

# EfW and the Circular Economy

The role for EfW in NSW and how does it reconcile with the circular economy?

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# Sydney Region - Putrescible Landfill Capacity



Put simply: we are running out.

- NSW Waste and Sustainable Materials Strategy – Guide to future infrastructure needs, June 2021:

**Residual waste** – At our current rate of waste generation and recycling, **putrescible landfills** servicing Greater Sydney are likely to reach capacity by **2036** and **non-putrescible landfills** by **2028**. While we will implement strategies to reduce the volume of waste we generate and increase the amount we re-use, repair and recycle, we need to make sure we have enough capacity to safely dispose of the material we can't recycle.

- Seems to ignore disaster waste
- New landfill development in the Sydney Basin will be “challenging”
- Long haul transport seems more likely
  - Extra cost
  - Where to?
- 10 years to open a site – nothing new till 2032 if start tomorrow

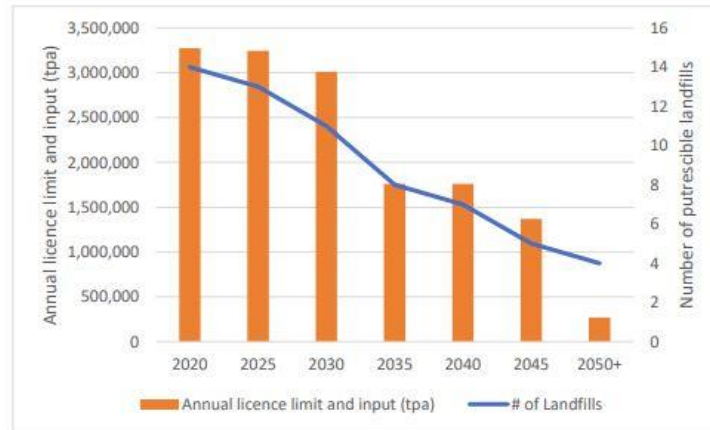
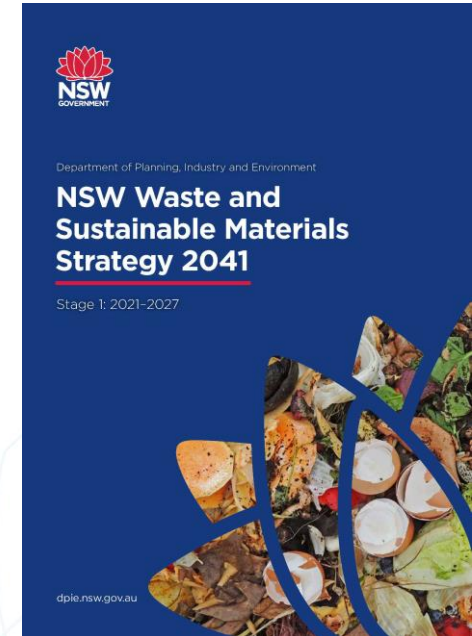
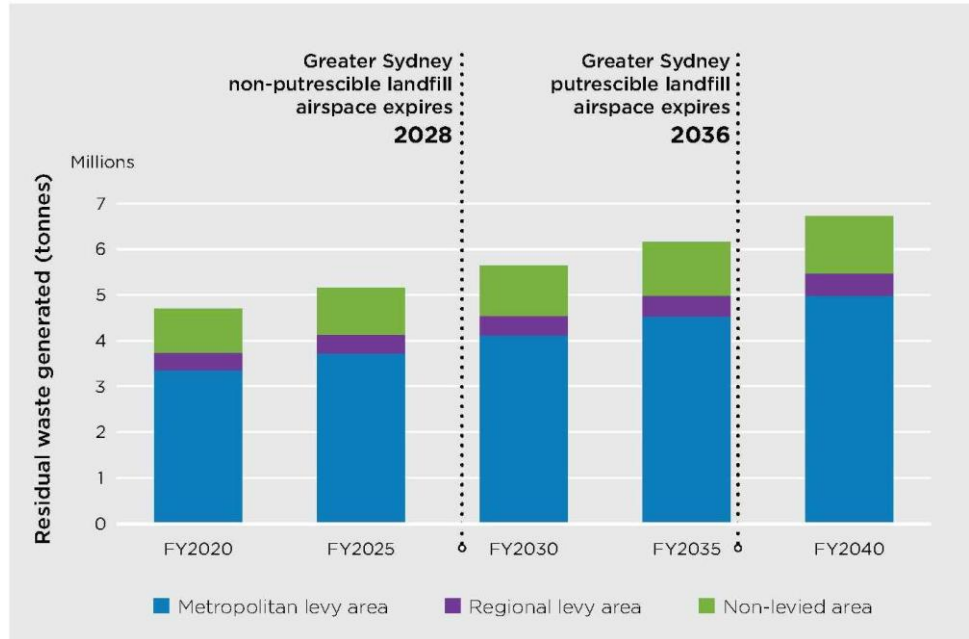


Figure 9: Summary of the number of putrescible landfills within Sydney metropolitan region and the associated annual input limit (tpa)

[https://www.acor.org.au/uploads/2/1/5/4/21549240/acor\\_-\\_final\\_report\\_v02\\_\\_1\\_.pdf](https://www.acor.org.au/uploads/2/1/5/4/21549240/acor_-_final_report_v02__1_.pdf)

# NSW Waste Strategy 2041

Figure 2: Projected residual waste (household and commercial) by levy area, under 'business as usual'



# A Landfill Crisis in 2036?

- Landfill capacity data is generally very uncertain
  - New cell; otopop; enhanced resource recovery etc
- Hyder 2009 – “the data to enable modelling of the consumption of landfill capacity is weak”
  - Modelled expected depletion date range for approved putrescible landfill airspace 2019 – 2022
- Arcadis 2020 – model showed more time
- Lucas Heights currently ~10m m<sup>3</sup>
- Kemps Creek Inert landfill currently ~ 9m m<sup>3</sup>
  
- New facilities will need regulatory support
  - MWOO
  - Waste to Queensland
  - Recovered fines
  - EfW

Landfill	Annual licence limit and input (where known)	Estimated closure date (where known)
<b>Greater Sydney</b>		
Lucas Heights Landfill <sup>3</sup>	Licence limit: 1,000,000 tpa	2033
Woodlawn Landfill	Licence limit: 1,100,000 tpa	2046
Kemps Creek SAWT facility (MBT)	Licence limit: 134,000 tpa	2030
Eastern Creek UR-3R MBT	Licence limit: 220,000 tpa	2032
Woodlawn MBT	Licence limit: 240,000 tpa	2040+

# Disaster waste

- Never seems to be considered
- Can't be predicted
- Will probably increase
- Building large scale recovery infrastructure not financially practical



The Australian 3 March 2022

# EfW will be needed



- NSW Government has conceded EfW will be required
- Parkes SAP
- Issues to be addressed:
  - EfW Policy hurdles:
    - Identify sufficient “eligible” waste
    - Pre-processing infrastructure
  - Gain contractual commitments
  - Transport infrastructure
  - Community consultation
  - Ash re-use/disposal

## Needs 2030

The indicative mix of facilities will be needed to service the following areas:

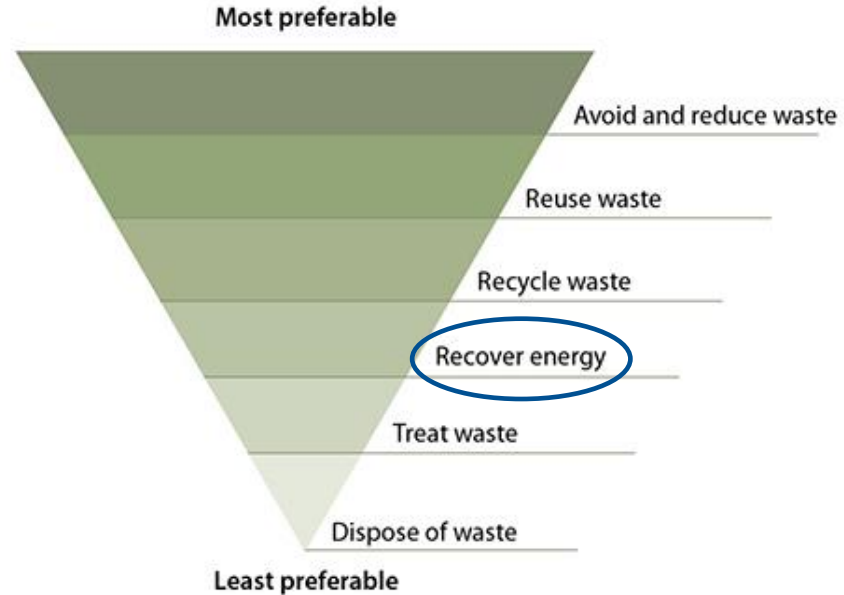
- **Greater Sydney:**
  - Additional non-putrescible landfill capacity to accept >3 million tpa
  - Additional putrescible landfill capacity to accept >500,000 tpa
  - At least one large-scale regional energy recovery facility and medium-scale ‘dirty MRF’ would be required to reduce the need for additional landfill capacity in this decade.
- **Hunter:** None
- **Northern Rivers:** Additional landfill capacity (to accept up to 100ktpa) or an equivalent medium-scale energy recovery facility
- **Coffs Harbour:** Additional landfill capacity to accept up to 25ktpa

In addition, if significant residual capacity is needed outside of Sydney/Hunter to service Sydney/Hunter residual waste, a network of transfer stations would be required.

# Waste Management Hierarchy

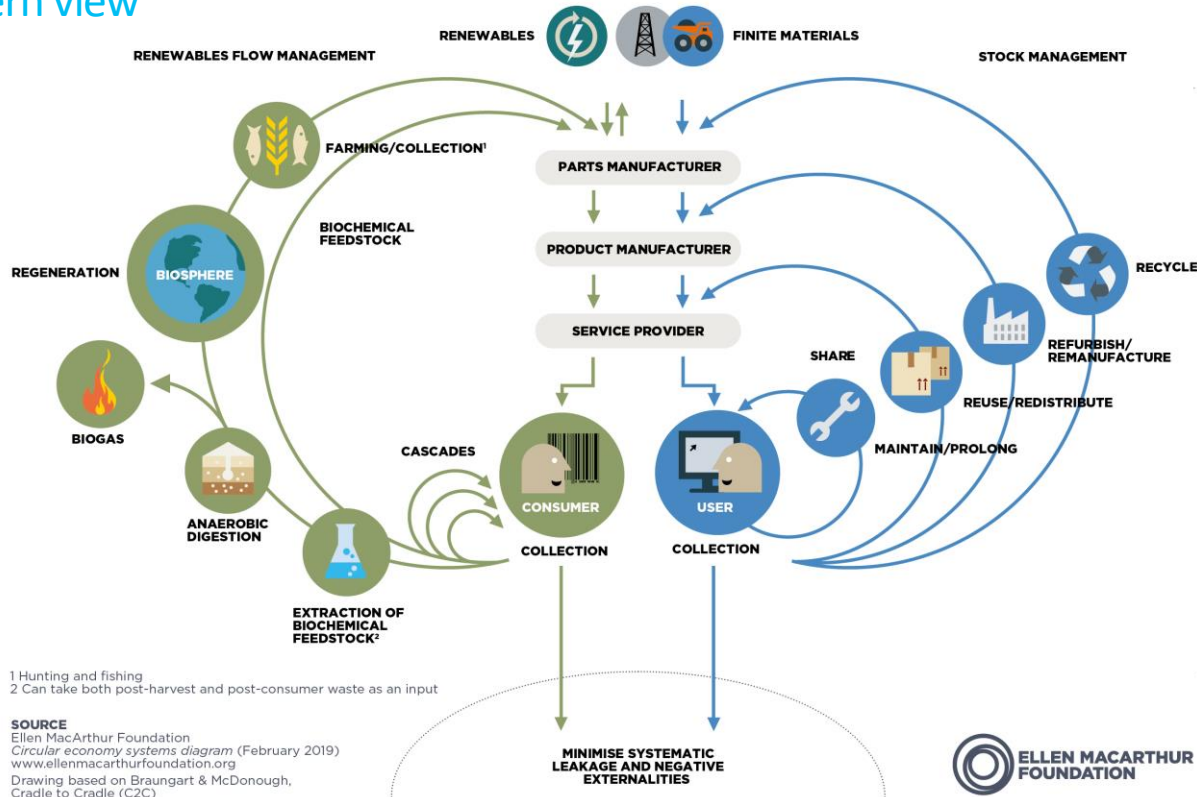
## The traditional view

- Official NSW EPA view
- Mixed implementation



# The Circular Economy

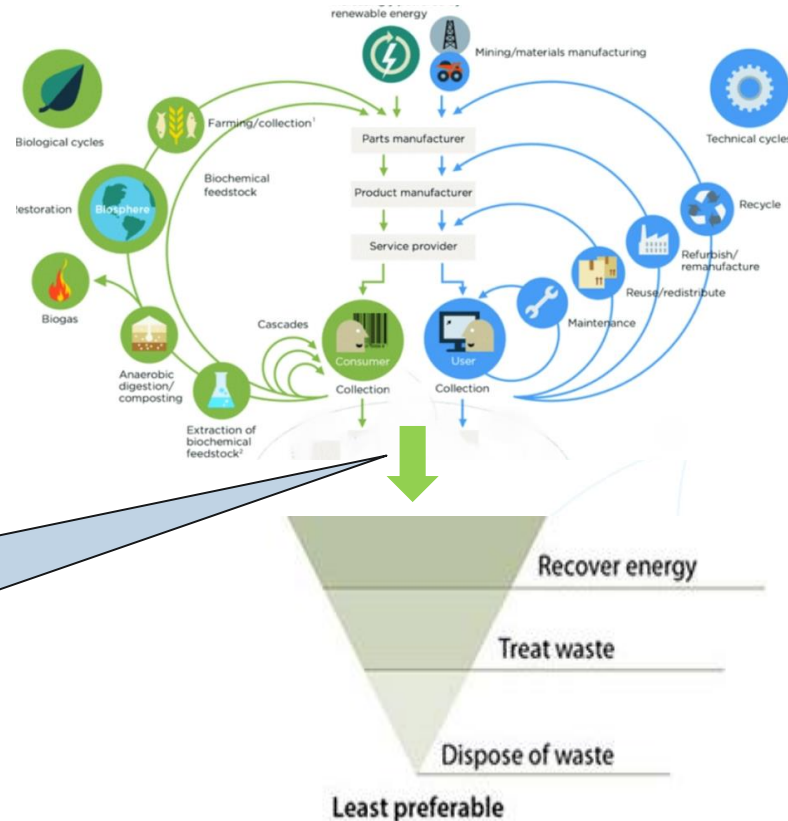
## The modern view





# EfW and the Circular Economy

- Circular Economy and EfW are not mutually exclusive – both part of an integrated system of materials flow
- Need for a realistic and practical approach:
  - How long to achieve????
  - Dealing with residue cannot wait.



Flow depends on the “circulatory efficiency”

# EfW's role is not understood

Well intentioned but misguided opposition



## LGNSW Conference March 2022:

**L3**

### Waste to energy incinerators

That Local Government NSW:

- a) Acknowledges concerns regarding the impact of waste to energy incinerators on communities and the environment;
- b) Notes that the Draft Regulations and the Environment Protection Authority's (EPA) Energy from Waste Infrastructure Plan would prohibit waste to energy incinerators in some places and not others;
- c) Considers burning energy an outdated technology and encourages diversion rather than incineration.

**Decision: Carried**

**This position unfortunately sees EfW as competing with resource recovery whereas in fact it does not.**

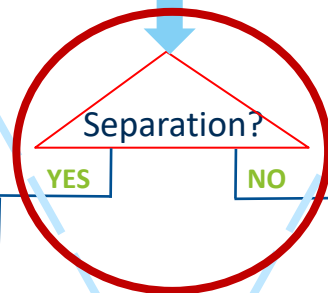
# Where should EfW apply?

- Need for clarity in what is being dealt with
- Typically households have up to 4 bins
  - red, yellow and green (and blue sometimes)
  - Education needed to get material into the correct bin
  - EfW applies to the **red bin only**
- Minimise red bin contents
  - Collection infrastructure
  - Processing infrastructure
  - Markets
- EfW helps to maximise resource value of the residual
  - EfW can take many forms
  - Not just “incineration”



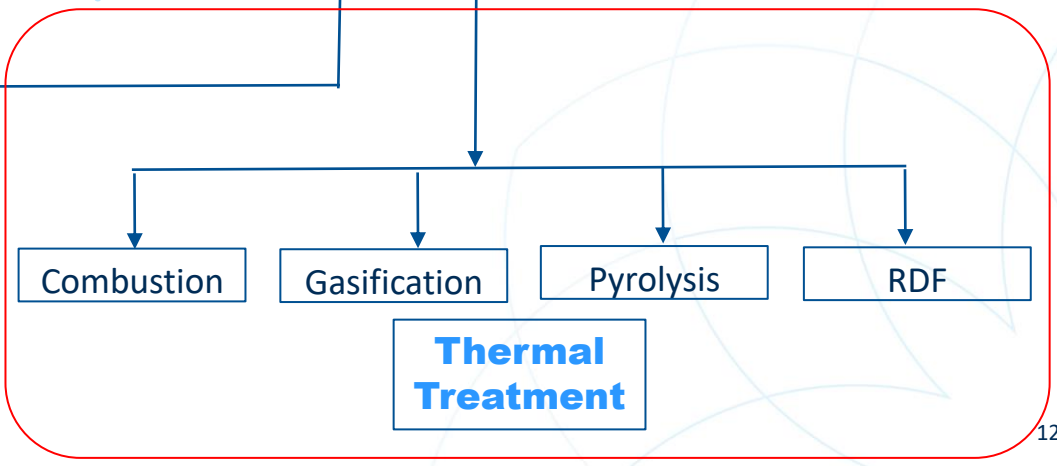
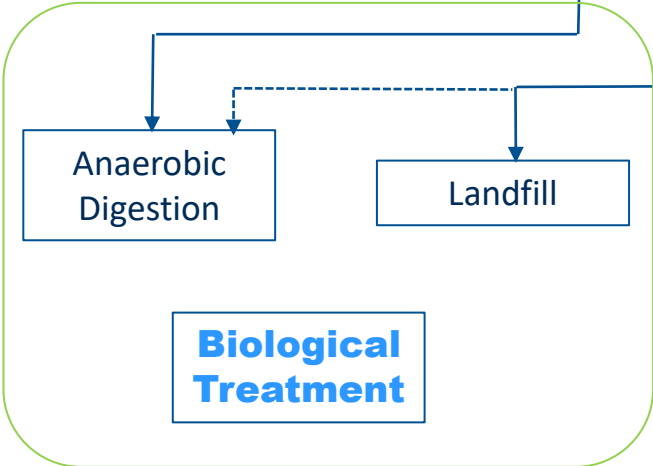


# Waste Generation



Recovery/Recycle materials  
(no energy)  
**MWOO no longer an option**

Fuel ← Chemical recycling



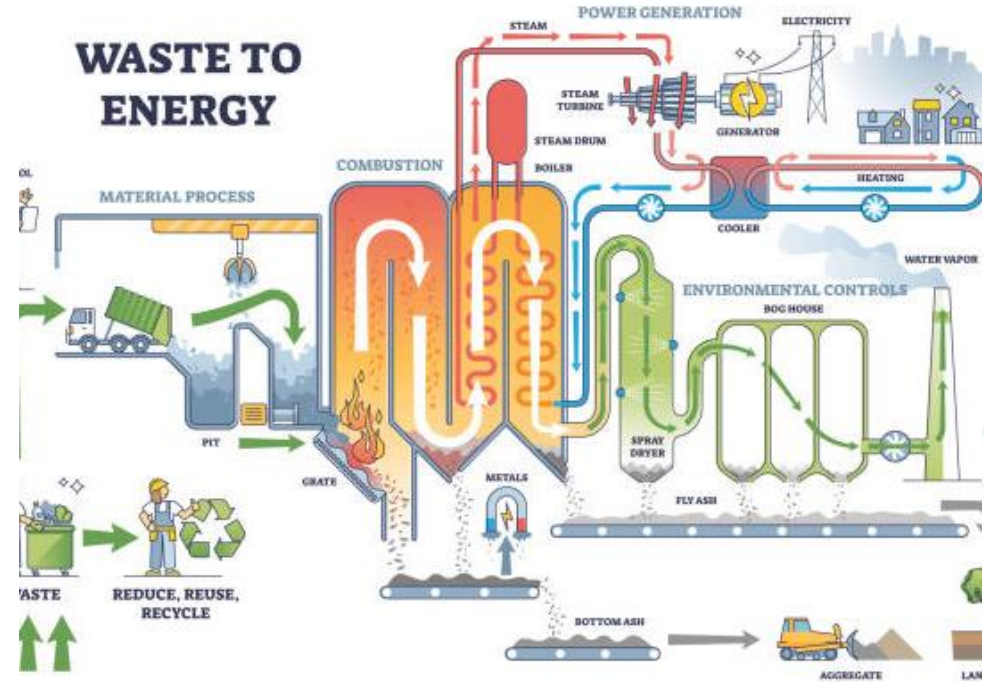
# Anaerobic Digestion

- Source separated organic material
- Not effective on woody materials
- Produce biogas ( $\text{CO}_2 + \text{CH}_4$ )
- Energy recovery – heat and/or electricity
- Inject into gas mains
- Dewatering and disposal of digestate



# Combustion

- Mass burn incineration + energy recovery as electricity &/or heat
- Large scale
- High CAPEX
- Sophisticated gas clean-up
- Well proven technology
- Able to treat heterogeneous wastes





## No More Incinerators

Say no to Suez's Matraville Incinerator

[Home](#) [EPA Submission](#) [Donate](#) [Petition](#) [Videos](#) [10 reasons to say no](#)  
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### NMI and Maroubra Local Meet With NSW EPA



**Terminological inexactitude**



This week NMI and a retired Maroubra MD spoke to the EPA's Manager of the Land & Resources Policy Group and a senior air quality expert who were instrumental in advising the NSW Government on the Energy from Waste Policy. The discussion was wide ranging, but the following is worth noting:

1. The NSW EPA stated that WtE incinerators will only be a temporary measure to





# Gasification

- Limited quantities of air/steam
- Production of syngas – remote energy recovery or chemical feedstock
- Medium scale
- Medium CAPEX
- Sophisticated gas clean-up
- Less examples with mixed waste applications



# Pyrolysis

- Requires indirect heating
- No air or steam
- Combustible gases
- Remote energy recovery or chemical feedstock
- Tars and Char
  - Source separated feedstock needed
- Medium scale
- Medium CAPEX
- Sophisticated gas clean-up
- Not practical for mixed waste applications

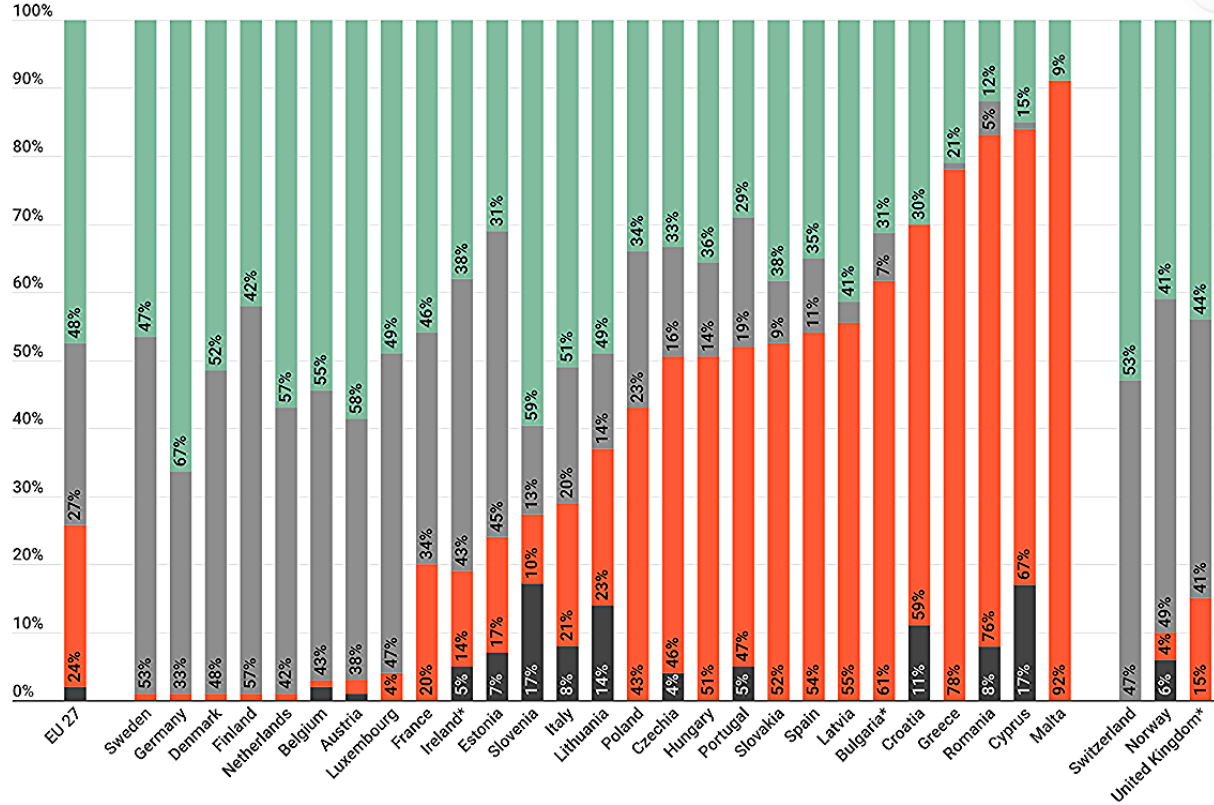


# Refuse Derived Fuel (RDF)

- Separated and shredded combustible portion of mixed waste
- Remote energy recovery
- Emissions regulations require quality control
  - Process Engineered Fuel (PEF)



# Municipal waste treatment in 2019



● Missing data ● Landfill ● Waste-to-Energy ● Recycling + Composting

## Jurisdictions with EfW:

- high resource recovery
- low landfill

# Urban Waste Incineration in Australia

## Slowly becoming reality

- The last one treating MSW (Waverly-Woollahra) closed in 1996
- Poorly perceived by the community
- Starting to become a reality again in WA and Victoria



### WA – 2

- Kwinana
- Rockingham

### QLD – 1

- Remondis

### NSW – 3

- Reg Growth- Parkes
- Veolia- Woodlawn
- Northern Rivers

### VIC – 4

- Opal
- Sims
- GSWT
- REA

- TNG Sydney (LEC Appeal)
- Veolia Botany
- CWY Macquarie-Lithgow
- Cleanaway Sydney
- Re.Group Lithgow
- Jerrara Goulburn

# Refuse Derived Fuel (RDF)

## Process Engineered Fuel (PEF)

- Cement kilns
- Export opportunities



SA – 1

- ResourceCo

QLD – 1

- ResourceCo Hemmant

NSW

- ResourceCo CWY
- Doyle Bros

# Take Home Messages

1. Sydney's landfill capacity is nearly depleted
2. New capacity in the Sydney basin is unlikely
3. Successful Circular Economy initiatives are a positive step
  - Less waste requiring “disposal”
  - Takes time and requires a change in the functioning of the economy
4. Increasing quantities of disaster waste are likely
5. Large regional waste management facilities will be necessary
  - Need to start planning and development now
  - Consultation with local communities will be critical
6. EfW is an essential part of an integrated waste management system
7. Long distance waste transport infrastructure will be required
8. Critical role for government – SV model
9. Negative community perceptions about EfW need to be challenged with facts
  - WA & Vic experience will help, but can NSW wait?
  - Government leadership required for credibility

# Thank you

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