

Speciality chemicals

52-WEEK HIGH	7.99p
52-WEEK LOW	1.48p
PRICE	2.55p
MARKET CAP MLN	£7.54

Share Price



Major Shareholders

Woodford Investment	33.0%
Kensington Research LLC	12.3%
IP Group	11.2%
Shares in issue	269,130,071
Avg Three-month trading volume	2,003,154
Primary Index	AIM

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Itaconix - Gaining global reach

Global blue-chip partners support revenue growth

Itaconix PLC (LON:ITX) designs and manufactures functional polymers for applications in consumer and industrial products. The company creates new products through its proprietary polymerisation process that uses Itaconic acid, which is a bio-based building block produced by fermentation using corn as a source of sugar. There are three major areas of commercial focus in the 2019-2020e timeframe: non-phosphate detergents, odour control, and hair-care.

Following a deal announced with Nouryon on 28 February in the hair-care and personal care space, Itaconix now has global blue-chip players as commercial partners across all three of the focus product areas. In this report, we examine the three focus areas, the scale of those market opportunities, and the revenue potential for Itaconix through to 2021e.

A versatile chemistry platform

Looking further forward, Itaconix has a vast addressable market with product segments adding up to many US\$ billions. In this report, we consider the potential growth trajectory for Itaconix and the implications for share valuation. We believe that 2019 represents an important year in terms of validating the growth strategy and demonstrating the long-term value potential of the company's polymer technology.

Year end Dec 31	Current	2019	2020	2021
Revenue £M	0.7	1.7	3.5	6.5
EBITDA (£M)	(4.3)	(1.5)	(0.6)	1.0
EPS (p)	(2.8)	(0.7)	(0.4)	0.2
Net cash/ (debt) £M	2.2	0.7	0.2	0.5

John Shaw, CEO of Itaconix, has a broad experience of building speciality chemical and medical technology businesses, and was a co-founder of Itaconix Corporation

Yvon Durant, Co-founder of Itaconix, is a world expert and leading innovator in itaconate chemistries, and co-founder of Itaconix Corporation. He was previously research professor & director of the Advance Polymer Laboratory at the University of New Hampshire

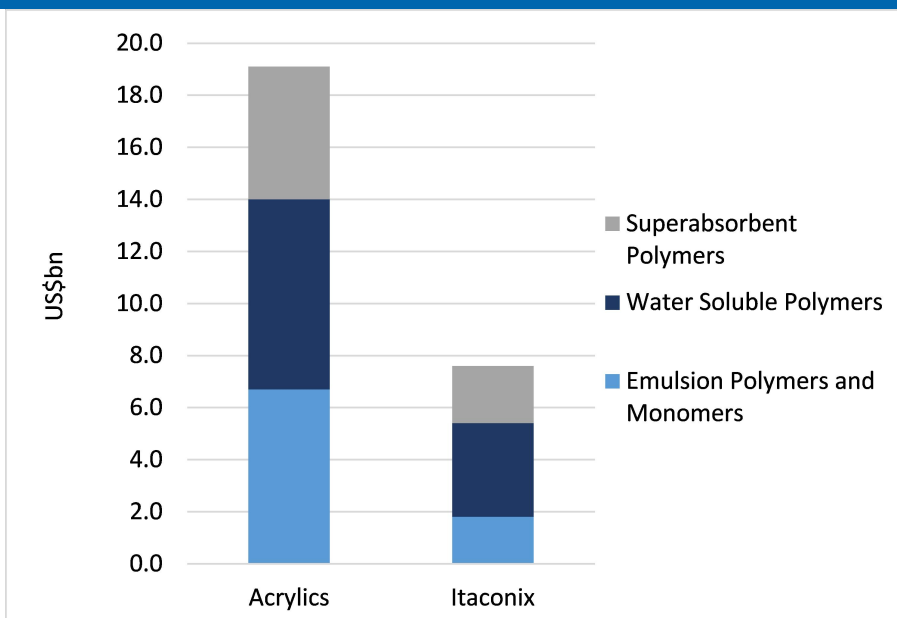
The market opportunity

Itaconix designs and manufactures polymers for use as functional ingredients within products for home care, personal care, and industrial use. The polymers that Itaconix has developed offer advantages in terms of functionality, sustainability, and cost.

Itaconix's proprietary processes, which are protected by multiple layers of patents, build polymers using Itaconic acid. This is an organic acid with similar potential use and functionality as acrylic acid. Rather than being derived from petroleum feedstocks, as is the case with acrylic acid, itaconic acid is produced by large-scale fermentation using corn as a source of sugar. The company has a very flexible tool kit that allows it to produce multiple different polymers that address similar market areas to the ones addressed by acrylic acid. Each new product that is developed can give rise to additional patents, so the lifespan of the intellectual property portfolio can be continuously extended.

The potential addressable market for Itaconix is vast, as illustrated by the following charts and table. As an initial proxy for the addressable market, we consider the current market for acrylic-acid based polymers covering water-soluble polymers, super-absorbents, and emulsion polymers for paints and coatings. Based on the comparative and unique properties of Itaconix polymers versus the acrylic acid market, we estimate a total addressable market for Itaconix products of US\$7.6 billion.

Itaconix addressable market relative to the acrylic acid market



Source: Market sources

We expect Itaconix to extend into additional applications for its current polymers and to expand its product portfolio with new products in key market opportunities

The following table summarises the segments within the addressable market for Itaconic acid derived polymers.

Water Soluble Polymers		Emulsion Polymers and Monomers		Superabsorbent Polymers	
Non-phosphate detergents	\$0.7bn	Paints	\$0.8bn	Personal hygiene	\$1.8bn
Hair & skin care	\$0.5bn	Adhesives & binders	\$0.5bn	Agriculture and Industrial	\$0.4bn
Odor control	\$0.3bn	Packaging	\$0.3bn	Total	\$2.2bn
Water treatment	\$0.8bn	Other	\$0.2bn		
Oil & gas, minerals	\$0.5bn	Total	\$1.8bn		
Agriculture	\$0.5bn				
Construction	\$0.3bn				
Total	\$3.6bn				
Total					
\$7.6bn					

Source: Industry sources

There are three markets that are addressed by existing commercially ready products from Itaconix, and which drive our revenue growth expectations in the next 1-3 years.

Chelant / non-phosphate detergent: Chelants are chemicals that bind calcium ions in water that would otherwise reduce the performance of the active ingredients and limit the performance of detergents and cleaners. This segment has been the first major commercial success for Itaconix.

Hair-care: Polymers are used to give hair styling products their “hold”. Other applications exist in shampoos, conditioners and skin care.

Odour control: Itaconix's polymers can act as odour neutralisers for use in home care, personal care, and industrial or agricultural applications.

We examine these three key product areas individually on pages 5-7. Looking further forward, there are other applications that are in development or still to be developed. It is important to remember that Itaconix's polymerisation process is not just a 'recipe' for a specific polymer, it is a flexible chemistry platform with numerous potential applications.

Given the large addressable market for its products, we expect Itaconix to extend into additional applications for its current polymers and to expand its product portfolio with new products in key market opportunities. Three areas that we highlight are:

Hygiene: Itaconix is recognised in the industry as the leading potential producer of bio-based, biodegradable super-absorbents.

Agriculture: Environmental pressures to improve the application and use of chemicals for crop production are expected to create opportunities for the unique functionality and bio-based content of Itaconix products.

Plastics and coatings: Similar to the above areas, we see emerging opportunities for Itaconix products based on consumer trends across plastics, packaging, and paints.

We expect Itaconix to extend into additional applications for its current polymers and to expand its product portfolio with new products in key market opportunities

Background and progress Itaconix was founded as a private company in the USA, Itaconix Corporation, in 2008. The company became a stock-market listed company on the LSE in 2016, via a merger with the former Revolymer PLC. The company subsequently raised additional capital and signed important new commercial partnerships. The following timeline outlines the key developments in Itaconix's history.

Event	Date
Itaconix Corporation founded by John Shaw and Yvon Durant	September 2008
First commercial sale of Itaconix DSP™ for use in detergents	December 2009
Launch of new products including Itaconix ZINADOR™	2015
Merger with Revolymer PLC	June 2016
Revolymmer PLC renamed Itaconix PLC	March 2017
Collaboration with Croda on malodour applications	January 2017
Joint development framework agreement with Nouryon	January 2017
Application development agreement with Nouryon Chelates	August 2017
Capital raise: £3.2m net	July 2018
John Shaw named group CEO	August 2018
Supply agreement with Nouryon Chelates	January 2019
Supply agreement with Nouryon Surface Chemistry in personal care	February 2019
Source: Capital Network	

In January 2017 Itaconix announced a commercial collaboration with Croda

We consider some of the major developments:

The Revolymer deal

Itaconix Corporation was acquired in June 2016 by Revolymer PLC, a company focussed on gum manufacture. Later the same year, Revolymer sold its gum assets. In this sense, the deal resembles a reverse takeover, with the company changing its name to Itaconix PLC in 2017. In July and August 2018 the company raised additional capital and announced John Shaw, one of the founders of Itaconix Corp, as its new chief executive.

It is important to remember when looking at historic market data or accounting data that the old Revolymer business is no longer part of the parameter. Historic data really relates to a different business.

In August 2017 the company announced a collaboration with Nouryon to develop chelates for the non-phosphate detergent market. Nouryon is the world's number 1 in chelates.

Commercial collaborations

In January 2017 Itaconix announced a commercial collaboration with Croda Inc for the supply and marketing of Itaconix's odour removal additive ZINADOR. Croda is number 2 globally in this market.

In August 2017 the company announced a collaboration with Nouryon to develop chelates for the non-phosphate detergent market. Nouryon is the world's number 1 in chelates.

The reformulation of end-market homecare and personal care products with new ingredients can take two to three years to bring to market due to the product development cycles of the major consumer products companies. The processes that began with the Croda and Nouryon deals are expected to begin affecting revenues in 2019, with a full effect in 2020. We believe that these deals support strong revenue growth in the 2020-2021 timeframe.

Three key product areas for 2019-2021

There are three major current ongoing commercial areas for Itaconix: 1) The Itaconix CHT™ and Itaconix DSP™ products address the non-phosphate dishwasher detergent and other markets for chelants; 2) The Itaconix ZINADOR™ product in the odour control segment; 3) The RevCare™ NE 100S hair styling additive. The following diagram illustrates.

Three key product segments for 2019-2021



Non-phosphate detergents

- North America, Europe
- Emerging markets
- Scaling with Nouryon



Malodour control

- Home care
- Scaling with Croda



Bio-based hair styling

- Pumps, sprays, gels
- Worldwide opportunity
- Scaling with Nouryon

Source: Itaconix plc

This go-to-market strategy has now been applied in the three initial market segments. We expect strong revenue growth in 2019, 2020, 2021 arising from these three categories

Itaconix has followed a consistent strategy for bringing new products to market in each of these segments:

- Identify a commercial need for Itaconix's novel polymers
- Generate initial demand and prove customer value through direct selling
- Partner with a global category leader to create a broad market reach.

The following table summarises the partnerships in each of the three segments:

Product segment	Partnership announced	Partner
Odour control	January 2017	Croda, world number 2 in the segment
Non-phosphate detergents	September 2017	Nouryon, world number 1 in the segment
Hair-care / personal care	February 2019	Nouryon, world number 1 in the segment

Source: Capital Network

This go-to-market strategy has now been applied in the three initial market segments. We expect strong revenue growth in 2019, 2020, 2021 arising from these three categories. Looking further forward, we expect Itaconix to enter other product segments using a similar approach.

We next consider each of the three focus segments.

The automatic dishwashing (ADW) detergent market has been transformed by the ban on phosphate ingredients that has been in place in the US and also in the EU since 2017

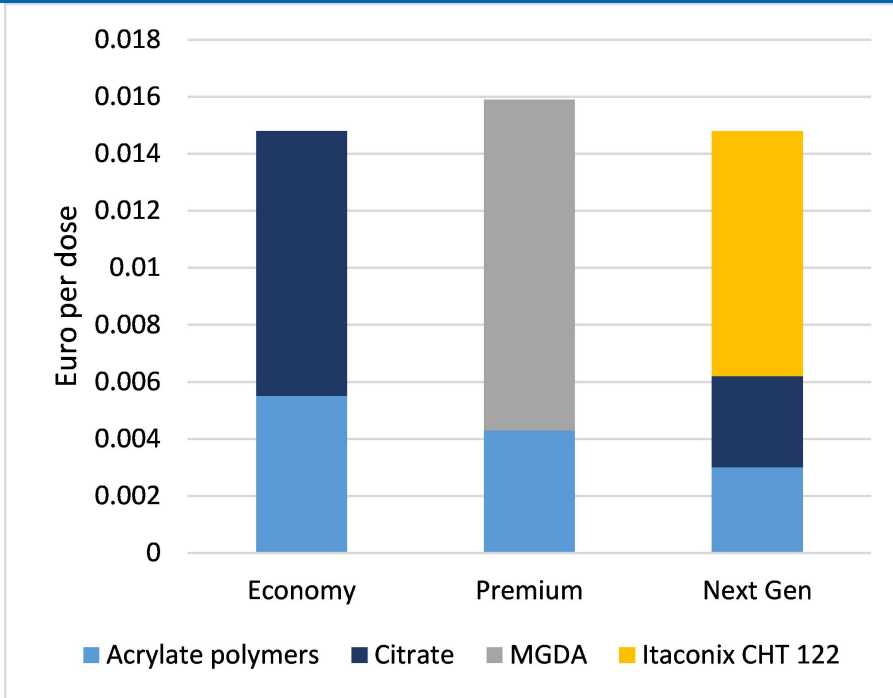
Non-phosphate detergents

Chelants are agents that can bind metal ions in solution. A particularly important application is the use of chelants to bind calcium ions in water, thus maintaining the performance of cleaning agents in detergents and preventing the calcium residues. Chelants are also used in industrial and agricultural applications to prevent calcium scaling.

The automatic dishwashing (ADW) detergent market has been transformed by the ban on phosphate ingredients that has been in place in the US and also in the EU since 2017. Phosphates have previously been used as a chelant and as an anti-scaling agent, but have been shown to leave harmful residues in wastewater. We believe that phosphates are likely to be phased out in other jurisdictions around the world over time.

Since the phosphate ban, the most widely used substitutes have been sodium citrate acid or a formula called MGDA chelate combined with acrylate polymers. Compared to these combinations, the Itaconix CHT™ product offers performance advantages, and also a cost advantage. The following chart shows the relative cost of different ADW detergent combinations.

Cost benefit of Itaconix CHT 122™



Source: Itaconix PLC

We believe that Itaconix CHT™ offers major advantages for use in the next generation of non-phosphate detergents

We believe that Itaconix CHT™ offers major advantages for use in the next generation of non-phosphate detergents in current markets and in future jurisdictions that have not yet phased out phosphates. We believe that the total potential market for Itaconix's current products in the ADW detergent space is currently around US\$135mIn annually and will grow rapidly as areas of the world outside of Europe and North America ban phosphates to protect water supplies.

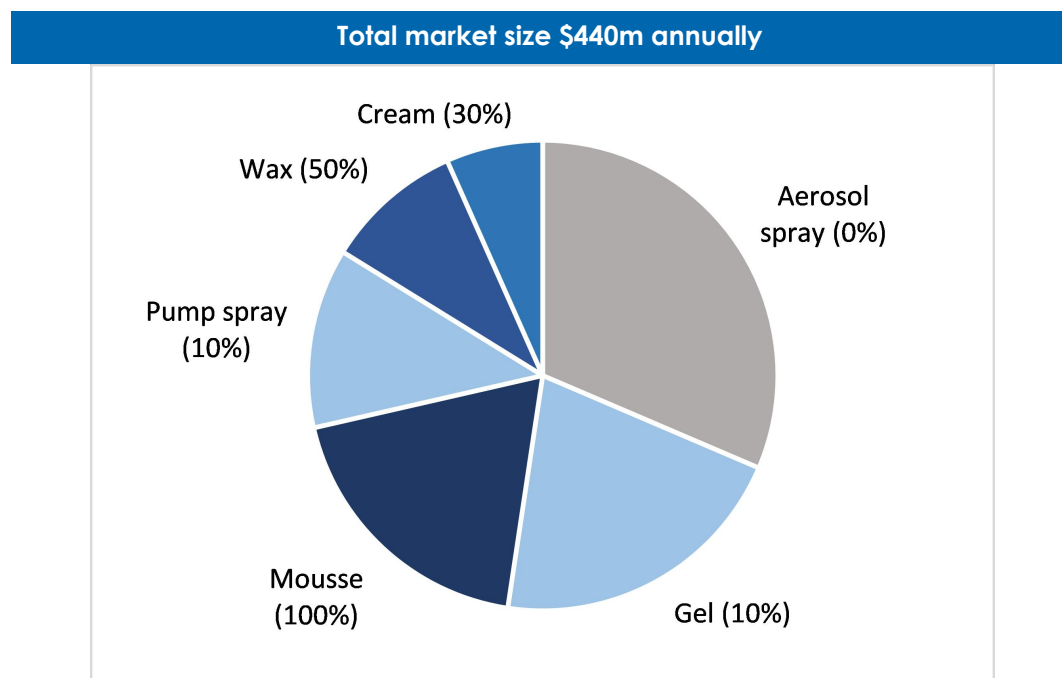
Hair-care

Polymers are used in hairsprays and mousses to give structural support to the hair. Hair-care polymers compete on functional properties such as styling hold, anti-frizz properties, and the tactile quality of the product on hair. The Itaconix RevCare NE product offers various performance advantages, as well as being a bio-based (corn-derived) ingredient in contrast to existing petrochemical based alternatives.

Market leaders in this space include:

- Nouryon, world number 1, which announced a partnership with Itaconix in February 2019
- BASF, world number 2
- Ashland, world number 3

The following chart shows the total market for hair-styling polymers.



Source: Itaconix plc

We estimate that the addressable market for Itaconix currently stands at US\$130m annually

Based on this market breakdown, we estimate that the addressable market for Itaconix currently stands at US\$130m annually. The RevCare NE product already has ongoing revenues through direct sales to consumer brands and distributors in 14 countries.

In February 2019, Itaconix announced a collaboration with Nouryon, the world leader in hair-care polymers. This collaboration covers a range of personal care products including skin care, sun care and cosmetics, with hair-care being the most immediate application. We believe that this collaboration provides affirmation from Nouryon of the competitive qualities of Itaconix's products and a greatly expanded route to market for Itaconix.

Odour control

Itaconix ZINADOR™ (homecare) and RevCare MC (personal care) products are polymer-based odour neutralising ingredients that offer performance advantages compared to existing zinc-based odour control products.

Applications include:

- Air freshener
- Carpet cleaners
- Fabric care
- Surface cleaners
- Pet care
- Aluminium-free underarm deodorant

We believe that this partnership will deliver significant incremental revenues in the 2019-2020 timeframe.

The market for odour control products in the household segment has been transformed over the last decade by a ZINADOR competitor – Fabreze from Proctor & Gamble, which uses cyclodextrins (non-zinc based compounds) to neutralise odours. This has become a US \$1bn (annual revenue) product in its own right, with Fabreze-branded products in air freshening, fabric care, carpet care, pet care and automobile products.

ZINADOR works in a slightly different way to Fabreze but applies the same principal – actively binding to odour causing molecules rather than just masking the odour.

Itaconix formed a collaboration in 2017 with Croda, one of the world leaders in the odour control market, for the global supply and joint marketing of ZINADOR in homecare and industrial applications. We believe that this partnership will deliver significant incremental revenues in the 2019-2020 timeframe.

Itaconix markets its RevCare MC product for odour neutralisation in personal care applications directly and through a worldwide network of distributors.

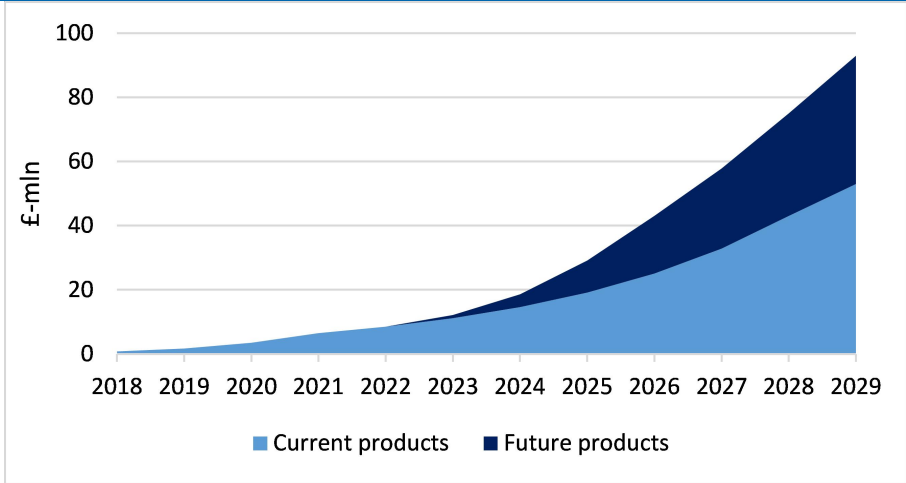
Looking beyond this timeframe, we expect further revenue opportunities arising from additional products in further market segments

Next phase

Itaconix has a development pipeline of products over and above the three current focus areas. A key element of the Itaconix investment thesis is that the company's proprietary polymerisation process is not just a recipe book for a particular set of products, but a chemistry platform that is capable of producing a wide range of polymers.

The three current focus product groups support our revenue forecasts out to 2021, with £6.5mIn of revenue in the full year (FY) to the end of Dec 2020e. Looking beyond this timeframe, we expect further revenue opportunities arising from additional products in further market segments. The following chart illustrates how this revenue trajectory could progress.

Revenue potential for Itaconix



Source: Proactive Research

We believe there is a pathway to revenue growth and positive underlying earnings (EBITDA) by 2021e

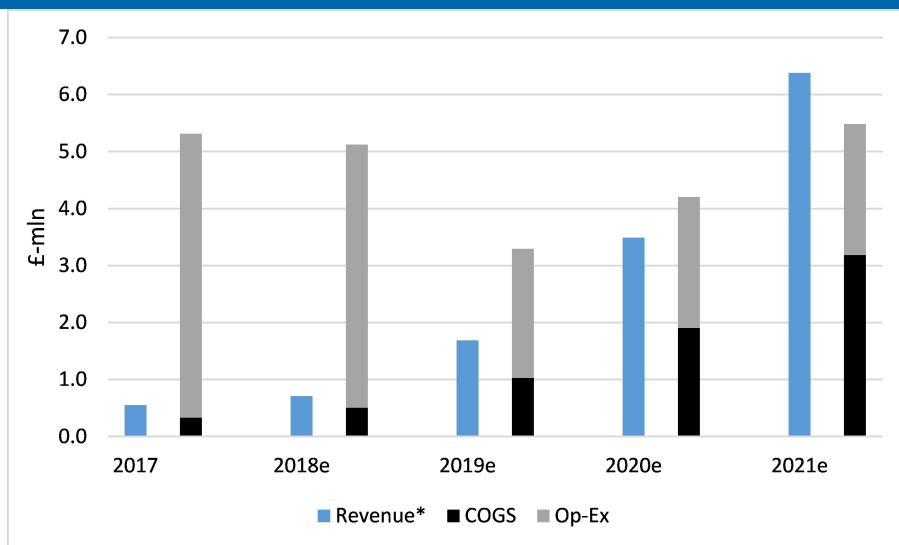
At this stage it is not possible to say which product areas are likely to be the next set of revenue drivers; however, we believe that the first three product categories have demonstrated the pathway to commercialisation:

- Identify a commercial need for Itaconix's novel polymers
- Generate initial demand and prove customer value through direct selling
- Partner with a global category leader to create a broad market reach

Financial outlook

Based on the commercial partnerships in place in the three key product areas, we believe there is a pathway to revenue growth and positive underlying earnings (EBITDA) by 2021e. The following chart shows our forecasts for revenue and costs over the next three years.

Revenue versus COGS and expenses



Source: Proactive Research

We believe that the company can deliver its revenue growth potential without the need to raise further capital

There is a sharp reduction in operating expenses in 2019, which is due to actions already undertaken and in particular the consolidation of operations to the US. In 2020 and 2021 we are forecasting a steady level of operating expenditure, with the cost of goods sold increasing in line with revenues. The improved fixed cost absorption leads to positive EBITDA by 2021e.

Based on these numbers, with Itaconix exceeding break-even in 2021 (EBITDA, net income, and cash flow) we believe that the company can deliver its revenue growth potential without the need to raise further capital – existing balance sheet resources take us through to the break-even point. The company could, however, do a small raise to maintain a safe cash balance.

Valuation

We next consider the market value of Itaconix compared with other high growth potential companies in the speciality chemical / advanced material space.

These companies do not compete in the same product areas as Itaconix, and indeed there are no direct peers; however, the proxies we have chosen here share common characteristics with Itaconix - companies with proprietary new advanced materials with large market potential.

	Technology Platform	Platform Addressable Market	Status	Market Value
Itaconix	Polymers from itaconic acid	US\$7.6bn	Listed, very early revenues	US\$8.7m
Allylix	Yeast-based process for flavours, fragrances and other	US\$110m immediately addressable, US\$15bn market	Acquired 2014. Pre-revenue	US\$59m
Ecosynthetix	Formaldehyde-free alternative for wood binding	US\$15bn wood resin market	Listed, revenue generating	US\$90m
Kraig Biocraft Laboratories	Synthetic spider silk	US\$5bn protective clothing/armor market	Listed, minimal revenue	US\$52m
Directa Plus	Graphene	Uncharted	Listed, very early revenues	US\$41m
First Graphene limited	Graphene	Uncharted	Listed, very early revenues	US\$48m

Source: Capital Network

We believe that the current valuation of Itaconix leaves significant upside.

We argue that the market values these types of companies relative to their addressable market size, rather than on a one-year or two-year forward revenue multiple. On this basis, we believe that the current valuation of Itaconix leaves significant upside.

Forecasts

The following tables include our forecasts for Itaconix profit & loss (P&L), balance sheet, and cash flow.

P&L

y/e Dec31, £k	2017	2018e	2019e	2020e	2021e
Revenue	553	710	1690	3490	6380
Cost of sales	-332	-505	-1,030	-1,905	-3,185
Gross profit	221	205	660	1,585	3,195
Other income	112	100	100	100	100
Operating expense (ex. D&A)	-4,981	-4,620	-2,265	-2,300	-2,300
EBITDA	-4,648	-4,315	-1,505	-615	995
Depreciation and amortisation	-526	-400	-400	-400	-400
EBIT	-5,174	-4,715	-1,905	-1,015	595
Finance income	1	0	0	0	0
Impairments etc.	-6,481	0	0	0	0
Associates	-214	0	0	0	0
PBT	-11,868	-4,715	-1,905	-1,015	595
Tax effect	1,694	0	0	0	0
Net Income (continuing ops)	-10,174	-4,715	-1,905	-1,015	595
Net income (discontinued)	33	0	0	0	0
Net income	-10,141	-4,715	-1,905	-1,015	595
Weighted share count (fully dil.) ,000s	78,715	170,000	269,130	269,130	269,130
Diluted EPS	-12.9	-2.8	-0.7	-0.4	0.2
Diluted EPS from continuing ops	-12.9	-2.8	-0.7	-0.4	0.2

Source: Capital Network

Balance Sheet

y/e Dec31, £k	2017	2018e	2019e	2020e	2021e
Non-current assets					
PPE	980	780	690	670	520
Intangibles	0	0	0	0	0
Associates	0	0	0	0	0
Total	980	780	690	670	520
Current assets					
Inventories	271	400	600	700	800
Receivables	706	1,000	2,000	2,600	3,200
Investments	0	0			
Cash & equivalents	3,606	2,242	588	125	1,273
Total	4,583	3,642	3,188	3,425	5,273
Total assets	5,563	4,422	3,878	4,095	5,793
Non-current liabilities					
Provisions	607	607	607	607	607
Deferred tax	0	0	0	0	0
Loans				0	0
Total	607	607	607	607	607
Current liabilities					
Payables	986	1,200	2,400	3,400	4,400
Total liabilities	1,593	1,807	3,007	4,007	5,007
NAV	3,970	2,615	871	88	786
Equity capital					
Equity capital	787	787	787	787	787
Equity premium + reserves	56,260	56,866	59,781	60,013	60,116
Retained earnings	-53,077	-57,792	-59,697	-60,712	-60,117
Total equity	3,970	2,615	871	88	786
Net cash (debt)	3,606	2,242	588	125	1,273

Source: Capital Network

Cashflow

y/e Dec31, £k	2017	2018e	2019e	2020e	2021e
Operating loss	-5,174	-4,715	-1,905	-1,015	595
Depreciation	259	400	400	400	400
Amortisation and impairment	267	0	0	0	0
FX loss	-83	0	0	0	0
Share based payments (credits)	184	100	100	100	100
Tax	500	0	0	0	0
Gross operating cashflow	-4,047	-4,215	-1,405	-515	1,095
WC movements:					
Inventories	-61	-129	-200	-100	-100
Receivables	18	-294	-1,000	-600	-600
Payables	-569	214	1,200	1,000	1,000
Net cashflow from operations	-4,659	-4,424	-1,404	-213	1,398
Interest	1	60			
Capex	-436	-200	-250	-250	-250
Acquisitions	0				
Investment in associates	-60				
Funds withdrawn from term deposits					
Loans drawn					
Cash from investing	-495	-140	-250	-250	-250
Cash loaned to associates	-45	0			
Net proceeds of equity issuance	16	3,200			
Cash from financing	-29	3,200			
Net cash inflow (outflow)	-5,183	-1,364	-1,654	-463	1,148

Source: Capital Network

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