

國立臺北大學自然資源與環境管理研究所

114 學年度第一學期『環境工程科學概論』

課程講義(12)：廢棄物處理與資源回收 Solid Waste Treatment and Resource Recycling

● INTRODUCTION

- Solid Waste (Refuse), Garbage (Food Waste), Rubbish, Discard => MSW
- 一般廢棄物、事業廢棄物（一般事業廢棄物、有害事業廢棄物）
- Waste-to-Energy Combustion/Incineration => Energy from Waste
- Sanitary Landfills => 衛生掩埋；灰渣：底渣＋飛灰
- Treatment of Garbage: Composting, Anaerobic Digestion, Soil Conditioner, etc.
- Recycling Schemes: 3Rs, 4Rs, 5Rs, 6Rs (Reduce, Reuse, Recycling, Recovery, R??)
「資源循環零廢棄」6R：減量（Reduction）、再使用（Reuse）、物料回收（Recycling）、能源回收（Energy Recovery）、賦予新用途（Repurpose）及改變設計（Redesign）
- [環境部資源循環署全球資訊網](#)

● TREATMENT OF SOLID WASTE

- Collection, Treatment, Disposal, Recycling, and Energy Recovery
- Open Dump, Sanitary Landfill; Incinerators; Recycling and Recovery
- Solid Waste Treatment and Disposal Facility
⇒ Externality: NIMBY (Not In My Back Yard)－嫌惡設施 => Positive Externality
- Source Reduction（源頭減量）=> Waste Minimization; Cleaner Production
- Collection and Transfer Operation => 「[四合一](#)」回收系統、垃圾費隨袋徵收
- [垃圾焚化廠興建經營方式](#)：公有公營、公有民營、民有民營 BOO/BOT
⇒ 環境管理署業務；廚餘、灰渣、回饋設施

● SUSTAINABLE PRODUCTION AND CONSUMPTION

- Sustainable Production: Waste Minimization, Eco-Design, Cleaner Production
- Eco-Labeling => Environmental Statement
⇒ [ISO 14020:2022 Environmental statements and programmes for products](#) (*)
⇒ Self-declared environmental claims (14021); environmental labels aka ecolabels (14024)
environmental product declarations (EPDs) (14025); footprint communications (14026).
⇒ Carbon Footprint=>自願性：[產品碳足跡資訊網](#) 強制性：氣候變遷因應法第 37 條
⇒ 「環境產品宣言 Environmental Product Declaration」「永續產品生態設計法規
Ecodesign for Sustainable Products Regulation, ESPR」「產品數位護照 DPP」
- Life Cycle Assessment
⇒ ISO 14040 & 14044 (ISO/TC 207/SC5) => Life Cycle Stages and Functional Unit
⇒ Cradle-to-Grave; Cradle-to-Gate; Cradle-to-Cradle => CBAM; Wheel-to-Grid
⇒ LCA Cases: [Diapers](#) and Hot-Drink Cups
- Circular Economy => the “[Butterfly Diagram](#)”
⇒ Technological Cycle; Biological Cycle => material recycling vs. energy recovery
⇒ [Cradle to Cradle Products Innovation Institute](#) => 認證、驗證、確證、查證