TORAY
Innovation by Chemistry

Itsue Yanagida, TORAY

ZERO TOLERANCE FOR VOCs

Protecting Workers, Factories, Air and Climate While Optimizing Flexible Packaging Printing

P4E
VOC-FREE
PRINTING SYSTEM

Welcome

Itsue Yanagida

Business Development Manager / Graphic Systems
Toray International Europe GmbH

- 2000-2006 Embassy of Japan in Germany, International communication
- 2006 Joined Toray
- The first destination in printing industry : Waterless printing for newspapers. Sales & marketing in Europe and UAE.
- From 2015 to 2020 : Corporate communication and marketing. Coordination between the HQ and 16 subsidiaries in Europe.
- 2020 : Rejoined in graphic systems team.

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‘TORAY‘

Introducing Toray

President:
Akihiro Nikkaku

Employees
48,320

Consolidated Net Sales
19,2
billion euros

Subsidiaries/Affiliates:
275 in **29**
countries worldwide

as of June 2019

Extensive Competence in Material Technologies

Fibers & Textiles
All three major synthetic fiber groups

Carbon Fiber Composite Materials
World's largest manufacturer of PAN-based carbon fibers

Performance Chemicals
Plastics and chemicals for a wide range of applications

Life Science
Medical products, pharmaceuticals and bio-tool products

Environment & Engineering
Construction and energy materials, engineering equipment and water treatment membranes

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Waterless Printing Technology in Europe

IMPRIMA

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VOCs:

The printing industry is one of the major sources of **Volatile Organic Compound** (VOC) emissions.

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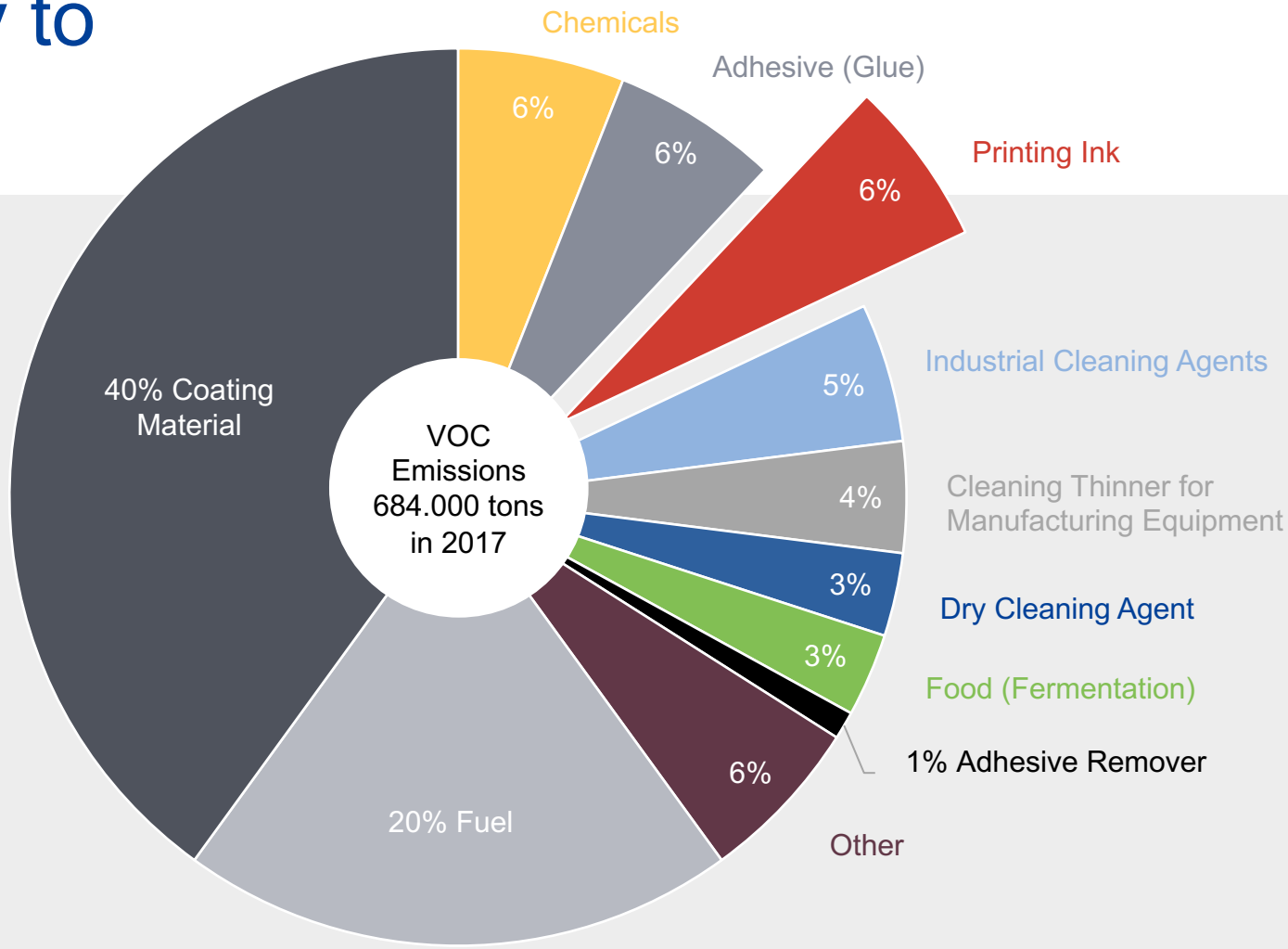
It Adds Massively to VOC Emissions



January 2018, Ministry of Economy, Trade and Industry
https://www.kansai.meti.go.jp/3-6kankyo/H30fy/VOC1129/jemai.pdf

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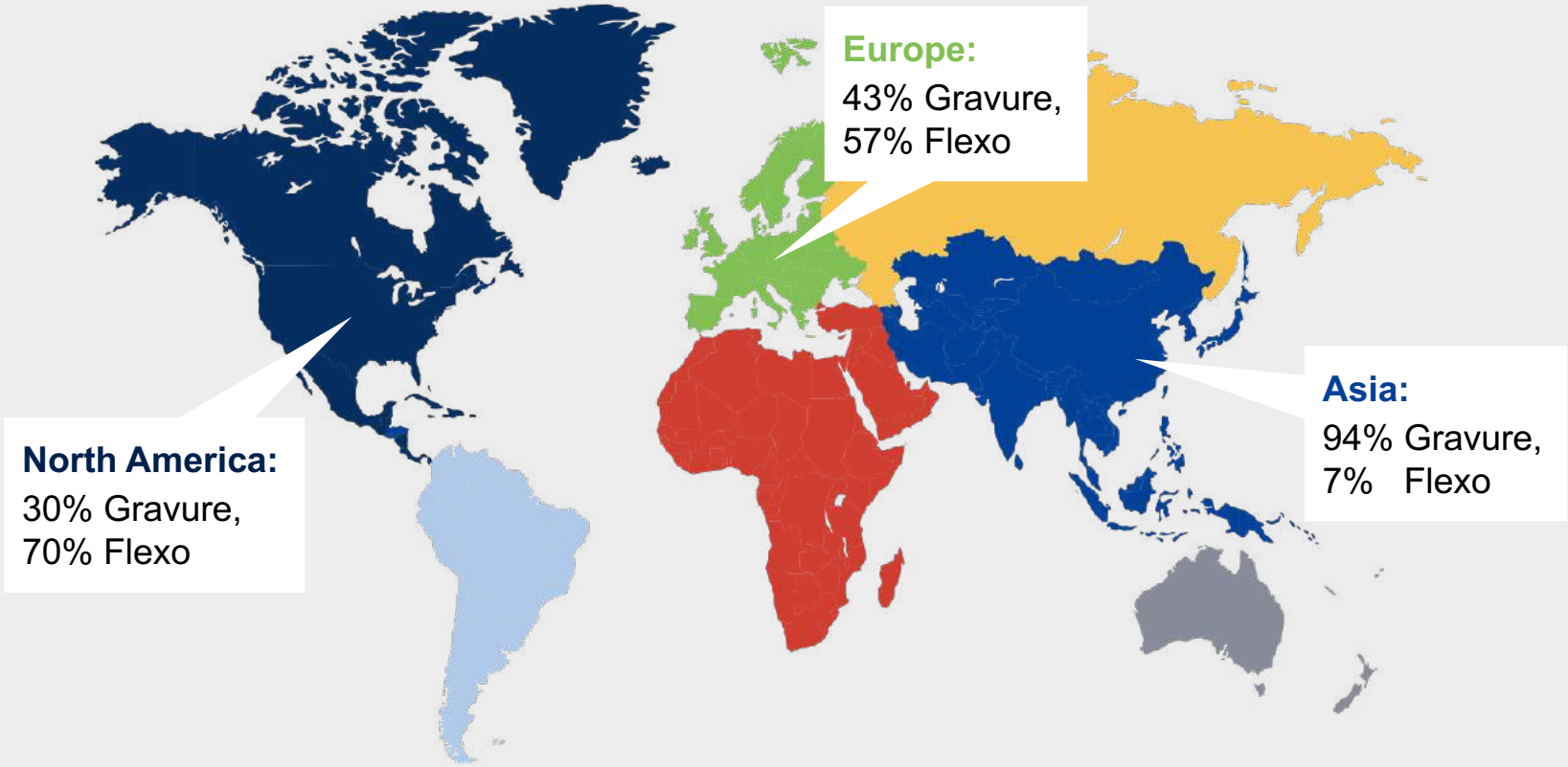
Existing Technologies Get Greener

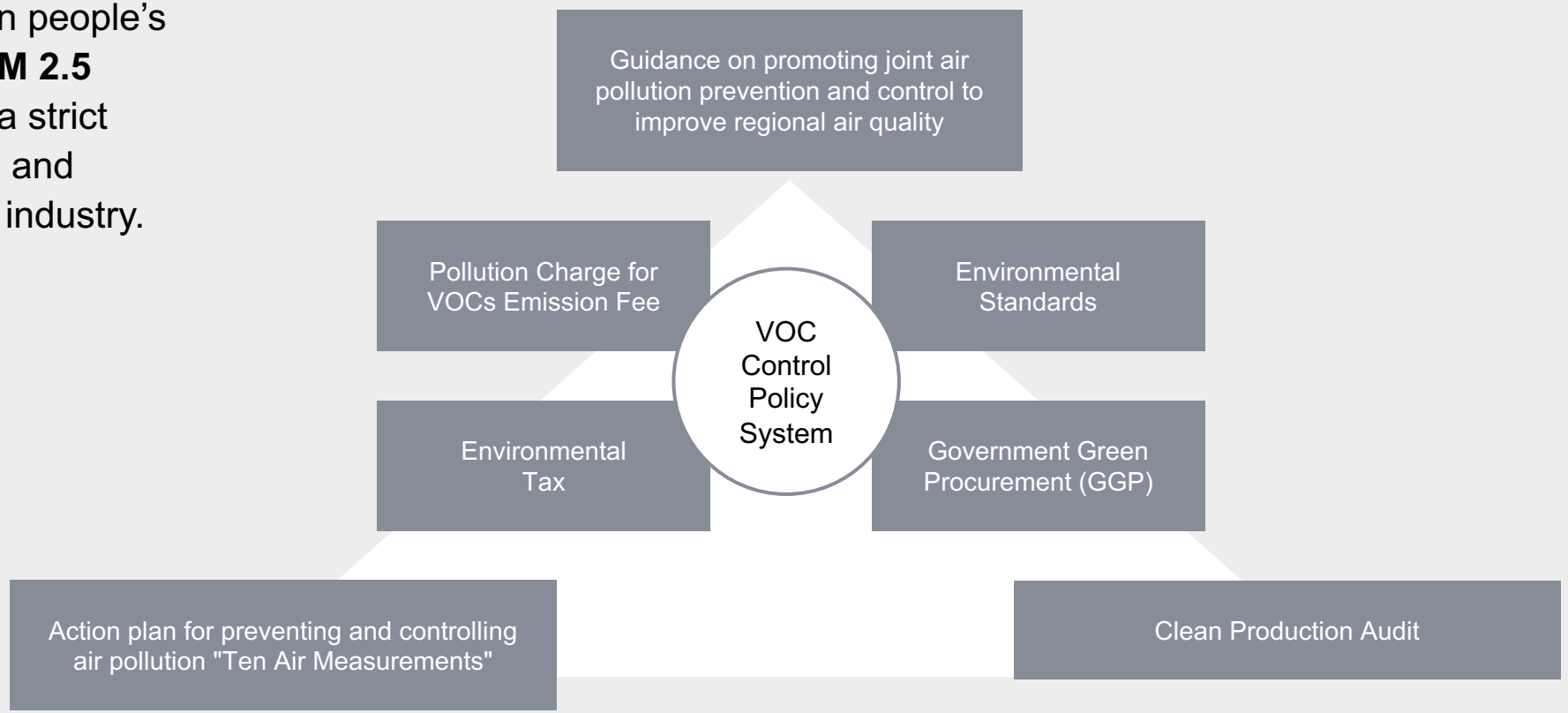
Existing Printing Methods Get Cleaner

The Current Situation of Printing Methods for Flexible Packaging is …



Regulations are increasing

Air pollution, with effects on people's health and an impact on **PM 2.5** problems in China lead to a strict VOC control policy system and regulations for the printing industry.



Conventional Printing includes VOC Reduction Process

Regenerative Thermal Oxidizer (RTO)

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- RTO cleans VOCs outside the factory

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- High initial cost and running cost
- Difficult and expensive installation
- Large size and weight
- High maintenance demand for moving parts
- VOC cannot be reduced to zero

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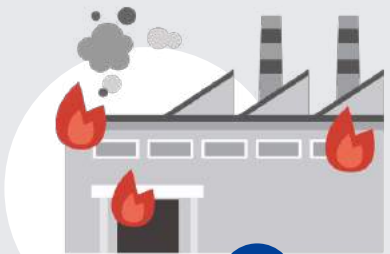
Reduction Does Not Solve the Core Problem



2 Safety Hazards

1 Workers' Health

3 Air Pollution

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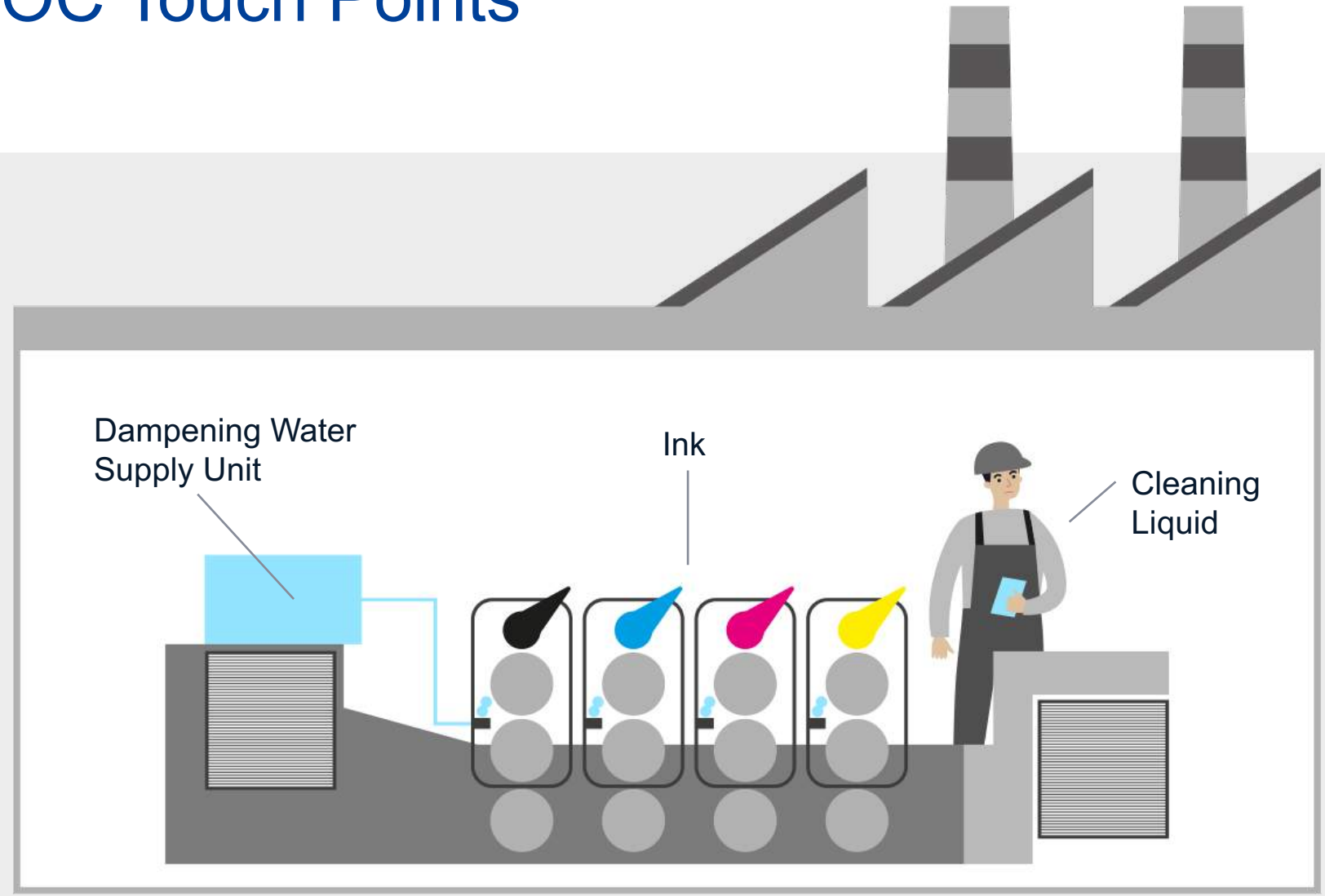
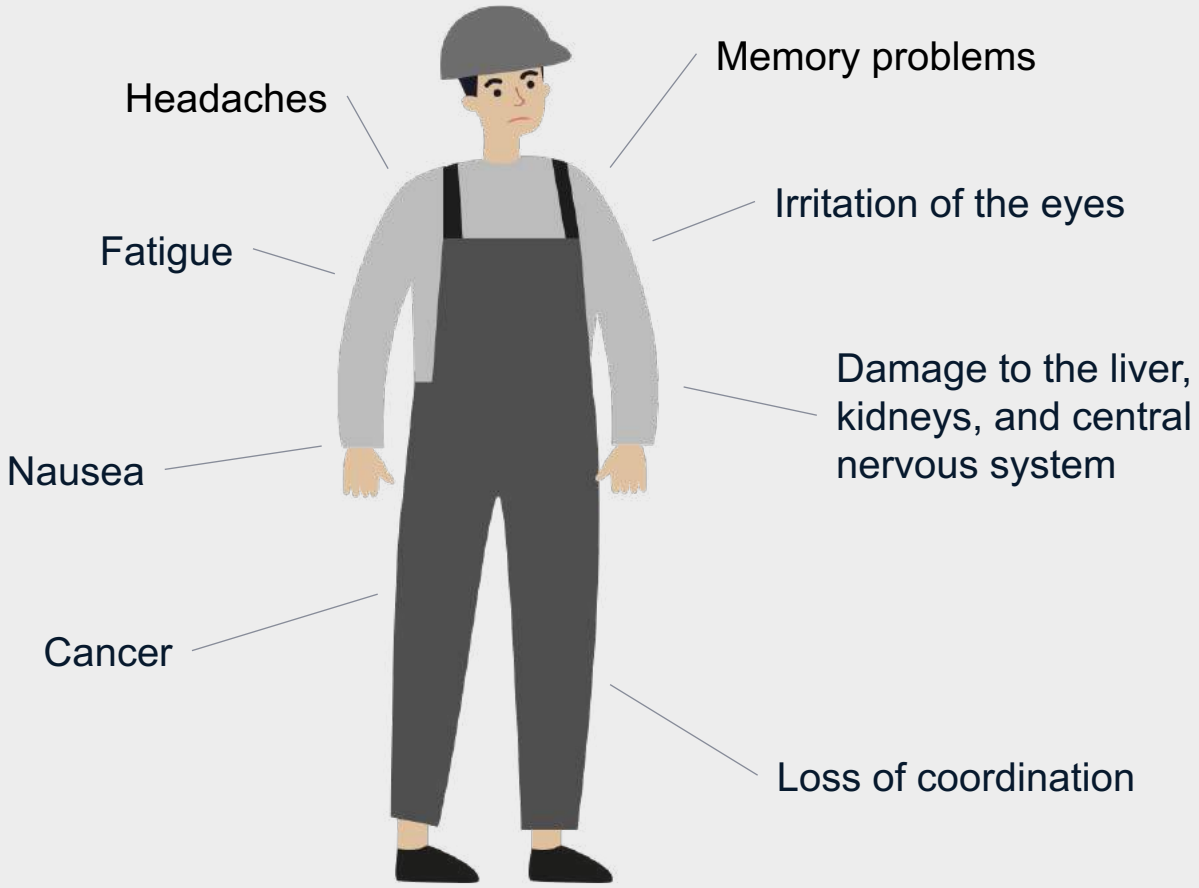
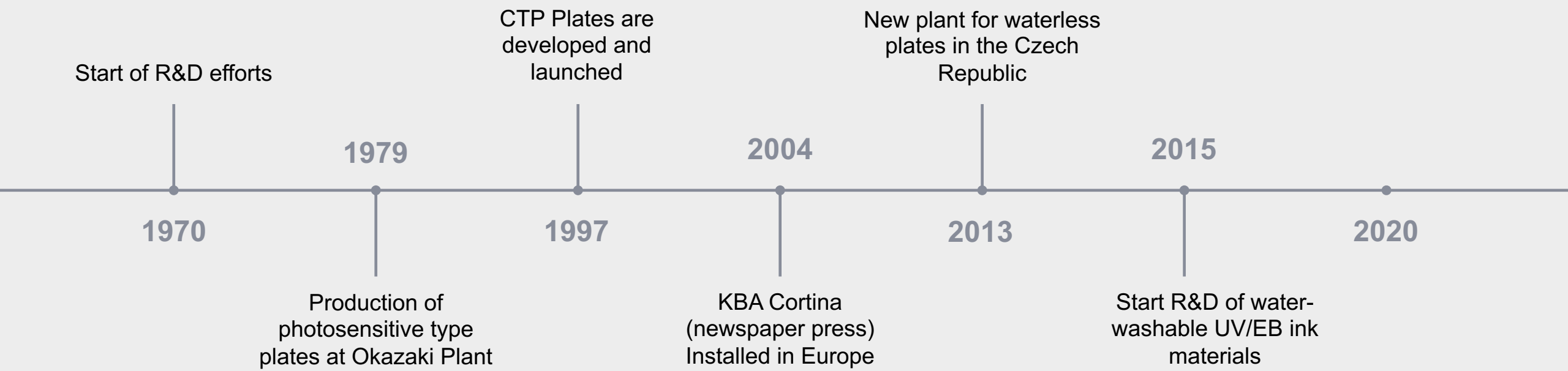
Worker VOC Touch Points



VOC Impact on Worker Health



TORAY Has Been Working To Eliminate VOCs for 50 Years



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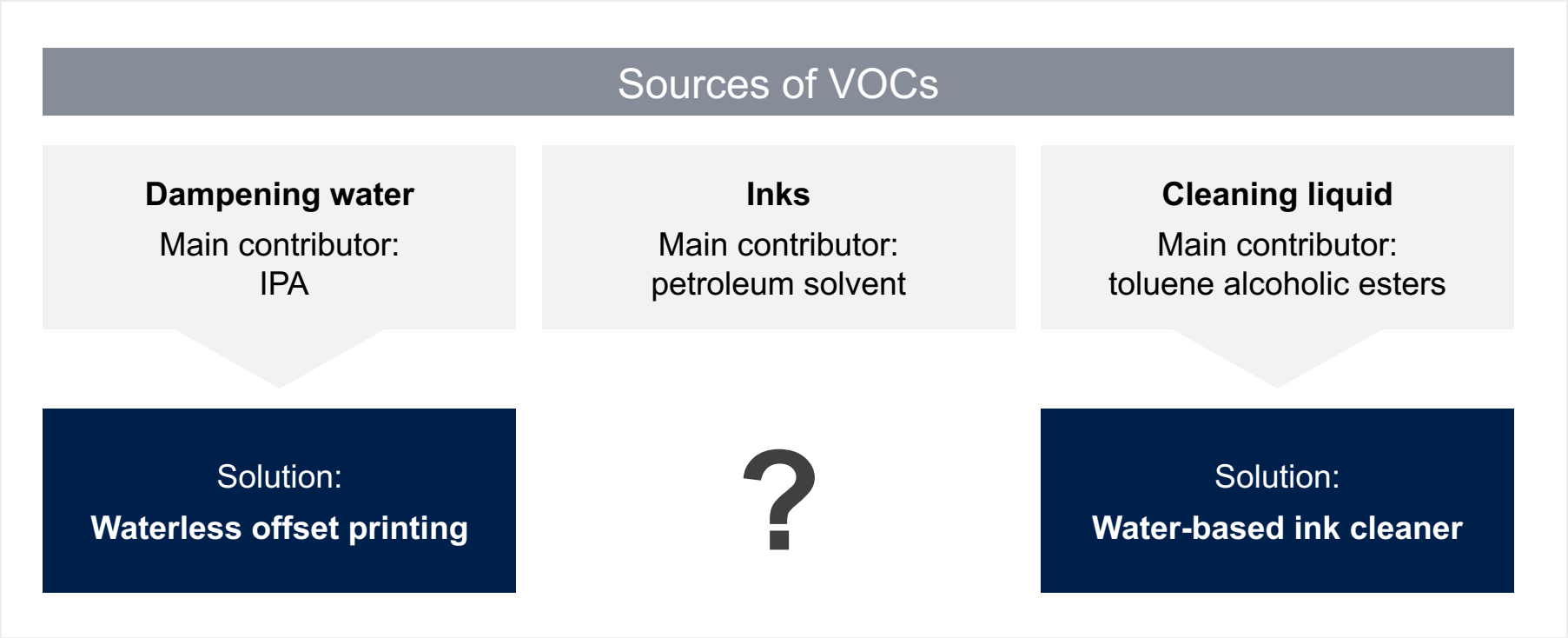
Water-Washable Ink – The Last Challenge



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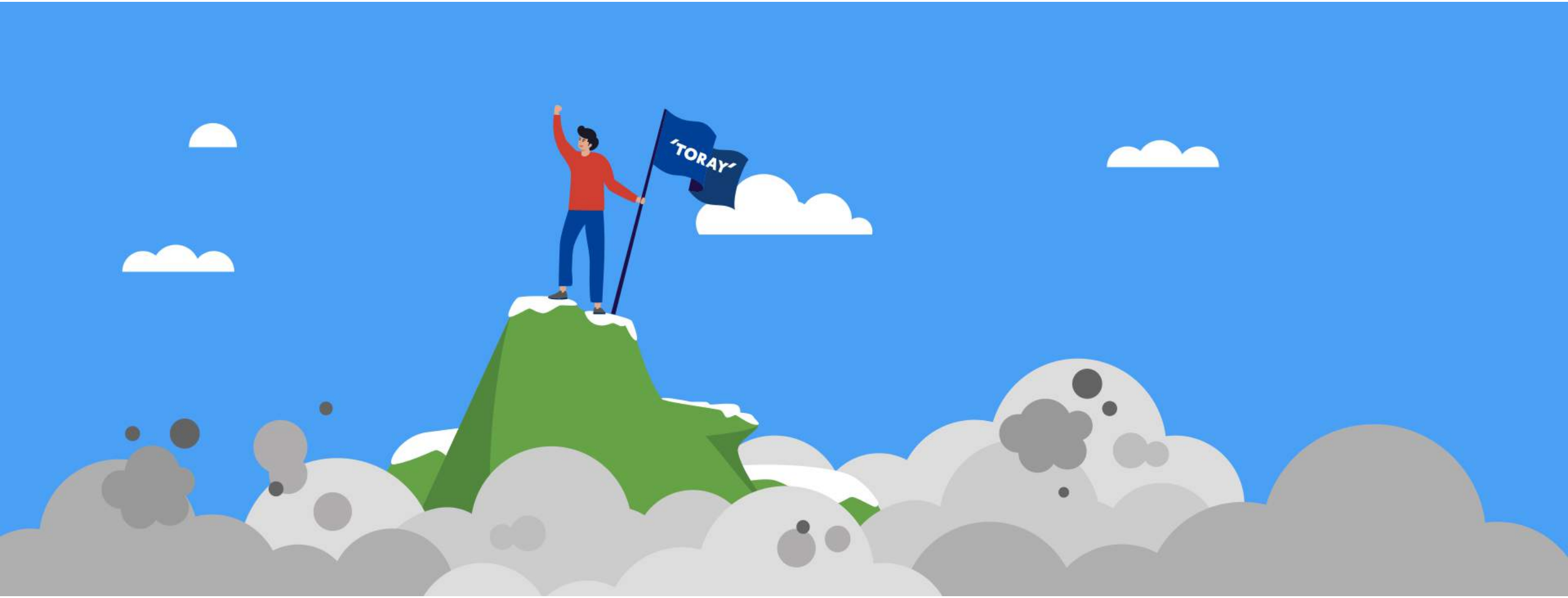
If Inks Become Water-Washable…

Today We Announce



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The Last Challenge In Printing Was Ink

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The Epoch-Making Solution We Present Today

Print for:

Ecology
Excellence
Efficiency
Epoch

P4E
VOC-FREE
PRINTING SYSTEM

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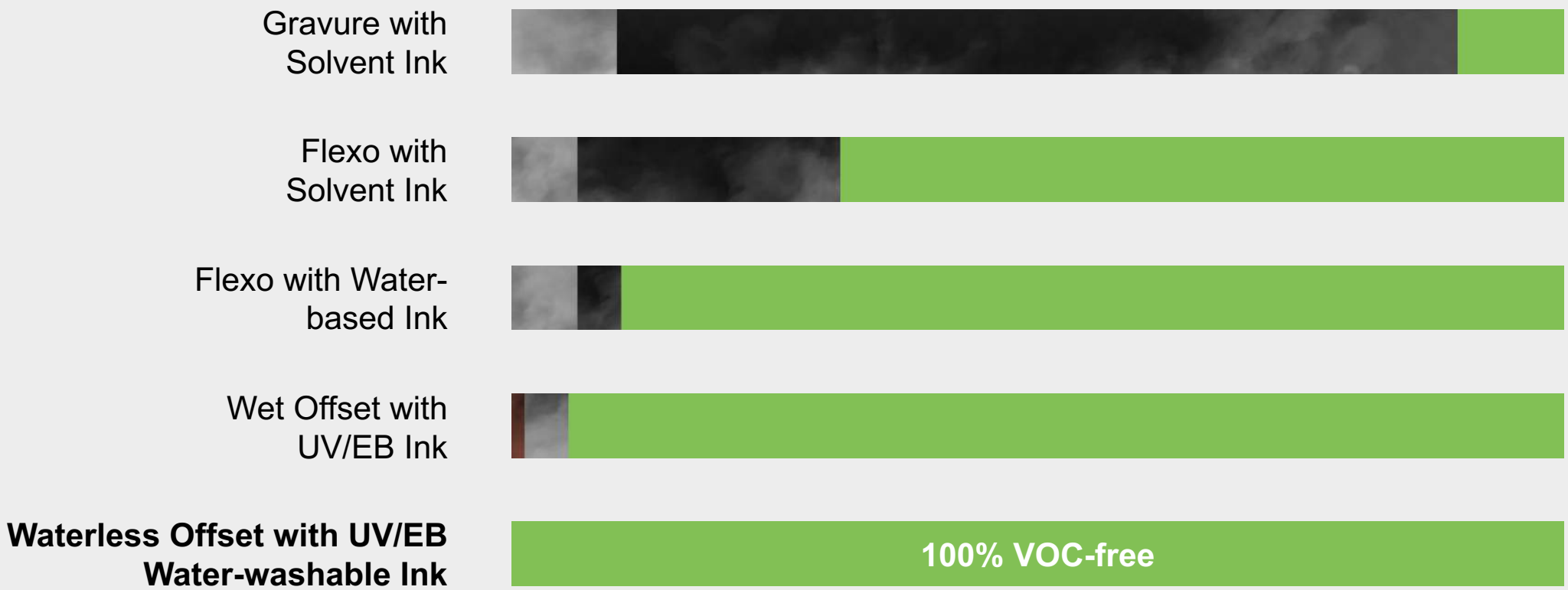
The first VOC-free Printing Technology:



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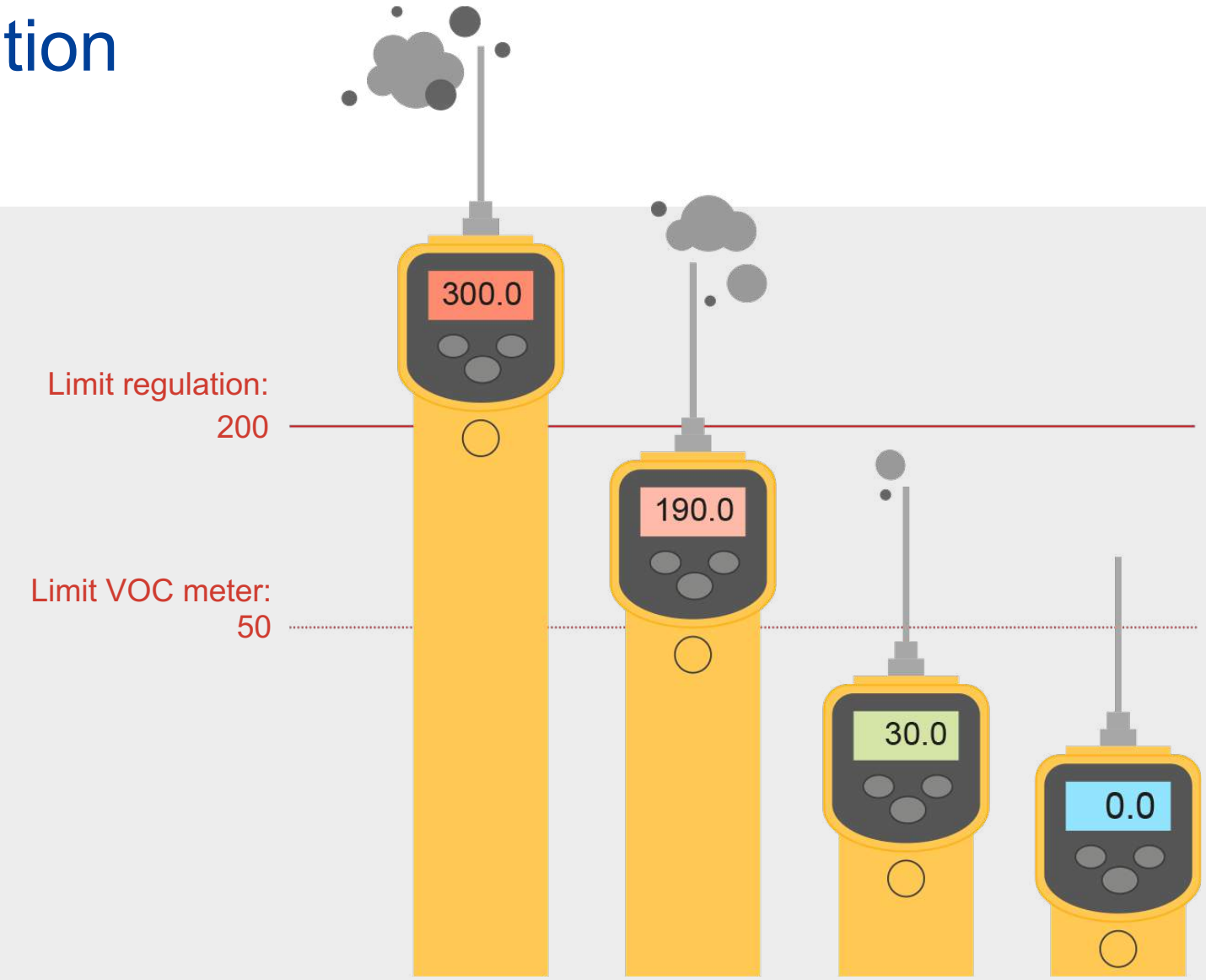
A Truly VOC-Free Solution

- Even in the printing industry, many people think that „VOC-free“ means zero emission, although the VOC emission is often only under the air pollution regulation.
- Torays technology generates ZERO VOCs from beginning-to-end.



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Key Technology:
Water-Washable EB Ink

Water-washable

EB Ink

Best Solution for Food Packaging

Regulations for food safety

- Nestlé standards
- Swiss ordinance
- Eupia guideline

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A New Epoch for Flexible Packaging

The world's first successful practical test of retort packaging printing with VOC-free waterless EB offset printing was realized at our partner SP Group, using the CI8 printing press by Comexi.

More Flexibility than Gravure or Flexo Printing

Increasingly, over the last decade, production lots consist of smaller volumes across a wider variety of products.

While gravure and flexographic printing are the preferred option for big lots, offset printing becomes more cost-effective when used for small and medium-sized lots – a segment that is growing.

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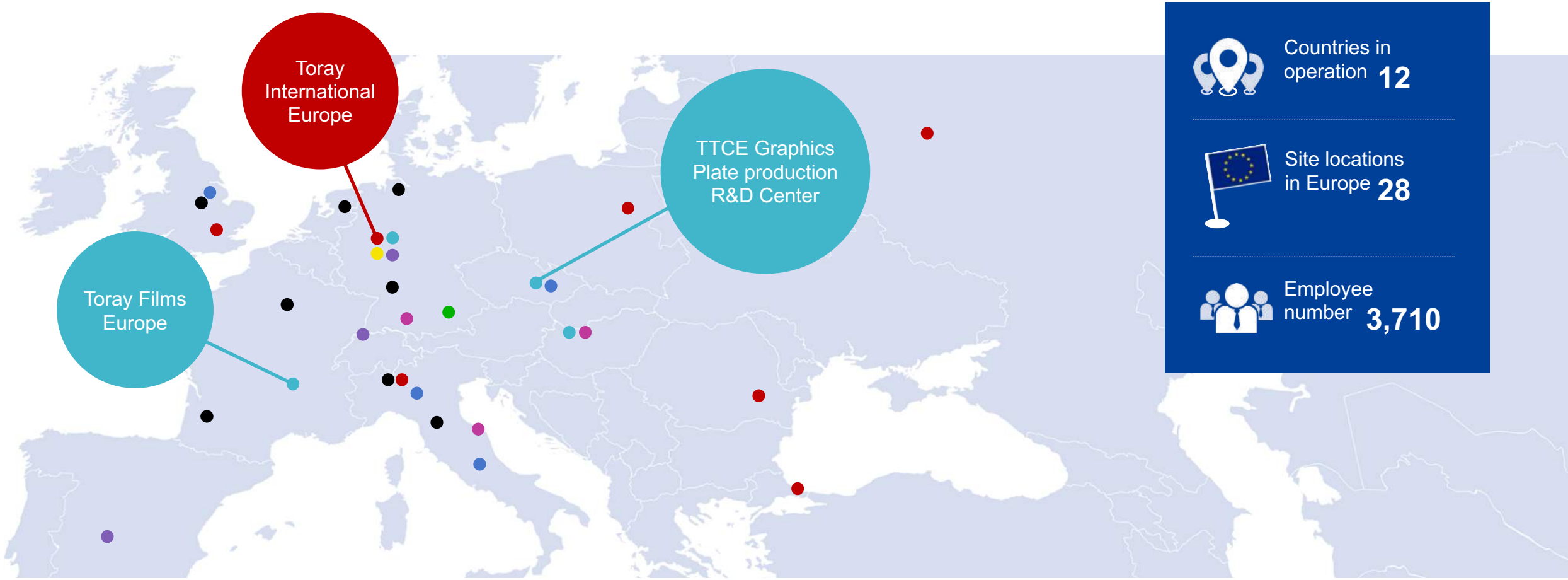
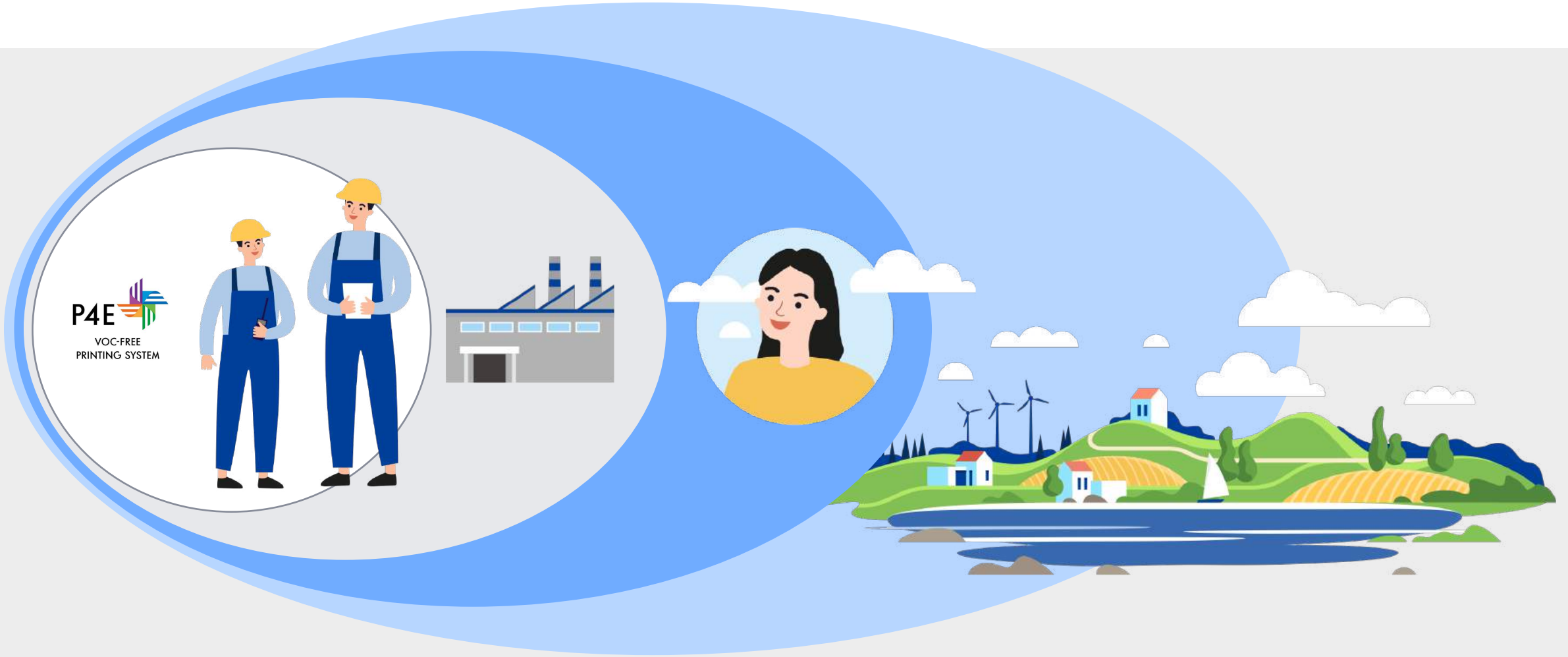
VOC-Free Printing: Already Close to You



And VOC-Free at the Core



Q & A ：Please Visit Toray Industries, Inc. Virtual Booth

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Takayuki Kamei
General Manager / Innovative Printing Materials Project
TORAY Industries,Inc.

YK

Yukio Kawakusu
Electronic & Information Materials Division
Toray

YB

YUZURU BABA
Electronic & Information Materials Division
Toray

THANK YOU

Innovation by Chemistry

Overview

P4E
VOC-FREE
PRINTING SYSTEM

	Waterless offset EB	Wet offset EB	Digital	Flexo	Gravure
VOC	0	+++	0	++	+
Quality (resolution)	+++	++	+	++	++
Quality (stability)	+++	+	++	++	+++
Quality (color range)	++	++	++	++	+++
Adhesion on films	++	+	+	++	+++
Boil & retort package	++	NA	NA	++	+++
Cost (Small lot jobs)	+++	+++	++	++	+

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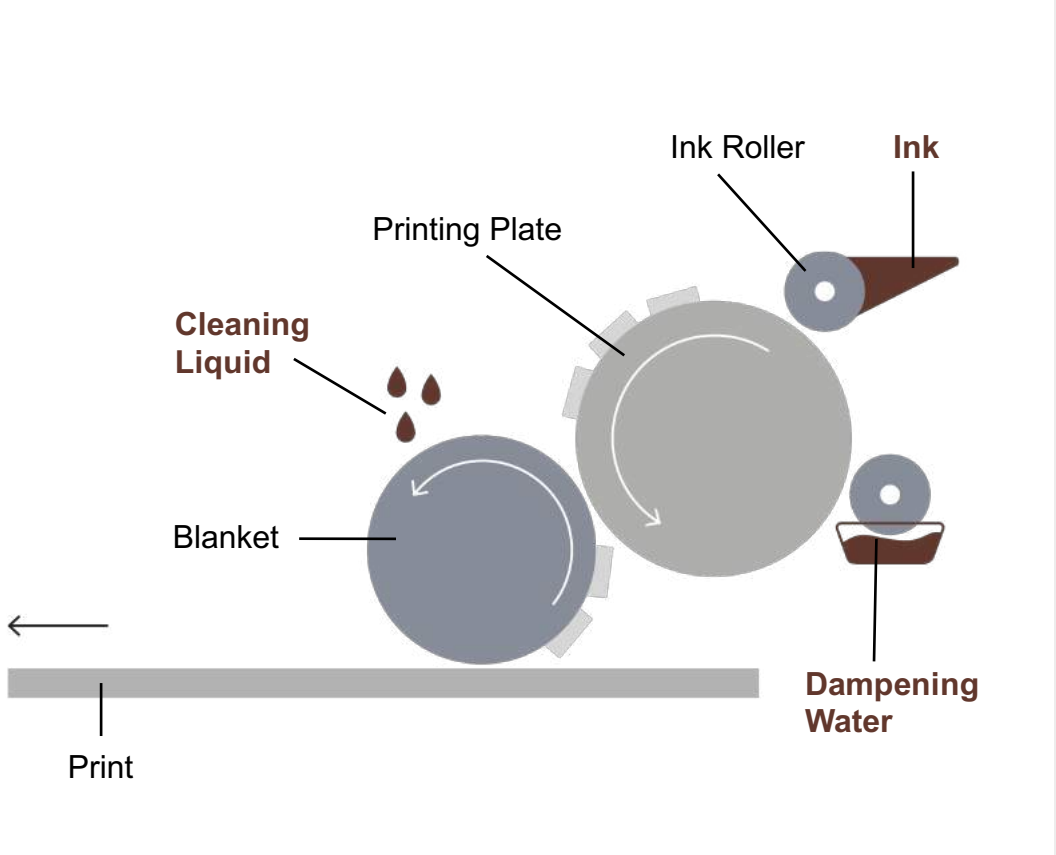
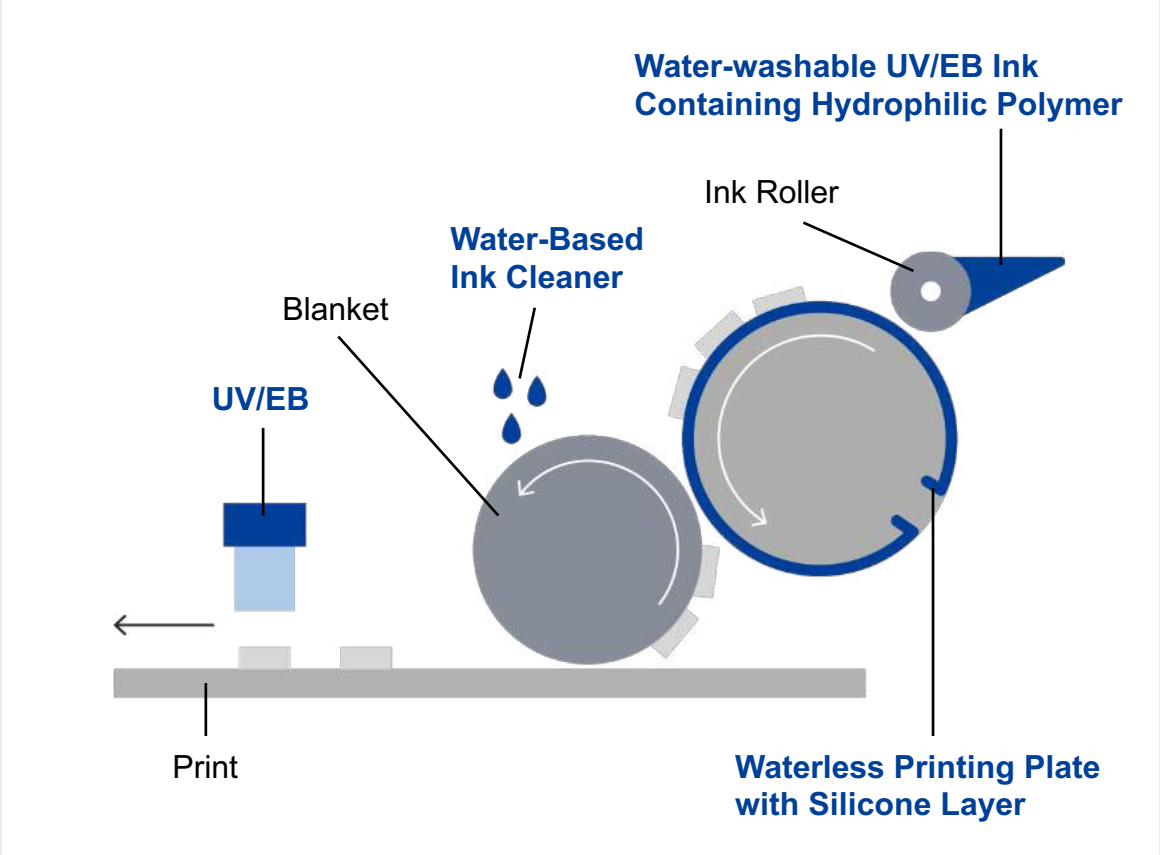
How the Complete Technology Works Practically





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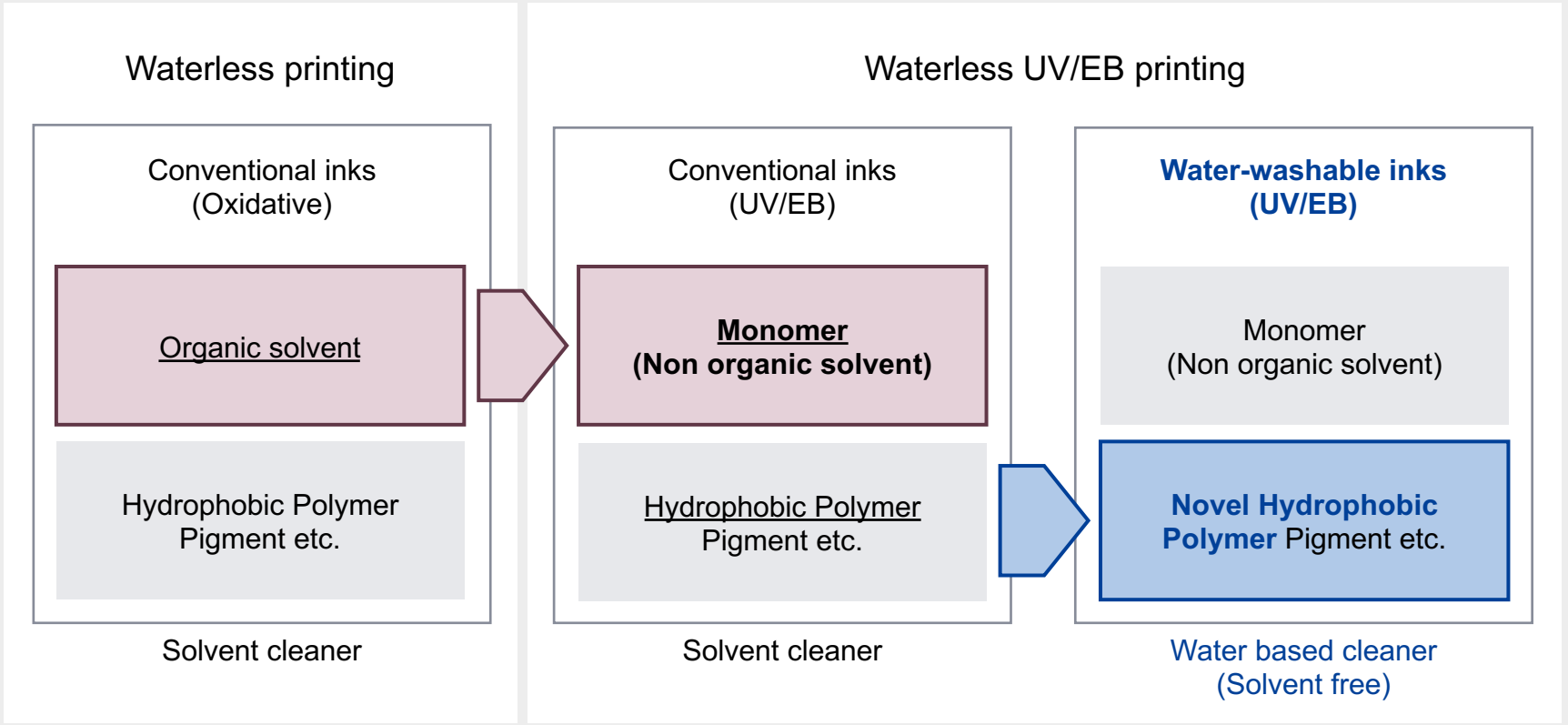
How was it Developed?

New ink for flexible packaging, developed based on water-soluble ink with unique polymer technology by TORAY.



Improved Print Quality

Superior printing quality

- sharper, high-resolution images due to silicone layer
- strong adhesion between inks and the substrate film materials

Conventional

Waterless

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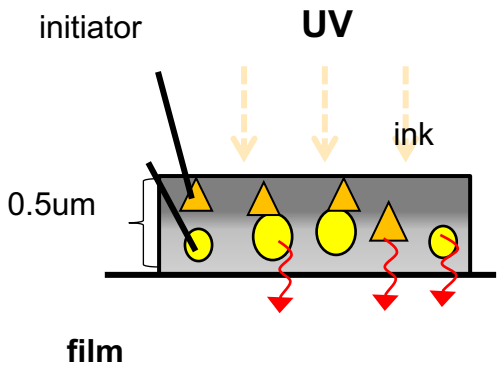
Packaged Products are Odorless and Safe

UV curing

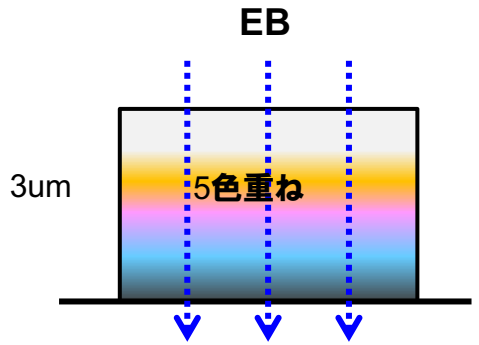
Curing starts from the surface layer
Initiator remains inside



Risk of migration and odor

EB curing

Heterogeneity curing
Initiator doesn't remain



No migration, No odor

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