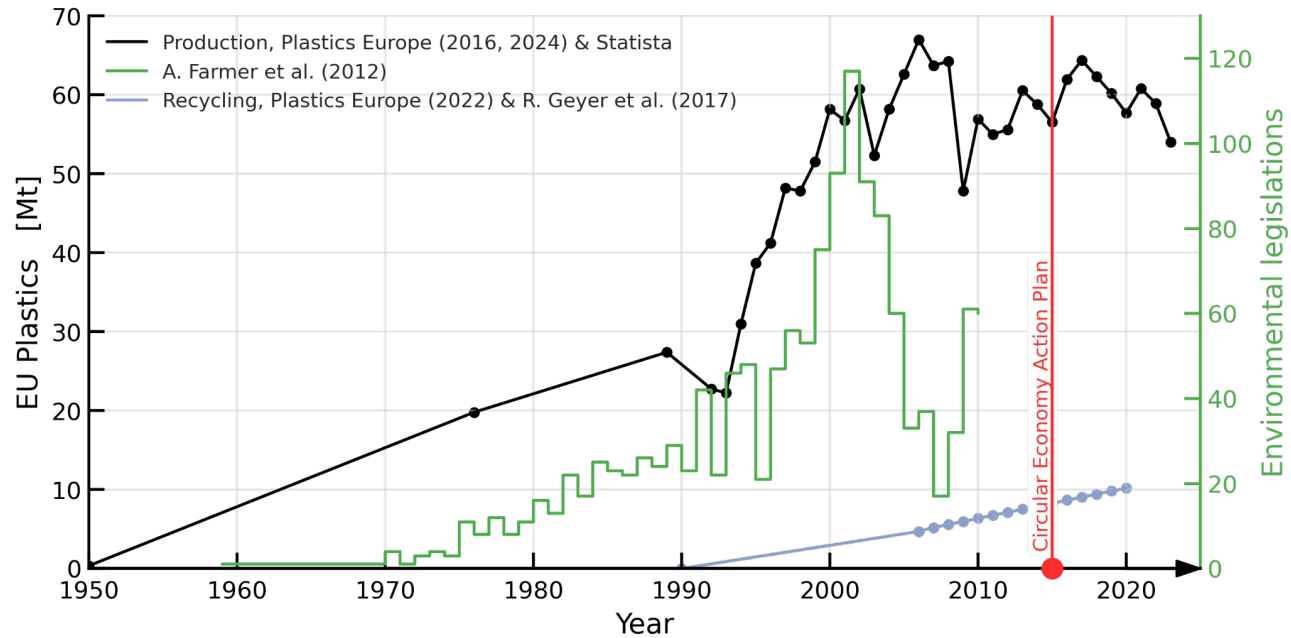
## EU plastic recycling





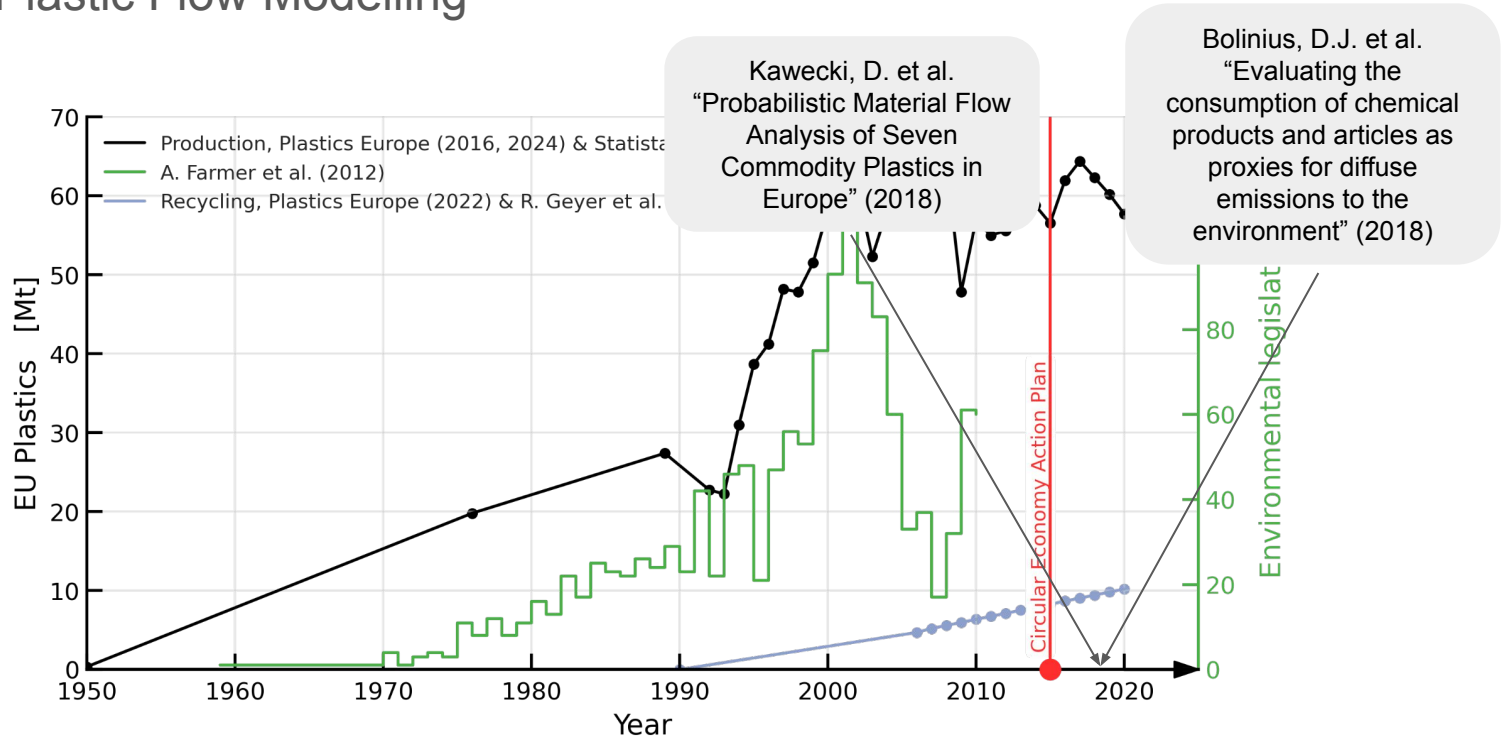
# EU Policy and the History of Plastics

## EU plastic recycling



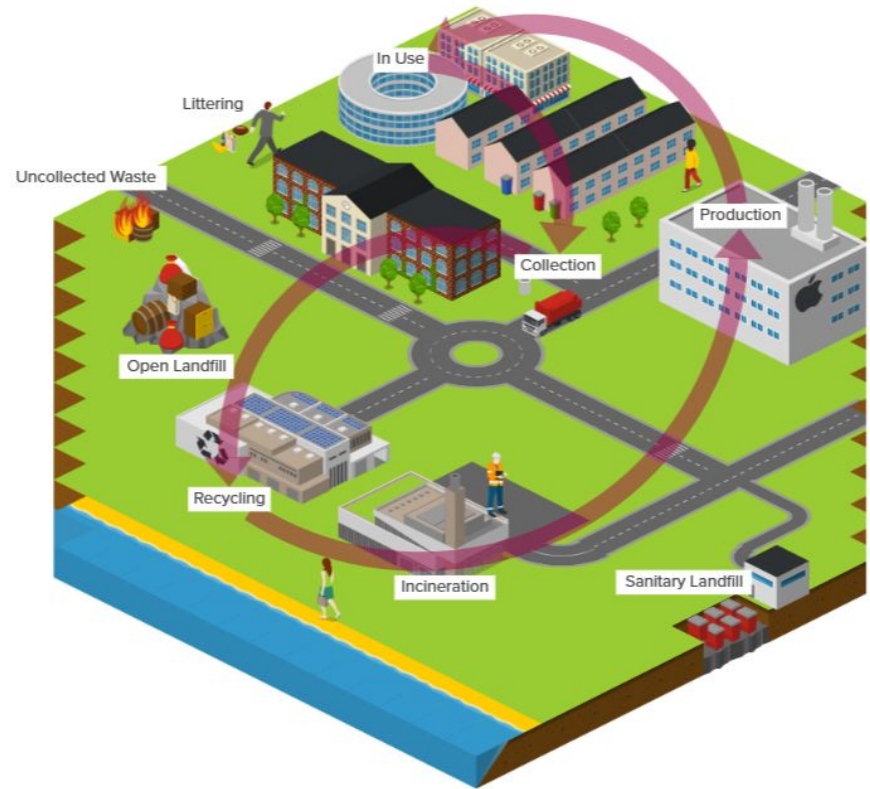
# EU Policy and the History of Plastics

## Prospective Plastic Flow Modelling



# Research Question

What is the uncertainty in post-consumer plastic-containing product waste flow?

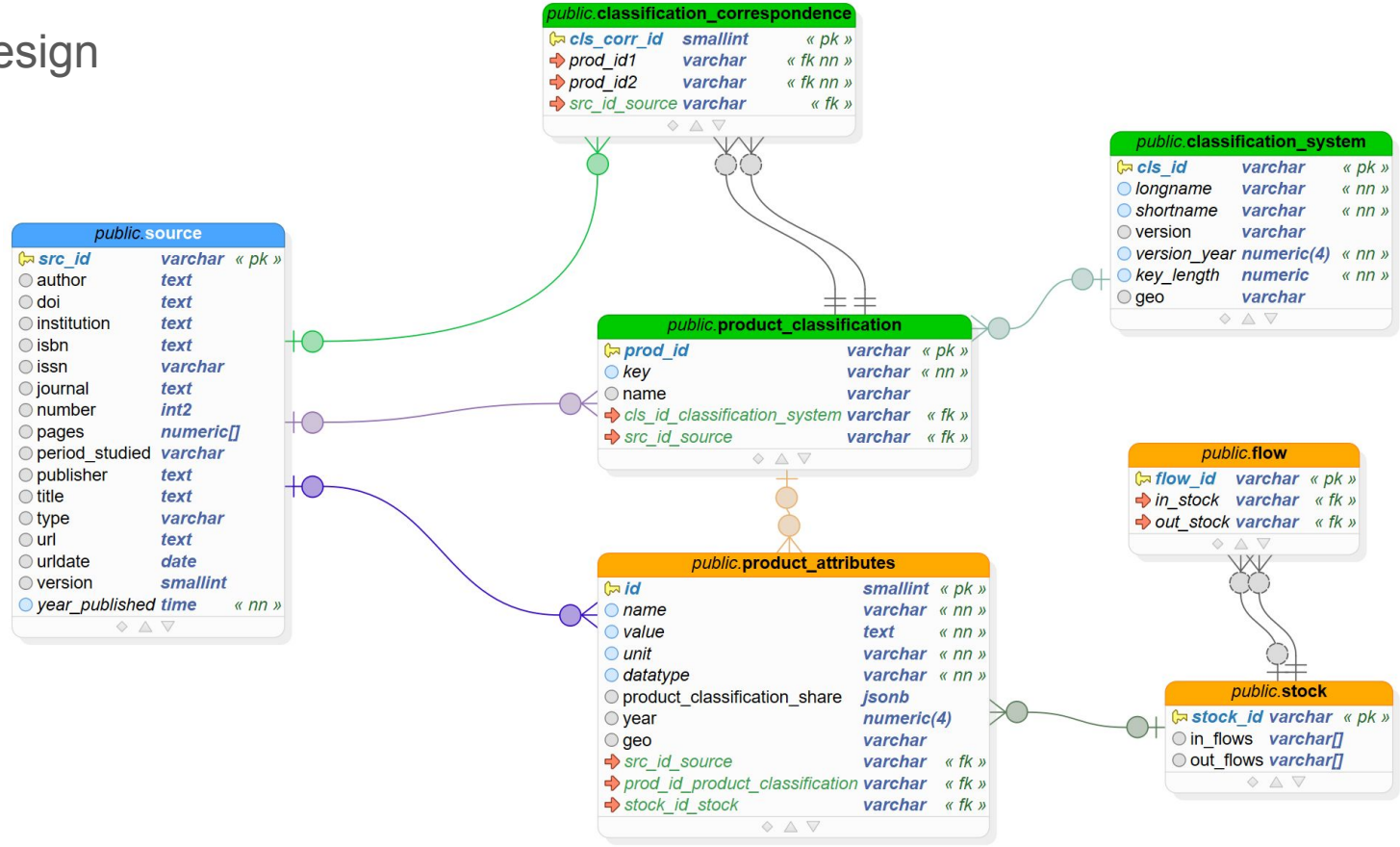




# Data & Method

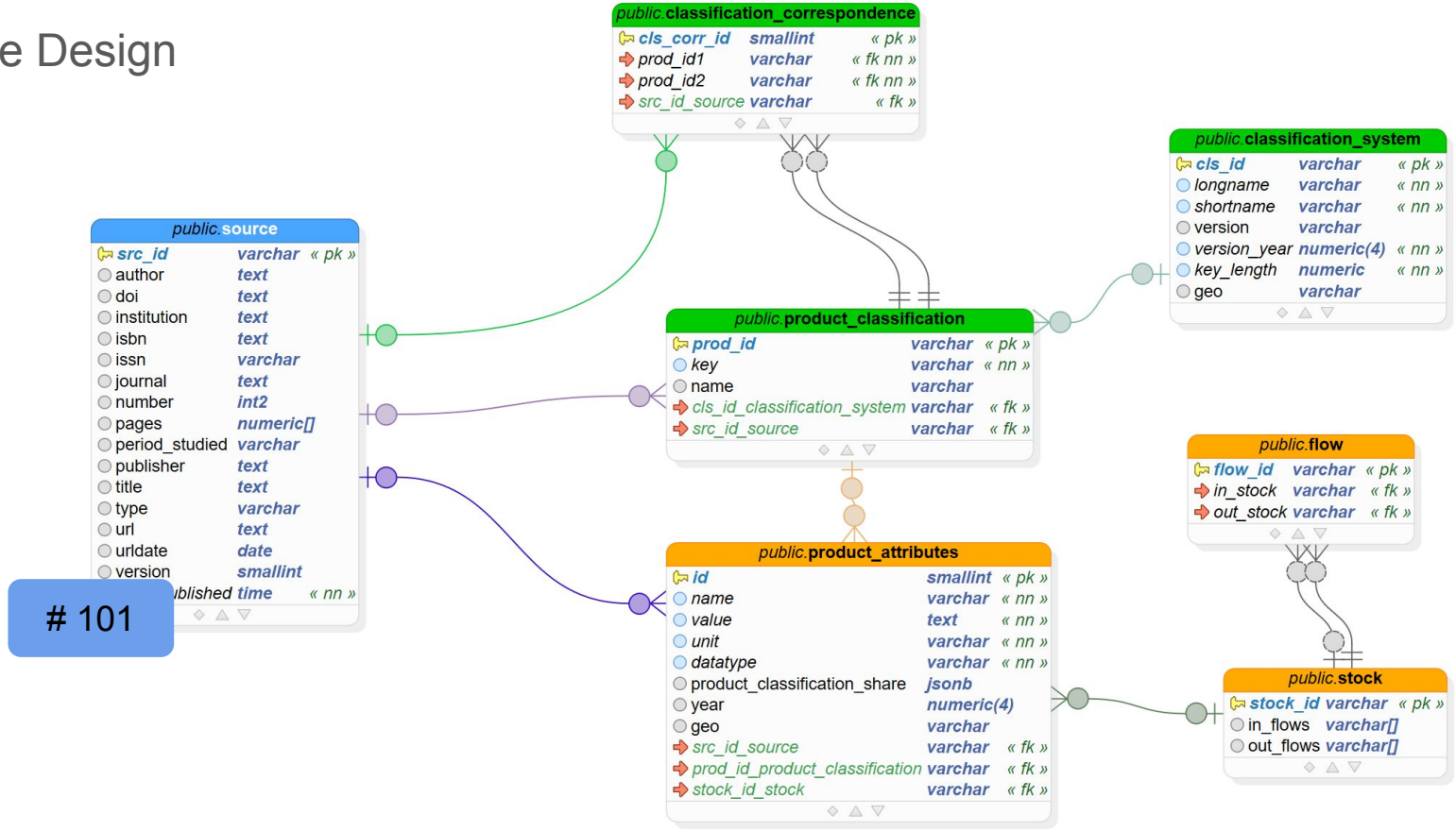
# A Database for Plastic Flow Modelling

## Database Design



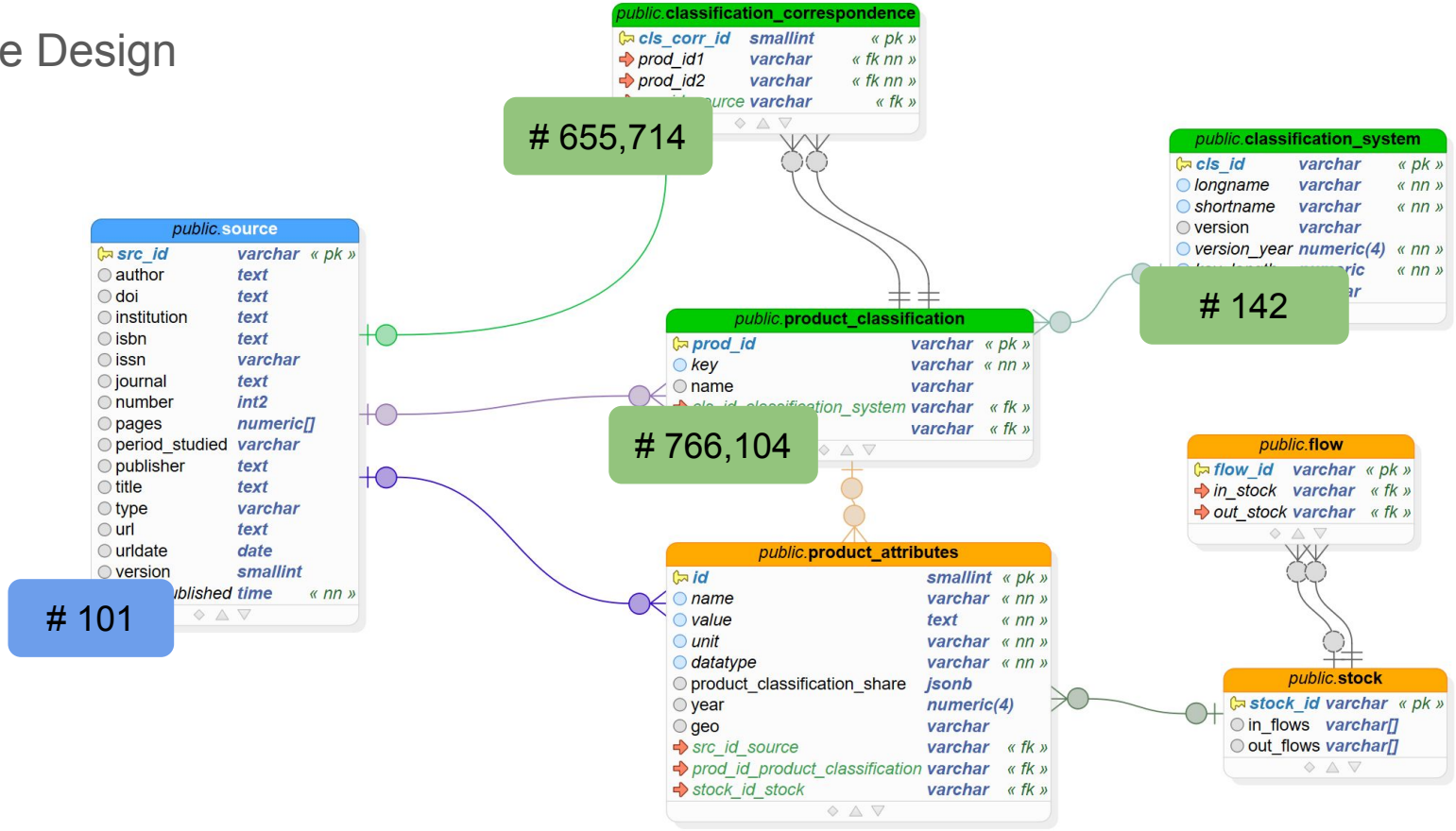
# A Database for Plastic Flow Modelling

## Database Design



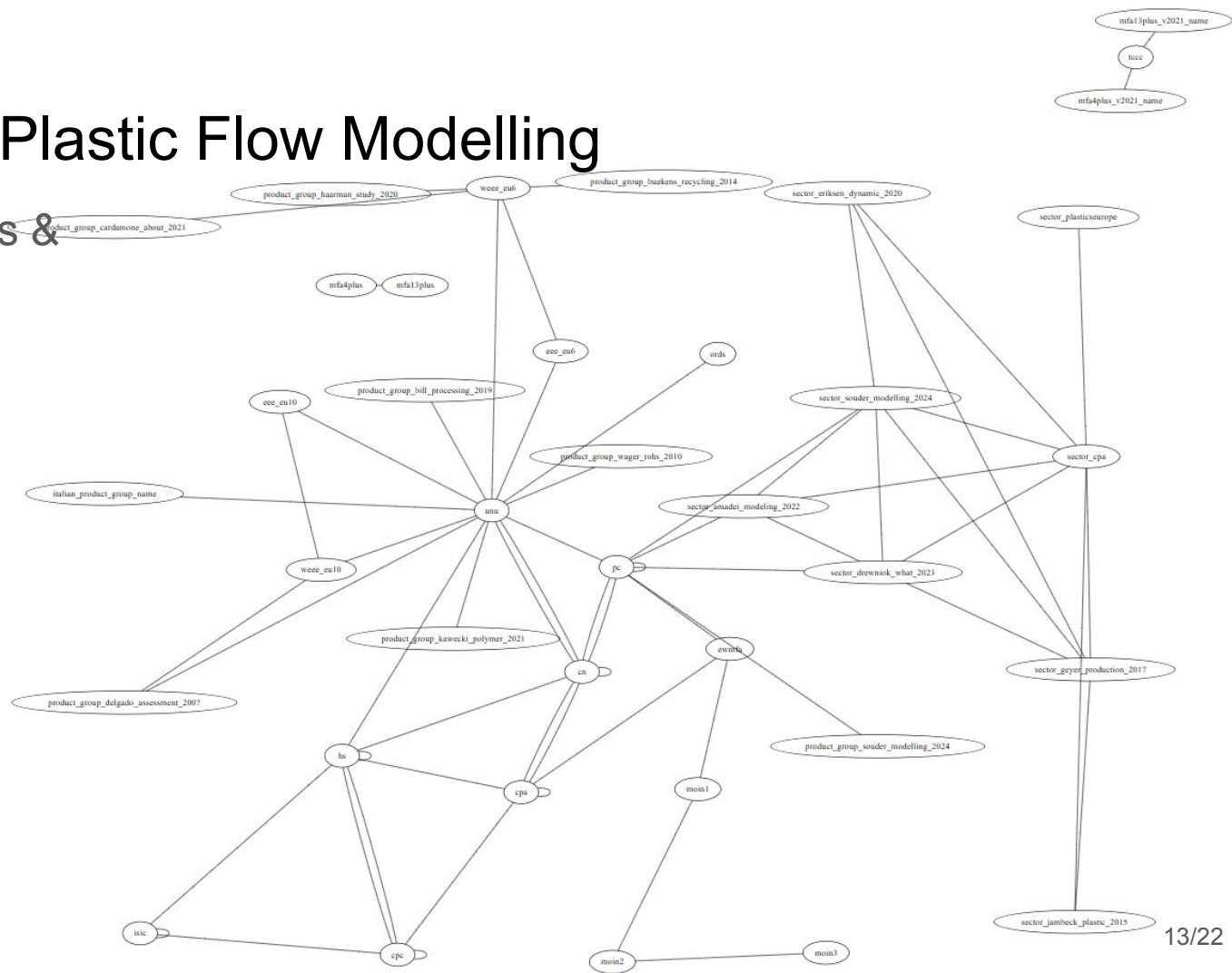
# A Database for Plastic Flow Modelling

## Database Design



# A Database for Plastic Flow Modelling

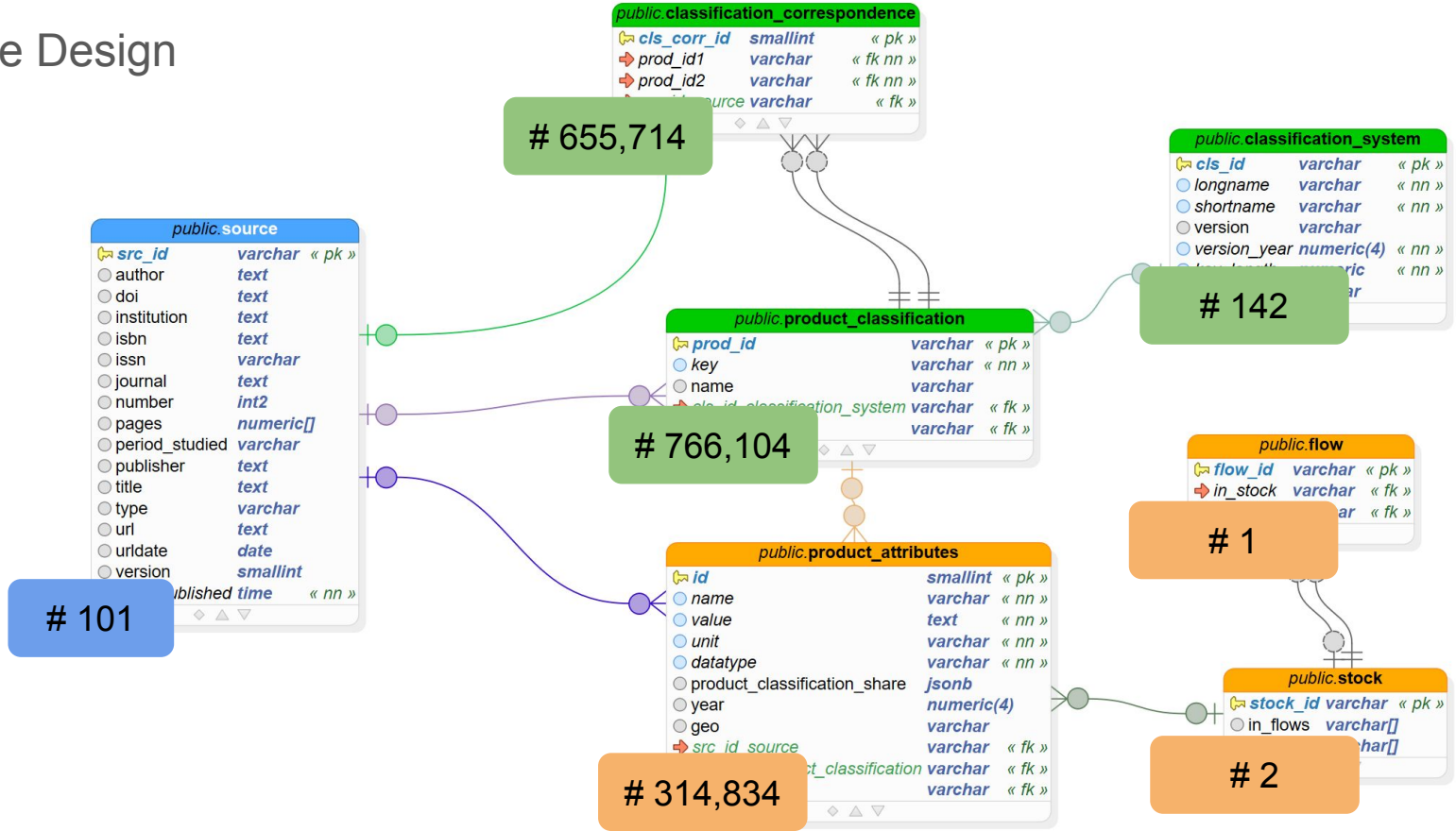
## Product Classifications & Correspondences





# A Database for Plastic Flow Modelling

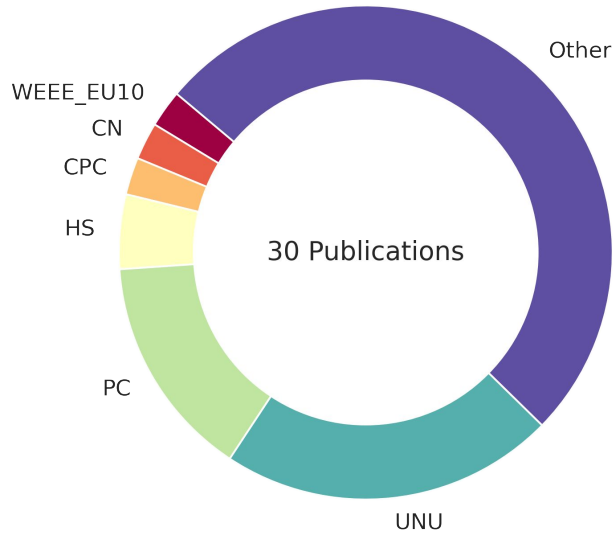
## Database Design



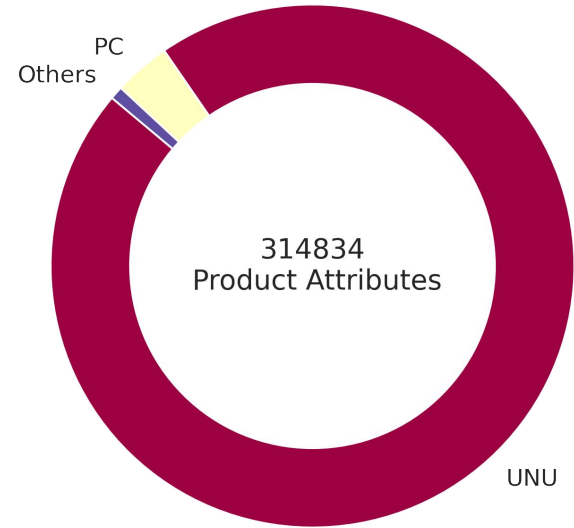
# A Database for Plastic Flow Modelling

## Product Attributes

public.product_attributes		
id	smallint	« pk »
name	varchar	« nn »
value	text	« nn »
unit	varchar	« nn »
datatype	varchar	« nn »
product_classification_share	jsonb	
year	numeric(4)	
geo	varchar	
src_id_source	varchar	« fk »
prod_id_product_classification	varchar	« fk »
stock_id_stock	varchar	« fk »



Nr of publications per product classification

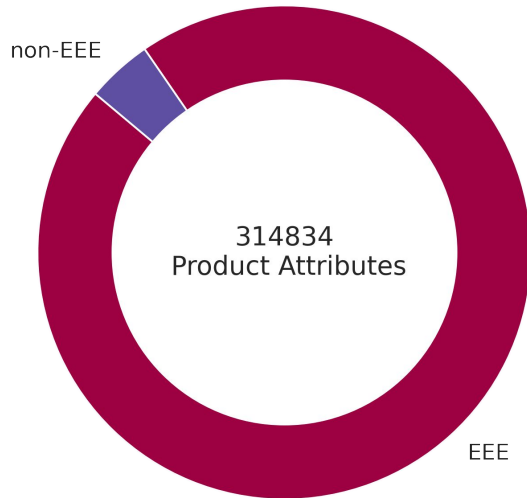


Nr of product attributes per product classification

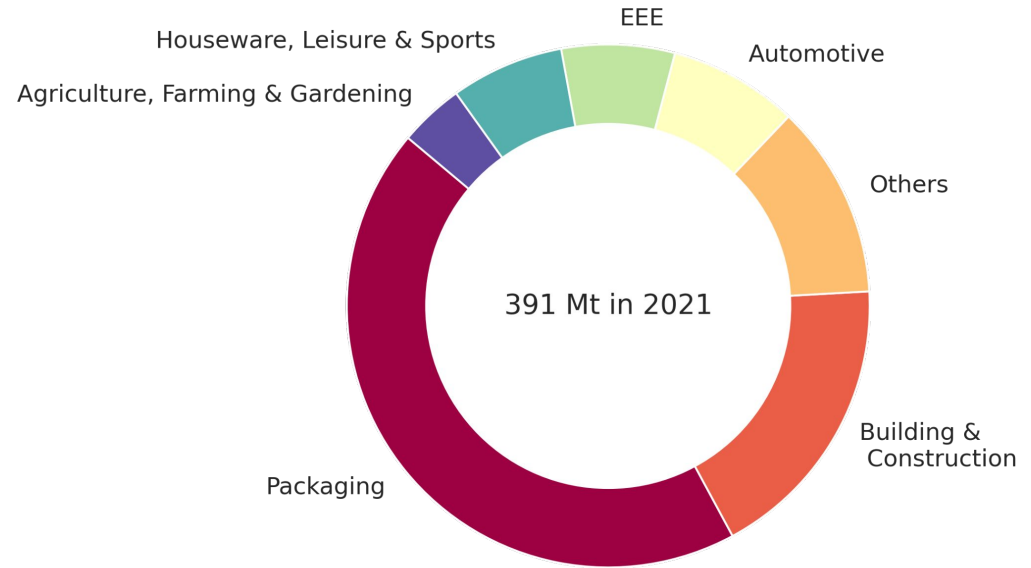
# A Database for Plastic Flow Modelling

## Product Attributes

public.product_attributes		
id	smallint	« pk »
name	varchar	« nn »
value	text	« nn »
unit	varchar	« nn »
datatype	varchar	« nn »
product_classification_share	jsonb	
year	numeric(4)	
geo	varchar	
src_id_source	varchar	« fk »
prod_id_product_classification	varchar	« fk »
stock_id_stock	varchar	« fk »



Nr of product attributes per sector in database.

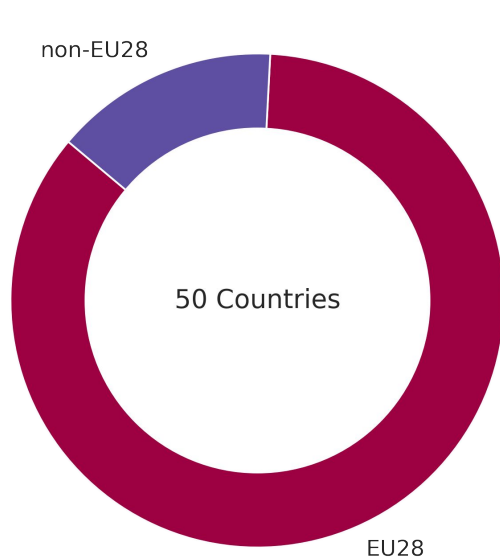


Distribution of the global plastics use by sector (Plastics Europe, 2023).

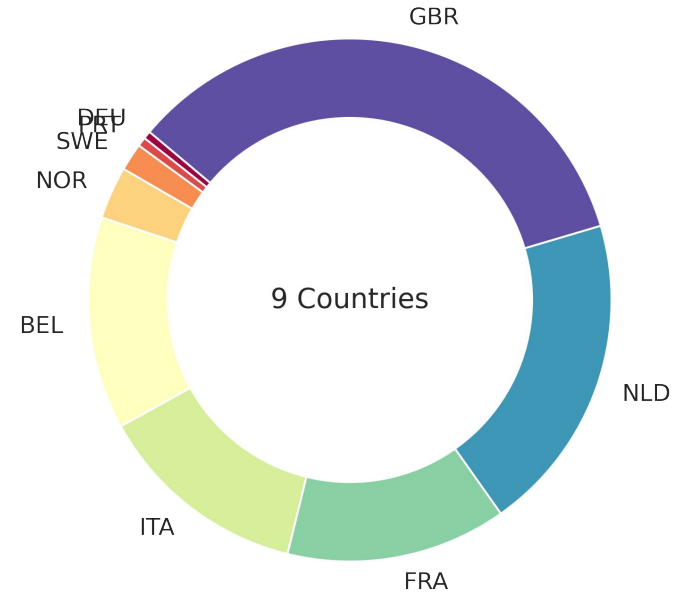
# A Database for Plastic Flow Modelling

## Product Attributes

public.product_attributes		
id	smallint	« pk »
name	varchar	« nn »
value	text	« nn »
unit	varchar	« nn »
datatype	varchar	« nn »
product_classification_share	jsonb	
year	numeric(4)	
geo	varchar	
src_id_source	varchar	« fk »
prod_id_product_classification	varchar	« fk »
stock_id_stock	varchar	« fk »



Nr of product attributes per country.



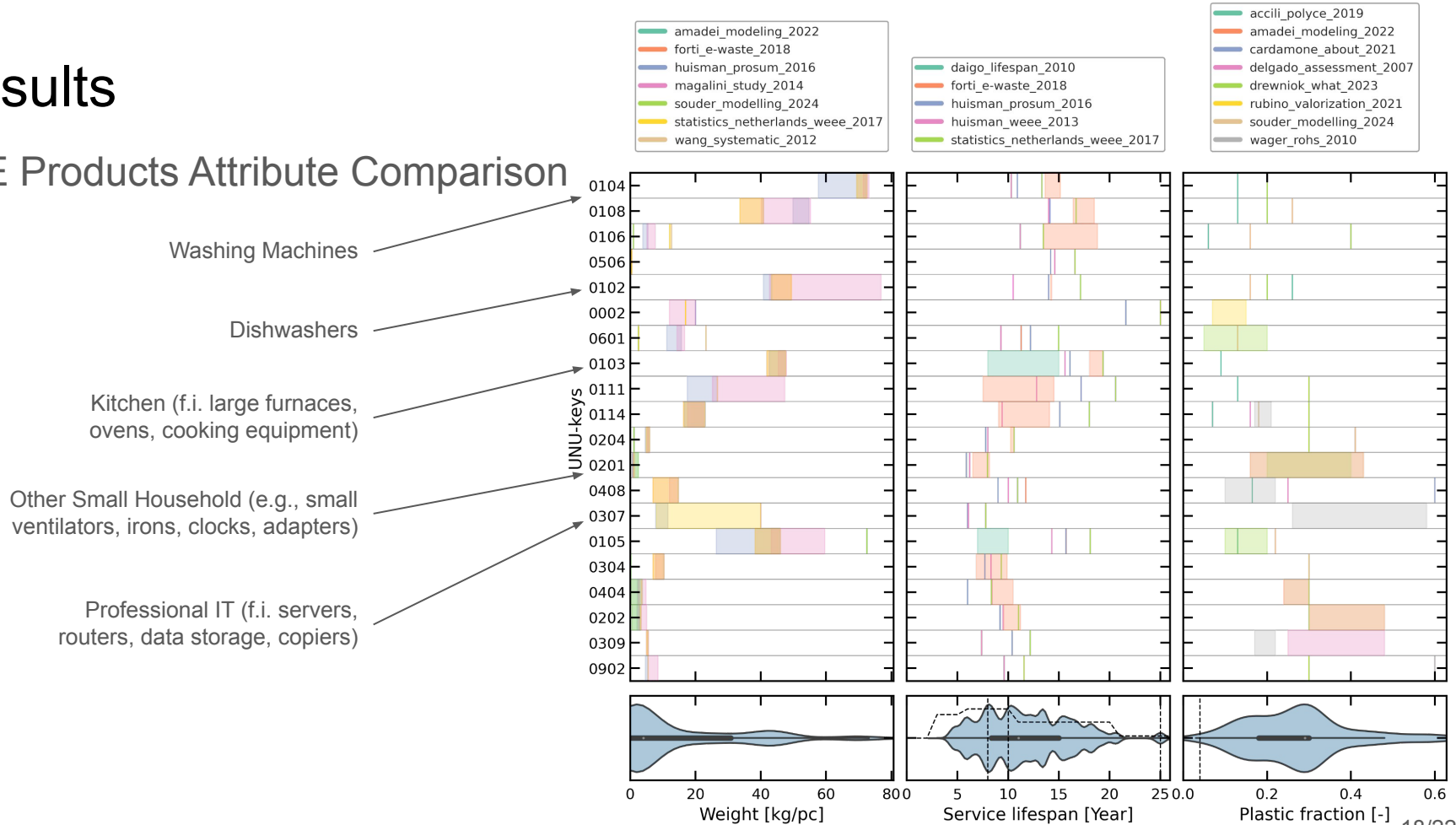
Nr of product attributes per country.

A large, semi-transparent circular graphic is centered over a high-angle photograph of a factory floor. The factory floor features several parallel conveyor belts with blue metal frames and perforated metal grates. In the background, there are various pieces of industrial equipment, including a blue forklift and a blue pallet jack. The circular graphic is a light blue color and contains the word "Results" in a bold, black, sans-serif font.

**Results**

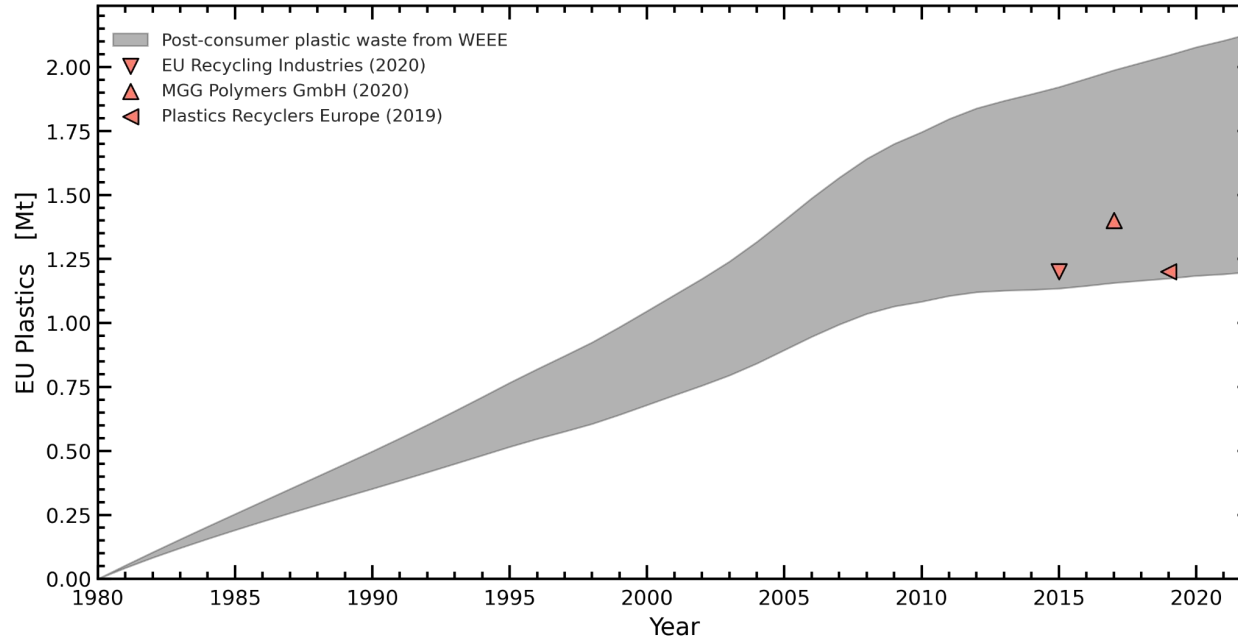
# Results

## EEE Products Attribute Comparison



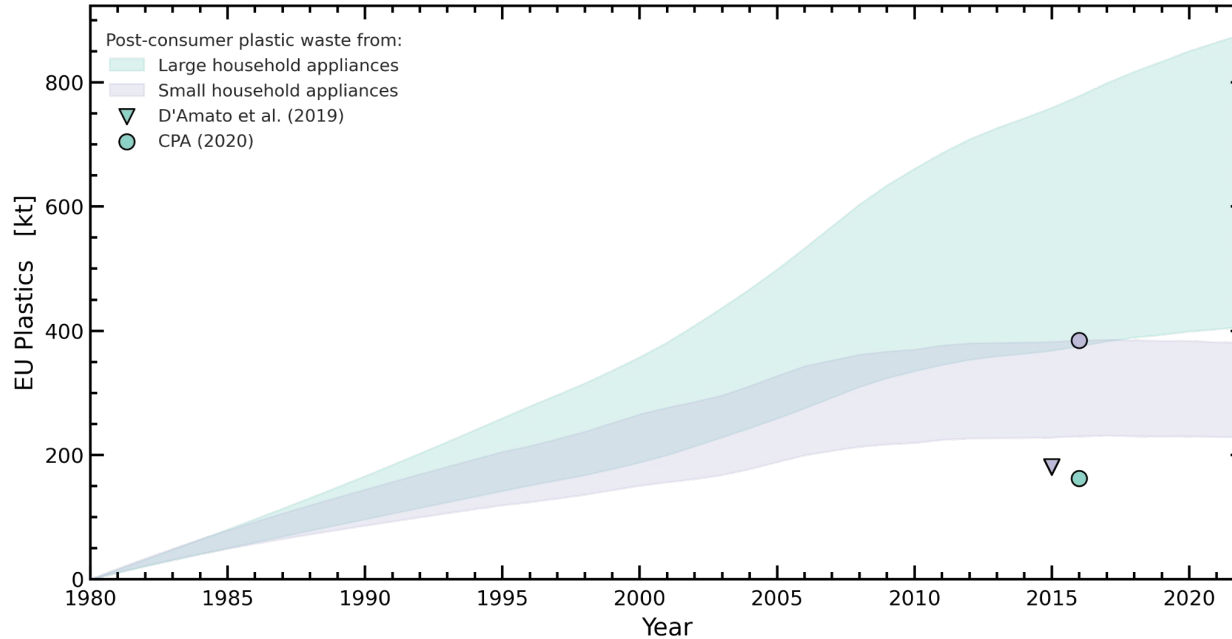
# Results

## Plastics in post-consumer EEE waste



# Results

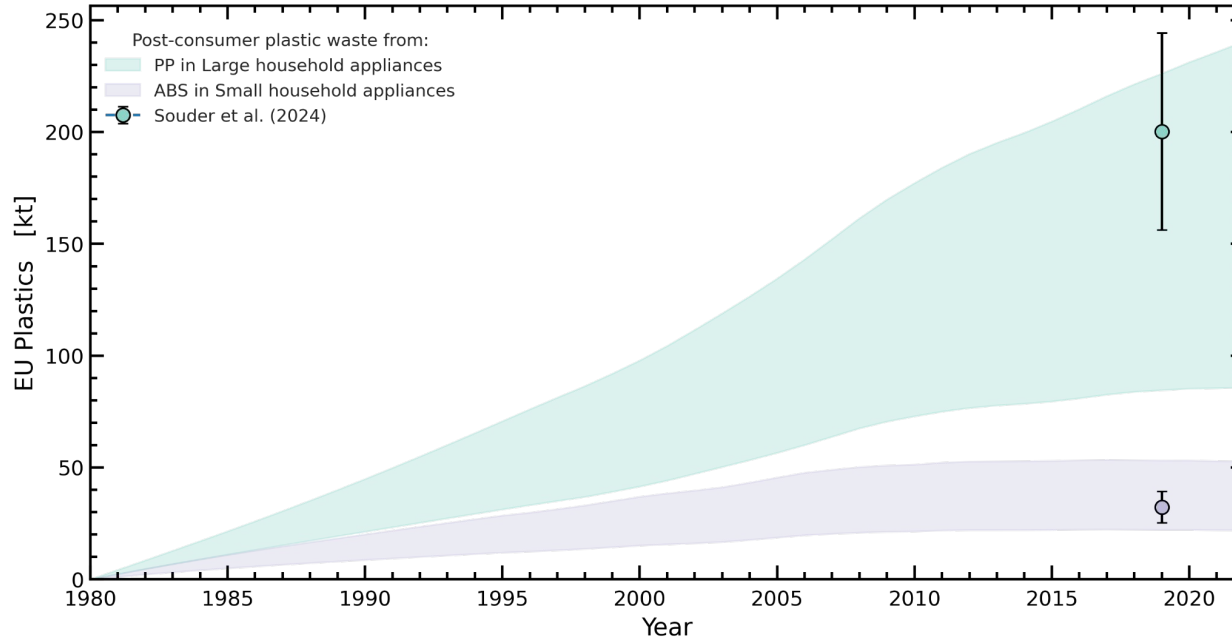
## Plastics in Waste of Large and Small Household Appliances





# Results

## PP and ABS in Waste of Large and Small Household Appliances



# Conclusions

- Material flow studies predominantly focused on EEE sector.
- Averaged product attributes across sector can distort material flow.
- Product waste flow highly uncertain due to variability of product attributes.
- Qualitative assessment (e.g. Pedigree matrix) underestimates uncertainty for EEE products.

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