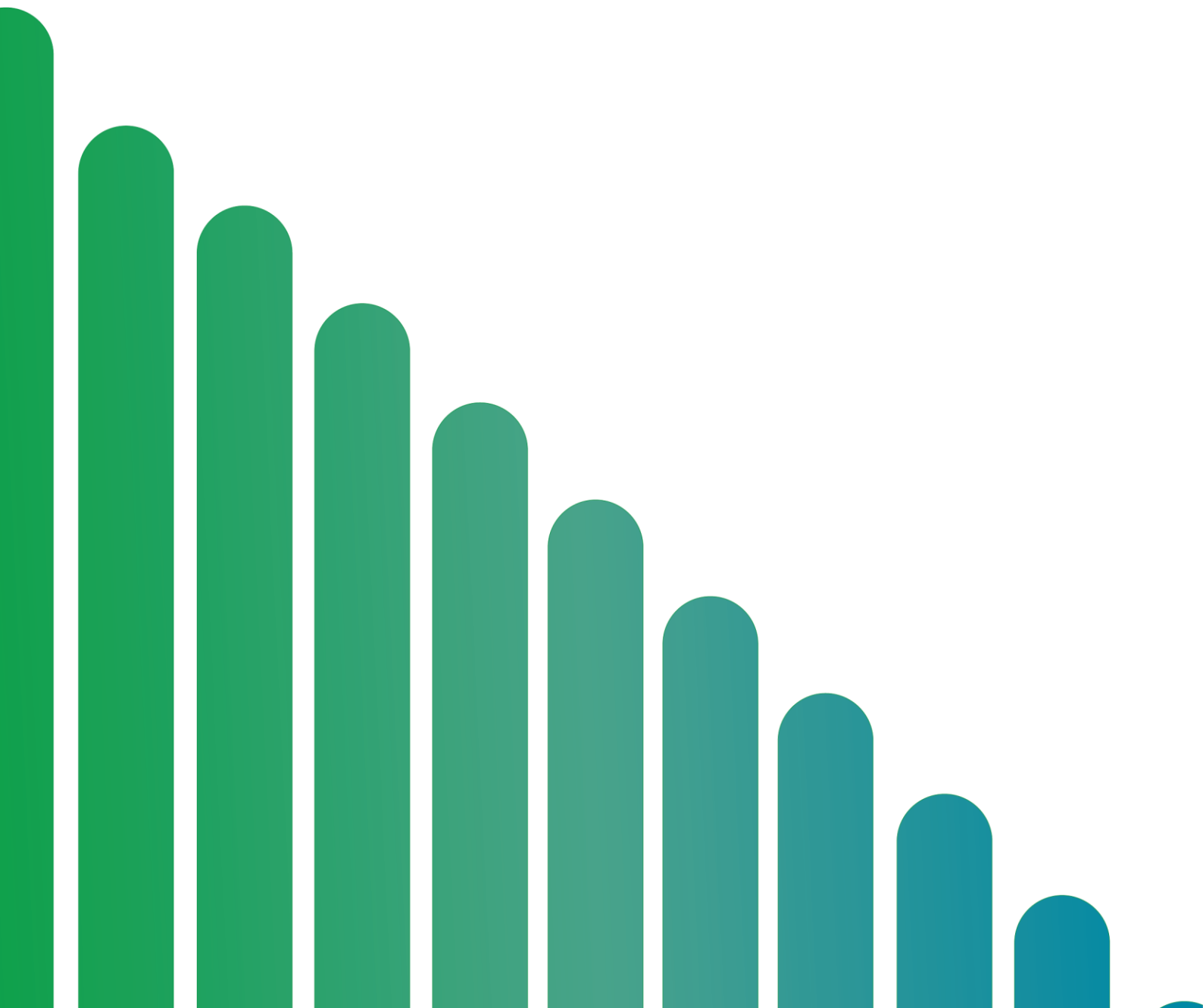


CELCIUS²

Financial Feasibility & Affordability

Chapter 6





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1 Affordability

HOUSE PRICES, ANNUAL CHANGE (%)		
Year	Nominal	Inflation-adjusted
2008	3.01	0.78
2009	-3.43	-4.36
2010	-2.25	-3.15
2011	-2.39	-4.74
2012	-6.53	-9.09
2013	-6.50	-8.83
2014	0.83	0.51
2015	2.88	2.66
2016	5.00	4.88
2017	7.62	6.24
2018	9.03	7.31

Sources: [Statistics Netherlands](#) (CBS), [Global Property Guide](#)

The type of market we are going to focus on is the housing market in the Netherlands. The housing market in the Netherlands has been overstretched in every respect over the past year. As you can see in the table, house prices are breaking records, rents in medium-sized cities are rising rapidly and, partly due to the nitrogen crisis, it is not possible to build enough new houses.

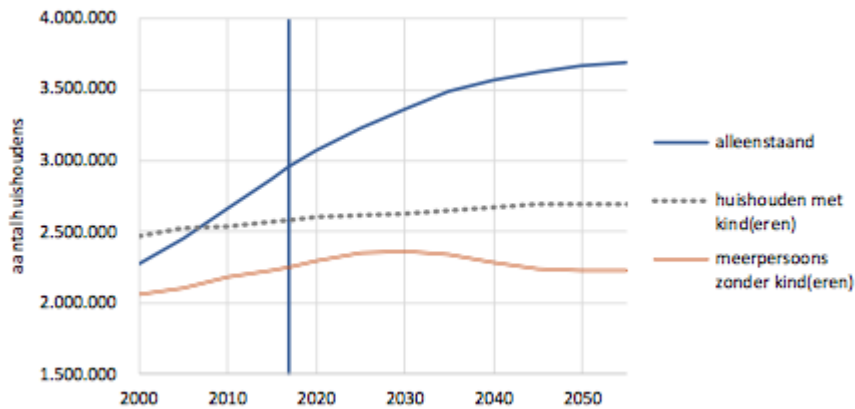
For 2020, house prices are expected to rise slightly or stabilise, depending on the forecast you make. House

prices are likely to continue to rise in the Randstad conurbation, but perhaps less than before, as people move in search of cheaper housing. In 2019, house prices rose by 6%, which was 2% less than the year before (Leeuwen, 2020).

New houses are rapidly becoming more expensive. In the third quarter of last year, the price of newly built houses sold was no less than 17 percent higher than twelve months previously, according to Statistics Netherlands. Existing houses were on average 9.2 percent more expensive. Part of this price increase is the result of the 'energy transition', which is actually a good thing because these houses will have an energy bill that costs less on a monthly basis. However, experts say that house prices are likely to remain at least stable and will most likely continue to rise in the coming years. The main reason for this is that the demand for buildings is not rising as fast as the demand for houses. Building is a complicated process in the Netherlands and obtaining permits etc takes time.

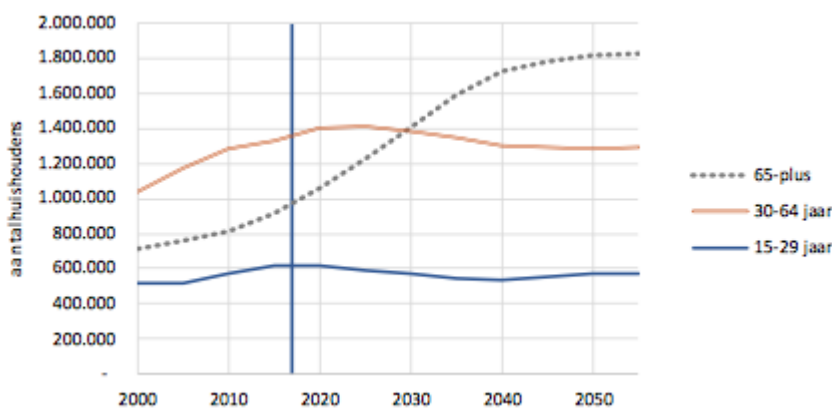
The part of the housing market that Celcius should focus on is the market for eco-friendly homes. A good windfall is that sustainability is becoming an increasingly popular trend, as a result of which the size of the market for eco-friendly homes is also increasing. For example, the global market for green building materials will reach 364.6 billion dollars by 2022. In addition, analysts from the research firm Market Research Future argue that demand for green buildings will be driven by changing consumer lifestyles and a growing focus on high-quality products and renewable energy (The future of housing is here, and it's green, sustainable, and affordable, 2019).





The number of singles in the Netherlands is increasing rapidly, much faster than the number of homes with children. This trend is set to continue with the ageing of the population. But what does this mean for the

housing market? The trends of more and more single people have been going on since at least the beginning of this century. As can be seen in the figure, the number of households in the Netherlands is set to increase by just under 900,000. It will mainly consist of single persons (or single-person households). The figure also shows that growth will level off after 2030, only to come to a standstill around the middle of the century. The quantitative implications of this development for the housing market are clear. In order to be able to house all these extra households, houses will have to be added for the time being. The obvious conclusion is that it is mainly single people for whom building is needed.



Until recently, singles of different ages were added. If we look ahead, we see that the future single persons are almost exclusively seniors, as a result of the ageing of the population. As can be seen in the figure, in

2017, one in three singles will be over 65 years of age; in 2032, according to Statistics Netherlands' forecast, 43% of singles will be 65 years of age or older, after that the proportion of people over 65 will increase even further. An important fact for the housing market is that, unlike young people, all future older single persons already have a home (with some exceptions), where they have often lived as a family. For the housing market, it makes a lot of difference whether these older single persons take another step by moving to a different house. The increase in the number of single persons does not automatically make these households the target group for new construction as it is not yet clear what they will do (André Buys & Michelle Hu, 2018).





2 Cost-Effectiveness

Celcius consists of a team full of students from different studies who are joining forces in order to make a real impact regarding changing the world for the better. Unfortunately, there is a lack of information about Celcius regarding Corporate Social Responsibility. However, we do know that Celcius is deeply engaged in minimizing global warming and hence the environment in general. This means that the company is aiming for minimizing its ecological footprint.

The future of Corporate Social Responsibility (C.S.R.) mainly includes topics such as sustainability, running out of resources, the ecological footprint, and ethics & immoral behaviour. Ultimately, C.S.R. could be very beneficial, especially if C.S.R. strategies are well-applied. Key CSR issues are: environmental management, eco-efficiency, responsible sourcing, stakeholder engagement, labour standards and working conditions, employee and community relations, social equity, gender balance, human rights, good governance, and anti-corruption measures. (Unido, 2019)

Regarding sustainability, two sustainable segments are likely to be interested in Celcius's housing: the sustainables (embracing a green lifestyle), and the critical citizens (conscious consumers). Regarding the ecological footprint, Celcius could use various easy and actionable ways to reduce their carbon footprint: go paperless, get green web hosting, recycle your e-waste, and work from home. By doing so, the company not only impresses its customers, it also saves a lot of money. (Wells, 2019)

Ethics in the (sustainable) supply chain is also of greater importance for Celcius. Celcius could do the following to manage this:

- Reduce waste by simplifying supply chain processes
- Ensure ethical sourcing and introduce transparency
- Minimize overproduction through efficient supply and demand planning
- Decrease fossil fuel consumption by optimizing routes
- Fully utilize containers and transportation to consolidate shipments
- Monitor for existing environmental risks

As consumers are getting more conscious about their purchases and expect organizations to meet a certain set of ethical standards, it is considered very important for Celcius to take the aforementioned steps. (Johar, 2019)





A McKinsey report on sustainability shows that more than 90% of the damage caused to the environment comes from the supply chain. Additional approaches to improve sustainability in supply chains:

- Locate critical issues across the whole supply chain
- Link supply-chain sustainability goals to the global sustainability agenda
- Assist suppliers with managing impact - and make sure they follow through
- (Swartz & Bové, 2016) (van Niel & Burioni, 2019)

Celcius currently employs the following C.S.R. strategies:

- Sustainable product development (sustainable housing = sustainable materials)
- Focus on sustainable lifestyles

For SMEs such as Celcius, a properly implemented C.S.R. concept can bring along a variety of competitive advantages and opportunities such as improved brand image and reputation hence increasing competitiveness, and innovation capacity.

It would be recommended for Celcius to highlight their sustainable character within the brand identity (brand values, branding). However, the main recommendation is to not only talk about your own company's sustainable values, but to serve the consumer in achieving difference on their own as many consumers are open to making a difference, however, they just need help.

The main trends for the defined market (industry) are:

Sustainability

There is a constant presence of stimulation of both the government and the municipality regarding sustainability. The demand for sustainable housing is increasing as homeowners are likely to pick sustainable housing over non-sustainable housing. By giving grants, the government tries to stimulate construction companies to use sustainably materials. Simultaneously, regarding the housing industry, buyers of houses are likely to choose sustainability in order to reduce their energy bills. (Trends in Nederland., 2019) (Rijksoverheid, 2020)

Increased demand for technically skilled workers

We see that nowadays many productivity activities are executed by robots as machines are more likely to deal well with physical load. In fact, this contributes to a fall in the number of disabled employees within the construction/housing industry. The technically skilled workers are aimed to successfully control robots in their work. These employees are often familiar with artificial intelligence and machine learning, and are generally using algorithm and technologies. (Companen, 2020)





Most families with young children move from urban areas to small villages

This trend is mainly caused by the fact that housing prices have been risen significantly at a rapid speed. Therefore, housing in urban areas such as Amsterdam won't be affordable anymore for lots of families with young children. The same situation is applicable to rental houses. However, there might be other reasons for families with young children to decide to move to small villages. For instance, the lack of square meters regarding urban housing (a non-sufficient number of bedrooms present), the absence of a garden, or simply safety reasons. (Vastgoed Business School, 2019) (CBS, 2019) (Vis, 2019)

The rising problem of nitrogen

Currently nitrogen is identified as a significant problem regarding building houses. The main problem is the construction itself, specifically heavy machines that are likely to release nitrogen. The solution regarding this problem will be the development of electric tools and vehicles such as electric shovels and electric cranes. However, these developments do not yet exist and are basically in their pioneering phase. As of right now, it is best for companies such as Celcius and Suteki to manage their nitrogen emissions by using innovative solutions such as nitrogen filters and to stimulate families with young children to live without gas, by using alternative heat sources. (Elting, 2019) (Koekkoek, 2020)





3 Cost Estimate

To build the Celcius house, several costs needed to be made. To calculate these costs the calculation of all the materials in combination with the sales forecast, which is important to include in the calculation because of the discounts of several quantities.

There will be 15 sold units in the first year. This is representative because after the first year it is very important to evaluate the processes of that year, analyse the bottle-necks and think of solution and improvements for the process of selling and the after sales. After this first year we think the sales will increase very fast, which has been shown in the sales forecast.

Sales forecast in sold units	
Year 1	15
Year 2	50
Year 3	90

In the costs the furnishing costs are not included because these will be paid by the owner of the Celcius house. Also the lot costs are not included in the costs calculation because these costs will be covered by the future partner of Celcius. If you want to know more about this partner and the entry strategy, please read the entry strategy again. Which means that this is a costs calculation for Celcius. It is hard to implement the lot costs because it is not sure which plots of land will be bought because this requires further research.

Costs year 1 & 2

There is a difference between the calculations of year 1 & 2 and the 3rd year, because the quantity discounts on materials etc. are given from 75+ units, and our forecast states that from the 3rd year there will be over 75 units sold.

Costs per house m2		Building costs (without discounts)	
53 m2	€ 124.712,77	53 m2	€ 17.986,40
110 m2	€ 244.575,83	110 m2	€ 37.330,26
150 m2	€ 276.680,14	150 m2	€ 50.904,91

In the tables above you can see the costs per house, the houses differ in size, furthermore the houses are the same. As you can see both material and building costs are shown.

Total Costs Celcius house	
53 m2	€ 142.699,17
110 m2	€ 281.906,09
150 m2	€ 327.585,05

in the overview above you can see the total costs of the Celcius house per size. These costs are a representation of: Total material Costs + The building costs per house.





Costs year 3

In the 3rd year the sales forecast states that there will be 90 units sold. This means that a quantity discount needs to be implemented in the cost price per Celcius house, because, according to the calculation of Celcius, there will be a discount of 10% when there are 75+ houses sold.

Costs per house m2		Building costs with 10% discount for 3th year sales	
53 m2	€ 112.241,49	53 m2	€ 14.665,60
110 m2	€ 220.118,25	110 m2	€ 30.438,04
150 m2	€ 249.012,13	150 m2	€ 41.506,42

Therefore the costs of the different houses are significantly lower than the costs in year 1 & 2. In the table shown above you can see the costs of the Celcius house in the 3rd year.

Total Costs Celcius house with 10% discount	
53 m2	€ 126.907,09
110 m2	€ 250.556,28
150 m2	€ 290.518,54

And in this table above you can see to total costs per house in the 3rd year. This includes the same costs as in the first two years: Total material Costs + The building costs per house.

The break-even point and profit forecast

To calculate the break-even point you need to have the fixed and the variable costs. These costs are set as followed:

		Fixed costs	
		Year 1	€ 150.000,00
R&D Costs		Year 2	€ 200.000,00
€ 150.000,00		Year 3	€ 220.000,00

As you can see the R&D (research and development) costs are very low. The clarification of this amount is that the Celcius project is made by students, which did not get paid for their work because it is a part of their study and their learning process. This means that the R&D costs in this case is an estimate of the expenses made. The fact that these R&D costs are very low is beneficial for the potential of selling this project. This will be shown in the break-even and profit forecast.

Profit year 3





Net profit with a 10% profit margin and 10% quantity discount		Net profit with a 10% profit margin	
€ 30.061,99		€ 14.269,92	
€ 59.540,42		€ 28.190,61	
€ 69.825,01		€ 32.758,50	

Profit year 1 & 2

Customer price per house m2	
53 m2	€ 156.969,09
110 m2	€ 310.096,70
150 m2	€ 360.343,55

In the tables above you can see the customer price for every Celcius house and the profit per house in the 1st and 2nd year and the profit per house (with the discount) in the 3^d year.

The profit margin has been set on 10% because this is a regular margin in the housing industry. This has been said by Mr. Bij De Vaate in the interview with this professional, which you can read in the external analysis. The profit in year 3 per house is significantly higher compared to the profit in the 1st and the 2nd year, because of the discounts which are given when 75+ houses are made. The profit in the 3^d year therefore is higher, because the sales forecast states that there will be 90 houses sold.

	Houses in m2	Break-even point	Revenue Forecast		Profit forecast	Profit - R&D costs
year 1	53 m2	11	53 m2	€ 2.354.536,31	€ 214.048,76	€ 64.048,76
	110 m2	5	110 m2	€ 4.651.450,55	€ 422.859,14	€ 272.859,14
	150 m2	5	150 m2	€ 5.405.153,25	€ 491.377,57	€ 341.377,57
year 2	53 m2	14	53 m2	€ 7.848.454,35	€ 713.495,85	
	110 m2	7	110 m2	€ 15.504.835,18	€ 1.409.530,47	
	150 m2	6	150 m2	€ 18.017.177,51	€ 1.637.925,23	
year 3	53 m2	7	53 m2	€ 14.127.217,83	€ 2.705.579,46	
	110 m2	4	110 m2	€ 27.908.703,32	€ 5.358.637,69	
	150 m2	3	150 m2	€ 32.430.919,52	€ 6.284.250,82	

The following table shows the break-even analysis and profit & revenue forecast:

In the break-even analysis you can see the break-even point for every house and the amount of houses which are needed to be sold to have break-even. In the first year you can see the profit minus the R&D costs this shows that minus all the costs, in year 1 there already will be a profit and the profit will increase almost exponentially if you look at the profits in year 2 & 3.

Within 3 years there will already be an estimated profit of over 1 million euro's. The reason for the increasing break-even point from year 1 to year 2 is that the variable costs increased because of the significant increasement in the sales forecast. The reason that in year 3 the break-even point isn't increasing is because of the discounts in the costs which causes a higher profit per house.





All these factors are making it very interesting for potential partners to invest in the Celcius house, and which is maybe the most important factor for these investors, besides the sustainability, is the fact that already in the first year there are profits and that within 3 year there can be an estimated profit of more than 1 million euro's. The R&D costs play a big role in this calculation and are therefore also kind of an USP for the Ceclius house, because these costs are very low. The reason for that is that as told before the project is made by students and therefore there are no employment and research costs for these students because theses student worked on this project for their own development and learning processes.

