



CEPE

The evolution of coatings products after the solvents directive 2004/42/EC

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Introduction



- Some 25 years ago there was pressure on the industry to reduce the emissions of air pollutants, like VOC (Volatile Organic Compounds)
- There was experience in the USA since the early '90s and in 1999 the EU introduced a directive to reduce emissions from sites and installations (Solvent Emissions Directive 1999/13/EC)
- On requests from customers, new leads had been developed for lower VOC products (really lower VOC; not like the California route)
- The EU also wanted to do lower emissions from paint products which were not used in installations or on industrial sites and they wanted to simplify the inspections of Vehicle Refinishes (VR) installations
- The result was the paint product directive 2004/42/EC

30.4.2004

EN

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**DIRECTIVE 2004/42/CE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 21 April 2004**

on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC

Impact

The impact on the decorative coatings world was very substantial

- Some of the new technologies were coming on the market, but their introduction had to be speeded up to meet the deadlines
- Other technologies were really new: training programs for professional end-users
- Over 90% of the products in the market were phased out: replacement strategies, new product names, new labels for products and new marketing documents
- The complete pipeline was replaced:
manufacturers/importers – national warehouses – wholesalers – distributors – retailers



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- The complete pipeline was replaced:
manufacturers/importers – national warehouses – wholesalers – distributors – retailers
- The VOC limits were copied in other countries, where VOC legislation was introduced
- The current European VOC limits for products are still the lowest in the world (except where exempt solvents are allowed)



Implementation

- For decorative products and for vehicle refinishes (VR) products categories were defined and for each category the maximum content of VOC's was capped
- No solvents were exempted
- Where possible, waterborne products were demanded, but where solventborne was the only option, high solids products needed to be developed
- The VR products swap was to be implemented by 2007 and the Deco swap was carried out in two steps (2007 and 2010), because more work was necessary
- The implementation process of this directive was reviewed by Ökopol in 2009/2010. Eventually only a small number of changes (mainly clarifications) followed that review

ANNEX II

A. MAXIMUM VOC CONTENT LIMIT VALUES FOR PAINTS AND VARNISHES

	Product Subcategory	Type	Phase I (g/l (*) (from 1.1.2007)	Phase II (g/l (*) (from 1.1.2010)
a	Interior matt walls and ceilings (Gloss <25@60°)	WB	75	30
		SB	400	30
b	Interior glossy walls and ceilings (Gloss >25@60°)	WB	150	100
		SB	400	100
c	Exterior walls of mineral substrate	WB	75	40
		SB	450	430
d	Interior/exterior trim and cladding paints for wood and metal	WB	150	130
		SB	400	300
e	Interior/exterior trim varnishes and woodstains, including opaque woodstains	WB	150	130
		SB	500	400
f	Interior and exterior minimal build woodstains	WB	150	130
		SB	700	700
g	Primers	WB	50	30
		SB	450	350
h	Binding primers	WB	50	30
		SB	750	750
i	One-pack performance coatings	WB	140	140
		SB	600	500
j	Two-pack reactive performance coatings for specific end use such as floors	WB	140	140
		SB	550	500
k	Multi-coloured coatings	WB	150	100
		SB	400	100
l	Decorative effect coatings	WB	300	200
		SB	500	200

(*) g/l ready to use

B. MAXIMUM VOC CONTENT LIMIT VALUES FOR VEHICLE REFINISHING PRODUCTS

	Product Subcategory	Coatings	VOC g/l (*) (1.1.2007)
a	Preparatory and cleaning	Preparatory	850
		Pre-cleaner	200
b	Bodyfiller/stopper	All types	250
c	Primer	Surfacer/filler and general (metal) primer	540
		Wash primer	780
d	Topcoat	All types	420
e	Special finishes	All types	840

(*) g/l of ready for use product. Except for subcategory (a) any water content of the product ready for use should be discounted.

IMPLEMENTATION AND REVIEW OF DIRECTIVE 2004/42/EC

FINAL REPORT – PART 1: MAIN REPORT, ANNEXES 1-25

DRAFT VERSION: 21 MAY 2009, COMMENTED: 8 JUNE 2009

1ST FINAL VERSION: 21 JUNE 2009, COMMENTED: 17 JULY 2009

2ND FINAL VERSION: 25 AUGUST 2009, COMMENTED: 26/27/28 AUGUST 2009

3RD FINAL VERSION: 28 SEPTEMBER 2009, COMMENTED: 9 OKTOBER, 1/10 NOVEMBER 2009

4TH FINAL VERSION: 10 NOVEMBER 2009

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- Industrial painting and manufacturing of paint are regulated through the Solvent Emissions Directive (now Industrial Emissions Directive: 2010/75/EU)
- The IED was recently reviewed (BREF's projects)
- New standards (BREFs) are adopted for high volume industrial sectors
- The IED projects will not be reviewed in this presentation; we will look at the product regulation approach for paints only

Options for reductions of VOC emissions

- In the review report by Ökopol in 2010, several options were elaborated and two main questions raised:
 - Can the VOC limits for regulated products be reduced even further
 - Are there other paint products that should be regulated through a product directive approach
- We will address the technological issues for these two questions
 - Waterborne products need to become very resistant against water after application and drying
 - Waterborne products have to be protected by biocides to prevent the impact of bacteria and moulds on the products in the can

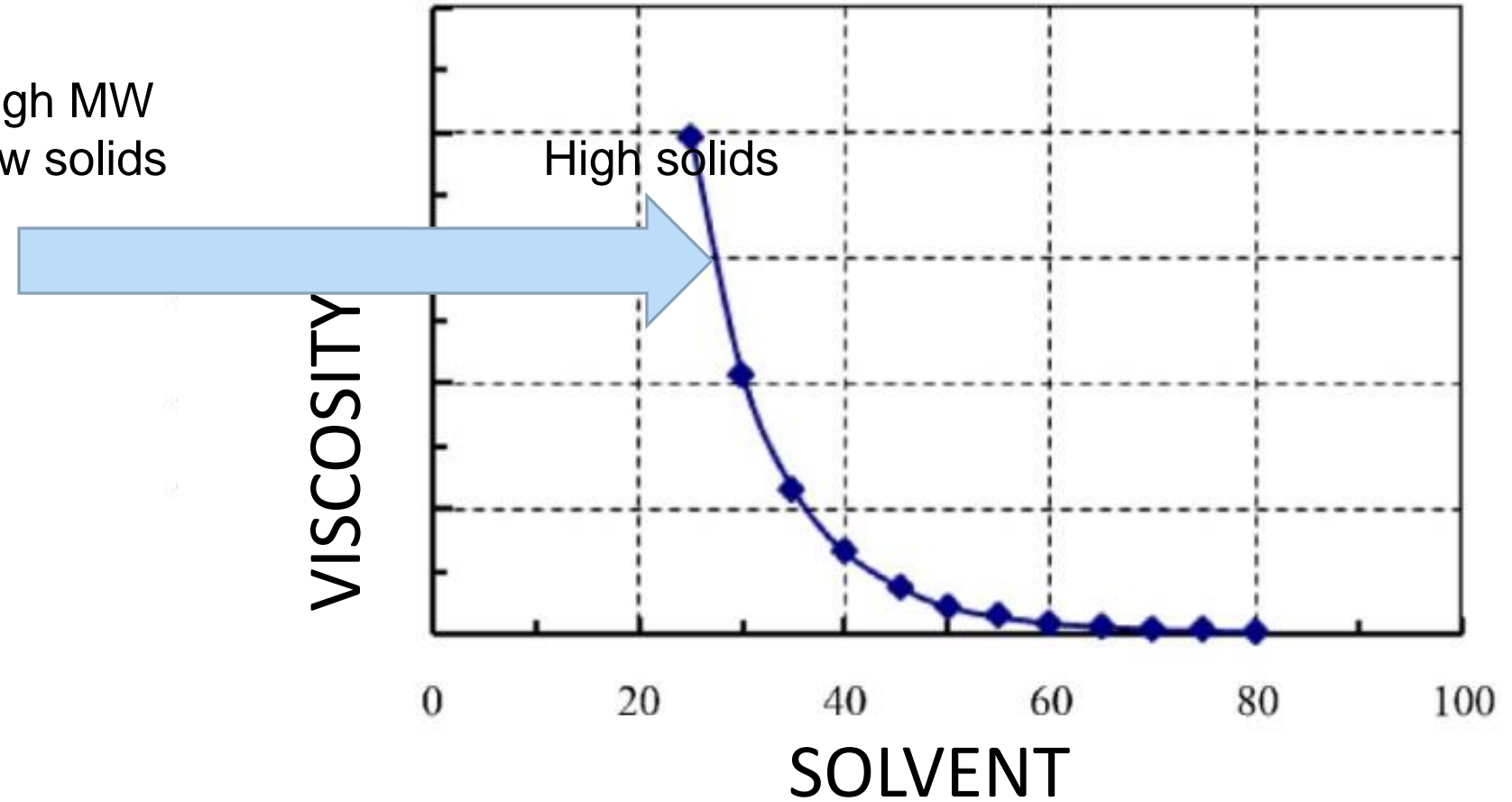
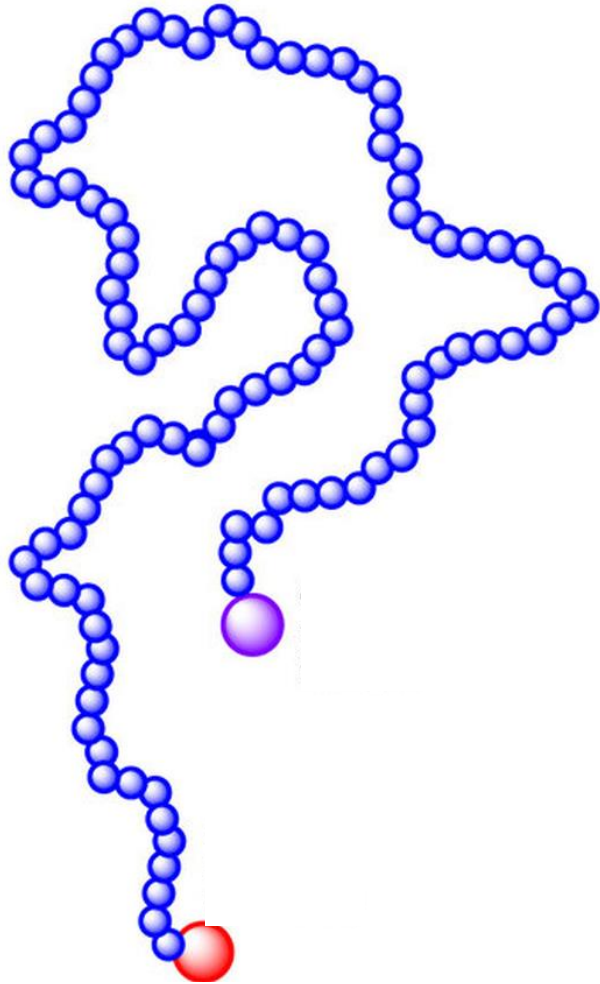


Options for reductions of VOC emissions

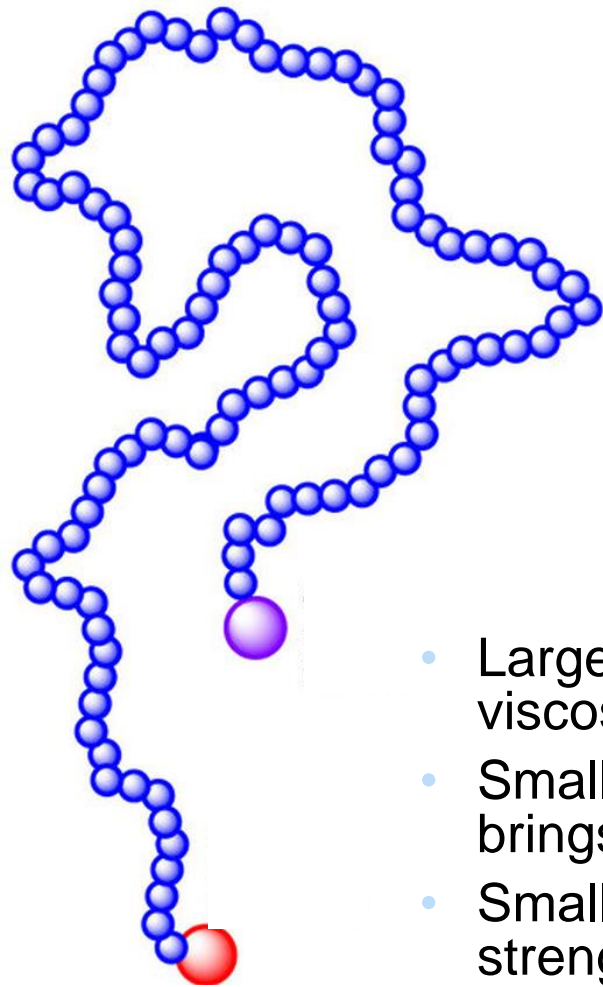
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 - Waterborne products need to become very resistant against water after application and drying
 - Waterborne products have to be protected by biocides to prevent the impact of bacteria and moulds on the products in the can
 - High solids technology has its limitations as well



Limitations of high solids technology



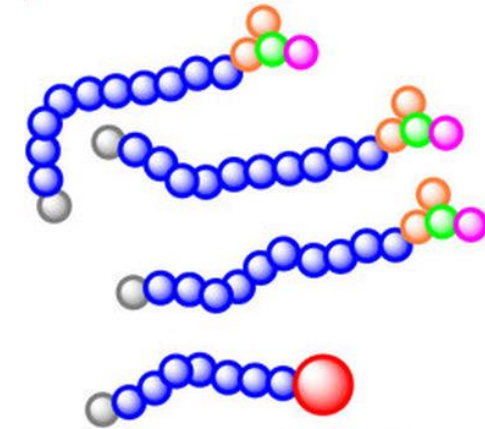
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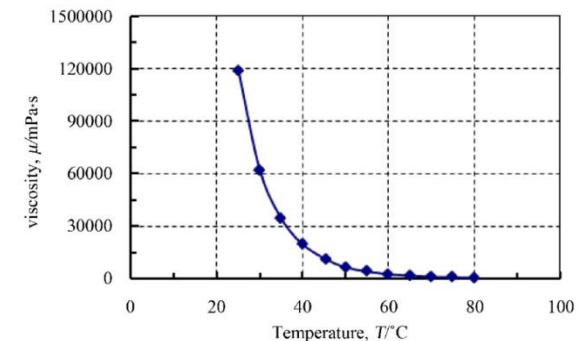
High MW
Low solids



Low MW
High solids

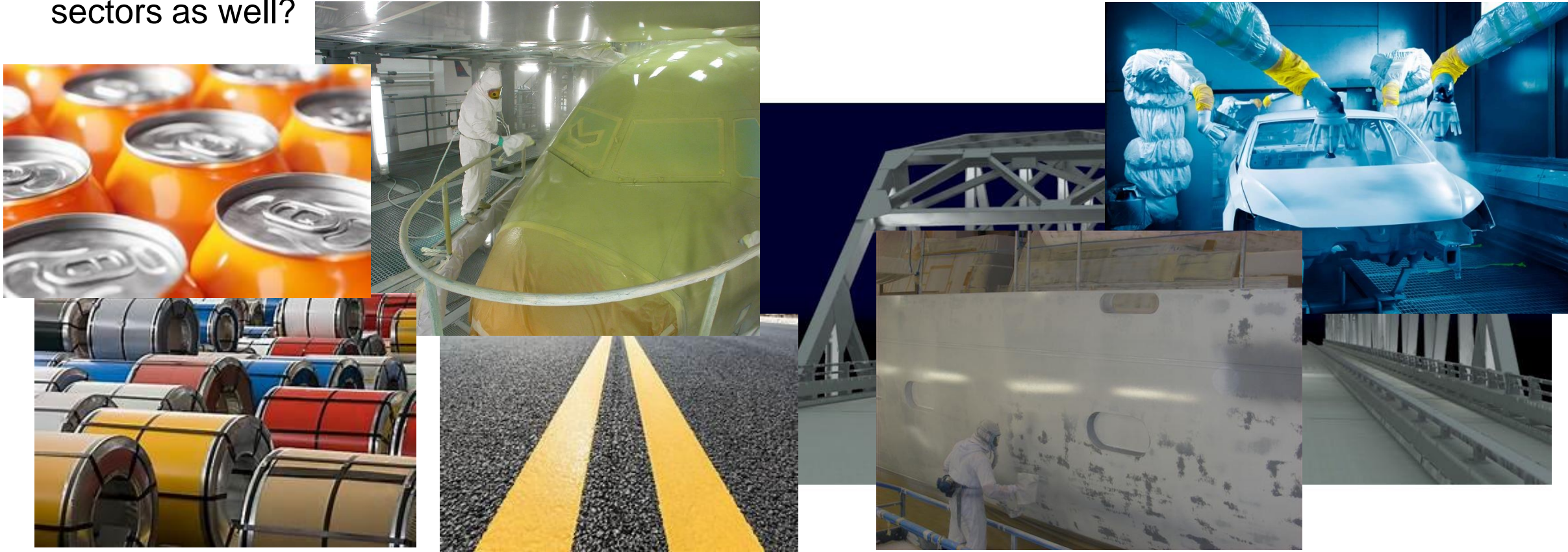


- Large molecules need more solvent to attain the right viscosity
- Smaller molecules need less solvent, but their reactivity brings different hazard profiles (e.g. isocyanate, epoxy)
- Smaller molecules as such don't bring enough physical strength; post-application reactions are needed



Should the scope of the PD be extended?

- If the reductions of emissions from the use of DECO and Vehicle Refinishes products was successful through a product regulation, would it be possible for other paint and coatings sectors as well?

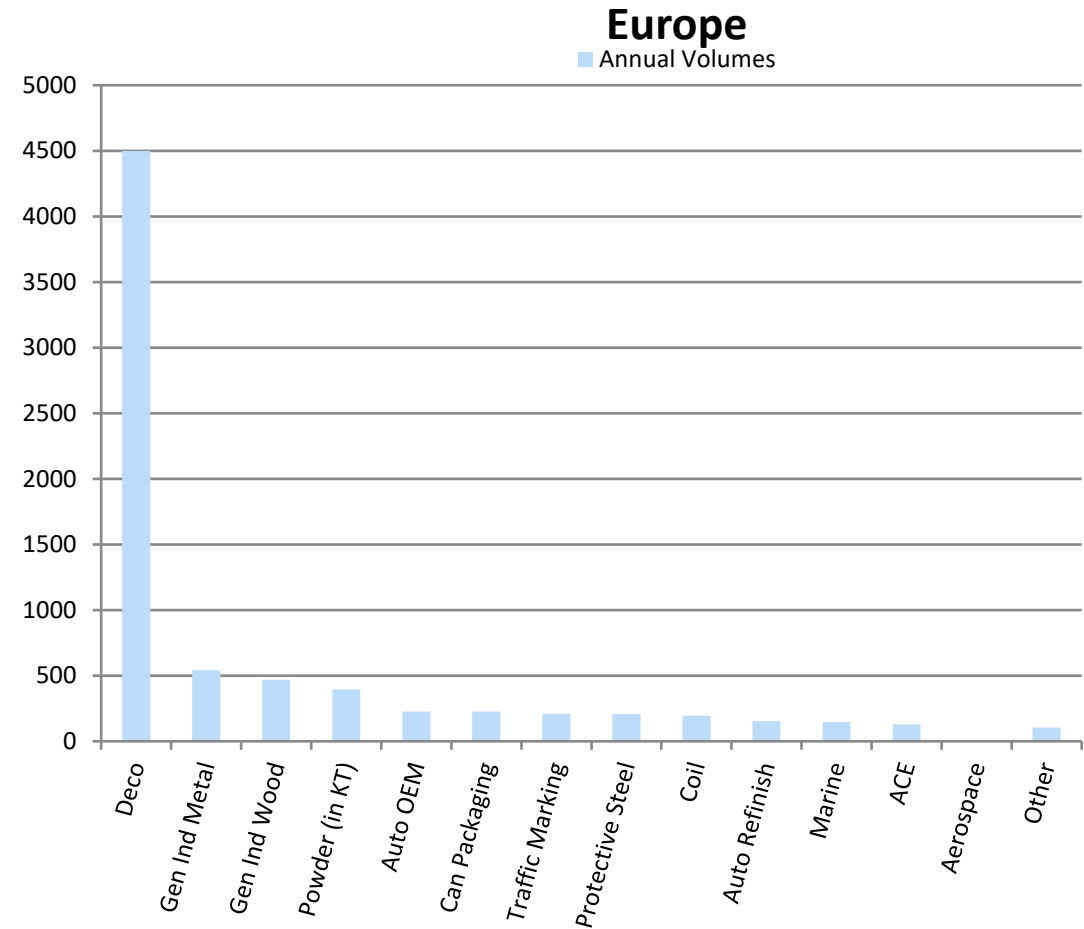


The coatings market in Europe

Can other sectors be brought under a product directive



Europe *	MLiters	%-age
Deco	4500	60
General Industry Metal	541	7
General Industry Wood	469	6
Powder (in KiloTons)	394	5
Auto Original Equipment Manufact.	227	3
Can Packaging	226	3
Road Marking	209	3
Protective Steel	208	3
Coil	195	3
Auto Refinish	153	2
Marine	147	2
Agricultural Construction Equipment	130	2
Aerospace	8	0
Other	104	1
Total	7511	100



* incl Russia (741) and Turkey (532)

Source: Orr & Boss, quarterly updates

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Total	7511	100

- Regulated through the Product Directive 2004/42/EC
- No VOC
- Regulated through the (SED) IED 2010/75/EU

This means that 90 % of the European coatings volume is now covered under two directives (or solvent free)

There is no simple product based approach that can deliver any significant reduction of VOC emissions

Commission decided to leave the scope of the product directive unchanged

* incl Russia (741) and Turkey (532)

Source: Orr & Boss, quarterly updates



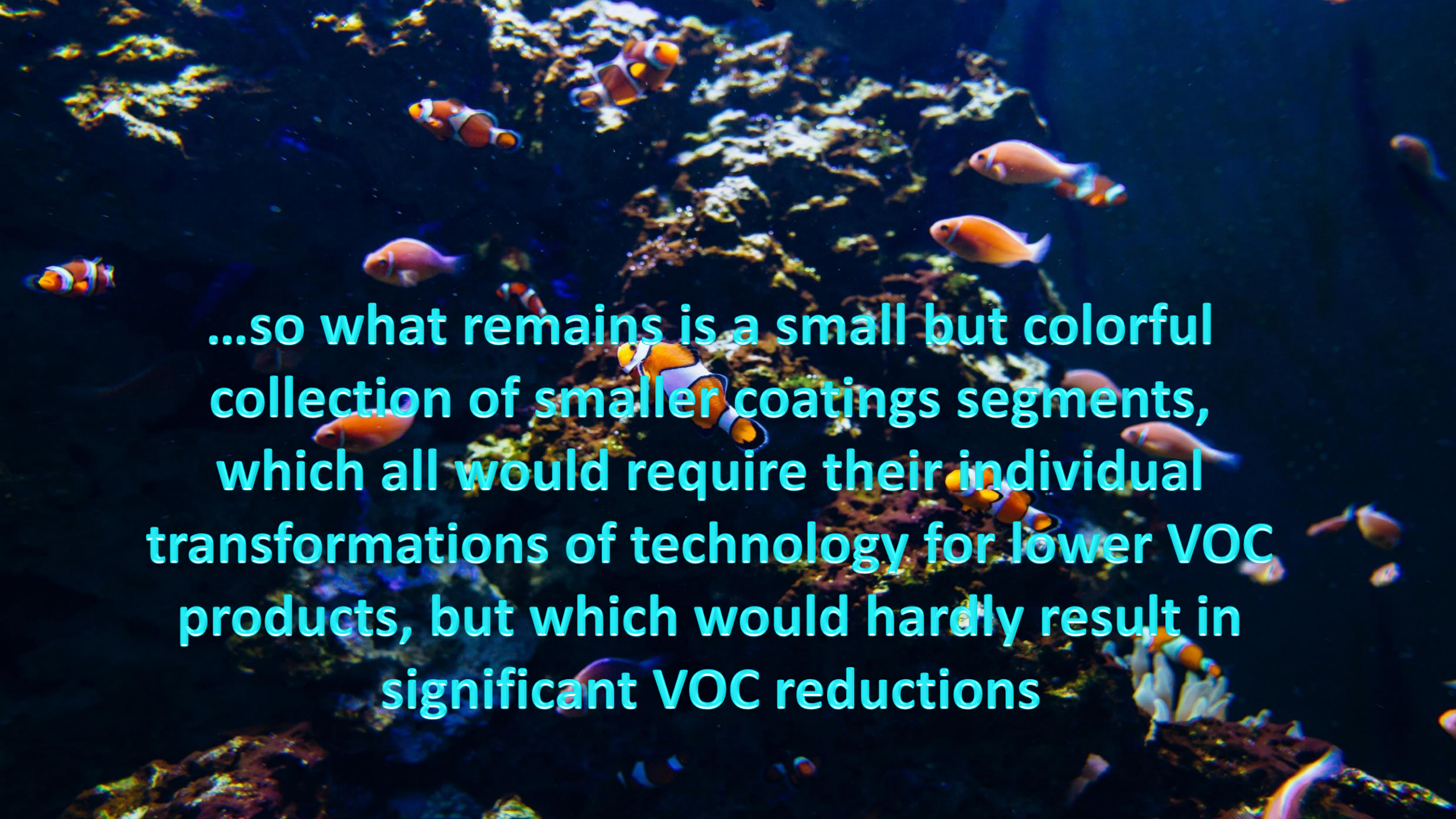
IN SUMMARY....



THE BIG FISHES ARE GONE



**REGULATING FURTHER WHAT WAS
ALREADY REGULATED LEAVES NO ROOM
TO MANEUVERE**



...so what remains is a small but colorful collection of smaller coatings segments, which all would require their individual transformations of technology for lower VOC products, but which would hardly result in significant VOC reductions



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