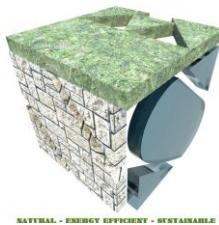


NATURAL - ENERGY EFFICIENT - SUSTAINABLE

Natural, Energy Efficient and Sustainable, Products and Services

Business Model Guide



Introduction

The **NEES (Natural Energy Efficiency and Sustainability Project)** is investigating the potential and feasibility of popularising the application of renewable and recycled natural materials for the production and installation of products to improve the energy efficiency of new and existing buildings. Also, identifying and promote local design and installation services available for the application of these products or based on sustainable natural processes.



Map of Northern Periphery Area

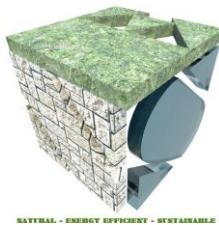
The NEES project is made up of 7 social enterprises, academic and research agencies in Europe's Northern Periphery, comprising the Republic of Ireland, Northern Ireland, Scotland, Sweden and Greenland. The project is funded by the Northern Periphery Programme for its three year duration.

There has been considerable commercial development of high-tech solutions for energy efficiency, including chemical and industrially manufactured products and processes,

nanotechnology, the use of IT in smart buildings and smart grids. In contrast, there has been a notable lack of research and development of products and services based on natural products and processes.

In Ireland, grants for retrofitting existing homes (under the Warmer Homes and Greener Homes Schemes for example), is limited to energy-intensive industrial and petrochemical products, and no single technology for retrofit of existing walls based on the use of natural materials has been approved for subsidy.

This limitation has consequences for sustainability, including the fact that such products are usually manufactured outside of the region, though energy-intensive industrial processes, with a considerable environmental impact. They have then to be transported from other regions. Little use is made of local products, especially agricultural products and by-products that could achieve a similar effect. The production or installation of these materials rarely promotes new skills locally, or the development of the local economy, other than in a limited sales or installation role. The building and refurbishment sector has become dependent on these imports, when there are potentially viable products available locally that could be developed and delivered locally.



Examples of the types of products available are:

- Timber from renewable forests;
- Hemp and lime;
- Straw; and
- Recycled Newspaper.

Examples of services that could help reduce energy use are:

- Timber frame design;
- Bioclimatic design;
- Energy and sustainability assessments; and
- Local behaviour change training.

These products and services are:

- Less capital intensive;
- More locally based;
- Consume less rare and finite materials in production;
- More reusable;
- Less polluting waste;
- Require less transport.

The skills required in their production are usually found locally, and their installation is often based on traditional skills and local resources. If properly identified and developed these products and services could provide much needed jobs and training opportunities, and new green enterprises.

These products are by their nature linked to diversification of agricultural production, so could have a positive effect on agricultural diversification and on biodiversity on the one hand, and on new and on diversification of rural economies on the other.

Energy efficiency and sustainable development are two of the European Union's main priorities, as reflected in the Energy Performance of Buildings Directive (EPBD), the Energy Services Directive (ESD) and the Eco Design of Energy Using Products Directive (Up), and the requirement for all Member States to National Energy Efficiency Action Plans.



Hempcrete construction in timber shuttering



The availability of naturally based products and services is also an important consideration in the development of a sustainable economy and green procurement policy. Procurement by public bodies constitutes 16% of all purchases, even more in some countries (e.g. 30% in UK). An excellent example of the NEES approach in practice is the recent Drumalla House project in Carnlough, Co. Antrim, Northern Ireland, developed by the Oaklee Home Group. The aim of this project was to design and build a new social housing development of 11 homes, to achieve Level 4 of The Code for Sustainable Homes (CSH) using renewable materials as an alternative to traditional forms of construction. This project was a pilot project under Northern Ireland's Department of Energy and Climate Change's Renewable Construction Demonstrator Programme.

The project will also assess the validity of this alternative building type in terms of feasibility for future developments, along with examining energy consumption and also considering tenant attitudes. The fabric of the scheme uses timber frame construction with a hempcrete (formed from the hemp plant in combination with hydraulic lime) outer skin in place of concrete. The CO₂ absorbed in the growing of hemp more than offsets the CO₂ produced in the manufacture of the binder, and use of the product will have reduced the embodied carbon dioxide in the construction of the houses by almost 40%.

In order to establish a viable business from natural, sustainable, energy efficient materials the initial steps are crucial. The preliminary planning and research can have an enormous impact upon the future success of any business and none more so than in an emerging market such as this. In general natural, energy efficient products and services tend to be more expensive than traditional materials at present. Rather than allowing this to hinder the development of the market it should be used to the seller's advantage. For example a timber frame construction business may not be able to compete with traditional construction methods on price, but they could focus more upon on differentiating themselves and emphasising some of the other qualities which their products possess.



Management

A clear vision of what the business wants to achieve may greatly impact the level of success which it enjoys. Setting targets and objectives can help to fulfil this vision. It is important that the management team have a clear understanding of the set vision and that it can be conveyed to each member of staff. Objectives can be both long and short term and generally will have clear indicators in place to measure their level of success.

Before entering a new market it is important that prior investigation and analysis is conducted. This will help to assess how successful your new product or service is likely to be. One method which deals with this is Five Forces Model developed by Michael Porter. This considers the five potential forces which will affect a market as demonstrated below in the construction industry;

1) The threat of new competition,

It takes time and money to build a brand. When companies need to spend resources building a brand, they have fewer resources to compete in the marketplace. These costs may negatively affect the ability of a company to compete with rival firms. If barriers are high then it is more difficult for new competitors to enter the market such as an emerging hempcrete construction business.

2) Threat of substitute products/services,

When entering a market with no or few substitute products / services, a company can gain a significant competitive advantage as customers have little choice but to buy their product. In addition to looking at existing products and services it is important for a company to assess if the benefits of a product or service is difficult to replicate or better with a substitute product then the risk of new competitor is likely to be low. Another concern may be an indirect substitute shrinking the market, for example an insulation supplier may be considered with other types of insulation taking its market share, but it may also be considered with the indirect threat of new building methods making the need for insulation obsolete.

3) Bargaining power of customers (buyers),

In a market like energy efficiency where information on technologies is abundant, buyers can utilise this information to their advantage to negotiate better deals. They can demand a certain level of energy efficiency for a certain price, knowing that there are other products available that can meet their demands if one supplier can't. Depending on the type of energy efficiency sought, there will often be many alternative products on the market which gives the customer considerable negotiating power when deciding what to purchase.

4) Bargaining power of suppliers,



The easier it is to switch suppliers, the less bargaining power they have. Due to the housing market crash the construction industry is (at the time of writing) very competitive, with companies willing to settle for lower profit margins in order to ensure custom.

5) Intensity of competitive rivalry

As mentioned, the construction sector is incredibly competitive at the moment due to the recent housing market crash. This type of competitiveness can make it difficult for smaller firms to compete on an equal footing with large organisations, and makes retaining a market share difficult. New entrants must consider how to compete with rival firms in order to ensure their success.

To help identify future threats and also clarify the reasons for buying a product a company can conduct what is known as a SWOT analysis. This is its, Strengths, Weaknesses, Opportunities and Threats. A hypothetical example of this for a Glulam (Glued Laminated Timber) product may be:

Strengths

- Strong, clean and more sustainable alternative to steel or concrete frame construction.
- Savings in transportation due to its weight.
- Aesthetically pleasing
- Easy to work with, construct and to erect.
- Fire resistant

Weaknesses

- Large amount of storage space required
- Waiting period from order to completion
- Usually more expensive than brick and block alternative

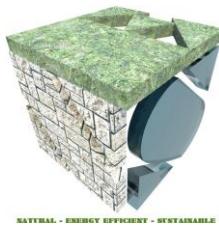
Opportunities

- Increase in demand for timber waste products such as bark and wood chip.
- Advances in technology should reduce production costs
- Excellent U-value rating which is becoming an increasingly important issue.

Threats

- Economy slowdown
- Reduction in availability of old growth forests.
- Forestry ownership bidding may cause raw material supply issues

SWOT analysis can be applied to business, its resources and environment. When potential weaknesses have been identified then the company can concentrate on converting them into strengths, and also matching the strengths with opportunities. For example; if a recycled newspaper insulation company found that it had a skills gap, then it could try to rectify this by investing in training and development of staff or improving their recruitment and selection techniques.



Training

Competent, skilled and motivated staff can make an enormous difference to a business in trying to achieve its objectives. Training is one method which may be used to help achieve this. Many natural, sustainable construction processes require highly specialist techniques. It is important that the employees who are recruited are trained properly and acquire the skills which are required. The installation of some natural energy efficient materials will require some specialist skills which are not commonly taught. This may be said of hempcrete construction. However, it is imperative that the work is carried out by those who have the knowledge and expertise that is required.

Cost Structure

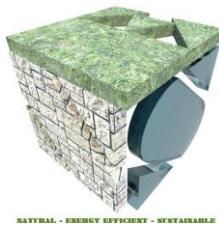


The two main types of cost structures are; cost-driven and value driven. Most businesses will be somewhere in between these two extremes. If your business is involved in straw bale construction then it will typically be more value driven. This is due to the fact that the main raw material used is relatively inexpensive but the building quality must be of a high standard otherwise it will not be fit for purpose or even structurally unsound. However, the business will still seek to keep its costs low in order to maximise its profits. There are a number of different characteristics to any cost structure which a company can identify which include; fixed costs, variable costs, economies of scale and economies of scope.

Manufacturers of natural energy efficient products would typically have higher fixed costs resulting from, salaries, rent and physical manufacturing facilities. Variable costs include

raw materials, stocks and components or commission. Economies of scale is achieved when a company is able to lower the average cost per unit through increased production. This is due to fixed costs being divided over an increased number of goods. A timberframe construction company could take advantage of economies of scope by also providing recycled newspaper insulation as a product. The theory is that it would be cheaper for one company to be involved in both timber construction and insulation than for two companies to do so separately. This is because they can use the same storage and preparation space and therefore reduce costs.

There are a number of considerations to take into account such as; equipment requirements, storage, supply chain requirements, production materials, location, capacity, size and the supply chain requirements. For example; a company who sells sheep wool insulation must ensure that they have the essential storage capacity and conditions available. Long term contracts may be negotiated with suppliers in an effort to bring long term stability and guarantee that supply will be sufficient to meet the demand.



The Value Chain

A Value Chain analysis may be useful in determining competitive strength. This focuses on the primary activities and the support activities of the business. Primary activities are directly concerned with producing and delivering a product or service and would typically include aspects such as, inbound logistics, operations, outbound logistics, marketing and sales, and service. Support activities concern, procurement, human resource management, technology development and infrastructure. Although support activities are not directly involved with production, they can be important in making the business more efficient and effective. It is quite uncommon for a business to undertake all of these activities and outsourcing.

Marketing

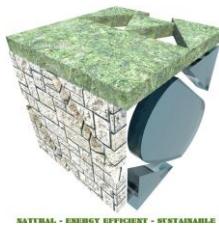
Marketing can be a significant aspect of developing a business in an emerging market such as natural sustainable building. If the customer is unaware that the product or service exists then they will not buy it. Not only must the potential customer be aware of the natural, sustainable product or service, but they must also be informed about the product's features and the reasons for switching from a more traditional product or service. The switching costs must be explained and justified in order to convince the customer to do so. A successful marketing plan should ideally have a vision which the potential customer can buy into. The importance of identifying the target audience for your product or service cannot be underestimated. This factor will shape the marketing plan which will be adapted. Identifying the target audience can be achieved by considering the following criteria:

- The customer has an important need and your brand meets that need;
- Your brand has the potential to be preferred by them;
- There is something about your brand which they admire;
- The customer has the potential to provide your organization with the ample revenues and profits over the long run; and
- Your organization can grow by building a long-term relationship with and increasingly fulfilling the evolving needs of these customers.

Identifying and understanding target customer attributes is another important aspect of successful marketing. Some basic elements include;

- Demographics Lifestyle;
- Needs/desires;
- Fears/concerns;
- Product purchase behaviour; and
- Product usage behaviour.





Pricing

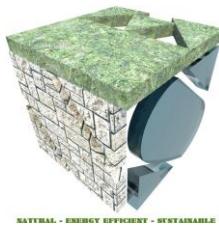
The pricing policy which is adopted for a product or service is incredibly important as this is obviously the means by which you will generate your revenue. For natural, sustainable energy efficient products and services the pricing policy will be forced to compete to some extent with more established materials in the market. The pricing policy may depend largely upon the target audience which has been identified. Price may be dictated by a variety of other forces. Negotiation or a bidding process can influence how high the price will be set. The price could be fixed by per square metre of sheep wool insulation, for example. Price may be set depending upon the volume ordered or the other value proposition features- for example a custom design on a timber frame construction may be more expensive than a standard order.

Distribution

Distribution of products takes place by means of channels. Rather than distributing a product exclusively via their own business establishment, a company may decide upon a number of channels. Depending on the nature of the product there may be a number of intermediaries between the production of the good and the point at which it is consumed. The distribution of your product or service may be influenced by factors such as the capacity of your organisation and other elements in your marketing strategy.

Promotion and Brand

There are a number of different elements which must be utilised to successfully promote a product or service. Promotion contains elements such as: advertising, public relations, personal selling and sales promotion. A company must decide how much time and capital to spend on each of these promotional areas for each. The promotional plan your company adopts may contain a wide range of objectives, such as: an increase in sales, competitive retaliations, creation of brand equity, new product acceptance, positioning, or creation of a corporate image. In order to compete with the more traditional construction products and services the role of branding and promotion becomes more important.



Finance

The financial plan describes the income, expenditure, how and where the business will get the capital to fund the potential investment (grants, loans, donations). With any new business proposal securing funding is often the most significant challenge to overcome. There are a number of ways to help secure the initial funding required such as; redundancy payment, second job, using savings or a bank loan. However, there are a number of other options available in the UK.

Below are a number of links which may be useful in addressing the issue of funding-

<https://www.gov.uk/business-finance-explained>

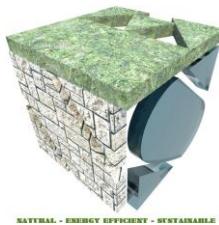
<http://www.ukbusinessgrants.org/index.php>

<http://www.investni.com/>

<http://www.greenwisebusiness.co.uk/resources/green-grants-and-funding-16.aspx>

It is important that financial reporting is accurate and up to date. Basic reports such as profit & loss account, sales forecast and cash-flow analysis, should be made a priority. Hiring the services of a chartered accountant may be wise in this instance. Take time to monitor your finances at least monthly. This will allow you to identify any potential problems in advance and take steps to avoid bigger problems later. It is important to have an idea of the level of sales the business can expect to achieve and also costs.

One of the most effective ways to allow a business to take advantage of new business opportunities and to manage cash flow is budgeting. Cash flow should be reviewed regularly and any credit which is given to customers should be balanced with the terms agreed with suppliers. Ensuring that the business has an appropriate amount of cash in the bank can prove to be a significant advantage. Cash will be required to cover tax liabilities but having too much cash in the current account will mean the business will not earn as much interest as it could. It may be worthwhile comparing and negotiating interest rates with a number of banks so that the most competitive rate can be acquired.



Risk Analysis

The need for contingency plans will arise from a comprehensive analysis of the risks the company may face in the future. The critical business functions should be identified and ways to minimise loss should be charted. Risks need to be identified and prioritised so that they can be responded to if and when they occur. Risks can present themselves in a variety of ways such as- market risks, operational risks, staffing risks, financing risks or managerial risks. It is wise to put in place measures which can assist in dealing with the potential risks so that they are easier dealt with should they arise.

Continuity Plan

A continuity plan can cover a range of possible scenarios such as; the death of key personnel, crisis events that threaten to shut down business operations for an extended period of time, and any other financial situation or unexpected event which could harm the business. Insurance policies are usually a significant part of continuity plans.

Asset Security

An asset security plan should cover the theft or destruction of key machinery or equipment, intellectual property, and any other valuable assets a company needs to maintain its market position and to carry out its operations. Legal strategies are generally found in a contingency plan in order to help mitigate damage created by such events.

Reorganisation

It is important to establish how the company will be able to re-establish normal operations following an unexpected crisis and the contingency plan should outline this and also how to contain and manage future contingencies. Whether the business is coping with negative events or with unexpectedly high sales reorganisation is important in meeting fresh challenges.