Document 4

Reduced-Risk Products Science Update

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Forward-Looking Statements

This presentation contains forward-looking statements. These statements appear in a number of places in this document and include statements regarding the intent, belief, or current and future expectations of our management with respect to our business, financial condition and results of operations. In some cases, you can identify forward-looking statements by terms such as “may”, “will”, “should”, “would”, “expect”, “intend”, “project”, “plan”, “aim”, “seek”, “target”, “anticipate”, “believe”, “estimate”, “predict”, “potential” or the negative of these terms or other similar terminology. These statements are not guarantees of future performance and are subject to various risks and uncertainties. Actual results, performance or achievements, or those of the industries in which we operate, may differ materially from any future results, performance or achievements expressed or implied by these forward-looking statements. In addition, these forward-looking statements are necessarily dependent upon assumptions, estimates and data that may be incorrect or imprecise and involve known and unknown risks and uncertainties. Forward-looking statements regarding operating results are particularly subject to a variety of assumptions, some or all of which may not be realized.

Risks, uncertainties or other factors that could cause actual results to differ materially from those expressed in any forward-looking statement include, without limitation:

(1) increase in awareness of health concerns related to smoking;

(2) regulatory developments; including, without limitation, tax increases and restrictions on sales, marketing, packaging, labeling and use of tobacco products, privately imposed restrictions and governmental investigations;

(3) litigation around the world alleging adverse health and financial effects resulting from, or relating to, tobacco products;

(4) our ability to further diversify our business beyond the traditional tobacco industry;

(5) our ability to successfully expand internationally and make investments outside Japan;

(6) competition and changing consumer preferences;

(7) our ability to manage impacts derived from business diversification or business expansion;

(8) economic, regulatory and political changes, such as nationalization, terrorism, wars and civil unrest, in countries in which we operate;

(9) fluctuations in foreign exchange rates and the costs of raw materials; and

(10) catastrophes, including natural disasters.

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Science is central to our RRP business

Multi-disciplinary expertise & international collaboration



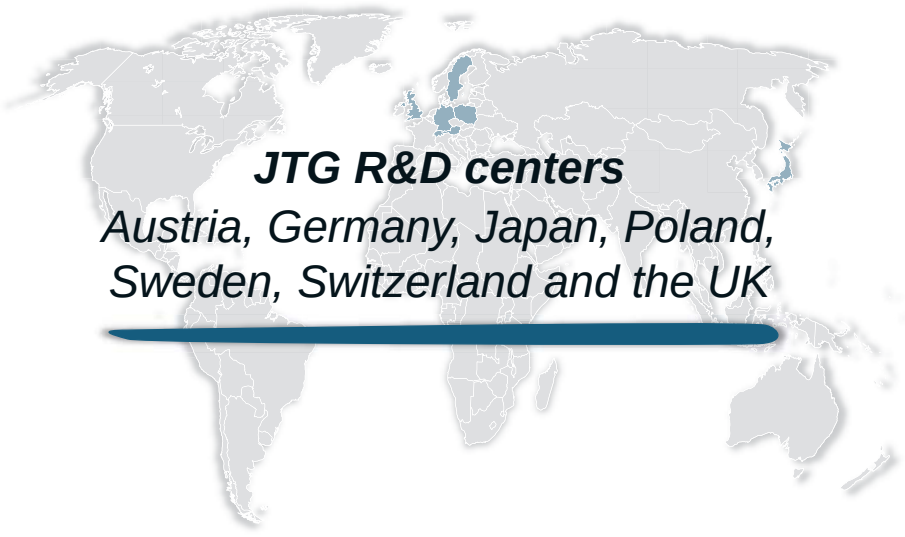
Fundamental Research



Applied Science



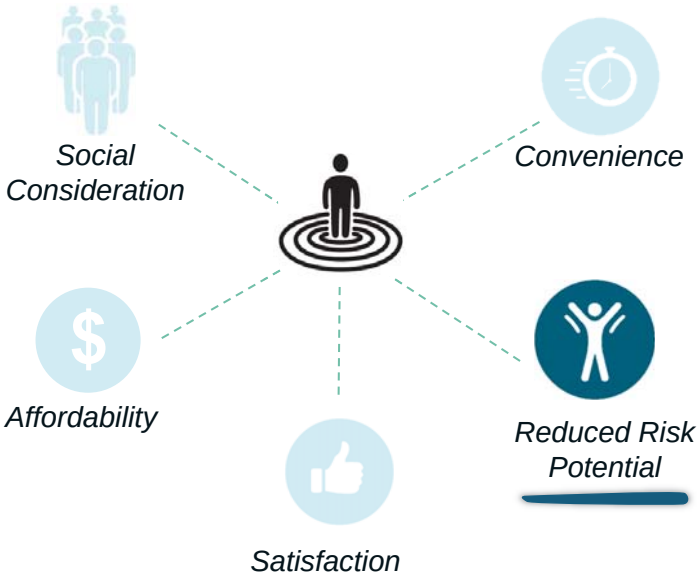
Reduced-Risk Assessment



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Broadening spectrum of consumer needs

Focus on Reduced-Risk potential



Consumers** are increasingly interested in experiences and products that address a **broadening spectrum of personal and social needs

Combining risk-reduction potential & product acceptance

To fulfill the Harm Reduction equation



The JT Group approach to assessment of RRP

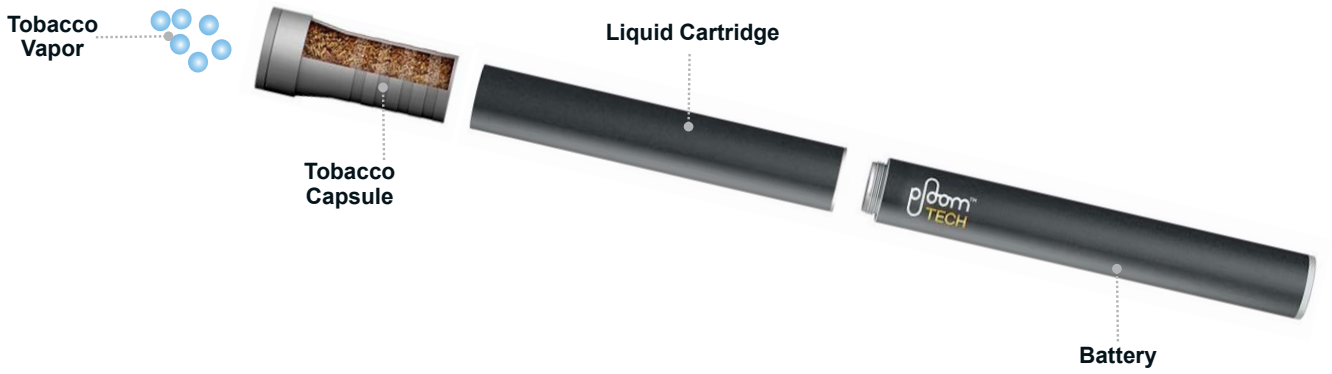
The emission is our starting point

1. **EMISSION** ▶ ***What comes out of the product***
2. **UPTAKE** ▶ ***Users' exposure to emissions & uptake into the body***
3. **EFFECT** ▶ ***Biological effects of uptake into the body***

4. **INDOOR AIR QUALITY** ▶ ***Environmental impact simulations***

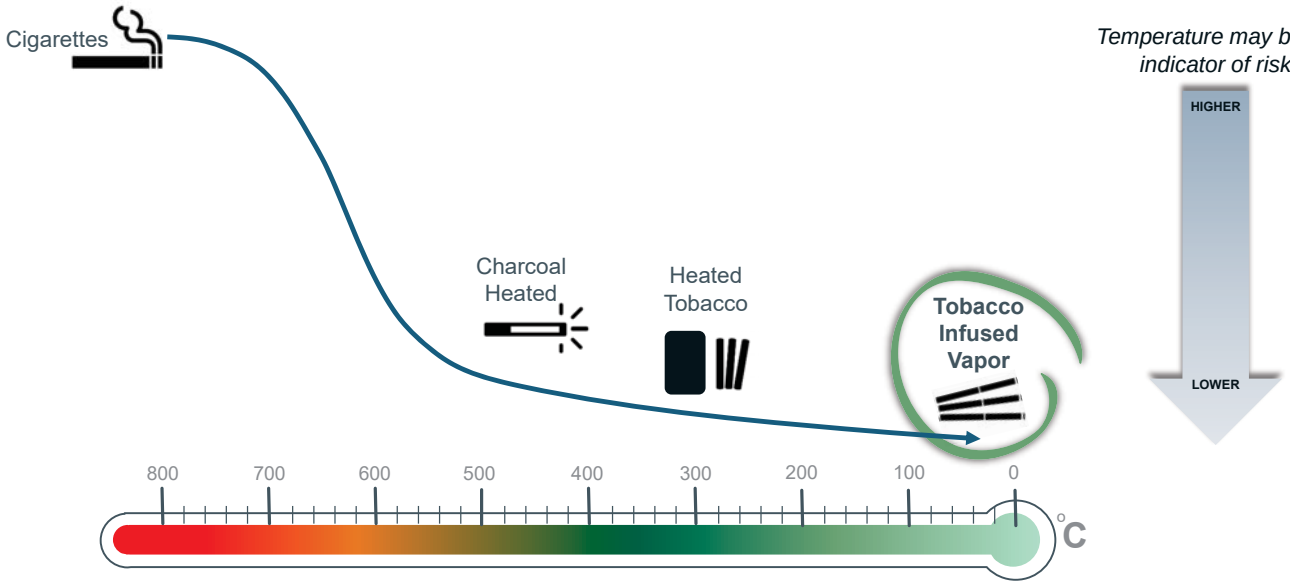
Tobacco Infused Vapor

How Ploom TECH works



1 Emission | The *risk cliff* concept

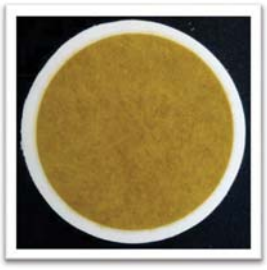
Potential risk-reduction in T-Vapor products



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1 Emission | Dramatically reduced levels of TPM in Ploom TECH

Analysis of smoke & vapor constituents



3R4F Reference cigarette (control)



Commercially available Heated Tobacco product





E-cigarette

Reduction in the nine constituents recommended by the WHO for reduction in cigarette smoke

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Reference: Internal JT Group Studies. Note: "TPM" stands for Total Particulate Matter.

2 Uptake | Clinical study design

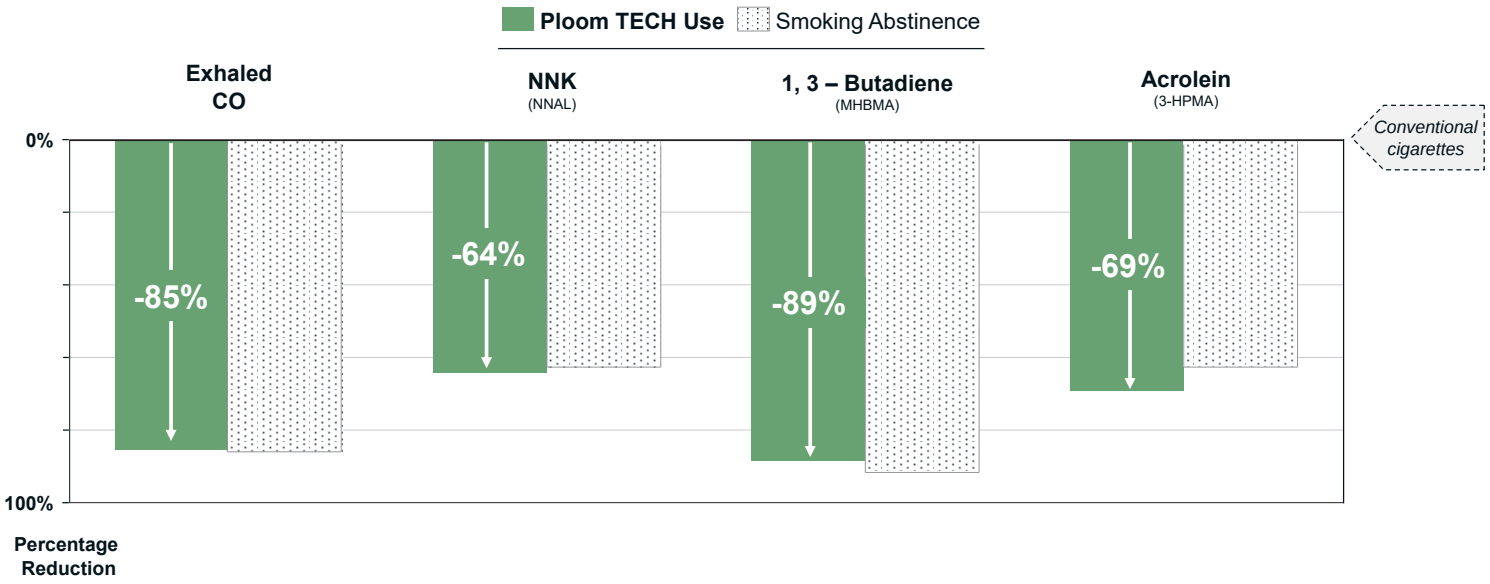
Biomarkers of exposure



The subjects used products *ad libitum* for 5 days

2 Uptake | Reductions similar to smoking abstinence

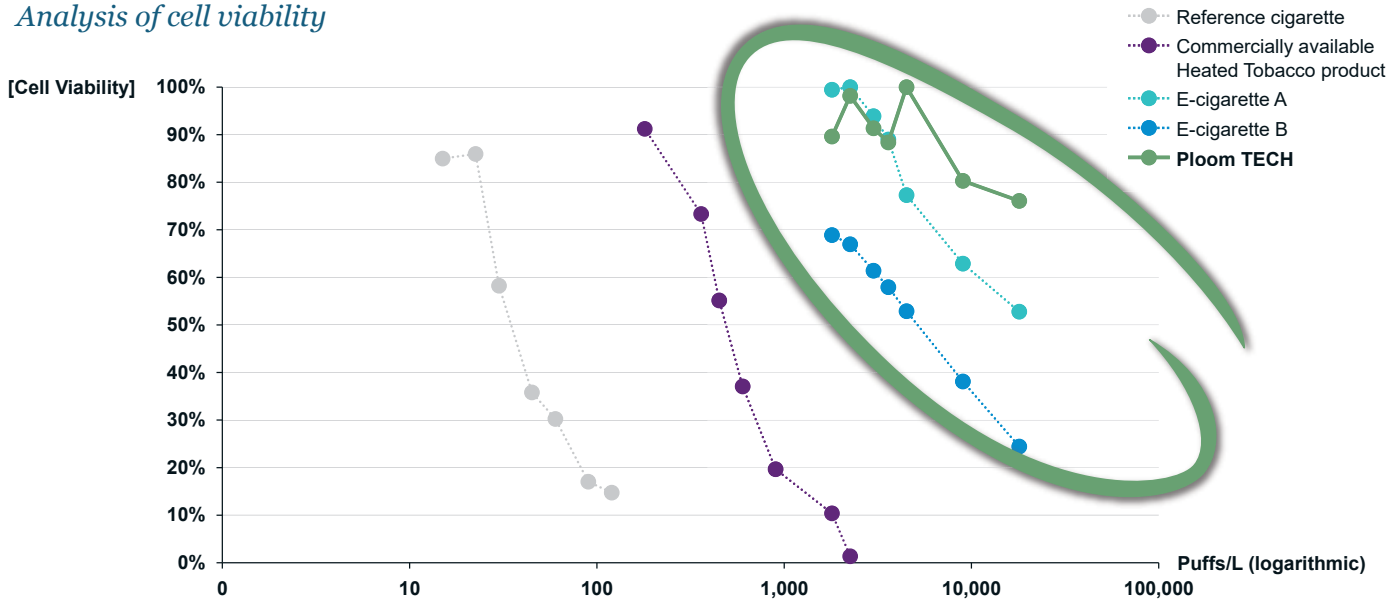
Biomarkers of exposure



Reference: D. Yuki et al., 2018. Assessment of the exposure to harmful & potentially harmful constituents in healthy Japanese smokers using a novel tobacco vapor product vs. conventional cigarettes and smoking abstinence. Regul Toxicol Pharmacol. 96, 127-134.

3 Effect | Less biological impact compared to smoking

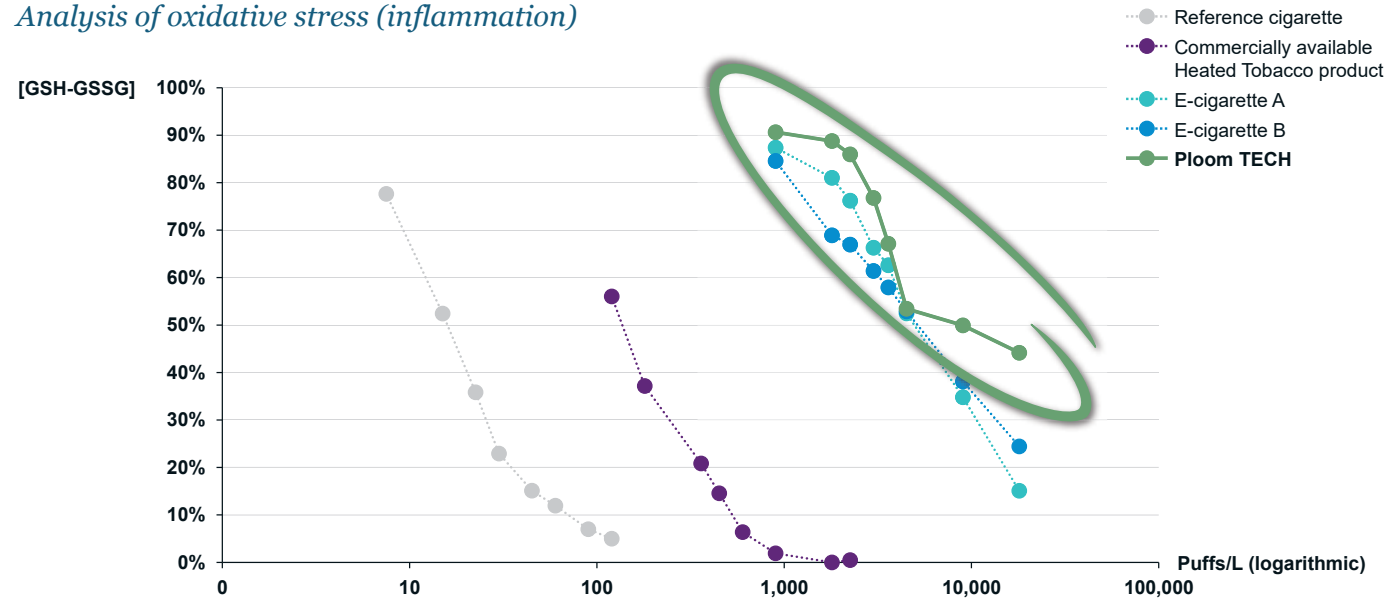
Analysis of cell viability



Reference: S. Munakata et al., 2017. Comparative effects of cigarette smoke and novel tobacco product vapor on in vitro cellular responses in human bronchial epithelial cells. Society of Toxicology 2017, Baltimore.

3 Effect | Less biological impact compared to smoking

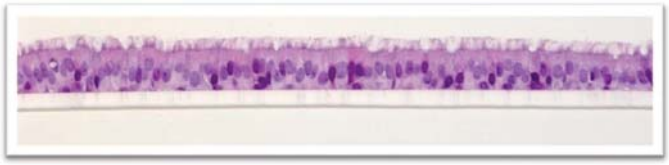
Analysis of oxidative stress (inflammation)



Reference: S. Munakata et al., 2017. Comparative effects of cigarette smoke and novel tobacco product vapor on in vitro cellular responses in human bronchial epithelial cells. Society of Toxicology 2017, Baltimore.

3 Effect | Observably less effect on tissue model, even at 10 times more puffs

In vitro airway model



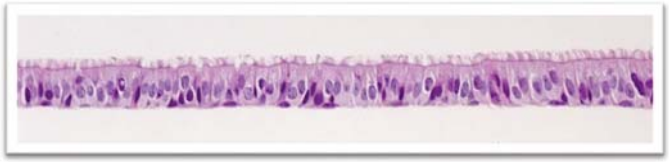
Control
(before exposure)

0 Puffs/L



Smoking
(3R4F cigarette)

200 Puffs/L



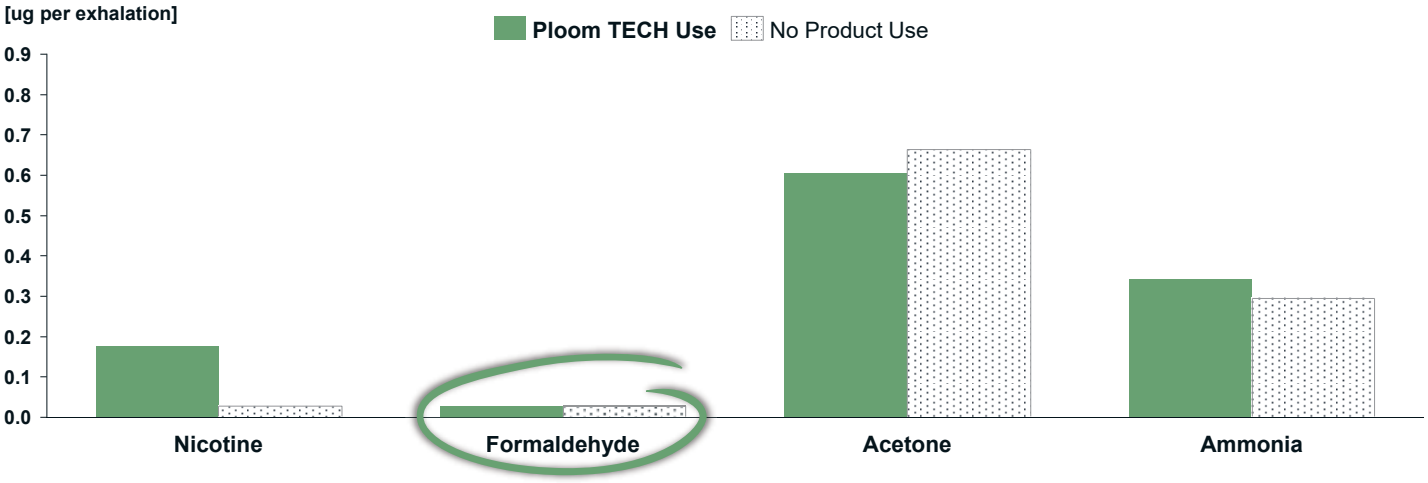
ploom TECH

2,000 Puffs/L

Reference: Internal JT Group Studies.

4 Indoor Air Quality | Minimal impact

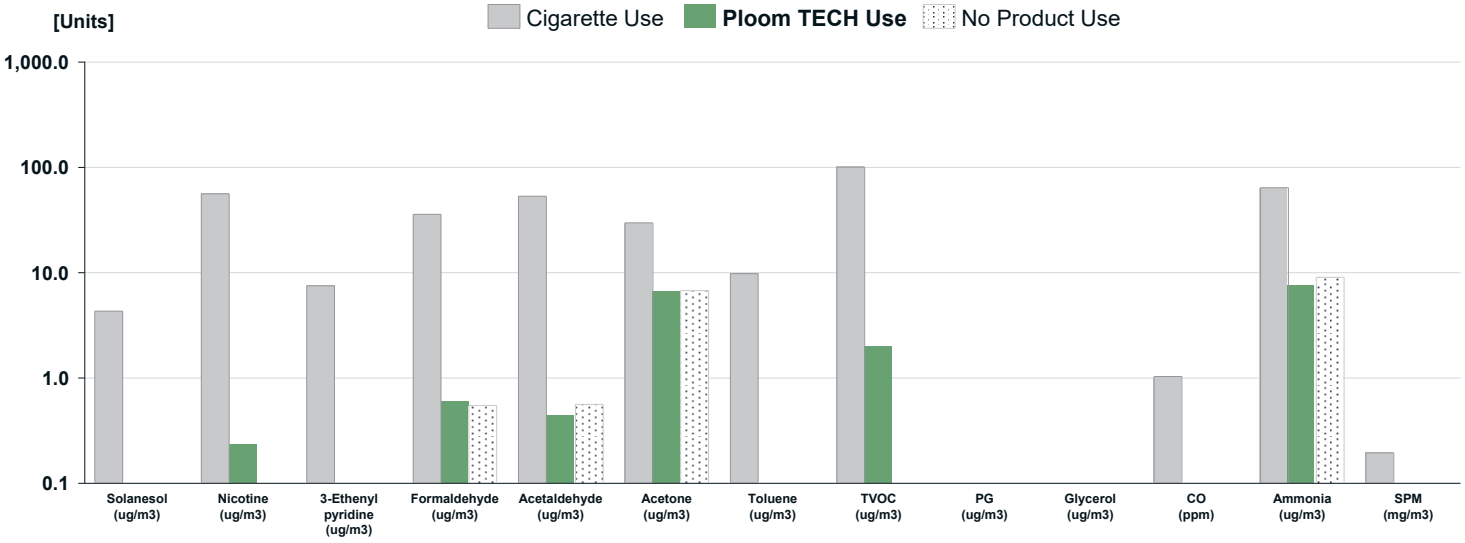
Exhaled breath analysis



Reference: H. Ichitsubo and M. Kotaki, 2018. Indoor air quality (IAQ) evaluation of a Novel Tobacco Vapor (NTV) product. Regul Toxicol Pharmacol. 92, 278-294.

4 Indoor Air Quality | Minimal impact

Simulation of an occupied smoking lounge



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Reference: H. Ichitsubo and M. Kotaki, 2018. Indoor air quality (IAQ) evaluation of a Novel Tobacco Vapor (NTV) product. Regul Toxicol Pharmacol. 92, 278-294.

Positive scientific results to date

Summary of Reduced-Risk potential

1. EMISSION ✓
2. UPTAKE ✓
3. EFFECT ✓

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4. INDOOR AIR QUALITY ✓

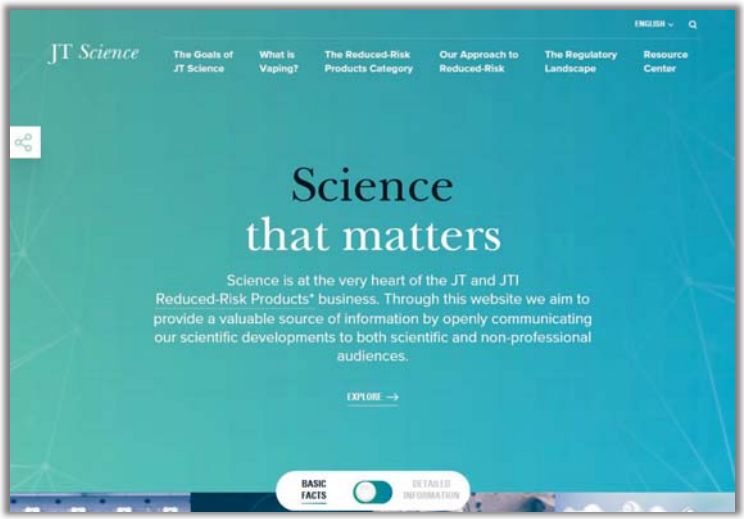


Our scientific assessments on Ploom TECH are providing very encouraging results, highlighting its strong Reduced-Risk potential

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