



UNITED NATIONS
UNIVERSITY

UNU-VIE SCYCLE

Sustainable Cycles Programme

SCYCLE

Programme

Study proposal:

**WEEE Recycling Economics –
The shortcomings of the current business model?**

EERA meeting – March 30, 2017

Jaco Huisman – [Huisman\[at\]unu.edu](mailto:Huisman[at]unu.edu)



Contents

- Proposal and Approach
- Discussions in SC
- Survey approach:
 - The economics of WEEE treatment
 - Influence of scavenging products and components
- Practical arrangements and Q&A

Approach



UNITED NATIONS
UNIVERSITY

UNU-VIE SCYCLE
Sustainable Cycles Programme



Task 1:
Baseline +Survey
(Feb. – Apr.)

Case Studies (>3 EU MS)

Task 2:
Economic Analysis
(May- June)

Economics of compliant recycling

Competition distortion elements (best & worst practices)

2005-2015:

- Economic analysis of the treatment practises
- Main cost elements
- Non-compliance triggering

Task 3:
Recommendations
(Sep.-Dec.)

Long term strategy + Recommendations:

- Governance & business models
- Financing mechanisms
- Monitoring & enforcement
- Strategy to enhance collection & recycling quality

2015-2020:

- Evolution of collection & treatment costs
- Impact of CENELEC standards
- Achievability of targets

Summary discussion with SC



■ Project administration

- Award Notice
- NDA's

■ Scope

- Excluding lamps.
- Nr of members contributing per country: SWE: 2; DEU: 5-6; ESP: 2
- EU report with possibly a DEU component
- Survey → direct XLS exchange in April
- Also include a more elaborate scavenging level assessment – EU wide

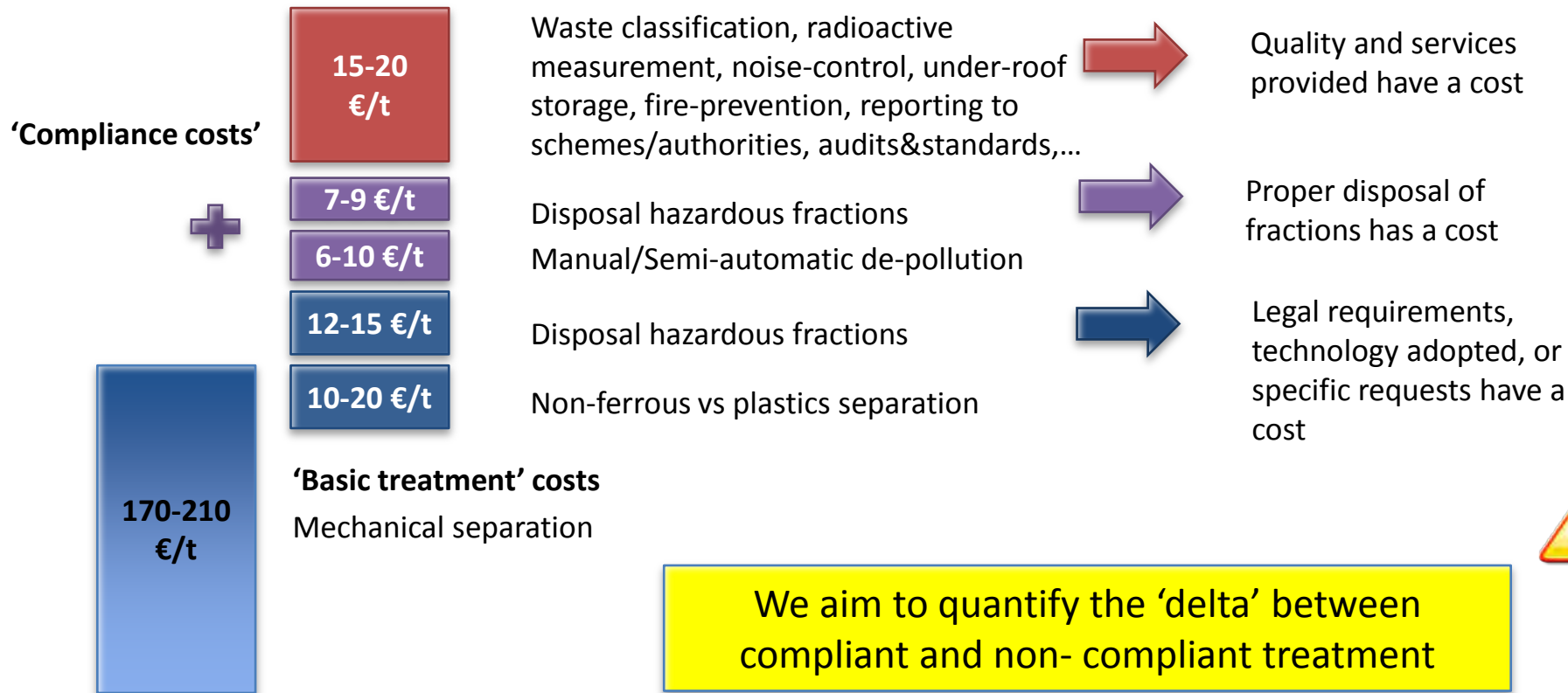
Timing and Gantt - 2017



2017	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Meetings		30-Mar			07-Jun			28-Sep		30-Nov	
PHASE 1: Baseline											
Data Gap Analysis, review existing studies											
Preparation of Survey											
Survey, analysis of (past) treatment costs		survey response									
PHASE 2: Analysis of economics and scenarios											
Definition and analysis of minimal technical costs											
Drivers for and analysis of non-compliant treatment											
Scenario analysis for 2015-2020											
PHASE 3: Recommendations and long term strategy											
Conclusions											
Recommendations re:											
Report Finalisation, Executive Summary, Presentation											

3 physical meetings planned: March 30, June 7 and November 30
10 regular telcons planned.

The 'compliance costs' delta



Economics Survey - Technical Costs



2016		Flow type	C&F	LHHA	CRT	FPD	SHA	Lamps
CAPEX	total capex							
	Installed kW							
	Depreciation - tangibles							
	Depreciation - intangibles							
OPEX	total opex							
	Energy							
	Line maintenance							
	Labour - depollution							
	Labour - processing							
	Hazardous waste disposal							
	Non Hazardous waste disposal							
	Cost for audits							
	Waste characterization, radioactive measurement, ...							
	Cost for reporting to authorities, Compliance Schemes, ...							
OH other staff (f.i. logistics planning, adm, ...)								
treated tons	upstream total							
Overview	TOTAL							
	costs (capex+opex)							
	revenues							
	TOTAL PER TON							
	costs (capex+opex)							
revenues								

Economics Survey – Materials



	Flow type	C&F	LHHA	CRT	FPD	SHA	Lamps
2016 flow composition	total (%)	0%	0%	0%	0%	0%	0%
2016 downstream	upstream total (t)	0 t	0 t	0 t	0 t	0 t	0 t
2016 output material costs & revenues	downstream total (€)	- €	- €	- €	- €	- €	- €
total material costs & revenues	TOTAL €	- €	- €	- €	- €	- €	- €
	costs	- €	- €	- €	- €	- €	- €
	revenues	- €	- €	- €	- €	- €	- €
	TOTAL € PER TON	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	costs	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	revenues	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Approach – Economic Questions



UNITED NATIONS
UNIVERSITY

UNU-VIE SCYCLE
Sustainable Cycles Programme



- We will contact members individually
 - Provide the XLS
 - Adapt to existing reporting structure
 - Discuss data directly with person filling it in
- We will provide NDA's also individually
 - One clause cannot be altered: UNICATRAL arbitration.

Scavenging levels - General



UNITED NATIONS
UNIVERSITY

UNU-VIE SCYCLE
Sustainable Cycles Programme



Nr Question (bold one most relevant)	Answer
1 Please select the WEEE stream(s) your Company is treating	
2 Do you treat Small Household Appliances and IT equipment separate from each other?	
3 Reference year	
4 Total amount treated in country, all plants (may be specified in indicative ranges like 1000-2500 tons)	
4a How much WEEE appliances (in tonnes) are treated by your company in the reference year in the residence country? - LHHA	
4b How much WEEE appliances (in tonnes) are treated by your company in the reference year in the residence country? - C&F	
4c How much WEEE appliances (in tonnes) are treated by your company in the reference year in the residence country? - SHA (+IT if not separate)	
4d How much WEEE appliances (in tonnes) are treated by your company in the reference year in the residence country? - IT	
4e How much WEEE appliances (in tonnes) are treated by your company in the reference year in the residence country? - SCREENS	
5a Are you treating WEEE derived parts and pre-shredder material?	
5b From sampling of pre-shredder fractions, do you know the average % of WEEE in the total mix of WEEE derived plus other sources combined generated in your country (or can you provide an estimate)? - Open-Ended Response	
5c Do you have data on tonnes of WEEE derived parts and pre-shredder materials you treated?	
5d How much WEEE derived parts and pre-shredder material are processed by your company in the reference year in the residence country?	
6a In your country: How would you judge the quality of the nationally reported quantities (1-5)	1= Very poor, 2= Poor, 3= Sufficient, 4= Good, government checks in place, 5= Excellent, no doubts
6a If you have witnessed any anomalies: can you specify these?	

Scavenging levels – C&F, LHA



UNITED NATIONS
UNIVERSITY

UNU-VIE SCYCLE
Sustainable Cycles Programme



Cooling and Freezing

Nr	Question (bold one most relevant)
1	Tonnage C&F (from General Q)
2	How much of these are (H)CFC containing (% on a weight basis)?
3	What % of fridges and freezers is "without pressure" or lacking its compressor when arriving at the treatment plant?
4	What % of fridges and freezers is lacking cable/ mains cords when arriving at the treatment plant?
5	Can you provide more specific sampling documentation? (multiple data points to determine fluctuations)

LHHA

Nr	Question (bold one most relevant)
1	Tonnage LHHA (from General Q)
2	What % of appliances is lacking cable/ mains cords when arriving at the treatment plant?
3	What percentage of appliances is missing motors/ coils/ transformers?
4	What is the % of individual cables and adapters (not connected to original product)? (total weight and if possible also pieces count)

Scavenging levels - Screens



UNITED NATIONS
UNIVERSITY

UNU-VIE SCYCLE
Sustainable Cycles Programme



SCREENS	
Nr	Question (bold one most relevant)
1	Tonnage Screens (from General Q)
2	Do you have data on the product count/ frequency in the collected stream (pref. on a pieces basis):
3	What is the % of CRT monitors (0308) in the return stream? (pieces or weight)
3a	What % is lacking cable/ mains cords when arriving at the treatment plant?
3b	Idem for printed circuit boards/ graphics card?
3c	Idem for deflection coil?
4	What is the % of CRT TV's (0302) in the return stream? (pieces or weight)
4a	What % is lacking cable/ mains cords when arriving at the treatment plant?
4b	Idem for printed circuit boards/ graphics card?
4c	Idem for deflection coil?
5	What is the % of laptops and netbooks (030301) in the return stream? (pieces or weight)
5a	What % is lacking printed circuit boards/ memory/ graphics card?
5b	Idem for HDD or SDD?
5c	Idem for Battery packs (external)
6	What is the % of tablets (030302) in the return stream? (pieces or weight)
6a	What % is lacking printed circuit boards/ memory/ graphics card?
7	What is the % of LCD monitors (0308) in the return stream? (pieces or weight)
7a	What % is lacking cable/ mains cords when arriving at the treatment plant?
7b	Idem for printed circuit boards/ graphics card?
8	What is the % of LCD TV's (0309) in the return stream? (pieces or weight)
8a	What % is lacking cable/ mains cords when arriving at the treatment plant?
8b	Idem for printed circuit boards/ graphics card?
8c	Idem for deflection coil?
9	What is the % of individual cables and adapters (not connected to original product)? (total weight and if possible also pieces count)

Scavenging levels, SHA and IT



UNITED NATIONS
UNIVERSITY

UNU-VIE SCYCLE
Sustainable Cycles Programme



SHA	
Nr	Question (bold one most relevant)
1	Tonnage SHA (from General Q)
2	What % of appliances is lacking cable/ mains cords when arriving at the treatment plant?
3	What percentage of appliances is missing motors/ coils/ transformers?
4	What is the % of individual cables and adapters (not connected to original product)? (total weight and if possible also pieces count)

IT equipment	
Nr	Question (bold one most relevant)
1	Tonnage IT (from General Q)
2	Do you have data on the product count/ frequency in the collected stream (pref. on a pieces basis):
3	What is the % of desktops (0302) in the return stream?
3a	What % is lacking cable/ mains cords when arriving at the treatment plant?
3b	Idem for printed circuit boards/ memory/ graphics card?
3c	Idem for HDD or SDD?
3d	Idem for optical drives CDD/ DVD?
4	What is the % of laptops and tablets (0303) in the return stream?
4a	What % is lacking printed circuit boards/ memory/ graphics card?
4b	Idem for HDD or SDD?
4c	Idem for Battery packs (external)
5	What is the % of mobile phones and smartphones (0306) in the return stream?
5a	What % is lacking printed circuit boards/ memory/ graphics card?
5b	Idem for Battery (removable!)
6	What is the % of game consoles (0702) in the return stream?
7	What is the % of individual cables and adapters (not connected to original product)? (total weight and if possible also pieces count)

Approach Scavenging levels

- Review general approach now
- SC + EERA members to provide comments on the survey questions by April 10
- We will contact all EERA members individually
 - Provide the XLS
 - Only fill it in for collection categories with relevant volume
 - Send back to UNU individually (not to EERA Secr.)
- Support information/ actual batch sample data most welcome
 - If you are planning to do a batch test: we have a sampling protocol in development
- If needed, we will provide additional NDA's

Next steps



- Send this PPT and XLS with scavenging level questions March 31
- Await final signature UNU and cleared draft NDA's (?)
- By April 10: Feedback on Scavenging level questions
- Next SC: April 11
- Data collection and individual exchange from April until half of May
- Process the phase 1 information before the June 29 EERA meeting