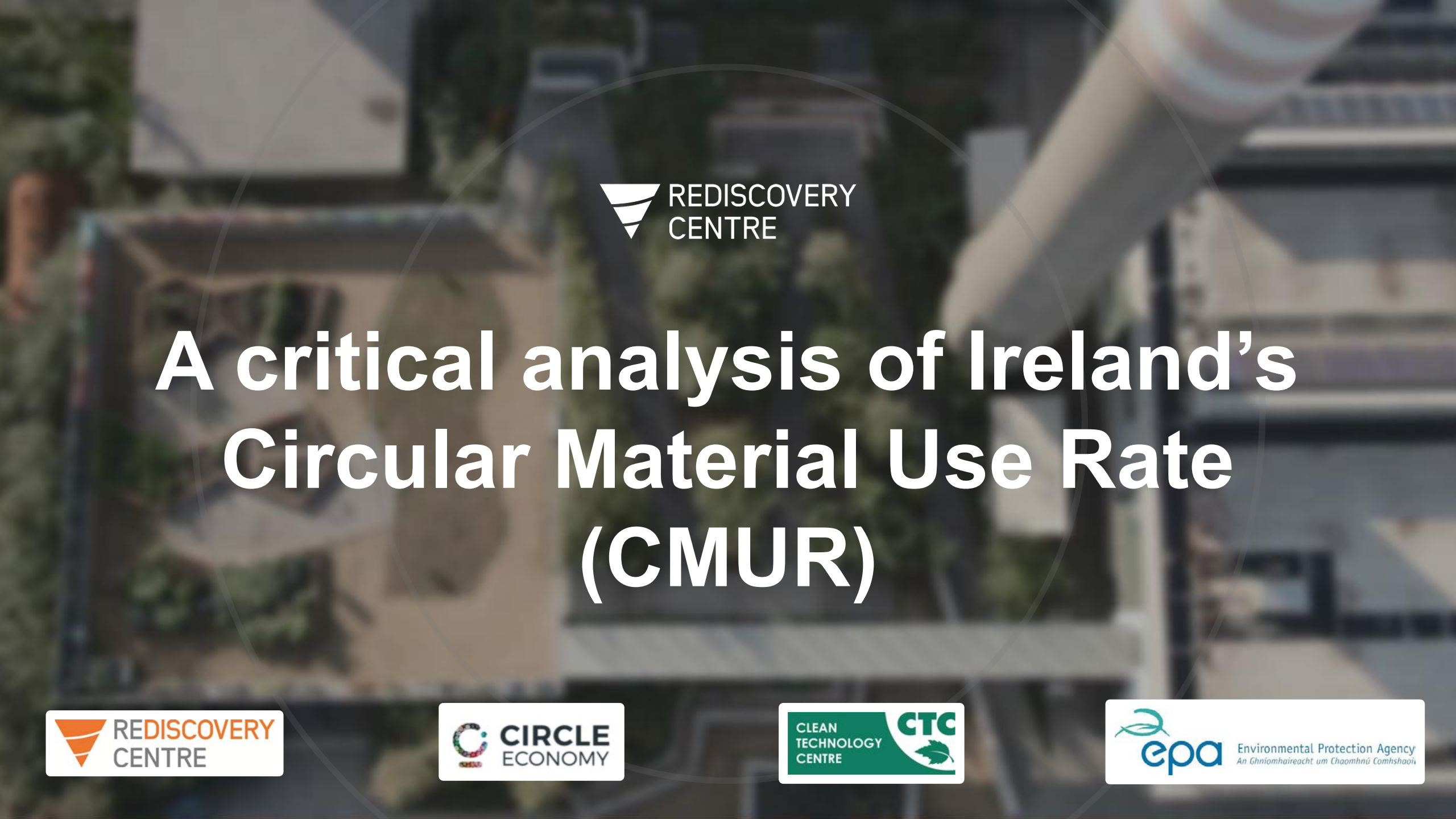


A critical analysis of Ireland's Circular Material Use Rate (CMUR)

REDISCOVERY CENTRE

CIRCLE ECONOMY

CLEAN TECHNOLOGY CENTRE CTC

epa Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

REDISCOVERY CENTRE

Context & Research Question

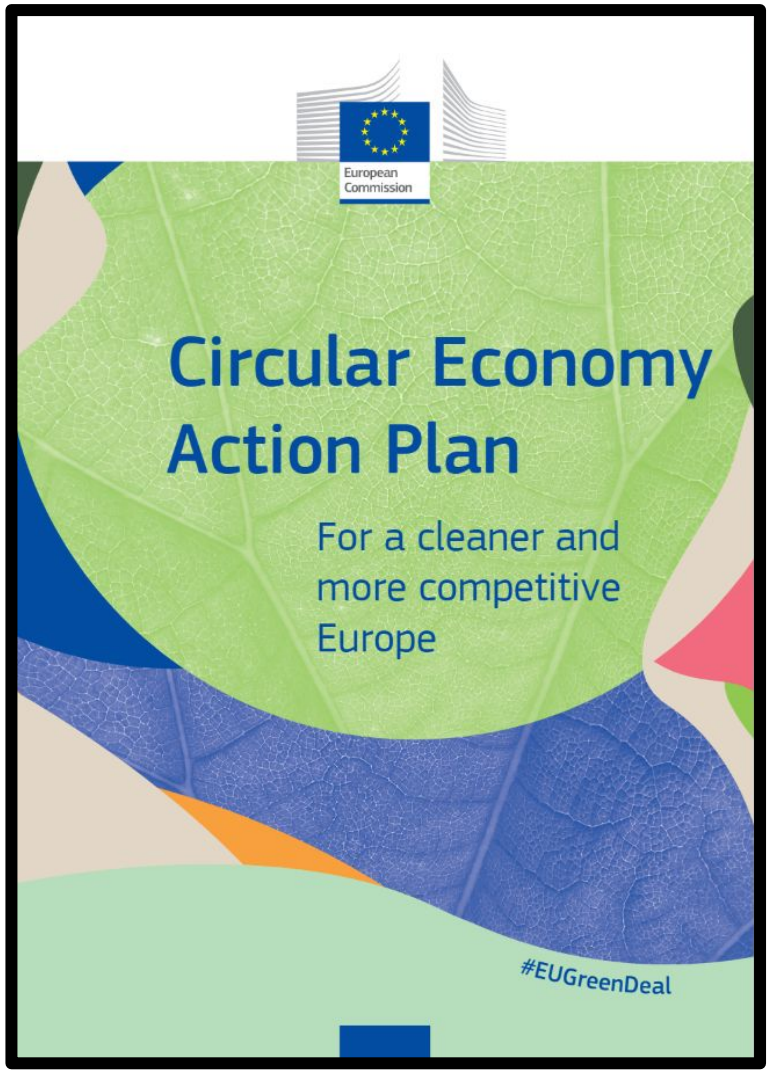
A critical analysis of Ireland’s Circular Material Use Rate (CMUR)

Context & Research Question

REDISCOVERY CENTRE

Transitioning to a Circular Economy

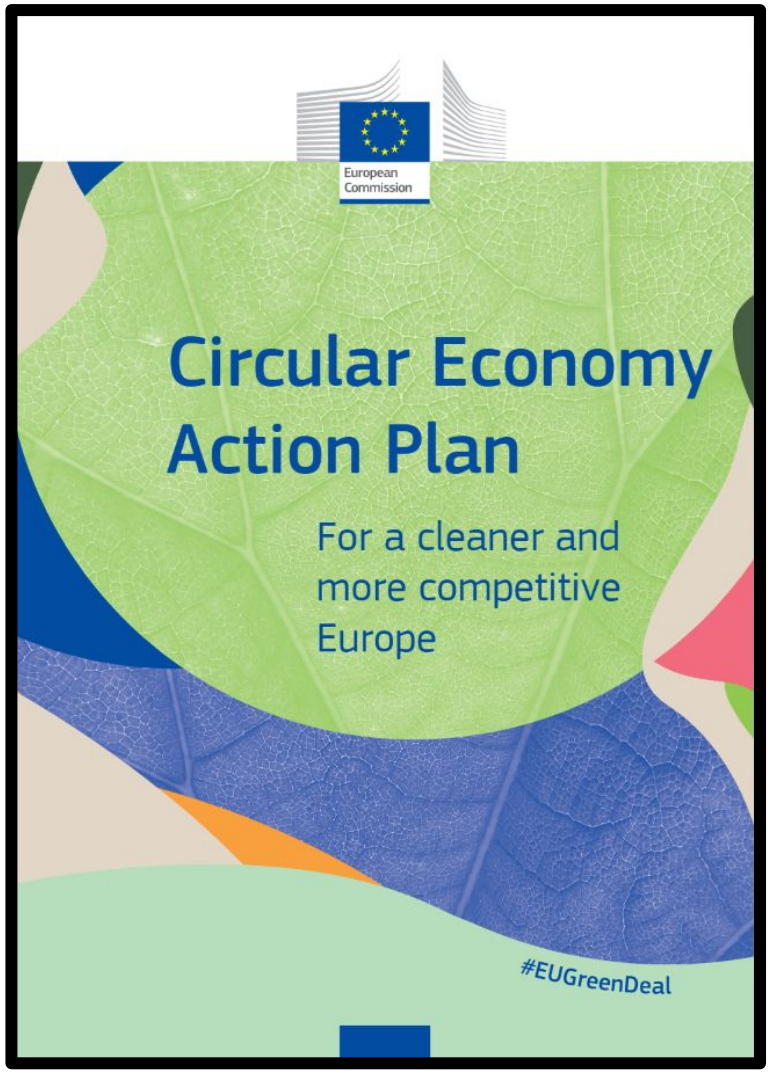
…“where the value of products, materials and resources is maintained … for as long as possible and the generation of waste is minimised” (Eurostat, 2018)



Context & Research Question

Transitioning to a Circular Economy

- **Eurostat developed CMUR to monitor progress**
- **Indicates use of secondary materials in national economies**

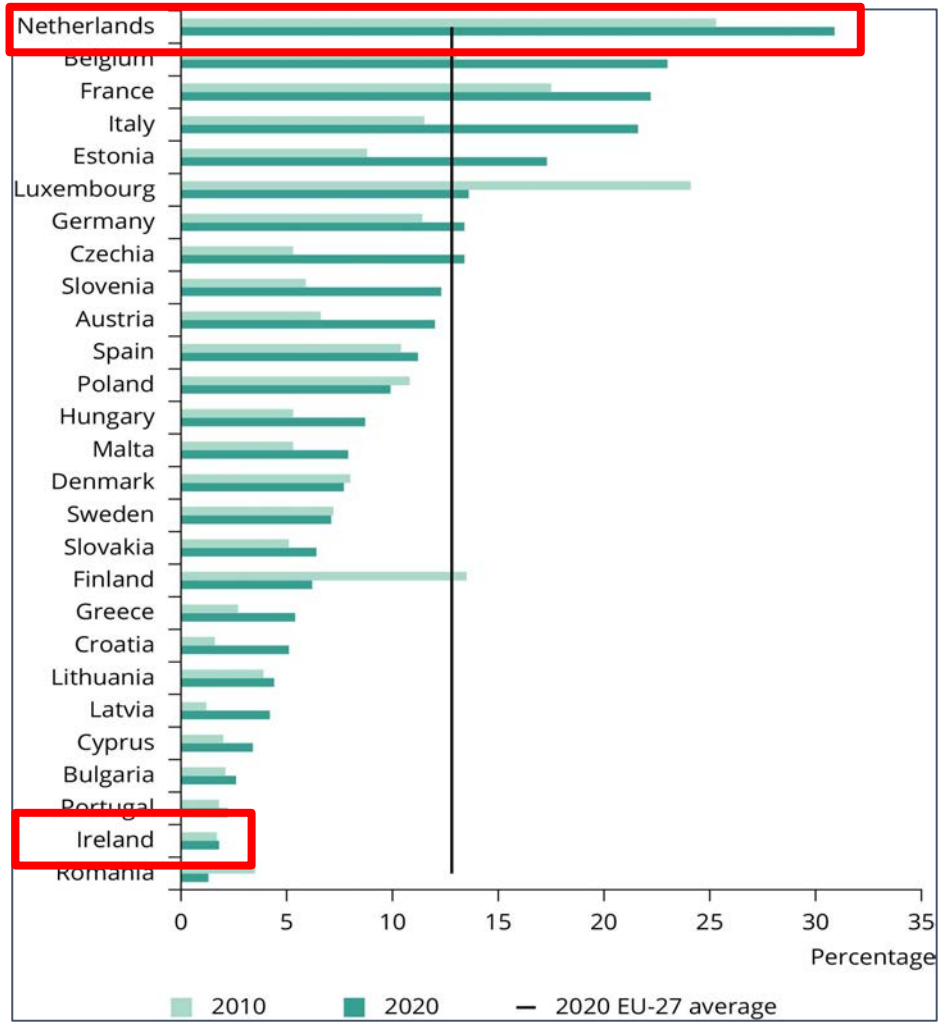


Context & Research Question

REDISCOVERY CENTRE

Comparing Ireland

- **EU avg. = 12%**
- **Ireland's CMUR = 2%**
- **Netherlands = 31%**



Context & Research Question

REDISCOVERY CENTRE

Relevance to Policy

Improve Ireland's CMUR to above EU average by 2030

Primary Research Question

REDISCOVERY CENTRE

Why is Ireland's CMUR so low, and what can be done about it?

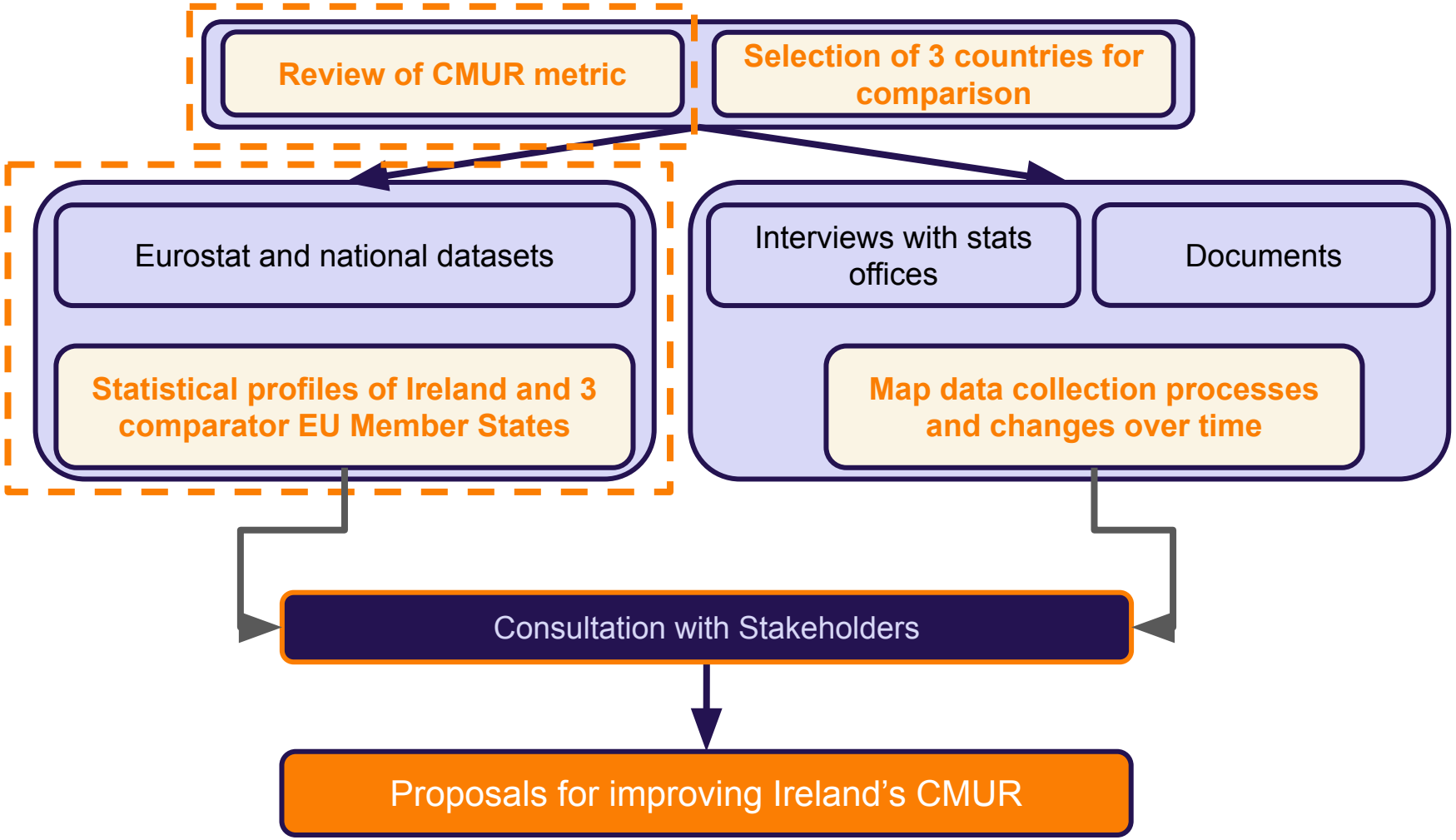
1. **Research Process**
2. **Details & Critique of CMUR**
3. **Comparative Profile of Ireland's Stats**

REDISCOVERY CENTRE

Research Process

A critical analysis of Ireland’s Circular Material Use Rate (CMUR)

Research Process



REDISCOVERY CENTRE

Details and critique of Circular Material Use Rate (CMUR) as a Metric

A critical analysis of Ireland’s Circular Material Use Rate (CMUR)

Formula

REDISCOVERY CENTRE

Material recycled through official waste management (U)

Corrected for Trade

Recycled Material

Total material consumed nationally (M)

Corrected for Trade

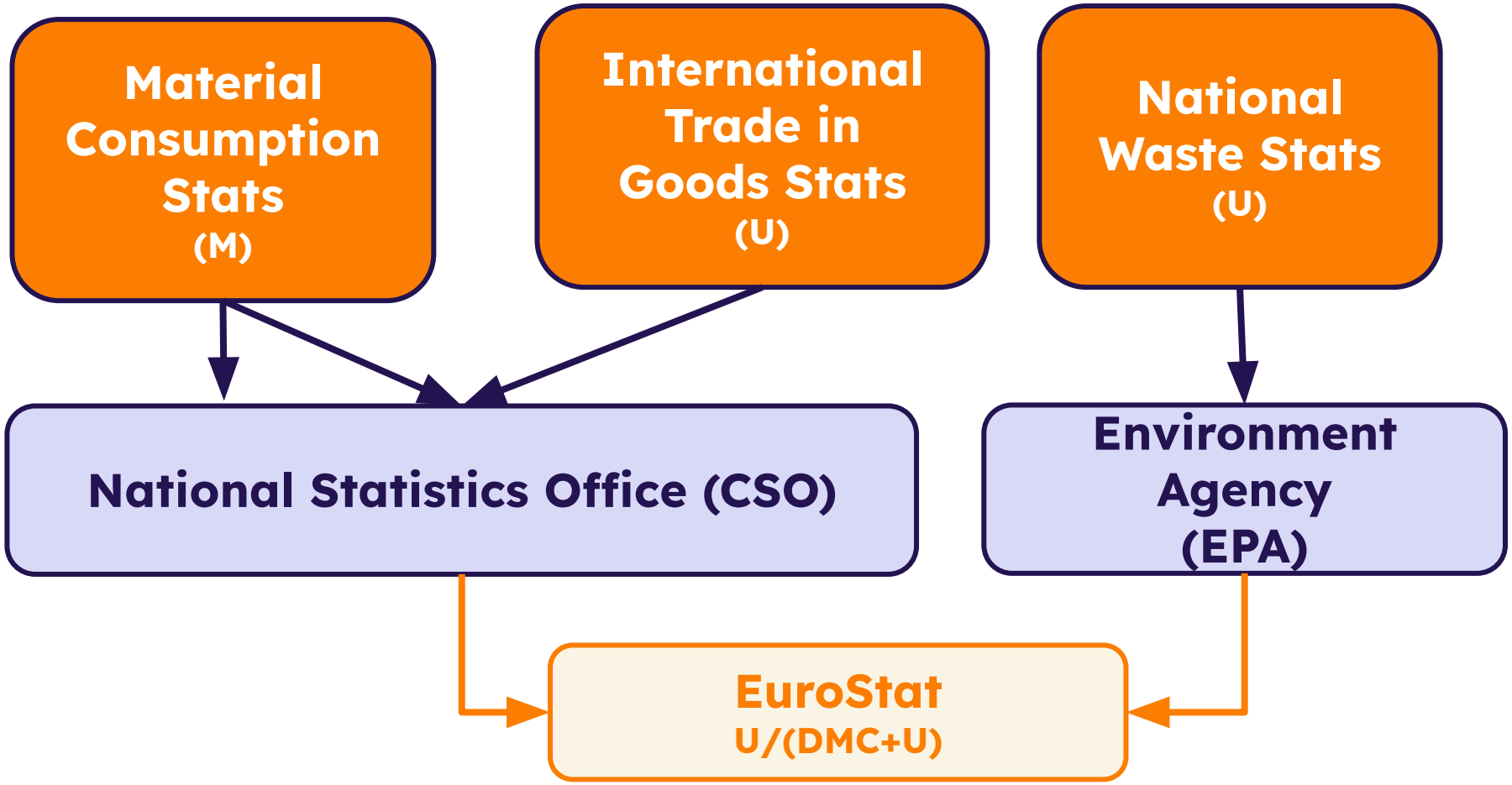
Biomass

Non-Metallic Ores

Metal Ores

Fossil Fuels

CMUR Data Flows in Ireland



REDISCOVERY CENTRE

CMUR: Limitations

Limitation 1

CMUR does not measure prevention or reuse

Limitation 2

- **A weight based metric – emphasis is on heavy and bulky materials**
- **Does not account for other environmental impacts (e.g. carbon footprint)**

Finding

CMUR should be used in conjunction with other metrics and indicators

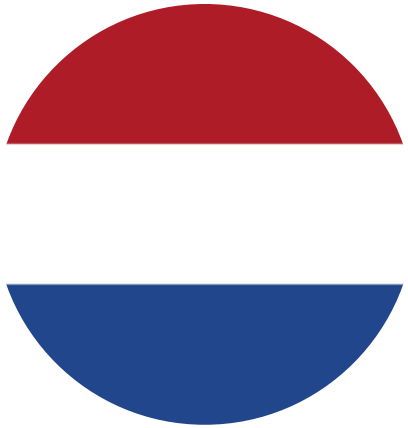
REDISCOVERY CENTRE

Comparative profile of Ireland's Circular Material Use Rate (CMUR) Stats

A critical analysis of Ireland's Circular Material Use Rate (CMUR)

Comparator Countries

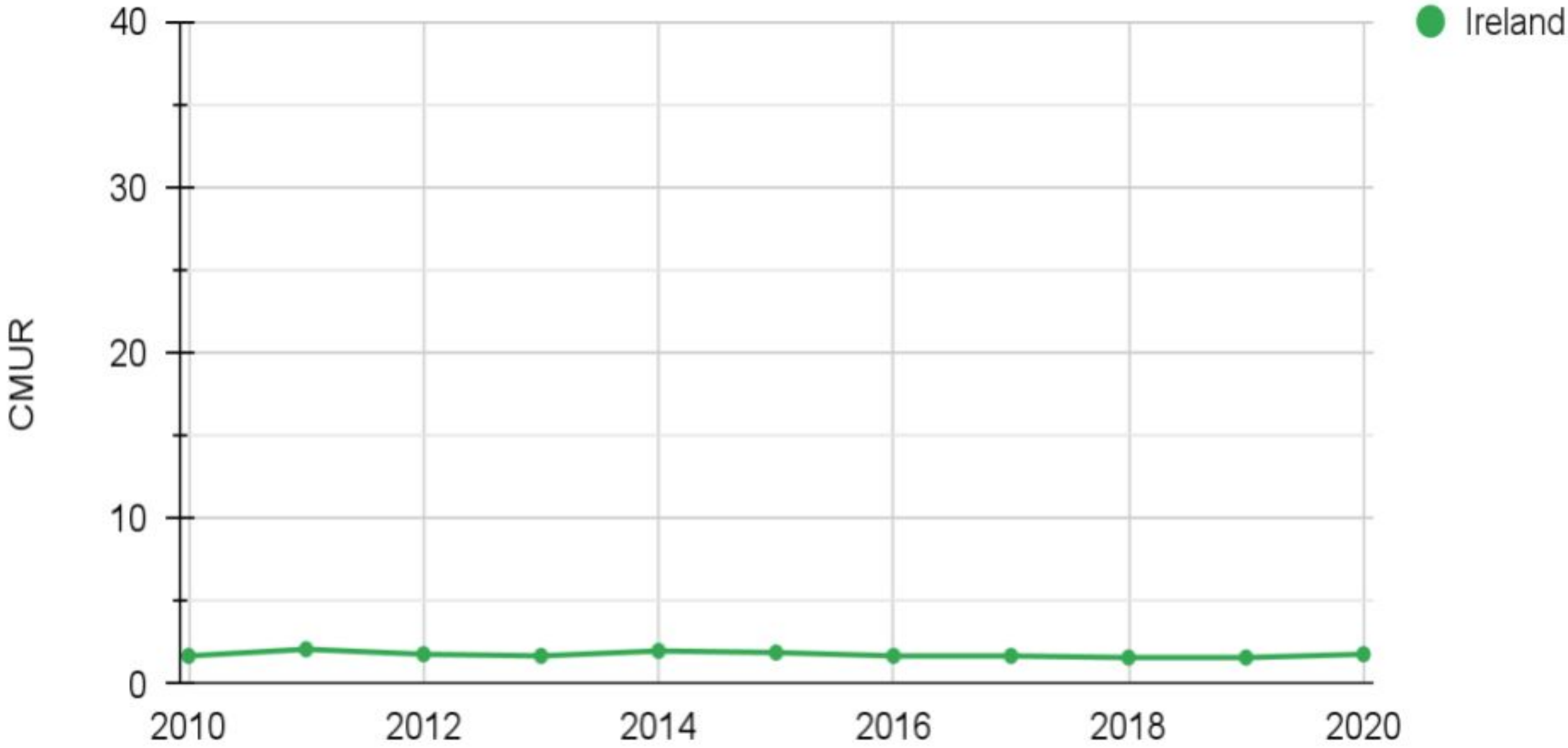
REDISCOVERY CENTRE

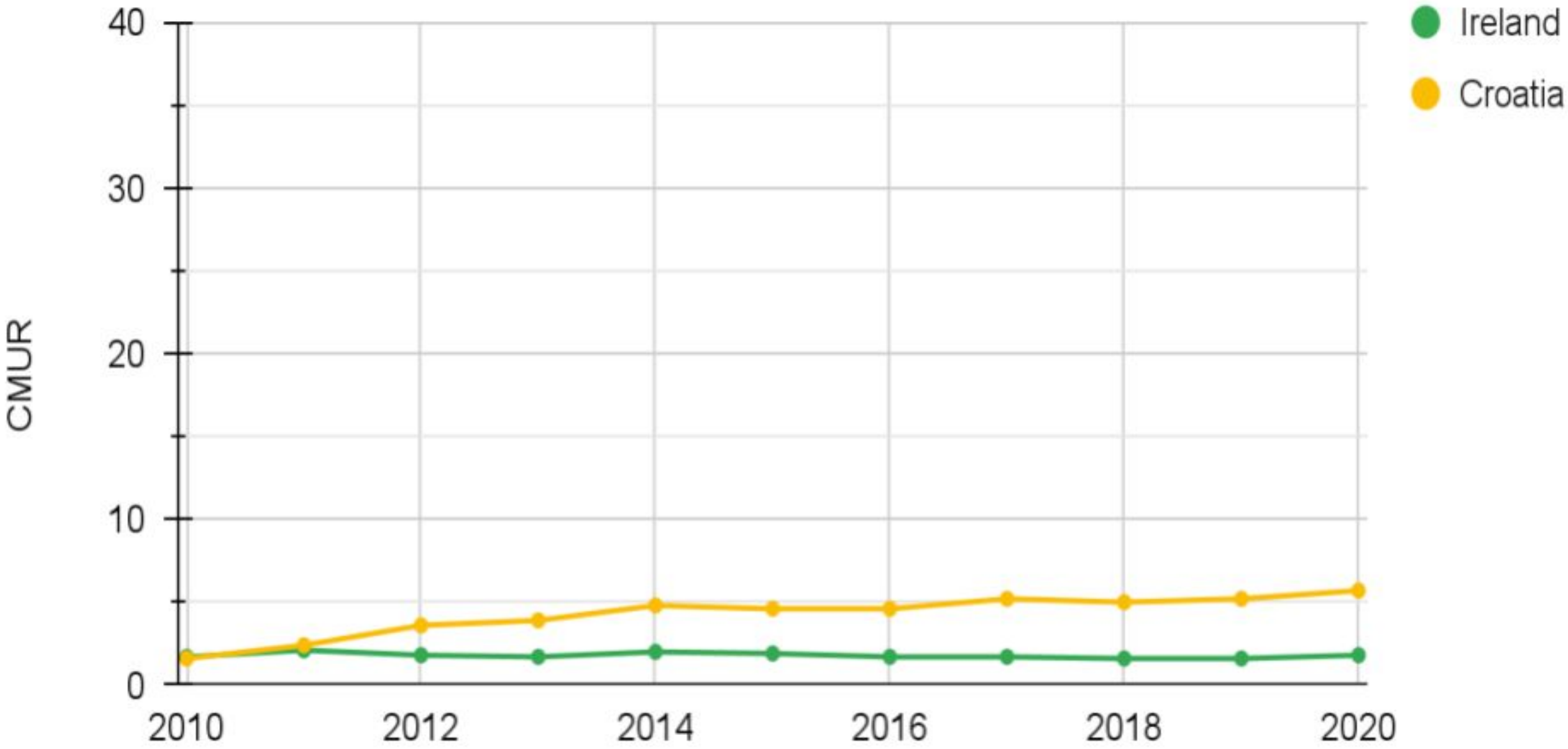


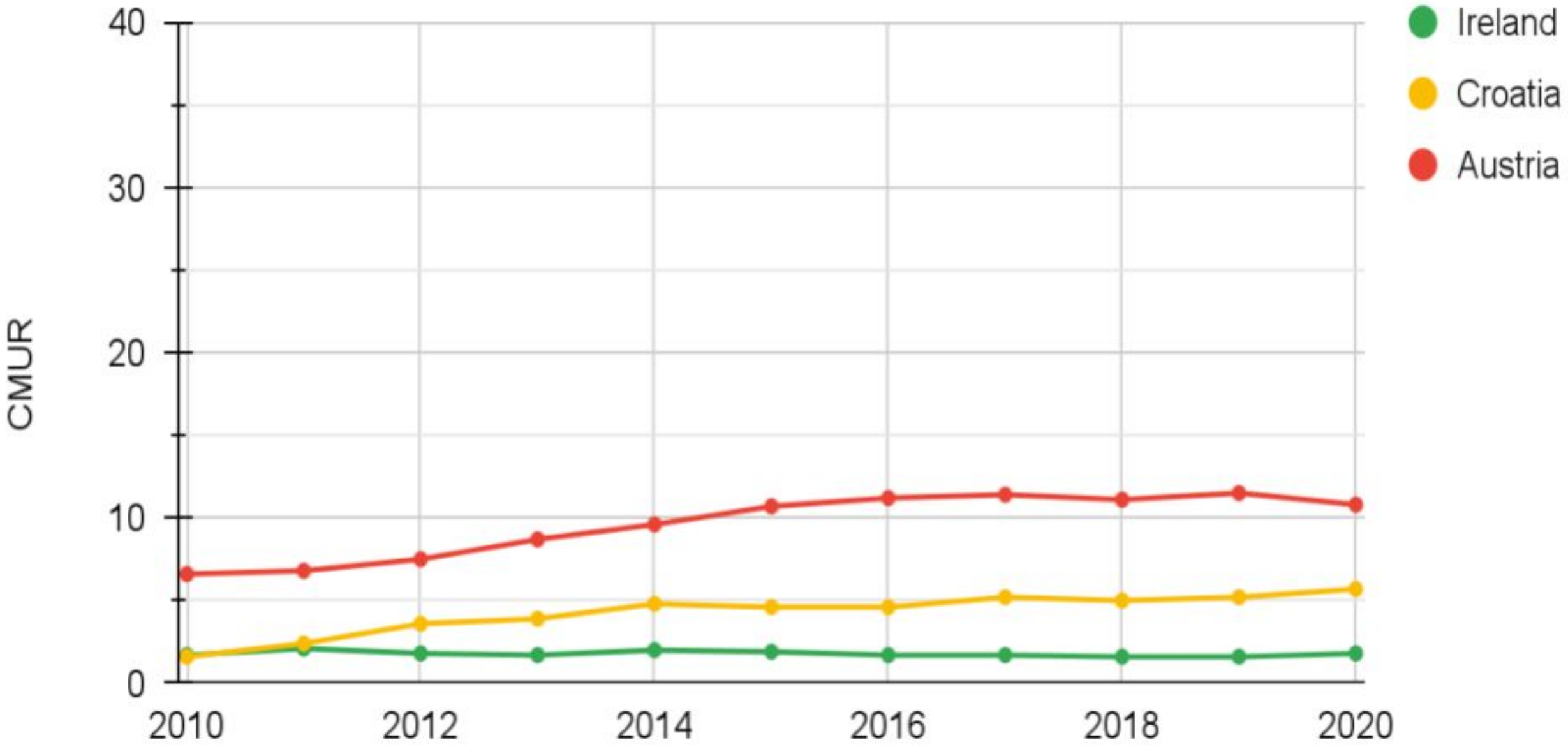
Netherlands
EU CMUR Leader

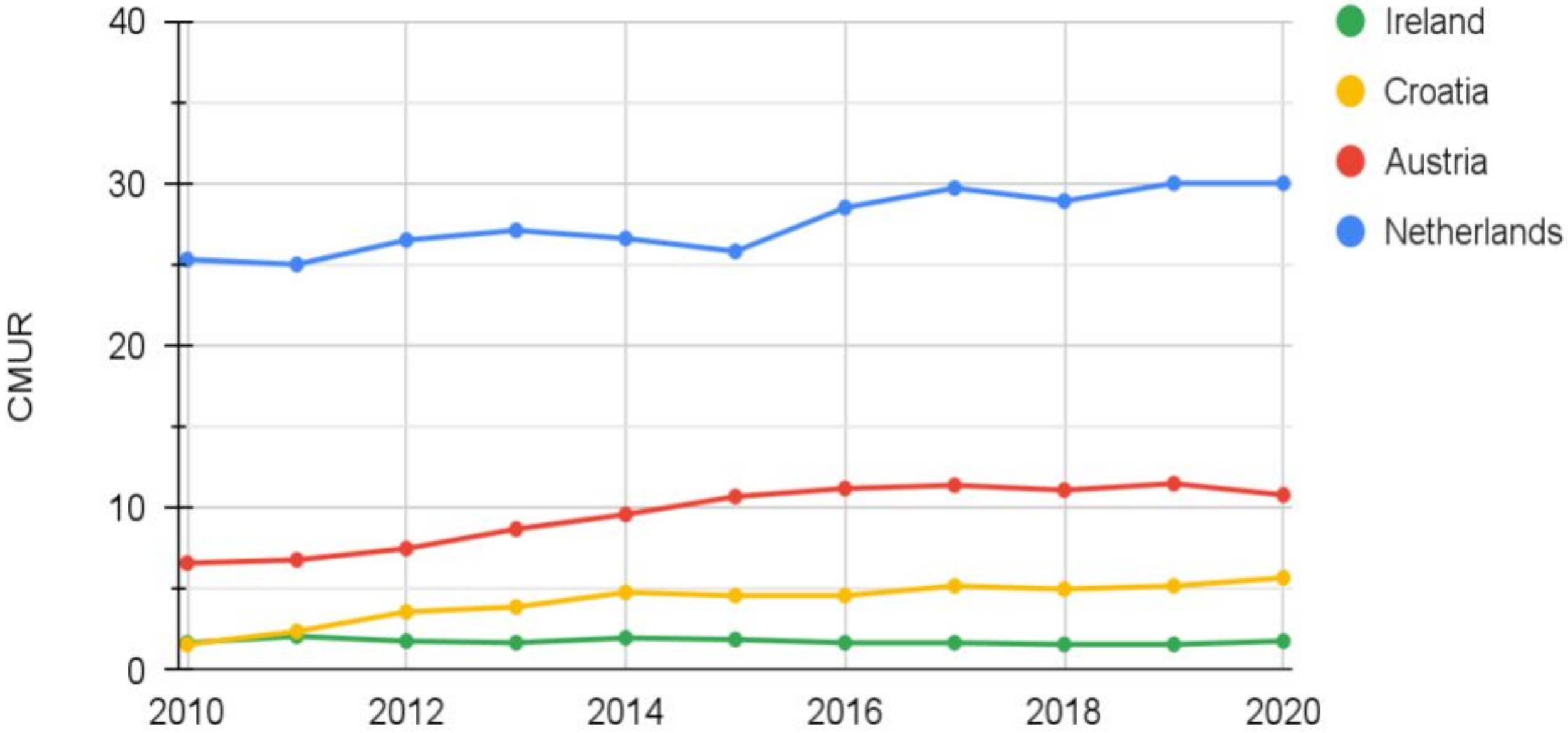
Austria
Mid-level Improver

Croatia
Improved CMUR from Low Base


Ireland
CMUR
40
30
20
10
0
2010
2012
2014
2016
2018
2020

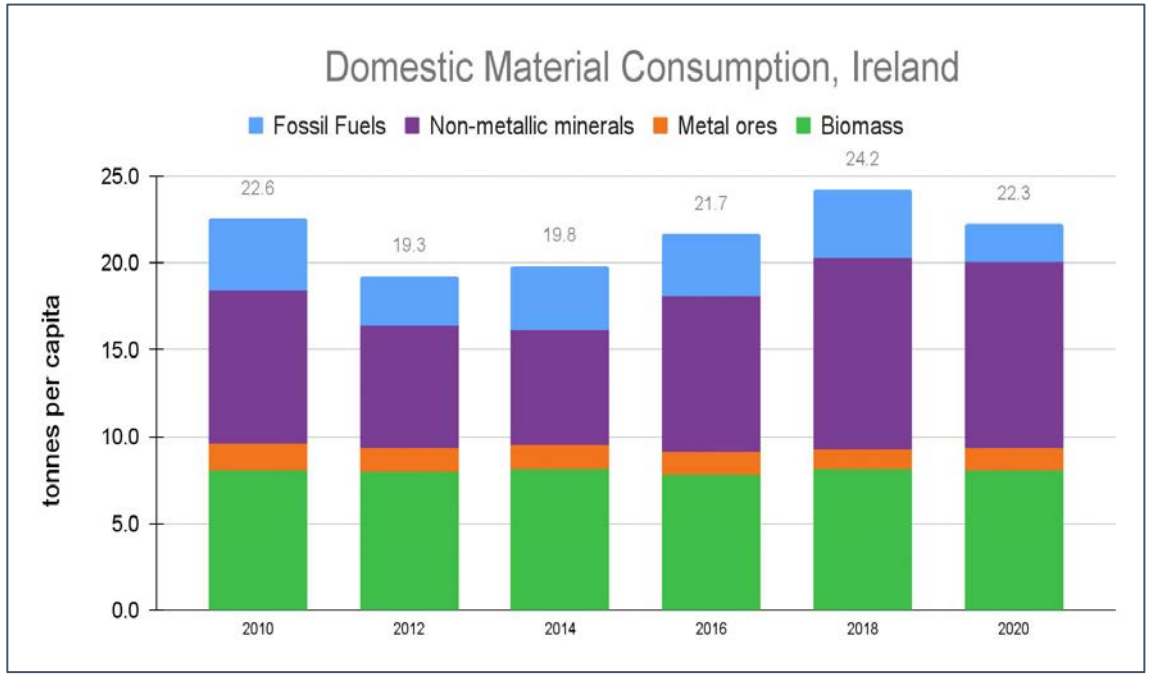

40
30
20
10
0
CMUR
2010
2012
2014
2016
2018
2020
Ireland
Croatia

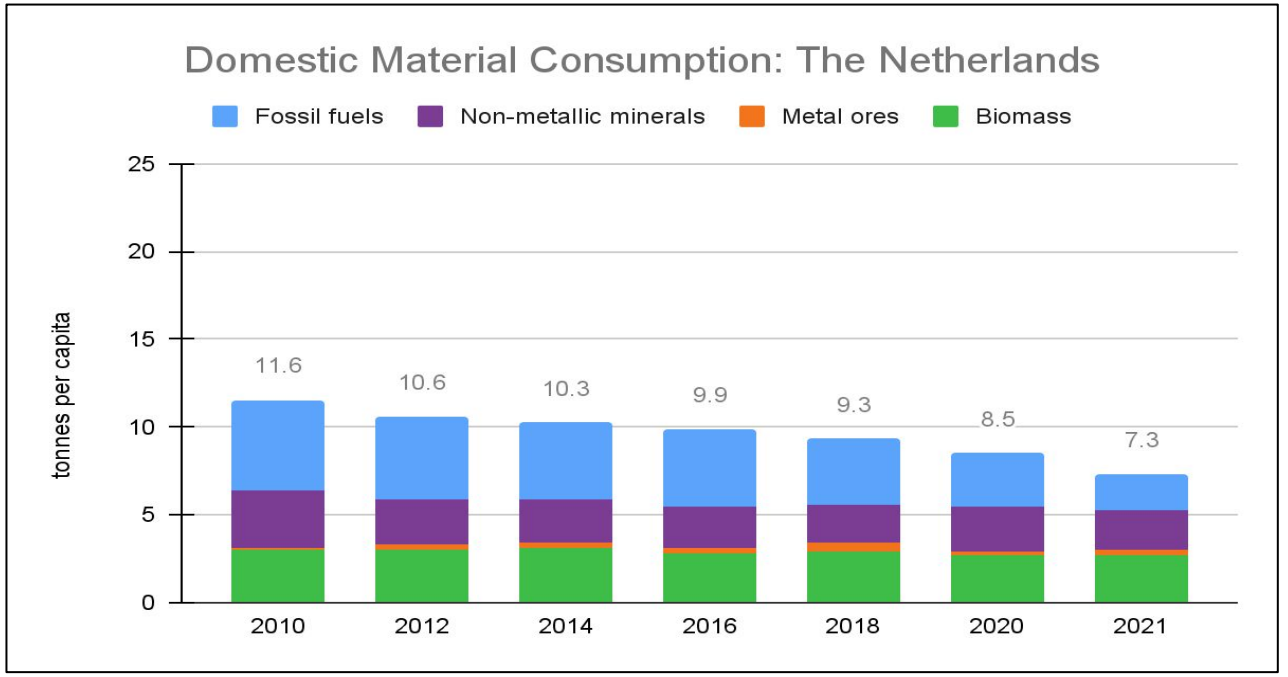

40
30
20
10
0
CMUR
2010
2012
2014
2016
2018
2020
Ireland
Croatia
Austria

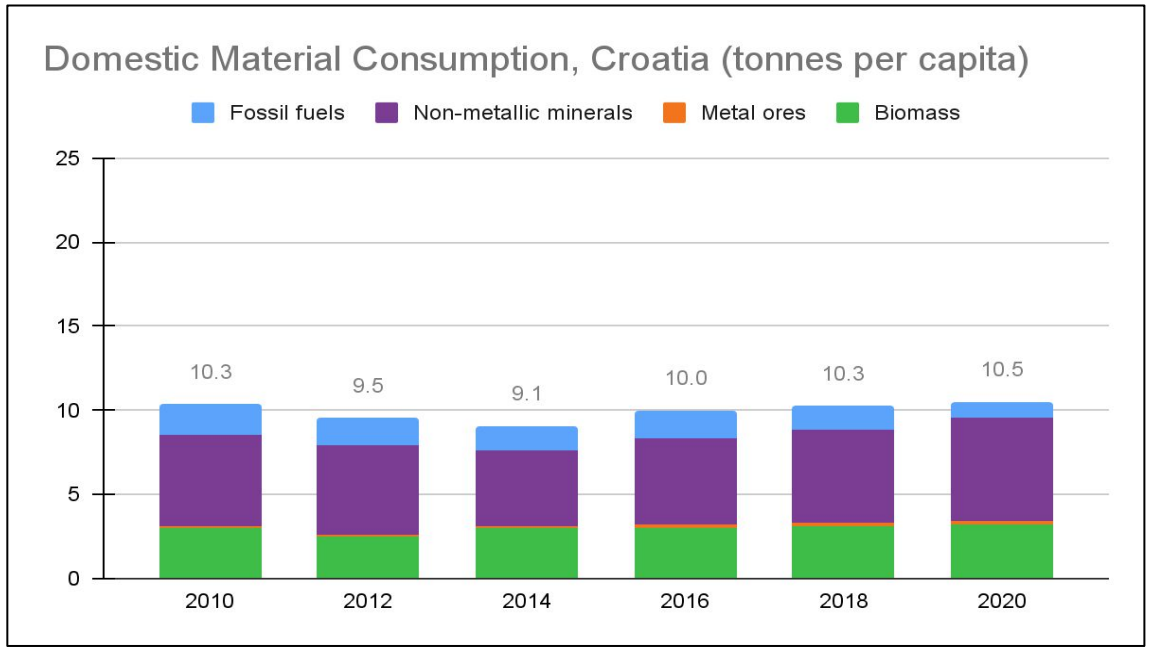

40
30
20
10
0
CMUR
2010
2012
2014
2016
2018
2020
Ireland
Croatia
Austria
Netherlands

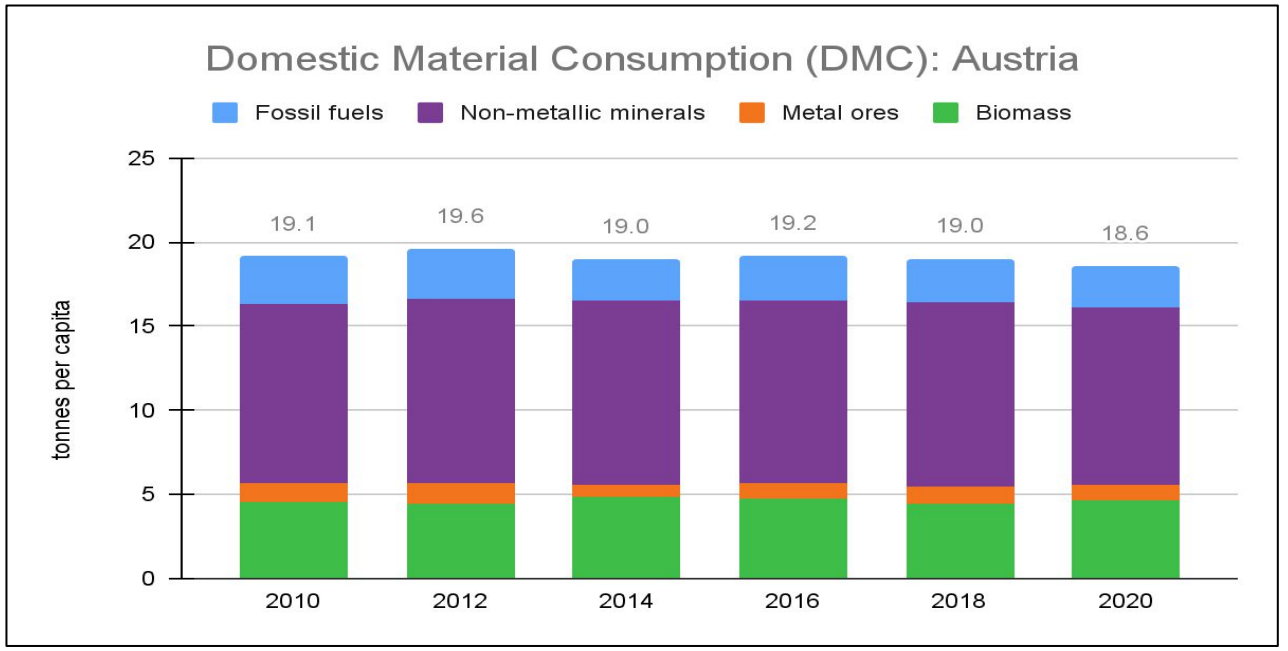
Statistical Observations

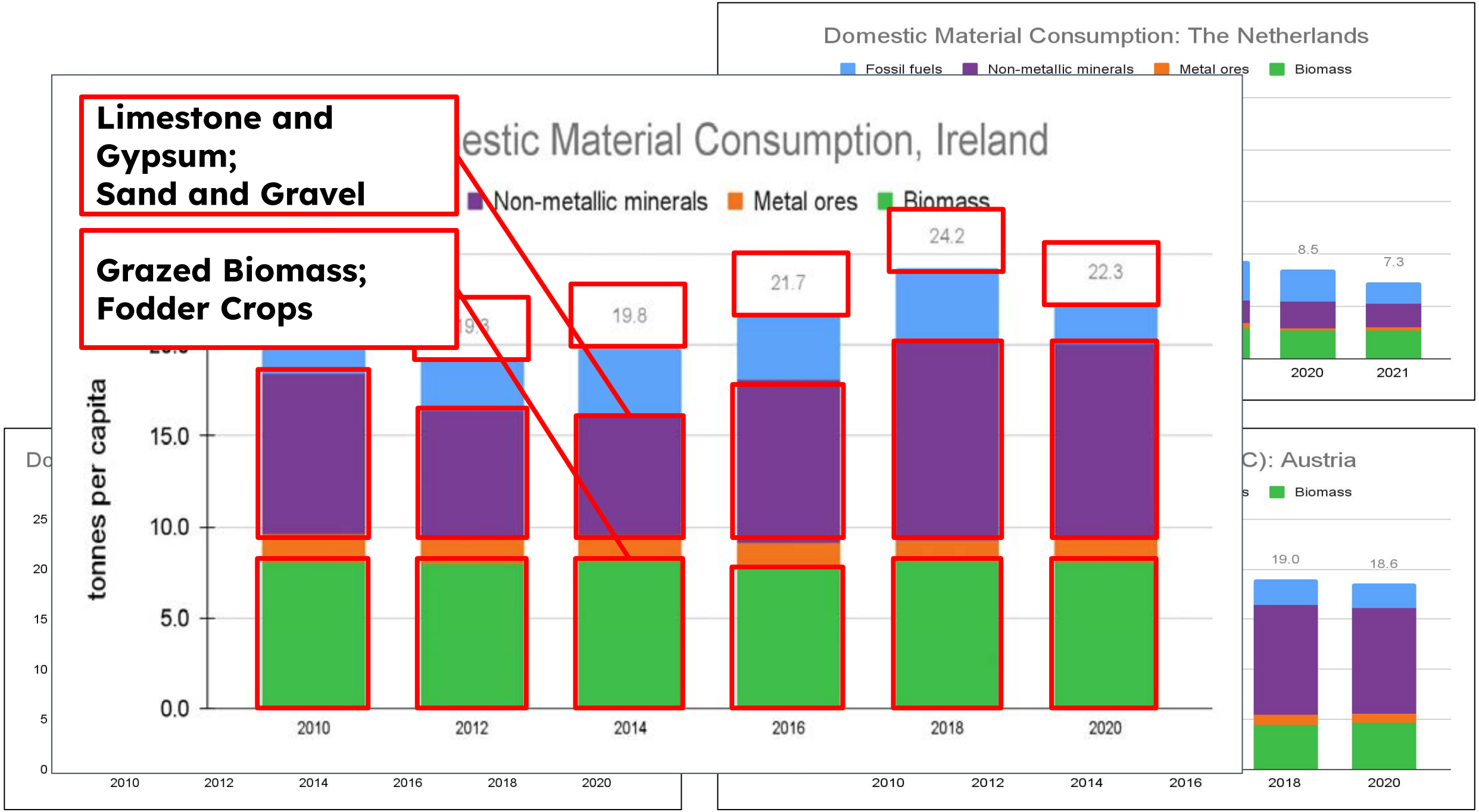
1. **Ireland consumes more per capita than comparator countries**

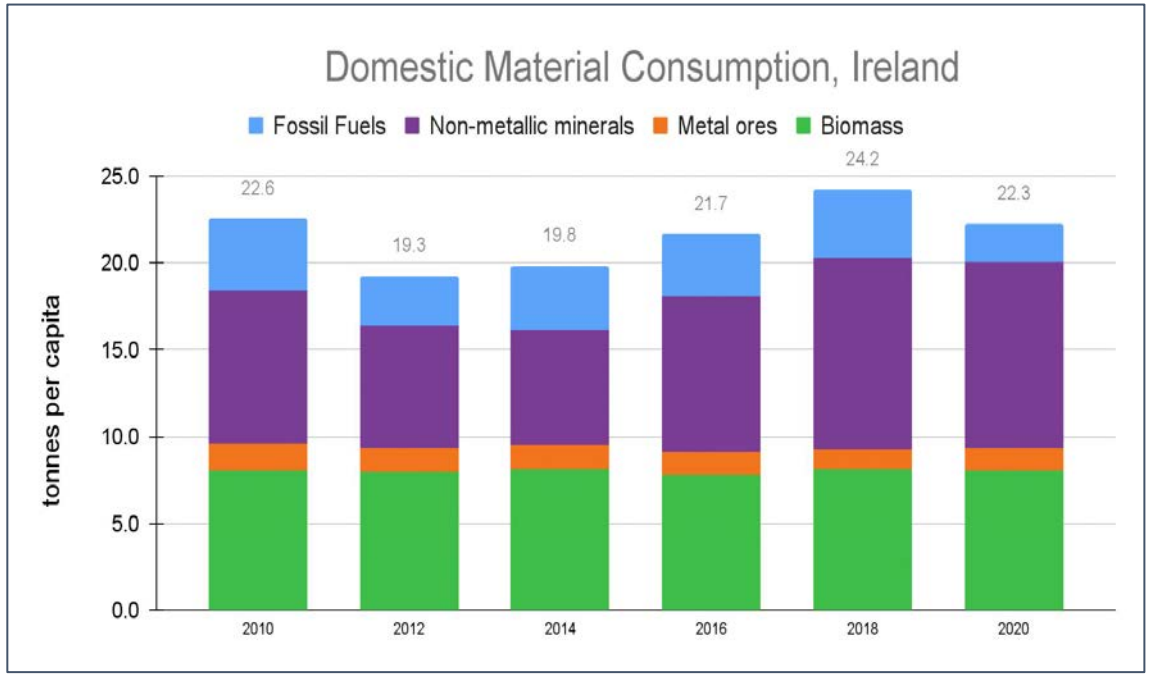

Domestic Material Consumption, Ireland
Fossil Fuels
Non-metallic minerals
Metal ores
Biomass
tonnes per capita
25.0
20.0
15.0
10.0
5.0
0.0
22.6
19.3
19.8
21.7
24.2
22.3
2010
2012
2014
2016
2018
2020

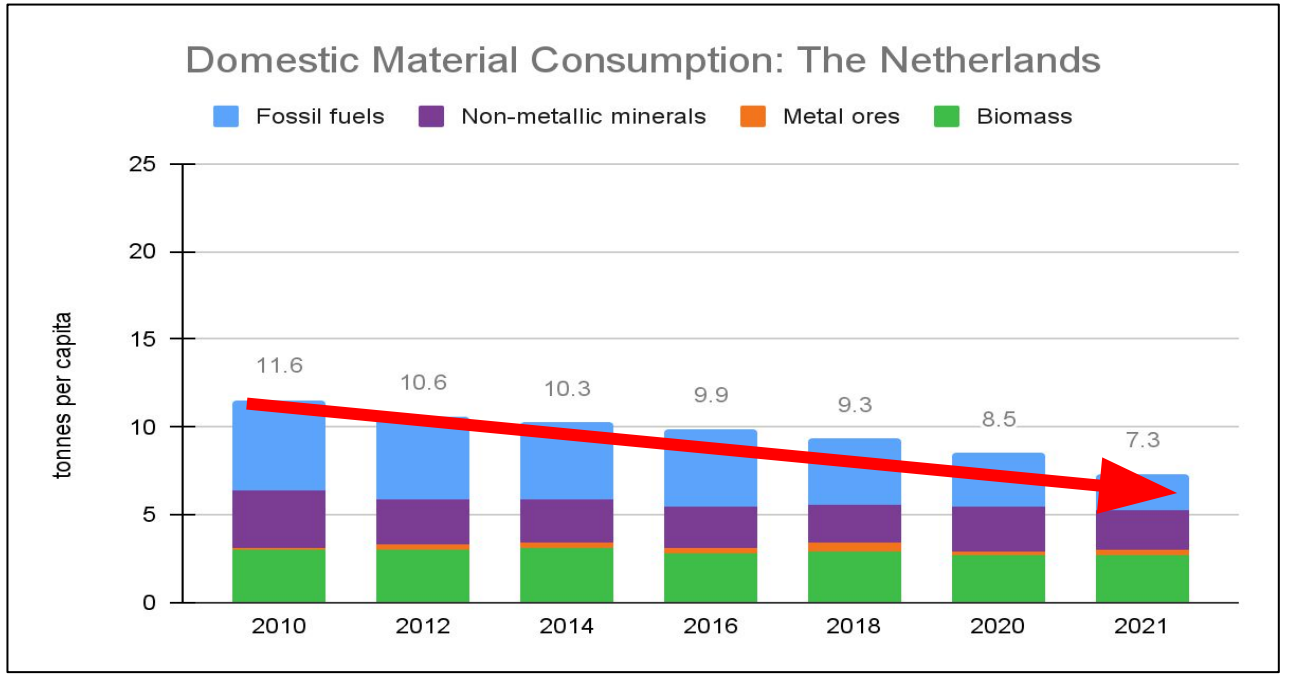

Domestic Material Consumption: The Netherlands
Fossil fuels
Non-metallic minerals
Metal ores
Biomass
tonnes per capita
25
20
15
10
5
0
11.6
10.6
10.3
9.9
9.3
8.5
7.3
2010
2012
2014
2016
2018
2020
2021

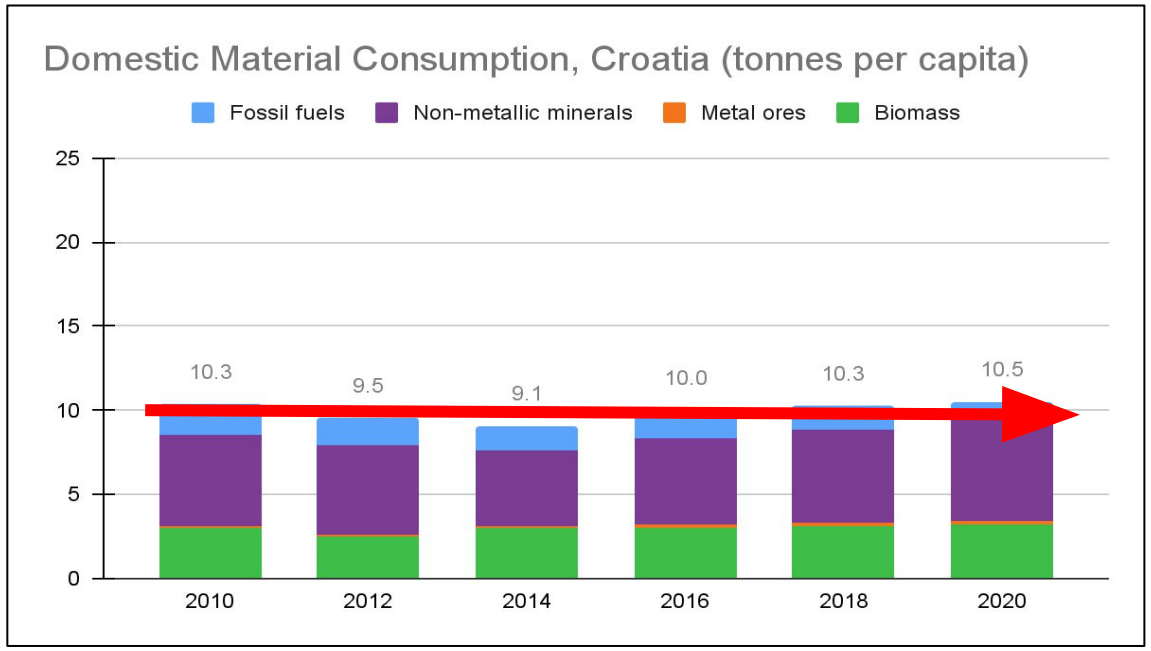

Domestic Material Consumption, Croatia (tonnes per capita)
Fossil fuels
Non-metallic minerals
Metal ores
Biomass
25
20
15
10
5
0
10.3
9.5
9.1
10.0
10.3
10.5
2010
2012
2014
2016
2018
2020

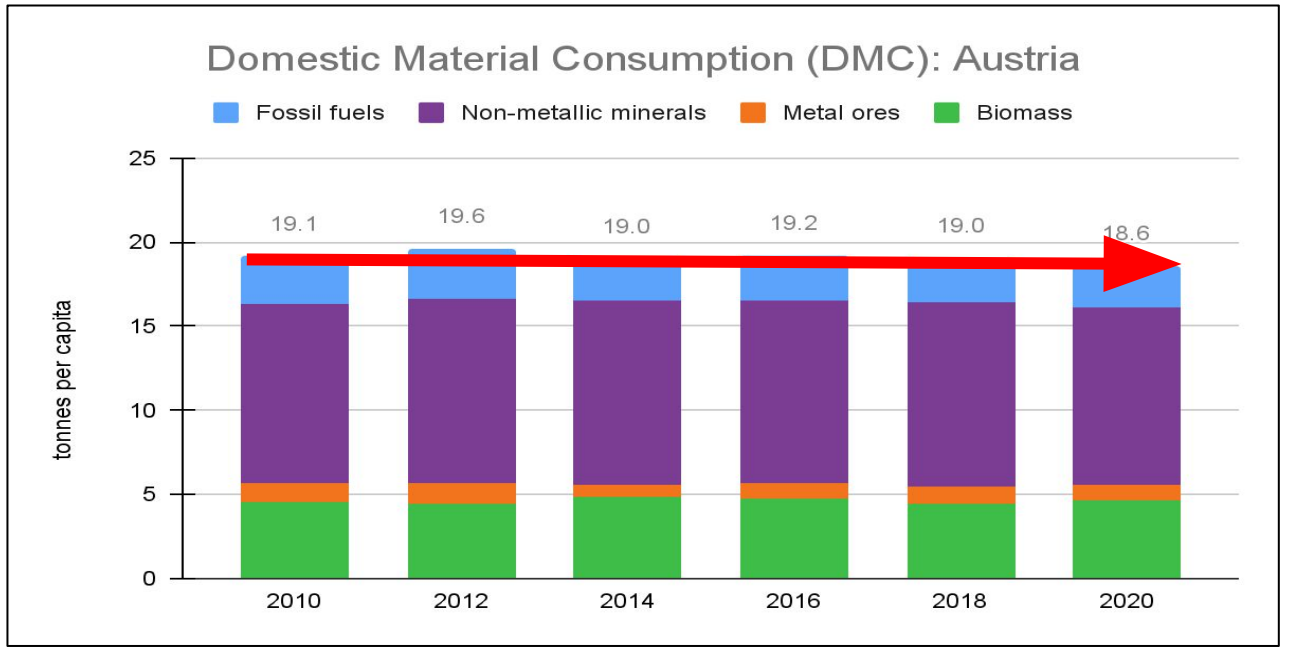

Domestic Material Consumption (DMC): Austria
Fossil fuels
Non-metallic minerals
Metal ores
Biomass
tonnes per capita
25
20
15
10
5
0
19.1
19.6
19.0
19.2
19.0
18.6
2010
2012
2014
2016
2018
2020


Limestone and Gypsum;
Sand and Gravel
Grazed Biomass; Fodder Crops
estic Material Consumption, Ireland
Non-metallic minerals
Metal ores
Biomass
tonnes per capita
0.0
5.0
10.0
15.0
19.8
21.7
24.2
22.3
2010
2012
2014
2016
2018
2020
Domestic Material Consumption: The Netherlands
Fossil fuels
Non-metallic minerals
Metal ores
Biomass
8.5
7.3
2020
2021
C): Austria
Biomass
19.0
18.6
2018
2020


Domestic Material Consumption, Ireland
Fossil Fuels
Non-metallic minerals
Metal ores
Biomass
tonnes per capita
25.0
20.0
15.0
10.0
5.0
0.0
22.6
19.3
19.8
21.7
24.2
22.3
2010
2012
2014
2016
2018
2020

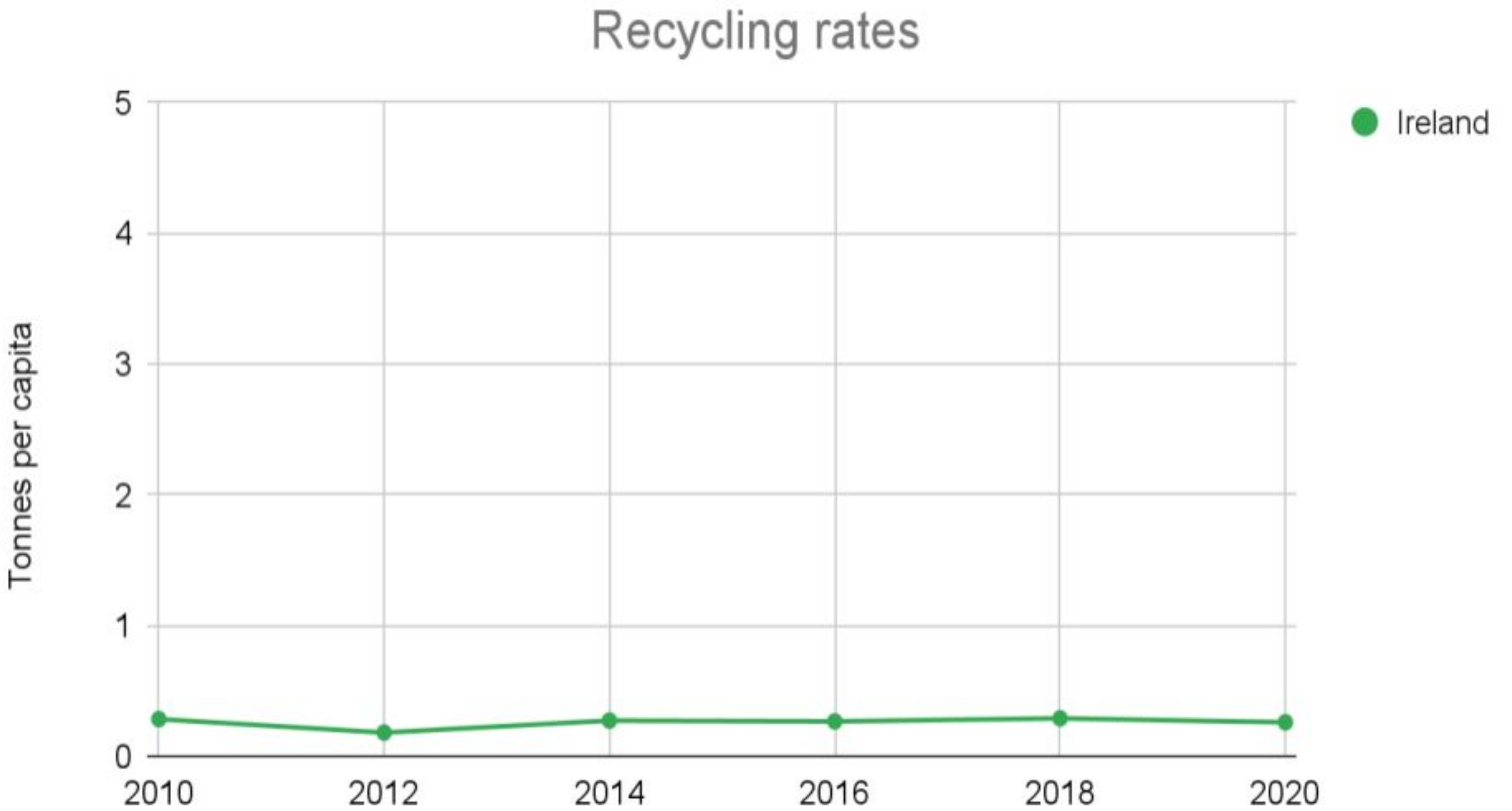

Domestic Material Consumption: The Netherlands
Fossil fuels
Non-metallic minerals
Metal ores
Biomass
tonnes per capita
25
20
15
10
5
0
11.6
10.6
10.3
9.9
9.3
8.5
7.3
2010
2012
2014
2016
2018
2020
2021

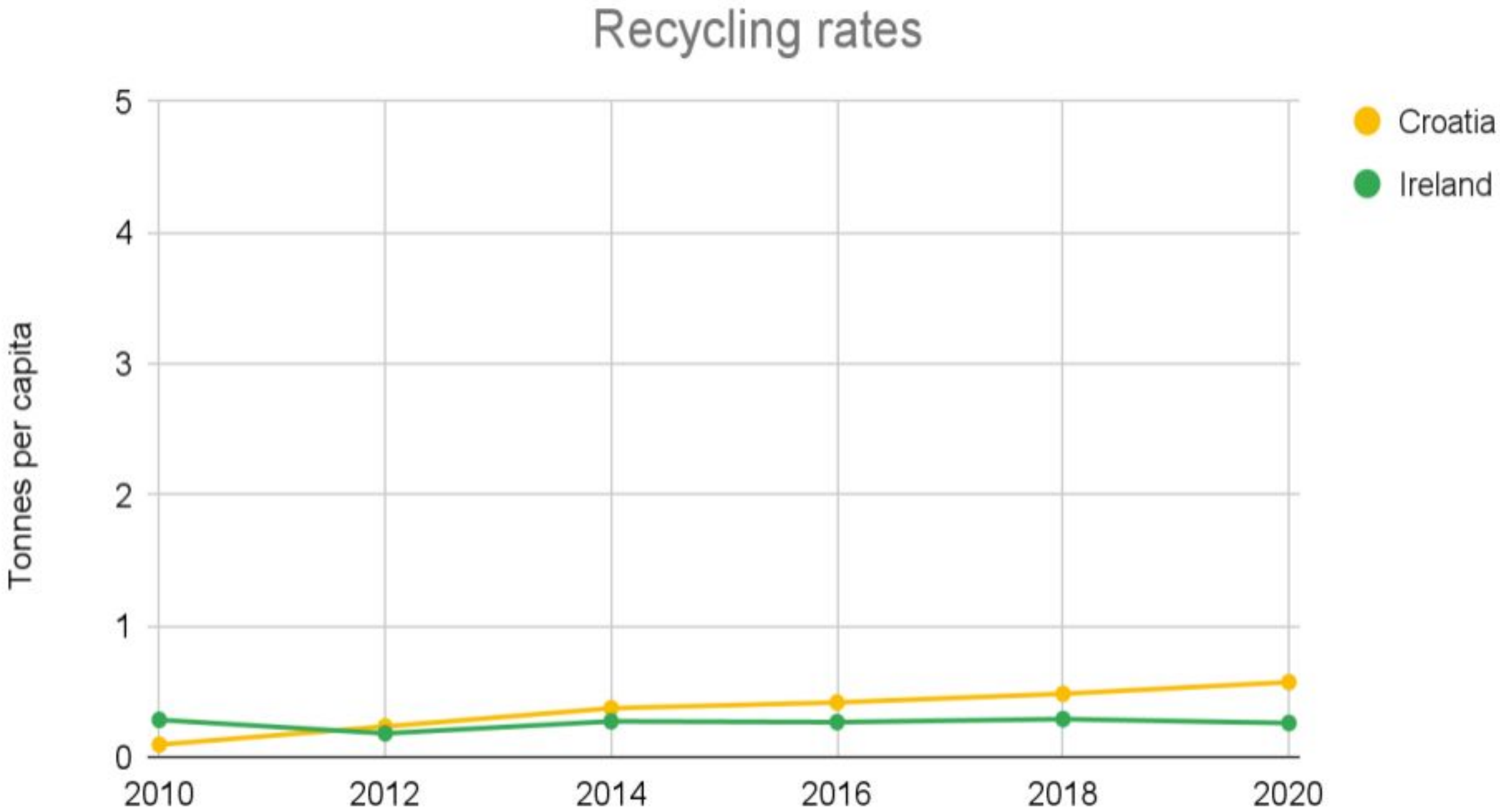

Domestic Material Consumption, Croatia (tonnes per capita)
Fossil fuels
Non-metallic minerals
Metal ores
Biomass
25
20
15
10
5
0
10.3
9.5
9.1
10.0
10.3
10.5
2010
2012
2014
2016
2018
2020

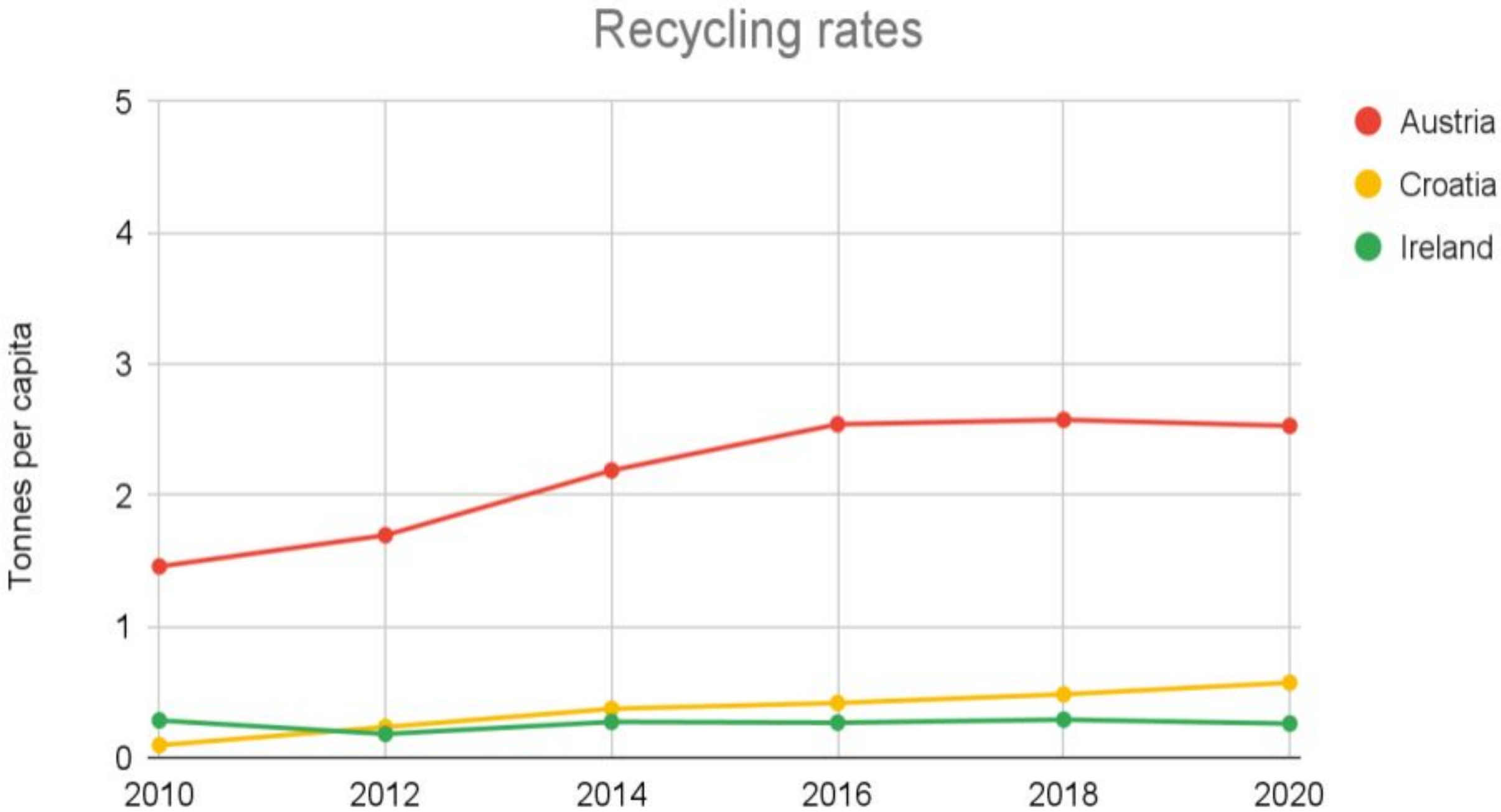

Domestic Material Consumption (DMC): Austria
Fossil fuels
Non-metallic minerals
Metal ores
Biomass
tonnes per capita
25
20
15
10
5
0
19.1
19.6
19.0
19.2
19.0
18.6
2010
2012
2014
2016
2018
2020

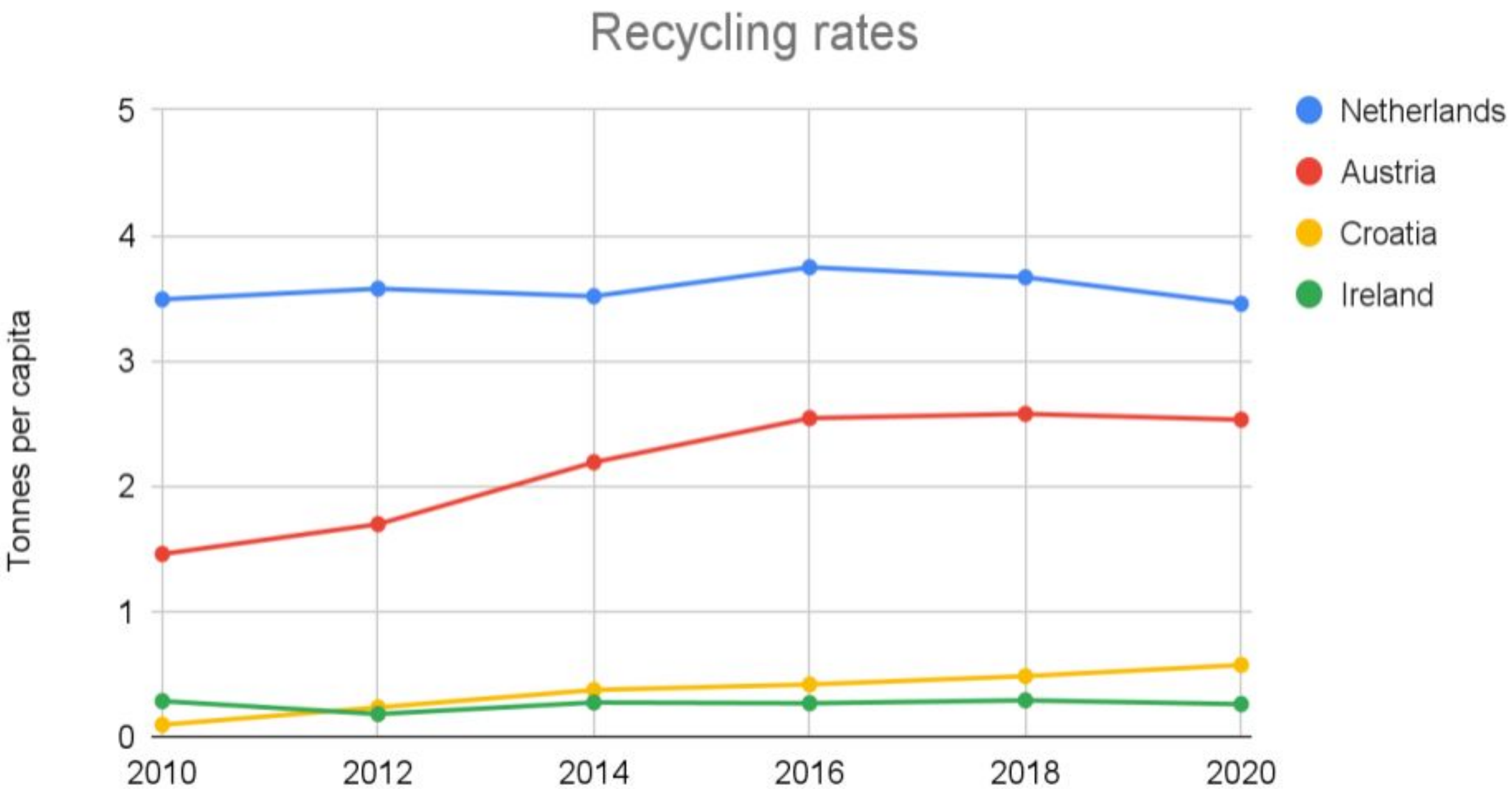
Statistical Observations

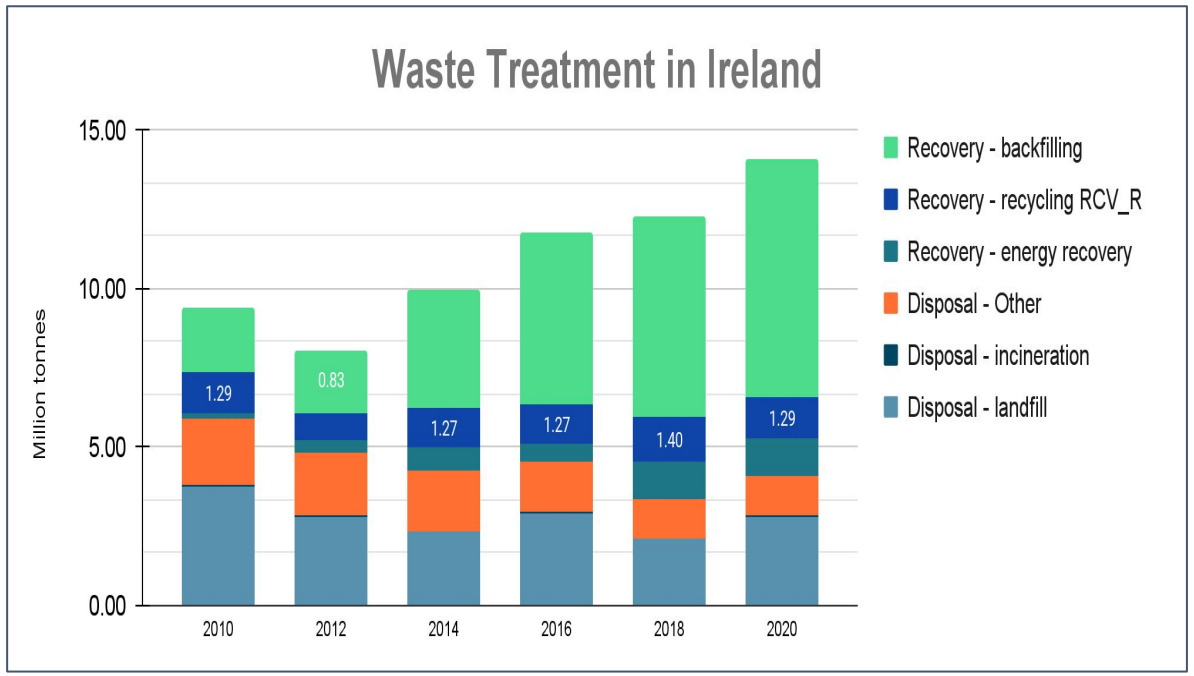
2. Ireland recycles less per capita than comparator countries

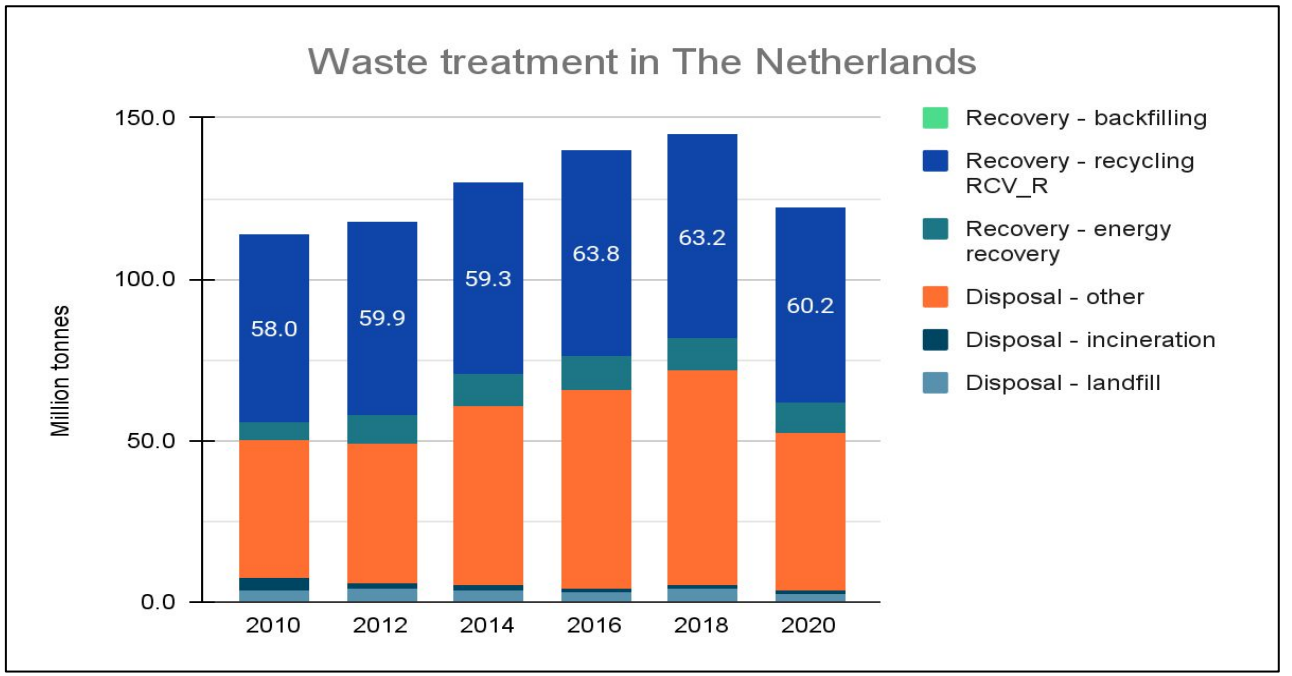

Recycling rates
Tonnes per capita
5
4
3
2
1
0
2010
2012
2014
2016
2018
2020
Ireland

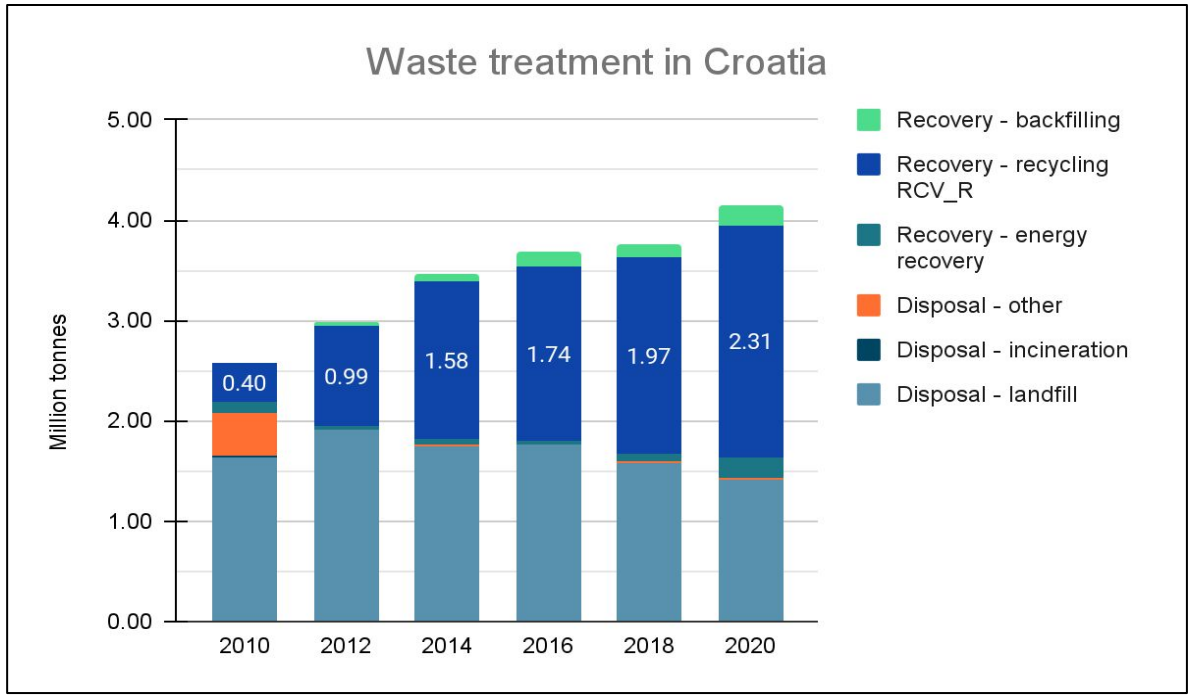

Recycling rates
Tonnes per capita
5
4
3
2
1
0
2010
2012
2014
2016
2018
2020
Croatia
Ireland

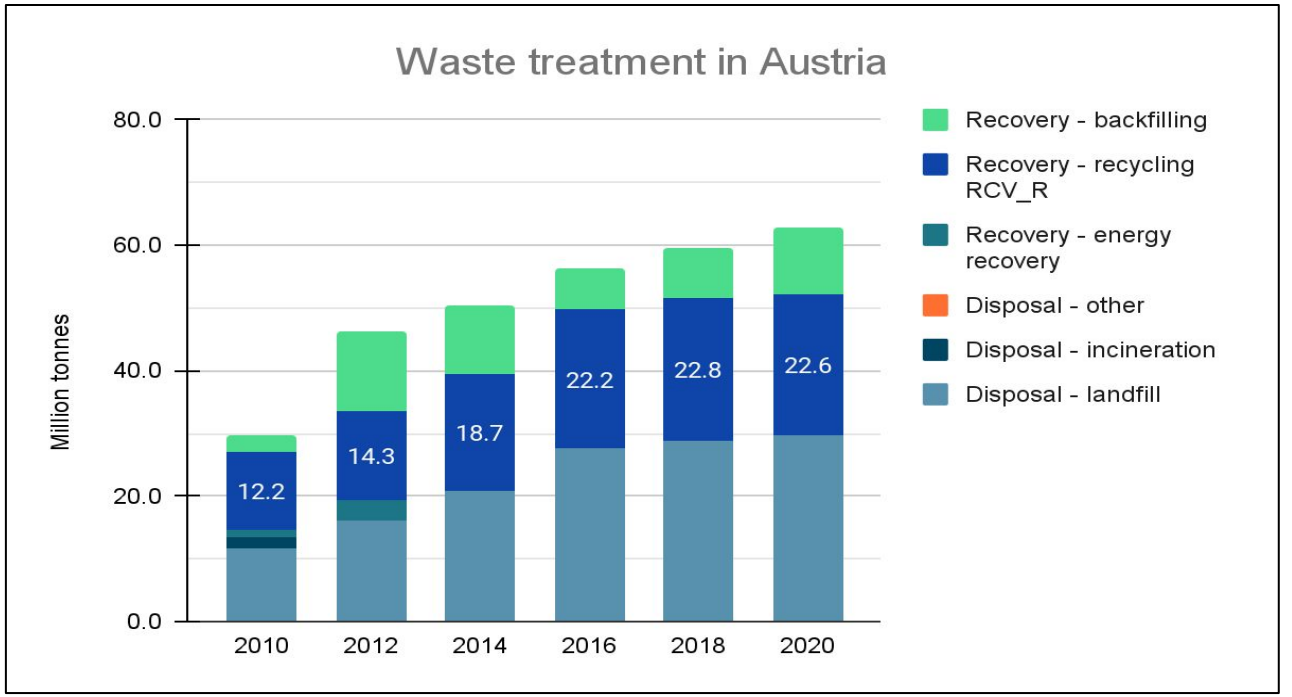

Recycling rates
Tonnes per capita
5
4
3
2
1
0
2010
2012
2014
2016
2018
2020
Austria
Croatia
Ireland

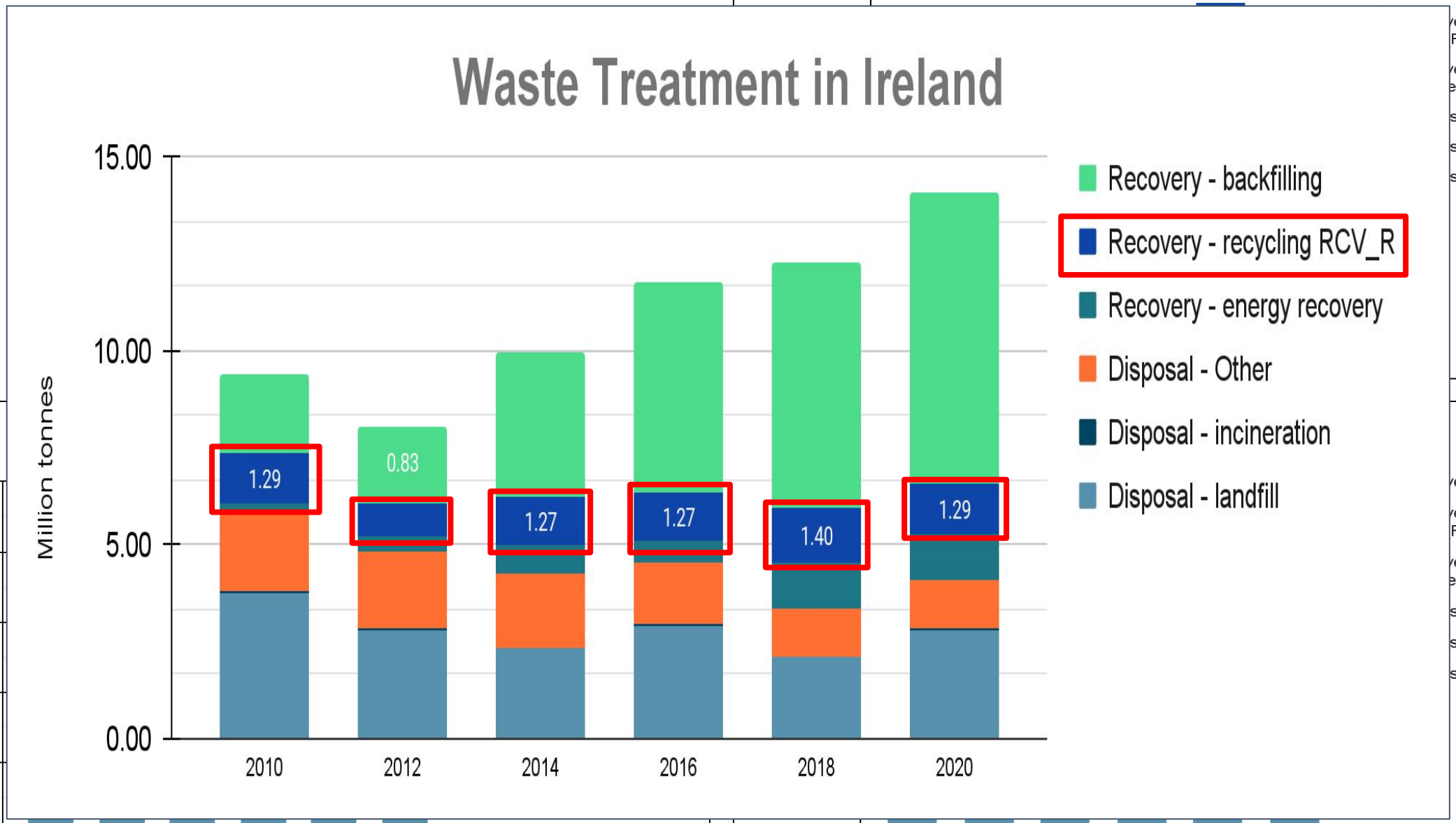

Recycling rates
Tonnes per capita
5
4
3
2
1
0
2010
2012
2014
2016
2018
2020
Netherlands
Austria
Croatia
Ireland

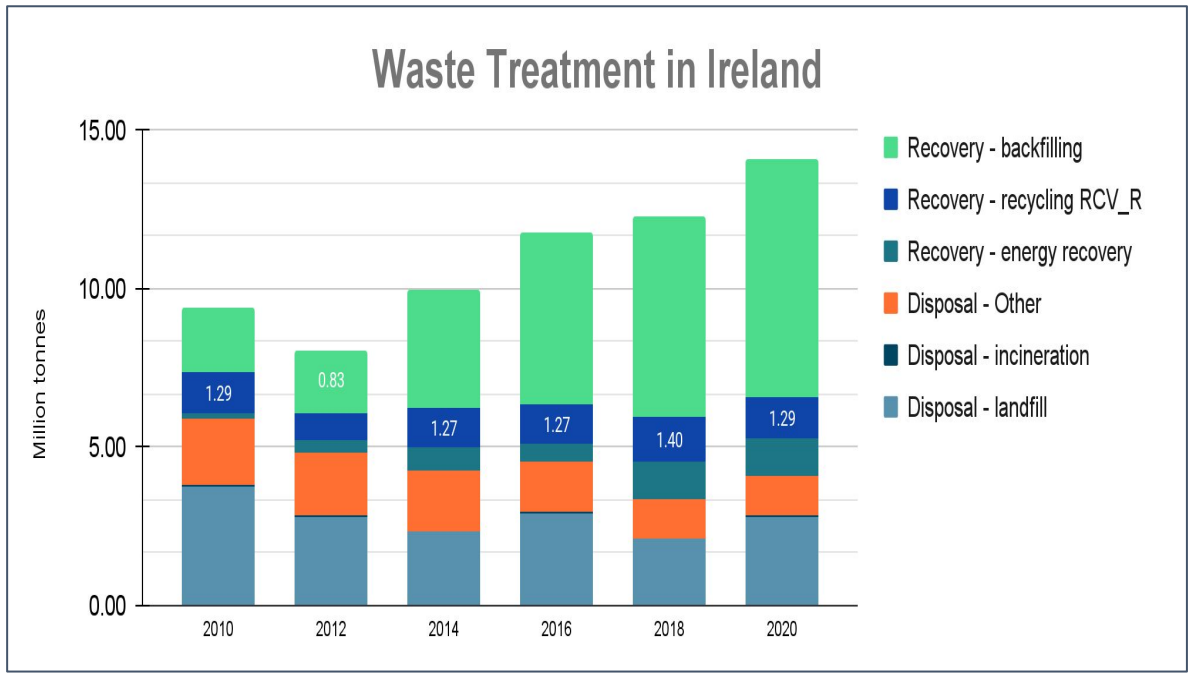

Waste Treatment in Ireland
Million tonnes
15.00
10.00
5.00
0.00
1.29
0.83
1.27
1.27
1.40
1.29
2010
2012
2014
2016
2018
2020
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - Other
Disposal - incineration
Disposal - landfill

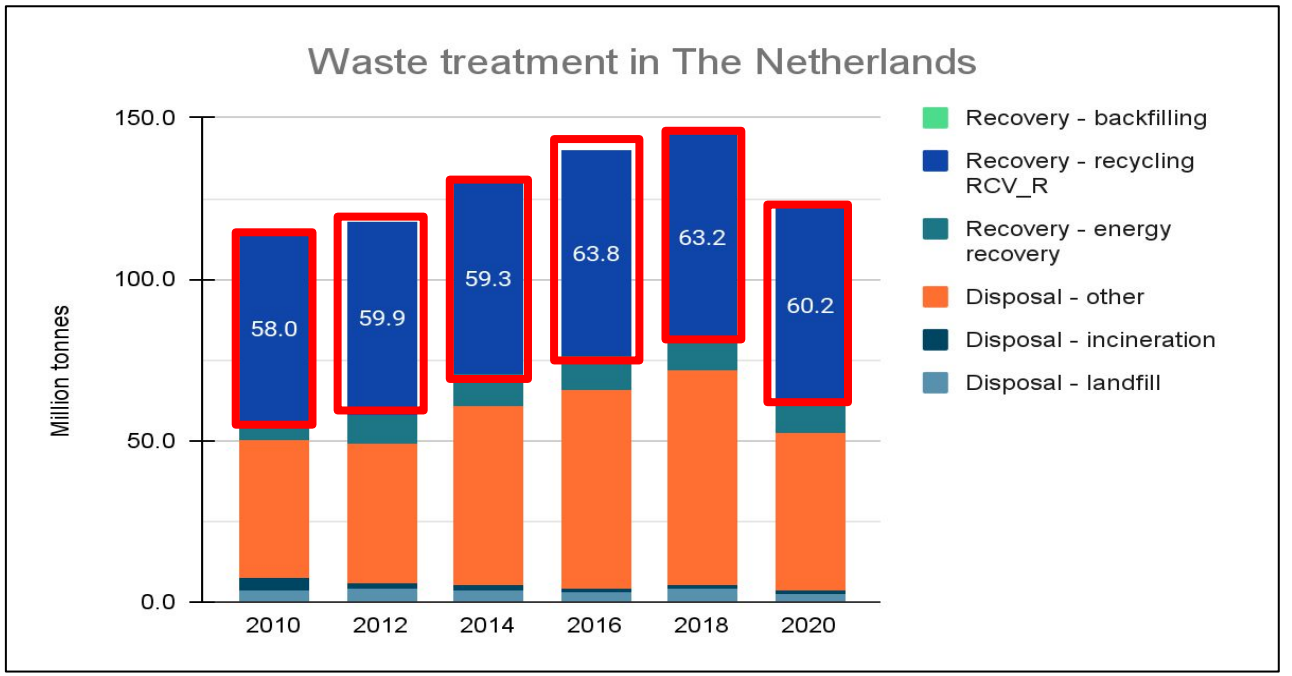

Waste treatment in The Netherlands
Million tonnes
150.0
100.0
50.0
0.0
58.0
59.9
59.3
63.8
63.2
60.2
2010
2012
2014
2016
2018
2020
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - other
Disposal - incineration
Disposal - landfill

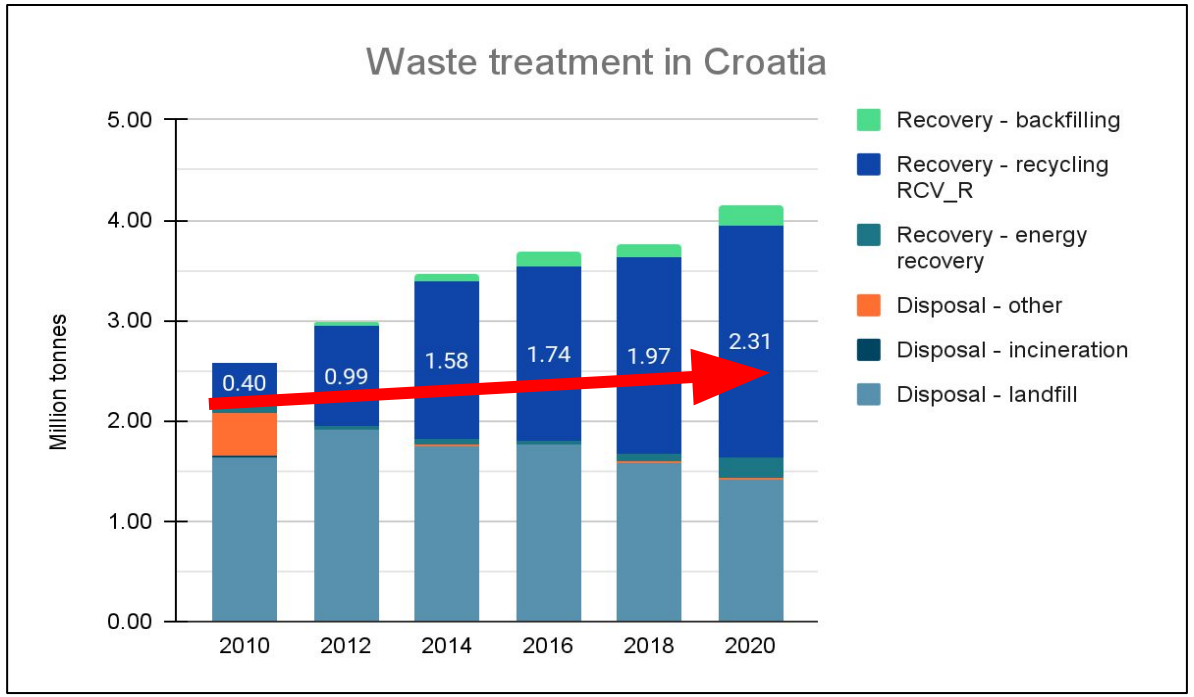

Waste treatment in Croatia
Million tonnes
5.00
4.00
3.00
2.00
1.00
0.00
0.40
0.99
1.58
1.74
1.97
2.31
2010
2012
2014
2016
2018
2020
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - other
Disposal - incineration
Disposal - landfill

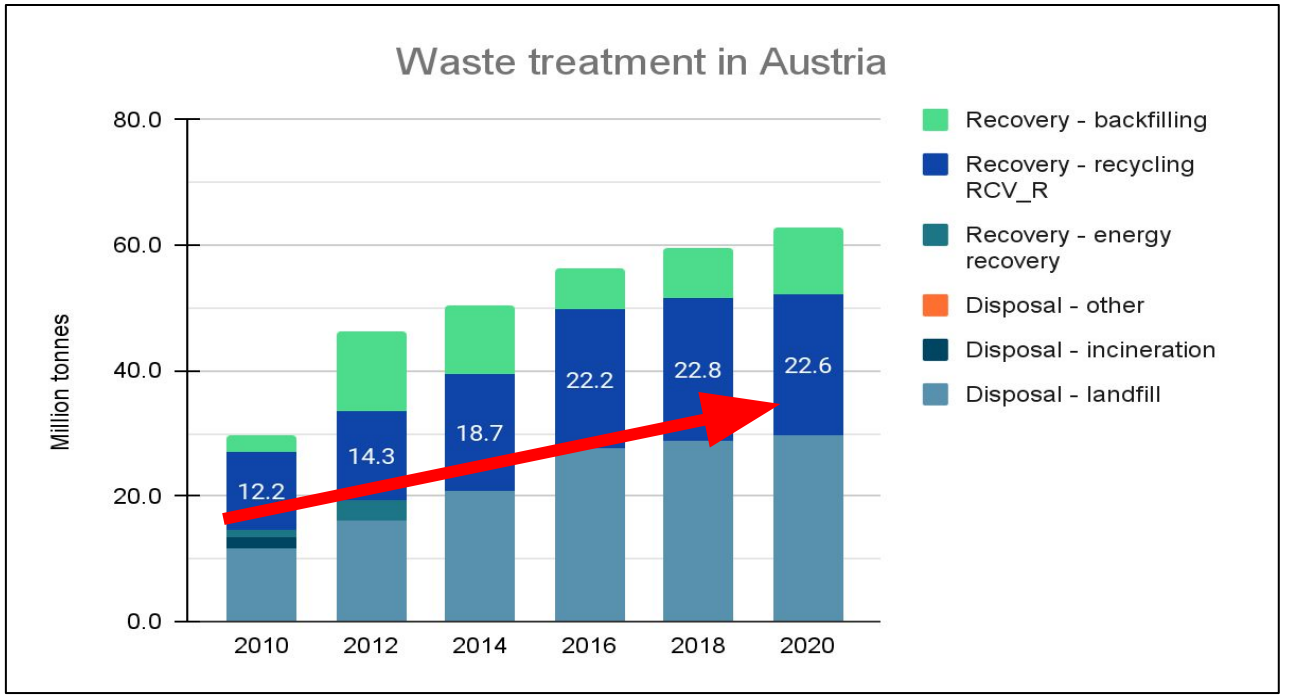

Waste treatment in Austria
Million tonnes
80.0
60.0
40.0
20.0
0.0
12.2
14.3
18.7
22.2
22.8
22.6
2010
2012
2014
2016
2018
2020
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - other
Disposal - incineration
Disposal - landfill


Waste Treatment in Ireland
Million tonnes
15.00
10.00
5.00
0.00
2010
2012
2014
2016
2018
2020
1.29
0.83
1.27
1.27
1.40
1.29
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - Other
Disposal - incineration
Disposal - landfill


Waste Treatment in Ireland
Million tonnes
15.00
10.00
5.00
0.00
2010
2012
2014
2016
2018
2020
1.29
0.83
1.27
1.27
1.40
1.29
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - Other
Disposal - incineration
Disposal - landfill


Waste treatment in The Netherlands
Million tonnes
150.0
100.0
50.0
0.0
2010
2012
2014
2016
2018
2020
58.0
59.9
59.3
63.8
63.2
60.2
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - other
Disposal - incineration
Disposal - landfill

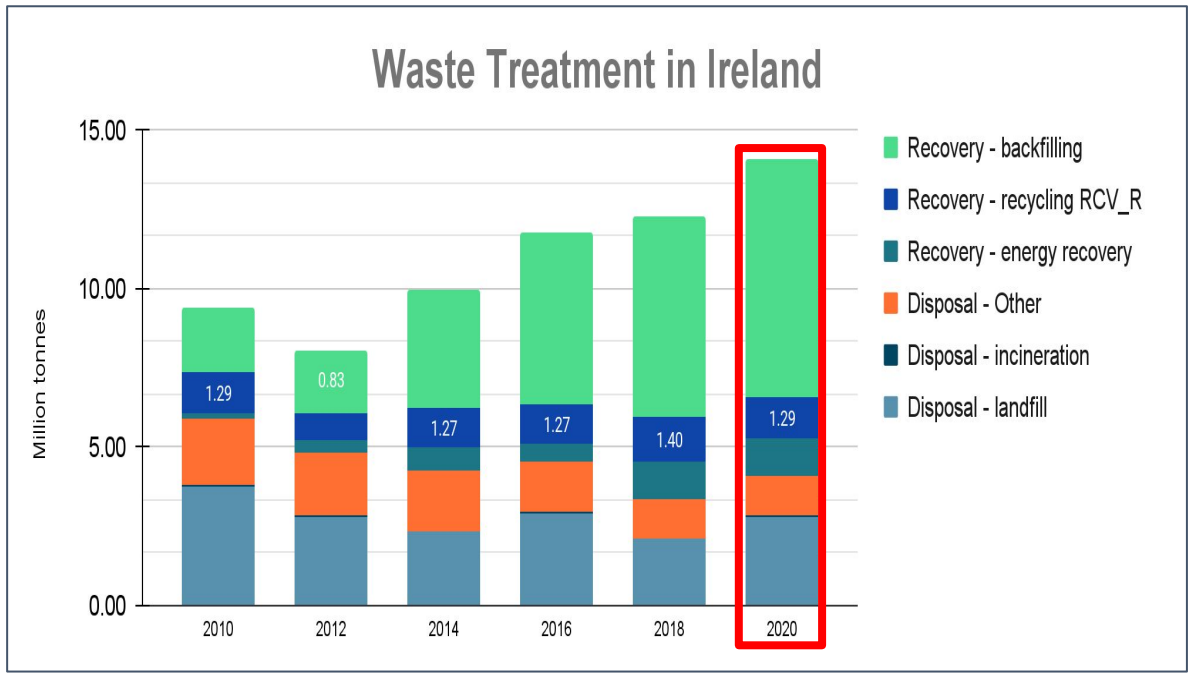

Waste treatment in Croatia
Million tonnes
5.00
4.00
3.00
2.00
1.00
0.00
2010
2012
2014
2016
2018
2020
0.40
0.99
1.58
1.74
1.97
2.31
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - other
Disposal - incineration
Disposal - landfill

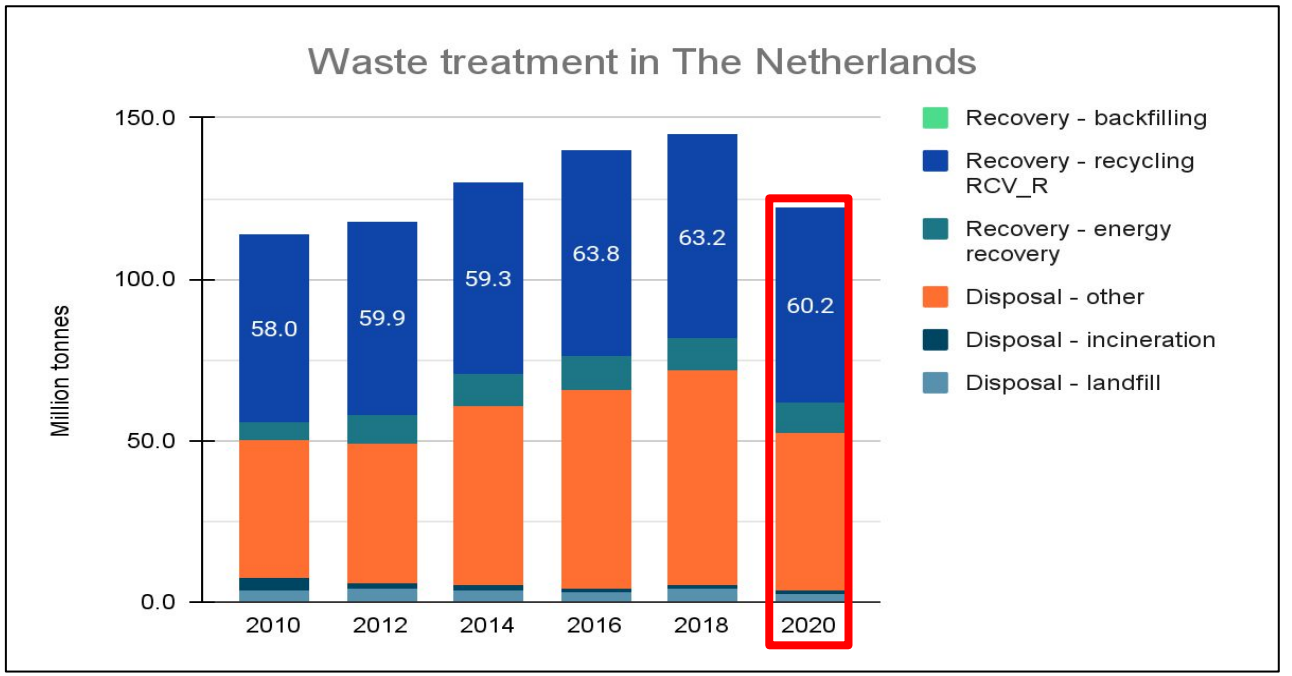

Waste treatment in Austria
Million tonnes
80.0
60.0
40.0
20.0
0.0
2010
2012
2014
2016
2018
2020
12.2
14.3
18.7
22.2
22.8
22.6
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - other
Disposal - incineration
Disposal - landfill

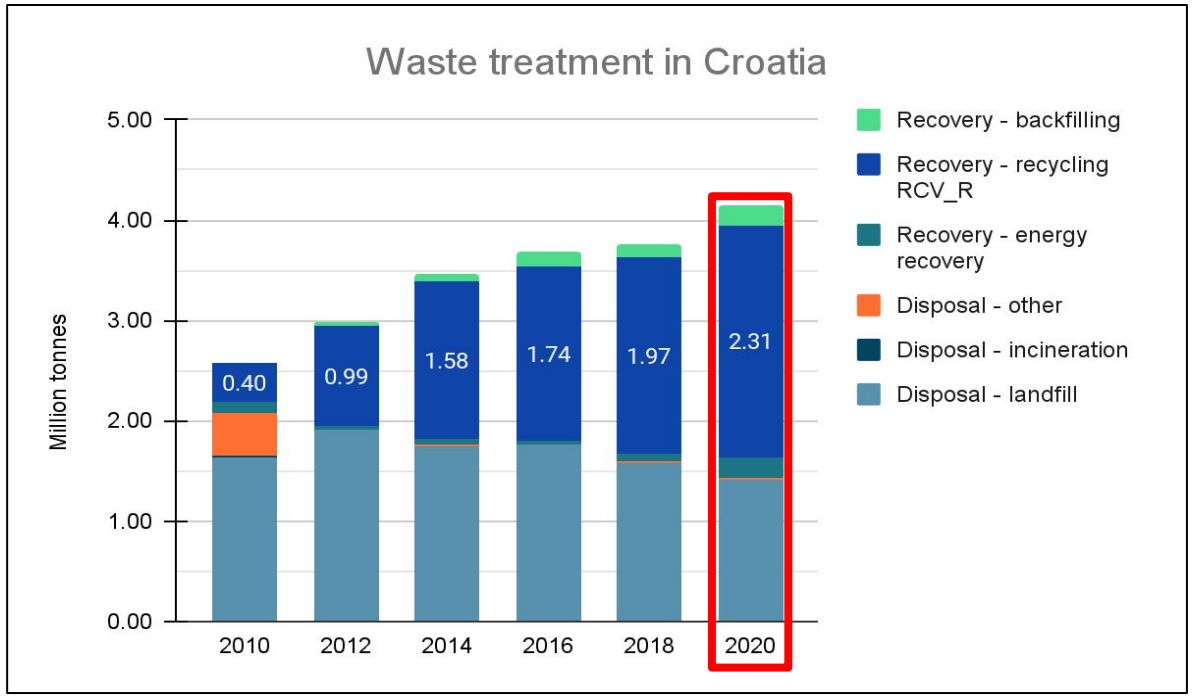
Statistical Observations

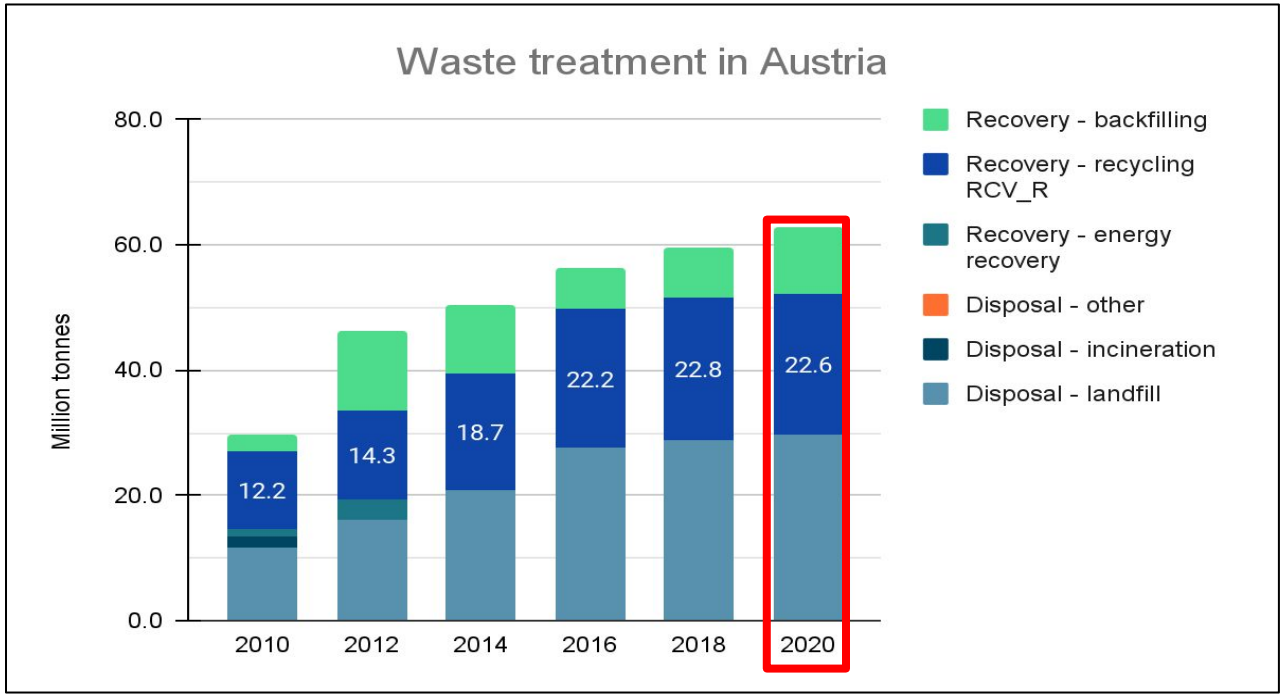
3. Ireland underperforms in recycling certain waste materials

This is where we need to focus!


Waste Treatment in Ireland
Million tonnes
15.00
10.00
5.00
0.00
1.29
0.83
1.27
1.27
1.40
1.29
2010
2012
2014
2016
2018
2020
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - Other
Disposal - incineration
Disposal - landfill

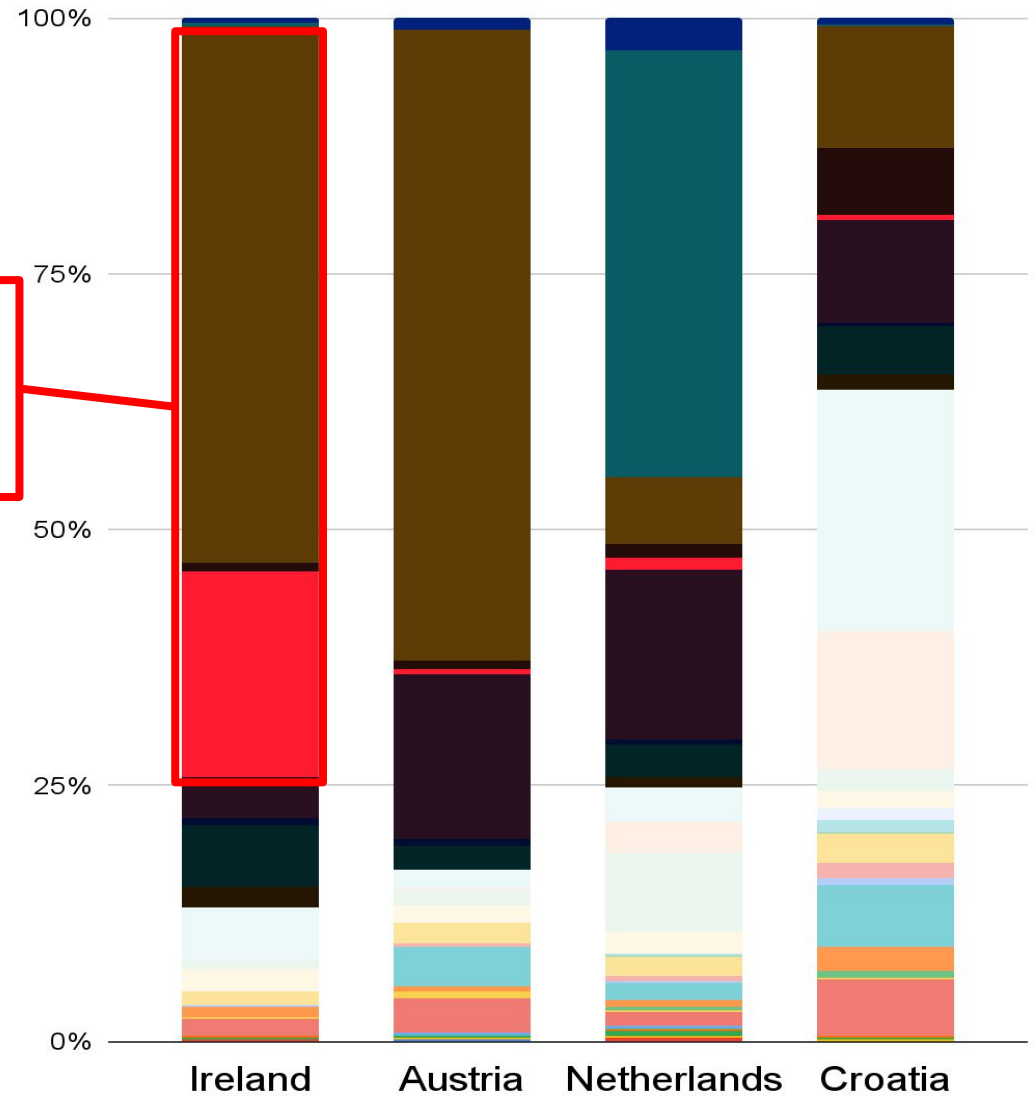

Waste treatment in The Netherlands
Million tonnes
150.0
100.0
50.0
0.0
58.0
59.9
59.3
63.8
63.2
60.2
2010
2012
2014
2016
2018
2020
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - other
Disposal - incineration
Disposal - landfill


Waste treatment in Croatia
Million tonnes
5.00
4.00
3.00
2.00
1.00
0.00
0.40
0.99
1.58
1.74
1.97
2.31
2010
2012
2014
2016
2018
2020
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - other
Disposal - incineration
Disposal - landfill


Waste treatment in Austria
Million tonnes
80.0
60.0
40.0
20.0
0.0
12.2
14.3
18.7
22.2
22.8
22.6
2010
2012
2014
2016
2018
2020
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - other
Disposal - incineration
Disposal - landfill

All Waste Treatment by Material Type 2020

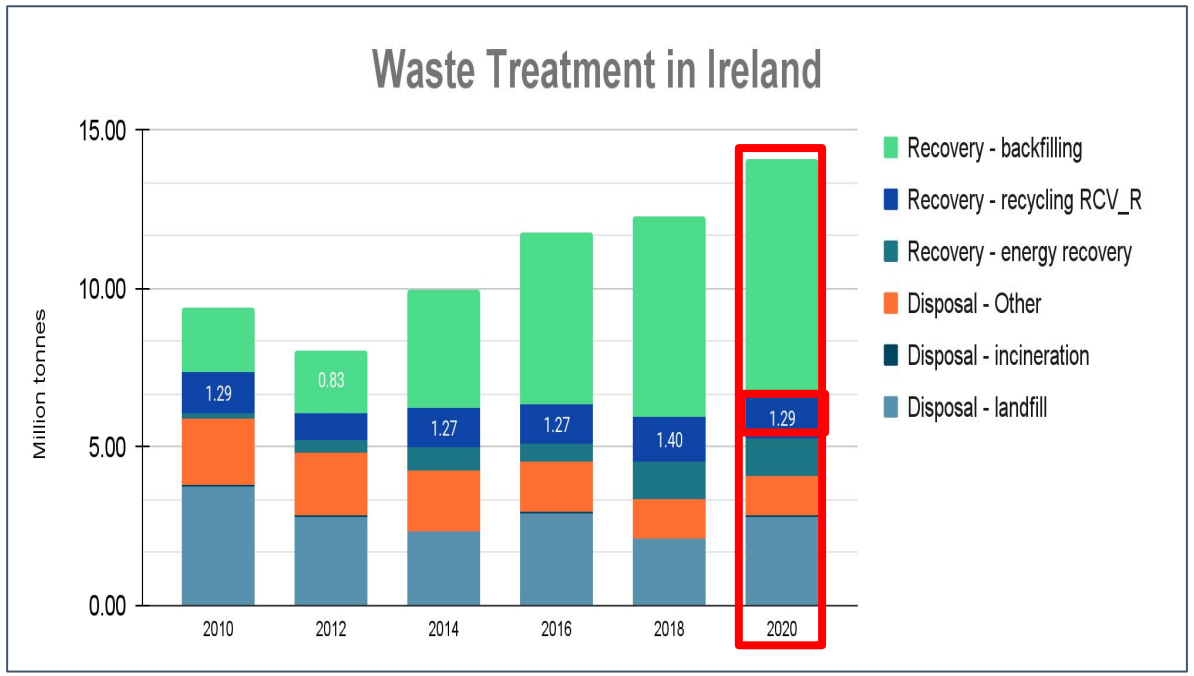
73% of Ireland's waste

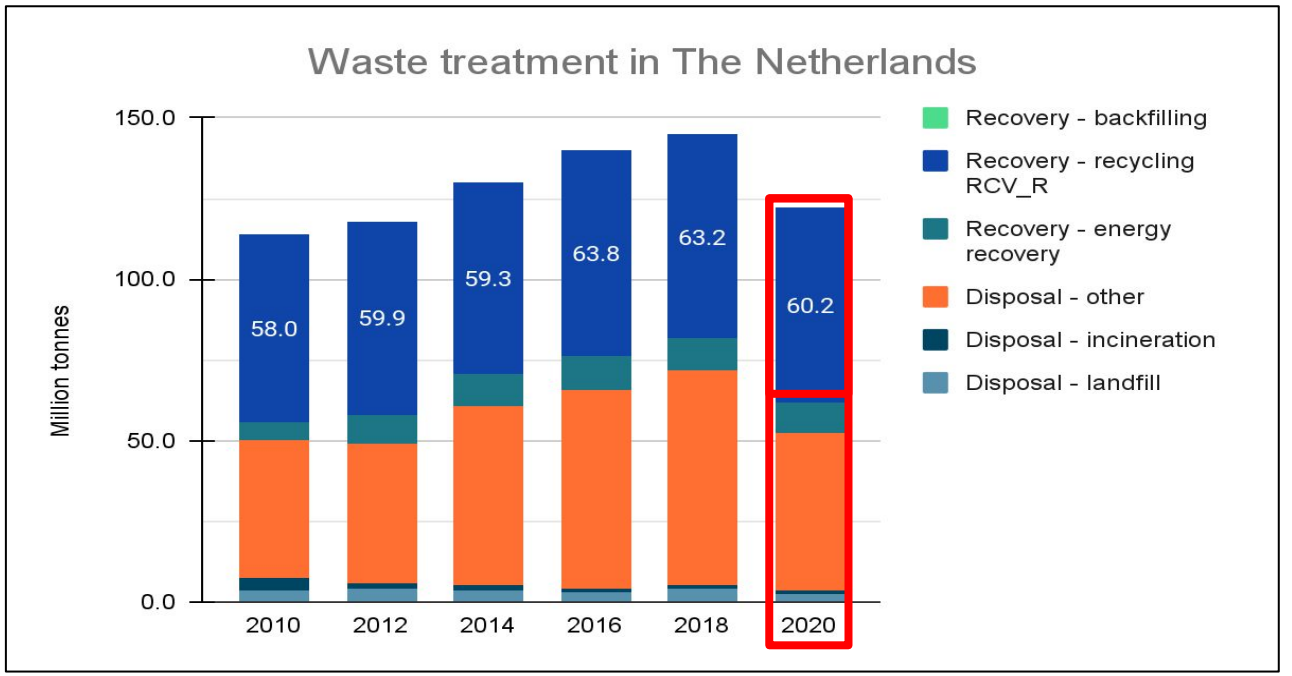


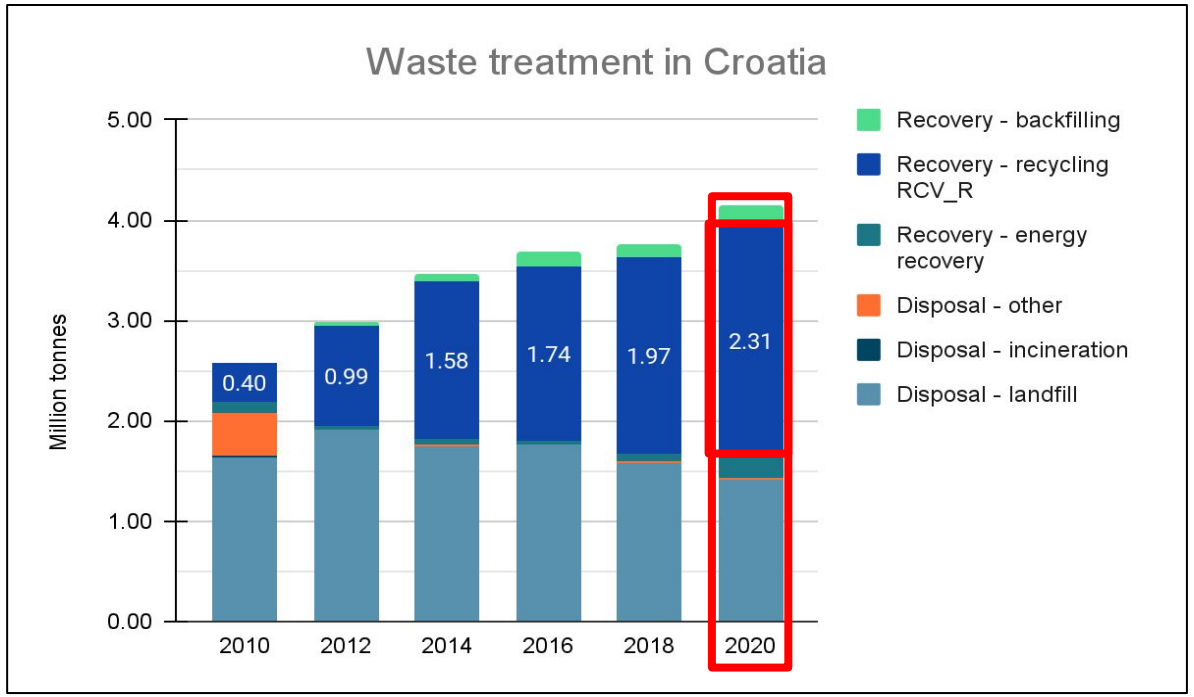
Mineral wastes from
Dredging spoils
Soils
Combustion wastes
Other mineral wastes
Mineral waste C&D
Common sludges
Sorting residues
Mixed and undiffere
Household and simi
Animal faeces, urine
Vegetal wastes
Animal and mixed food waste
Batteries and accumulators
Discarded vehicles
Discarded equipment (except
Waste containing PCB
Textile wastes
Wood wastes
14 more

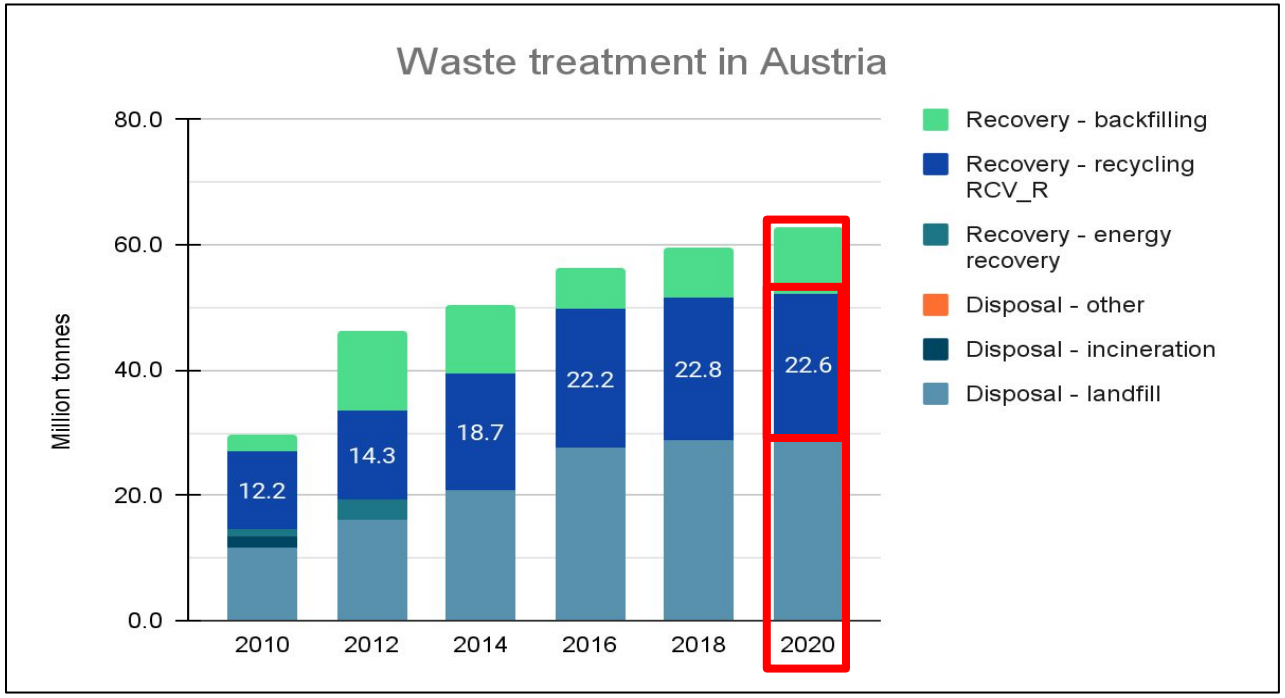
Excavated during construction projects

Quarried and metal manufacturing waste

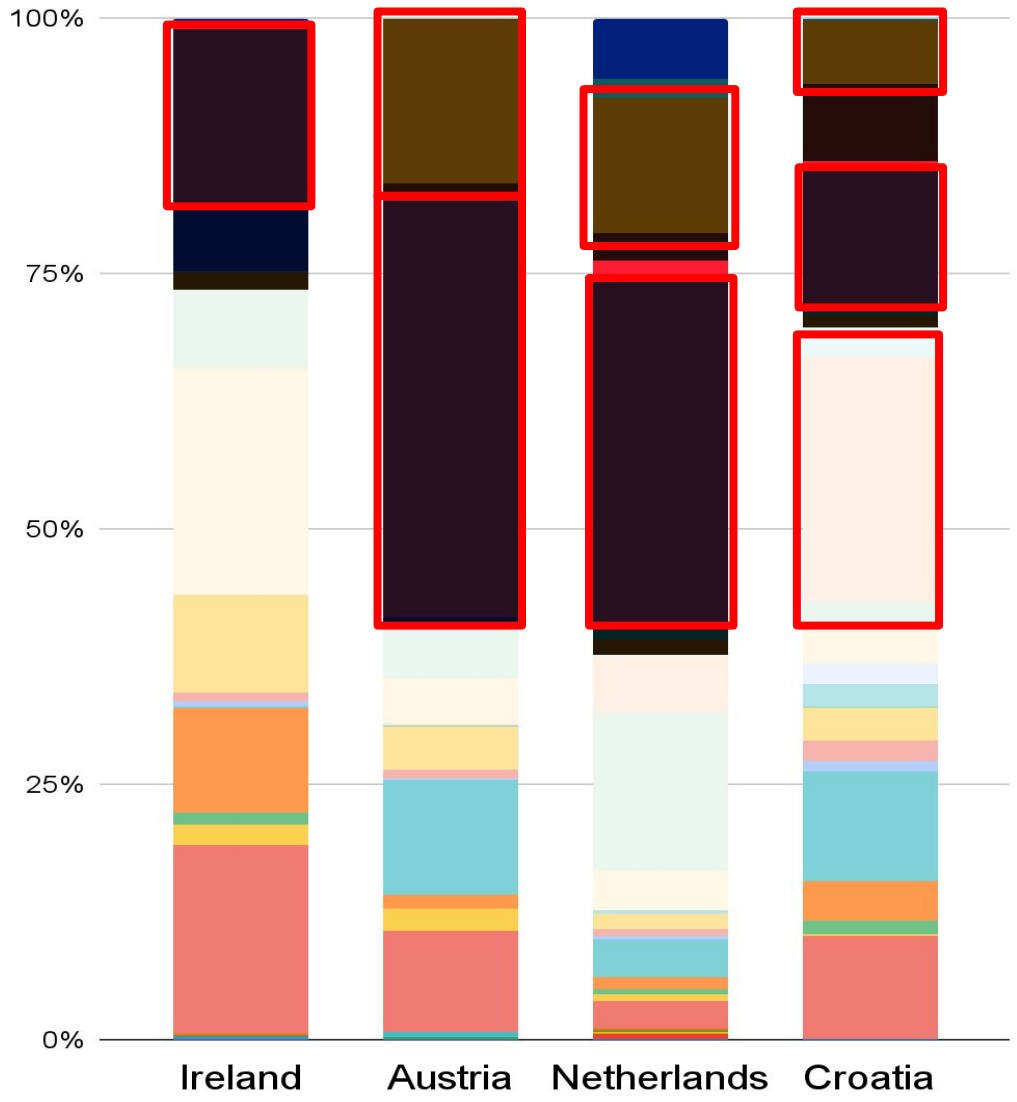

Waste Treatment in Ireland
Million tonnes
15.00
10.00
5.00
0.00
2010
2012
2014
2016
2018
2020
1.29
0.83
1.27
1.27
1.40
1.29
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - Other
Disposal - incineration
Disposal - landfill


Waste treatment in The Netherlands
Million tonnes
150.0
100.0
50.0
0.0
2010
2012
2014
2016
2018
2020
58.0
59.9
59.3
63.8
63.2
60.2
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - other
Disposal - incineration
Disposal - landfill


Waste treatment in Croatia
Million tonnes
5.00
4.00
3.00
2.00
1.00
0.00
2010
2012
2014
2016
2018
2020
0.40
0.99
1.58
1.74
1.97
2.31
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - other
Disposal - incineration
Disposal - landfill


Waste treatment in Austria
Million tonnes
80.0
60.0
40.0
20.0
0.0
2010
2012
2014
2016
2018
2020
12.2
14.3
18.7
22.2
22.8
22.6
Recovery - backfilling
Recovery - recycling RCV_R
Recovery - energy recovery
Disposal - other
Disposal - incineration
Disposal - landfill

Recycling Only by Material Type 2020



Mineral wastes fro
treatment and stab
Dredging spoils
Soils
Combustion wastes
Other mineral wastes
Mineral waste C&D
Common sludges
Sorting residues
Mixed and undifferentiate
Household and similar wastes
Animal faeces, urine and
Vegetal wastes
Animal and mixed food waste
Batteries and accumulators
Discarded vehicles
Discarded equipmen
Waste containing PC
Textile wastes
15 more

Less than 1% recycled in Ireland

0% recycled in Ireland
Quite low in other countries too

NL and AT over 80% recycling

Accounts for 25% of Croatia's recycling

REDISCOVERY CENTRE

Next Steps

Targeted Stakeholder Workshop

Expand the biogas / biomethane sector

Introduce stronger reuse and recycling requirements for C&D projects

Explore opportunities for recycling quarrying and metal manufacturing waste

Further research into high carbon impact materials / products

REDISCOVERY CENTRE

Thank you!

Research@rediscoverycentre.ie

REDISCOVERY CENTRE

CIRCLE ECONOMY

CLEAN TECHNOLOGY CENTRE CTC

epa Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil