BRYAN, GARNIER & CO

CORPORATE RESEARCH

23rd March 2016

Amoéba

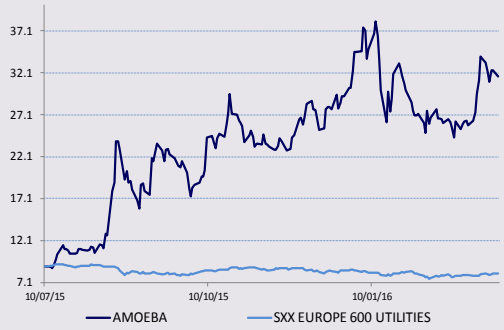
It's getting closer!

Utilities

Fair Value EUR35 (price EUR30.70) **CORPORATE**

Bloomberg	AMEBA.FP
Reuters	AMEBA.PA
12-month High / Low (EUR)	38 / 8
Market capitalisation (EURm)	164
Enterprise Value (BG estimates EURm)	170
Avg. 6m daily volume ('000 shares)	21.70
Free Float	6.7%
3y EPS CAGR	
Gearing (12/15)	-73%
Dividend yield (12/16e)	NM

YE December	12/15	12/16e	12/17e	12/18e
Revenue (EURm)	0.59	3.13	15.30	41.04
EBIT(EURm)	-3.99	-2.88	3.16	18.61
Basic EPS (EUR)	-0.75	-0.55	0.38	2.32
Diluted EPS (EUR)	-0.75	-0.55	0.38	2.32
EV/Sales	NS	NS	11.01x	4.06x
EV/EBITDA	NS	NS	40.4x	8.1x
EV/EBIT	NS	NS	53.3x	9.0x
P/E	NS	NS	80.0x	13.3x
ROCE	NS	NS	10.2	40.9



In this report we revisit Amoéba's investment case and update both our estimates and FV after integrating more optimistic assumptions on the group's commercial development as well as a lower risk premium. Newsflow since Amoeba's IPO in July 2015 has been clearly reassuring, reducing risk components for investors. Our new EUR35/share FV implies >10% upside, and more than 30% if market authorisations are delivered.

- **A solid track record since the IPO**: Since its successful IPO in July 2015, Amoeba has signed **new partnerships with water treatment companies** in Europe and outside Europe, adding weight to the group's pre-commercial success in the sector. It has also been granted **two new patents,** which will allow it to use its product for new applications. The group also announced that provisional market authorisations for EU countries could come earlier than expected, once the ANSES validates the active principle in Amoeba's solution. Investors have reacted positively to this newsflow with the stock gaining more than **300%** compared with the IPO price of **EUR8.3**.
- **Nearer to commercialisation?** Recent comments (*March 2016*) regarding market authorisations to sell the product in Europe were reassuring, as they **1/** confirmed the market authorisation procedure schedule unveiled during the IPO, excluding the risk of delay, and **2/** indicated that MA in Europe should be validated (*or not*) by October 2016 as the latest whereas in our model we were anticipating a start in H1 2017. Although we have no further details as to whether or not the approvals will be validated, we at least have more reassuring news on the approval process schedule.
- **A new FV at EUR35/share**: We have updated our model to include 2015 metrics and more optimistic sales assumptions following LOI signings with partners to promote the product in Germany and in Turkey, two important industrial markets. We have also cut our WACC (*by 250bp to 12%*) by reducing our beta on Amoeba to reflect the solid track record since the IPO and higher visibility on market approvals. Our new **EUR35/share FV** implies **>10%** upside while our FV post market approvals (*without discount*) would imply **>30%**

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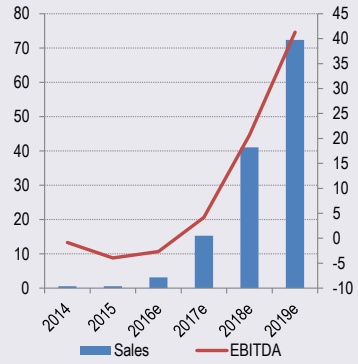

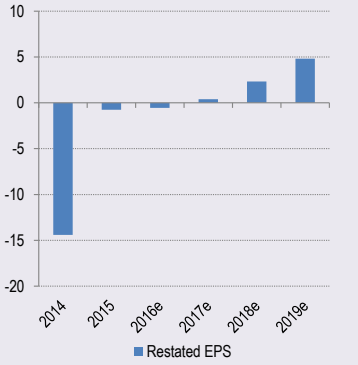

Company description

Based in Lyon, France, Amoéba develops and will commercialize the Green Biocide/BIOMEBA. Today, this is the only truly green biocide, harnessing the biocidal properties of Willaertia magna to treat, with outstanding results, 14 cooling towers (TP11). The group now targets to expand in Europe and in U.S. and to replace progressively the chemical bicod.

Simplified Profit & Loss Account (EURm)	2013	2014	2015	2016e	2017e	2018e	2019e	2020e
Revenues	0.42	0.55	0.59	3.1	15.3	41.0	72.3	106
Change (%)	*12.9%*	*29.8%*	*7.1%*	*431%*	*388%*	*168%*	*76.3%*	*46.3%*
Adjusted EBITDA	(0.42)	(0.83)	(4.0)	(2.7)	4.2	20.7	41.3	63.2
EBIT	(0.49)	(0.92)	(4.0)	(2.9)	3.2	18.6	38.6	60.3
Change (%)	*-122%*	*-87.0%*	*-332%*	*-27.8%*	*-%*	*489%*	*108%*	*56.0%*
Financial results	(0.03)	(0.05)	(0.03)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Pre-Tax profits	(0.52)	(0.97)	(4.0)	(3.0)	3.1	18.5	38.6	60.2
Exceptionals	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tax	0.0	0.0	0.0	0.0	(1.0)	(6.1)	(12.7)	(19.9)
Profits from associates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minority interests	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net profit	(0.52)	(0.97)	(4.0)	(3.0)	2.1	12.4	25.8	40.3
Restated net profit	(0.52)	(0.97)	(4.0)	(3.0)	2.1	12.4	25.8	40.3
Change (%)	*-111%*	*-87.0%*	*-312%*	*-26.1%*	*-%*	*503%*	*108%*	*56.2%*
Cash Flow Statement (EURm)								
Operating cash flows	0.50	(1.2)	(3.6)	(4.4)	(1.3)	6.4	18.8	33.4
Change in working capital	0.93	(0.48)	0.89	(0.75)	(3.5)	(7.4)	(9.0)	(9.6)
Capex, net	(0.53)	(0.89)	(1.7)	(6.5)	(8.5)	(4.5)	(2.5)	(6.5)
Financial investments, net	0.12	4.2	11.8	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Dividends	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.0	(0.00)	0.0	0.0	0.0	0.0	0.0	0.0
Net debt	0.30	(0.81)	(5.8)	5.2	15.0	13.2	(3.1)	(29.9)
Free Cash flow	(0.03)	(2.1)	(5.3)	(10.9)	(9.8)	1.9	16.3	26.9
Balance Sheet (EURm)								
Tangible fixed assets	0.25	0.19	1.8	8.0	15.5	17.8	17.7	21.2
Intangibles assets	1.4	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Cash & equivalents	0.46	2.6	9.2	(1.8)	(11.7)	(9.8)	6.4	33.2
current assets	0.62	3.1	9.5	(0.67)	(6.4)	4.2	31.1	69.3
Other assets	1.6	2.4	4.0	10.3	17.7	20.1	19.9	23.4
Total assets	2.2	5.6	13.5	9.6	11.3	24.3	51.0	92.8
L & ST Debt	0.76	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Others liabilities	1.0	0.94	1.6	1.7	2.3	3.7	5.4	7.2
Shareholders' funds	0.43	2.8	10.1	6.1	7.1	18.8	43.8	83.7
Total Liabilities	2.2	5.5	13.5	9.6	11.3	24.3	51.0	92.8
Capital employed	0.84	2.1	2.8	9.8	20.7	30.5	39.3	52.4
Ratios								
Operating margin	(116)	(168)	(676)	(91.90)	20.66	45.34	53.42	56.97
Tax rate	0.0	0.0	0.0	33.00	33.00	33.00	33.00	33.00
Net margin	(123)	(177)	(681)	(94.79)	13.44	30.23	35.71	38.11
ROE (after tax)	(120)	(34.82)	(39.95)	(48.75)	28.77	66.15	59.00	48.18
ROCE (after tax)	(58.86)	(43.81)	(142)	(19.65)	10.21	40.89	65.90	77.09
Gearing	69.98	(28.78)	(73.13)	59.25	188	61.98	(10.53)	(37.54)
Pay out ratio	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Number of shares, diluted	0.05	0.07	5.36	5.36	5.36	5.36	5.36	5.36
Data per Share (EUR)								
EPS	(9.97)	(14.40)	(0.75)	(0.55)	0.38	2.32	4.82	7.53
Restated EPS	(9.97)	(14.40)	(0.75)	(0.55)	0.38	2.32	4.82	7.53
% change	*-98.0%*	*-44.5%*	*-94.8%*	*-26.1%*	*-%*	*503%*	*108%*	*56.2%*
EPS bef. GDW	(9.97)	(14.40)	(0.75)	(0.55)	0.38	2.32	4.82	7.53
BVPS	NM	NM	1.88	1.14	1.33	3.50	8.17	15.63
Operating cash flows	0.50	(1.19)	(3.65)	(4.43)	(1.32)	6.39	18.77	33.36
FCF	(0.55)	(30.81)	(0.99)	(2.03)	(1.82)	0.36	3.05	5.02
Net dividend	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Company Data; Bryan, Garnier & Co ests.

Please see the section headed "Important information" on the back page of this report.

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1. Investment Case

Why the interest now?

The reason for writing now

After acquiring the exclusive licence from UCLB for use of the patented technology *Willaertia magna*, Amoéba is about to enter **the industrialisation and marketing phase**, once it has obtained all the relevant marketing authorisations. As for the product commercialization, the group is in advance, at least in terms of LOI/partnerships signatures. Since its IPO it has signed **5 more LOI**, leading to a total of **8** that will allow Amoeba to be ready to commercialize its product at big scope once approvals are being made.

Cheap or Expensive?

Valuation

We adjusted our model to reflect the unexpected LOI the group signed since its IPO and reduce our WACC (*by 250bp to 12%*) as group's credibility is stronger now than six months ago. Our new **EUR35/share FV** implies **>10%** upside while our FV post market approvals (*without discount anymore*) would imply **>30%**

When will I start making money?

Catalysts

The group should benefit from **commercialization approval** announcements for the group's various markets as well as announcements for the start-up of production facilities in France and Canada. Any new partnership creations with a European or North American water treatment company should have a positive impact.

What's the value added?

Difference from consensus

There is no consensus on the stock. Our estimates are currently based on **1/**marketing in **France** of Amoéba's biocide in **H1 2016**, **2/** marketing in other EU states of the Amoéba biocide in **H1 2017**, **3/** a commercialisation in the **US** in **H1 2017** and **4/** a commercialization of the solution in **Canada** in **H1 2018**. We have also factored royalties of **25%** into our model on the margin generated by the distributor.

Could I lose money?

Risks to our investment case

The main risks lie in **1/**delays or refusals of obtaining marketing approval in France and Europe, **2/** in lower productivity from the biocide production facilities compared with our expectations, and **3/**from lower commercial development/market share than expected.

2. What has happened since the IPO?

Since its successful IPO in July 2015, Amoeba has signed **new partnerships with water treatment companies** in Europe and outside Europe, adding weight to the group's pre-commercial success in the sector, and has also been granted **two new patents,** which will allow it to use its product for new applications. The group announced that provisional market authorisations for European Union members could come earlier than expected, once **ANSES** validates the active principle in Amoeba's solution (*authorisation could come at the latest three months after ANSES validation*).

Below is a summary of the announcements made by the group since July 2015 in chronological order:

- **23rd November 2015**: Amoeba announced that it had been authorised by the **Canadian Pest Management Regulatory Agency** (PMRA) to start industrial tests of its biological biocide in Canada, six months after the group signed an LOI with Canadian group **Magnus.**

- **25th November 2015**: **Letter of Intent signed with Drewo**, an Italian water treatment firm, for the commercialisation of Amoeba's product in **Italy over a three-year period, provided** that market authorisation (*MA*) is obtained, which could happen at the end of 2016. The group did not communicate on the size of this market, but we understand it is an important market in Europe (*larger than the French market*).

- **2nd December 2015**: **Letter of Intent signed with Aqua Concept**, a German water treatment firm, for the commercialisation of Amoeba's product in **Germany for a three-year period, provided** that market authorisation (MA) is obtained, which could happen at the end of 2016. The group did not communicate on the size of this market.

- **28th February 2016**: **Letter of Intent signed with Aqua Concept Polska**, a Polish water treatment firm (*entity of Aqua Concept*), for the commercialisation of Amoeba's product in **Poland for a three-year period,** provided that market authorisation (MA) is obtained, which could happen at the end of 2016. The group did not communicate on the size of this market.

- **25th February 2016**: Amoeba was granted **two new patents,** which will allow it to develop new applications for its biological biocide. The **first patent granted for the European market**, claims a biocidal action for Amoeba's solution against the pathogenic bacteria *Pseudomonas*, the primary agent responsible for nosocomial infections in healthcare institutions. It applies to the **Domestic Hot Water (DHW) sector**. The **second patent granted in the US**, states that Amoeba's product has a biocidal activity against the pathogenic bacteria *Listeria*, which is often implicated in incidents of food poisoning. The product can be applied to treat the water sources used to **clean equipment and material in the food and agriculture industry**. The start of tests, which could lead to the use of Amoeba's biocide in **these two applications**, requires the development of pilots mimicking the future conditions of use for the product in industry. Amoeba has equipped itself with a DHW pilot, simulating water treatment in the industrial application conditions.

- **10th March 2016**: **Letter of Intent signed with Green Chemicals**, a Turkish water treatment firm, for the commercialisation of Amoeba's product in **Turkey for a three-year period**. This is the 8th distribution agreement for the group. This market is equivalent in size to the French market for industrial cooling towers.

The group has therefore massively expanded its commercial network in the main industrial countries in Europe and outside Europe, and now counts **eight commercial partnerships**, vs. **two** before its IPO. The group's target is to sign at least **21 partnerships before the end of 2017**, with almost **10 signatures in total in 2016** (*implying eight new signatures compared with 2015*).

Recent comments (*March 2016*) regarding market authorisations (*MA*) to sell the group's product in Europe were reassuring, as they **1/** confirmed the market authorisation process schedule unveiled during the IPO, excluding the risk of delay, and **2/** indicated that the MA in Europe should be validated (*or not*) by October 2016 at the latest, whereas in our model we were forecasting a start of commercialisation by H1 2017. Although we still have no further details on whether the approvals will be validated, we at least have more reassuring news on the schedule for the approval process.

Assuming **ANSES** (*French Agency for Food, Environmental and Occupational Health & Safety*) validates the active principle in Amoeba's solution, which should take place in the first half of 2016 (*30th June at the latest*), Amoeba will be able to request provisional MA in the European Union and in France to market its product. The group assumes that the provisional MA should be obtained within a month of submitting the request in France, and within three months of submission in member states.

We have factored these **new calendar dates into our model**, and raised our European market share estimates, with the group addressing bigger European markets than initially anticipated. We now expect Amoeba to reach a **20%** market share in the region by 2020, vs. **13%** previously. As a reminder, the group's guidance at the IPO was to reach **15%** market share by 2020. As such, we now stand above group's mid-term target for this market. As for North America, we maintain our **19%** market share estimate for 2020.

Since the IPO in July 2015, made at a price of **EUR8.3/share**, the share has gained more than **300%** to **EUR31/share**, implying a market capitalisation of **EUR166m** and an **EV** of **EUR171m (BG estimates).**

3. Who is Amoeba?

Created in 2010 after acquiring the exclusive licence from the Claude Bernard University in Lyon (*UCLB*) to use and exploit the natural biocide properties of the *Willaertia magna* amoeba, Amoéba develops and is set to market (*as of **2016** for the French market*) a biological biocide that is harmless for man and the environment, and capable of reducing by **99.5**% the presence of pathogenic bacteria such as *Legionella, Listeria* and *Pseudomonas* which are present in industrial waters.

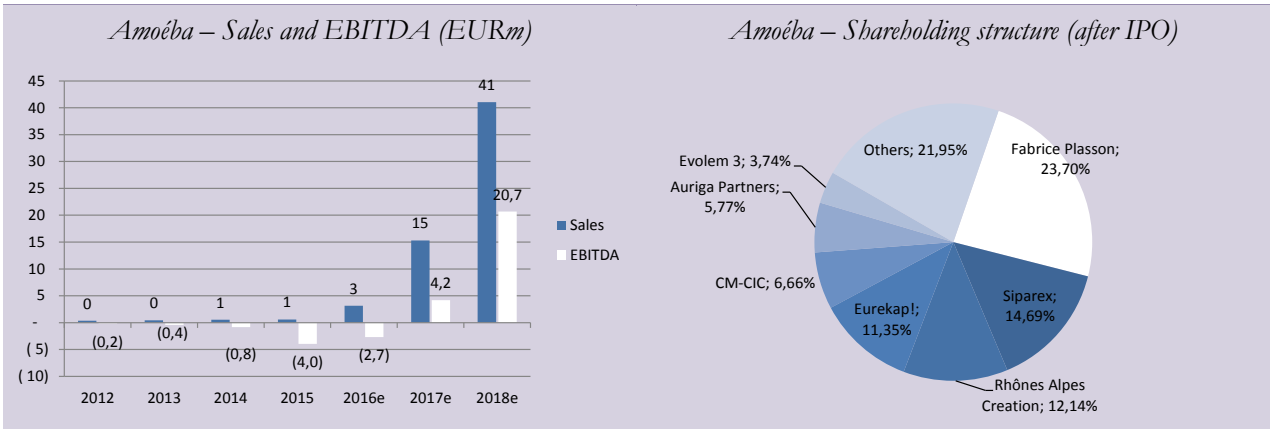
The group is currently waiting for marketing approval to develop its product in Europe, the US and Canada and so-far, boasts eight years of extensive combined tests, thanks in particular to partnerships signed with renowned industrial groups (*Haagen Dazs, Sanofi, ST Microelectronics*…). Amoéba is entering a process of partnership creations in the various continents that it is targeting for distribution of its biocide to end-clients (through exclusivity contracts in certain countries) via the intermediary of water treatment companies (*Earthwise, Magnus, Aquaprox*, *Drewo, Novochem*…). At the same time, the group is also on the point of developing its industrial facilities in order to massively increase its production capacity in Europe and the US.

At end-2015, the group had **EUR590k** in sales primarily thanks to its tax credits and the contract with Aquaprox, and reported an operating loss of **EUR4m** due to the important increase in SG&A and R&D expenses. Since it was created in 2010, Amoéba has logically never been profitable given that the marketing phase has not yet started. The group has first raised **EUR4.6m** with **Rhône Alpes Création, Eurekap Siparex, CMC CIC and Auriga Partners** ad also benefited from loans, reimbursable advances and advances from Oséo, Coface and BPI for an overall amount of **EUR745k**. At mid-March 2016, after having raised **EUR13.2m** on the market in July 2015, Amoéba was **23.8%-owned** by its founder and Director, **Fabrice Plasson**, **10.3%** by **Siparex** (*investment capital*), **.63%** by **Eurekap!** (*venture capital*) and **8.5%** by **Rhône Alpes Création** (*start-up fund*)**.**

In our model, we now forecast breakeven at the EBIT level and a positive net margin in 2017, versus 2018 in our previous estimates.

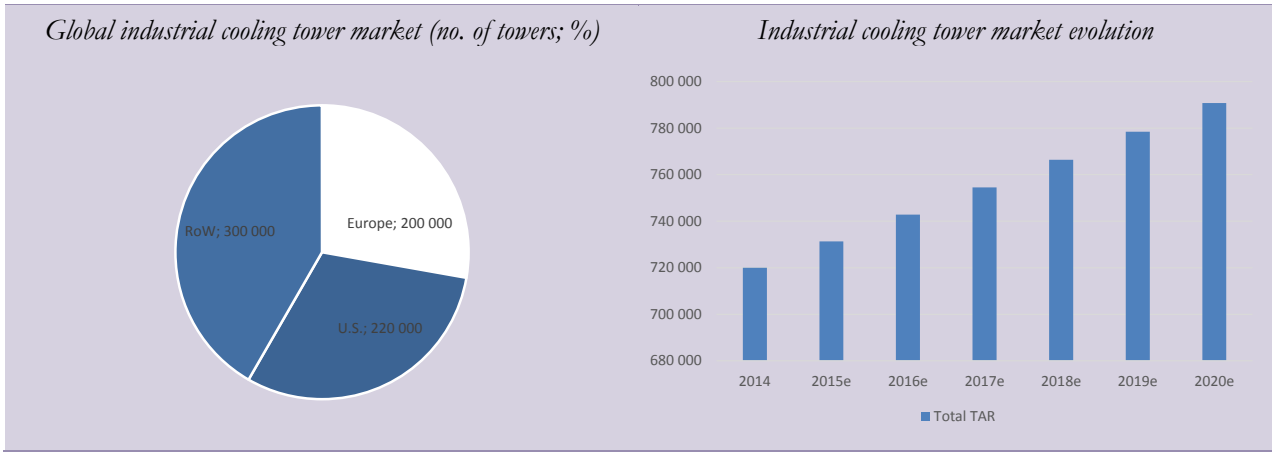
4. Investment case in six charts

Fig. 1: Amoéba – Sales and EBIT / Breakdown of capital after IPO



Source: Company Data, Bryan, Garnier & Co ests.

Fig. 2: Industrial cooling tower market in the world



Source: Company Data, Bryan, Garnier & Co ests.

Fig. 3: Legionella statistics in France

Source: INVS

4.1. A breakthrough technology…

4.1.1. A natural biocide more efficient than chemical biocides

Amoéba aims to revolutionise classic water treatment methods in order to provide better protection for humans from disease-bearing pathogens (*Legionella; Klebsiella, Pseudomonas and Chlamydia),* as well as to protect the environment from the chemical products that are currently used in water treatment (*chlorine, bromium and isothiazolone).* The Amoéba biocide therefore positions itself as a substitution for products currently used by water treatment companies, with no danger for mankind and the environment. The business model is feasible and should be competitive relative to products that are currently restrictive (*from a practical viewpoint*), inefficient, and harmful for industrial installations, mankind and the environment. Amoéba's ultimate aim is to fully substitute its biocide for chemical biocides in the various markets and primarily in the cooling towers market.

Amoéba's green biocide is a natural micro-organism, the *Willaertia magna* amoeba, which is a natural predator of pathogenic bacteria and the reservoirs such as biofilms (*slime*) in which they protect themselves in order to avoid chemical biocides. The biological biocide helps control pathogenic bacteria and causes no toxic waste, thereby reuniting the two contradictory objectives that chemical biocides cannot combine (*using the most chemical biocide possible in order to prevent the spreading of legionellosis by cooling towers and avoid all public contamination while using the least possible amount of chemical biocides to reduce waste from chemical degrading products, which harm water treatment stations and the environment*).

4.1.1.1. Amoeba, biocides and biofilms

In order to understand Amoéba's business model, it is important to understand what an amoeba is, how it is used as a biocide and finally, how it intervenes in pathogenic bacteria and reservoirs such as biofilm.

Amoebas and *Willaertia magna*

Free-living amoebas

Amoebas are living single cell eukaryotes previously classified in the major group of protozoas. They are characterised by a cell body that has the ability to alter its shape, primarily by extending and retracting pseudopods, which enable them to move on a surface or to capture microscopic prey by phagocytosis (*a cellular process by which micro-organisms are destroyed by certain categories of leucocytes, by capturing and ingesting the inert or living solid particles*). For the most part, these are free species living in water, wet ground and mousses. These amides therefore take the form of a predator for bacteria found in water or aquatic surroundings. However, certain amoeba and free-living amoeba, since they are naturally present in water (and feed on biofilm), can also been overpowered by bacteria, which can penetrate into the amoeba in order to protect themselves from chemical biocides or other biological biocides.

Amoéba's amoeba - Willaertia magna

Willaertia magna is a thermophilic amoeba (optimal growth temperature: 44 °C), which is very different from other natural amoeba (free-living amoeba), especially since it can target numerous different organisms (*planctonic bacteria and sessiles such as legionella and listeria, amoeba and mature biofilms*) by phagocytosis. This amoeba, which was isolated in a French thermal drinking water, is considered as ubiquitous, thereby reducing the risk caused by its use as a biocide (*Amoéba uses the amoeba directly with no transformation*). Furthermore, contrary to other free-living amoeba, in *Willaertia magna,* phagolyosomal fusion **is not inhibited by parasitic bacteria** such as *Legionella pneumophila.* This is the very property that makes its biocide effect so robust and efficient. The biocide is therefore

resistant to pathogenic bacteria (*not taken over by bacteria to protect themselves*), but is also harmful for pathogenic bacteria thanks in particular to its natural ability to feed itself on biofilm. Finally, and significantly so, the amoeba is non-pathogenic and non-toxic, as proven by tests on several animal models (rat, pig, fish, rabbit, etc.), for the environment. **The lack of toxicity enables it to be classified as a product with no danger category** for humans and the environment according to regulation directive no. 1271/2008.

The biocide ability of *Willaertia magna* was patented by the **University of Lyon in 2006** for a 20-year period, and an exclusive licence was granted to Amoéba via a contract dating 29 July 2010 from the University Claude Bernard Lyon I for the first family of patents covering two strains of specific **amoebian** protozoa in the *Willaertia magna* species and **their use as a biocide agent**. This licence is **exclusive**, covers all activity in the fight against bacterial proliferation and covers the EU, Switzerland, Turkey and the US. The contract remains valid until all of the patents expire, thereby implying an end to this licence in **2026** (for further details on patents, see section xxx).

Biocides

The family of biocide products covers a range of products **destined to destroy, repel or neutralise harmful organisms, to prevent their action or to fight them**, via a chemical or biological action. Although they target harmful organisms, biocides are by definition active products likely to have an effect on human beings, animals and the environment. In-situ generation procedures for biocide products are also governed by regulations, as are treated articles that incorporate biocide products. Biocides are classified into four major groups including **22 different product types**: disinfectants (*product types 1-5*), protection products (*types 6-13*), pest-control products (*types 14-20*) and other products (*types 21 to 22*). In addition to chemical biocides (*chlorine, bromium, isothiazolone for the industrial sector especially, but insecticides and antifungals are also chemical biocides*), biological biocides are also found naturally in the environment and are increasingly used by humans to eliminate pathogenic bacteria. Biocide sprays (*launched by the Florame brand*) also exist for bacteria such as Pseudomonas aeruginosa (*a common bacteria that is increasingly responsible for nosocomial infections)* and Adenovirus type 5, a common germ responsible for pneumonia, pharyngitis and conjunctivitis. The substance produced and soon to be officially marketed by Amoéba should therefore been seen as a natural biocide using the *Willaertia* magna amoeba as a green biocide.

Biofilms

A biofilm is any group of microorganisms (*bacteria, mushrooms or protozoa*) **in which cells stick to each other on a surface, and which secrete an adhesive and protective matrix**. Biofilm generally forms in water or an aqueous setting and hence in industrial markets using water in their production facilities. Biofilm is a normal or potential stage in the life-cycle of the majority of bacteria, which then show a cooperative behaviour and produce differentiated phenotypes leading to specific functions, often as a reaction to stress. **The biofilm therefore acts as a protection for bacteria and other microorganisms and as such**, is the main reservoir for pathogenic bacteria. A study carried out by Dalkia in 2011 shows that **99.5%** of *legionella* bacteria are found in biofilm, whereas various studies have proven the inefficiency of chemical biocides on bacteria in the biofilm. This therefore means that chemical biocides only treat **0.5%** of bacteria, those that remain in the water.

The *Willaertia magna* amoeba therefore acts as a biological biocide against certain pathogenic bacteria and contrary to chemical biocides currently present in the market, it is also efficient on biofilm, where 99.5% of pathogenic bacteria are located.

4.1.2. Patents protecting use of the biocide

So far, Amoéba has:

Amoéba has an exclusive licence granted by UCBL for the *Willaertia Magna*, biocide until 2026.

- **On the one hand,** an exclusive licence granted by the University Claude Bernard Lyon I (UCBL) for a family of patents covering the two strains of amoeban protozoa specific to the *Willaertia magna* species and their use as a biocide agent, until the end of the patents filed by UCBL, namely until 2026
- **On the other hand**, three families of patents aimed more specifically at the biocide applications specific to the protozoan strains.

Geographical coverage of the patents that Amoéba owns or has under licence, is suitable for the markets targeted.

4.1.2.1. An exclusive licence granted by the UCBL out to 2026

Since *Willaetia magna* was discovered and studied directly by the University Claude Bernard Lyon I (UCBL), its exclusive use by Amoéba is based on a contract agreement and limited by a licence that started on 29 July 2010. This licence concerns the family of patents entitled "new procedure for biological fight against the proliferation of *Legionella pneumophila*, and new disinfecting agent containing amoebic protozoa of the *Willaertia* type". This family of patents includes all patents and/or extensions stemming from all or part of the initial patent filed on 12th October 2006 by UCBL and the CNRS.

In return for this exclusivity, Amoéba **must pay royalties to UCBL** according to the following fixed rates: **1/**in the event of direct operation by the group and its affiliates, **the rate is 3% of net sales** generated until **2023** and **2%** for the **following years** (out to 2026), and **2/**in the event of operation via sub-licences granted by the group, **the rate is 6% of net sales** generated by the group in terms of the said sub-licence until **2023** and **4% for the following years.**

Beyond 2026, the exclusive use of the *Willaertia* amoeba by the group will end, although thanks to the label patents that the group filed for in 2010, its use by competitors as a disinfecting agent against the proliferation of *Legionella*, *Listeria* and *Pseudomonas* will be banned.

4.1.2.2. Three families of patents protecting use of the amoeba

- **First family**: Procedure for the biological fight against the proliferation of *Legionella pneumophila*. This family includes a delivered European patent validated for eight designated countries, and a delivered US patent. The patents protect the two specific protozoa strains filed for in the ATCC collection under the numbers PTA-7824 and PTA-7825 for which Amoéba also has an exclusive licence, and their use as a disinfecting agent, particularly to fight against the proliferation of *Legionella Pneumophila*.

- **Second family**: Procedure for the biological fight against *Listeria*. Since the patents for this family were filed for only recently by the group (*December 2012*), so far, only the French patent stemming from the priority request has been delivered. The patent requests currently being examined aim to protect a procedure for the fight against the proliferation of *Listeria monocytogenes* using protozoa from the *Willaertia magna* species, or more generally, use of a disinfecting agent containing protozoa from the *Willaertia magna* species as a biocide for *Listeria*.

- **Third family**: Procedure for the biological fight against *Pseudomonas*. So far, no patent has been delivered given that the titles for this patent family were filed for fairly recently (December 2012). The patent requests currently being examined aim at protecting a procedure for the fight against the proliferation of *Pseudomonas* using protozoa from the *Willaertia magna* species or more generally, use of a disinfecting agent containing protozoa from the *Willaertia magna* species as a biocide for *Pseudomonas*.

At end-2032, the group will have no more valid patents protecting use of the amoeba

By end-2032, no more valid patents will protect use of the *Willaertia magna* amoeba as a disinfecting agent, especially for the fight against proliferation of *Legionella pneumophilia*, *Listeria* and *Pseudomas*.

4.2. …to address a cooling towers market facing regulatory restrictions

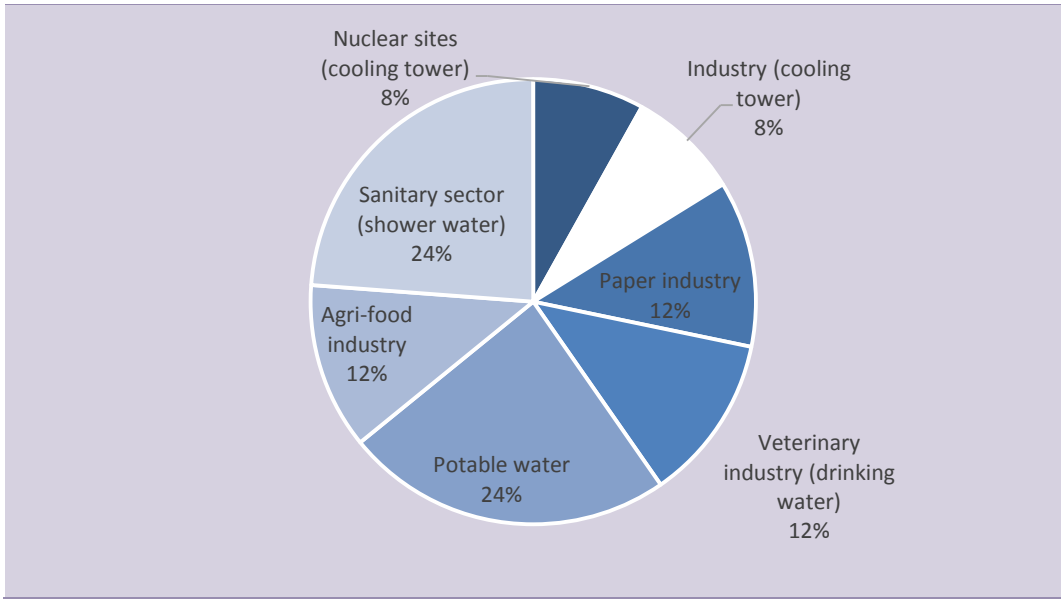
The IPO and fund-raising operations were set to help the group finance industrial development for the industrial cooling tower market

The group aims to revolutionise classic water treatment methods in order to better protect humans from disease-carrying pathogens as well as to protect the environment from toxic waste from the chemical products currently used in water treatment. This is to be made possible by Amoéba's natural biocide that it currently has the right to use in the fight against the proliferation of *Legionella pneumophilia*, *Listeria* and *Pseudoma* until 2032 (*maximum date of one of the patents*). In a chemical biocides market estimated at **EUR21bn** (*Market & Market and Freedonia estimates*) the group initially aims to focus on the water treatment market for cooling towers, which represents an opportunity of **>EUR1.7bn** on a global level for its biological biocide (*Amoéba estimates based on price and volume assumptions for its biological biocide*). Development in other markets (*nuclear plant cooling towers, the paper industry, animal drinking water, the drinking water network for the agrifood industry and the sanitary sector*) could be envisaged once the necessary approvals have been granted (*more difficult to obtain since humans would be directly in contact with the product*).

The recent IPO and fund-raising operations were set to help the group finance its industrial development for the industrial cooling towers market (on a global level).

If the company would like to step up its development in other markets (sanitary sector and nuclear plants primarily), another fund-raising operation would need to be considered, if this ramp-up takes place before the self-financing of the industrial cooling towers project, namely in 2018 on our estimates.

Fig. 4: A global addressable market estimated at EUR21bn



Source: Company Data; Bryan, Garnier & Co ests.

4.2.1. A directly addressable market estimated at >EUR1.7bn...

The company estimates there are 720,000 industrial cooling towers in the world today (excl. nuclear), 28% of which in Europe, 30% in the US and 42% elsewhere

Amoéba is initially focusing on the industrial cooling tower market, which is estimated at **EUR1.7bn** (Amoéba estimates based on price and volume assumptions for its biological biocide*)*. The company estimates the number of **industrial cooling towers** in the world at **720,000** (non-nuclear), **28%** of which in Europe, **30%** in the US and **42%** elsewhere in the world. In order to analyse the market, Amoéba has taken the French market as a starting point (easy to assess since a cooling tower listing is established by the regional industry, research and environmental organisation, the DREAL*)* and then extrapolated this figure (13,000 cooling towers) to apply it to Europe, the US and the rest of the world, by multiplying it by the industrialisation coefficient of these different regions relative to that in France, to obtain a total number of cooling towers in the world of **720,000**.

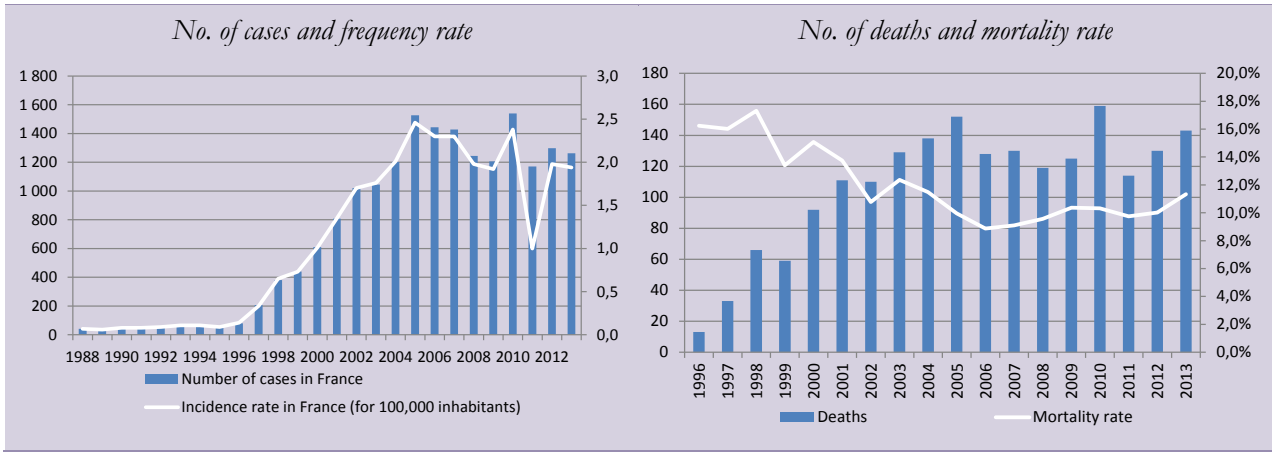
4.2.1.1. Water quality: a public health issue

The world health authorities consider bacterial risk as a major public health issue. Since water networks are a natural breading-ground for bacterial proliferation, they must be correctly treated by industrialists or water treatment companies in order to reduce the risk of contamination. Among the four most pathogenic bacteria identified today, three are primarily conveyed by water networks, thereby explaining the high pressure stemming from authorities and regulatory bodies in order for cooling tower water networks to be treated perfectly. **The bacteria in question here are *Legionella*, *Klebsiella* and *Pseudomonas*, which alone account for more than 250,000 deaths in France each year.**

As an example of the infections caused by ***Pseudomonas***, one of the main nosocomial infection germs transmitted by water networks, accounted for more than 450,000 cases in France in 2009, with a high mortality rate (50-70%). These bacteria cause various types of pathology: eye, wound, urine, gastro-intestinal and lung infections, inoculation meningitis, septicaemia as the terminal stage of acute infections or complications in patients subject to immunodepressive treatments, leukaemia etc. They easily cause systemic infections in immunodepressed patients (*due to chemotherapy and AIDS*) and in burns and cystic fibrosis (*mucoviscidosis*) victims. Like certain other gram-negative bacteria, this bacteria strain develops in the biofilm of water networks.

Meanwhile in 2013, the germ at the root of Legionellosis, the ***legionella*** bacteria was diagnosed in **1,262 patients** with a mortality rate of **11.3%** (*143 deaths*). An epidemic in **Ireland** in 2013 caused 83 cases and 18 deaths, whereas in 2014 a number of epidemics affected **Spain** (*40 cases, eight deaths*), **Portugal** (*311 cases, eight deaths*) and **Germany** (*two deaths*). This respiratory infection is primarily caused by *legionella* epidemics in hot water distribution circuits, cooling towers, hot baths, equipment for respiratory treatment (*aerosols*) and thermal waters. Also known Legionnaire's disease, it attacks the lungs and is one of the diseases that must be declared to the authorities in France, Belgium and Canada since 1986 and a reason why cooling tower water networks are subject to regulatory restrictions (*bacteriological tests*). Contamination is caused by inhalation of droplets of water containing the bacteria, which are suspended in the air.

Fig. 5: Legionellosis in France



Source: INVS

The ***Klebsiella*** bacteria is also mainly conveyed by water networks and represented more than **22,500** cases in France in 2009 with a mortality rate of close to **50**%. The bacteria is naturally present in certain organs such as the digestive tube and lungs, but its action is well controlled by the organism such that there is no infection. It is only when a patient's immune defences are diminished that the bacteria can become aggressive and thereby cause angina, lung infections and other more general infections. Poor quality of water can therefore also be responsible for triggering an infection.

In order to fight against the contamination of cooling tower water networks with bacterial pathogens, industrialists have no choice but to use chemical biocides such as **chlorine** (1914), **bromium** (1960) and **isothiazolone** (1974) in order to respect regulatory restrictions. However, the tools available are not entirely satisfactory, especially in view of the new resistance or avoidance strategies developed by these bacteria (*hiding in the biofilm*). Discovered in Europe in 1914 under the name of chlorine or bleach, this biocide was quickly combined with bromium given its inefficiency once the pH level exceeds 7.5. In order to be efficient in settings where the pH is high, bromium therefore became an obligatory tool for water treatment companies in order to meet the restrictions placed on their industrial clients.

Only in 1974 did Dow Chemical develop another chemical substance, **isothiazolone**, which is efficient against certain bacteria but unfortunately very toxic for humans and the environment.

Only these three active substances are authorised in Europe to ensure treatment of bacterial risk in water, although their efficiency remains limited on bacteria hidden in the biofilm or in amoeba. Since the chemical products do not penetrate the biofilm, the bacteria and other pathogenic agents can continue to bread, thereby obliging water treatment companies to maintain a high level of chemical biocide in the water. **This strong concentration of chemical products is nevertheless a significant problem in terms of toxicity since the products give off other products such as chloroform, alkylphenol and chloroacetic acid, which not only have negative effects for humans, flora and fauna, but also wipe-out the biological activity necessary for the smooth running of waste water purification stations** (*managed by Veolia and Suez Environment, for* example).

The need to find an efficient, easy-to-use and environmentally friendly biocide has become a priority for industrialists in the sector

Increasingly strict regulations have been implemented precisely in order to avoid this risk and to provide a framework for the use and concentration of chemical biocides. The need to find an efficient biocide that is easy-to-use and environmentally-friendly has become a priority for all industrialists in the sector.

4.2.1.2. Cooling tower functioning and dilemma in terms of regulations

Cooling towers are common facilities, present in air-conditioning installations, or industrial and power procedures (*power plants, sugar plants, chemicals plants etc.*) and are mainly used to evacuate waste heat from cooling systems into the atmosphere (*air conditioning or industrial processes*) by circulating hot water in a flow of air. Hot water is pulverised at the top end of the cooling tower and streams down the heat-exchange body. The air crosses the streaming system and is rejected into the atmosphere. Cooling is primarily carried out by evaporation of the water. The system's efficiency is linked to the design and maintenance of the cooling tower as well as atmospheric conditions (*temperature and humidity*). The main elements making up a classic cooling tower are:

- **A water distribution system** whose role is to uniformly dispatch the water in the form of droplets.
- **the packing or heat exchange system**, via which the heat is transferred between air and water,
- **the droplet separator** installed at the air exit of the cooling tower, designed to prevent vesicular feed,
- **the access hatch(s)**, an opening on the side of the tower enabling access to the inside in order to visually control the various component parts.
- **the pool** located at the bottom of the tower used to recover the cooled water,
- **the ventilator** ensuring constant air flow. This can be located at the top or bottom end of the tower.
- Eventually, one or several **exchange systems and a pump** ensuring circulation of water, for double-circuit cooling towers and hybrid towers.

Any operator of an industrial installation, a public establishment (shopping centre, hospital etc.), an office building, a collective housing building etc. can operate a cooling tower of this type. They are primarily used in air conditioning for large-sized premises, computer rooms or cooling for industrial processes that generate heat. These installations are governed by an authorisation or declaration scheme as defined by decree 2004-1331 of 1st December 20014. Operators are obliged to file their declaration with the regional Prefect. **A listing is maintained up-to-date by the regional industry, research and environmental organisations (DREAL), thereby explaining why the number of cooling towers in operation is easy to calculate.**

Management of cooling tower waters has **five major objectives**: **1/**guaranteeing an efficient exchange of heat by fighting against isolating deposits, **2/**reducing water testing in order to reduce operating costs, **3/**preserving the installations from corrosion in order to maximise as far as possible the lifespan of the towers and reduce maintenance and repair costs, **4/** controlling Legionellosis risk by

controlling the development of biofilms by using biocides and **5/**preserving the quality of the natural setting, in particular by implementing good environmental practices (limiting the impact on the environment, reducing the risk of water contamination outside the systems etc.).

In France, since the implementation of regulations in 2004, controlling the risk of Legionellosis has become a priority, thereby placing pressure on industrialists to treat their water networks with chemical biocides (chlorine, bromium and isothiazolone).

Indeed, if bacteria such as *legionella* contaminate water in the water network (which creates a vapour plume that is visible in the atmosphere way above the cooling towers), a large number of people over a wide distance can be affected. For example, the epidemic that occurred in the Pas-de-Calais region during winter 2003-2004 (almost 86 cases noted and 18 deaths) affected peopled several tens of kilometres away from the contaminated industrial cooling towers. The dilemma is that on the one hand, industrialists need to prevent contamination of cooling towers by using a large quantity of chemical biocides while on the other hand, also prevent the rejection of chemical products into the atmosphere, thereby implying use of the smallest amount of chemical products possible.

European regulations for 2015 (2015 framework directive) are all the more restrictive in that they impose tax payments on industrialists who do not respect the threshold for waste levels of chemical products in the atmosphere. Industrials customers will also have to treat waste-water by implementing improvements which imply fairly costly treatment investments.

Fig. 6: A very costly dilemma for industrialists

Preventing contamination of cooling towers by using a large quantity of chemical biocides	Preventing chemical product waste in the atmosphere by using the least amount of chemical biocides
In order to prevent bacterial contamination, the industrial cooling towers are listed in the majority of countries and subject to strict regulations to avoid contamination risks, and especially the risk of spreading *legionella*. Authorities have also imposed monthly measurements to monitor the efficiency of this treatment. Industrialists outsource this activity to water treatment specialists (Nalco-Ecolab, GE-Water, Aquaprox...). These companies currently use chemical biocides.	The use of chemical biocides necessarily causes an amount of chemical products to be rejected into the atmosphere, or initially in wastewater. In order to combat this pollution, the new framework directive of 2015 implements a series of measures aimed at eliminating residues from chemical products or sub-products in the environment. This makes the use of chemical biocides restrictive and very costly.

Source: Company Data

4.2.2. Amoéba is targeting a lion's share of the market

In the industrial cooling tower market in Europe, the group estimates it can reach market share of **20% within five/six years** thanks to the signing of a number of exclusivity contracts (total or partial) with water treatment companies and by increasing its biocide production capacity. While Amoéba has not provided a global target, in our model, we estimate that the group is capable of reaching market share of **7.6%** on a global level as of 2020.

Amoéba's market **is not a growth market, but clearly a substitution market** (substituting itself for traditional chemical biocides), thereby implying that the group's performance will lie solely in the ability of sales representatives at its partner water treatment companies to convince their industrial clients to switch from a chemical biocide to a biological biocide.

As indicated previously, industrialists in Europe and soon in the US, are facing a major dilemma in terms of treating contamination risks for their cooling tower water networks by bacteria such as

legionella pneumophila, listeria and pseudomas. Extremely harmful infections in humans can very easily be transmitted once the cooling tower is contaminated.

4.2.2.1. A more efficient, less risky and competitive product

The biocide proposed by Amoéba to its end clients offers numerous advantages compared with current chemical biocides:

- **A decline in makeup water consumption of 10%:** Since cooling towers have to renew the water contained in their circuit in order to work properly, overall water consumption by the cooling tower represents a significant share of management costs. Analyses carried out during industrial tests have helped prove that use of a green biocide reduces daily water consumption by the cooling tower by **10%.** This decline in consumption is directly linked to lower corrosion levels and a lower level of iron in the water, thereby prompting a lower amount of makeup water consumption.

- **Financial savings thanks to lower use of softeners, anti-tartar and anti-corrosion products**: Although the price per cubic metre proposed to end clients (industrial sites) is set to be higher than the current price of a chemical biocide (*EUR1/l for green biocide vs. EUR0.7/l on average for a chemical biocide, pointing to a* ***43% premium*****),** use of Amoéba's product eliminates entirely the need for additional chemical products such as anti-tartar and anti-corrosive products, as well as biodispersing products to remove the biofilm. The lower use of softeners should also enable significant gains relative to the use of chemical biocides.

- **Better efficiency relative to bacteriological risk**: Numerous tests undertaken onsite and on actual industrial sites (via the extensive testing process carried out at around 10 clients since early 2013) have shown that Amoéba's green biocide eliminates 100% of the biofilm problem (compared with 0% when water treatment companies use chemical biocides) given that Amoéba's amoeba is capable of eliminating bacteria hiding in the biofilm whereas chemical biocides only treat bacteria present in water. Other tests (also on real sites) have shown that only the biological biocide helped ensure a significant reduction in DNA load for *legionella* bacteria in the water (***9x more efficient that chemical biocides*****).**

- **A biocide enabling companies to respect the 2015 water framework directive:** Following the application on **1st January 2015** of the framework directive on water CE/2000/60 (*transposed into French law since 2014*), the European authorities were hoping to ban residues from chemical products and sub-products that are a danger to the environment. This directive continues on from the biocide 98 Directive that bans overly-dangerous biocide products for man and the environment. As such, since 1st January 2015 in Europe, measurements are carried our regularly on wastewater from industrial sites in order to assess how much chlorine, or other products and sub-products stemming from chemical biocides, it contains. Depending on the levels measured, the industrialist may be allowed to dump the water but a tax could be imposed according to a barometer fixed locally, or may not be able to dump the water and will have to invest in

its site (*pools or activated carbon treatment etc.)* in order to pre-treat its water containing high levels of chemical products. **Whatever the case, the impact of this new directive on industrialists involves additional costs, whereas the use of Amoéba's biological biocide implies no tax payments and no site investments.**

- **Simplicity in the logistics chain:** Every year, an industrial group using a chemical biocide brings in 126 chlorine container trucks in order to treat bacteriological risk, as well as 126 sulphuric acid container trucks to reduce the water pH level in order to make the use of chlorine in the water network more efficient (*since chlorine is more efficient when the pH level is lower*). The use of Amoéba's biological biocide **would only require one weekly delivery of the product of around 10-20 litres** Use of sulphuric acid would also no longer be necessary whereas the use of anti-corrosive products could be reduced substantially (advantages in terms of overall cost of treating *legionella* risk).

- **Harmless for man and the environment**: Whereas chemical biocides are dangerous for humans and the environment and require the use of increasingly drastic measures to protect workers and the environment, the biological biocide proposed by Amoéba has been recognised as having no danger category in terms of the CLP 1272/2008 regulation implemented by the Environment ministry since December 2012. Beyond the clear advantage of using a harmless product compared with a harmful product previously, actually use of the product itself is highly improved since it takes employees less time to use and no particular precautionary measures are necessary (*no need to carry individual protection equipment, no storage area considered dangerous*).

- **An increase in the lifespan of the cooling tower thanks to a decline in corrosion:** The lifespan of cooling towers is directly dependent on the level of corrosion to which they are subjected. Chemical biocides, as well as the addition of sulphuric acid to reduce the pH level are extremely corrosive for cooling towers and have a negative impact on their lifespan (*20 years*). Various tests have shown that with the biological biocides, corrosion levels have been reduced substantially, as has the build-up of tartar deposits. In partnership with Haagen Dazs, Amoéba has undertaken tests on new cooling towers and these have shown that **the lifespan of cooling towers could be extended by 2.5 years, representing a financial gain of 12.5% for the price of the cooling tower.**

By combining the various competitive and economic advantages, we conclude that treatment with a biological biocide would enable end-clients (industrial sites with cooling towers) to reduce the overall usage cost per cubic metre by 11%, despite the cost of the biocide being 70% higher.

The various tests undertaken on 10 industrial sites have been in place since 2012 (*six years of cumulated industrial tests*) and therefore help prove the superiority of a biological biocide relative to a chemical biocide in a real-life environment. By combining the various competitive and economic advantages, we conclude that treatment with a biological biocide would enable end-clients (*industrial sites with cooling towers*) to reduce the overall usage cost per cubic metre by 25%, despite the cost of the biocide being 70% higher. The water treatment companies with whom Amoéba is currently in negotiations, as well as those that have already signed a partnership (Aquaprox in France) or a Letter of Intent should therefore easily convince industrial clients to switch to a biological biocide treatment.

4.2.2.2. Product much-awaited by water treatment companies and end-clients

As indicated previously, the solution proposed by Amoéba is already used in a test phase in 10 major groups that use cooling towers in their businesses in France (*Sanofi, Arecelor Mittal, ADP*…) thanks to the exclusive contract signed with French water treatment company Aquaprox. Amoéba's technology therefore boasts **six years of cumulated tests in real-life environments** as well as very positive client feedback prompted by the various advantageous of the product's use relative to chemical biocides. The group has also obtained positive feedback from potential distribution partners who are looking for ways of standing out in a mature market (little growth in cooling towers and volume of water to treat) that is dependent on solutions that have now been used for decades. **The market on which the group is focusing as a priority is a market that has seen no technological revolution since the discovery of chlorine in 1914 and the discovery of isothiazolone in 1974**.

Rather than become a rival to water treatment companies by trying to sell its biological biocide directly to industrialists, Amoéba has decided to favour faster penetration of its technology by distributing its product via already-established water treatment companies. On a global level, we have identified three categories of water treatment companies:

- **Global players**, who focus on global contracts for global industrial groups and negotiate with water treatment companies capable of providing services for all of their plants throughout the world. Examples are **Nalco Ecolab, GE Water…**

- **National players,** who could potentially serve in all countries but who do not have sufficiently large coverage to serve global clients beyond their domestic borders. **Here we mean players such as Aquaprox in France, Chemtreat, US Water and ChemAqua in the US and Magnus in Canada).**

- **Regional players,** who do not benefit from national coverage in dense industrial regions such as the US for example. **Examples are Earthwise in the US.**

So far, Amoéba has signed an exclusive contract with *Aquaprox* in France (for three years) and signed 7 Letters of Intent with *water treatments firms* in Europe and North America.

In order to better optimise penetration of its products and improvement of its margins, the group aims to have just **two to four distributors per region:** a national distributor and a global distributor. Depending on the country, the group could also sign contracts with local distributors.

So far, Amoéba has signed an exclusive contract with Aquaprox in France (*for three years*) and signed 7 Letters of Intent with Magnus (*Canada*), Earthwise Environmental (*5 US states*), Novochem Water Treatment (*Benelux*), Drewo (Italy), Aqua Concept (*Germany*), Aqua Concept Polska (Poland) & Green Chemicals (Turkey).

Fig. 7: Overview of partnerships signed with water treatment companies

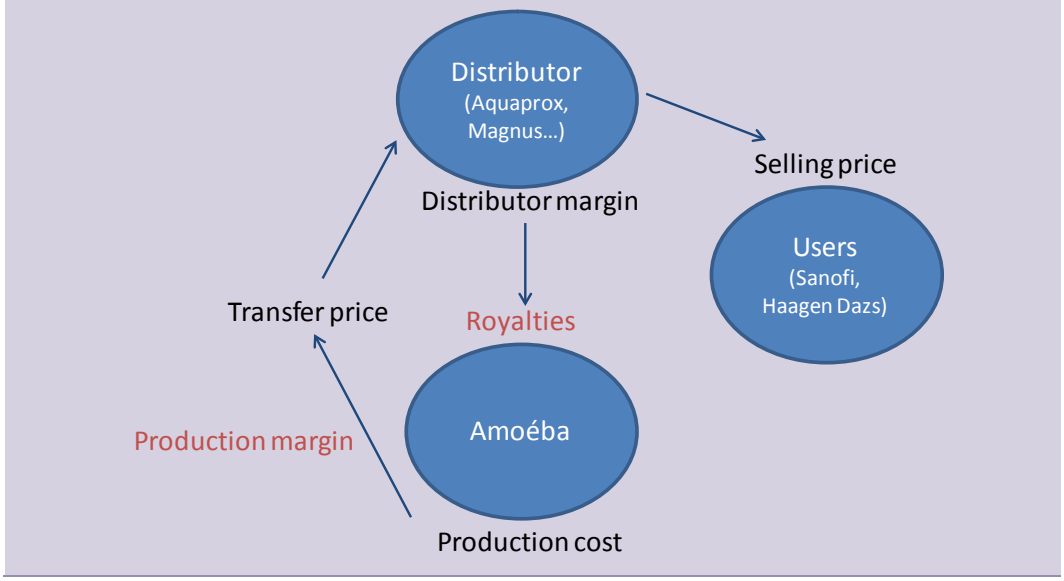
	Non-disclosure agreement	Interest to distribute the product	Interest to realize industrial tests	Contract negotiation	Type of contract	Country	Licence type
Aquaprox	**X**	**X**	**X**	**X**	**Contract**	**France**	**Exclusive licence for 3 years**
Magnus	**X**	**X**	**X**	**X**	**LOI signed**	**Canada**	**Exclusive licence**
Earthwise	**X**	**X**	**X**	**X**	**LOI signed**	**U.S.**	**5 states in co-exclusive licence**
Novochem	**X**	**X**	**X**	**X**	**LOI signed**	**Benelux**	**Co-exclusive licence**
Drewo	**X**	**X**	**X**	**X**	**LOI signed**	**Italy**	**Co-exclusive licence**
Aqua Concept	**X**	**X**	**X**	**X**	**LOI signed**	**Germany**	**Co-exclusive licence**
Polska	**X**	**X**	**X**	**X**	**LOI signed**	**Poland**	**Co-exclusive licence**
Green Chemicals	**X**	**X**	**X**	**X**	**LOI signed**	**Turkey**	**Co-exclusive licence**
Biochemica	X	X	X	X		UK	Co-exclusive licence
Clearwater	X	X	X	X		UK, Italy	Co-exclusive licence
US water/Chemical	X	X	X	X		U.S.	Co-exclusive licence
Chem-aqua	X	X	X	X		U.S.	Co-exclusive licence
Buckman	X	X	X	X		U.S.	Co-exclusive licence
Chem treat	X	X	X	X		U.S.	Co-exclusive licence
Anderson Chemical	X	X	X	X		U.S.	17 states in co-exclusive licence
Feedwater	X	X	X	X		UK	Co-exclusive licence
Cocoon	X	X	X	X		Australia	Exclusive licence
Kurita	X	X	X			Germany & Others	Co-exclusive licence
Aqua-Chem	X	X	X			Italy	Co-exclusive licence
Lubron	X	X	X			Luxembourg	Co-exclusive licence
Holland Water	X	X	X			Luxembourg	Co-exclusive licence
Kurita	X	X				US, Japan, Europe	Co-exclusive licence

Source: Company Data

Via this business model, the group intends to generate recurring margins with its partner distributors in two ways: **1/a production margin via the sale of the biological biocide product to distributors and 2/the billing of royalties on the margin generated by the distributor on sales of the biological biocide. The group should also receive up-front fees each time a contract is signed with a water treatment company.**

All details on group's business model can be found in the section called "Our estimates".

Fig. 8: Amoéba production business model



Source: Bryan, Garnier & Co ests.

For information, the group has pledged to 1/announce two further LOIs by the end of the year (US and Europe) and 2/sign eight distributor contracts a year.

4.2.2.3. Profitable and competitive production facilities

Over two years, the group is aiming to roll out its production facilities in France, the US, Canada and later in the UK.

A proprietary culture medium optimised for industrial production

To start with the group worked on the culture medium necessary to grow *Willaertia magna*. Indeed, until now, scientific laboratories had never needed to optimise the culture medium and used raw materials considered too expensive for the industrial production envisaged by the group. A **first industrialisation process** has already enabled the group to divide **by a factor of 10** the overall cost of the culture medium (*which includes no component sensitive to either the level of toxicity, environmental risk or ease of supply*). The group's culture medium notably contains no foetal bovine serum, which ensures a better quality and reproducible nature of the process (*fewer hazards in the quality and reproducible nature than when the culture medium uses bovine serum nutritive elements such as amino acids, vitamins and other nutriments for microorganisms*).

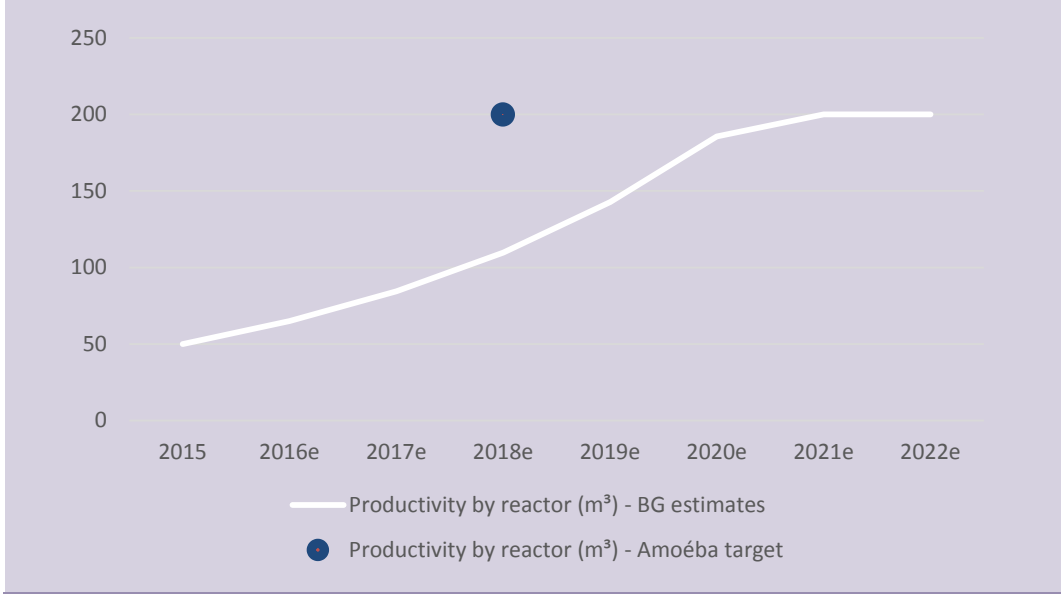
At the same time as making progress in the culture medium used, the group's engineers accomplished a major scientific challenge by validating the possibility of producing amoeba in suspension rather than using the traditional production method (on a surface). After several months of cross-experimentation, the group's engineers, in association with researchers from TWB's technological centre succeeded in proving the possibility of growing *Willaertia magna* in suspension according to defined physico-chemical conditions. This scientific progress, which is still Amoéba's property is an integral part of its know-how, lies in a combination of physico-chemical and mechanical factors and an optimisation of the culture medium for a culture in suspension. After testing and controlling the various production methods (*batch and fed-batch*), the group and TWB rapidly considered that the production process for the *Willaertia magna* amoeba in the fed-batch mode was sufficiently well mastered to attempt a continuous production method. Tests to optimise this continuous production

method were therefore carried out. So far, the company estimates that the optimisations undertaken (*entry and exit speed of culture medium and the quantity of amoeba present in the stationary phase)* suggest a doubling in productivity with the aim of a quadrupling in the next two years (*from* ***50m³*** *per module in 2015 to* ***200m³*** *by 2017-18*).

The total lifespan of Amoéba's product is 30 days after leaving the reactor.

From a logistical perspective, the lifespan of Amoéba's product is initially 15 days for the finished product, to which a further 15 days flexibility is added by intermediary products coming out of the reactor.

Fig. 9: Productivity by reactor (m³) –BG estimates vs. Amoéba target



Source: Company Data, Bryan, Garnier & Co ests.

In our model, we are more cautious than the group's management since we have assumed 200m³ per module in 2021 compared with 2018 for Amoéba.

In France

Within the production unit, the group has adapted its existing **500 litre** production unit (the *Reactor 3C France*), to make it operational in the new building based in Lyon according to the continuous production method (*in order to increase the reactor's productivity*). This already-existing unit meets current needs for products for the R&D test phases in France and the Netherlands. The unit could also serve for **inoculum production** for the 500 litre production units currently being built and whose operating start-up is planned for 2016-17.

The group's new French plant should be capable of welcoming a total of **five production lines of 500 litres each,** thereby enabling Amoéba, once productivity has doubled at each reactor between 2017 and 2018 (*after having doubled production in 2015 compared with the test level of the Reactor 3C France in 2014*), to post a market share of around **19%** in the potential biocide market for industrial cooling towers in Europe (*market estimated at* ***EUR580m*** *assuming* ***1/*** *a price for end-clients of* ***EUR1.2/m³*** *of treated water for Amoéba's biological biocide and* ***2/*** *an industrial cooling tower market of* ***200,000*** *at end-2014 and* ***3/*** *no growth in the market out to 2018*).

The group estimates the cost of an autonomous production line based on a 500 litre reactor at around **EUR2-2.5m**. This cost corresponds to both the purchase and installation of production equipment as well as the necessary fixtures for installing the reactor in a standard plant.

US

The group is also planning to build identical production plants to the French unit in the US in 2016 with an initial set-up of **two production lines of 500 litres** each. We estimate the cost per reactor should be identical to that of the French plant (*identical equipment*).

Canada and the UK

Pending the conclusion of a definitive contract with Magnus, the group could consider development of production facilities in Canada. Depending on marketing approval, we estimate the plant could possibly start up at end-2017. In the UK, the group is ruling nothing out but the installation of production facilities in the country should stem from both marketing approval and the partnerships signed with local water treatment companies.

At end-2018, we therefore estimate that the group should be capable of producing 791m³ of its biocide product, or 4.3% of the global market.

At end-2018, we estimate that the group should be capable of producing 791m³ of its biocide product (or 4.3% of the global market), which would then be sold onto water treatment companies and on which the group would take a production margin and royalties. Our previous estimates implied a market share of 2.4% at end 2018.

4.2.3. Marketing in France in 2016 and Europe as of 2017

As mentioned, the group currently has an exclusive distribution agreement with **Aquaprox** (three years of exclusivity) for the French market (*market estimated at 13,000 cooling towers, which could represent a potential market of* ***EUR30m*** *for the group*) and **7 LOIs** to address two markets in North America and in other European markets (*including Turkey*). Since development of the group's production facilities is underway (*the aim being to have a 500 litre production line up and running in H1 2016*), only regulatory procedures will predict the group's marketing schedule in Europe and the US.

So far, the group is waiting for marketing approval in all markets but seems confident in a positive outcome for **H1 2016** concerning provisional marketing approval **for the French market.** Concerning other European markets, the group estimates it should obtain **marketing approval at the latest in October 2016 for the European. As for US and Canadian markets we still anticipate marketing approval at end-2017.**

4.3. Other potential markets, but not addressable yet

As explained previously, the group is currently only intending to address the industrial cooling towers market, but has also set longer-term targets to position itself in the nuclear power plant market and the sanitary sector. The group recently unveiled (*end February 2016*) it has been granted **two new patents** which will allow it to develop new applications for its biological biocide. The first patent, called "Process for the biocontrol of Pseudomonas" has just been granted for Europe by the European patent office, and will allow the group to use (*once approval*) its product to fight Pseudomonas, to the Domestic Hot Water (*DHW*) sector. The second patent, called "Process for the biocontrol of Listeria" will allow the group to use its product to treat the water sources used to clean equipment and material in contact with food products and animal feed. The two new patents clearly confirm the strong interest of the group for new markets.

At present, our model only factors in the group's development in the industrial cooling towers market. In order to address two other markets, patents must be filed for in order to protect use of the amoeba, tests with certain clients need to be undertaken, and above all, market approval applications validated. The nuclear cooling tower market is quite similar in size to the industrial cooling tower market (>**EUR1.7bn**). As for the sanitary water market, we have more difficulties to fully estimate and analyse the size of the market given most of group's customers will be small local players (*hotels or other small professionals*).

Our new **FV of EUR35/share** still does not integrate the other potential markets.

5. Our estimates

Our main scenario is based on the following assumptions for marketing (*for the industrial cooling towers markets*), royalties, production margin and market share:

- **Marketing start estimates** (*for the industrial cooling towers market*):
  - **France**: H2-2016
  - **Europe**: Q4-2017
  - **US**: H1-2017
  - **Canada**: H1-2018

- **Royalty assumptions de**
  - **Royalties paid by Amoéba** to **UCLB** for use of the amoeba: **average of 4%**
  - **Royalties paid by water treatment companies to Amoéba** for use of the biocide: **25%**
  - **Product selling price to water treatment companies: EUR30/l**

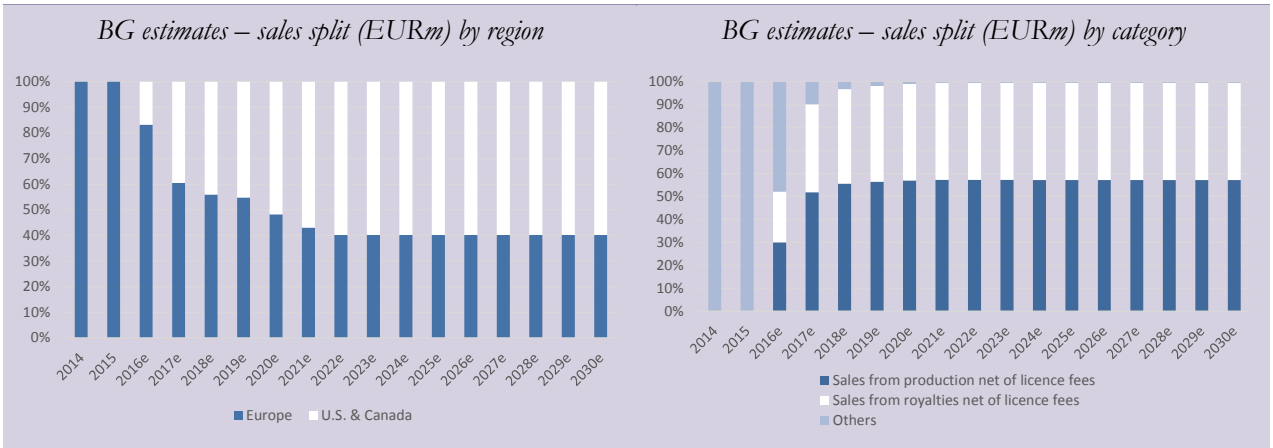
- **Market share assumptions:**
  - **Europe**: **3.3%** end-2017 and **20%** end-2020e
  - **US: 2%** at end-2017 and **19%** end-2020e
  - No assumption for penetration in the **Asian or Latin-American markets** at this stage, with the company not having so far deployed commercial resources in these territories, and having no fully defined investment project.

- **Production margin assumptions:**
  - **EUR4.4/l** in 2017e
  - **EUR10.7/l** in 2020e

- **Utilisation rate assumptions (200m³/reactor)**
  - **44%** in 2018e
  - **83.5%** in 2020e

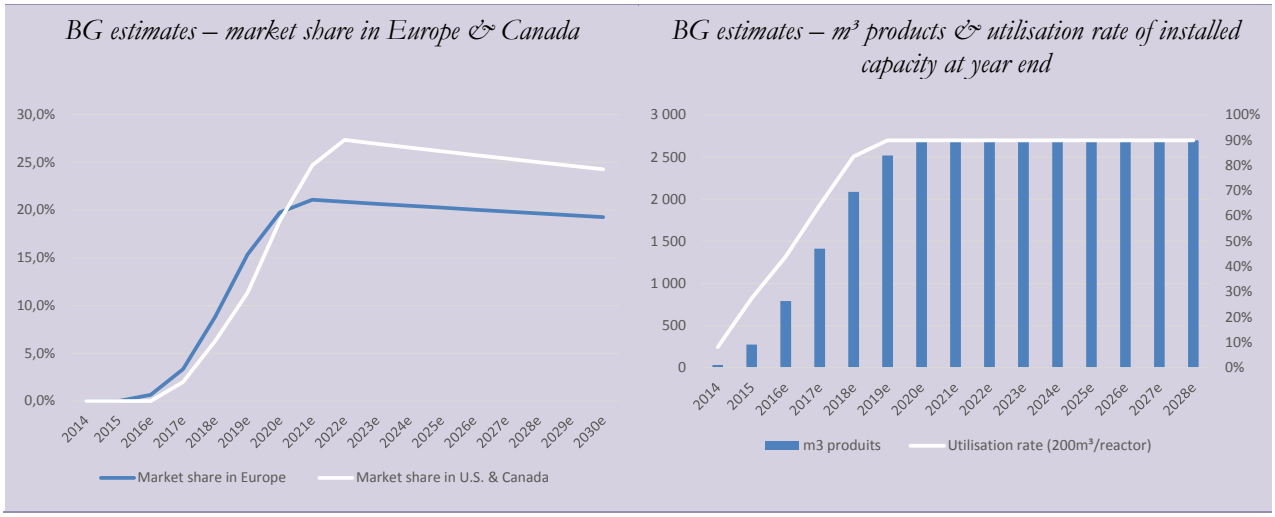
5.1. Our estimates in six charts

Fig. 10: Amoéba – Production margin and market share (BG)



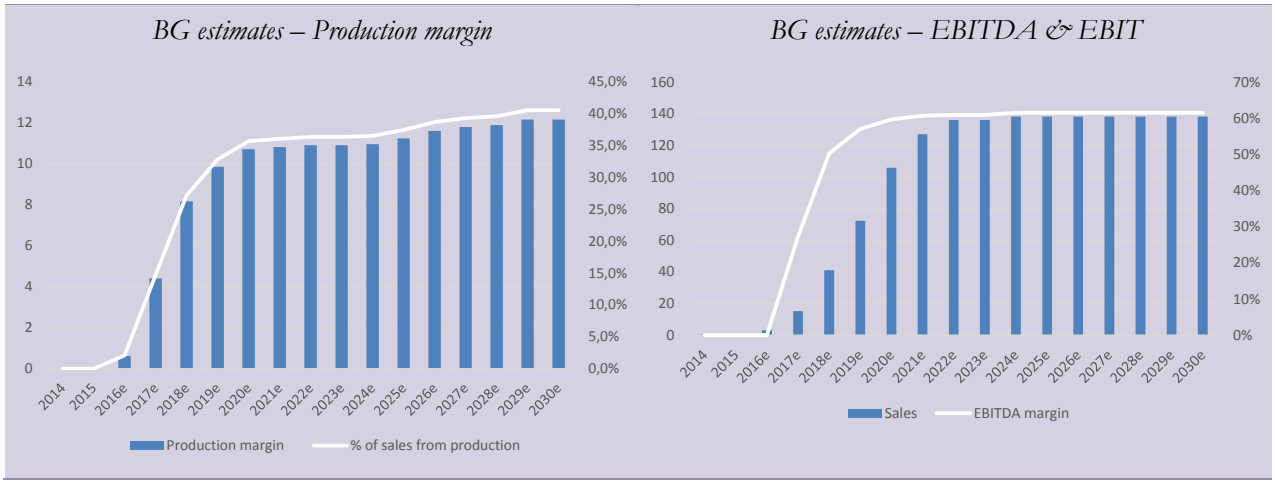
Source: Bryan, Garnier & Co ests.

Fig. 11: Amoéba – Production margin and market share (BG)



Source: Bryan, Garnier & Co ests.

Fig. 12: Amoéba – Production margin and market share (BG)



Source: Bryan, Garnier & Co ests.

5.2. P&L account

Fig. 13: Amoéba – BG estimates – P&L account (EURm)

	2012	2013	2014	2015	2016e	2017e	2018e	2019e	2020e
Total sales	**0,4**	**0,4**	**0,6**	**0,6**	**3,1**	**15,3**	**41,0**	**72,3**	**105,8**
YoY growth	-	13%	30%	7%	431%	388%	168%	76%	46%
EBITDA	**(0,2)**	**(0,4)**	**(0,8)**	**(4,0)**	**(2,7)**	**4,2**	**20,7**	**41,3**	**63,2**
% of sales	-40,6%	-98,2%	-151,5%	-669,4%	-85,3%	27,3%	50,4%	57,1%	59,7%
D&A	(0,1)	(0,1)	(0,1)	(0,1)	(0,2)	(1,0)	(2,1)	(2,6)	(2,9)
% of sales	-18,5%	-18,1%	-16,0%	-8,5%	-6,6%	-6,6%	-5,0%	-3,6%	-2,8%
EBIT	(0,2)	(0,5)	(0,9)	(4,0)	(2,9)	3,2	18,6	38,6	60,3
% of sales	-59%	-116%	-168%	-676%	-92%	21%	45%	53%	57%
Net financials	(0,0)	(0,0)	(0,1)	(0,0)	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)
Profit before tax	(0,2)	(0,5)	(1,0)	(4,0)	(3,0)	3,1	18,5	38,6	60,2
Tax	-	-	-	-	-	(1,0)	(6,1)	(12,7)	(19,9)
Minorities	-	-	-	-	-	-	-	-	-
Associates	-	-	-	-	-	-	-	-	-
Net profit	**(0,2)**	**(0,5)**	**(1,0)**	**(4,0)**	**(3,0)**	**2,1**	**12,4**	**25,8**	**40,3**
Net margin	-66%	-123%	-177%	-681%	-95%	13%	30%	36%	38%

Source: Company Data; Bryan, Garnier & Co ests.

5.3. Balance sheet

Fig. 14: Amoéba – BG estimates – Balance sheet (EURm)

	2012	2013	2014	2015	2016e	2017e	2018e	2019e	2020e
Tangible fixed assets	**0,3**	**0,3**	**0,2**	**1,8**	**8,0**	**15,5**	**17,8**	**17,7**	**21,2**
Intangibles assets	0,9	1,4	2,2	2,2	2,2	2,2	2,2	2,2	2,2
Cash & equivalents	0,4	0,5	2,6	9,2	(1,8)	(11,7)	(9,8)	6,4	33,2
current assets	0,6	0,6	3,1	9,5	(0,7)	(6,4)	4,2	31,1	69,3
Other assets	1,1	1,6	2,4	4,0	10,3	17,7	20,1	19,9	23,4
Total assets	**1,7**	**2,2**	**5,6**	**13,5**	**9,6**	**11,3**	**24,3**	**51,0**	**92,8**
L & ST Debt	0,6	0,8	1,8	1,8	1,8	1,8	1,8	1,8	1,8
Others liabilities	0,2	1,0	0,9	1,6	1,7	2,3	3,7	5,4	7,2
Shareholders' funds	0,9	0,4	2,8	10,1	6,1	7,1	18,8	43,8	83,7
Total Liabilities	**1,7**	**2,2**	**5,5**	**13,5**	**9,6**	**11,3**	**24,3**	**51,0**	**92,8**
Capital employed	1,3	0,8	2,1	2,8	9,8	20,7	30,5	39,3	52,4

Source: Company Data; Bryan, Garnier & Co ests.

5.4. Cash flow statement

Fig. 15: Amoéba – BG estimations – CFS (EURm)

	2012	2013	2014	2015	2016e	2017e	2018e	2019e	2020e
Operating cash flows	**(0,2)**	**0,5**	**(1,2)**	**(3,6)**	**(4,4)**	**(1,3)**	**6,4**	**18,8**	**33,4**
Change in working capital	(0,1)	0,9	(0,5)	0,9	(0,8)	(3,5)	(7,4)	(9,0)	(9,6)
Capex, net	(0,5)	(0,5)	(0,9)	(1,7)	(6,5)	(8,5)	(4,5)	(2,5)	(6,5)
Financial investments, net	0,7	0,1	4,2	11,8	(0,1)	(0,1)	(0,1)	(0,1)	(0,1)
Dividends	-	-	-	-	-	-	-	-	-
Other	-	-	(0,0)	-	-	-	-	-	-
Net debt	**0,2**	**0,3**	**(0,8)**	**(5,8)**	**5,2**	**15,0**	**13,2**	**(3,1)**	**(29,9)**
Free Cash flow	(0,6)	(0,0)	(2,1)	(5,3)	(10,9)	(9,8)	1,9	16,3	26,9

Source: Company Data; Bryan, Garnier & Co ests.

5.5. Main ratios

Fig. 16: Amoéba – BG estimations – Main ratios (%)

	2012	2013	2014	2015	2016e	2017e	2018e	2019e	2020e
Operating margin	**-59,2%**	**-116,3%**	**-167,5%**	**-675,7%**	**-91,9%**	**20,7%**	**45,3%**	**53,4%**	**57,0%**
Tax rate	0,0%	0,0%	0,0%	0,0%	33,0%	33,0%	33,0%	33,0%	33,0%
Net margin	-65,7%	-122,8%	-176,9%	-680,9%	-94,8%	13,4%	30,2%	35,7%	38,1%
ROE (after tax)	-26,1%	-120,1%	-34,8%	-39,9%	-48,7%	28,8%	66,2%	59,0%	48,2%
ROCE (after tax)	**-17,7%**	**-58,9%**	**-43,8%**	**-141,6%**	**-19,7%**	**10,2%**	**40,9%**	**65,9%**	**77,1%**
Gearing	25,5%	70,0%	-28,8%	-73,1%	59,2%	188,5%	62,0%	-10,5%	-37,5%
Pay-out ratio	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%

Source: Company Data; Bryan, Garnier & Co ests.

6. Valuation

We value Amoéba at **EUR35/share**, pointing to **>10%** upside. Only assumptions for prices, market share and production starts differ between the scenarios. Compared with our previous report, we have cut our WACC by **250bp** to around **12% by reducing our beta following the group's excellent track record since its IPO in terms of commercial development. We now also assume** a growth rate to infinity of **1.5%** and EBIT margin for the terminal value of **35%** in our three scenarios (*vs. 30% previously*) while cutting our discount rate from **30%** to **15%** as visibility on market approvals improves.

6.1. WACC calculation

Our WACC works out to **12%** in our model with **1/**a market premium of **6.4**%, **2/**a risk-free rate of **2**%, **3/**a beta of **1.42** and a tax rate of **33.3%**. Since Amoéba had a negative net debt position at end-2015, **our current WACC therefore corresponds to the cost of capital.**

Fig. 17: WACC calculation

BG risk free rate	**2.00%**
BG equity risk premium	6.40%
Beta	1.42
Cost of Equity	**12.0%**
Cost of debt	**5.00%**
Tax	33.3%
Cost of debt - post tax	3.3%
WACC	**12.0%**

Source: Bryan, Garnier & Co ests.

6.2. Overview of our DCF valuation

Fig. 18: Amoéba – BG Estimates – DCF model (EURm)

	2016e	2017e	2018e	2019e	2020e	2021e	2022e	2023e	2024e	2024e	2024e
Sales	**3,1**	**15,3**	**41,0**	**72,3**	**105,8**	**127,1**	**136,2**	**136,2**	**138,2**	**138,2**	**138,2**
Revenue Growth Rate	-	388%	168%	76%	46%	20%	7%	0%	1%	0%	0%
Operating Margin	-92%	21%	45%	53%	57%	58%	58%	58%	58%	59%	59%
EBIT	**(2,9)**	**3,2**	**18,6**	**38,6**	**60,3**	**73,5**	**79,0**	**78,6**	**80,5**	**81,2**	**82,2**
Adjustment for provisions	-	-	-	-	-	-	-	-	-	-	-
(-) Taxes on EBIT	0,9	(1,0)	(6,1)	(12,8)	(19,9)	(24,2)	(26,1)	(25,9)	(26,6)	(26,8)	(27,1)
(+/-) Movements in working capital	(0,8)	(3,5)	(7,4)	(9,0)	(9,6)	(6,1)	(2,5)	0,1	(0,6)	-	-
(+) Depreciation and amortization	0,2	1,0	2,1	2,6	2,9	3,7	4,1	4,4	4,6	3,8	2,8
(-) Capital Expenditures	(6,5)	(8,5)	(4,5)	(2,5)	(6,5)	(2,8)	(2,8)	(2,8)	(2,8)	(2,8)	(2,8)
(-) Intangibles	-	-	-	-	-	-	-	-	-	-	-
FCF	**(8,9)**	**(8,8)**	**2,7**	**17,1**	**27,3**	**44,1**	**51,6**	**54,3**	**55,1**	**55,4**	**55,1**
Discount factor	1,1	1,3	1,4	1,6	1,8	2,0	2,2	2,5	2,8	3,1	3,5
Discounted FCF	(8,0)	(7,0)	1,9	10,9	15,5	22,3	23,3	21,9	19,9	17,8	15,8

Source: Bryan, Garnier & Co ests.

Fig. 19: Amoéba – Estimations BG – FV @ EUR35/share

Amoeba - DCF	
PV of Free Cash Flows	**134,4**
PV of Terminal Value	69,6
Value of Operating Assets	**203,9**
2015 net debt (-)	(0,8)
Pensions (-)	0,0
Financial assets (+)	-
Minorities (-)	-
Tax credit (+)	1,7
Value of Equity - Pre-money	206,4
Discount	15%
Value of Equity - Pre-money discounted	175,4
Capital increase	13,2
Implied Equity value post money	**188,6**
FV per share	**35**
Share price	30.7
Upside/Downside	13,5%

Source: Company Data; Bryan, Garnier & Co ests.

Note that our **EUR35/share FV** still integrates a discount linked to the risk of delays stemming from marketing approvals in France, Europe and the US. Our previous rate was **30%** and was comparable to assumptions made for **biotech** and **med-tech companies** which are situated between the **phase 3** and **marketing approval** in their industrial and sales procedures *(discount of 10-30%)*. To reflect the positive recent news from the group on this subject we have decided to cut our rate from **30%** to **15%**.

Assuming no more discount would imply a FV of EUR41/share, reflecting >30% upside to the latest share price.

Assuming no mode discount would imply a FV of EUR41/share, reflecting >30% upside to the latest share price.

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Stock rating

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NEUTRAL — Opinion recommending not to trade in a stock short-term, neither as a BUYER or a SELLER, due to a specific set of factors. This view is intended to be temporary. It may reflect different situations, but in particular those where a fair value shows no significant potential or where an upcoming binary event constitutes a high-risk that is difficult to quantify. Every subsequent published update on the stock will feature an introduction outlining the key reasons behind the opinion.

SELL — Negative opinion for a stock where we expect an unfavourable performance in absolute terms over a period of 6 months from the publication of a recommendation. This opinion is based not only on the FV (the potential downside based on valuation), but also takes into account a number of elements that could include a SWOT analysis, momentum, technical aspects or the sector backdrop. Every subsequent published update on the stock will feature an introduction outlining the key reasons behind the opinion.

Distribution of stock ratings

BUY ratings 64.4% NEUTRAL ratings 28.1% SELL ratings 7.4%

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