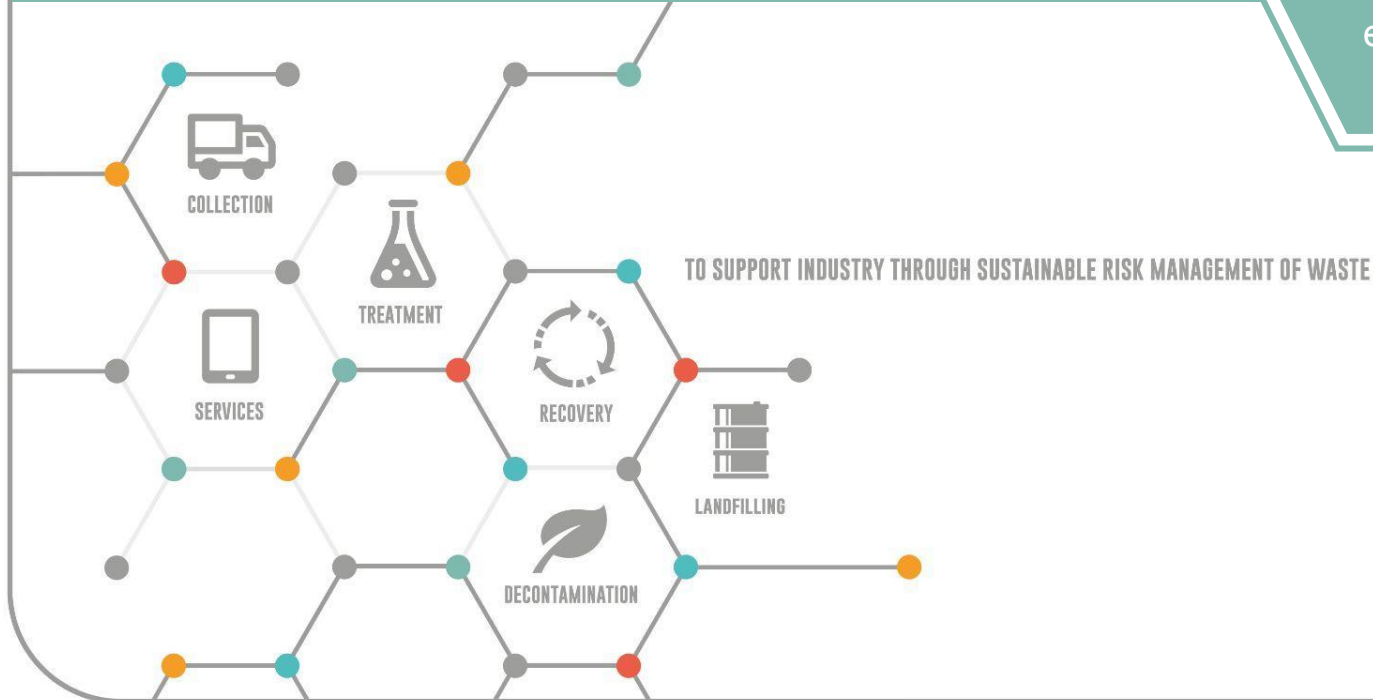


# PCB DECONTAMINATION

Your solution  
for PCB  
contaminated  
electrical  
equipment



# WHO WE ARE – key figures

Started:	1995
Location:	Grimbergen, Belgium
Shareholders:	51% Veolia, 26% Indaver, 23%Renewi
Turnover (2021):	4.667 k€
Total input (2021):	3.300 ton
Metals recycled (2021):	2.680 ton
FTE:	12
Contribution to CO <sub>2</sub> reduction (2021):	7.400 ton
Certifications:	9001-14001-45001



# INTERNATIONAL REFERENCES

- Our company was established to solve Electrabel's PCB problem, but soon was called to answer requests from many different countries. This is a non-exhaustive list:

- France
- Spain
- Netherlands
- United Kingdom
- Ireland
- Poland
- Rumania
- Bulgaria
- Greece
- Germany
- Algeria
- Morocco
- Tunisia
- Jordan
- Cameroon
- Congo (Brazzaville)
- Zambia
- Thailand
- South Korea
- Kazakhstan
- Ecuador
- Colombia
- Peru
- Panama
- Argentina
- Costa Rica
- Chili

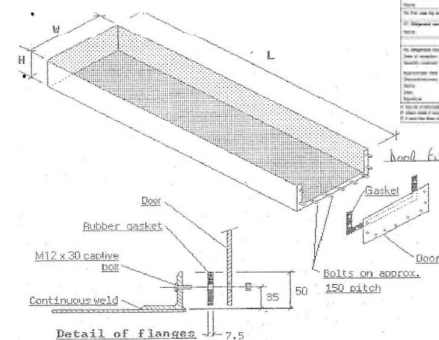
**We are able to answer to  
any request from  
anywhere in the world!**

Provided the export country has  
ratified the Basel Convention





1. <b>Background</b> (or motivation for the work)	2. <b>Research context</b> or <b>introduction</b>	3. <b>Research aims</b> or <b>objectives</b>	4. <b>Structure</b> of the paper
1.1. <b>Background</b>	2.1. <b>Research context</b>	3.1. <b>Research aims</b>	4.1. <b>Structure</b>
1.2. <b>Motivation</b>	2.2. <b>Research context</b>	3.2. <b>Research aims</b>	4.2. <b>Structure</b>
1.3. <b>Background</b>	2.3. <b>Research context</b>	3.3. <b>Research aims</b>	4.3. <b>Structure</b>
1.4. <b>Motivation</b>	2.4. <b>Research context</b>	3.4. <b>Research aims</b>	4.4. <b>Structure</b>
1.5. <b>Background</b>	2.5. <b>Research context</b>	3.5. <b>Research aims</b>	4.5. <b>Structure</b>
1.6. <b>Motivation</b>	2.6. <b>Research context</b>	3.6. <b>Research aims</b>	4.6. <b>Structure</b>
1.7. <b>Background</b>	2.7. <b>Research context</b>	3.7. <b>Research aims</b>	4.7. <b>Structure</b>
1.8. <b>Motivation</b>	2.8. <b>Research context</b>	3.8. <b>Research aims</b>	4.8. <b>Structure</b>
1.9. <b>Background</b>	2.9. <b>Research context</b>	3.9. <b>Research aims</b>	4.9. <b>Structure</b>
1.10. <b>Motivation</b>	2.10. <b>Research context</b>	3.10. <b>Research aims</b>	4.10. <b>Structure</b>
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1.13. <b>Background</b>	2.13. <b>Research context</b>	3.13. <b>Research aims</b>	4.13. <b>Structure</b>
1.14. <b>Motivation</b>	2.14. <b>Research context</b>	3.14. <b>Research aims</b>	4.14. <b>Structure</b>
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1.16. <b>Motivation</b>	2.16. <b>Research context</b>	3.16. <b>Research aims</b>	4.16. <b>Structure</b>
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1.18. <b>Motivation</b>	2.18. <b>Research context</b>	3.18. <b>Research aims</b>	4.18. <b>Structure</b>
1.19. <b>Background</b>	2.19. <b>Research context</b>	3.19. <b>Research aims</b>	4.19. <b>Structure</b>
1.20. <b>Motivation</b>	2.20. <b>Research context</b>	3.20. <b>Research aims</b>	4.20. <b>Structure</b>
1.21. <b>Background</b>	2.21. <b>Research context</b>	3.21. <b>Research aims</b>	4.21. <b>Structure</b>
1.22. <b>Motivation</b>	2.22. <b>Research context</b>	3.22. <b>Research aims</b>	4.22. <b>Structure</b>
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1.26. <b>Motivation</b>	2.26. <b>Research context</b>	3.26. <b>Research aims</b>	4.26. <b>Structure</b>
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1.28. <b>Motivation</b>	2.28. <b>Research context</b>	3.28. <b>Research aims</b>	4.28. <b>Structure</b>
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1.30. <b>Motivation</b>	2.30. <b>Research context</b>	3.30. <b>Research aims</b>	4.30. <b>Structure</b>
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1.32. <b>Motivation</b>	2.32. <b>Research context</b>	3.32. <b>Research aims</b>	4.32. <b>Structure</b>
1.33. <b>Background</b>	2.33. <b>Research context</b>	3.33. <b>Research aims</b>	4.33. <b>Structure</b>
1.34. <b>Motivation</b>	2.34. <b>Research context</b>	3.34. <b>Research aims</b>	4.34. <b>Structure</b>
1.35. <b>Background</b>	2.35. <b>Research context</b>	3.35. <b>Research aims</b>	4.35. <b>Structure</b>
1.36. <b>Motivation</b>	2.36. <b>Research context</b>	3.36. <b>Research aims</b>	4.36. <b>Structure</b>
1.37. <b>Background</b>	2.37. <b>Research context</b>	3.37. <b>Research aims</b>	4.37. <b>Structure</b>
1.38. <b>Motivation</b>	2.38. <b>Research context</b>	3.38. <b>Research aims</b>	4.38. <b>Structure</b>
1.39. <b>Background</b>	2.39. <b>Research context</b>	3.39. <b>Research aims</b>	4.39. <b>Structure</b>
1.40. <b>Motivation</b>	2.40. <b>Research context</b>	3.40. <b>Research aims</b>	4.40. <b>Structure</b>
1.41. <b>Background</b>	2.41. <b>Research context</b>	3.41. <b>Research aims</b>	4.41. <b>Structure</b>
1.42. <b>Motivation</b>	2.42. <b>Research context</b>	3.42. <b>Research aims</b>	4.42. <b>Structure</b>
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1.44. <b>Motivation</b>	2.44. <b>Research context</b>	3.44. <b>Research aims</b>	4.44. <b>Structure</b>
1.45. <b>Background</b>	2.45. <b>Research context</b>	3.45. <b>Research aims</b>	4.45. <b>Structure</b>
1.46. <b>Motivation</b>	2.46. <b>Research context</b>	3.46. <b>Research aims</b>	4.46. <b>Structure</b>
1.47. <b>Background</b>	2.47. <b>Research context</b>	3.47. <b>Research aims</b>	4.47. <b>Structure</b>
1.48. <b>Motivation</b>	2.48. <b>Research context</b>	3.48. <b>Research aims</b>	4.48. <b>Structure</b>
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1.50. <b>Motivation</b>	2.50. <b>Research context</b>	3.50. <b>Research aims</b>	4.50. <b>Structure</b>
1.51. <b>Background</b>	2.51. <b>Research context</b>	3.51. <b>Research aims</b>	4.51. <b>Structure</b>
1.52. <b>Motivation</b>	2.52. <b>Research context</b>	3.52. <b>Research aims</b>	4.52. <b>Structure</b>
1.53. <b>Background</b>	2.53. <b>Research context</b>	3.53. <b>Research aims</b>	4.53. <b>Structure</b>
1.54. <b>Motivation</b>	2.54. <b>Research context</b>	3.54. <b>Research aims</b>	4.54. <b>Structure</b>
1.55. <b>Background</b>	2.55. <b>Research context</b>	3.55. <b>Research aims</b>	4.55. <b>Structure</b>
1.56. <b>Motivation</b>	2.56. <b>Research context</b>	3.56. <b>Research aims&lt;/</b>	



# PROCESS: AUTOCLAVE CLEANING TECHNOLOGY

- Multiple cycles

- Solvent rinsing
- Drain
- Vacuum
- Vapor injection / pressure increase
- Drain
- Vacuum drying



# PCB DESTRUCTION : high temperature incineration (INDAVER)

## Thermal treatment hazardous and industrial waste

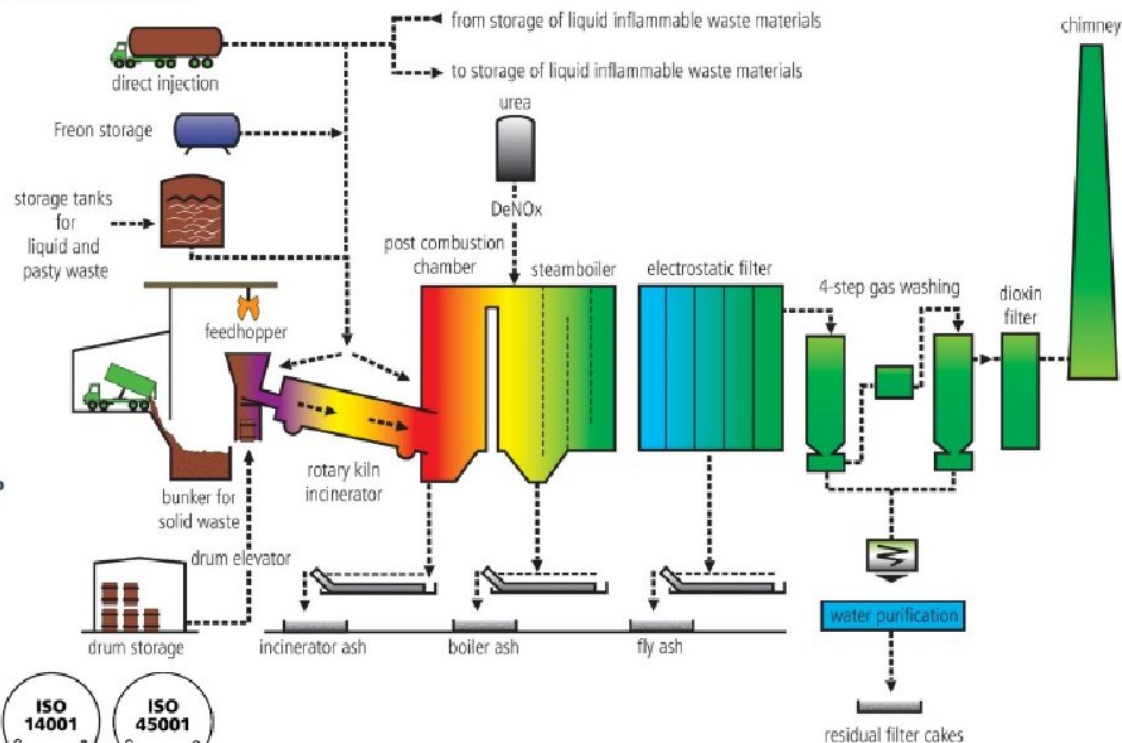
- Incinerator lines: : 3
- Extensive flue gas washing
- Physical condition: : liquid, pasty & solid
- Throughput : 2 x 7,8 T/H
- Incineration temp. : 1100 °C
- Calorific value : 14,000 kJ/kg
- Duration: : 25-35 min.

Gas washing in electronic filter, 4-multiple wet gas washing, dioxin filter

Residual waste → Landfill cat. 1 Heat supply to neighbouring company + IndaMP



## Process scheme





# Study case 1: Local cleaning versus external treatment

We recommend

- **Not to** set procedures for local cleaning/retrofilling for transformers with a contamination grade > 500ppm PCB.
- Retrofilled transformers should be checked again on PCB content after 4 months.
- The core is containing **porous** parts like **wood and paper**. It is proven, these parts are not cleaned <50ppm with a simple rinse/wash!!

Experimental PCB results (in ppm)				
		result after chemical cleaning		
Oil		Metal	wood	paper
271		<1	256	156
346		<1	101	96
		result after chemical cleaning		
214		Wood surface		107
		Wood core		115



# Case 1 Use correct labelling

## **WARNING PCB CONTAMINATED EQUIPMENT**

Awaiting Disposal. Wear Appropriate PPE.  
For Proper Disposal Information contact the  
Environmental Department<sup>5</sup>

## **WARNING IN USE PCB CONTAMINATED EQUIPMENT <0.05%**

Internal PCB Oil Contamination less than 0.05%  
(500ppm). Wear appropriate PPE.  
For proper disposal information contact the  
Environmental Department<sup>5</sup>

## **DECONTAMINATED PCB EQUIPMENT**

Fluid containing PCBs was replaced

\_ with .....(name of substitute)  
\_ on .....(date)  
\_ by ..... (undertaking)

Concentration of PCBs in

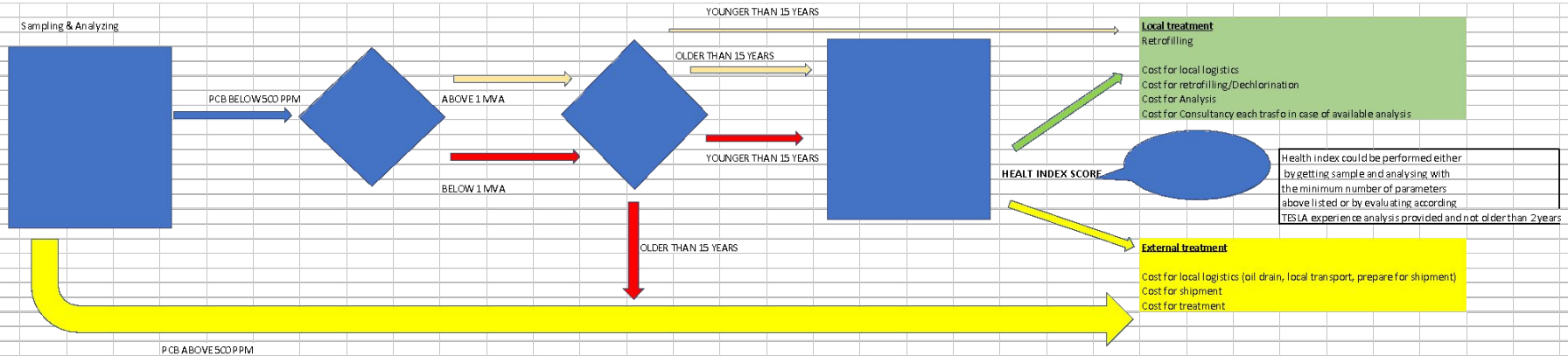
\_ old fluid .....(% by weight)  
\_ new fluid .....(% by weight)

Total PCB contamination level (% w/w)	Less than 0.005%	Greater than 0.05%	Between 0.005% and 0.05%	Greater than 0.05%
Required Action				
Dispose as WEEE at end of useful life	√			
Dispose of as PCB waste (WEEE) at end of useful life		√		
Notify EPA of equipment Dispose of as PCB waste (WEEE) at end of useful life			√	
Notify EPA of equipment Decontaminate or dispose of immediately				√

\* In-use PCB-contaminated equipment must be labelled and a notification sent to the EPA



# Study case 2: Decision tree



- Transformers after 1995 considered as PCB free
- Retrofilling with local chemical dechlorination technology when min 10-20m<sup>3</sup> of oil available on 1 location
- Retrofilling with fresh oil (125% of the amount of oil needed <500ppm, 175% <2000ppm)
- Retrofilled transformers >500ppm have to wear a warning label: “when dismantling, porous fractions like wood and paper may still contain >50ppm PCB and have to be treated as PCB-waste!”



# Challenge 1 logistics: limited shipping lines

- More and more shipping companies are refusing PoP transfers
- Severe marine pollutant products
- Severe control with more risk of “blocking” (estimate 1 lost day = 300k€)



## Challenge 2 logistics: Basel notification

- ❑ Some countries not respecting the deadlines (usually 1 month)
- ❑ Some countries waiting on the consents of the other transit countries (“for us ok when also ok for the others”)
- ❑ Not always easy to pay the fee in the local currency
- ❑ Some countries acting beyond their responsibilities:

*The competent authority(ies) of transit may, within the 30-day time limit referred to in paragraph 1, raise reasoned objections based only on paragraph 1(b), (c), (d) and (f).*

- ❑ To avoid Basel transit issues, we tried air transport but extremely expensive (5-10k€/ton)
- ❑ No ombudsman/Service to negotiate



# CONTACT

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- Mail: [frank.wauters@veolia.com](mailto:frank.wauters@veolia.com)
- <https://www.pcbdecontamination.com>

