# Practical Limitations of Use Maps in the Plastics Industry

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# Plastics Exposure Scenario Team

espa

EFRA

exiba the european XPS association

LiSAO

EuMBC

German Masterbatch Association

FEDERCHIMICA AISPEC

Gruppo additivi e ausiliari per materie plastiche, elastomeri, coating ed altri

EuPC EUROPEAN PLASTICS CONVERTERS

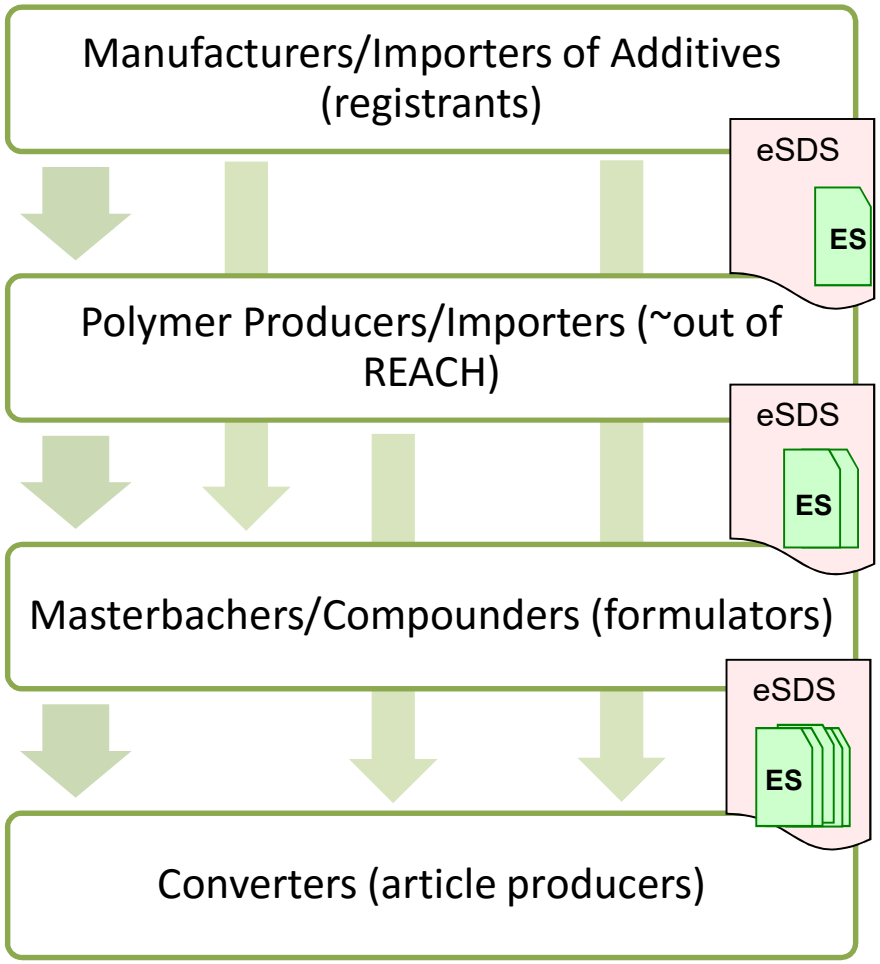
PlasticsEurope

Association of Plastics Manufacturers

- The Plastics Exposure Team was set up in 2009 to facilitate the required REACH communication in the plastics value chain
- Generic Exposure Scenarios were formulated around 2013
- Specialist Plastics Exposure Scenario Tool available for use in 2015

# Generic Exposure Scenarios and Use Maps

- The Generic Exposure Scenarios are comparable to, and will be converted to a use map and included in a piece of supply chain communication
- The Generic Exposure Scenarios cover the life cycle stages from starting with additive mixture formulation up until the formation of articles by converters.



# PEST Use Map

| | | |
|---|---|---|
| Formulation of Additive Mixtures | CA name | CA descriptor |
| | Tabletting, compression, extrusion, pelletisation, granulation | PROC14 |
| | Handling | PROC8b |
| | Handling | PROC9 |
| | Formulation into mixture | ERC2 |
| Feeding and mixing of additives for production of masterbatches and compounds | | |
| Use in the production of masterbatches | | |
| Use in the production of compounds | | |
| Direct use of additives at converter's facilities in closed process | | |
| Direct use of additives at converter's facilities in open process | | |
| Feeding and mixing of masterbatches for conversion | | |
| Feeding and mixing of plastic compounds for conversion | | |
| Use of masterbatches or compounds in closed process | | |
| Use of masterbatches or compounds in semi-Open process | | |
| Use of masterbatches or compounds in open process | | |
| Use of coating formulations in roll coating or dip coating | | |
| Use of masterbatches or compounds in spreadcoating or dip coating | | |
| Use of masterbatches or compounds in foam production | | |
| Use in the polymerization or polycondensation process | | |
| recycle | | |

# PEST SWEDs?

- Converting the PEST Generic Exposure Scenario's to a Use Map is feasible and is currently being finalised
- Sector-specific Worker Exposure Description (SWED) for the Plastics Value Chain? We tried, but:
  - Plastics industry is a heterogeneous complex environment complicating the worker exposure description

# Industry Complexity and SWED fields

| | | |
|---|---|---|
| 1.4.1 | Short description of the applicability domain (in terms of substance properties) | When relevant and when known, identify any boundaries with respect to substance properties (e.g. hazard classification, volatility bands, DNEL bands). The intention is to help registrants identify the appropriate SWEDs for their substance |

- Hazardous plastic additives have all ranges of volatility, all ranges of toxicity.

# Industry Complexity and SWED fields

| | | |
|---|---|---|
| 2.1 | Percentage (w/w) of substance in mixture* | Indicate any information on concentration per type of substances in the used product. This can be in the form of generic formulations or maximum concentration of certain substances in the product, up to 100%. Alternatively, the registrant may base it on own information. |

- This is dependent on additive type (15 types) and location in value chain
  - E.g. Fillers, colourants (organic/inorganic), Flame Retardants (organic/inorganic), plasticisers, Antioxidants, UV Blockers, Blowing Agents, Curing Agents, Cross-Linking Agents, …

| | Converter | Masterbatch |
|---|---|---|
| Antioxidants | 0.8% | 30.0% |
| Blowing agents | 4.0% | 70.0% |

# Industry Complexity and SWED fields

| | | |
|---|---|---|
| 2.4 | Physical form of the used product* | Select the physical form of the product as used. Note: The product may change to a different form during use, for example a liquid may be agitated and aerosols formed. If this is likely to influence the exposure estimation, indicate this in row 1.4.2. above. For description of solids: 'very dusty': fine light powders (flour, carbon black, chalk dust); 'medium dusty': granular solids (sugar, detergents); 'low dusty': pellets not breaking up, wax. |

- An additive supplier might supply a liquid or fine powder, state changes if incorporated in Masterbatch/ Compound. But can also be used as such in Converters process.

| | | |
|---|---|---|
| 2.5 | Operating temperature (˚C)* | Indicate the maximum temperature under which the activity(ies) takes place. The temperature may impact on exposure as it may change the vapour pressure or the physical state of the substance. |

- Dependent on polymer type (many types):
  - E.g. HIPS 240 °C and PA6.6 340 °C

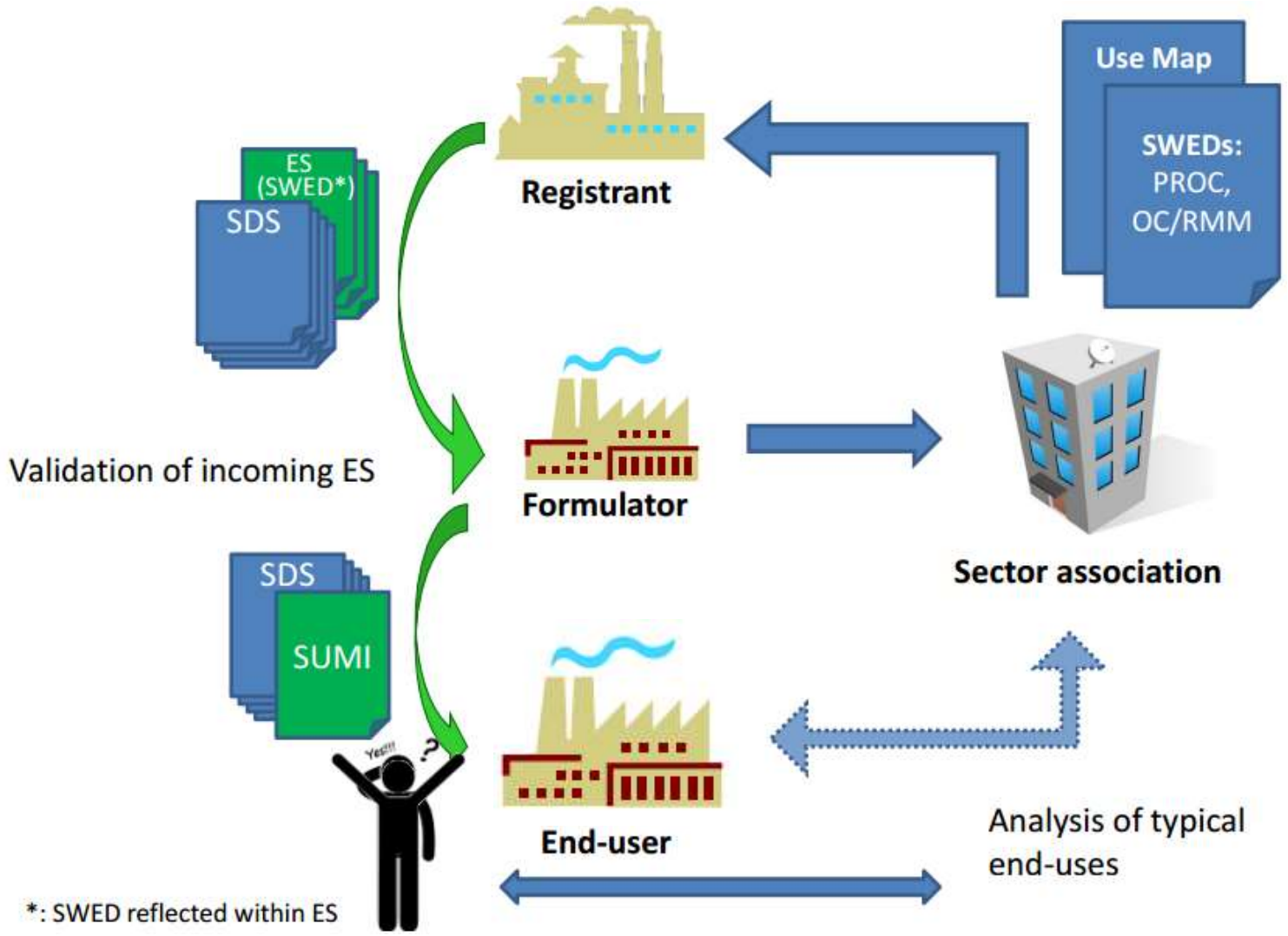
# Industry Complexity and SWED fields

- For the following points the risk management measures will be based on the used additives:
  - 2.6 General ventilation,
  - 2.7 Local Exhaust Ventilation (LEV),
  - 2.8 Use of Respiratory Protection Equipment (RPE),
  - 2.9 Use of gloves & other dermal protection, and
  - 2.10 Use of eye protection
- If one would force the production of SWED**s** of the plastics industry. One might envisage a solution with SWED**s** for each additive type, with 3 or more risk bands, different loading levels depending on position in the value chain, etc. ➔ would this reduce complexity?

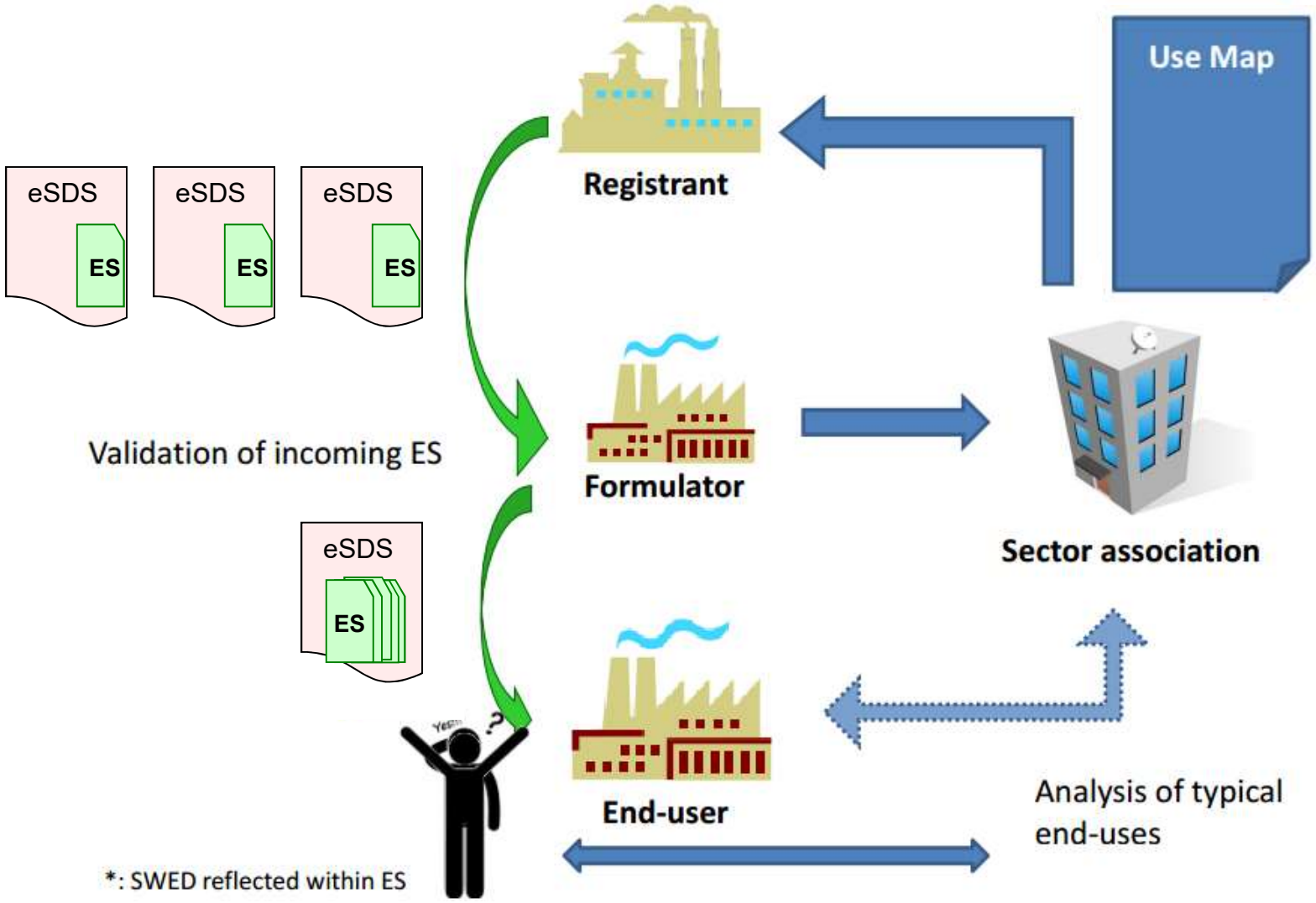
# PESTOOL: the plastics industry's solution to reduce complexity

- The Plastics Exposure Scenario Tool is a plastics specific (Downstream User) Chemical Safety Assessment tool
  1. Users input their substances (by cas number), specify the concentration, and select their location in the supply chain
  2. PESTOOL utilizes the LCID methodology to select the substance driving the hazard for each exposure compartment (inhalation, dermal, and environment)
  3. For each use that is relevant for the user (based on location in the value chain) a chemical safety assessment is performed which incorporates the ECETOC TRA with an OECD ESD refinement for environmental emission and for uses where the substance is in a polymer matrix a matrix refinement for dermal and inhalation exposure is performed.
  4. Output is an SDS Exposure Scenario Annex

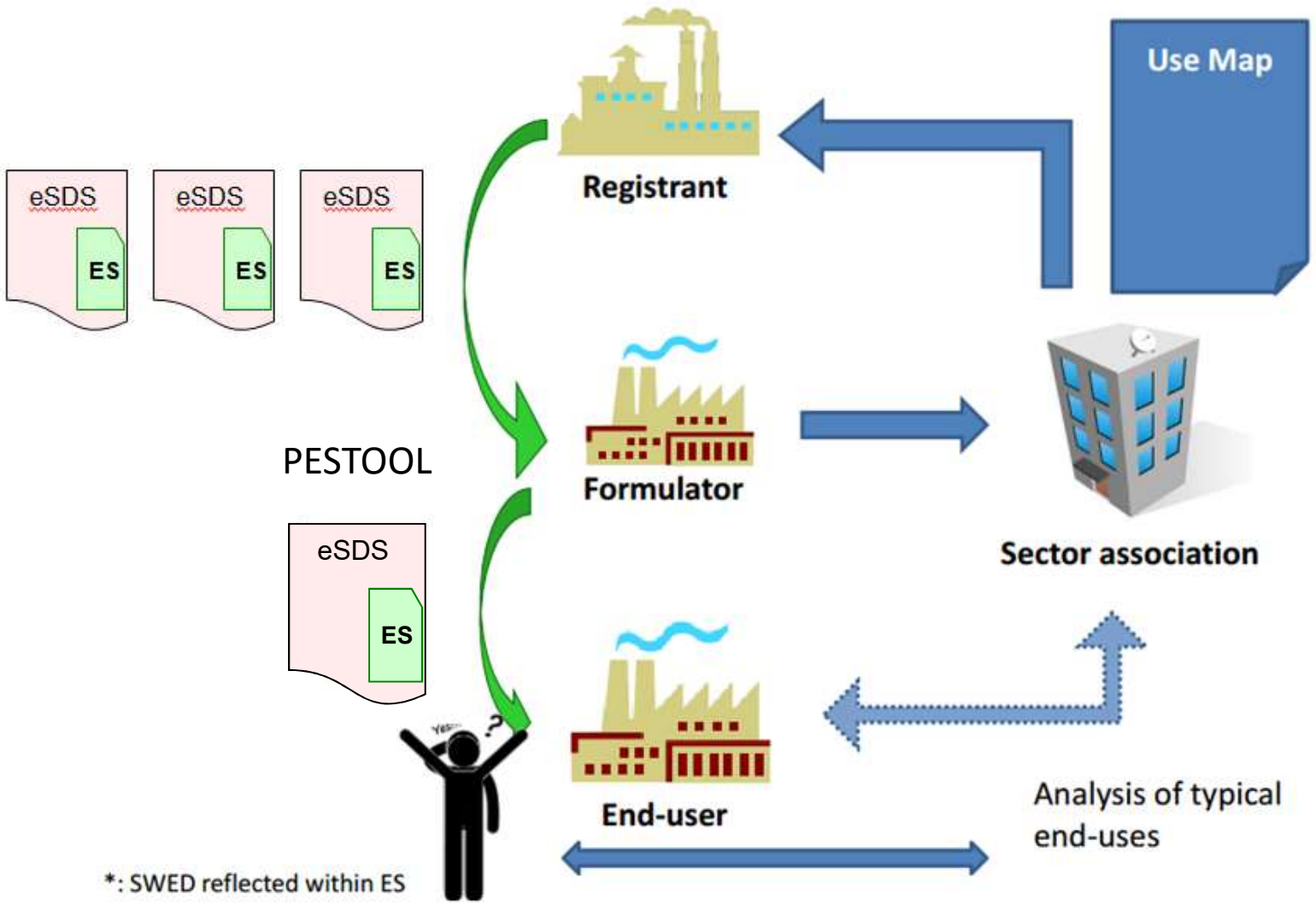
# Thermoplastics Sector uses mixtures in an industrial setting



# No Sufficiently Typical End-Use Conditions



# PESTOOL


eSDS
ES
eSDS
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eSDS
ES
Registrant
Use Map
PESTOOL
Formulator
Sector association
eSDS
ES
End-user
Analysis of typical end-uses
*: SWED reflected within ES