

# LightwaveRF

Switch to Smart By Milan Radia, Hardman & Co Analyst

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Source: Refinitiv Eikon

Market data	
EPIC/TKR	LWRF.L
Price (p)	7.80
12m High (p)	20.25
12m Low (p)	6.50
Shares (m)	82.3
Mkt Cap (£m)	6.42
EV (£m)	6.22
Free Float*	67%
Market	AIM

\*As defined by AIM Rule 26

#### Description

LightwaveRF is a manufacturer of smart home devices that has developed a broad range of connected products. Established in 2008, the company is headquartered in the UK. It sells directly to consumers and through a range of distributors and major retail chains.

## **Company information**

CEO	Jason Elliott
CFO	Kevin Edwards
Chairman	Barry Gamble

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# Key shareholders (30/11/18)

Directors	4.5%
Committed Capital	29.0%
Unicorn Asset Management	16.1%
Brewin Dolphin Nominees	9.3%
Herald Investment Mgt.	9.5%

# LightwaveRF

# Switch to Smart

Against a market backdrop of strong growth in consumer adoption of smart home products, Lightwave's next-generation products are seeing a combination of favourable reviews and accelerating sales. An almost three-fold increase in direct-to-consumer revenue to £1.24m in 2018, from £0.35m in 2017, was followed by an overall revenue growth run rate for the first two months of 2019 that was 25% higher than the 4Q'18 run rate. Led by an experienced new CEO, digital marketing and distribution initiatives are among the management team's highest priorities. The £2.5m fundraising, due to be completed in March 2019, will allow the company to execute on these initiatives.

- ▶ Consumer interest in smart home technologies has never been greater, yet penetration remains in its relative infancy. The ease of use and instant access to content offered by Amazon Alexa/Echo, Google Home and Apple HomeKit are having a dramatic impact on consumer appetite for smart devices. Market forecasts anticipate substantial growth, in one case to ca.\$160bn globally by 2022.
- ▶ Today, Lightwave products are available in Apple Stores in five countries, including the UK, and on Apple's online stores across Europe. These developments have been highly positive for the company's brand recognition. Large proportions of the product ranges are available on Amazon, as well as in Screwfix, John Lewis, Currys, B&Q and many other specialist online and physical retailers
- ▶ Lightwave's financial performance in recent years has been relatively flat. However, these metrics do not yet reflect the benefits of the substantial product investment and device launches that took place during 2018 or the more prevalent online and instore retail presence. Growth rates have accelerated in the last few months, indicating that the strategic initiatives are starting to bear fruit.
- ▶ The smart home segment has seen extensive M&A in recent years. The incumbent manufacturers of domestic electrical devices have, in many cases, struggled to keep up with smart home developments and have opted to make acquisitions to plug product gaps. Lightwave's new partnership with Resideo Inc. for the latter's Honeywell Home brand is, in our view, particularly noteworthy in this context.
- ▶ Risks: Lightwave is a small vendor that will need to succeed in its online marketing initiatives to drive and maintain greater brand recognition against several large players in the market. At the same time, it will need to execute on an ambitious product refresh programme, as it upgrades its first-generation products to the specification of its Generation 2 products. The recent successful £2.5m fundraising was an important step in creating financial flexibility to deliver on these objectives.

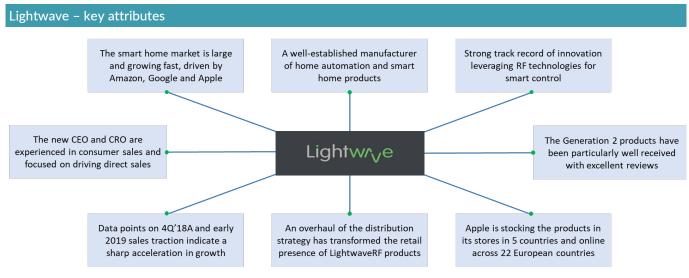
Financial summary and valuation					
Year-end Sept (£m)	2016	2017	2018	2019E	2020E
Revenue	1.44	3.03	2.81	6.40	12.30
Gross profit	0.47	1.08	0.83	2.78	5.97
Gross margin	32.5%	35.5%	29.3%	43.5%	48.5%
EBIT	(0.81)	(0.80)	(2.50)	(2.26)	0.14
Pre-tax profit	(0.84)	(0.85)	(2.54)	(2.27)	0.14
Net profit	(0.84)	(0.85)	(2.54)	(2.27)	0.14
EPS - basic (p)	(4.37)	(2.39)	(3.80)	(2.40)	0.14
EPS - diluted (p)	(4.37)	(2.39)	(3.80)	(2.40)	0.14
P/E (x)	-	-	-	-	nm
EV/revenue (x)	4.3	2.1	2.2	1.0	0.5

Source: Hardman & Co Research



# Investment highlights

LightwaveRF (Lightwave) is a well-established manufacturer of smart home devices that has developed a broad range of connected products. The company is, in fact, one of the longest-standing manufacturers in the market. Founded in 2008 and headquartered in Birmingham in the UK, the company launched its first range of internet-enabled devices in 2009. At that stage, home automation was entirely feasible but rather more complex than it is today, when matters are rather different, with consumers able to readily retrofit smart devices into existing domestic environments and easily control these devices using apps, remote controls and voice commands. For Lightwave, these products include smart sockets, light switches, heating controls and security sensors, with numerous new products on the way. The launch of its second-generation products (called the Smart Series) has been very well received in the market, and it appears that the consistent expenditure in research & development of new products is starting to yield material progress in terms of product functionality versus competing offerings.



Source: Hardman & Co Research

Lightwave's recent reported financial performance has been relatively flat in terms of overall revenue and operating profit. However, these metrics do not yet reflect the benefits of the substantial product investment and device launches that took place during 2018. Similarly, the more prevalent online and instore retail presence resulting from the new distribution agreements described below should benefit growth rates in 2019. Indeed, in the last quarter of fiscal 2018 (to end-September), the company reported a material uplift in sequential monthly sales performance. While this was insufficient to offset the 1H'18 shortfall caused by disruption from the distributor changes, management expects a marked improvement in financial performance in 1H'19 and thereafter. Certainly, the almost three-fold increase in direct-to-consumer revenue to £1.24m in 2018, from £0.35m in 2017, represents noteworthy momentum. Equally, the company notes that distributor stocking was almost entirely absent from the revenue line in 2018, in contrast to previous years. In its 2018 results statement, it was noted that the revenue run rate for the first two months of 2019 was 25% higher than the 4Q'18 run rate.



- Lightwave's new CEO, Jason Elliott, arrived at the company in July 2018, and brings extensive experience of consumer sales. He was previously Chief Sales Officer at Onzo, a provider of analytics to energy utilities, which followed multiple senior roles at software and communications companies. Shortly prior to Mr Elliott's appointment, Adam Williams had been hired as the company's Chief Revenue Officer (CRO), having previously worked in senior strategy and retail partnership roles at Sony Europe and Samsung (including managing retail partnerships for Samsung's smart home business). Looking back, it seems fair to observe that the distribution changes and initiatives to drive a greater proportion of direct-to-consumer sales took longer to properly implement than had been expected. In this regard, the CEO change seems to have been timely. The company appears to have struck an appropriate balance between introducing fresh impetus from the new CEO and CRO, while maintaining some senior management continuity with the Chairman and CFO.
- The need to increase recognition of the Lightwave brand is high on management's agenda. Favourable reviews of the product ranges are helpful, but trade shows represent another important mechanism to reach and demonstrate product effectiveness to potential distribution partners, new retailers and, in many cases, end-users. Marketing initiatives are among the management team's highest priorities, with a particular focus on digital marketing to directly address as wide a consumer audience as possible. A highend animation company has been engaged to produce graphics for this initiative, which centres on an animated family known as The Smarts. The schematic below captures screenshots from a 90-second animated movie that shows the role that Lightwave lighting technologies play in enhancing this digital family's lives and routines. Lightwave intends to build on these initial videos with further "adventures" that showcase additional technological capabilities of the newer products. This innovative approach to direct-to-consumer marketing exemplifies the substantial marketing experience of the new CEO.

# Lightwave - digital marketing initiative screenshots







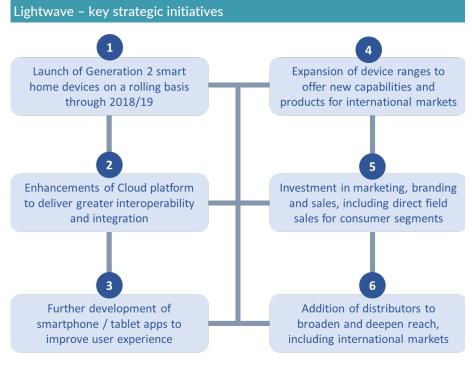


Source: YouTube, Hardman & Co Research, Company data



This digital marketing initiative will be complemented by an intensified presence at trade shows and exhibitions. An announcement from the company dated 15 November 2018 confirmed that Lightwave had exhibited at a series of major electrical trade shows in November alone. These initiatives will inevitably require an uplift in sales and marketing expenditure to support a continuation of the sharp acceleration in organic revenue growth that has been seen in the last six months. This uplift in administrative expenses is incorporated into our financial estimates.

The company continues to execute on strategic objectives that have been clearly laid out, as summarised in the diagram below. Lightwave has created a solid reputation in the lighting automation and smart socket segments, particularly with its most recent Generation 2 products. The process to upgrade older products and release entirely new offerings will continue into 2019. Alongside these products, the Lightwave Cloud platform is being enhanced, especially from a device interoperability perspective, as is the suite of control apps for various operating systems and devices. The retail partnerships, especially with Apple, are creating opportunities to deliver specific products into new international markets. Perhaps most importantly at this juncture, the emphasis in terms of headcount allocation and opex is progressively shifting towards marketing, branding and sales, seeking to build on the additional distribution initiatives announced earlier this year, which we discuss further below.



Source: Hardman & Co Research, Company data

Lightwave continues to step up its distribution agreements to a new level across multiple segments. Over the past few years, the company has made extensive changes to its distribution channels, most recently in the early part of FY'18. The quality of the products is not in doubt, but the challenge remains to create productive and sustainable channels to market. In this respect, a raft of new distribution agreements have taken Lightwave into many new major retailers. A key initiative for the company over the past 12 to 18 months has



been to broaden distribution reach across the wholesaler and retailer market segments. Integral to these steps was the dismantling of the previous exclusive arrangements with Megaman (no longer a Lightwave distributor), with ERA Home Security Ltd, which will continue to distribute Lightwave products, and with Deta Electrical in the wholesale segment. Accordingly, a series of announcements have been made over the past eight to nine months:

(i) In March 2018, with respect to retail channels, Lightwave announced that it had signed distribution agreements with Exertis (UK) Ltd, a large and fast-growing European distributor of technology products, and with Westcoast Ltd, a major UK-based IT distributor. Exertis has already broadened Lightwave's reach into a number of major UK retailers, including John Lewis (largely online to date). Westcoast continues to add names to Lightwave's retail presence.

Today, Lightwave products are available in Apple Stores in five countries, including the UK, and on Apple's online stores across Europe. These developments have been highly positive for the company's brand recognition. Large proportions of the ranges are available on Amazon, as well as on the websites of Screwfix, John Lewis, Currys, B&Q and many other specialist retailers. Screwfix stocks 33 different product variations, while B&Q lists 44 products on its website, a large proportion of which are available instore.

- (ii) Also in March 2018, Lightwave announced a broader range of electrical wholesaler relationships, adding City Electrical Factors (the largest electrical wholesaler in the UK), Edmundson Electrical, Stearn Electric and YESSS Electric. These changes are, in our view, particularly important given the requirement to install Lightwave products perhaps even more so when considered together with the current initiative with NICEIC summarised below and discussed in more detail later in this report.
- (iii) In November 2018, a distribution agreement was announced with Dixons Carphone to sell a number of smart Lightwave products through the Currys online store.
- (iv) Further announcements are in the pipeline. One will likely relate to an ongoing initiative with NICEIC to launch a formalised smart home and accreditation programme for electrical contractors. NICEIC will be familiar to anyone who has undertaken electrical work in a domestic setting building regulations require, for safety reasons, that this work is carried out by an accredited contractor who can provide a certificate confirming that the work has been carried out in line with appropriate safety standards. The 80,000 electricians that Lightwave will be able to reach via this partnership will likely purchase significant proportions of their components and supplies from some of the major electrical wholesalers that have been added to the Lightwave distribution roster earlier this year.
- The new distribution agreements are configured differently to allow a greater degree of flexibility, in turn ensuring that distributors play to their strengths across the Lightwave range of products. For example, distributors are able to return stock from lines seeing less traction, at the same time taking (a higher value) of other product lines. The channel will also be holding very limited amounts of stock, implying a higher quality of revenue for Lightwave, which will maintain adequate levels of stock to meet demand requirements. The last



significant change is that Lightwave is proactively seeking to avoid channel conflict to avoid scenarios where multiple vendors seek to sell its products at different prices on popular consumer websites such as Amazon or eBay. Consistency in retail prices is an important objective and Lightwave is discernibly succeeding in this respect.

- The definition of smart homes and devices is evolving constantly, as vendors introduce new capabilities into the market. At the heart of the smart home is the notion of a connected environment, characterised by connections between the various devices themselves and by connections to the outside world through the public internet. Smart home devices will typically fall into the following categories: (i) power sockets that can be controlled through apps; (ii) sensors and monitoring devices for detection of movement, light or even air quality; (iii) lighting through automation of wired switches or replacement of bulbs to those that can be controlled through apps; (iv) heating controls, including app-controlled thermostats and room valves; and (v) control devices, offering voice- or app-based control of a range of devices, groups of devices or a sequence of actions from a single command.
- Penetration of smart devices remains in its relative infancy, and market growth from this point should be significant across regions. The growing intensity of smart home adoption patterns by consumers should drive strong growth rates for all of the established vendors. However, assessing the consumer value proposition for various categories will remain an important consideration it is still the case that appetite for connected fridges and washing machines continues to trend more slowly than other segments, presumably due to an imbalance between perceived utility and high price points for these products.
- The consumer electronics market segment can be particularly influenced by online reviews, especially by the leading technology websites. Favourable reviews can potentially make or break a product line, or even arguably an entire business, as these opinions drive not only consumer sales but also retailer attitudes towards products. In this context, it is encouraging to see that Lightwave is accumulating a significant stock of positive reviews on its products. The Generation 2 products, in particular, have achieved a strong response in the consumer arena with a series of positive reviews in influential magazines and online forums. A high-profile review was published in December 2017 on the Trusted Reviews website, a leading online review portal for consumer technology products. This review concluded the following:

"Improved LED bulb support and fantastic-looking switches make Lightwave Generation 2 the high-end automation kit of choice."

This was followed by a further review by Trusted Reviews in October 2018 of multiple lighting control systems, reaching the following conclusion:

"We've reviewed all the major lighting systems and options, but out of everything two systems stand out. Philips Hue is by far the best overall system with the widest choice of products and controls. If you just want to make your existing bulbs smart with attractive dimmers, then the Lightwave Generation 2 system is the best option."

In July 2018, 9to5mac, the popular Apple-centric technology website, declared LightwaveRF to have the best UK HomeKit solution for smart lighting, noting that the Apple smart home standard was "picking up steam" as more compatible products become available. The review notes:



"It's hard to critique something that works without a hitch. Lightwave is the perfect answer for us, it lets us connect our non-standard lighting to a smart light system that anyone can use, either through the Home app or pressing the physical switch. If someone comes over, you don't need to explain to them what to do. They can use the light switch like a light switch, as it should be.

In addition to HomeKit, you can get a Lightwave app for Android, and connect to an Echo with an Amazon Alexa skill, and there's integration with Google Home too.

The real crux here is whether you need or want smart home lights in the first place. We are very much in the scope of a first-world problem space here, but I can say I would miss the switches if they somehow could vanish overnight. It's incredible how useful being able to turn off the downstairs lights are whilst you are upstairs. There's just a fantastic convenience to everything about it, it's more than just turning off the lights in the same room that you are in."

Combined with the overhauled distribution agreements, these developments in terms of market support should assist revenue traction of the business in 2019.

- Smaller smart home vendors such as Lightwave are benefiting from the heavy marketing investment being made by the major players, as they continue to educate consumers on the benefits of smart home technology. Amazon Alexa/Echo, Google Home and Apple HomeKit are having a dramatic impact on consumer appetite for smart devices. Across the board, manufacturers of domestic devices understand that integration with Amazon, Google and Apple platforms, and perhaps Samsung and IFTTT as well, are essential in order to access this opportunity, whether relating to heating controls, security systems, electrical sockets and light switches or music systems.
- ▶ Ease of use is undoubtedly a major driver of demand, as smart home devices become mainstream. Initially seen as a means of accessing music content and information, these devices feature artificial intelligence capabilities and are now widely acknowledged to be ideal controllers for home automation and smart devices in a domestic context. While the initial control mechanism was through smartphone and tablet-based apps, the evolution that is taking place at present is towards voice control of a multitude of device types − increasingly from multiple vendors given that the control platforms are vendor-agnostic. These devices themselves are developing quickly, and increasingly incorporate digital screens and touchscreen interfaces. The value proposition to consumers is compelling, with adults and children alike able to communicate with their chosen devices. Amazon and Google developers are playing along with these trends, instilling a healthy dose of humour and personality into their respective digital assistants.
- ▶ The Internet of Things (IOT) is a phenomenon that, on one level, is centred on the notion of everyday devices becoming connected devices. These devices will, in turn, either receive and act on data or gather and transmit data, or increasingly perform all of these functions. There is a clear consensus across the technology, media and telecoms industries that the number of connected devices globally will see a steep upward trajectory over the next decade. The 50 billion connected devices by 2020 forecast that Ericsson published a few years ago was rejected by many at the time, but it transpires that the phasing was out of synch by only three or so years. Recent forecasts from Statista suggest that the total number of connected devices worldwide will grow from around 20 billion at the end of 2017 to over 75 billion by 2025. Smart home



devices are an excellent representation of how IOT is evolving over time, with artificial intelligence adding a further layer of capabilities to these devices. Today, the surface has barely been scratched in terms of collection of data to enhance user utility. Privacy issues and fears are part of the restraining factors, but these continue to diminish over time. This will create an opportunity for vendors such as Lightwave to add analytics platforms to their product suites. Lightwave management understands the importance of the data opportunity and initiatives are underway to address this opportunity.

Partnership Honeywell Home by Resideo. On 4 February 2019, Lightwave announced a partnership with Honeywell Home by Resideo following several months of discussions. Resideo was demerged from Honeywell in October 2018 as a standalone entity focused on smart home and related technologies. Resideo posted revenue of \$4.5bn in 2017 and EBIT of \$484m, and currently has a market capitalisation of \$3.1bn. The two companies have agreed to share their proprietary radio protocols to both integrate their respective technologies and to jointly develop new technologies. This will include Lightwave hosting the Honeywell protocol on its RF hub and platform, in turn allowing Honeywell smart home products to be used interoperably with Lightwave products.

An important factor to note is that Lightwave and Honeywell both use the 863.0 MHz RF frequency, which is not commonly used by smart home manufacturers and offers advantages compared with W-Fi based offerings, as we discuss in a later section on Key Technologies. They also both appear to have a self-install/DIY focus to many of their products. The benefits to both companies from this partnership are potentially significant, in terms of filling gaps in their respective product ranges. Given Resideo's scale and smart home focus, the absence of smart sockets and switches is a notable gap in its portfolio. There may also be benefits from the Lightwave platform integration with Amazon Echo/Alexa, Google Home and Apple Homekit devices.

- ▶ Further partnership discussions are in progress. Lightwave continues to attract interest from a variety of potential partners. Utility companies are discussing the scope to resell Lightwave products through their own networks of maintenance and installation engineers. Other manufacturers of heating and security control products are also likely to be potential sales partners for Lightwave as they look to fill gaps in their respective product portfolios.
- The smart home segment has seen extensive M&A in recent years. The incumbent manufacturers of domestic electrical devices have, in many cases, struggled to keep up with smart home developments and have opted to make acquisitions to plug gaps in their product portfolios. Over the past few years, a number of sizeable acquisitions of leading vendors in the smart home market have taken place. Acquirers have included Amazon, Google, Samsung, Schneider Electric and LeGrand, while targets have included Nest, Netatmo, Smart Things, GET Electrical and Alert. Our expectation is that further industry M&A is likely.

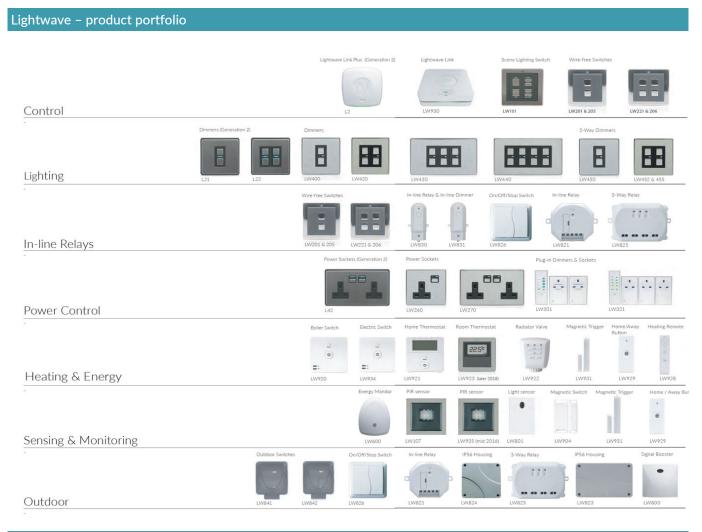


# Lightwave products

# Broad range of functional coverage

The Lightwave product ranges span a number of smart home functions and applications. The products are designed mainly to require installation – for example into a domestic electrical circuit. As we discuss further in the section on the company's competitive landscape, this is, in our view, a positive feature from a competitive positioning perspective. The instructions provided with the items are easy to follow, with accompanying instructional videos available online to assist with installation.

As the photographs below show, the products are available in a range of finishes, and considerable effort has been made to ensure that they are aesthetically pleasing, especially the newer Smart Series product ranges. The current product investment includes upgrades of the previous Connect Series to Smart Series specification, which should allow the company to expand traction in segments outside of lighting and power control.



Source: Hardman & Co Research, Company data



# Hub and spoke

Lightwave's products operate on a hub and spoke basis, as users are required to deploy a connected "hub" that is connected to the router. The various connected devices then create wireless links to the central hub. A typical initial purchase will likely comprise the hub, plus two to three light switches or smart sockets. Beyond the initial deployment, the company's strategic imperative is to persuade the user to add further devices across the range of categories on offer. For the user, if the initial steps in the journey are successful and deliver the desired elements of functionality, an appetite on the part of the user to extend the coverage of the Lightwave product offerings in the home with further devices should be triggered.

In this case, consumers will have decisions to make, the outcome of which may depend on their own circumstances. For example, a room with 12 downlights and one switch would lend itself far better to replacement of the existing switch to a smart version, rather than replacement of 12 light bulbs with costly smart alternatives to achieve the same degree of control. Lightwave has focused on the switch replacement option, whereas competitors such as Hive and Phillips have opted to focus on bulbs, all of which still require connected hubs.

From a user perspective, on the one hand, it is the case that the Amazon and Google platforms create a vendor-neutral layer, under which devices from multiple manufacturers can be combined. That said, there is, in most cases, an upfront investment that is required in terms of purchase of a hub, which, in turn, connects to the user's domestic router. Once the initial purchase of a Lightwave starter set has been made, users should be persuaded to continue to expand with Lightwave over time. Nonetheless, it is entirely realistic to assume that various vendors, including devices produced by Amazon themselves, could creep into a typical user environment.

#### Product innovation in-house, manufacturing outsourced

Lightwave's product development and innovation take place in-house. This includes hardware engineering, as well as software and firmware development and upgrades. The company remains relatively small in terms of headcount, today comprising 52 people, of whom 23 are in the engineering team, and the majority of the remainder focused on sales and marketing. The balance has been progressively shifting towards the latter. Manufacturing is, as one might expect, outsourced to various providers in China, Poland and the UK. Management notes that some issues with the UK manufacturer have resulted in an alternative supplier being sought out.

## Well-defined product roadmap

Management has a clear product roadmap encompassing the full suite of home automation offerings, with a sequence of new product launches scheduled for 2019. Central to this roadmap are further products for the European market. The Eurocompatible lighting dimmers were launched in 2H'18 and are now available online, as well as in Apple stores in multiple countries. The launch of the Euro smart sockets is scheduled for 1H'19. Meanwhile, the effort to upgrade further products from the first-generation products (now labelled the Connect Series) will continue over the next 12 to 24 months.

# Ease of use remains a primary focus

In our view, perceived ease of use is a critical determinant of the acceleration in demand. The notion that lighting, heating and electrical sockets can simply be turned on and off with simple voice commands is a compellingly simple proposition. This is the central marketing challenge for Lightwave, i.e. persuading consumers that the installation requirements and upfront costs of products are significantly more than outweighed by the convenience and utility benefits. Once installed into the home, the user is required to download an app that is free from either the Apple or Google



app stores. The capabilities of its app are critical in this regard. The images below demonstrate the simplicity of the interfaces that accompany the lighting and heating products.

# Lightwave - app functionality

#### **Device Control by Room**



The LightwaveRF devices can be grouped by room so that a number of light switches and sockets are activated by the press of a single button on the app, or increasingly commonly, with a voice instruction to, say, Amazon Alexa to turn on or off the living room lights. Any devices can be included as well as thermostatic heating controls.

#### Scene Control



The scene control functionality allows various combinations of the devices to be pre-set. For example, a user may decide to dim the celing lights to a certain level and turn on table lamps and his television and DVD sockets simultaneously. This setting could be named "movie" and activated with a single voice command.

#### **Scheduling of Events**



The ability to schedule "events" allows configuration of the LightwaveRF devices for either security or convenience purposes. Users who are away can schedule lights to turn on in their absence. Similarly, domestic routines can be complemented by lights and other devices being switched on at pre-scheduled times.

#### **Heating Control**



Heating controls are an area of the home automation market with relatively low penetration but set to grow relatively quickly. Thermostatic radiator valves can be controlled by the app and used to set heating levels room-by-room. These can be readily installed by users. Boiler controls are often professionally installed.

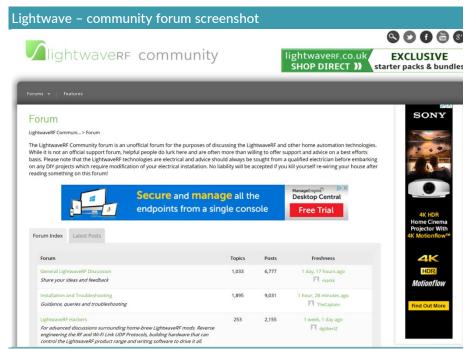
Source: Hardman & Co Research, Company data

# Online forums and discussion boards

The nature of a proportion of Lightwave's products is that they are not plug-andplay, but rather require a degree of user installation (or by an electrician if the user is uncomfortable with undertaking the relatively straightforward process). One helpful aspect of online consumer presence is that forums have merged where users address many of each other's queries themselves.

It is well understood that online forums and discussion boards are an important mechanism for online businesses to attract visitors and drive customer loyalty. In Lightwave's case, the ability for customers to share experiences in terms of how they have used and deployed its smart home products or overcome any installation niggles and uncertainties is a potentially very important driver of repeat business.





Source: Company data

# Routes to market

# Overhauled distribution strategy

The sales, marketing and distribution aspects of the company's strategic execution will perhaps have the largest impact on the financial performance of the business over the next few years. The Generation 2 products are well engineered, the roadmap appears to be clearly defined and the response has been positive from some of the most discerning technologists in the world – from Apple through to consumer-centric technology publications. A primary strategic imperative from here is to broaden the presence of the product ranges across online and physical stores, particularly targeting retailers that attract technology-savvy customers. Elsewhere in this report, we make reference to surveys conducted by PwC, which found that millennials aged between 18 and 25 are an example of a population segment worldwide that is expected to be particularly active in purchasing smart home technology in the coming years. Online store presence will be an important aspect for these buyers.

#### Key channels

The direct channel through its online store and direct sales to certain commercial segments, for example housebuilders, is expected to remain Lightwave's primary source of revenue in 2019, at around 45% of total revenue. Retail and distribution is expected to represent ca.35% of revenue. Lastly, the continental European business, today driven largely by Lightwave's presence in Apple stores and its website, is expected to account for the remaining ca.20% of revenue. These are stated as proportions of an expected 2019 revenue base of £6.40m, more than double the level of revenue reported in 2018 of £2.81m.

There are, however, several moving parts in this picture, especially given the significant collaboration with NICEIC that is discussed below. The contribution from this partnership will fall within the distribution revenue segment, given that it directly targets electrical contractors, who will often be a key source of product advice for end-users where any element of installation is required.



# Retail Growing retail presence generates credibility and consumer exposure to products, particularly in higherend environments such as John Lewis Partnership stores. Direct Online A key channel for Lightwave, which includes direct sales to consumers as well as housebuilders and other commercial users of the products. Trade / Wholesalers The full range of products are stocked by a range of electrical wholesalers, supplying building contractors, electricans and certain end-user groups.

Source: Hardman & Co Research, Company data

# The Apple relationship is progressing well

The Apple Store presence of the Lightwave products is undoubtedly impressive, with the photograph below taken recently in the Brent Cross branch. Notably, the Lightwave products spanned a full shelf of a display, which is sizeable coverage for a company of Lightwave's size. As disclosed in the company's 2017 annual report, an initiative to create ranges of devices compatible with European standards is under way, prompted by indications from Apple that it would like to roll out the products across more of its European retail operations. The Lightwave lighting products are currently available in selected Apple Stores in the UK, Belgium, France, Germany, Holland and Sweden.

However, management sensibly acknowledges that, while these developments with Apple are an important component of Lightwave's efforts to build a more widely recognised brand, the revenue contribution *per se* will be more limited, at least in the next couple of years. The "halo effect" of being seen as a "best-in-class" vendor by Apple is at least as important when it comes to Lightwave's key direct channels.

Lightwave - products on display in Apple store (Brent Cross Shopping Centre, London) - November 2018



Source: Hardman & Co Research



# NICEIC partnership

The fact that a number of the Lightwave products require a degree of installation is a point of differentiation in terms of generating productive routes to market. The electrical installation segment is a clear example in this regard. The challenges for traditional electricians with respect to smart home technologies include keeping up with the rapid pace of developments in smart home technology, but also being able to obtain the appropriate training, guidance and certification. For most electrical contractors focusing on the domestic market, high-end solutions that require programming and deployment of application interfaces may be beyond their comfort zones. However, retrofit products that offer compelling functionality and ease of use at modest prices are an ideal fit for contractors and customers.

Lightwave is addressing precisely this opportunity with a new partnership with NICEIC –a body that provides assessment and certification services for contractors working across the building services sectors, including electricians, renewable energy installers, plumbers, and gas and heating engineers. Homeowners typically seek to engage contractors, especially electricians (given important safety considerations), who are NICEIC registered and can offer the appropriate completion certificates once the work has been carried out. Lightwave has worked with NICEIC to create a smart home accreditation and training programme. It has also invested in creating training materials and course documentation. The target is for the partnership to go live in 1Q'19.

These accreditation programmes will be available to both existing qualified electricians and those new to the industry undergoing training. The most recent statistics indicate that there were around 265,000 employed and self-employed electricians and electrical fitters in the UK at the end of 2017. Lightwave estimates that its collaboration with NICEIC will allow it to access ca.80,000 of these individuals, who essentially represent sales interfaces with consumer end-users, in particular with those consumers who are seeking to undertake electrical work at that point in time.



# Smart home market trends

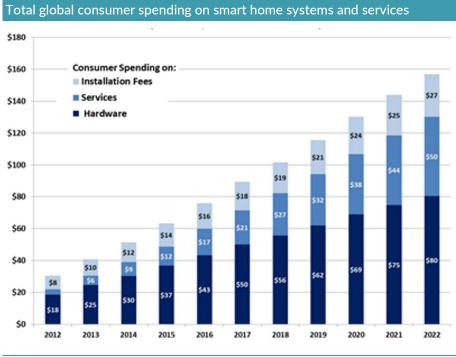
# A period of rapid evolution

The smart home marketplace is undergoing rapid expansion as consumers seek to leverage the growing capabilities of low-cost, easy-to-install automation devices. Central to the growth of the market have been Amazon's Echo/Alexa and Google's home devices and operating systems. Aggressive marketing and highly competitive pricing are making these devices increasingly commonplace in consumer homes. Apple is a relative latecomer into this market, but its Homekit platform should recover market share, given the full integration and pre-installation with the Apple iOS.

Across the board, as we noted earlier, manufacturers of domestic smart devices understand that integration with Amazon, Google and Apple platforms, and perhaps Samsung and IFTTT as well, are essential in order to access this opportunity, whether regarding heating controls, security systems, electrical sockets and light switches, or entertainment systems.

# Market forecasts show strong growth

Industry forecasts across the board point to strong growth ahead for the smart home market, whether relating to products or services. Strategy Analytics quantifies the global consumer market to be worth over \$100bn today, expanding to almost \$160bn by 2022. These are large numbers, and suggest that small vendors with the right access to markets and well-configured distribution models could deliver rapid growth against the favourable market backdrop.



Source: Strategy Analytics



# PwC survey of consumers

A 2018 survey by PwC of over 2,000 UK consumers found that just under 50% had plans to invest in connected home technology. 30% intended to make a purchase within two years, a metric that was over double the percentage in a similar survey two years previously. There is a significant overlap between this group and those that had already invested in smart entertainment offerings and wearable technologies. Notably, PwC's forecasts suggest that £10.8bn will be spent on smart home devices in the UK in 2019.

These are useful forecasts. One could, however, look at them in a more negative light and highlight the fact that 70% don't intend to make a purchase over the next couple of years. One concern we have with these types of surveys for technology products is how the notion of a connected product is being defined. The initial emphasis in this context on smart fridges and other white goods was perhaps not the best starting point, and yet it is how many consumers continue to view this market. If the same consumers were asked if they would like to be able to control lights in their homes with simple voice commands at relatively low cost, the relative proportions might turn out to be more in support of smart home products.



# Major European market participants

## Broad range of sub-segments

Lightwave's competitive landscape is characterised by a combination of very large players and smaller, niche providers, but the broad range of potential applications means that no dominant vendor across the entirety of the marketplace has emerged. Even within, say, the smart lighting segment, there are vendors such as Lightwave offering consumers smart switches that replace existing legacy switches, while other providers have focused on developing smart light bulbs that can be controlled with apps. As we discussed earlier, each option has its relative merits depending on the specific consumer environment and differing degrees of competitive protection.

## Categorising smart home vendors

The schematic below seeks to categorise the main market participants by specific key criteria. The purpose of our analysis here is not to enter into a detailed discussion of the relative merits of the specific functionality of the various devices; of greater relevance are factors such as (i) the breadth of product ranges across the different smart home segments that were identified earlier in this report, (ii) the implementation complexity of the products and the ease of use thereafter, (iii) price points and whether the products have the scope to gain mass market penetration, and (iv) the brand recognition and geographical focus of the vendor. The chart addresses the first two of these criteria, and we then follow up with commentary on each vendor to provide some additional perspectives on their respective positioning relative to Lightwave.



Source: Company data



No doubt, if opened up to debate, each of the vendors listed would proclaim greater breadth than the schematic suggests, or, at the very least, they would point to a future product roadmap that encompasses a wider array of functional devices. However, as matters stand, these strike us as fair categorisations. For Lightwave, it is relevant to make a distinction between its Generation 2 products and older products. The smart heating and security products, for example, are in the process of being upgraded to the look and feel of the existing Generation 2 products, and form part of the product releases scheduled for 2019.

## Signs of commoditisation at low-end of market?

A further consideration is the extent of product differentiation. A search for a smart plug on Amazon today yields dozens of results. Manufacturer names that pop up include Kasa, Slitinto, Vindar, TECKIN, AISIRER, Horsky, ANEKEN, ANOOPSYCHE, MANZOKU, KUSSN, Blitzwolf, Unitify, HLT, Energenie, DELICACY, ChengYing and hyleton. These are the names that feature on page one of dozens of pages of product listings, most offering next-day Prime delivery through the Amazon marketplace. All of these devices proclaim compatibility with Amazon Echo and Google Home. The simple fact is that the low-end of the market, where devices are essentially plug-and-play, is already showing signs of commoditisation. Notably, Amazon itself has launched smart plugs, which is expected to be followed by various further easy-to-use devices for the smart home market.

# Lightwave operates in a more discerning segment

Fortunately for Lightwave, the company operates in an adjacent, higher-end and more differentiated market segment. Given the need for installation of products into domestic lighting and electrical circuits, consumers will inevitably be far more focused on product quality, compliance with safety regulations and ongoing performance and reliability. This is where Lightwave is able to readily differentiate itself, with an established brand and substantial credibility stemming from product adoption by major retailers and favourable reviews from recognised publications. The partnership with respected independent bodies such as NICEIC is also an example of the scope that Lightwave has to establish its reputation as a market leader and create some pricing resilience.



# Competitor profiles



Lutron is one of the largest players in the smart home market but remains primarily focused on lighting and automation of related aspects, such as blinds and curtains. It is a US-headquartered vendor that has dominated the high-end market for many years. Its solutions are primarily designed for professional installation in commercial and larger residential environments, and require programming and proprietary cables to be run between the smart panels (pictured on the left below) and the remote switches. Lutron systems are generally costly and relatively complex solutions, with which most electricians have limited experience. There is also no mobile app support for the majority of its core products at present. Lutron has launched a simpler offering named Caseta, which offers wireless replacement switches that would, in principle, compete with Lightwave. However, these are available only for US formats at present, and no plans to create equivalent product offerings for other regions have been announced.



**Hive** was formed within British Gas when Centrica created a connected homes business in 2012. Accordingly, the company has approached the UK market with an initial focus on smart central heating controls, subsequently acquiring AlertMe in February 2015, which was a specialised smart device manufacturer. This allowed Hive to progressively add products, including connected plugs, smart light bulbs, sensors that detect motion or opening of doors and windows and, most recently, a security camera. All of these items can be monitored and controlled via the Hive smartphone app. While the heating controls require installation, more often than not by a plumbing engineer, the other devices are essentially plug-and-play. Its lighting offerings are limited at present to smart bulbs, rather than light switches.

# netatmo

**Netatmo** was recently acquired by LeGrand and offers design-led solutions comprising internal/external security cameras, heating controls and weather stations. There are no lighting or electrical offerings in the Netatmo range, so the overlap with Lightwave, especially for the Generation 2 products, is limited, but the products benefit from strong distribution, leveraging the recognition of Philippe Starck, the French designer, who was commissioned to design a number of Netatmo's products.



**Nest** is another major player in the global smart home market. Founded in California in May 2010, the company represents one of the largest acquisitions in this segment – it was acquired by Google in January 2014 for \$3.2bn in cash (Google already owned a 12% stake in the business). This was an important transaction in a broader market context, as it threw the spotlight onto the smart home market and signalled that it was becoming mainstream. Indeed, it was in 2015 that Amazon's Echo devices started to be seen as smart home controllers in earnest. Nest remains focused on home heating and security, with several internal and external cameras added to the initial heating control products, along with movement sensors and door bells.





**Philips Hue** is part of Signify N.V., formerly the Philips Lighting division of Royal Philips N.V. The product range is focused on colour-changing LED lamps and light bulbs that can be controlled wirelessly through an app or through the major Amazon and Google platforms. These products were first introduced in 2012. Competing directly with Hive in this segment, the offerings are narrowly focused on light bulbs and LED lightstrips, with no announcements to date of any proposed launches in other segments of the smart home market.

# **Honeywell** Home

Honeywell Home is the trading brand of Resideo Technologies, which was spun out of the Honeywell Group as a separately traded public company in October 2018. It has a 40-year licence to use the Honeywell Home brand. The product range at this juncture is focused on thermostats, humidifiers, smoke and carbon monoxide detectors, security cameras and motion detectors. This is a sizeable business, in aggregate terms posting \$4.5bn of revenue in 2017 and \$484m of EBIT. However, only 49% of this is related to product, with the remainder comprising wholesale distribution of security and other products. Within the product business, the company considers itself to be a leader in security systems and thermostats, with an installed base of 150 million homes. Of ca.\$2.4bn of product revenue, 29% is earned in EMEA. 95% of net product sales are via professional installers.

# tado°

**Tado** is a less well-known smart home brand in the UK. Based in Germany, the company has focused exclusively on developing intelligent heating and cooling products for domestic and some commercial environments. The company's smart thermostats connect heating and air conditioning systems to the internet. In particular, the company offers smartphone app-based control products. These include devices that enable remote control of air-conditioning units (the Tado device is compatible with over 85% of the existing air conditioners deployed worldwide) and smart thermostatic radiator valves that connect wirelessly to central heating controls. The company's CEO previously led Philips' EMEA consumer division. In October 2018, the company announced a \$50m funding round, bringing total funding to date to \$102m. Investors in the latest round included Amazon, E.ON, the European Investment Bank and some private equity investors.



**Belkin** is a major vendor in the consumer electronics market. Alongside its main and Linksys brands, WeMo is Belkin's newest brand, and is focused on smart home products. At present, WeMo is targeting the simplest product categories, having launched smart sockets that plug into traditional wall sockets and a wi-fi camera, which is a commonly available product. Further product releases are inevitable given that Belkin innovates quickly. However, we do not expect WeMo to release any products that require electrical installation.



# Key technologies

# RF explained

As the Lightwave company name might suggest, the company's family of products are based on RF (radio frequency) technologies for the communication protocol between the devices and the central hub, and, in turn, with other related devices such as the Alexa and Google control devices.

- ▶ A "simplex" RF system is a radio transmission technology that allows one-way communication from a transmitter to a receiver. Examples in this category include FM radio transmission, analogue television broadcasts and pagers.
- ▶ A "half-duplex" RF system allows each end to transmit and receive, but not simultaneously. The communication is bi-directional over the same frequency but uni-directional for the duration of the message. Examples in this category include wireless PC keyboards and mice, walkie-talkies and, of course, Lightwave smart home devices.
- ▶ A "full-duplex" RF system, to complete the picture, is a system in which each end can transmit and receive simultaneously. Two frequencies co-exist in the communications channel one dedicated to transmitting and the other to receiving. Examples include mobile cellular phones and satellite communication.

# Frequency spectrum allocation: unlicensed ISM/SRD bands

<ul> <li>USA/Canada:</li> <li>260 – 470 MHz</li> <li>902 – 928 MHz</li> <li>2400 – 2483.5 MHz</li> </ul>	(FCC Part 15.231; 15.205) (FCC Part 15.247; 15.249) (FCC Part 15.247; 15.249)	
• Europe:	LightwaveRF	
<ul> <li>433.050 – 434.790 MHz</li> </ul>	(ETSI EN 300 220) operates here	
■ 863.0 – 870.0 MHz	(ETSI EN 300 220)	
■ 2400 – 2483.5 MHz	(ETSI EN 300 440 or ETSI EN 300 328)	
• Japan:		
■ 315 MHz	(Ultra low power applications)	
<ul> <li>426-430, 449, 469 MHz</li> </ul>	(ARIB STD-T67)	
<ul> <li>2400 – 2483.5 MHz</li> </ul>	(ARIB STD-T66)	
■ 2471 – 2497 MHz	(ARIB RCR STD-33)	
<ul> <li>ISM = Industrial, Scientific and</li> <li>SRD = Short Range Devices</li> </ul>	d Medical	

Source: Hardman & Co Research, Texas Instruments

# RF versus Wi-Fi

Lightwave decided at the outset to use the 863.0 MHz part of the RF spectrum, in recognition of its greater range (Lightwave's devices have a range of 600m in openair environments), higher levels of building penetration and in anticipation of the congestion issues that are now emerging with Wi-Fi.

Essentially, RF is simply a slightly broader frequency spectrum than the microwave range. The Wi-Fi signal from a laptop is usually transmitted at 2.4 GHz or 5 GHz, frequencies found within the microwave range, or a spectrum of 300 MHz to 300 GHz. These 2.4 GHz and 5 GHz frequencies are also within the same spectrum of what is called the RF range, 3 KHz – 300 GHz. These are all parts of the unlicensed



frequency spectrum, and Lightwave is using a slice of this that falls within the 863.0 to 870.0 MHz range. Devices operating in this segment are often referred to as short-range devices (SRDs), defined as devices that are generally used for the transmission of information and have a low capability of causing harmful interference to other radio equipment.

# Wi-Fi congestion issues

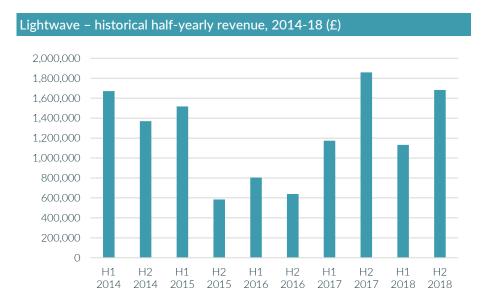
There are multiple differences between Wi-Fi and the 863.0 MHz spectrum used by Lightwave. One of the growing issues faced by smart home vendors using the Wi-Fi spectrum is congestion and a crowded frequency, which leads to slower performance for connected devices. The reason for the popularity of Wi-Fi among the commodity smart home manufacturers is that a dedicated hub is not required. The devices connect directly to the router. However, performance issues are already a factor and will be exacerbated by the growing number of devices being deployed in the average home.



# **Financials**

# Historical track record

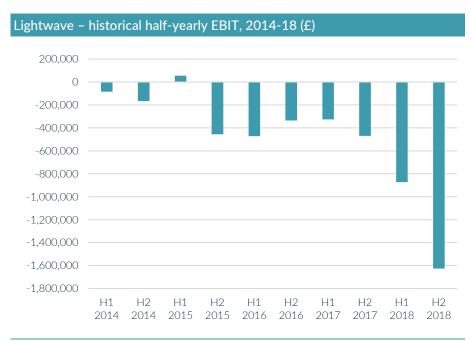
- ▶ Lightwave has exhibited some volatility in its financial results over the past few years, as shown in the chart below. Consistent traction on a half-yearly basis has eluded the company for the last three to four years. Certainly, as with most consumer-facing businesses, some seasonality is to be expected. The company's fiscal year-end of September means that the boost from the Christmas, Black Friday and Cyber Monday periods fall into its first half. The importance of the latter two events for consumer electronics is high, especially for smart home products which are becoming a star segment.
- ▶ It has been clearly communicated that the 1H'18 weakness was due almost entirely to the changes in distribution. The previous exclusive relationship was dismantled, leading to a disconnect emerging with the previous partner. Nonetheless, it is clear that a broader range of routes to market, including a focused direct sales effort and a presence in a range of very large retail chains, represents an improvement on the previous single distributor scenario.



Source: Hardman & Co Research, Company data

- ▶ The profitability track record of the business has reflected the revenue deviations noted above. The chart below looks at the EBIT outturn of the business over 2014-18. 2018 saw a substantial ramp in operating expenses, from £2.1m in 2017 to £3.7m in 2018, as the company sought to invest in R&D and sales and marketing resources to grow. Given the inevitable lag with which these initiatives translated into improved revenue traction, the EBIT loss profile widened substantially in 2018.
- ▶ The onus is now on management to demonstrate a path back to profitability based on the sharp uptick in sequential monthly revenue growth rates that is currently being seen, as discussed below.





Source: Hardman & Co Research, Company data

# Outlook for 2019

Central to the investment case for Lightwave is the prospect of an improvement in growth rates stemming from a combination of the distribution channel changes and launch of new products that have taken place. Management updates on the company's recent growth trajectory have been positive.

- ▶ On 26 October 2018, Lightwave released its full-year trading update for the 12 months ended 30 September. While the outturn for the year was noted to have been relatively sluggish, with 2018 revenue expected to be a little below 2017 revenue of £3.0m, due to 1H weakness, the revenue run rate for the final quarter of FY'18 was stated to be up in excess of 50% compared with the average for the prior three quarters.
- ▶ The annual report for 2018, released in mid-December, provided further detail. The almost three-fold increase in direct-to-consumer revenue to £1.24m in 2018, from £0.35m in 2017, represents noteworthy momentum. Also significant was the point that distributor stocking was almost entirely absent from the revenue line in 2018, in contrast to previous years. By way of outlook, it is noted that the revenue run rate for the first two months of 2019 was 25% higher than the 4Q'18 run rate.
- ▶ Most recently, the 1Q'19 trading update for the three months ended 31 December 2018 noted that revenue for the period was up 156% year-on-year to £1.15m, continuing the strong momentum seen in 4Q'18. This quarterly revenue outturn is essentially equal to the revenue outturn for the first half of 2018. Management indicated in the statement that it was confident that this momentum could be maintained.

Our financial estimates at this stage capture only a proportion of the potential uplift in revenue on a year-on-year basis implied by these data points. Consistent execution will inevitably be required to deliver continued growth rates at these levels. However, there may well be scope for meaningful revenue upgrades at the 1H'19 stage (for the six months ended March 2019) if the current momentum is sustained.



# Revenue model and drivers

Our revenue estimates are set out in the table below. We expect the key driver of growth in 2019E to be the direct-to-consumer segment. This is where the company is able to exert the greatest degree of direct influence through direct marketing, SEO optimisation and pricing promotions. Continuing the strong growth patterns seen in 2018, our direct-to-consumer revenue estimate for 2019 is £2.85m, versus £1.24m in 2018.

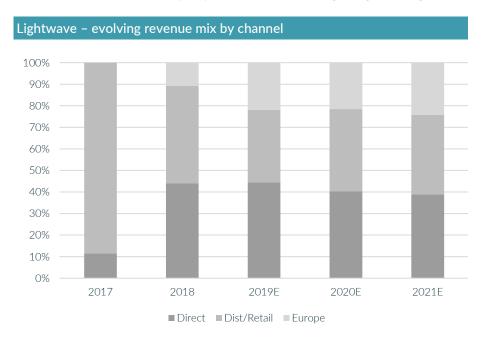
- ▶ We are relatively conservative in our estimates for distribution/retail channel revenue, and well below management targets, despite the growing presence for Lightwave's products in Apple stores in the UK, together with the new presence either online or in the retail stores of John Lewis, Dixons, Currys and B&Q. Similarly, further European product launches with Apple are scheduled to be released in early 2019, implying that the European revenue estimates may be relatively conservative.
- ▶ It is perhaps worth noting management's view that if all went to plan in the current year, it could achieve revenue comfortably ahead of our £6.40m estimate. However, we remain mindful that much will depend on the effectiveness of the sales and marketing initiatives and strong execution will be required.

Lightwave – revenue growth and mix by segment						
Y/e Sept (£m)	2017	2018	2019E	2020E	2021E	
Direct-to-Consumer	0.35	1.24	2.85	4.95	5.60	
% growth YoY	-	254%	130%	74%	13%	
Dist/Retail	2.68	1.27	2.15	4.70	5.30	
% growth YoY	-	-53%	69%	119%	13%	
Europe	0.00	0.30	1.40	2.65	3.50	
% growth YoY	-	-	367%	89%	32%	
Total	3.03	2.81	6.40	12.30	14.40	
% growth YoY	-	-7%	127%	92%	17%	
Y/e Sept (%)	2017	2018	2019E	2020E	2021E	
Direct-to-Consumer	12%	44%	45%	40%	39%	
Dist/Retail	88%	45%	34%	38%	37%	
Europe	0%	11%	22%	22%	24%	
Total	100%	100%	100%	100%	100%	

Source: Hardman & Co Research, Company data



As the chart below shows, there has been a step change in favour of direct revenue away from distribution, and this mix change is expected to remain intact over the next few years, especially given the current focus on direct-to-consumer sales, which helpfully also commands the highest gross margins.



Source: Hardman & Co Research, Company data

Lightwave's revenue in 2018 was derived almost entirely from the UK, with £49,000 of revenue from the Middle East.

# **Gross margins**

- ▶ The revenue mix disaggregated by route to market will be the primary determinant of gross margins. We set out in the table below our estimates for gross margins across the direct-to-consumer, distribution/retail and European channels to market.
- As discussed above, the marked shift in favour of direct sales is highly beneficial to gross margins, given the absence of a payaway on sales to partners. Accordingly, compared with the relatively weak gross margin profile of the last few years, an increase the overall gross margin towards 50% is expected driven by the strong traction in direct-to-consumer sales. We expect the latter to represent 45% of revenue in 2019E, compared with only 12% in 2017.
- ▶ The gross margin in 2H'18 was impacted by a provision taken for inventory of the old Connect series products to reflect the risks of technological obsolescence as the newer Smart series products are released. The margin in that period was also adversely impacted by the restructuring of the distributor arrangements. The exit of Megaman (which handled the Screwfix and Maplin relationships) required Lightwave to buy back stock to avoid excessive discounting by Megaman. The underlying gross margin in 2018 before these impacts was 35.3%, which was broadly maintained from 2017.



Lightwave – gross profit 2018					
Channel (y/e Sept, £m)	Gross margins	Revenue	Gross profit		
Direct-to-Consumer	37%	1.24	0.45		
Dist/Retail	24%	1.27	0.31		
Europe	22%	0.30	0.07		
Total		2.81	0.83		
Gross margin			29.3%		

Source: Hardman & Co Research, Company data

Our blended overall estimate for Lightwave's 2019E gross margin is 43.5%, versus 29.3% reported (35.3% underlying) in 2018, as set out in the table below.

Lightwave – gross profit estimates 2019E					
Channel (y/e Sept, £m)	Gross margins	Revenue	Gross profit		
Direct-to-Consumer	55%	2.85	1.57		
Dist/Retail	37%	2.15	0.80		
b	30%	1.40	0.42		
Total		6.40	2.78		
Gross margin			43.5%		

Source: Hardman & Co Research, Company data

▶ We estimate a further gross margin improvement is anticipated in 2020, as set out below, reflecting in large part a greater degree of "productization" of the newer products, the Euro sockets, new thermostatic radiator valves (TRVs) and relays, in particular.

Lightwave – gross profit estimates 2020E					
Channel (y/e Sept, £m)	Gross margins	Revenue	Gross profit		
Direct-to-Consumer	60%	4.95	2.97		
Dist/Retail	44%	4.70	2.07		
Europe	35%	2.65	0.93		
Total		12.30	5.97		
Gross margin			48.5%		

Source: Hardman & Co Research, Company data

- ▶ We are conservative in our forecast year-on-year gross margin progression at this stage as much will depend on how the revenue mix evolves. However, as discussed earlier, the heavy intended marketing expenditure, especially on digital channels that are mostly linked to direct-to-consumer sales, could have a beneficial impact on the blended gross margin.
- ▶ At the same time, pricing pressure could be a feature alongside negotiated discounts from the main distributors as they build volumes. These are the factors that presently lead us to assume a margin contraction of 270 basis points in 2021 versus the prior year, as set out in the table below.

Lightwave – gross prof	fit estimates 2021E		
Channel (y/e Sept, £m)	Gross margins	Revenue	Gross profit
Direct-to-Consumer	58%	5.60	3.25
Dist/Retail	42%	5.30	2.23
Europe	32%	3.50	1.12
Total		14.40	6.59
Gross margin			45.8%

Source: Hardman & Co Research, Company data



# Operating expenses

- ▶ The company's operating expense base has grown substantially over the past three years. From an opex or administrative cost base of ca.£1.3m in 2014 and a little under £1.1m in 2015, these costs were increased to £2.1m by 2017 and further, to over £3.7m, in 2018. This represents a tripling of administrative costs, while revenue has remained essentially flat over the same period.
- ▶ It should be recognised that much of the opex uplift was a function of Apple's enthusiasm for Lightwave's Smart Series range of products, which in turn prompted the decision to accelerate the development of the European range of products. While this was an appropriate strategic call given the thriving relationship with Apple, the shorter-term impact was a material increase in cash burn
- ▶ Headcount has been the primary driver of the opex increase and, in turn, expansion of the R&D and sales and marketing efforts. In 2018, total staff costs more than doubled year-over-year to just under £2.2m, with the average number of employees in the period increasing to 40 heads, including six directors, compared with 24 employees in total, on average, in the prior year.
- Management continues to scale up marketing expenditure, acknowledging that there is much to do to build Lightwave brand recognition. This category of opex will be the driver of the incremental administrative expenses in each of 2019 and 2020.

The table below sets out our estimates for administrative expenses, which are expected to decline as a percentage of revenue from 83% in 2019E to 41% in 2021E.

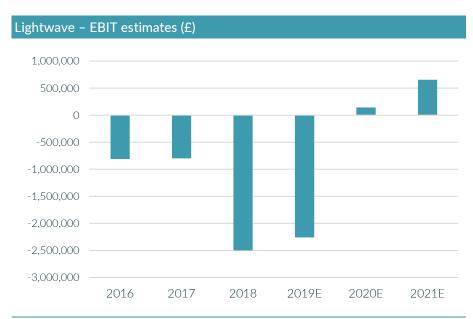
Lightwave – administrative	expenses					
Y/e Sept (£)	2016	2017	2018	2019E	2020E	2021E
Administrative expenses	-1,489,106	-2,121,559	-3,735,662	-5,341,997	-5,822,776	-5,939,232
% of revenue	103%	70%	133%	83%	47%	41%

Source: Hardman & Co Research, Company data

# EBIT breakeven in prospect in 2020E

- ▶ Given a relatively conservative stance on our 2019E revenue estimate together with the incremental marketing expenditure planned for the current year, we expect that the company will achieve EBIT breakeven on a full-year basis in 2020E.
- As summarised in the chart below, an EBIT loss of £2.26m is forecast for 2019E, turning around to an EBIT profit of £0.14m in 2020E (EBIT margin: 1%) and an EBIT profit in £0.65m in 2021E (EBIT margin: 5%).





Source: Hardman & Co Research, Company data

#### R&D tax credits

Lightwave continues to spend heavily on R&D – in 2018, R&D expenditure was £1.60m, up from £0.88m in 2017. In 2018, £0.13m of the R&D expenditure was expensed and £1.47m was capitalised. Accordingly, tax credits on R&D expenditure should continue to be recognised in future years as Other Income. In 2019, we expect £0.3m in tax credits, consistent with the financing obtained against this anticipated credit (see below). However, at this stage, we conservatively assume no Other Income for the period 2020-21.

#### Tax losses

The 2018 annual report quantifies the carried-forward unrecognised losses at £5.94m, leading us to expect no tax charge during our forecast period.

#### Debt position

Lightwave had total borrowings of £0.42m at the end of fiscal 2018 to end-September. This entirely comprised a convertible loan note with a supplier at a coupon rate of 3%. Denominated in US dollars, this convertible note was issued in October 2011 and can be redeemed at any point. Similarly, the loan note holder may opt to convert the outstanding balance into ordinary shares at any point, but provided confirmation at the year-end that it had no intention of converting. The company's current cash position is £0.20m and is expected to increase as debtors are collected in the near term.



# **Financing**

- On 1 March 2019, Lightwave announced that it had raised £2.50m gross proceeds through a placing of/subscription for 29.412m shares at a share price of 8.5p per share. Around one-third of the shares were issued on a firm basis and commenced trading on 6 March 2019. The remaining new shares are conditional on certain board resolutions being passed and are expected to start trading on 20 March 2019. As at 5 March 2019, the company had a net cash position of ca.£0.2m, prior to receipt of the proceeds of the fundraising.
- ▶ In December 2017, the company completed a fundraising of £4.90m (net of fees), to be deployed on scaling the business. This followed the decisions to broaden the distribution agreements and place a clearer focus on direct-to-consumer sales.
- ➤ Since the 2018 financial year-end, Lightwave has drawn down a £300,000 loan from Finstock Capital Limited secured against, and repayable from, R&D tax credits receivable.
- ▶ With respect to future funding requirements, it should be expected that Lightwave will seek to raise equity funding to invest in product development and routes to market. The company also expects to make greater use of debt financing against inventory and debtors. At the same time, Committed Capital Ltd, which has a 24% shareholding in Lightwave, has confirmed its continued willingness, if required, to invest further funds into the company in support of its strategy.
- ► The recent strong momentum confirmed by the company's trading updates should also facilitate fundraising efforts.

# **P&L** estimates

Lightwave – income statement								
Y/e September (£m)	2014	2015	2016	2017	2018	2019E	2020E	2021E
Revenue	3.04	2.10	1.44	3.03	2.81	6.40	12.30	14.40
% growth YoY	-	-31%	-31%	110%	-7%	127%	92%	17%
Cost of sales	(2.01)	(1.43)	(0.97)	(1.95)	(1.99)	(3.62)	(6.33)	(7.81)
% growth YoY	-	-29%	-32%	101%	2%	82%	75%	23%
Gross profit	1.03	0.67	0.47	1.08	0.83	2.78	5.97	6.59
% growth YoY	-	-35%	-30%	130%	-23%	237%	114%	11%
Gross margin (%)	34%	32%	33%	36%	29%	43%	49%	46%
Other Income (R&D credits)	-	-	0.21	0.25	0.41	0.30	-	-
Administrative expenses	(1.28)	(1.07)	(1.49)	(2.12)	(3.74)	(5.34)	(5.82)	(5.94)
% growth YoY	-	-17%	39%	42%	76%	43%	9%	2%
EBIT profit / (loss)	-0.25	-0.40	-0.81	-0.80	-2.50	-2.26	0.14	0.65
% growth YoY	-	59%	102%	-2%	214%	-10%	-106%	359%
EBIT margin (%)	-8%	-19%	-56%	-26%	-89%	-35%	1%	5%
Finance expense	(0.05)	(0.02)	(0.03)	(0.05)	(0.05)	(0.01)	-	-
Pre-Tax Profit / (Loss)	-0.30	-0.42	-0.84	-0.85	-2.54	-2.27	0.14	0.65
% growth YoY	-	40%	101%	0%	201%	-11%	-106%	359%
Pre-tax margin (%)	-10%	-20%	-58%	-28%	-90%	-35%	1%	5%
Taxation	0.15	0.19	0.0	0.0	0.0	0.0	0.0	0.0
Net profit / (loss) attributable to	-0.14	-0.23	-0.84	-0.85	-2.54	-2.27	0.14	0.65
equity shareholders of parent								
Profit / (loss) per share - basic (p)	(1.20)	(1.73)	(4.37)	(2.39)	(3.80)	(2.40)	0.14	0.65
Profit / (loss) per share - dil. (p)	(1.20)	(1.73)	(4.37)	(2.39)	(3.80)	(2.40)	0.14	0.65

Source: Hardman & Co Research, Company data



# **Balance sheet estimates**

Lightwave – balance sheet								
As at 30 September (£m)	2014	2015	2016	2017	2018	2019E	2020E	2021E
ASSETS								
Non-current assets								
Intangible assets	0.00	0.40	0.82	1.21	2.07	3.13	3.98	4.66
Property, plant and equipment	0.06	0.04	0.02	0.03	0.05	0.12	0.19	0.27
	0.06	0.44	0.84	1.24	2.12	3.25	4.17	4.92
Current assets								
Inventories	0.00	0.00	0.10	0.39	0.99	1.04	1.09	1.15
Trade and other receivables	0.34	0.64	0.32	0.47	0.68	0.73	0.84	0.97
Cash and cash equivalents	0.22	1.04	0.00	0.22	0.47	0.09	0.23	1.36
Corporate tax recoverable	0.15	0.12	0.19	0.25	0.41	0.00	0.00	0.00
_	0.72	1.80	0.61	1.33	2.55	1.87	2.16	3.48
Total assets	0.78	2.24	1.45	2.56	4.67	5.11	6.33	8.41
EQUITY & LIABILITIES								
Shareholders' equity								
Issued share capital	0.61	0.94	1.03	1.94	3.58	5.01	5.33	5.33
Share premium	2.82	4.03	4.15	5.46	8.73	9.87	10.55	11.84
Reverse acquisition reserve	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Share-based payment reserve	0.00	0.02	0.05	0.07	0.09	0.11	0.13	0.15
Profit and loss reserve	-4.23	-4.46	-5.30	-6.15	-8.69	-10.96	-10.82	-10.16
Total shareholders' equity	-0.90	0.43	-0.17	1.22	3.60	3.93	5.09	7.06
Current liabilities								
Trade and other payables	0.49	0.80	0.63	0.75	0.62	0.77	0.86	1.01
Loans and borrowings	0.57	0.62	0.79	0.59	0.42	0.38	0.34	0.30
Total current liabilities	1.07	1.43	1.42	1.34	1.04	1.15	1.20	1.31
Provisions	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Warranty provision	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.03
Non-current liabilities								
Loans and borrowings	0.62	0.38	0.21	0.00	0.00	0.00	0.00	0.00
Total non-current liabilities	0.62	0.38	0.21	0.00	0.00	0.00	0.00	0.00
Total equity & liabilities	0.78	2.24	1.45	2.56	4.67	5.11	6.33	8.41

Source: Hardman & Co Research, Company data



# **Cashflow estimates**

Lightwave – cashflow								
Y/e September (£m)	2014	2015	2016	2017	2018	2019E	2020E	2021E
Cashflow from operating activities	0.4.4	0.00	0.04	0.05	0.54	0.07	0.4.4	0.75
Loss for the year	-0.14	-0.23	-0.84	-0.85	-2.54	-2.27	0.14	0.65
Adjusted for:								
Depreciation and amortisation	0.01	0.02	0.12	0.32	0.65	0.81	1.09	1.36
Finance expense	0.05	0.02	0.03	0.05	0.05	-0.01	0.00	0.00
Share-based payments	0.00	0.02	0.03	0.02	0.02	0.02	0.02	0.02
Other income	-0.15	-0.19	-0.21	-0.25	-0.41	-0.30	0.00	0.00
Foreign exchange loss/(profit) on								
convertible loan	0.00	0.00	0.09	-0.01	0.01	0.01	0.00	0.00
Increase in inventories	0.40	0.00	-0.10	-0.29	-0.60	-0.05	-0.05	-0.05
Increase in trade and other receivables	0.01	-0.27	0.32	-0.15	-0.19	-0.05	-0.11	-0.13
Increase in trade and other payables	0.20	0.33	-0.17	0.12	-0.12	0.15	0.09	0.15
· · · · · · · · · · · · · · · · · · ·	0.36	-0.29	-0.73	-1.02	-3.15	-1.69	1.19	2.01
Decearch and development toy gradite								
Research and development tax credits received	0.00	0.23	0.14	0.19	0.25	0.30	0.00	0.00
	-0.05	-0.02	-0.03		-0.05	-0.01	0.00	0.00
Finance costs paid	-0.05	-0.02	-0.03	-0.05	-0.05	-0.01	0.00	0.00
Operating cashflow	0.31	-0.09	-0.63	-0.89	-2.95	-1.40	1.19	2.01
Cashflows from investing activities								
Purchase of property, plant and equipment	-0.06	0.00	0.00	-0.03	-0.06	-0.07	-0.07	-0.08
Development expenditure	0.00	-0.40	-0.51	-0.69	-1.47	-1.18	-0.94	-0.75
	-0.06	-0.40	-0.52	-0.72	-1.53	-1.24	-1.01	-0.83
Cashflows from financing activities								
Proceeds from issue of shares	0.39	1.55	0.22	2.36	5.25	2.80	0.00	0.00
Costs associated with issue of shares	0.00	0.00	-0.01	-0.14	-0.34	-0.20	0.00	0.00
Invoice discounting repaid	0.00	0.00	0.05	-0.05	-0.01	0.00	0.00	0.00
Repayment of convertible loan note	0.00	0.00	-0.02	-0.07	-0.05	-0.04	-0.04	-0.04
Repayment of other loans	-0.32	-0.23	-0.14	-0.28	-0.12	-0.30	0.00	0.00
	0.06	1.31	0.10	1.83	4.73	2.26	-0.04	-0.04
Net increase in cash and cash equivalents	0.31	0.82	-1.04	0.22	0.25	-0.38	0.14	1.14
Cash and cash equivalents at start of year	-0.09	0.22	1.04	0.00	0.22	0.47	0.09	0.23
Cash and cash equivalents at year-end	0.22	1.04	0.00	0.22	0.47	0.09	0.23	1.36

Source: Hardman & Co Research, Company data



# Lightwave management

# Barry Gamble (Non-Executive Chairman)

Barry has experience from a number of board advisory and non-executive roles. He was Chairman of Fisher German LLP and of Fountains plc, where he led the MBO and AIM IPO. A former Editor at Large of *BoardRoom* magazine, he writes about and contributes to board workshops on best practice corporate governance, including for the Non-executive Directors Association and Quoted Companies Alliance.

# Jason Elliott (CEO)

Jason was Chief sales officer for ONZO Ltd, which provides energy data analytics to major utilities, and through which he gained first-hand experience of the smart home market. He was previously Divisional Managing Director of SafetyBank, the safety management software company, a wholly-owned subsidiary of Olive Communications Solutions Limited. Prior to that, he held a number of senior sales roles at Azzurri Communications Limited, the cloud hosting and data management provider, now part of Maintel Holdings plc. He has a strong technical grounding, from serving for seven years as an engineer in the Royal Navy Submarine Service.

## Kevin Edwards (CFO)

Kevin qualified as a Chartered Accountant in South Africa and, on moving to the UK, qualified as a Chartered Management Accountant with CIMA. He has worked in senior finance and commercial positions in blue-chip organisations such as Thomson Fly and National Grid. For the past 10 years, he has used his expertise in M&A activity, manufacturing and process management, and supply chain optimisation, to scale up early-stage and private equity-backed businesses.

# John Shermer (Founder and CTO)

John established the Centre of Access Technology to provide expertise and training on technology and disability to UK local authorities and overseas agencies. He also worked with the European Commission as an expert advisor on technology, and later established SRS Technology Group plc, where he held various senior executive and Board positions. John is a founder of the company, and continues to provide the energy, vision and conviction that inspires Lightwave to innovate and lead in the smart home sector.

#### Mike Lord (Non-Executive Director)

Mike is a serial entrepreneur, having grown the revenues of his last business, Minivator group, from £5m to £50m, executing a double-digit EBITDA multiple exit. He has a thorough understanding of technology, as well as the opportunities for its commercialisation. Mike is a business graduate who has spent his career managing fast-growth businesses. He has a strong track record in business strategy, sales and marketing, finance and M&A.

## Steve Harris (Non-Executive Director)

Steve is CEO of Committed Capital, a London- based venture capital business investing in high-growth, early-stage technology businesses. Steve has some 20 years' experience of technology investment, and currently serves on four investee company boards. He is a strong advocate of investor support, in addition to finance, to optimise investee company growth, and typically provides input on remuneration, sales and marketing strategy, transaction structure and documentation. He has a background in management consulting with PA Consulting, and in corporate finance with HSBC and Société Générale. He was formerly an officer in the British Army. He has a master's degree in business administration from London Business School.



# **Shareholders**

Lightwave's major shareholdings		
Other Shareholders	No. of Shares	%
Committed Capital	23,864,980	29.00
Nominees		
Unicorn Asset Management	13,224,957	16.07
Brewin Dolphin Nominees	7,661,638	9.31
Herald Investments	7,917,353	9.62%
Perry Morgan	2,951,200	3.59
Brendan Kerr	2,565,384	3.12
Stephen Pycroft	2,565,384	3.12

Source: Company data

Lightwave's director shareho	ldings	
Director Shareholdings	No. of Shares	%
Mike Lord	1,300,000	1.58
Barry Gamble	1,225,000	1.49
John Shermer	896,666	1.09
Kevin Edwards	173,076	0.21
Jason Elliott	90,681	0.11

Source: Company data

# One-year share price performance





Source: Hardman & Co Research, Company data



# **Risks**

# Upgrades of older products, fast pace of market innovation

Lightwave will need to execute on an ambitious product refresh programme as it upgrades its first-generation products to the specification of its Generation 2 products, including Apple HomeKit compatibility. At the same time, in a fast-moving market, with a need to ensure full and continuing compliance with the interfaces and protocols of Amazon Echo and Google Home, the company's engineering team faces a challenging couple of years ahead.

# Brand recognition in an increasingly crowded market

Lightwave is a small vendor that is managing to 'punch above its weight'. The photograph presented earlier in this report of the company's products occupying an entire shelf in an Apple Store in London last month is testimony to that assertion. The increasing focus being placed by management on direct sales to the consumer segment and a greater emphasis on online marketing will be helpful initiatives, but brand recognition in this market will likely remain a challenge.

## Well-funded competitors

The sizeable smart home opportunity and the accelerating adoption curve fostered by Amazon, Google and Apple are attracting many large players into the market. Many of these companies face attrition in their traditional revenue and need to create revenue streams in these newer segments. Lightwave will need to continue to deploy R&D funds effectively. To date, with relatively limited resources, the company has managed to deliver products that have received a very positive market response, but this process will need to be repeated many times in the coming few years.

# Scalability of internal processes

Lightwave's headcount almost doubled in FY'18, while administrative expenses have tripled in just four years. There are two challenges here: (i) to scale and develop internal management processes across the business to ensure that productivity ratios are maintained; and (ii) to maintain line of sight to EBIT breakeven in 2020 against a backdrop of the proposed increases in marketing expenditure.

#### Funding requirements

A funding gap has opened up as a consequence of sizeable cost initiatives taking longer to convert into improved revenue growth acceleration than had been expected. Similarly, the distribution changes caused a greater hiatus than had been anticipated. In the short term, the company has been able to obtain a loan advance on expected R&D tax credit inflows, but a further fundraising process appears to be likely.

#### **Brexit**

The scope for the UK to lurch into a no-deal Brexit is evidently greater now than it has ever been. Lightwave's European strategy at present is entirely dependent on its distribution and retail partners – Apple in particular. It is unclear whether there will be a material impact on the company's European revenue in the next 12 to 24 months, given the productive retail relationships that are now in place.



# Notes



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