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WEEE collection & recycling

A resource classification approach for the circular economy



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H2020 PROJECT: COLLECTORS

Many territories in the European Union still lag behind when it comes to achieving current recycling targets, due to specific challenges or lack of resources

Goal

To identify and highlight existing good practices of waste collection and sorting for high quality recycling



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General description – ‘Cyclad’ case

- Focus on small WEEE & IT, lamps
- Cyclad Mixed Syndicate is the collective waste collection organisation in the north-east Charente-Maritime, France
- 150.000 habitants, covering 2.700 km² (= 57 inhabitants/km²)
- Responsibility: Collection, treatment & final disposal, awareness campaigns for sorting and reducing waste
- Close cooperation with the PROs Eco-systèmes (SHA/IT) & Recylcum (lamps)
- 65 wt. % of all WEEE is collected at 25 civic amenity sites
- 25 wt. % is collected in retail stores and social recycling centers
- One of the biggest problems related to WEEE collection in the past was scavenging / theft



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Goal & research questions

Goal:

Assessment of waste collection systems with respect to recycling quality by using a resource classification approach

Research questions:

- What measures were taken in the past in the 'Cyclad' region to increase the quantities and quality of WEEE collection? (retrospective approach)
- What was the impact on collected quantities, greenhouse gas emissions, costs and benefits?



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A Resource Classification Approach



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How?

To evaluate the effect of measures aimed at increasing WEEE collection we look at:

- The good practice that sparked the increase in WEEE collection;
- Two points in time (before and after the measure)
- The costs & benefits & saved greenhouse gas emissions linked to this practice;

from the perspective of the collecting entity, i.e. the Producer Responsibility Organization by using a resource classification approach.

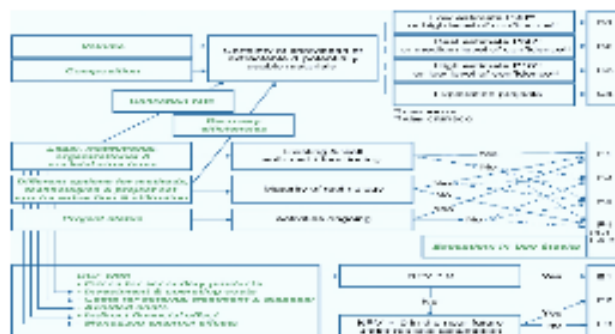


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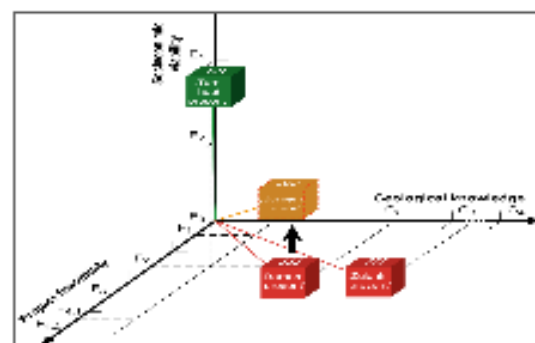


Classification criteria

- Level of knowledge / confidence in estimates (G-Axis)
- Technical feasibility & project status (F-Axis)
- Social, environmental, economic viability (E-Axis)



Source: Winterstetter et al. 2016



Results

H2020 COLLECTORS WEEE Case Study



Increasing WEEE collection in the 'Cyclad' region

Two measures led to increased capture rates between 2014 - 2018

1. **Improved security of civic amenity sites** to prevent theft: Locked containers, mark WEEE, camera surveillance & regular police checks
2. **Campaign against misinformation** on what happens to WEEE after collection targeting the general public

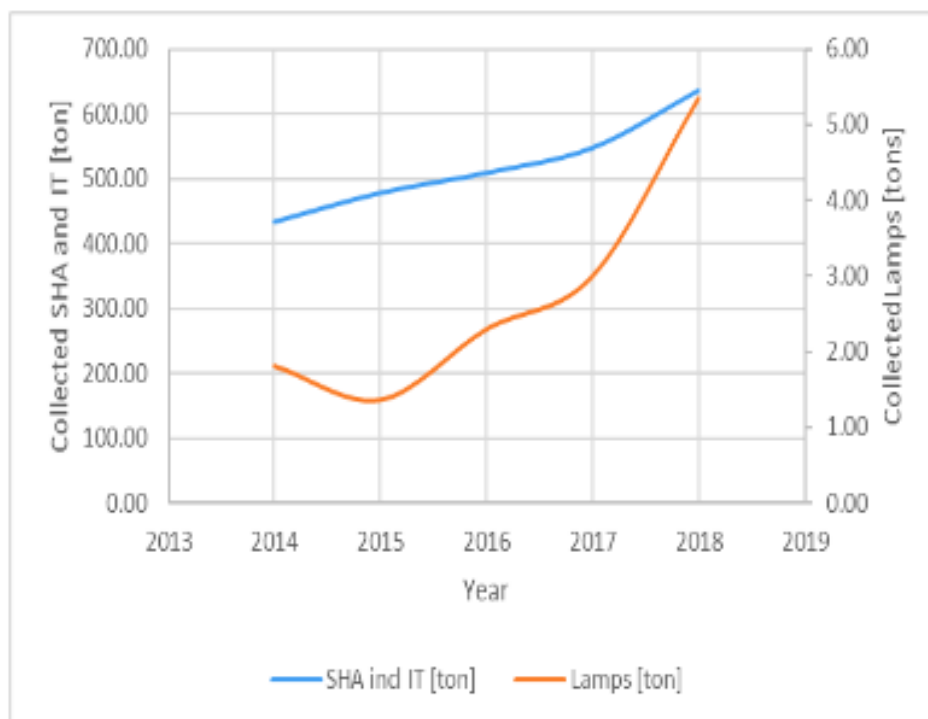


WEEE & storage containers are marked against theft



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	2014	2018	Increase
Small WEEE & IT			
[t/a]	433	635	+47%
[Kg/cap/a]	2.9	4.3	
Capture rate	36%	45%	
Lamps			
[t/a]	2	5	+150%
[Kg/cap/a]	0.01	0.03	
Capture rate	11%	33%	

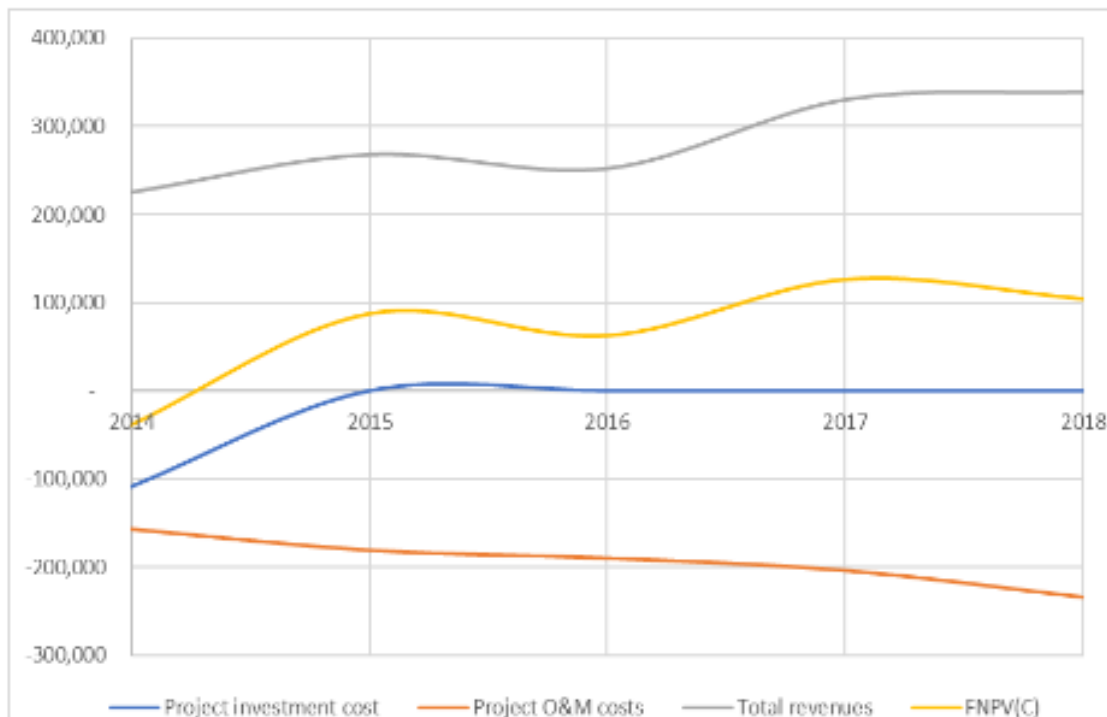
WEEE collection in the 'Cyclad' region, 2014 - 2018



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Economic results



Total investment	€ 108,000	Euro
Extra WEEE collected	205	tons
Cost for extra collected WEEE	€ 525	Euro/ton
Avoided loss due to scavenging	€ 1,480	Euro/ton

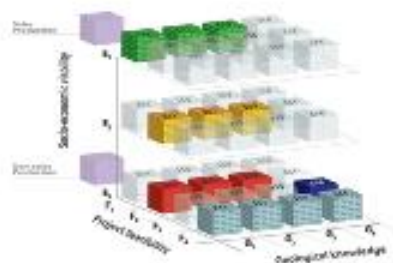
Overview of the financial flows of WEEE collection in Cyclad, 2014 - 2018



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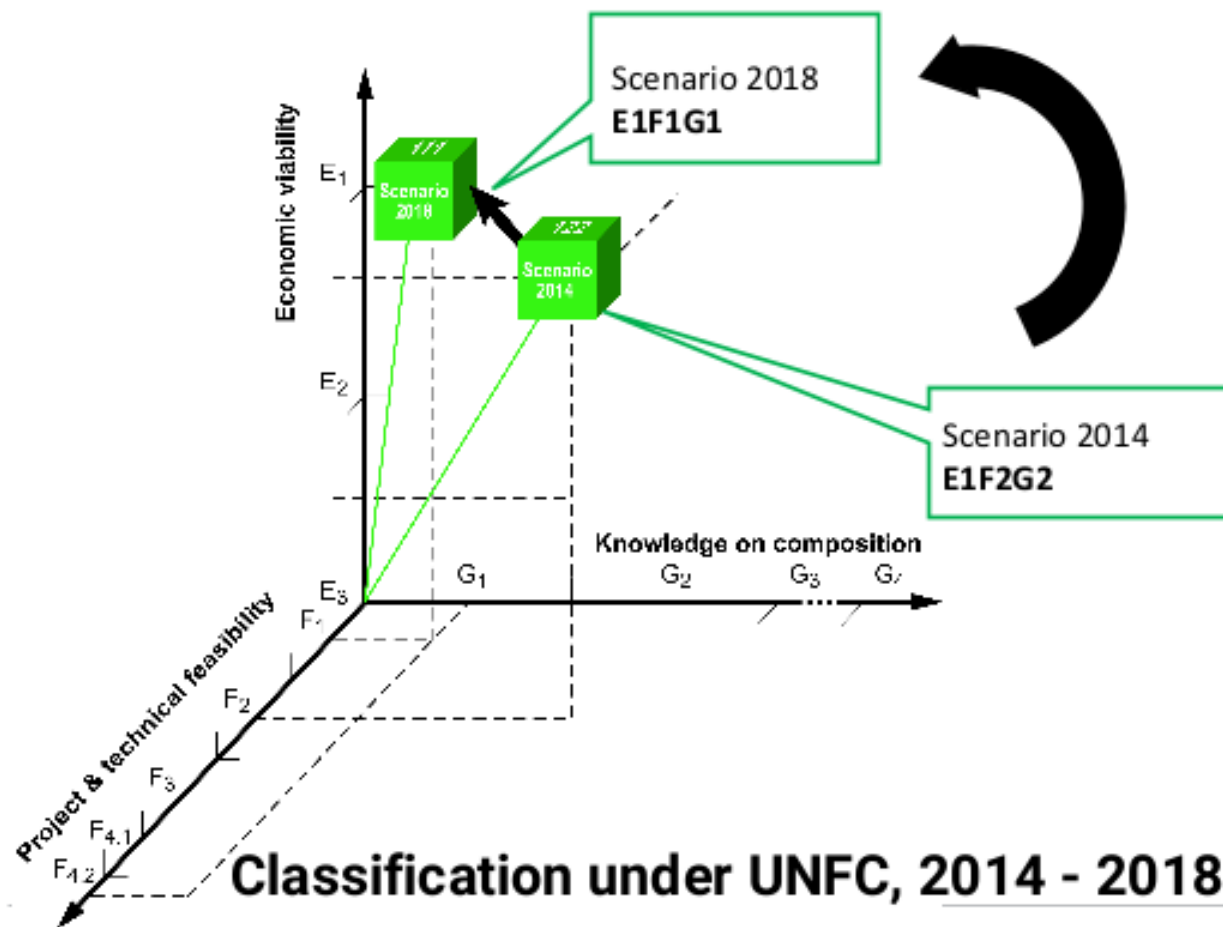
Translation into UNFC categories



Classification results

	Scenario 2014	Scenario 2018
Knowledge on composition (G – Axis)	G2 Medium level of confidence: Uncertainties due to loss of valuable WEEE to scavengers	G1 High level of confidence: Uncertainties on collected quantities and quality of waste reduced
Technical & Project Feasibility (F - Axis)	F2 <ul style="list-style-type: none"> • Collection infrastructure is sufficient, but CAS are not secured • Low public awareness 	F1 <ul style="list-style-type: none"> • Secured collection infrastructure • High public awareness for WEEE collection
Socioeconomic Viability (E-Axis)	E1 Net Present Value (NPV) positive GHG emission savings	E1 NPV even higher GHG emission savings even higher





Past measures:

- Secured collection infrastructure at CAS
- Campaigns against misinformation for general public

Potential future measures to be assessed:

Increase the share of WEEE collected in social recycling centers & retail stores, currently only 25 % of all WEEE



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Conclusions & Outlook

- The identified measures (securing collection infrastructure & communication campaigns) had a positive impact and the uncertainties about collected quantities and quality could be reduced.
- The Resource Classification approach turned out to be useful
 - To evaluate past measures by comparing collected quantities, quality, costs & benefits, and greenhouse gas emissions before and after the measures taken.
 - To look at waste management system with a focus on resource recovery
 - To communicate the impact of key factors and different boundary conditions



Thank you!

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