

Thin Film Electronics

Q315 results

Milestones adding up

Thinfilm has reported Q315 results showing a 3.5% q-o-q decline in revenues and a 19.3% q-o-q increase in operating losses, mainly due to lumpy grant revenues and rising external development costs resulting from the ramp-up of production capacity. The key milestones during the quarter were Xerox's announcement of the launch of Thinfilm labels, the placing of a pilot order by Diageo, and Ypsomed announcing its intention to use NFC OpenSense in autoinjectables. We see the potential for news of further new order inflows, progress in capacity expansion and in product development to further increase interest in the stock in coming quarters.

| Year end | Revenue (\$m) | PBT* (\$m) | EPS* (c) | DPS (c) | EV/Sales (x) | Yield (%) |
|----------|---------------|------------|----------|---------|--------------|-----------|
| 12/13 | 1.9 | (10.4) | (2.5) | 0.0 | 103.3 | N/A |
| 12/14 | 4.5 | (24.2) | (4.9) | 0.0 | 46.5 | N/A |
| 12/15e | 4.0 | (28.0) | (5.2) | 0.0 | 56.7 | N/A |
| 12/16e | 13.2 | (32.5) | (5.9) | 0.0 | 20.5 | N/A |

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

Q3 results affected by increased development costs

The 3.5% q-o-q revenue decline and 19.3% q-o-q increase in operating losses reported by Thinfilm in Q315 reflected lumpy grant revenues and the need to spend more on external development costs in gearing up to volume production. During the quarter, largely due to increased capex and higher EBIT losses, cash burn was \$9.5m before FX effects, not far off the \$8.4m of Q2, leaving net cash of \$24.6m. As a result of the longer than expected gap between pilot and first volume orders for Thinfilm's key products (EAS and NFC OpenSense) and the above mentioned higher than expected development costs, we have increased our forecast normalised losses per share for 2015 and 2016 by 2.7% and 24.6%, respectively.

Dynamic growth expected in coming quarters

Over the next six months we see strong prospects for substantial order inflows, particularly from giants Diageo and Nedap. Xerox will also start production of Thinfilm memory products under licence in Q116. Based on our assumption that Thinfilm will complete the total \$17.5m investment required to increase its production capacity to 120m OpenSense equivalents by the end of this year, we believe that Thinfilm's existing funding will be sufficient to take it into Q216.

Valuation: All about the next three years

Thinfilm has shown the ability to enter into licensing (Xerox) and large-scale sales agreements (Nedap), and has a very prospective pipeline (Diageo, Ypsomed, Australian wines). We see the main driver of value for the company as its ability to monetise these developments and its promising portfolio of technologies. Our DCF model gives rise to a valuation of NOK6.7 per share (previously NOK9.0). This is based on our forecast 76% CAGR in revenue to 2025, a terminal EBITDA margin of 28% (peak of 34% in 2020), terminal EBITDA growth of 3% and a WACC of 15%.

Tech hardware & equipment

30 November 2015

Price **NOK3.75**

Market cap **NOK2,082m**

NOK8.668:US\$1

Net cash (\$m) at 30 September 2015 24.6

Shares in issue 555.3m

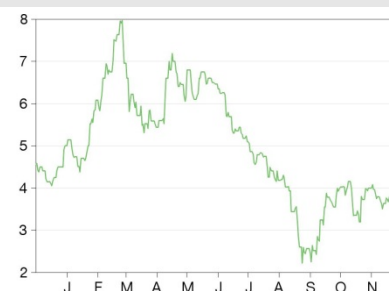
Free float 73.7%

Code THIN

Primary exchange Oslo

Secondary exchange N/A

Share price performance



% 1m 3m 12m

Abs (5.8) 53.7 (17.2)

Rel (local) (6.6) 45.6 (18.5)

52-week high/low NOK8.0 NOK2.2

Business description

Thin Film Electronics (Thinfilm) commercialises printed electronics and owns key patents for printing rewritable, non-volatile memory and printable NFC circuits. It also licenses technology from others to develop complete printed systems.

Next events

Q415 results 26 February 2016

Analysts

Anna Bossong +44 (0)20 3077 5737

Dan Ridsdale +44 (0)20 3077 5729

tmt@edisongroup.com

[Edison profile page](#)

Review of Q315 results

In Q315, Thinfilm reported a 3.5% q-o-q decline in revenue to \$1.0m and a 15.3% q-o-q increase in operating costs to \$8.9m, leading to a 19.3% q-o-q increase in operating loss to \$8.3m. Revenues were 21% lower than our forecast, while the operating loss was 15% greater than expected, principally due to lower than expected EAS (electronic article surveillance) production, faster than expected contraction in grant revenues and a sharp increase in external development costs.

We had forecast sales revenues to reach \$640,000 in Q3 on the assumption that Thinfilm would increase production of EAS labels from 4.5m units in Q2 to 5.0m units in Q3 to complete 10.5m of the total 13m unit order from Nedap. We envisaged that this would leave production capacity free for follow-on orders from Nedap in Q4, which management was/is negotiating. However, no new orders from Nedap materialised and EAS production was reduced to 3.4m, affecting our revenue expectation by c \$102,000, based on our unit price estimate of 6.4c.

Similarly, our forecast for NFC OpenSense revenues was affected by the production of pilot units for Ferngrove in the third quarter being aggregated for delivery in Q4. The delay in this revenue recognition reduced sales revenue versus our forecast by \$20,000. Removing these items totalling \$122,000 from our forecast, Thinfilm's sales revenues would have been 5% below expectations, reflecting the weaker than expected trend in technology access fees.

Exhibit 1: Interim results summary

| US\$000s | 9M15 | 9M14 | Change (%) | Q315 | Q215 | Change (% q-o-q) | Q315e | Q314 | Q115 |
|---|-----------------|-----------------|---------------|----------------|----------------|------------------|----------------|----------------|----------------|
| Sales revenue | 1,225 | 1,334 | (8.2) | 494 | 478 | 3.3 | 640 | 578 | 253 |
| Other Operating revenue | 1,306 | 1,454 | (10.2) | 434 | 492 | (11.8) | 556 | 709 | 380 |
| Other Income | 283 | 501 | (43.5) | 111 | 107 | 3.7 | 112 | (7) | 65 |
| Total revenue | 2,814 | 3,289 | (14.5) | 1,039 | 1,077 | (3.5) | 1,308 | 1,280 | 698 |
| Payroll | (12,072) | (9,835) | 22.7 | (4,051) | (3,797) | 6.7 | (4,167) | (2,691) | (4,224) |
| Share-based payments | (588) | (308) | 90.9 | (195) | (352) | (44.6) | (313) | (505) | (41) |
| Premises, supplies | (4,875) | (3,658) | 33.3 | (1,930) | (1,557) | 24.0 | (1,700) | (1,321) | (1,388) |
| Other operating costs | (6,270) | (6,536) | (4.1) | (2,749) | (2,032) | 35.3 | (2,010) | (2,514) | (1,489) |
| Total operating costs | (23,805) | (20,337) | 17.1 | (8,925) | (7,738) | 15.3 | (8,190) | (7,031) | (7,142) |
| D&A | (1,079) | (927) | 16.4 | (427) | (308) | 38.6 | (354) | (351) | (344) |
| Reported operating profit | (22,070) | (17,974) | 22.8 | (8,313) | (6,969) | 19.3 | (7,236) | (6,102) | (6,788) |
| Net financial items | 2,038 | 568 | 258.8 | 1,925 | 53 | 3,532.1 | 58 | 158 | 60 |
| PBT | (20,032) | (17,406) | 15.1 | (6,388) | (6,916) | (7.6) | (7,178) | (5,944) | (6,728) |
| Tax | 0 | 0 | N/A | 0 | 0 | N/A | 0 | 0 | 0 |
| Profit for the period | (20,032) | (17,406) | 15.1 | (6,388) | (6,916) | (7.6) | (7,178) | (5,944) | (6,728) |
| Normalised profit for the period | (19,444) | (17,098) | 13.7 | (6,193) | (6,564) | (5.7) | (6,865) | (5,439) | (6,687) |
| Normalised loss per share | 0.036 | 0.036 | 0.8 | 0.011 | 0.012 | (8.5) | 0.012 | 0.011 | 0.013 |
| Net cash | 24,622 | 19,915 | 23.6 | 24,622 | 36,291 | (32.2) | 29,659 | 19,915 | 23,542 |
| Cash flow from operations | (18,257) | (18,844) | (3.1) | (6,146) | (6,817) | (9.8) | (6,633) | (6,067) | (5,294) |
| Purchase of PPE | (4,909) | (2,904) | 69.0 | (3,413) | (1,055) | 223.5 | 0 | 0 | (442) |

Source: Thinfilm, Edison Investment Research

Other operating revenue, which is primarily grant revenues, also fell by a greater than expected 11.8% q-o-q to \$434,000, but other income, primarily rental income from the San Jose site, was broadly stable. Grant revenues should improve in the coming quarters with the inclusion of an estimated \$88,000 per quarter from the \$350,000 FlexTech Alliance funding, announced in mid-August. We had expected a contribution from this funding in the Q3 numbers, but the numbers are affected by activity undertaken in the project, which we understand was low in Q3.

Operating costs were increased by \$1.8m in service costs in Q3. This figure was \$1.9m in Q314, but had declined to a quarterly average of \$0.8m in H115, as the company carried out more research in house (a major part of the cost in 2014). We understand that the sharp increase reflected some lumpy payments to external development projects, as well as increased

engagement of industry-specific and packaging consultants to aid the production side of the business.

The net loss was significantly reduced by \$1.9m in net financial income, principally currency effects from the strong US\$/NOK.

Net cash fell \$11.7m to \$24.6m by the end of Q3, affected by increased capex of \$3.4m (Q314: \$0m), widening EBIT losses of \$8.3m and the impact of the strong dollar on the value of NOK cash balances of \$2.1m. On our current forecasts, we expect Thinfilm's existing funding will be sufficient to take it into Q216.

Activity update: Outlook by product

NFC OpenSense

The proposition: Anti-counterfeiting and direct consumer communication

NFC OpenSense is an anti-counterfeiting label, which contains a unique encrypted ID and information as to whether the product has been opened. By tapping the label with an NFC-enabled smartphone, the consumer is connected to the website of the retailer and is able to determine whether the product is genuine, as well as if it has been opened or tampered with. This is an important point, as until the advent of NFC-enabled labels, such as NFC OpenSense, consumers had not been given the means to definitively verify whether a product was authentic.

At the same time, the near field communication (NFC) interconnectivity in the label enables it to communicate with potential/actual customers, both in store and at home. When the label is tapped, geolocation and opt-in information about the consumer is also passed on to the brand owner. In turn, the consumer can be provided with information such as the brand's history and tips and advice on the best way to enjoy the product. It can also encourage users to go online for more information and as a platform for cross-selling.

It is worth noting that the number of NFC-enabled smart phones is growing rapidly and already exceeds 1bn globally. With Apple recently joining the NFC forum, NFC-enabled phones are likely to be standard in coming years.

The advantages of the anti-counterfeiting aspect of the product are significant. The International Federation of Spirits Producers estimates that 30% of global alcoholic beverages are counterfeit, while the Coalition Against Illicit Trade has stated that 12% of cigarette sales are counterfeit, costing governments €40bn pa. Efforts by producers to prevent this problem include adding invisible sugar dyes to spirits, which can be picked up with litmus tests, using hologram labels that are difficult to copy and anti-refill closures to make it harder to top up empty bottles.

These problems are particularly acute in emerging markets and most particularly China, where counterfeiting expert Nick Bartman has estimated that up to 70% of alcohol sold in 2013 was counterfeit. The problem of fake pharmaceutical products is also a matter of significant public concern, particularly in emerging markets, but also in western markets where drugs are increasingly sold over the internet.

NFC OpenSense was launched in February 2015 and so far Thinfilm has announced pilot projects with a Chinese-owned wine producer, Ferngrove, and Diageo, the global leader in alcoholic beverages.

Ypsomed, a producer of auto-injectables, also this month announced a co-operation agreement with Thinfilm to create self-injectable devices fitted with NFC OpenSense tags. These provide patients with information on how to use the devices, as well as confirmation for them and their

doctors that the device has been used as prescribed and that its contents have not been tampered with.

Thinfilm is also in discussions with more than a dozen Forbes 2000 companies about incorporating NFC OpenSense into their products. These organisations cover a range of verticals including cosmetics, pharma, tobacco, the drinks industry and other high-volume consumer packaged goods.

The big picture

Thinfilm is looking at a selling price for NFC OpenSense of 30-50c, which at the mid-point represents less than 1% of the selling price for products priced over \$40 and 0.2% for products above \$200. Thinfilm believes that there are multiple 50-100m unit opportunities in branded products. We see the key ROI inputs for potential purchasers as:

- the value of the product;
- sales losses and/or consumer dangers caused by counterfeiting;
- the potential uplift in sales arising from increased consumer confidence in the product (ie the perception of counterfeiting);
- the value-added of the communication/compliance features of the NFC functionality; and
- the ability to reduce tax losses.

As such, we believe the strongest initial demand will come from:

- **producers of luxury goods**, where the tags are a small percentage of the product's retail price. Taking the Diageo example, Johnnie Walker Blue Label whisky retails at more than \$260 a litre, which means the tag represents less than 0.2% of the retail price. Luxury spirits are one of the fastest growing areas of the alcoholic beverage market and their typically high net worth/high disposable income customer bases present attractive marketing targets, which can be difficult to reach via normal channels.
- **producers of luxury spirits and other premium goods aimed at the Chinese market:** as mentioned above, counterfeiting is considered to be rife in China across all products. In addition to purchases in China, according to Bain & Co research, currently some 70% of luxury goods, concentrated in leather goods, cosmetics, watches and jewellery, are bought directly by the Chinese from abroad, which we would attribute in part to concerns by domestic consumers about the authenticity of products bought on the mainland. In addition to the obvious benefit of recovery of the market share lost to counterfeiters, we would expect additional demand to come from an effective anti-counterfeiting tool that can be authenticated not just by the retailer but also directly by the consumer.

As well as helping to overcome consumer scepticism about the quality of the goods on offer, we would expect NFC OpenSense to generate considerable value-added in enabling producers to educate and inform consumers unfamiliar with, and therefore potentially unwilling to buy, products such as premium western spirits and wines. With Android phones leading the way in NFC capability, it is also worth noting the high level of Android phone penetration in China.

The potential in the Chinese alcoholic beverage market is significant. According to International Wine and Spirits Research (IWSR) research from 2014, China was:

- the largest red wine market worldwide;
- the fifth largest producer of wine worldwide in 2012;
- the fifth largest wine market in the world for still, light and sparkling wines;
- the largest spirits market in the world; and
- the second largest cognac market worldwide (after the US).

In 2014, imports of wine to China rose 3% to 32m cases, or 384m bottles, and domestic wine production reached 119m cases (1.4bn bottles), giving rise to total production of 1.8bn bottles.

According to research undertaken by IWSR on behalf of VinExpo, China consumes 40% of world production of spirits. Taking into account China's 19% share of the global population, this indicates twice the average spirits consumption. Spirits sales in 2012 totalled 1,201m nine-litre cases, representing 14.4bn 750ml bottles. This is potentially a higher number than 2015 sales as during 2013 and 2014 demand for wine and spirits was adversely affected by the Chinese government's anti-extravagance campaign. Nevertheless, Euromoney's research forecasts 7% CAGR over the five years to 2019, so we see these data as a reasonable proxy for likely demand over the next two to three years.

Exhibit 2: Chinese wine and spirits consumption

| | Bottles (m) | Cases (m) |
|-------------------------|-------------|-----------|
| Wine imports | 384 | 32 |
| Domestic production | 1,428 | 119 |
| Total wine consumption* | 1,812 | 151 |
| Spirits consumption** | 14,412 | 1,201 |

Source: IWSR. Note: *2014. **2012.

As such, we believe the strongest initial demand will come from:

- **pharmaceutical and cosmetics companies**, particularly those with high levels of sales direct to the public (where there are concerns about product authenticity) or where there is value added potential from the NFC functionality, be it with information and marketing or patient compliance, such as Ypsomed.
- **customs bodies charged with countering tax losses from counterfeiting**: in May the World Customs Organization (the body overseeing customs regulations governing trade, which also co-ordinates and advises governments on customs matters) announced that it had formed a partnership with Thinfilm to utilise NFC OpenSense products in its armoury of anti-counterfeiting tools – the only NFC platform on its global platform. One potential use includes incorporation in tax stamps for assessing the tax paid on shipments passing borders.

Diageo pilot

The Diageo pilot could lead to substantial orders

For Thinfilm's NFC OpenSense product, we believe it is difficult to overstate the importance of Diageo's interest, even though there are other Thinfilm customers who may be faster to market. Diageo recently announced a pilot programme for NFC OpenSense on its Johnnie Walker whisky brand. In our view, the key to this choice is that Johnnie Walker whisky, particularly its Blue and Black label brands, is high value, selling for c \$260 and \$50 per litre respectively, and therefore a prime target for counterfeiters. Additionally, the brand is highly exposed to sales to emerging markets, where counterfeiting is typically less well policed, with 70% of its sales in these regions. If the pilot is successful, we believe that the first market in which Diageo is likely to want to implement the product is China, given the prevalence of counterfeiting.

Diageo does not publish brand volume data. We nevertheless estimate that Diageo has annual sales of c 9.8m bottles pa of Johnnie Walker brand whisky in China, the mid-point of our estimated range of 7.8-11.8m. This estimate rests on the assumption that JW brand sales are a similar proportion of overall sales in China as they are in Diageo's emerging markets as a whole. We believe this is conservative given the overall size of spirits consumption in China as indicated by the data from IWSR discussed above.

To derive this estimate we have employed data from Statista of total Johnnie Walker sales of more than 20.1m 9 litre cases (equivalent to 241m 750ml bottles) in 2013, together with Diageo's reports that China represents 2-3% of its global sales in FY15 and that Diageo sells close to 70% of Johnnie Walker in emerging markets (ie c 170m bottles), which in turn constitutes 43% of Diageo's global sales.

Of course, JW is not the only valuable brand in Diageo's stable. Diageo has a number of other premium spirits in its brand stable, such as Smirnoff Black Label Vodka, which is similar in price to the JW Black Label product. We believe it is logical to expect Diageo to add NFC OpenSense to these products if it is used on the JW Black Label brand.

Outlook and projections

At present our 2016 forecasts focus most strongly on the prospects arising from the two current field trials by Diageo and Ferngrove. We currently assume that the pilot programme for **Ferngrove** winery is completed successfully and that the seven-digit unit order (spread over three years), which is conditional on the successful pilot commencing in early 2016 (in our previous forecasts we assumed it would commence in Q415). We have assumed that this order is for an annual 700,000 labels, reflecting the approximate volume of Ferngrove's annual sales into the Chinese market.

As mentioned above, we believe the Diageo pilot for NFC OpenSense on its Johnnie Walker brand whisky has strong prospects. We have incorporated into our model the assumption that the five-digit (we assume 50,000 unit) **Diageo** pilot programme for NFC OpenSense will run until mid-2016. We have also assumed that it will be followed in mid-2016 by an order for 9.8m units pa of the product for deployment across the complete Johnnie Walker whisky range in China, and a further 2.8m pa for deployment across the Blue Label JW brand in the rest of the emerging markets.

We also assume that another spirits or pharmaceutical manufacturer places an order for a further 8m units in Q316 following a pilot programme in H116. In total, we forecast orders from the above sources to generate demand for 10.3m units in 2016, including Ferngrove, leading to a revenue contribution of \$4.1m (at a price of 40c/unit). This is after estimated revenues of \$54,000 in 2015, based on pilot projects for Diageo and Ferngrove.

It is worth noting that our revenue forecasts for 2016 do not assume any orders outside those mentioned above, ie Diageo, Ferngrove and 2m units from an as yet unknown additional beverage or pharmaceutical producer. We could well imagine circumstances in which these orders could be boosted to much higher levels from mid-2016, assuming that new customers commence pilot programmes in the coming months.

In preparation for an increase in sales volumes, management is on track to increase capacity of its NFC OpenSense/EAS/Sensor label front-end production line from 28m to 44m units in Q116. During next year the company also intends to make the decision on whether to invest in a roll-to-roll plant, which would have capacity of 1bn OpenSense equivalent labels pa (+/-15%).

We believe it most likely that the largest product orders will come in around mid-2016 with the conclusion of the Diageo field trial and those of other potential new customers. Nevertheless, we calculate that if the company uses all its spare capacity for production of NFC OpenSense from the start of the year, it could enable production of an additional 16m units above our current sales forecasts for 2016, assuming that the increase in capacity from 28m to 44m OpenSense-equivalent units comes on stream at the end of Q116. It should be noted that the company plans to assess product demand in H216 and potentially increase capacity for a second time, via further de-bottlenecking, to 120m units. In keeping with our demand assumptions we believe that Thinfilm will undertake this capacity increase at end-2016.

In these circumstances, extra potential revenue generation could reach \$6.4m (based on 40c per label), if demand is sufficiently in excess of our current forecasts and either materialises earlier in the year than we currently forecast, or if management is prepared to stockpile the product ahead of gaining orders.

Management estimates the likely gross margin on NFC OpenSense production at c 50%. We have assumed a 45% margin after material costs for the purposes of our forecasts, which implies a contribution to revenues based on our sales forecasts after material costs of c \$1.2m in 2016.

Prospects: we see strong potential for a rapid increase in product sales over the next three to five years. In Chinese beverages alone, if NFC OpenSense can capture 10% of exports of wine to China, helped by its growing links with the Australian wine industry (the second largest wine exporter to China), this would translate into 38m in annual label production. Extending this to 5% of the total Chinese wine market would represent a total of 91m labels. A 2% share of the spirits market would represent sales of 288m labels (worth c \$115m in sales at 40c per label).

We expect an increasing number of pilot programmes to take place over the next 12 months in pharmaceutical products and medical devices, and in the customs field the agreement with the World Customs Organization has the potential to lead to high-volume orders if exporters are required to affix the NFC OpenSense labels to high-volume goods.

The take-up arising from demand for the NFC- related marketing communication advantages of the labels is harder to predict but, with fast-moving consumer goods a realistic target of the company, this would suggest potential order sizes of 50-100m labels.

EAS

The proposition: Flexible, reliable and cost-saving, anti-theft protection

Thinfilm's EAS label is one of its key products based on its memory label tag technology and is used by retailers to alert them if the products are taken out of the store before payment. The labels can be encoded and installed in the production stage and have the following advantages over traditional RFID tags:

- they can be incorporated in a garment at the production stage rather than having to be added in store by more highly paid shop staff;
- they can be permanently switched off in the store, removing accidental reactivation problems that can beset RFID tags and cause privacy concern to consumers; and
- as they are flat and printed on flexible plastic, they can be incorporated "invisibly" in garments and footwear and it is not necessary for them to be removed after purchase.

Outlook and projections

This quarter Thinfilm should complete the last tranche of the first major order for its EAS tags, a 13m unit order placed by Nedap Identification Systems, a specialist in electronic ID and access. Thinfilm has shipped 8.9m units under this order over the first three quarters of the year. The product has been incorporated into shoes, with the first shoes being sold in the stores of Nedap's customers in October. Thinfilm is currently negotiating follow-on orders with Nedap, which is looking to expand authorisation to deploy Thinfilm EAS tags in women's apparel and denim items, encompassing annual sales by their customers of more than 100m units.

We see good potential for these orders to materialise, assuming the current in-store trials are successful, but now assume that they will not be placed soon enough for there to be a material impact on Q4 sales; we had previously assumed that 3m units would be included in FY15 sales.

Given that we consider it likely but not certain that Nedap will place annual orders of up to 100m in this quarter or next (management guides for 100m aggregate orders by end 2016), we have maintained our forecast of 46m units of EAS production in 2016. We see good prospects for further order inflow from fashion retailers outside Nedap's customer base now that the product is in active use.

We have assumed that Thinfilm sells its EAS labels for 6.4c each in 2016, compared with management guidance of 6-10c, giving rise to estimated revenues of \$2.9m in 2016 after an estimated \$0.8m in 2015. We assume a margin after material costs of 22% on EAS products, resulting in a \$0.6m contribution to revenues after material costs.

Prospects: with worldwide apparel production at 80bn units according to Apparel Market, if Nedap's trials are successful, we think it would be realistic for Thinfilm to target sales of 400-800m labels pa in two to three years based on it reaching a 0.5-1.0% market share. Assuming a sales price of 6c per label, this represents sales of \$24-48m.

Sensor labels

The proposition: High-tech sensors for less

Thinfilm is developing a range of sensor labels, which will initially be aimed at the temperature measurement market, but eventually may be expanded to measure wetness, humidity, alcohol, bad breath, Ph, light, strain, CO, CO₂, H₂S, ozone, cholesterol, glucose and other health diagnostics.

The company is likely to initially target its sensor labels at the temperature measurement market. The estimated \$1.4bn market is a key part of the requirement on producers and retailers to ensure they do not sell goods that have been spoiled by being stored outside their safe temperature range. The market is currently served for bulk purposes by chemical tags that change colour when a certain temperature is breached and, at the higher-quality end, by silicon-based electronic indicators.

Thinfilm intends that its range will have the following advantages:

- similar quality as the silicon-chip based tags in simpler applications (as there are some potential differences in functionality and performance in the higher-end products), but at around half the price, helped by the lower cost of using printed electronics over silicon chips;
- superior precision and ease of readability to chemical tags, but at about the same price;
- faster processing by retailing staff, with the addition of NFC-enabled chips to enable the retailer and consumer to see if a product has been exposed to unsafe temperatures by touching a smartphone to the tag; and
- the incorporation of printed batteries using Imprint Energy technology with the benefit of having 60-70% lower production costs and being much more environmentally friendly.

The initial target market for these temperature labels is producers of foods and temperature-sensitive drugs such as vaccines. As Thinfilm adds other labels, its market is likely to widen out to a broad range of industries including hospitals and clinics, diagnostics, building safety and compliance.

Outlook and projections

Thinfilm has encountered problems in bringing its sensor labels to the market, principally due to the complexity of the back-end process of putting the components together, a reflection of the significant complexity and breadth of the product range. Thinfilm has been working with Temptime, a specialist in time-temperature indicators, to perfect its products and bring them to market. Management has worked continuously on resolving these back-end problems and has continued to work with Temptime in the development of its labels. In the Q3 results management reported that it expects to announce progress on this issue in Q415 or Q116.

We have pushed back our assumption of initial production in Q415 to a Q216 production start, in line with our assumption that a positive announcement will be made in Q116. At that stage, assuming the production problems have been resolved, we see potential for several pilot programmes to be launched based on Thinfilm's reported strong interest from the food and pharmaceutical industry. We have assumed pilot trial sales of the standard sensor and NFC-enabled units of 100,000 each in 2016 at an average unit price of \$1 and \$1.5, respectively.

Prospects: Thinfilm's work with Temptime and Imprint Technology should enable it to produce an attractive product for bulk applications. If it can secure a 0.5-1% market share in the medium term, this would imply potential a sales target of \$7-14m.

Brand protection/Xerox

The proposition: Smart consumables and brand protection

Xerox is advanced in its plans to commence production of Thinfilm memory labels under licence from the start of 2016. The company will produce them in two variants: one with and one without the addition of its own patented encryption technology. Xerox has indicated that it is anticipating producing up to 1.3bn of these labels pa. The product is anticipated to be used in a wide variety of products, including on pharmaceuticals and in tax stamps to verify authenticity. The read-writeable labels are also expected to contain information on the history of the product, for example whether it passed through the hands of authorised distributors.

Outlook and projections

We have assumed initial unit sales of 206m labels in 2016, rising to 470m in 2017 and 1.1bn in 2018. This gives rise to revenues of \$1.2m in FY16e, which assume that the Thinfilm component of the label is sold for an average of 5c/unit (management guidance 4-10c) with Thinfilm generating an assumed a licence fee on this sum of 12% in 2016.

Prospects: if Xerox unit sales reach 1.3bn, applying the 11% licence fee to management guidance on the selling price range would give rise to potential licence fee income of \$5.7-14.3m, which should drop straight down to the operating profit line.

Balance sheet

During the third quarter net cash balances fell \$11.7m to \$24.6m. This was due to higher EBIT losses of \$8.3m, as discussed above, \$3.4m in capex (Q314: zero) as the company invested in the expanded of its production facilities, and the stronger dollar.

Exhibit 3: Cash flow/balance sheet summary

| US\$000s | Q314 | Q414 | Q115 | Q215 | Q315 | Q415e | 2014 | 2015e | 2016e |
|--|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|
| Cash flow summary | | | | | | | | | |
| Operating profit (loss) | (6,102) | (7,822) | (6,788) | (6,969) | (8,313) | (8,984) | (25,796) | (31,054) | (33,400) |
| Decrease (increase) in working capital | (775) | 1,632 | 725 | (549) | 1,276 | (513) | (1,492) | 939 | (4,486) |
| Net cash from operations | (6,067) | (5,235) | (5,294) | (6,817) | (6,146) | (8,646) | (24,078) | (26,903) | (34,657) |
| Capex | 0 | (287) | (442) | (1,055) | (3,413) | (3,052) | (3,191) | (7,961) | (10,000) |
| Net cash from investments | 113 | (205) | (394) | (1,589) | (3,392) | (2,635) | (5,348) | (8,009) | (9,502) |
| Proceeds from issuance of shares | 460 | 20,273 | 790 | 20,342 | (24) | 0 | 21,986 | 21,108 | 0 |
| Key ratios | | | | | | | | | |
| Net debt (cash)/equity (%) | (75.3) | (85.0) | (83.1) | (85.6) | (72.5) | (50.6) | (85.0) | (50.6) | (502.7) |
| Net cash/(debt) | 19,915 | 30,854 | 23,542 | 36,291 | 24,622 | 13,341 | 30,854 | 13,341 | (30,818) |

Source: Thinfilm, Edison Investment Research

With the company continuing to expand its production capacity this quarter, we expect capex to remain high at \$3.1m. We forecast operations to absorb a further \$8.6m cash in Q415, reflecting the ongoing costs of managing the transition to a volume producer. As a result, we expect cash balances to decline a further \$11.3m to \$13.3m.

We forecast cash burn to reach \$10.8m in both Q116 and Q216. Taking into account the forecast \$13.3m cash balance at the start of the 2016, we expect Thinfilm's existing funding to be sufficient to take it into Q216.

Forecast revision

| Exhibit 4: Change in earnings forecasts | | | | | | | | |
|---|-----------------|-----------------|---------------|-----------------|-----------------|---------------|-----------------|----------------|
| US\$000s | 2015 new | 2015 old | Change (%) | 2016 new | 2016 old | Change (%) | 9M15 | 9m15/ FY15e |
| Sales revenue | 1,814 | 3,226 | (43.8) | 10,733 | 18,150 | (40.9) | 1,225 | 67.5 |
| Other Operating revenue | 1,812 | 1,871 | (3.1) | 2,015 | 2,058 | (2.1) | 1,306 | 72.1 |
| Other Income | 396 | 399 | (0.7) | 476 | 482 | (1.2) | 283 | 71.4 |
| Total revenue | 4,022 | 5,496 | (26.8) | 13,224 | 20,690 | (36.1) | 2,814 | 70.0 |
| Payroll | (16,512) | (16,554) | (0.3) | (18,600) | (18,810) | (1.1) | (12,072) | 73.1 |
| Share based payments | (921) | (1,033) | (10.8) | (1,395) | (1,411) | (1.1) | (588) | 63.8 |
| Premises, supplies | (6,898) | (7,347) | (6.1) | (13,840) | (17,666) | (21.7) | (4,875) | 70.7 |
| Other operating costs | (9,153) | (7,548) | 21.3 | (10,955) | (8,302) | 31.9 | (6,270) | 68.5 |
| Total operating costs | (33,485) | (32,482) | 3.1 | (44,790) | (46,189) | (3.0) | (23,805) | 71.1 |
| EBITDA, reported | (29,463) | (26,986) | 9.2 | (31,566) | (25,499) | 23.8 | (20,991) | 71.2 |
| D&A | (1,591) | (1,431) | 11.2 | (1,834) | (1,855) | (1.1) | (1,079) | 67.8 |
| Operating profit, reported | (31,054) | (28,418) | 9.3 | (33,400) | (27,354) | 22.1 | (22,070) | 71.1 |
| PBT, normalised | (28,028) | (27,169) | 3.2 | (32,513) | (26,304) | 23.6 | (20,032) | 67.0 |
| Normalised profit (loss) per share (c) | (5.2) | (5.1) | 2.7 | (5.9) | (4.7) | 24.6 | (3.6) | 69.1 |
| Reported profit (loss) per share (c) | (5.4) | (5.3) | 2.7 | (6.1) | (5.0) | 22.3 | (3.7) | 68.9 |

Source: Edison Investment Research

We continue to expect production at Thinfilm to rise sharply in the coming years. Nevertheless, we have pushed back the timing for key product deployment orders with a negative impact on our Thinfilm earnings forecasts for 2015 and 2016.

For 2015 these changes principally reflect an expected delay in the follow-up EAS order from Nedap from Q415 to H116 and in the first commercial orders from Diageo from late 2015 to mid-2016 following news of the timing of the recently announced five-digit unit pilot programme.

The net impact for 2015 is a 27% reduction in revenue and a 9% increase in reported operating loss. With the benefit of the \$1.9m financial gain in Q315, principally caused by the currency effects of the strong US\$/NOK, we have increased our forecast normalised EPS loss by only 3% to 5.2c per share. For 2016 the result is a 36% reduction in our revenue expectation, a 24% increase in operating loss and 22% increase in the normalised EPS loss to 5.9c per share.

Exhibit 5: Financial summary

| | US\$ '000s | 2013 | 2014 | 2015e | 2016e |
|--|------------|----------|----------|----------|----------|
| Year end December | | IFRS | IFRS | IFRS | IFRS |
| PROFIT & LOSS | | | | | |
| Revenue | | 1,897 | 4,479 | 4,022 | 13,224 |
| EBITDA | | (10,420) | (23,550) | (28,542) | (30,171) |
| Operating Profit (before amort. and except.) | | (10,688) | (24,855) | (30,133) | (32,005) |
| Intangible Amortisation | | 0 | 0 | 0 | 0 |
| Exceptionals | | (2,154) | 0 | 0 | 0 |
| Share-based payments | | (847) | (941) | (921) | (1,395) |
| Operating Profit | | (13,689) | (25,796) | (31,054) | (33,400) |
| Net Interest | | 274 | 701 | 2,105 | (507) |
| Profit Before Tax (norm) | | (10,415) | (24,155) | (28,028) | (32,513) |
| Profit Before Tax (FRS 3) | | (13,416) | (25,096) | (28,949) | (33,908) |
| Tax | | 0 | 0 | 0 | 0 |
| Profit After Tax (norm) | | (10,415) | (24,155) | (28,028) | (32,513) |
| Profit After Tax (FRS 3) | | (13,416) | (25,096) | (28,949) | (33,908) |
| Average Number of Shares Outstanding (m) | | 412.7 | 493.5 | 535.3 | 555.2 |
| EPS - normalised (c) | | (2.5) | (4.9) | (5.2) | (5.9) |
| EPS - (IFRS) (c) | | (3.3) | (5.1) | (5.4) | (6.1) |
| Dividend per share (c) | | 0.0 | 0.0 | 0.0 | 0.0 |
| EBITDA Margin (%) | | N/A | N/A | N/A | N/A |
| Operating Margin (before GW and except.) (%) | | N/A | N/A | N/A | N/A |
| BALANCE SHEET | | | | | |
| Fixed Assets | | 3,112 | 7,189 | 14,176 | 22,413 |
| Intangible Assets | | 0 | 2,319 | 2,387 | 2,458 |
| Tangible Assets | | 3,112 | 4,870 | 11,789 | 19,955 |
| Investments | | 0 | 0 | 0 | 0 |
| Current Assets | | 45,121 | 33,870 | 16,817 | 11,219 |
| Stocks | | 0 | 451 | 611 | 2,502 |
| Debtors | | 1,318 | 2,565 | 2,865 | 7,536 |
| Cash | | 43,803 | 30,854 | 13,341 | 1,182 |
| Other | | 0 | 0 | 0 | 0 |
| Current Liabilities | | (5,865) | (4,748) | (6,147) | (40,222) |
| Creditors | | (5,865) | (4,748) | (6,147) | (8,222) |
| Short term borrowings | | 0 | 0 | 0 | (32,000) |
| Long Term Liabilities | | 0 | 0 | 0 | 0 |
| Long term borrowings | | 0 | 0 | 0 | 0 |
| Other long term liabilities | | 0 | 0 | 0 | 0 |
| Net Assets | | 42,367 | 36,311 | 24,846 | (6,589) |
| CASH FLOW | | | | | |
| Operating Cash Flow | | (7,905) | (24,078) | (26,903) | (34,657) |
| Net Interest | | 234 | 569 | 570 | 570 |
| Tax | | 0 | 0 | 0 | 0 |
| Capex | | (2,487) | (3,217) | (7,904) | (10,071) |
| Acquisitions/disposals | | 0 | (2,700) | (674) | 0 |
| Financing | | 48,560 | 16,477 | 17,399 | 0 |
| Dividends | | 0 | 0 | 0 | 0 |
| Net Cash Flow | | 38,402 | (12,949) | (17,513) | (44,159) |
| Opening net debt/(cash) | | (5,401) | (43,803) | (30,854) | (13,341) |
| HP finance leases initiated | | 0 | 0 | 0 | 0 |
| Other | | 0 | 0 | 0 | 0 |
| Closing net debt/(cash) | | (43,803) | (30,854) | (13,341) | 30,818 |

Source: Thinfilm, Edison Investment Research

Edison, the investment intelligence firm, is the future of investor interaction with corporates. Our team of over 100 analysts and investment professionals work with leading companies, fund managers and investment banks worldwide to support their capital markets activity. We provide services to more than 400 retained corporate and investor clients from our offices in London, New York, Frankfurt, Sydney and Wellington. Edison is authorised and regulated by the Financial Conduct Authority (www.fsa.gov.uk/register/firmBasicDetails.do?sid=181584). Edison Investment Research (NZ) Limited (Edison NZ) is the New Zealand subsidiary of Edison. Edison NZ is registered on the New Zealand Financial Service Providers Register (FSP number 247505) and is registered to provide wholesale and/or generic financial adviser services only. Edison Investment Research Inc (Edison US) is the US subsidiary of Edison and is regulated by the Securities and Exchange Commission. Edison Investment Research Limited (Edison Aus) [46085869] is the Australian subsidiary of Edison and is not regulated by the Australian Securities and Investment Commission. Edison Germany is a branch entity of Edison Investment Research Limited [4794244]. www.edisongroup.com

DISCLAIMER

Copyright 2015 Edison Investment Research Limited. All rights reserved. This report has been commissioned by Thin Film Electronics and prepared and issued by Edison for publication globally. All information used in the publication of this report has been compiled from publicly available sources that are believed to be reliable, however we do not guarantee the accuracy or completeness of this report. Opinions contained in this report represent those of the research department of Edison at the time of publication. The securities described in the Investment Research may not be eligible for sale in all jurisdictions or to certain categories of investors. This research is issued in Australia by Edison Aus and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act. The Investment Research is distributed in the United States by Edison US to major US institutional investors only. Edison US is registered as an investment adviser with the Securities and Exchange Commission. Edison US relies upon the "publishers' exclusion" from the definition of investment adviser under Section 202(a)(11) of the Investment Advisers Act of 1940 and corresponding state securities laws. As such, Edison does not offer or provide personalised advice. We publish information about companies in which we believe our readers may be interested and this information reflects our sincere opinions. The information that we provide or that is derived from our website is not intended to be, and should not be construed in any manner whatsoever as, personalised advice. Also, our website and the information provided by us should not be construed by any subscriber or prospective subscriber as Edison's solicitation to effect, or attempt to effect, any transaction in a security. The research in this document is intended for New Zealand resident professional financial advisers or brokers (for use in their roles as financial advisers or brokers) and habitual investors who are "wholesale clients" for the purpose of the Financial Advisers Act 2008 (FAA) (as described in sections 5(c) (1)(a), (b) and (c) of the FAA). This is not a solicitation or inducement to buy, sell, subscribe, or underwrite any securities mentioned or in the topic of this document. This document is provided for information purposes only and should not be construed as an offer or solicitation for investment in any securities mentioned or in the topic of this document. A marketing communication under FCA Rules, this document has not been prepared in accordance with the legal requirements designed to promote the independence of investment research and is not subject to any prohibition on dealing ahead of the dissemination of investment research. Edison has a restrictive policy relating to personal dealing. Edison Group does not conduct any investment business and, accordingly, does not itself hold any positions in the securities mentioned in this report. However, the respective directors, officers, employees and contractors of Edison may have a position in any or related securities mentioned in this report. Edison or its affiliates may perform services or solicit business from any of the companies mentioned in this report. The value of securities mentioned in this report can fall as well as rise and are subject to large and sudden swings. In addition it may be difficult or not possible to buy, sell or obtain accurate information about the value of securities mentioned in this report. Past performance is not necessarily a guide to future performance. Forward-looking information or statements in this report contain information that is based on assumptions, forecasts of future results, estimates of amounts not yet determinable, and therefore involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of their subject matter to be materially different from current expectations. For the purpose of the FAA, the content of this report is of a general nature, is intended as a source of general information only and is not intended to constitute a recommendation or opinion in relation to acquiring or disposing (including refraining from acquiring or disposing) of securities. The distribution of this document is not a "personalised service" and, to the extent that it contains any financial advice, is intended only as a "class service" provided by Edison within the meaning of the FAA (ie without taking into account the particular financial situation or goals of any person). As such, it should not be relied upon in making an investment decision. To the maximum extent permitted by law, Edison, its affiliates and contractors, and their respective directors, officers and employees will not be liable for any loss or damage arising as a result of reliance being placed on any of the information contained in this report and do not guarantee the returns on investments in the products discussed in this publication. FTSE International Limited ("FTSE") © FTSE 2015. "FTSE®" is a trade mark of the London Stock Exchange Group companies and is used by FTSE International Limited under license. All rights in the FTSE indices and/or FTSE ratings vest in FTSE and/or its licensors. Neither FTSE nor its licensors accept any liability for any errors or omissions in the FTSE indices and/or FTSE ratings or underlying data. No further distribution of FTSE Data is permitted without FTSE's express written consent.