EDISON

Carbios

FY17 results

Transition year and strengthened balance sheet

Alternative energy

Carbios's 2017 results were an important staging post on the journey from a pure research operation towards a market-ready business. The balance sheet has been strengthened and operations are fully funded into 2019. Announcements of partnership deals with other consumer brand owners, similar to that announced with L'Oréal, could act as a further share price catalyst. Our remodelled DCF provides an indicative valuation for Carbios of €15/share.

Year end	Revenue (€m)	PBT* (€m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
12/16	8.9	3.6	128.0	0.0	5.3	N/A
12/17*	1.0	(4.6)	(86.0)	0.0	N/A	N/A
12/18e	1.1	(4.6)	(86.0)	0.0	N/A	N/A
12/19e	1.2	(4.9)	(90.0)	0.0	N/A	N/A

Note: *PBT and EPS (fully diluted) are normalised, excluding amortisation of intangibles, exceptional items and share-based payments.

Final benefits of the Thanaplast programme

The Thanaplast programme that brought Carbios into existence concluded in 2017, having reached all the milestones set at its inception. Carbios received the final milestone payment of €1m under the Thanaplast programme in H217 (€0.47m in final subsidies and €0.57m in repayable advances).

Progress on recurrent operating cost reduction

The reported operating loss of €4.65m for FY17 compared to a profit of €3.55m in FY16. However, the 2016 figure included €8m in non-cash income from the licensing deal under which Carbios took control of Carbiolice (not consolidated). Excluding this one-off, we estimate a comparable underlying loss of €4.45m in 2016. For FY18 and FY19, we expect operating losses of €4.6m and €4.8m respectively. We forecast capex of c €0.7m pa for each of the next four years and a further €3.4m investment in Carbiolice (€1.1m in FY19 and €2.3m in FY20) in addition to the recently announced €1.1m investment.

Valuation: Stronger balance sheet

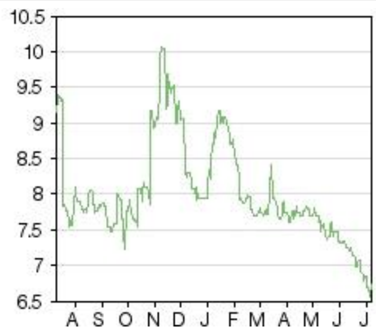
2017 saw a major strengthening of Carbios's balance sheet. Fresh equity finance raised €5.1m and, as we have noted, the fifth and final stage of Thanaplast financing contributed c €1.0m. Carbios's operations are now fully funded into 2019 although additional capital will be required to fund the business beyond this point. We have remodelled our DCF valuation to reflect the division of the business into biorecycling and biodegradation and revised our long-term projections. Using a discount rate of 15% and a terminal growth rate of 2%, our DCF indicates Carbios could be worth c €15/share (previously a range of €20-32/share).

9 July 2018

Price	**€6.74**
Market cap	**€31m**

Net cash (€m) at 31 December 2017	7.2
Shares in issue	4.57m
Free float	57%
Code	ALCRB
Primary exchange	Euronext Growth
Secondary exchange	N/A

Share price performance



%	1m	3m	12m
Abs	(8.0)	(13.1)	(29.0)
Rel (local)	(6.5)	(15.0)	(32.2)
52-week high/low		€10.1	€6.5

Business description

Carbios develops enzyme-based processes for biodegradation and biorecycling of plastics, with a long-term aim of displacing current recycling and production practices.

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Out of the chrysalis

2017 was a year of major transition for Carbios as it marked the final year of the Thanaplast research programme. There were also a number of major technological advances in Carbios's PET recycling processes. 2017 was also the first full year of the arm's length relationship between Carbios and its 61.3% investment, Carbiolice, its key partner in the development and commercialisation of biodegradable plastics technologies. Carbios's balance sheet was considerably strengthened during the year, in large part through an equity issue, leaving the company funded through to 2019 (according to the company's management).

In our 31 October 2017 update note we reviewed a number of the year's other major developments: a reshaping of Carbios's management structure to meet the needs of the transition from a research operation to a fully commercial entity; the breakthrough five-year agreement with personal care products titan, L'Oréal, for the exploitation of Carbios's biorecycled PET technology; and an agreement with TechnipFMC, the major global energy and chemical engineering company, under which Technip will develop methods of integrating modules using Carbios's technology to produce precursors for PET manufacture.

Thanaplast conclusion marks exit from pure research

Carbios originally came into being to execute the five-year and five-stage Thanaplast programme. The Thanaplast programme, partially funded by the French state via national investment bank, Bpifrance, was focused on the development of enzymatic processes for the biodegradation and biorecycling of plastic polymers. Thanaplast was shaped by an agreement with a number of blue-chip scientific, industrial and development partners: the National Centre for Scientific Research (CNRS), the University of Poitiers; the National Institute for Agricultural Research (INRA), the French state body that directs applied scientific research for agriculture; Limagrain, a large agricultural co-operative focused on cereals; Deinove, a quoted biotech company; and the Barbier Group, a major supplier of plastic films.

The Thanaplast programme came to an end on 30 June 2017, having reached all the milestones set at its inception. While this marked the closure of the operational phase of the programme, there was still some uncertainty over the timing of its final financial payments. Carbios received the final payments under the programme in the 2017 accounting period (c €1m in H217). This means a financial line can be drawn under the programme as we do not anticipate any repayment of advances during our forecast horizon to end 2019. The total amount repayable to Bpifrance, of €4.525m, will be triggered only if Carbios receives cumulative revenue, from the utilisation of products resulting from the Thanaplast project, of greater than €10m. The repayments are scheduled to be spread over five years (once the €10m threshold has been crossed) and back-end loaded with a final payment of €1.95m in year five. An additional payment of 4% of its revenues (related to the utilisation of the product) becomes payable if cumulative revenue exceeds €100m. This additional payment is time limited to five years consecutively post the conclusion of the repayment of the original advances and is limited to a maximum of €7.1m.

The conclusion of the Thanaplast programme marks the end of Carbios's original incarnation as the manager of a scientific research programme, which had already been declining in importance compared to its strategy of scaling up these technologies and licensing the processes developed under the Thanaplast programme.

Commercial relations with Carbiolice underway

Carbios's relationship with Carbiolice, in which it holds 9.5m shares (61.3% but treated as an equity interest in which Bpifrance and Limagrain are minority investors), is starting to generate revenue.

Carbios received three payments worth €0.72m in research fees from Carbiolice during FY17. Two, worth a total of €0.47m, came in the first half and the third, worth €0.25m, came in the second half. In total, the research agreement is worth €1.248m (five payments). The two remaining payments, worth €0.52m, are due to be received in 2018. Agreements, covering other services, including consulting and laboratory equipment provision, yielded smaller amounts, totalling c €76k.

Carbiolice is well funded with its owners committed to investing €18m. Carbios's potential additional contributions now total €3.4m (post the recent commitment of €1.1m), although payments could turn out to be less than this maximum figure. Live tests of its processes are scheduled to begin with potential clients in 2019. Its intermediate objective is to address an ultimate end-user market of 40,000 tonnes of biodegradable plastics. This will take the form of masterbatches (rather than compound pellets) to produce 100% compostable and biodegradable plastics scheduled for production in 2020.

The holding in Carbiolice does not fit into Carbios's strategy as a developer and owner of intellectual property, so it is more than possible that ownership will drop below the majority level over time.

FY17 results and commentary

The pattern of results across the half-year periods illustrates the lumpy character of Carbios's revenue line. The timing of research services payments from Carbiolice and the final outright subsidy payment from Bpifrance had a noticeable effect on the revenue line, only partially offset by a jump in miscellaneous revenue in the second half. We had originally factored in the assumption of €300,000 in licence revenue from Carbios's PET technology, but due to timing issues this has not yet materialised.

Exhibit 1: Income statement and cash flow details 2017 vs 2016

€000s	H116	H216	FY16	H117	H217	FY17
Carbiolice research services revenue				518	206	724
Subsidy payment from Bpifrance				105	0	105
Other	556	8,314	8,870	9	145	154
Total revenue	**556**	**8,314**	**8,870**	**632**	**351**	**983**
Bought-in services	(1,863)	(1,117)	(2,980)	(879)	(1,435)	(2,314)
Salaries	(681)	(676)	(1,357)	(913)	(734)	(1,647)
Social charges	(232)	(217)	(449)	(306)	(260)	(566)
Total payroll	(913)	(893)	(1,806)	(1,219)	(994)	(2,213)
Other	(211)	(322)	(533)	(285)	(804)	(1,107)
Total operating costs	(2,987)	(2,332)	(5,319)	(2,383)	(3,252)	(5,635)
Operating loss (pre-exceptionals)	**(2,431)**	**5,982**	**3,551**	**(1,751)**	**(2,901)**	**(4,652)**
Financial net	41	34	75	33	(9)	24
Current pre tax	(2,390)	6,016	3,626	(1,718)	(2,910)	(4,628)
Exceptionals	(6)		(27)	(6)		(11)
Taxation	860	461	1,321	371	331	702
Net loss	**(1,536)**	**6,477**	**4,920**	**(1,353)**	**(2,579)**	**(3,936)**
Cash flows						
Cash at opening	9,011	7,203	9,011	3,987	4,736	3,987
Cash from operations	(1,668)	6,304	4,636	(498)	(1,723)	(2,221)
Cash from investments	(160)	(9,669)	(9,829)	(77)	(235)	(312)
Cash from financing	21	148	169	1,324	4,768	6,092
Change in cash	(1,807)	(3,217)	(5,024)	749	2,810	3,560
Cash at close	7,203	3,987	3,987	4,736	3,987	7,547

Source: Carbios data, Edison Investment Research

There were also some observable trends in operating expenses. At the halfway stage we highlighted that the bought-in services charge had declined sharply as the volume of external research work commissioned under the Thanaplast programme dwindled and although the second half saw a rise due to the ramping-up of business development, year-on-year external charges fell by 22%. In H1, staff costs rose by 33.5% y-o-y due to the hiring of three employees including a new Deputy CEO and while this moderated in H2, staff costs increased by 23% y-o-y for the full year.

Overall we had expected a decline in second-half costs, but these rose significantly, principally due to Carbios's provisioning for future royalty payments of €0.72m owed to independent researchers as and when their work generates commercial revenues (€0.08m had already been expensed in 2016). This was a non-cash item and led to a rise in end-2017 accounts payable to €1.43m from €0.49m (FY16).

The reported operating loss of €4.65m for FY17 compared to a profit of €3.55m in FY16. However, the FY16 figure included €8m in non-cash income from the licensing deal under which Carbios took control of Carbiolice. Excluding this, we estimate a comparable underlying loss of €4.45m in FY16.

The 2017 balance sheet was strengthened significantly by the €3.6m capital increase in July (at some €7.7 per share), and the issue of new shares worth €1.5m under the Kepler Cheuvreux equity line finance programme. The Kepler Cheuvreux facility was put in place at the end of March 2017 and allows Kepler Cheuvreux to subscribe for a maximum of 380,000 Carbios shares (c 9.9% of the shares at the time the agreement was signed) over a period of 24 months. The shares can be acquired by Kepler-Cheuvreux at a maximum discount of 7.5% to the volume weighted average price (VWAP) in the two days prior to the issue. As at the end of FY17, 200k shares had been issued under this facility. As a result of the equity issues, the FY17 gross cash increased to €7.5m from €4.7m at end June 2017. The free issue of redeemable equity warrants to existing shareholders on a one-to-10 ratio in November 2017 is unlikely to have a short-term effect on Carbios's liquidity, in our view, as the current share price is below the exercise price of €10.4/share. The warrants expire at the end of November 2018. Management states that it will be able to fund current activities well into 2019 without recourse to fresh external finance.

Operating losses to hold steady

For FY18 we have assumed total revenue rises marginally, to €1.1m. We forecast a similar small rise in revenue in FY19 to €1.2m.

While we forecast Carbios's costs of sales will rise, we expect Carbios's general and administrative expenses will decline in FY18 (versus FY17) given a full year of lower external research costs, non-recurrence of one-off personnel costs and the charge for royalty payments. With the overall cost base relatively stable, we expect this to translate to broadly static operating losses of €4.6m in FY18 and €4.8m in FY19 (from €4.7m in FY17).

We expect capex to remain broadly constant over the forecast period at c €0.7m and for Carbios to make additional contributions to Carbiolice of €3.4m in total in the period 2019 and 2020 (€1.1m committed in 2018). Our forecasts assume capex and expenses are funded via the issue of debt (€7m in 2019 and 2020).

Further progress in PET technology

In March 2018 Carbios was able to announce a major technological advance in its PET processes in addition to the production of virgin PET via the depolymerization of coloured PET bottles announced in October 2017. It can now demonstrate the depolymerization of waste PET textile fibres into its original monomers: terephthalic acid (TPA) and monoethylene glycol (MEG). It has also just announced significant progress in the development of the technology in the form of an optimised enzyme that cuts the time required for the hydrolysis part of the process by three.

We understand Carbios is in negotiations with a number of major brand owners for collaborative deals similar to the breakthrough agreement signed with L'Oréal last autumn. Carbios hopes to have sufficient partners on board to launch the recycling consortium formally by the second half of 2018. Ideally, this will include representatives from the major industries currently using PET: drinks, foods and textiles. A decision will probably be made later this year on the specifications and financing of the pilot line for the PET technology. The output capacity of the pilot plant has yet to be fixed and this decision will be driven by the number and scale of collaborative deals with brand owners but we estimate a capacity of c 10,000kgs/year is possible. There is also a range of potential financing options for the plant with a state-subsidised operation directly under Carbios's ownership as a possibility, in our view.

Share price drivers and valuation

With the first full-scale commercial revenues still a couple of years in the future, we believe the key influence on the share price in the coming months will be the announcement of further collaborative deals with brand owners. However, there is inevitably a low degree of visibility, on both scale and timing, in this respect. Meanwhile, Carbios is still an early-stage company, on the cusp of transitioning from a pure research entity. This means that future cash flows are uncertain in terms of size and timing as they are governed by technology, execution and commercialisation risk, as well as risk related to market development and product adoption that is still very far out, which means that there is a heavy weighting to cash flows that are still very far in the future. We therefore use a DCF methodology to provide an indicative valuation for Carbios.

We have updated our valuation to reflect the acquisition of a majority interest in Carbiolice in 2016, the recent results, the issue of equity and the additional contribution of €1.1m to Carbiolice in 2018. We have also remodelled our DCF and now base our cash flow projections on two principal business segments: biodegradation and biorecycling. We have extended projected cash flows to 2035, assuming a long-term EBIT margin of 60% (for the period 2031-35 we assume the margin remains at 60%), a discount rate of 15% and perpetuity growth rate of 2%. Using these assumptions indicates a valuation for Carbios of c €15/share (down from the €20-32 per share shown in our report of October 2017). The reduced valuation reflects the increase in the number of shares, higher capex and a more cautious assessment of the timing and magnitude of commercial revenues. The valuation remains sensitive to assumptions on discount rates, perpetuity growth rates and long-term margins. Exhibit 2 below shows the sensitivity of our valuation to long-term margin projections to 2031 (we assume equilibrium 2031-2035) and, in particular, discount rates.

Exhibit 2: Margin projection scenarios 2022-2031 and valuation using a 15% or 20% discount rate

Scenario	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	DCF value (€) per share at discount rate of	
											15%	20%
1	20%	30%	40%	50%	60%	70%	80%	80%	80%	80%	18.0	8.0
2	20%	30%	40%	50%	60%	70%	70%	70%	70%	70%	17.0	7.0
3	20%	30%	35%	40%	45%	50%	55%	60%	60%	60%	15.0	6.0
4	20%	25%	30%	35%	40%	45%	50%	50%	50%	50%	14.0	6.0
5	20%	25%	30%	35%	40%	40%	40%	40%	40%	40%	13.0	5.0
6	20%	25%	30%	30%	30%	30%	30%	30%	30%	30%	12.0	4.0

Source: Edison Investment Research

Exhibit 3: Financial summary

Year end 31 Dec	€m	2014	2015	2016	2017	2018e	2019e	2020e
INCOME STATEMENT								
Revenue		0.66	0.84	8.87	0.98	1.10	1.22	1.40
Cost of Sales		(2.91)	(3.15)	(2.98)	(2.31)	(2.95)	(3.20)	(2.92)
Gross Profit		(2.25)	(2.31)	5.89	(1.33)	(1.85)	(1.98)	(1.52)
General and Administrative Expenses		(0.74)	(1.10)	(1.36)	(1.65)	(1.24)	(1.25)	(1.26)
EBITDA (norm)		(3.45)	(4.23)	3.34	(4.89)	(4.84)	(5.04)	(4.71)
Reported Operating Profit		(3.36)	(4.06)	3.55	(4.65)	(4.60)	(4.79)	(4.46)
Net Interest		0.05	0.08	0.08	0.02	(0.01)	(0.07)	(0.06)
Profit before tax (reported)		(3.32)	(3.98)	3.63	(4.63)	(4.61)	(4.86)	(4.52)
Reported tax		1.09	0.94	1.32	0.70	0.70	0.74	0.69
Profit after tax (reported)		(2.23)	(3.05)	4.95	(3.93)	(3.91)	(4.12)	(3.83)
Extraordinary gain or loss		0.02	(0.02)	(0.03)	(0.01)	0.00	0.00	0.00
Net income (reported)		(2.21)	(3.07)	4.92	(3.94)	(3.91)	(4.12)	(3.83)
Basic average number of shares outstanding (m)		3.75	3.78	3.85	4.57	4.57	4.57	4.57
EPS - basic reported (€)		-0.59	-0.81	1.28	-0.86	-0.86	-0.90	-0.84
Dividend (€)		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stock price		12.9	12.9	8.4	8.1	7.5	7.5	7.5
Revenue growth (%)		-26.2%	26.1%	959.7%	-88.9%	11.9%	10.7%	14.9%
Gross margin (%)		-338.6%	-275.7%	66.4%	-135.4%	-168.2%	-162.7%	-108.5%
Normalized EBITDA Margin (%)		-518.8%	-505.1%	37.7%	-497.6%	-440.3%	-413.6%	-336.6%
Normalized operating margin (%)		-506.6%	-485.3%	40.0%	-473.1%	-418.1%	-393.2%	-318.5%
BALANCE SHEET								
Total Current Liabilities		0.67	0.91	1.17	2.26	1.56	1.62	1.55
Accounts payable		0.20	0.34	0.49	1.43	0.71	0.77	0.70
Other current liabilities		0.47	0.57	0.67	0.83	0.85	0.85	0.85
Total Non-Current Liabilities		1.95	3.01	3.15	3.71	3.71	10.71	17.71
Other liabilities		1.95	3.01	3.15	3.71	3.71	10.71	17.71
Total Liabilities		2.62	3.92	4.32	5.97	5.27	12.33	19.26
Total Shareholders Equity		11.12	8.13	13.11	14.55	10.62	6.50	2.66
Common stock / Capital		2.63	2.65	2.68	3.20	3.20	3.20	3.20
Additional paid-in capital / Share premium		13.65	13.70	13.74	18.59	18.59	18.59	18.59
Retained earnings		(2.96)	(5.17)	(8.24)	(3.32)	(7.26)	(11.17)	(15.29)
Other reserves and surplus		(2.21)	(3.05)	4.94	(3.94)	(3.91)	(4.12)	(3.83)
Total liabilities and equity		13.73	12.04	17.43	20.52	15.89	18.82	21.92
Total assets		13.73	12.04	17.43	20.52	15.88	18.82	21.92
Total current assets		12.64	10.38	6.16	9.17	1.51	2.41	2.23
Cash and cash equivalents		11.10	9.01	3.99	7.55	0.93	1.78	1.54
Accounts receivable		1.40	1.22	1.95	1.46	0.41	0.45	0.52
Inventories		0.02	0.01	0.02	0.01	0.02	0.02	0.02
Prepaid expenses		0.12	0.13	0.22	0.15	0.15	0.15	0.15
Total Non-Current Assets		1.09	1.67	11.27	11.35	14.37	16.41	19.69
Property Plant and equipment, net		0.74	1.25	1.21	1.11	2.98	3.87	4.77
Other intangible assets		0.13	0.23	0.37	0.57	0.61	0.67	0.74
Other non-current assets		0.22	0.19	9.69	9.68	10.78	11.88	14.18
CASH FLOW								
Cash Flow from Operations								
Net income (loss)		(2.21)	(3.07)	4.92	(3.94)	(3.91)	(4.12)	(3.83)
Depreciation and Amortization		0.07	0.17	0.22	0.23	0.24	0.25	0.25
Other items		(1.36)	0.39	(0.51)	1.49	0.32	0.01	(0.13)
		(3.50)	(2.52)	4.64	(2.22)	(3.35)	(3.86)	(3.71)
Cash Flow from Investing								
Purchases of fixed assets		(0.85)	(0.79)	(0.30)	(0.33)	(2.17)	(1.19)	(1.23)
Other Investing Activities		(0.02)	0.00	(9.53)	0.02	(1.10)	(1.10)	(2.30)
Net cash used in investing activities		(0.87)	(0.79)	(9.83)	(0.31)	(3.27)	(2.29)	(3.53)
Cash Flow from Financing								
Change in Debt		0.15	0.07	(0.04)	(0.05)	0.00	7.00	7.00
Change in Capital Stock		0.17	0.06	0.07	5.38	0.00	0.00	0.00
Other Financing Activities		0.55	1.08	0.14	0.77	0.00	0.00	0.00
		0.87	1.22	0.17	6.09	0.00	7.00	7.00
Net Changes in Cash and Cash Equivalent		(3.50)	(2.09)	(5.02)	3.56	(6.62)	0.85	(0.24)
Effect of Exchange Rates On Cash		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cash and Cash Equivalents - Beginning		14.60	11.10	9.01	3.99	7.55	0.93	1.78
Cash and Cash Equivalents - End		11.10	9.01	3.99	7.55	0.93	1.78	1.54

Source: Company accounts, Edison Investment Research. Note: *FY16 revenues include an €8m non-cash payment treated as licensing revenues as per management guidance. This non-cash payment has been adjusted in the operating cash flow accordingly.

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