

## INSPIRING PRODUCTS DRIVING CHANGE



HARM REDUCTION FOCUS REPORT 2016

# **IN THIS REPORT**

- **02 WHAT IS HARM REDUCTION?**
- 03 UNDERSTANDING THE PRODUCTS AND RISKS
- 04 INSPIRING PRODUCTS, DRIVING CHANGE
- 06 AN EXPERT VIEW FROM KINGSLEY WHEATON
- 08 A CONSUMER-DRIVEN MARKETPLACE
- 09 A PROPORTIONATE APPROACH TO REGULATION
- 10 AN EXPERT VIEW FROM DR DAVID O'REILLY
- **12 OUR SCIENCE AND INNOVATION PROGRESS**
- 14 THE INDEPENDENT EVIDENCE TELLS US...
- 16 OUR COMMERCIAL PROGRESS
- **17 FUTURE OUTLOOK**

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We need to galvanise a global effort behind the message that alternative tobacco and nicotine products can have a dramatic and positive effect on public health."

Read more from Kingsley Wheaton on page 06 "

Offering consumers outstanding products, based on science, technology and innovation, is the cornerstone of the future of this company."

Read more from Dr David O'Reilly on page 10

#### **GROUP STRATEGY**



#### **OUR SUSTAINABILITY AGENDA**

Sustainability is important to all areas of our business, but we are particularly focused on three key issues, which we have identified, through a detailed materiality process, as the most important to our business and our stakeholders:

#### HARM REDUCTION

We are committed to researching, developing and commercialising less risky alternatives to regular cigarettes.

#### SUSTAINABLE AGRICULTURE AND FARMER LIVELIHOODS

We are committed to working to enable prosperous livelihoods for all farmers who supply our tobacco leaf.

#### **CORPORATE BEHAVIOUR**

We are committed to operating to the highest standards of corporate conduct and transparency.

Performance across all three areas can be found in our annual Sustainability Report.

In addition, we produce individual Focus Reports on each area, with this Report focusing specifically on the area of harm reduction. BAT is a highly successful, international business, and one of the great strengths of our 110-year history has been our ability to continually change and adapt to evolving consumer needs and market forces. The development of our range of less risky alternatives for adult consumers, which we call Next Generation Products, is a great example of this.

#### OFFERING CHOICE

This Report charts this progress and looks at the way in which the business has embraced the need to offer consumers a choice of new products, and how we are championing harm reduction and its potential to have a dramatic and positive effect on public health.

Both Kingsley Wheaton, Managing Director of Next Generation Products, and our Group Scientific and R&D Director, Dr David O'Reilly, talk about the significant progress the business has made. They explain how consumers are at the core of everything we do and how we're developing and marketing inspirational products, based on sound science and game-changing technology.

#### FUTURE INNOVATION

The Report also looks ahead to our planned expansion into new markets and the exciting range of new and innovative products we are poised to introduce, which will offer consumers even greater choice.

# WE BELIEVE THAT, THROUGH THE CREATION OF **NE CAN DRIVE CHANGE. AT THE HEART OF IS OUR DESIRE TO REDUCE THE HEALTH IMPAC OF TOBACCO ON THE WORLD."**

# **MORE INNOVATION, MORE CHOICE**

FOR SOCIETY IN REDUCING THE PUBLIC HEALTH **IMPACT OF SMOKING** 

WIN

FOR CONSUMERS **IN OFFERING A CHOICE OF EXCITING, LESS RISKY PRODUCTS** 

#### FOR SHAREHOLDERS IN GENERATING SUSTAINABLE VALUE

At BAT, we're proud of over a

century of delivering shareholder value. Rightly, however, the world now demands more of us.

We believe that, through the creation of inspirational products, we can drive change. At the heart of this is our desire to reduce the health impact of tobacco on the world.

There remains no doubt that the traditional tobacco products on which our business was founded present significant risks for the millions of people who continue to smoke.

So in 2012, we rearticulated our Group strategy and ambition, firmly placing consumers at the centre, and made a public commitment to satisfying consumers in tobacco and beyond.

We were clear then, as we are now, that our business is based on championing informed consumer choice through offering a range of outstanding products across the risk continuum.

The search for reduced-risk products that can have widespread consumer appeal is not new. Today, the evolution of new, game-changing technology presents the best opportunity we've seen so far to develop a whole range of less risky alternatives to smoking that can be scaled commercially and meet consumers' expectations.

I see this as having the potential to offer a triple win: a win for society in reducing the public health impact of smoking; a win for consumers in offering a choice of exciting, less risky products; and a win for our business and our shareholders in generating sustainable value.

Will all smokers switch to alternative products over the medium to long term? I doubt it, but that's not the same as saying we don't want that to be the end-game.

Over the last five years, we have invested over US\$1 billion in the development, scale-up and marketing of these alternative products. And our plans for the future are larger still, with a rolling five-year view on our innovations pipeline and further expansions into new markets to reach even more consumers.

I'm confident that we have the capabilities to succeed in our ambition and ultimately to deliver our commitments to consumers, society and our shareholders.

## Nicandro Durante

NICANDRO DURANTE **Chief Executive** February 2017

# WHAT IS HARM REDUCTION?

Tobacco harm reduction is about encouraging adult smokers, who have been unable to quit, to switch to alternative sources of nicotine with lower health risks.

This is based on a well-established public health concept that seeks pragmatic ways to minimise the impact of an inherently risky activity or behaviour without stopping it entirely. For example, advocating the use of condoms reduces the spread of sexually transmitted diseases.

The idea of tobacco harm reduction is not new and working to develop less risky products has been a strategic priority for BAT for many years. We've also long promoted snus, a type of lowtoxicant oral tobacco, which is proven to be reduced risk, but it has lacked wide consumer appeal and global regulatory acceptance.

More recently, a whole new generation of alternative products has emerged, including Vapour Products (e-cigarettes) that contain no tobacco at all, and Tobacco Heating Products (THPs) that heat rather than burn tobacco.

While these haven't been around long enough to generate epidemiological data, which looks at health impacts after decades of use, the evidence to date indicates that the risks are highly likely to be much lower than continued cigarette smoking. For example, an independent evidence review by Public Health England, an executive body of the UK Department of Health, concluded that "the current expert estimate is that using e-cigarettes is around 95% safer than smoking"<sup>1</sup>.

#### A WAY FORWARD FOR PUBLIC HEALTH

An increasing number of bodies in the scientific and public health community are now advocating this approach as the way forward to help the one billion people worldwide who continue to smoke despite the known health risks.

The World Health Organisation has stated that, "if the great majority of tobacco smokers who are unable or unwilling to quit would switch without delay to using an alternative source of nicotine with lower health risks, and eventually stop using it, this would represent a significant contemporary public health achievement"<sup>2</sup>.

A report by the UK Royal College of Physicians states that, "as most of the harm caused by smoking arises not from nicotine but from other components of tobacco smoke, the health and life expectancy of today's smokers could be radically improved by encouraging as many as possible to switch to a smoke-free source of nicotine"<sup>3</sup>.

Some governments, such as in the UK, are taking a progressive approach and recognising the role that these

# "

# With careful management and proportionate regulation, harm reduction provides an opportunity to improve the lives of millions of people."

UK Royal College of Physicians, 2016

However, concerns continue to be raised about long-term health risks, as well as the potential for alternative products to be a gateway into smoking, particularly for young people. So some governments are taking a precautionary approach through regulatory restrictions, such as bans on vaping in public places.

This is in contrast to the latest international peer-reviewed evidence and leads to confusion among the general public, which can undermine the public health benefits this new generation of tobacco and nicotine products could bring.

## >> Find out what the independent evidence tells us on pages 14–15.

#### **BAT'S ROLE IN HARM REDUCTION**

We see our role very clearly. It is to ensure that we have the resources, skills and ambition to develop and market a compelling range of alternative products, which will meet consumers' needs and reduce the public health impact of smoking.

As the world's most international and forwardlooking tobacco and nicotine company, we have a clear understanding of the complex needs of different consumers. We also have the know-how and capabilities in scientific research, product development and innovation, in robust safety and quality standards, in supply chain and manufacturing, and in responsible marketing.

We continue to advocate for, and work collaboratively to develop, clear and consistent regulations and industry-wide standards, to help ensure responsible and sustainable growth.

We understand that the tobacco industry is seen as controversial and that some people are sceptical about our motivations. We believe we should be given every chance to succeed in giving consumers a choice of less risky alternatives to cigarettes and drive change for the good of society.

products can play in the future of their tobacco control programme.

<sup>&</sup>lt;sup>1</sup> E-cigarettes: an evidence update, Public Health England, August 2015.

<sup>&</sup>lt;sup>2</sup> Electronic Nicotine Delivery Systems and Electronic Non-Nicotine Delivery Systems, a report by the World Health Organisation, August 2016.

<sup>&</sup>lt;sup>3</sup> Nicotine without smoke: Tobacco harm reduction, a report by the Tobacco Advisory Group of the UK Royal College of Physicians, April 2016.

# UNDERSTANDING THE PRODUCTS AND RISKS

Scientists widely agree that it's largely the toxicants found in cigarette smoke that cause smoking-related diseases – not the nicotine itself. Products that involve no combustion are likely to emit far fewer and lower levels of toxicants compared to conventional cigarettes and have the potential to be significantly less harmful to health.

The independent evidence for Swedish-style snus – a type of low-toxicant smokeless tobacco – and licensed medicinal products, such as nicotine patches or gum, is well-established

from decades of use. The same long-term evidence is not yet available for new types of Tobacco Heating and Vapour Products. However, our research has shown they emit far lower levels of toxicants compared to conventional cigarettes and have the potential, that needs to be confirmed by further research, to be associated with significantly lower health risks than continued cigarette smoking.

The level of toxicants different products emit, based on current evidence, is modelled on the graphic below:



# INSPIRING PRODUCTS, DRIVING CHANGE

We know cigarettes pose real and serious health risks and that the only way to avoid these risks is not to use them. But many adults continue to smoke, so working to develop and commercialise less risky products has been a strategic priority for the Group for many years.

Our R&D department was first established in 1956 and over that 60-year history we have invested heavily in tobacco research and trying to reduce toxicants in combustible cigarettes, as well as more recently seeking out innovative, lower-risk products.

In the last decade, we have seen a sharp increase in the pace of change and progress: from embedding harm reduction as a key strategic pillar in the Group Sustainability Agenda; to establishing our Next Generation Product business and enhancing our capabilities with new acquisitions and partnerships; to rapidly building a range of innovative and inspiring products for consumers across multiple markets.

### 2010

**Established our Nicoventures business** to focus exclusively on the development and commercialisation of Next Generation Products



2012 Next Generation

- Products become core to our enhanced Group strategy to be the world's best at satisfying consumer moments in tobacco and beyond
- Two Management Board positions
   created for Group
   Scientific and R&D
   Director, and Managing
   Director of Next
   Generation Products

#### FROM 1956

Established our first R&D department, followed by 60 years of research into understanding the risks of tobacco products

## 2007

Harm reduction forms a key strategic pillar of our new Group Sustainability Agenda, reflecting the significant business and stakeholder focus in this area

#### Acquisition of CN Creative, a UK-based e-cigarette company



2005 Launch of our

Launch of our first reducedrisk product, snus, a type of oral, smokeless tobacco



### 2008

- Launch of bat-science.com, increasing the transparency of our research
- Established our External Scientific Panel of leading experts to guide our research programme

### 2013

#### Launch of our first Vapour Product in the UK, making us

the first international tobacco company to market an e-cigarette

### 2014

- First tobacco company to have a product licensed as a medicine following receipt of a licence from the UK medicines regulator for our Voke nicotine inhaler
- Expanded the Vype range with the launch of the ePen, a rechargeable device with e-liquid cartridges in a choice of flavours

### 2015

#### **Expanded Vype to five further**

markets – Italy, France, Poland, Germany and Colombia



CHIC

Acquisition of the CHIC Group, a market-leading e-cigarette business in Poland

- New agreement with RJ Reynolds to collaborate on, and share, Vapour Product technology
- Launch of our first Tobacco Heating Product (THP), iFuse, in Romania
- Vapour Product Marketing Principles published and a commitment to 100% compliance
- Launch of the Vype eTank, an open, refillable modular device with a range of e-liquid bottles

### 2016

• Acquisition of Ten Motives, a UK-based e-cigarette business

MOTIVES

- **Launched Vype** in Kuwait, Bahrain, Guatemala and the Philippines
- Launch of our new THP, glo, in Japan
- Further expanded the Vype range with the launch of the Pebble, eBox and eTank Pro devices



AN EXPERT VIEW FROM KINGSLEY WHEATON

# WE NEED TO GALVANISE A GLOBAL EFFORT BEHIND THE MESSAGE THAT ALTERNATIVE TOBACCO AND NICOTINE PRODUCTS CAN HAVE A DRAMATIC AND POSITIVE EFFECT ON PUBLIC HEALTH."

The evolution of a new generation of tobacco and nicotine products provides an opportunity to dramatically reduce the health impact of smoking.

Kingsley Wheaton, BAT's Managing Director of Next Generation Products, explains how the future is all about more choices for consumers and why proportionate regulation, realistic taxation and freedom to innovate are crucial to long-term success.

### "

At BAT, consumers are at the core of everything we do and our success depends on addressing their evolving concerns, needs and behaviours. Central to this is offering a choice of inspirational products and ensuring the consumer is clearly informed of the relative risks.

This is where the new generation of tobacco and nicotine products come in and why we have been proactive in building a business focused on developing and marketing a range of products across different categories.

What these products are helping to do is solve a very obvious yet unmet need for smokers, which is 'how do I enjoy nicotine, and the ritual and the satisfaction of smoking, but in a safer way?'

#### CHAMPIONING CONSUMER CHOICE

We are continually innovating and launching new types of products and devices to meet different consumer needs. Our leading Vapour Product, Vype, is now available in 10 markets and we're introducing new devices all the time. This includes the Vype Pebble, which is a small, highly portable device that's simple to use and delivers superior vaping performance.

In the Tobacco Heating Product (THP) category, our iFuse product blends vaping technology with tobacco and is proving popular in our test market in Romania. I think it's a real breakthrough and feels like a very 21st-century nicotine solution.

And we've just launched an advanced yet intuitive THP, called glo, in Japan, which provides an experience similar to that of a cigarette, but with around 90% less toxicants<sup>4</sup>.

Focusing on this range of inspirational products across different categories is all about ensuring the complex needs and choices of all types of consumers can be met.

#### **BUILDING CONSENSUS**

Externally, I think there are two camps; those who see the potential of alternative products to improve public health, and those who only support quitting nicotine altogether – no matter how it's delivered. I believe the world has moved on from this 'black and white' approach, and now it's about giving consumers options and choices.

There are some who argue that these products can be a gateway into smoking. But the market has progressed from those early cigarettelike devices, and vaping is now seen as very different and a smarter way of consuming nicotine.

Just look at the types of flavours that are available – the vast majority of people who vape choose something other than tobacco-flavoured e-liquids because they want to move away from traditional cigarettes, not be reminded of them.

I think the idea that seeing someone vaping will make you want to have a cigarette is no longer the case.

Yet, because Vapour and THPs are so new there haven't been any long-term studies into their effects; but we don't want inertia for 30 years – that would be a huge wasted opportunity.

Instead, what we have is a general consensus among progressive health professionals that if you're going to either smoke or vape, it's better to vape, and that this represents the biggest game changer in public health, when it comes to tobacco, we've had.

We need to galvanise a global effort behind the message that alternative tobacco and nicotine products can have a dramatic and positive effect on public health.

#### SUPPORTING REGULATION

The growth of these products hasn't been without its problems and one of the most frustrating has been the lack of clear and consistent regulations.



#### OVER US\$1 BILLION

invested in our Next Generation Product business over the last five years



Our Vapour Products and THPs available across 12 MARKETS



We're not anti-regulation; in fact just the opposite. Regulation is critical to creating a fertile ground for responsible growth and consumer access, to support take-up by more smokers.

So what we argue for is proportionate, not arbitrary or ill-informed, regulation, which takes account of the relative risks and doesn't treat these products in the same way as traditional tobacco. I think collaboration is key to achieving this.

There are a lot of stakeholders involved in this area, and only by working together can regulations be developed that have clear aims and don't inadvertently create new problems once they're introduced.

It's important, too, that innovation should be encouraged – it mustn't be stymied – and regulation should be designed to allow innovation to flow.

Taxation is another issue. Alternative products shouldn't suffer from punitive taxes because if governments overly tax them they run the risk of artificially driving up their price, and may make switching to Vapour or THPs harder.

## A KEY PART OF THE SOLUTION

We know that some people will always see the tobacco industry as part of the problem and therefore unsuitable to play a role in harm reduction. But with our clear commitment to invest and innovate, we should actually be seen as a central part of the solution because we can help develop and market less risky products across the world.

Tobacco will be a core part of our business for many years, but the future is all about choice and being able to offer consumers outstanding alternative products, which our traditional business provides the investment for. I think many in society want these products to be as widespread, successful and easily available as possible in order to reduce the number of people who smoke. So to marginalise us, as a business that can help make this happen, doesn't make sense to me.

These may be fledgling product categories, but they are rapidly growing in popularity with the public. Over the last couple of years, we have consolidated our position and now we're set to expand. Next year will see even more progress as we move into many more new markets.

We're still in the early days and it's no easy undertaking, but we are more committed than ever and are further investing in capabilities across the business in:

- Scientific research, which will underpin consumer confidence and evidence-based regulation;
- R&D, to create an innovation pipeline of outstanding products for consumers;
- Branding and marketing, to help drive consumer adoption;
- Supply chain and manufacturing, to bring these new-to-world products to market; and
- Regulatory engagement, to help create fertile ground for responsible growth.

I believe we're on the right track to succeed in our ambition to bring more choices and innovation for consumers and less harm for public health.

**KINGSLEY WHEATON** BAT's Managing Director of Next Generation Products

# **A CONSUMER-DRIVEN MARKETPLACE**

Since the first Vapour Products were launched in 2003, a diverse and dynamic industry has emerged, with consumer demand driving innovation and leading to a wide range of devices.

Technological advances have seen the market move on from the original 'cig-alike' disposable products, to rechargeable 'modular' devices, which have a refillable e-liquid reservoir. There is also a wide variety of different e-liquid flavours, nicotine strengths and even nicotine-free options. This has led to a global industry, which continues to grow at a significant rate. 2015 estimates place a value of **U\$\$8 billion** on the global vapour market, with **29 million** people estimated to be vaping across the world<sup>5</sup>.

Research by Ernst & Young<sup>6</sup> into recent developments in the sale and use of Vapour Products in seven core markets<sup>7</sup> found that there are now an estimated **6.1 million** consumers, representing a **120%** increase in use between 2013 and 2016.

In terms of preferences, the research also found that **68%** of consumers prefer modular devices and three quarters opt for non-tobacco flavoured e-liquids. Looking specifically at the UK, research carried out among adults and young people by ASH<sup>8</sup> in 2016 found that there are an estimated **2.8 million** adults using e-cigarettes (6% of the adult population). Of these, **1.3 million (47%)** are ex-smokers and **1.4 million (51%)** are 'dual users' (i.e. vaping alongside current smoking).

However, the research also reported that both the public and smokers are failing to recognise that e-cigarettes are a lot less harmful than smoking, with **25%** inaccurately believing they are more or equally harmful.

#### **INDEPENDENT VIEWPOINT**

Jeff Stier, Senior Fellow at the National Center for Public Policy Research in Washington, D.C., and head of its Risk Analysis Division<sup>9</sup>

Jeff Stier is a key opinion leader on issues of public health policy and an advocate for harm reduction. He has a law degree and previously worked both in the office of the Mayor and in Corporation Counsel's office in the Giuliani administration in New York City. He has spoken on science and health policy issues at meetings of the United Nations, the US Food and Drug Administration and government legislative hearings, and is a regular contributor to the debate around harm reduction in the media.

<sup>4</sup> I'm an advocate for incorporating e-cigarettes into harm reduction strategies because they provide consumers with a way in which they can happily give up smoking and still enjoy nicotine if they choose, while dramatically reducing the health risks from their former method of nicotine consumption.

With all the taxes, regulations, warning labels and billions in advocacy and

research, governments have been unable to reach these now former smokers. The emergence of e-cigarettes is an example of where markets can sometimes be better at solving problems than governments, and demonstrates a clear consumer demand for safer alternatives to smoking.

Are they 100% safe? No. But not much is. Yet, there's no question that they are dramatically less harmful than smoking. And, for smokers, that's key.

So, while we're all on the same page when it comes to longer-term studies shedding more light on the issue, we must also now make sure these products are appropriately regulated and stay out of the hands of kids. We also mustn't limit access, affordability or innovation – all necessary elements to effective harm reduction strategies.

If improving public health is the ultimate goal, governments should foster free-market solutions to public health challenges. The interests of consumers are better advanced by the provision of accurate information and choice than by prohibitions and restrictions on innovative products under the 'precautionary principle'.

Take flavours, for example. These are absolutely critical in helping people not only quit smoking but, more importantly, stay off cigarettes. People will say they thought they liked the flavour of burnt tobacco – but what they really liked was the nicotine. Humans learn by association. Non-tobacco e-liquid flavours help people to disassociate the pleasure of the nicotine with the burnt tobacco. Efforts to ban flavoured e-cigarettes underscore how poorly advocates for these policies understand the issues.

Professor Michael Russell, whose research was the foundation for the 1988 US Surgeon General's report on nicotine addiction, put it simply: "People smoke for nicotine but they die from the tar."<sup>10</sup> So every time you see a former smoker vaping, you are seeing the life-saving answer to the problem Professor Russell posed: How can we help smokers who can't or won't quit using nicotine?



<sup>&</sup>lt;sup>5</sup> Global tobacco key findings report, Euromonitor International, August 2016.

<sup>&</sup>lt;sup>6</sup> Electronic Nicotine Delivery Systems (ENDS): an update on a rapidly evolving vapour market, Ernst & Young LLP, January 2017. This research was commissioned by BAT subsidiary Nicoventures Holdings Ltd. <sup>7</sup> The seven core markets are France, Italy, Germany, Poland, Russia, South Korea and the UK, and collectively account for 75% of global vapour consumer price turnover (excluding the US and China).

<sup>&</sup>lt;sup>8</sup> Use of electronic cigarettes (vapourisers) among adults in Great Britain, Action on Smoking and Health UK, May 2016.

# A PROPORTIONATE **APPROACH TO REGULATION**

With the rate of growth of the next generation of tobacco and nicotine products, there has been much debate and confusion about how they should be regulated. This has led to inconsistent approaches around the world.

Some governments have responded with restrictive regulations, such as bans on advertising and high excise taxes similar to those for tobacco, which we believe could stifle growth.

Other governments have considered the potential benefits these products can bring to public health.

These include Public Health England, an executive body of the UK Department of Health, which has stated: "Based on the international peer-reviewed evidence, e-cigarettes carry a fraction of the risk of cigarettes and have the potential to help drive down smoking rates and improve public health... Therefore policies should make clear the distinction between vaping and smoking."11

Given their potential, we would like to see a regulatory approach in which growth and innovation are encouraged but that places the onus on companies to put consumer safety and product quality first.

It is important that regulation does not stifle the development of e-cigarettes nor make accessing these products more difficult for smokers."

Cancer Research UK, Briefing on Electronic Cigarettes, July 2015

#### QUALITY AND SAFETY STANDARDS

High product standards, based on robust science, are needed to ensure consumer safety and confidence.

### RESPONSIBLE MARKETING TO ADULTS ONLY

The growth of new products should be supported by controlled marketing and advertising rules aimed at adult consumers only.

## **PREFERRED APPROACH TO REGULATION**

FREEDOM TO INNOVATE

The freedom to innovate should be cultivated, to enable the development of a compelling range of products for adult consumers.

**ENCOURAGES GROWTH** AND INNOVATION

#### **FRFFDOM TO** COLLABORATE AND COMMUNICATE

The public and private sectors need to work together to clearly communicate the benefits of lowerrisk products so consumers can make informed decisions.

### APPROPRIATE TAXES AND EXCISE

Excise and taxes should reflect the relative product risks and enable affordability to ensure they are less expensive than cigarettes, encouraging wide take-up.

### ENSURES PRODUCT QUALITY AND SAFETY

## SUPPORTS CONSUMER ACCESS AND SMOKERS SWITCHING

### INDUSTRY

We have created a new aeneration of alternatives to smoking, which are backed by robust science and strong product stewardship.

### **WORKING TOGETHER**

Manufacturers have provided a solution to harm reduction in the form of alternative products but it is now down to governments and regulators to 'open the door' and support their introduction into new markets.

### COLLABORATION

By working together we can bring clarity to new markets, develop a new benchmark for the industry and begin to realise the benefits alternative products can have on public health.



We would like legislators to develop consistent regulations and a fair system of taxation that reflects the relative risks of the products and doesn't restrict their growth.

<sup>9</sup> The National Center for Public Policy Research receives 1.4% of its support from the tobacco and e-cigarette industry.

<sup>10</sup> Low-tar medium-nicotine cigarettes: a new approach to safer smoking, Russell, M.A., British Medical Journal, June 1976.

<sup>11</sup> Use of e-cigarettes in public places and workplaces: key principles to guide policy making, Public Health England, July 2016.

#### AN EXPERT VIEW FROM DR DAVID O'REILLY

# **44** OFFERING CONSUMERS OUTSTANDING PRODUCTS, BASED ON **SCIENCE, TECHNOLOGY AND INNOVATION** IS THE CORNERSTONE OF THE FUTURE OF THIS COMPANY."

<image>

The pace of change around the new generation of tobacco and nicotine products is incredibly fast moving in comparison to that around traditional tobacco.

BAT's Group Scientific and R&D Director, Dr David O'Reilly, shares his thoughts and expertise on how robust science, new technology and innovations, and deep consumer insights are helping BAT to keep up with this changing landscape.

### "

For us, consumer insights are vital; they are the starting point for what we do. Then it is about turning these insights into great consumer products, based on sound science and gamechanging technology. For me, that's the magic formula.

## TECHNOLOGY AND INNOVATION

Over the last five years, we've changed how we operate in R&D to ensure we have an innovation pipeline of new, less risky products for the future, as well as developing the science we need to evaluate them.

We've recruited many new scientists, technologists and innovators from other sectors and are blending this new expertise with 60 years of tobacco research to create gamechanging products to satisfy evolving consumer needs. I think this is a very powerful combination. The job of our R&D team is to think deeply about the consumer. They use cutting-edge research and feedback to get deep insights into what consumers are looking for and then work on innovations that they think will satisfy some of those unmet consumer needs, as part of our long-term product pipeline.

Innovation will always be a core part of BAT's strategy.

Central to this is what we call 'technology landscaping', for which we've created a whole new department called 'Strategic Science and Technology'. Their time horizon is 5 to 10 years and they look around the world constantly at new technologies that are being developed by either small companies or individual inventors.

Those technologies are tested to see if they're something promising; then we work with these partners to further develop them to create an innovations pipeline of commercially scalable and consumer-satisfying products.

#### PROTECTING CONSUMER SAFETY

Following high standards to ensure quality and consumer safety is at the heart of everything we do in the design, development and manufacturing of our products.

So, for instance, we design the devices with safety features to protect against over-voltage and over-heating, and enforce strict manufacturing processes and quality controls at every stage of the production line.

Then, with the e-liquids themselves, we use only pharmaceuticalgrade ingredients and food-grade flavourings. We have some excellent toxicologists who work to ensure nothing is added that would increase the risk to the consumer.

This approach to product stewardship is second to none and absolutely industry-leading. It gives both consumers and regulators confidence in our products.

At the moment, our 'Vapour seal of quality' is a differentiator for us, but in time we think the whole industry will step up and follow the same high standard – I think regulation will help do that.

That's why we've been participating, as part of a broad consultation, in the development of industry standards, feeding in all the science we currently know. And it's been great to see the first national standards for Vapour Products in France and the UK come out of this process over the last year.

#### LONGER-TERM RISKS

It's true that the risk these products present in the long term is yet to be determined. But, from what we know today, compared to continued cigarette smoking, the risk is highly likely to be much, much lower.

That's the principle of harm reduction; a product that is safer, but not 100% safe, is a better alternative and should be made available now to smokers looking to quit, who otherwise would continue smoking cigarettes, with all the real and serious diseases that can cause.

Of course, we are planning longerterm research and clinical studies to look at the effects that switching to these products will have on the human body. And, obviously, continual monitoring of consumer use over many, many years will be conducted by us and others as well.

#### CREDIBILITY AND OPENNESS

Ensuring the quality and credibility of our science is fundamental to everything we do in R&D.

For over 10 years, we have had a policy of openness and transparency, which has seen every piece of publishable research we've carried out or funded, regardless of the results, peer-reviewed in international scientific journals.

What this means is that the work we do is open to scrutiny by scientific peers outside the industry and they determine whether it is of sufficient quality and integrity to be published.

All we ask is that we are judged by the quality of our science.

Seeing how many of our scientists are regularly invited to present at leading international conferences and to contribute to workshops and expert panels, such as those of the US Food and Drug Administration, I think is testimony to the quality and openness of our research.

#### **CONSUMER CONFUSION**

One of the most important issues we all need to address is the mixed messages that are out there, which are making it very confusing for consumers.

Unfortunately, there have been some sensational stories that can scare smokers off even trying these products.

We're doing what we can in terms of communicating the science. But really, we need to work together with public health bodies and governments to provide clear and accurate information in a meaningful way to the public.



Since 2008, over 200 of our research papers have been published in peerreviewed journals Right now, I would urge consumers to look towards the major UK-based bodies such as the Royal College of Physicians and Public Health England, which have decades of experience of looking at smoking and health-related issues and harm reduction, for a true and honest interpretation of the evidence.

#### FUTURE-FIT STRATEGY

I think our multi-category approach is definitely the right one.

We've got a world-class R&D that has the resources and structure to enable us to work across different product categories. There are also many synergies across them; some technologies can move from one category to another, and the science to evaluate them can be similar too.

Personally, I doubt there will be one category that will dominate in the future; I think it's actually becoming a more fragmented marketplace. It's the same as many other fast-moving consumer goods (FMCG) categories, such as chocolate or coffee – there isn't just one product experience any more; it fragments into multiple types of products to suit different consumers.

Which categories become bigger or smaller in the future will be down to consumers to decide.

Ultimately, I think offering consumers outstanding products, based on science, technology and innovation, is the cornerstone of the future of this company.

Solily

**DR DAVID O'REILLY** BAT's Group Scientific and R&D Director

# OUR SCIENCE AND INNOVATION PROGRESS



#### PRODUCT DEVELOPMENT AND INNOVATION

using scientific advances and new technologies to satisfy evolving consumer needs and preferences.

# $\boxed{\phantom{a}}$

#### **PRODUCT STEWARDSHIP** to ensure quality and

consumer safety based on robust science and toxicological risk assessments.



#### SCIENTIFIC EVALUATION OF RISK REDUCTION

to support evidence-based regulation and provide consumers with the information they need to make informed decisions.



#### COLLABORATIVE DEVELOPMENT OF PRODUCT STANDARDS

to ensure a consistent approach to product quality and safety across the industry and build consumer confidence.

### PRODUCT DEVELOPMENT AND INNOVATION

By listening to vapers and smokers, we can better understand their needs, preferences and wider consumer trends, and then use these insights in our new product development and innovation.

For example, recent research<sup>12</sup> we commissioned shows a shift in consumer preferences for Vapour Products, with 68% now preferring modular devices that give them more control over their vaping experience. The research also shows that three quarters of consumers opt for non-tobacco flavoured e-liquids, such as fruits and botanicals.

We've responded by developing a range of different Vype e-liquid flavours and nicotine strengths, including a nicotinefree option, and the launch, in 2016, of new modular devices, such as the eBox and eTank Pro.

# "

This is a fast-evolving field with new technologies, innovations and research methods. We're using our experience and expertise to develop a range of quality products to satisfy the needs of different consumers."

Dr Marina Trani Head of Next Generation Product Research & Development

# PRODUCT STEWARDSHIP

We use a wide range of analytical techniques, specialised laboratory technology and expertise to first develop and then conduct detailed tests of our products – from the flavours and e-liquids we formulate, to the devices we manufacture, to the combinations in which they are sold.

We also study the way consumers actually use the products to make sure our risk assessments are based on, and reflect, consumers' behaviours.

Only when we are fully satisfied that a product meets our high-quality standards do we allow it to go on the market.

We openly share our approach to product stewardship and hope to see it become the benchmark for the industry and regulators. We have already published several papers on this topic, such as the first practical guide on how to develop flavours responsibly, based on sound toxicological principles<sup>13</sup>.

# "

We scrutinise every detail of our products through a complete toxicological risk assessment to understand potential effects – from what goes into the e-liquids to the vapour that comes out."

Dr Sandra Costigan Principal Toxicologist



# $\overset{\mathscr{B}}{\rightharpoondown}$ scientific evaluation $\overset{\mathscr{B}}{\dashv}$ of risk reduction

To evaluate the harm reduction potential of new products, we have developed new scientific tests that:

- Help us understand how consumers use the products ensuring machine testing in the labs mimics real-life consumer use;
- Allow us to study vapour and its chemical make-up; and
- Allow us to look at the biological impact of vapour on human cells in the lab.

We've openly shared this knowledge through the publication, in 2015, of a new scientific framework to assess the relative risks of new products<sup>14</sup>. This could be used to provide an evidence base for the development of future regulation and for substantiating information for consumers to enable them to make an informed choice.

The results of our lab-based studies<sup>15</sup> on human cells that compared the biological effect of cigarette smoke with that of vapour from our Vype ePen, concluded that smoke is highly toxic to these cells, but vapour is significantly less so. In addition, we found that cigarette smoke causes DNA damage, but the vapour does not, even when the cells are subjected to doses much higher than for the smoke. So, in general, cells exposed to vapour did not exhibit the same disease-relevant responses as smoke. These results support our belief that Vapour Products have the potential to be substantially reduced risk compared to conventional cigarettes.

Tests on our iFuse Tobacco Heating Product (THP), which includes a tobacco section, showed that the vapour produced was almost indistinguishable from e-cigarette vapour, suggesting that the addition of tobacco is not adding any toxicants<sup>16</sup>.

In 2016, we completed the most comprehensive chemical comparison to date between cigarette smoke and e-cigarette vapour emissions. It found substantial reductions in Vype ePen emissions for all toxicant groups measured<sup>17</sup>. While this does not necessarily confirm that Vapour Products produce less adverse health effects than conventional cigarettes, it is very encouraging.

# "

We're conducting cutting-edge research into the effects of new products and publishing it in peer-reviewed journals. So far, the results are consistent with significant reductions in risk compared to smoking."

Dr Kevin McAdam Head of Product Safety Assessment



Manufacturing methods, materials and device performance can differ greatly, so we believe it's vital for all manufacturers to follow the same high standards for product quality and safety. This will give regulators the assurances they need and help to build consumer confidence in the products.

So we're working as part of multi-stakeholder groups to develop new industry-wide standards for Vapour Products, that can set a benchmark for best practice globally.

We were active contributors and participants in the development of the world's first national standards for Vapour Products by the British Standards Institute (BSI) in the UK and AFNOR in France.

We are now participating in working groups of the EU Standards Body (CEN), which is looking to develop Europe-wide Vapour Product standards. We are also providing technical input to the International Organisation for Standardisation (ISO) for developing global specifications on Vapour Products.

We are encouraged by the openness of these organisations and hope to see more opportunities for this kind of collaborative working in the future.

# "

Openly sharing our approach and collaborating on the development of high product standards is something I feel very privileged to be part of. I think it will make a real difference for the industry, regulators and consumers."

Dr Sudhanshu Patwardhan Senior International Engagement Manager

13 An approach to ingredient screening and toxicological risk assessment of flavours in e-liquids, Costigan, S., Meredith, C., Regulatory Toxicology and Pharmacology, 2015.

<sup>12</sup> Electronic Nicotine Delivery Systems (ENDS): an update on a rapidly evolving vapour market, Ernst & Young LLP, January 2017. This research was commissioned by BAT subsidiary Nicoventures Holdings Ltd.

<sup>&</sup>lt;sup>14</sup> A framework for the biological assessment of reduced risk tobacco and nicotine products, Lowe, F., Fearon, I.F., Camarcho, O.M., Minet, E. and Murphy, J., Recent Advances in Tobacco Science, 2015.
<sup>15</sup> (a) E-cigarettes aerosols induce lower oxidative stress in vitro when compared to tobacco smoke, Taylor, M., Carr, T., Oke, O., Jaunky, T., Breheny, D., Lowe, F. and Gaça, M., Toxicology Mechanisms and Methods, September 2016; (b) Electronic cigarettes aerosol induces significantly less cytotoxicity than tobacco smoke, Azzopardi, D., Patel, K., Jaunky, T., Santopietro, S., Camacho, O., McAughey, J. and Gaça, M., Toxicology Mechanisms and Methods, September 2016; (c) The mutagenic assessment of an electronic-cigarette and reference cigarette using the Ames assay in strains TA98 and TA100, Thorne, D., Crooks, I., Hollings, M., Seymour, A., Meredith, C., and Gaça, M., Mutation Research, October 2016; (d) The comparative in vitro assessment of e-cigarette and cigarette smoke aerosols using the yH2AX assay and applied dose measurements, Thorne, D., Larard, S., Baxter, A., Meredith, C. and Gaça, M., Toxicology Letters, January 2017.

<sup>&</sup>lt;sup>16</sup> The assessment of a range of next generation tobacco and nicotine products using pre-clinical in vitro tools, Taylor, M., Thorne, D., Azzopardi, D., Oke, O., Crooks, I., Haswell, L., Lowe, F.,

Gaca, M., Society for Research on Nicotine and Tobacco (SRNT), 2016.

<sup>&</sup>lt;sup>17</sup> Chemical Composition of Aerosol from an E-Cigarette: A Quantitative Comparison with Cigarette Smoke, Margham, J., McAdam, K., Forster, M., Liu, C., Wright, C., Mariner, D., and Proctor, C., Chemical Research in Toxicology, September 2016. Please note, this is a comparison between the smoke from combusted tobacco in a standard 3R4F reference cigarette (approximately 9 mg tar), and the vapour from Vype ePen, in terms of the 9 types of harmful components which the World Health Organisation recommends to reduce in cigarette smoke.

# THE INDEPENDENT EVIDENCE TELLS US...

Over the last few years, there has been a growing number of independent studies, complementing our own research, that are helping to increase understanding of the relative risks of tobacco and nicotine products, while recognising that further research and continued monitoring of consumer use are needed to determine long-term risks.

## ...VAPING CAN BE FAR LESS RISKY THAN SMOKING

#### "The current expert estimate is that using e-cigarettes is around 95% safer than smoking."<sup>18</sup>

This was the conclusion of the 2015 evidence review conducted by Public Health England, an executive body of the UK Department of Health, based upon national and international literature as well as relevant national survey data.

#### "Nicotine is not a carcinogen; there is no evidence that sustained human use of nicotine alone increases the risk of cancer."<sup>19</sup>

According to a 2016 report by the UK Royal College of Physicians, as most of the harm caused by smoking arises not from nicotine but from other components of tobacco smoke, the health and life expectancy of today's smokers could be radically improved by encouraging as many as possible to switch to a smoke-free source of nicotine.

The report does recognise "concerns that e-cigarettes are not hazard free are justified, but this hazard could be minimised by a combination of technological development and appropriate regulation."

#### "There's no evidence that second-hand e-cigarette vapour is dangerous to others."<sup>20</sup>

Cancer Research UK has said that, based on the evidence currently available, it does not believe there is justification for an indoor ban on e-cigarettes, either on the basis of potential harm to bystanders from second-hand vapour or that they renormalise smoking tobacco.



#### Vaping supports quitting

JOe

A UK cross-sectional population study, led by Professor Robert West of University College London's epidemiology and public health department and chiefly funded by Cancer Research UK, found that smokers trying to quit without professional support are around **60% more likely to succeed using e-cigarettes** than if they use products such as patches or gum, or just willpower<sup>21</sup>.

#### Long-term success

An independent Cochrane Review, a rigorous assessment of the best available evidence to date, concluded that e-cigarettes could help smokers quit and did not find any serious side effects associated with their use in the short to medium term<sup>22</sup>.

1.

ype

#### Promoting e-cigarettes; helping smokers to stop

The UK Royal College of Physicians has stated that "smokers who use nicotine products as a means of cutting down on smoking are more likely to make quit attempts. Promoting wider use of consumer nicotine products, such as e-cigarettes, could therefore substantially increase the number of smokers who quit."<sup>23</sup>

# "

We all agree that e-cigarettes are significantly less harmful than smoking... All the evidence suggests that the health risks posed by e-cigarettes are relatively small by comparison but we must continue to study the long-term effects."

Joint statement by Public Health England and other UK public health organisations, July 2016





## ...CLAIMS THAT VAPING IS A GATEWAY FOR YOUNG PEOPLE INTO SMOKING ARE, TO DATE, UNFOUNDED

An annual survey of young people in Great Britain aged between 11 and 18, commissioned by Action on Smoking and Health (ASH) UK, has shown for the past three years that regular e-cigarette use remains rare and indicates that it is unlikely they are acting as a gateway into smoking<sup>24</sup>.

# "

All the UK evidence, and almost all the international evidence, on the use of e-cigarettes by children and young people to date indicates that concerns about e-cigarettes helping to recruit a new generation of tobacco smokers through a gateway effect are, at least to date, unfounded."<sup>25</sup>

UK Royal College of Physicians

<sup>18</sup> E-cigarettes: an evidence update, Public Health England, August 2015.

- <sup>19</sup> Nicotine without smoke: Tobacco harm reduction, a report by the Tobacco Advisory Group of the UK Royal College of Physicians, April 2016.
- <sup>20</sup> 10 common questions about e-cigarettes answered, Cancer Research UK, May 2016 (accessed in February 2017).
- <sup>21</sup> Real-world effectiveness of e-cigarettes when used to aid smoking cessation: A cross-sectional population study, West, R. et al., Addiction, May 2014.
- <sup>22</sup> Electronic cigarettes for smoking cessation and reduction, McRobbie, H., Bullen, C., Hartmann Boyce, J., Hajek, P., The Cochrane Library, December 2014.
- <sup>23</sup> Nicotine without smoke: Tobacco harm reduction, a report by the Tobacco Advisory Group of the UK Royal College of Physicians, April 2016.
- <sup>24</sup> ASH Fact Sheet Use of electronic cigarettes among children in Great Britain, Action on Smoking and Health UK, October 2016 (accessed in February 2017).
- <sup>25</sup> Nicotine without smoke: Tobacco harm reduction, a report by the Tobacco Advisory Group of the UK Royal College of Physicians, April 2016.

# **OUR COMMERCIAL PROGRESS**

In the last five years, we have invested over US\$1 billion in building the Next Generation Product part of our business and making available a range of products that meet the preferences of different consumers.

#### ENHANCING OUR BUSINESS AND CAPABILITIES

Since our first acquisition in 2012 of CN Creative, a UK-based e-cigarette company, we have continued to build our business and capabilities through further acquisitions and partnerships.

We acquired the CHIC Group in Poland in 2015. Through this we gained access to Europe's largest Vapour Product retailing network, as well as to important new manufacturing and R&D capabilities.

Also in 2015, we signed an agreement with the RJ Reynolds Tobacco Company to collaborate and share technology around Vapour Products. In April 2016, we acquired Ten Motives, a UK-based Vapour Products business with particular strength in traditional grocery vand convenience stores.

In early 2017, we reached an agreement for our partner, Kind Consumer, to take ownership of the commercialisation of Voke, an innovative Licensed Medicinal Product.

#### BUILDING OUR PRODUCT RANGE AND REACH

We are proud of the considerable progress we're making in both building our range of new products and expanding to new markets.



Since launching Vype in the UK in 2013, we now have six different Vype devices available to consumers, as well as a variety of new e-liquid flavours and nicotine strengths, including a nicotine-free option.

In consumer tests, Vype is outperforming its nearest competitor and is seen as a trusted and superior brand. In the UK, according to the market researcher Nielsen, Vype is the fastestgrowing brand by retail market share and the number one brand in pharmacy stores. By the end of 2016, our Vype range was available across 10 markets worldwide covering the UK, France, Germany, Italy, Poland, Colombia, Guatemala, Kuwait, Bahrain and the Philippines.

In 2016, Vype was a finalist for brand revitalisation in the prestigious European Effie Awards, which highlight gold standards in commercial communications effectiveness.

While Vapour Products have great potential and wide consumer appeal, it's also important to make available Tobacco Heating Products (THPs) for consumers who want an experience closer to that of smoking.



In December 2016, we launched a new-to-world THP, called glo, in Japan. This is an innovative product, designed in the UK involving over 100 experts across five continents.

iFUSE™ We also have a product called iFuse, which blends vaping technology with tobacco, that has been performing well in our test market in Romania.

#### LEADING THE WAY IN RESPONSIBLE MARKETING

While Vapour Products are generally considered to be significantly less risky than smoking, nicotine is addictive and no product is 100% safe, so it's important to ensure they do not get into the hands of under-18s and are marketed in a responsible way.

Ahead of the expansion of Vype to further markets, in 2015, we published new Vapour Products Marketing Principles, aligned to the UK Committees of Advertising Practice Codes. These provide a globally consistent and responsible approach to marketing Vapour Products wherever they're sold.

We are committed to 100% compliance with the Principles and are actively advocating for this approach to be adopted across the whole industry.





# **FUTURE OUTLOOK**

Our ambition is to drive change and reduce the public health impact of tobacco, through the creation of inspirational products that can be scaled commercially and meet consumers' expectations. We have the commitment and capabilities to achieve this.

We are making great progress, but this is just the beginning. We have more technologies, product innovations and market launches in the pipeline.

For example, current Vapour Product technology is based on what's called the 'coil and wick' system. This has been successful so far, but has certain limitations.

So we're working on the development of a new technology that will allow us to create devices that will deliver improved taste, flavour satisfaction and safety for the consumer. We plan to launch our first Vype device using this technology in 2017.

In the THP category, we will continue to develop our iFuse and glo products based on the consumer insights and product performance from our two test markets in Romania and Japan. Having published our Vapour Products Marketing Principles in 2015, we now plan to develop new Marketing Principles for THPs in 2017. This will ensure we have specific principles in place for each of our different product categories worldwide.

We have a number of new scientific research studies planned and underway, the results of which will be submitted for publication in peer-reviewed journals, as well as shared with regulators and other relevant bodies around the world to contribute to the evidencebase for new products and inform the development of public policies.

We will also continue to take a lead in advocating for proportionate regulation that has high standards for consumer safety and product quality, while encouraging innovation and availability to enable this important category to grow and deliver its harm reduction potential.

Ultimately, we are in this for the long term and are very excited about the future.

## Age verification in an online world

Across the Group, we've worked with a global provider of online ageverification solutions and implemented them through our **govype.com** websites. Our contribution to the development of the BSI standards for Vapour Products in 2015 has also helped establish new UK industry standards for online age verification.

We're also working as part of the Digital Policy Alliance, a UK-based industry and policymakers group, to support the creation of credible standards for online age verification across different sectors with agerestricted sites and products.





More detailed information on our Sustainability Agenda and initiatives.



#### PERFORMANCE CENTRE

Progress against our goals, performance charts, Global Reporting Initiative (GRI) G4 reporting, independent assurance statement and our response to assurance.





#### **GET IN TOUCH**

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#### SUSTAINABILITY REPORT

Our sustainability strategy and the three key areas of Harm Reduction, Sustainable Agriculture and Farmer Livelihoods, and Corporate Behaviour.





#### **FOCUS REPORTS**

More in-depth information on a specific area of our Group Sustainability Agenda.

www.bat.com/ sustainabilityfocus



#### **ANNUAL REPORT**

Our Group vision, strategy, business model, governance and financial reporting.

www.bat.com/ annualreport



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#### About this Report

This is a report by British American Tobacco p.l.c. Associate companies are excluded. References to 'British American Tobacco', 'BAT', 'we', 'us' and 'our' when denoting opinion refer to British American Tobacco p.l.c. (the Company), and when denoting tobacco business activity refer to Group operating companies, collectively or individually as the case may be. This Report contains forward-looking statements that are subject to risk factors associated with, among other things, the economic and business circumstances occurring in the countries in which the Group operates. It is believed that the expectations reflected in these statements are reasonable, but they may be affected by a wide range of variables that could cause actual results to differ materially from those currently anticipated.

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