

ENERGY FROM WASTE IN THE NSW MARKETPLACE

Tackling the regulatory barriers

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OVERVIEW OF PRESENTATION

- The role of EfW in advanced economies around the world
 - Role and function in a modern waste management system
 - Capability of modern plants
 - Policy drivers
 - Do we really need them?
- Barriers to development in NSW
 - Policy, regulatory
 - Planning matters and approval pathway
 - Economic and social matters
- What has been learnt overseas, and how can this assist proponents in NSW?
 - Development strategies in other jurisdictions
 - Views of regulators
 - Possible strategies for future NSW projects



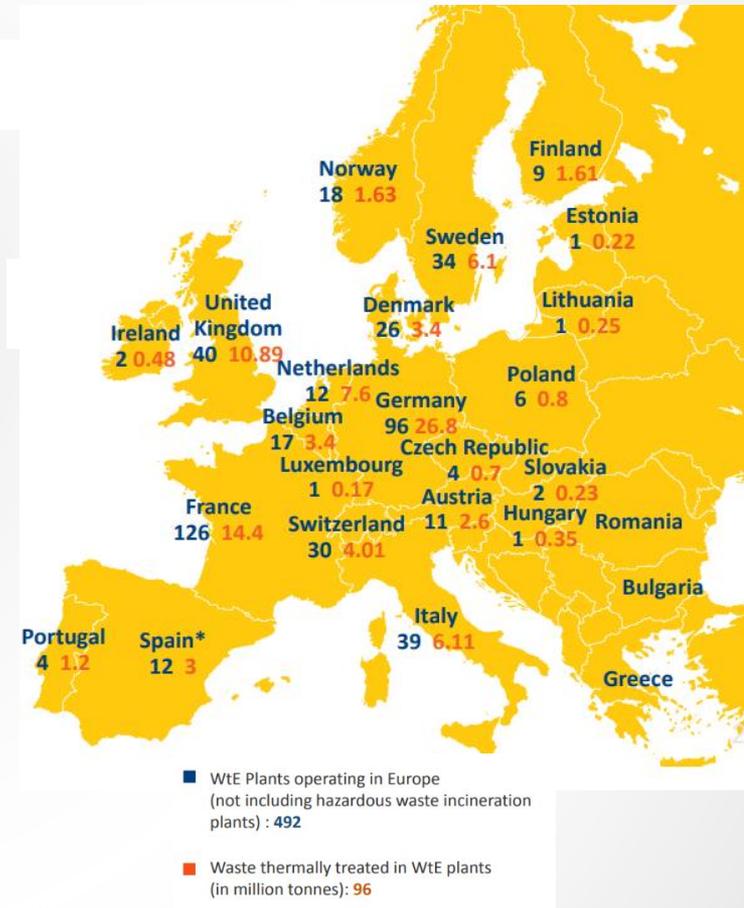
THE ROLE OF EFW IN ADVANCED ECONOMIES AROUND THE WORLD

- Around the world, it is estimated there is ~1,820 EfW projects in private and public sector for MSW¹
- Plants emerged in 1950's to treat and dispose of municipal solid waste in Europe and Japan to address critical shortages in landfill
- Pollution control systems, energy recovery and ash management was poor
- 512 plants in Europe, 822 in Japan, 88 in USA and 166 in China
- Most modern plants post 2000 recover energy and heat and provide electricity to the grid
- Combined heat and power plants recover >75% of energy
- Investment driven by need to address waste diversion targets, GHG minimisation and renewable energy



HISTORY OF DEVELOPMENT AND TRENDS³

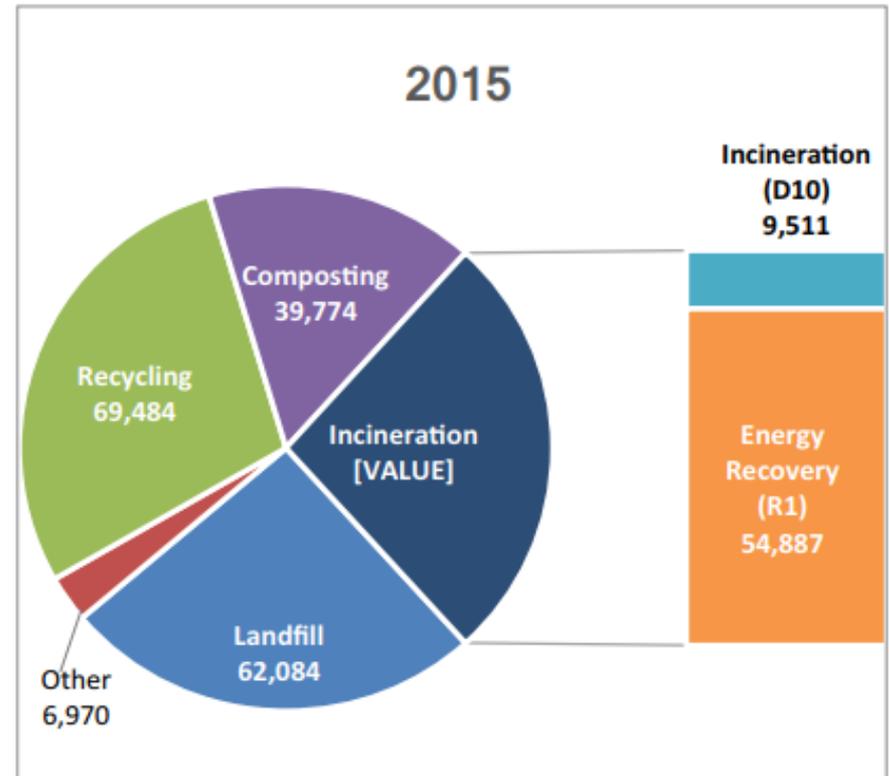
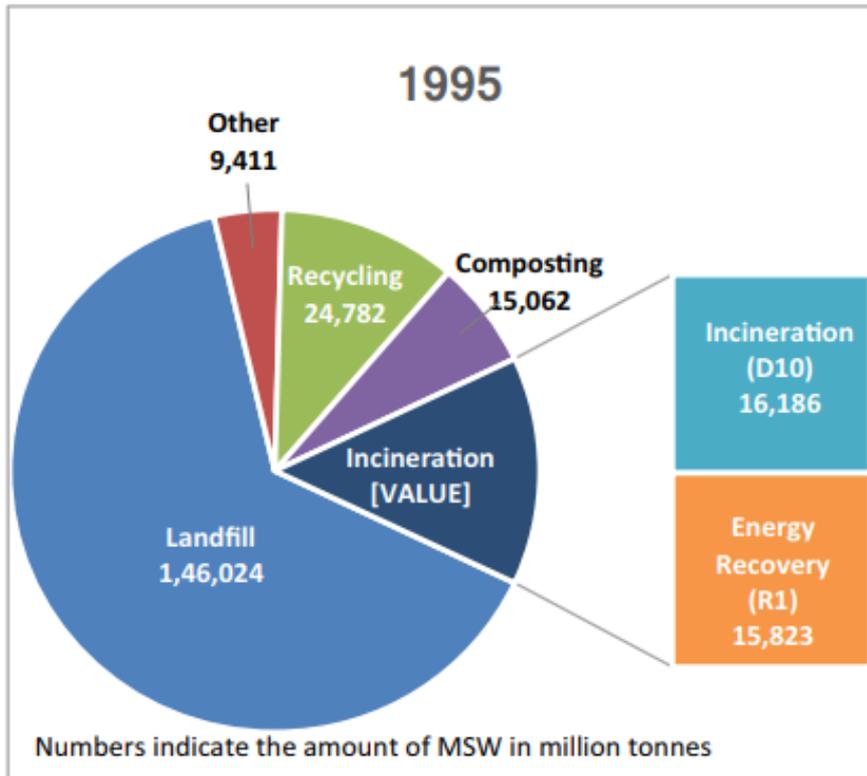
- Europe Union is the most experienced with longest history in development and operations
- EU policy and targets has driven investment and innovation:
 - Landfill Directive (from 1999)
 - Recycling targets (the Packaging and Packaging Waste Directive from 1994);
 - Target on recycling and preparing for reuse (Waste Framework Directive from 2008)
 - Waste Incineration Directive 2000/76/EC to protect human health and the environment
 - Industrial Emissions Directive 2010/75/EU, targets on performance and environmental protection
- Plant manufacturers achieve EU IED 2010/75/EU targets as a minimum
- More than 1,000 additional plants are under development worldwide



³ Confederation of European Waste to Energy Plants (2019). Waste-to-Energy Plants in Europe in 2017.



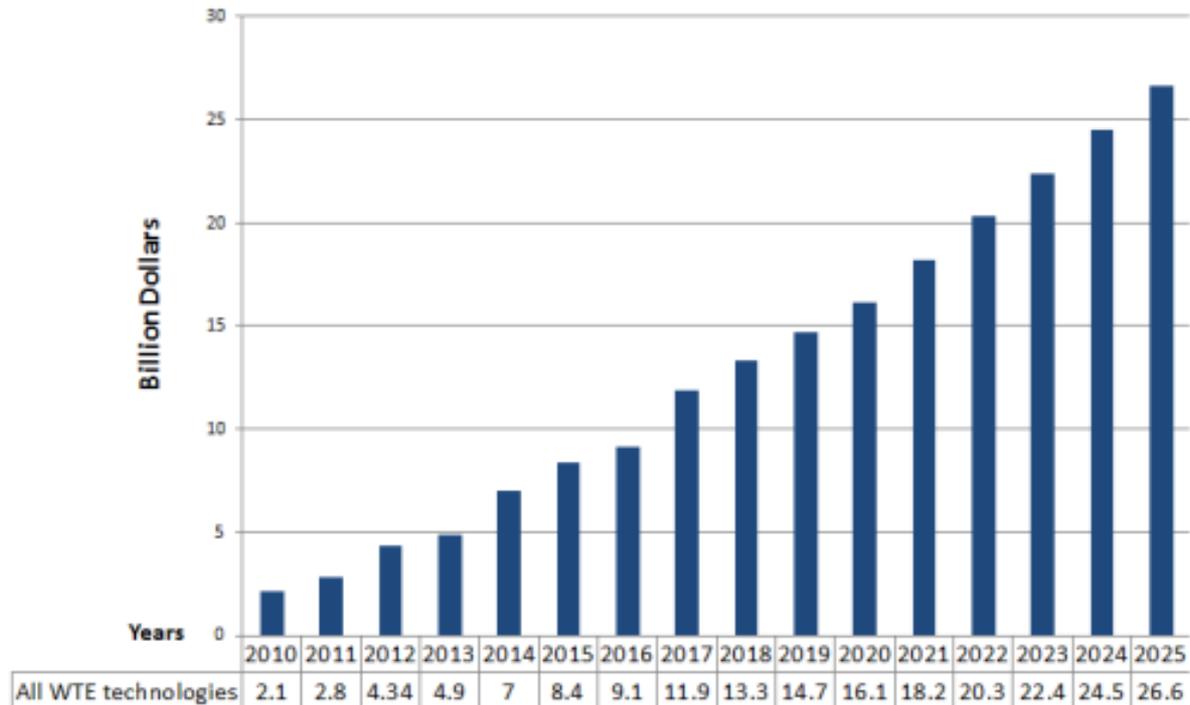
ROLE OF EFW IN A MODERN WASTE MANAGEMENT SYSTEM – EUROPE²



² Scarlet *et al* (2018). Status and Opportunities for Energy Recovery from Municipal Solid Waste in Europe. *Waste and Biomass Valorization*.

GROWTH IN EFW BY WORLD ENERGY COUNCIL³

FIGURE 12: GROWTH OF ALL WTE TECHNOLOGIES GLOBALLY WITH A CONSERVATIVE FORECAST UP TO 2025



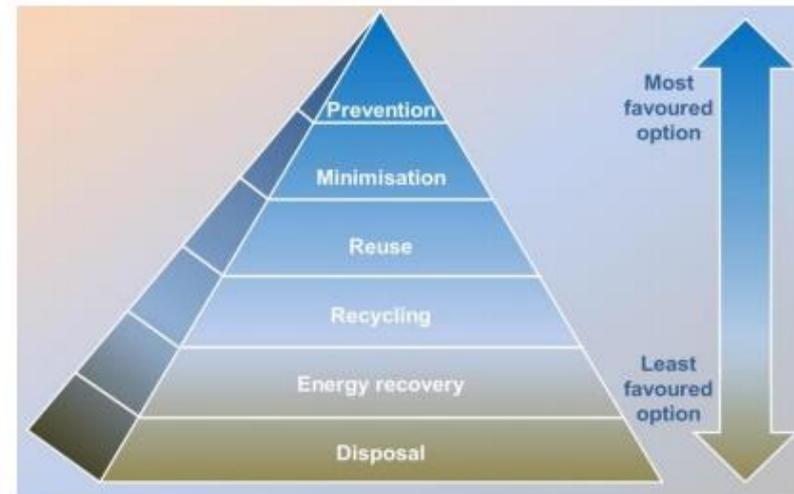
³ World Energy Council (2016). *World Energy Resources 2016 Report*.



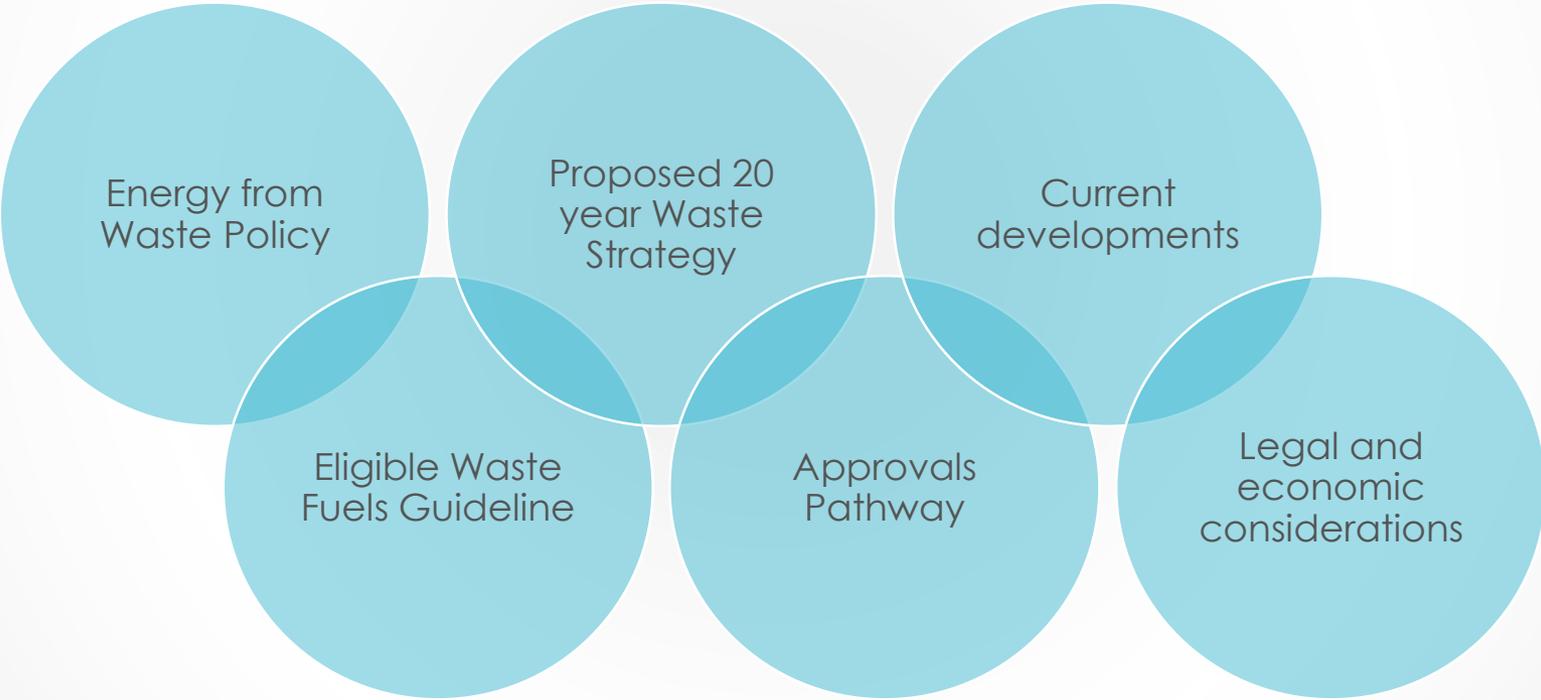
DO WE REALLY NEED THESE PLANTS?

- Waste policy reforms and laws across many advanced economies define a role for EfW for recovering energy prior to disposal
- Limits on recovery possible with prevention, minimisation, reuse and recovery a priority
- Residual waste requiring management
- Declining role of AWT and MBT worldwide
- Dual benefit of sustainable energy generation and minimising landfilling
- Role in Ecologically Sustainable Development
- Modern plants protect human health and environment, but are costly

FIGURE 10: THE WASTE MANAGEMENT HIERARCHY



ISSUES AFFECTING DEVELOPMENT: CURRENT POLITICAL AND REGULATORY ENVIRONMENT



NSW ENERGY FROM WASTE POLICY

- Policy requires current international best practice techniques, particularly with respect to:
 - Process design and control;
 - Emission control equipment design and control;
 - Emission monitoring with real-time feedback to the controls of the process;
 - Arrangements for the receipt of waste; and
 - Management of residues from the energy recovery process
- Exhaust gas treatment $>850^{\circ}\text{C}$ for 2 sec and $>1,100^{\circ}\text{C}$ for 2 sec is Cl $>1\%$
- Thermal efficiency criteria: $>25\%$ heat captured as electricity
- Resource Recovery criteria: $<25\%$ of mixed C&D and municipal:
 - $<10\%$ residuals from a MRF
 - $<5\%$ from GO processing
 - $<10\%$ from FOGO processing



ELIGIBLE WASTE FUELS GUIDELINE

• Overview

- Eligible waste fuels must meet following criteria
 - Consistency
 - No higher order use
 - Proof of performance
 - Meets emissions standards
- Waste fuels must be approved via Resource Recovery Order and Exemption

• Issues

- EPA has flexibility in application
- However, EPA may unilaterally amend and/or revoke
- No formal consultation framework for variation/amendment
- No appeal rights



PROPOSED 20 YEAR WASTE STRATEGY

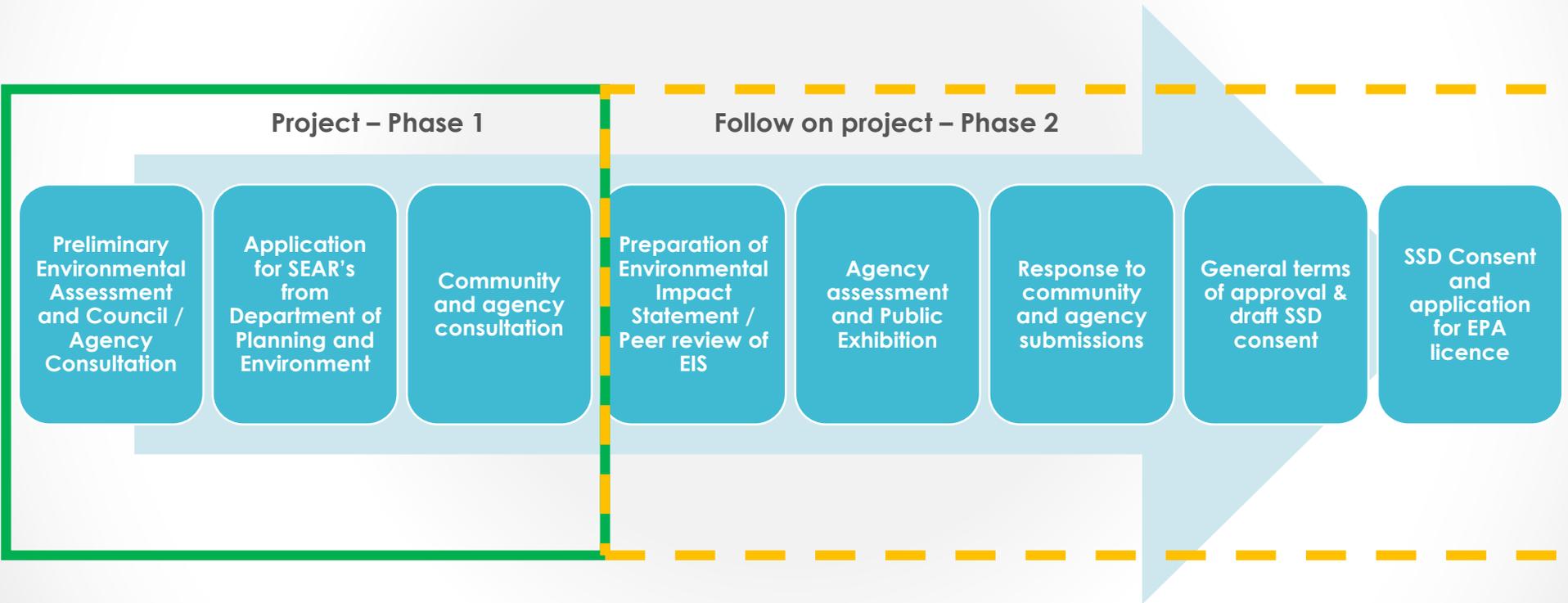
NSW EPA developing in conjunction with Infrastructure NSW

Reduce waste, drive sustainable recycling markets and identifying and improve the state and regional waste infrastructure network.

Certainty for industry and set goals and incentives, so the right infrastructure investments are made to meet community needs

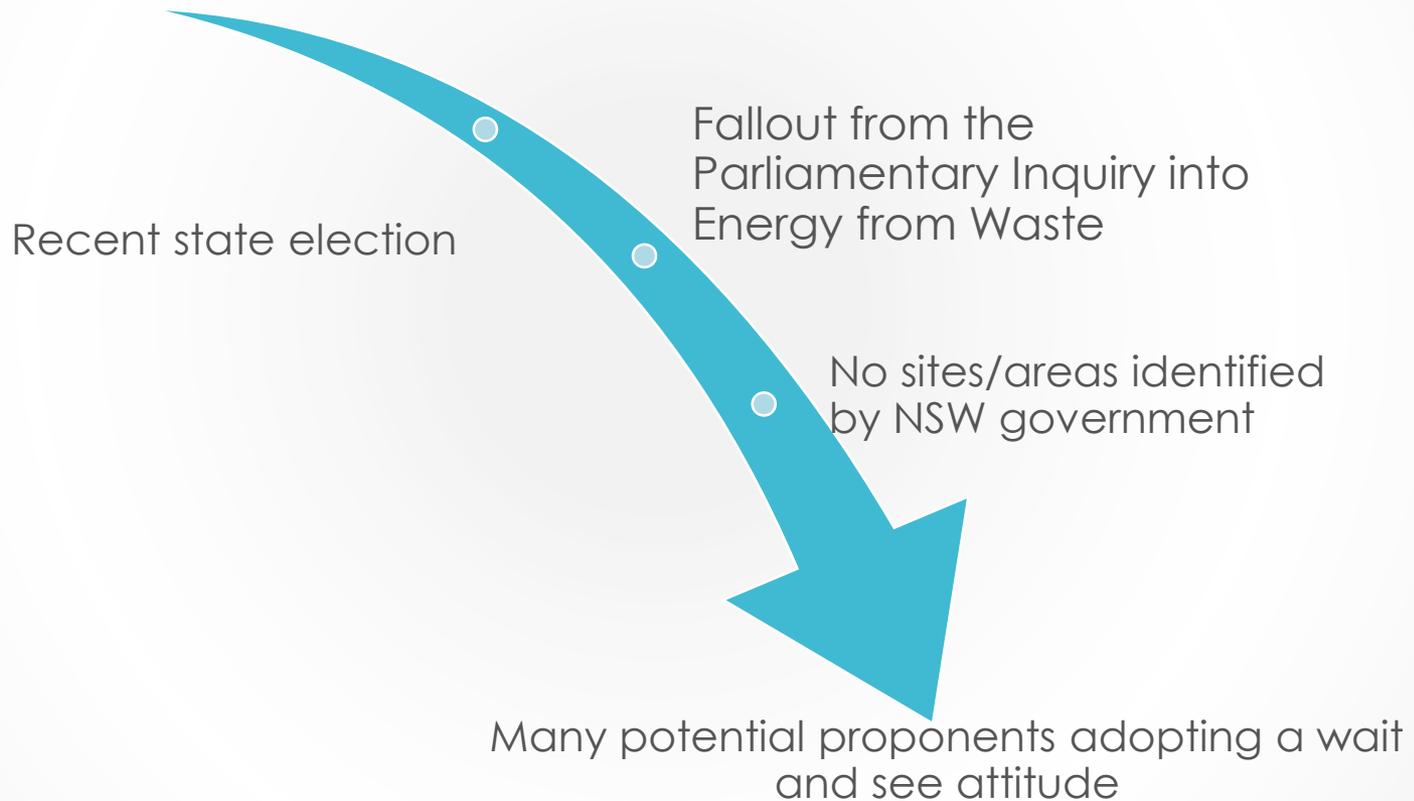
Targeted consultation underway

PLANNING AND ASSESSMENT PATHWAY FOR EFW PROJECTS UNDER EP&A ACT AND POEO ACT



POLITICAL AND REGULATORY CLIMATE

Impact of Next Generation facility
on public perception and social
licence



PLANNING BARRIERS

- Size and scale – building
- Lack of reference facilities
- Lack of strategic planning across Greater Metro Area (dedicated sites approved by the government)
- Social licence – BANANA principle (Build Absolutely Nothing Anywhere Near Anyone!)



ECONOMIC/LEGAL BARRIERS

- Timeframes for investment return (long term ~30yrs)
 - Obtaining finance
- Feeding the beast – Locking in supply
 - Aggregation of MSW
 - Ad hoc Council contracts for MSW in NSW
 - Impact of competition over life of facility
- Ash disposal – offtake innovation

WHAT HAS BEEN LEARNT OVERSEAS TO ASSIST PROPONENTS IN NSW?

- Most MSW EfW plants around the world have been procured by the public sector
- Government has generally identified sites, facilitated planning approvals and education of communities
- European, UK and Japanese experience similar – government leadership in plant procurement
- Private sector key role in designing, building and operating plants under BOO or BOOT contracts
- In market led economies where waste services have high levels of privatisation, lower capacity to develop EfW infrastructure (more specialised industrial waste treatment)
- Joint procurement is critical where a LGA does not have sufficient supply (but complex)



WHAT HAS BEEN LEARNT OVERSEAS TO ASSIST PROPONENTS IN NSW?

- Interviews with planning approval authorities and EPA's in Japan – government has a leadership role
- Gradual community acceptance over time with demonstrated plant performance
- Setting of stricter performance standards at plant level than required by law – beyond best practice
- Education is never complete – ongoing engagement with everyone in community is important
- Most plants are redeveloped every 25-30 years – development on 'greenfield sites' is rare
- Online and continuous emissions reporting done to assist in community acceptance



NEXT STEPS FOR NSW?

- Proponents to consider community engagement early
- Eastern Metropolitan Regional Council (EMRC) in Perth - under construction by New Energy Corporation in partnership with Hitachi Zosen INOVA and Tribe Infrastructure Group – 330,000 tpa – will act as a ‘local reference plant’
- 400,000 tpa Phoenix plant in Kwinana to follow as an additional reference plant
- In the absence of dedicated, strategically planned zones / sites, do we consider other models?
 - Development at existing power stations as old coal fired power plants are decommissioned?
 - Locating plant(s) away from residential receptors in regional NSW near transport infrastructure (e.g. rail?)
- State government has a critical role in facilitating regional procurement across local government



THANK YOU

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