Capital Investment Planning in Renewable Energy in Hospitality Sector: Strategy and Evaluation

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Degree programme in Tourism and Hospitality Business

Master's Thesis
Strategic Thinking and Management
2023

Abstract

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Degree
Master of hospitality management

Report/Thesis Title
Capital Investment Planning in Renewable Energy in Hospitality sector: Strategy and Evaluation

Number of pages and appendices
63 + 2

This thesis is based on constructive research methods, utilizing qualitative and quantitative data to develop a capital investment strategy framework for hospitality small and medium-sized enterprises (SMEs), that are planning to make eco-investment in renewable energy sources. The reason for writing this thesis emerged from increased consumer demand and state regulatory actions towards more sustainably produced hospitality products and services. Such impact created opportunities and challenges for small companies.

Hospitality SMEs that are planning to invest in renewable energy sources need to strategically plan and evaluate their financial investments and conduct an analysis of how this investment impacts the environment, customers, and financial outlook of the business.

The study starts with the review of Finnish hospitality sector and impact from COVID-19 followed by strategizing phase of the capital investment in solar panels with intention to generate electricity on hospitality SME premises. The phase consists of development of an insight into solar energy application, discussing its sustainability impact and value proposition of solar energy production and utilization on hospitality establishment premises. The research involves obtaining insights on solar energy generation through academic literature, contacts, enquiries, and negotiations with industry representatives. In addition, the strategizing process develops renewable energy-powered hospitality value proposition design.

The main action dedicated to financial analysis which provides results of the capital investment appraisal for solar energy project as the fundamental indicator of the viability of the project and provider of insight into which sustainable strategy the hospitality company should pursue. Consequently, study employs investment appraisal techniques and identifies profitability metrics, which are essential for further planning.

Based on investment appraisal outcomes development continues towards proposal of eco-investment through a sustainable business model that stands on the strategizing process results, thus delivering value to the stakeholders including customers, environment, and profit to the business. Finally eco-investment strategy framework is presented as an integrated strategy model. The framework is a result of the research and learning path of the thesis study, it comprises three levels of strategy formation and implementation: strategizing, sustainable business model design, and performance management phases.

Eco-investment strategy framework is intended to be utilised as tool for insight development, strategy formation and evaluation, when planning capital investment in renewable energy for hospitality SME.

Keywords
Capital investment, strategy, solar energy, hospitality, sustainability, business model.

Contents

1 Introduction

The hospitality sector is reliant on electricity consumption whether the accommodation and its supporting facilities are operating in warmer or colder geographic areas. In addition, continuously expanding infrastructure of hotels, resorts, various forms of accommodation and supporting facilities consume vast amounts of energy on a daily basis. The cost of electricity for the hospitality businesses has become a heavier burden due to growing energy prices in addition to the constant need to power more areas and devices. Furthermore, growing energy consumption has significant environmental implications, contributing to carbon emissions and climate change.

It is estimated that hotels and other types of accommodation account for 2% of the 5% of global carbon dioxide (CO2) emitted by the tourism sector (Hotel Energy Solutions, UNWTO, n.d.). Inferably the ratio of conventional non-renewable electricity usage in the hospitality sector is high and has a significantly negative environmental impact.

From the perspective of Finland's energy policy, the country has taken ambitious international obligations and commitments with EU law and the new Climate Change Act to reach climate neutrality and become the first fossil-free welfare society by 2035 (Treasury Finland 2021). This policy aims at total reduction of emissions generated by electricity and heat production, improvement of energy efficiency and financially disincentivizing environmentally harmful energy consumption using tax instruments. Considering Finland's geography, it means that energy consumption in the hospitality sector is generally high and as a worldwide issue, hospitality establishments have inefficient operational practices that contribute to higher energy consumption, this is dependent on seasonality, rooms, and facility maintenance in operational conditions.

According to United Nations World Tourism Organization (UNWTO) affiliated Hotel Energy Solutions (2011) analysis indicates that, for most hotels' energy use ranges between 200-400 kWh/m2/year (kilowatt hours per square metre per year). To demonstrate electricity consumption in financial terms in a lower and higher spectrum of consumption, above mentioned figures can be applied, say a hospitality unit of 100 standard rooms of 30m2 each, totalling 3000m2. Energy usage on both spectrums indicates 600,000 kWh and 1,200,000 kWh annual electricity consumption. Multiplying these figures with the current date (18.06.2023) basic electricity price of 15.42c/kWh set for Small and Medium Size Businesses (SMES) by the City of Helsinki owned energy company HELEN (Helen Oy) implies that the cost of electricity the whole year could be between 92,520€ and 185,040€ for the hospitality SME. These numbers exemplify two ends of the financial expense spectrum on electricity in one year.

Addressing energy consumption issues in the hospitality sector is essential for both financial and environmental reasons and it is in direct relationship with sustainable value creation and delivery to the consumers of tourism and hospitality products. The inspiring solution can be found in Finland, where Ruka Peak boutique hotel and restaurant implemented OptiWatti's energy efficiency and monitoring system on their hill-top hotel (Optiwatti n.d.). Such solutions evidently allow hotel operators in the cold months to utilize necessary amounts of energy where and when it is most needed, this way allocating electricity costs to revenue generating hours and units. Could this type of investment keep profits and customers in comfort zone? What could be the value gain in relation to capital expenditure?

This thesis aims at developing a capital investment plan in renewable energy sources for hospitality establishments with the goal to strategize sustainable value creation and utilize financial analysis tool for evaluating capital investment viability in renewable energy production. Therefore, one investment project in renewable energy source could potentially improve the financial performance of the hospitality establishment and second, it could contribute to the environmental profile of the organization. Finally, the capital investment plan in renewable energy is to be tested with the commissioning hospitality organization, that is to provide a raison d'être from an economic perspective in a real market environment.

1.1 Background

The global movement towards sustainable business processes and consumption has implications for hospitality sector organizations, whole industry ecosystem is caught up in trying to keep up with changing environmental legislations and growing demand for sustainable value by customers. In this reality it is vital for businesses offering hospitality services to international and domestic tourists to maintain shareholder's equity growth in order to be able to create jobs and continue reinvesting in efficient operations.

Evidently, past decades prior to the Covid-19 pandemic, had been beneficial for tourism industry development worldwide. Economic development, globalization and investments in travel and tourism infrastructure prompted international tourism and creation of new businesses, accommodation, and leisure experience offerings from remote islands of Pacific Ocean to rugged and picturesque lakeside forests in the Nordics. Although, in recent years, socio-economic instabilities, pandemics and geo-political situations have put strain on economies, disrupting supply chains, moreover, threatening basic human health and safety. This situation affected energy prices, making them soar and placing hospitality business operators in a difficult situation. According to CEO of Accor

Sébastien Bazin (Saul 06 December 2022) energy generally accounts to 8% of total costs, although could rise as high as 25% in worst case scenario. The prospective insight in 2022 from Bank of Finland suggested weakening of economic growth caused by energy crisis.

> "Higher energy prices will curb growth and drive up inflation in the immediate years ahead. High energy prices are now increasingly feeding through to prices of food, consumer goods and services, and this has become visible in the euro area's underlying inflation, which has already risen above 4%". (Bank of Finland Bulletin 2022).

Lower consumer spending on leisure and travel could impact domestic tourism by cutting off travel plans for the short and medium term, or it could have a substitution effect, provided that Finland's hospitality sector finds solutions to provide attractive value compared to non-domestic alternatives. Such development could be challenging for many small and medium accommodation service providing businesses. It will require greater deal of preparation and implementation of strategic actions, especially when smaller hospitality businesses are more fragmented and have less resources and capital to respond to volatilities in the economy.

In addition to the above reality, the consequences of continuous and relentless extraction of non-renewable natural resources leads to environmental crises. Currently, more resources are consumed by human activity than planet can regenerate, thus planet is in 'ecological overshoot' (Legrand, Sloan & Chen 2017, 2). Despite of all difficulties international tourism is steadily growing towards the pre Covid-19 figures, although above previously described issues of international instability affecting energy supply, growing energy demand and environmental issues create a need for many hospitality business operators to rethink their energy consumption habits and look into current technology solutions wherever it is possible to mitigate growing costs and environmental impact. The green and digital transition, coupled together, are widely seen as most important force in securing viable future for people and environment (Jones 2023). This could be opportunity for tourism sector to achieve greater efficiency resulting in cost reduction, greener product through sustainable processes.

The effective solution could be the installation of renewable solar energy panels by the open-air resorts, camping hotels, and by all accommodation providers where solar panels could be integrated within existing premises or infrastructure. Installation of solar panels requires the company executives to plan a capital expenditure. This means, making a capital investment decision that comprises present outlays in return for a stream of benefits in future year (Drury 2015, 309). Usually, financial expenses associated with capital project are high and requires accurate measurements of future benefits in relation to payback period compared to initial financial outlay(invest-

ment). In addition, it is crucial for the business to assess outward strategic implications and opportunities in relation to economic and environmental value offering to hotel guests and company stakeholders. Consequently, research of the thesis is directed towards financial and environmental considerations of the company when making decision on renewable solar energy investment.

1.2 Objectives

From the perspective of this research two central objectives can be identified and addressed. Firstly, what sustainable energy strategy could be implemented by Hospitality SME-companies in Finland and perhaps internationally, operating under identical economic volatility and environmental aspirations? This question encompasses within search for solution on how to achieve predetermined objective. This objective addresses the businesses environmental responsibility and possibility of designing sustainable value offering, incorporating it into current business model or modifying it, in order to strategically respond to challenges and opportunities. This response inevitably shaped by creating and delivering superior value offering to the market (Tovstiga 2015).

The second objective partially derives from the first and is directly connected to the idea of developing a solar renewable energy source within a hospitality businesses premises. And the question here poses, is it financially viable to invest in on-site solar energy panels? The answer requires the deployment of financial planning tools and analysis from a purely capital investment appraisal perspective. Conclusively, the research involves delving into three competence domains that are hospitality, environmental sustainability, and financial analysis, although these competencies are narrowed and focused to a particular strategy model and its evaluation. Following objective analysis tree provides graphic visualization of the phases and parts of the thesis that are main objectives in order to achieve a main goal, that is a development of the capital investment plan to be used in the hospitality sector (figure 1).

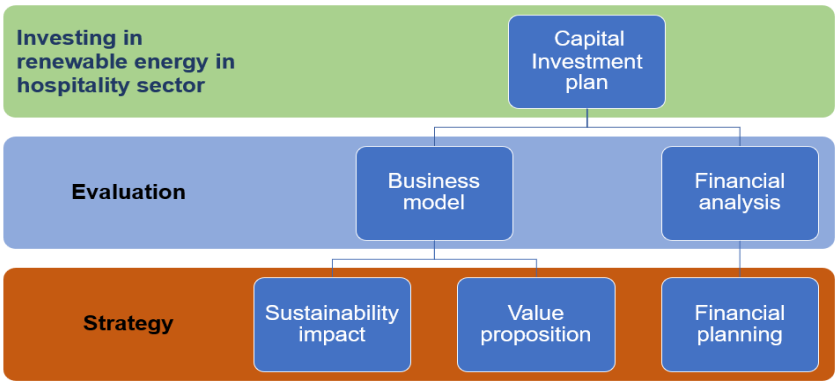

Figure 1. Objectives analysis tree of the thesis: Capital Investment Planning in Renewable Energy in Hospitality Sector: Strategy and Evaluation

Potentially, one investment project in renewable energy source could potentially improve the financial performance of the hotel and second, it could contribute to the environmental profile of the organization. This creates a double-impact solution with a single capital investment. Another aspect is the author's professional interest in combining finance, hospitality and environmental development competencies and creating an applicable sustainable investment strategy framework.

1.3 Key Concepts and scope

Scope of this thesis is geared to research and find answers to questions posed in previous section, they address finding optimal energy consumption strategy through the installation of renewable energy solar panels, incorporation of its benefits through value offering and business model revaluation and evaluation of financial viability of capital investment in renewable energy.

Objectives analysis tree in Figure 1. showcases phases and themes that are researched within the scope of this thesis. Starting with the strategizing phase, it provides fundamental level of sense making and strategic insight of investment in environmental project. Sense making provides help to identify bits and pieces of strategically relevant information related to a particular problem; to sort and filter these and reassemble them into bundles of insight which might be applicable to that particular problem (Tovstiga 2015, 62). The intention is to develop insight-driven strategic thinking and decision-making capability on capital investment in renewable energy sources with a real rationale of the current market situation.

There are three key concepts analyzed and implemented in the strategy phase as shown in figure 1. Sustainability impact, value proposition and financial planning. The first concept is derived from environmental impact which according to Legrand & al. (2017, 510) is the impact the community has on the environment as the consequence of its activities. Although, in this thesis environmental impact is analyzed through sustainability impact by investing in renewable energy production business perspective and it is connected to the second concept, which provides a set of value proposition benefits that are designed to attract customers (Osterwalder, Pigneur, Bernarda & Smith 2014, 6). Hence, designing a sustainable value proposition by investing in renewable energy sources in hospitality business provides organizations with significant leverage in the market. An important notion here is that the business should adapt in order to secure legitimacy, legality, and business success (Aagaard, 2019. 7).

Financial planning in the strategy phase refers to capital investment or capital budgeting, these are two interchangeably used terms. Essentially, it is a decision where expenditure and revenue for a specific project will continue over a period of time (Keat & Young 2006, 439). And according to Atrill and McLaney (2018, 281) the essential element is time when making investment decisions.

Conceptually based on Keat and Young's (2006, 440) illustration, Figure 2. Provides a visualization of the capital investment in a non-current asset class to which certainly solar panels belong.

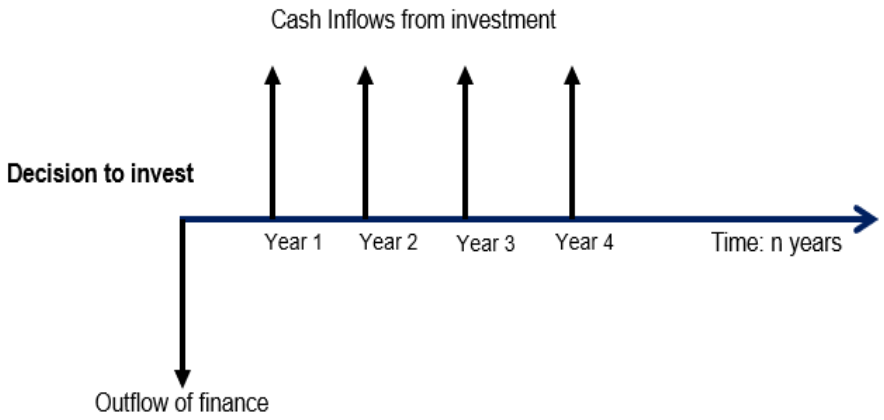

Figure 2. Capital investment decision followed by financial expenditure and revenue in the time period. (adapted from Keat and Young 2006, 440)

The evaluation phase of the thesis analysis estimation of revenues based on capital investment appraisal techniques: such are accounting Rate of Return (ARR), Net Present Value (NPV), Internal Rate of Return (IRR) Payback Period (PBP) and discounted payback period (Atrill, McLaney, 2018. 307-320; Drury, 2015. 309-338; Jones & al, 2012. 227-240). The most appropriate appraisal method is applied according to the source of the capital and time projections.

In order to keep capital investment plan in renewable energy in hospitality straightforwardly appliable at the core concept, this research does not include sensitivity or risk analysis which are potential impacts on viability of the project by changes in various outside or internal parameters.

Business model in evaluation phase incorporates environmental impact and new value proposition to analyze how hospitality company can transition towards sustainable business operations. However, this thesis does not cover studying the business model itself nor the physics of how solar panels work and their quantitative impact on the environment, the assumption is based on, that solar panel-generated electricity is a sustainable energy source compared to non-renewable sources. Since solar power is one of the mainstream forms of renewable energy along with, wind, geothermal, hydropower, bioenergy, and ocean power (Legrand & al. 2017, 50).

1.4 Research design

This thesis follows the constructive research approach (CRA). This in essence is creating a new construct for solving practice-oriented problems (Moilanen, Ojasalo & Ritalahti 2022, 85). Applica-

tion of CRA is especially relevant in the context of this thesis. Kasanen & al, point out, it was originally applied in the field of management accounting (Piirainen & Rafael 2014, 7). Capital investment appraisal methods used in this study are certainly known as a part of a managerial accounting syllabus. Although CRA it has a wide application as a research method in business management theory, CRA as a methodology, according to Lukka (Piirainen & Rafael 2014, 7-8) creates innovative constructions to solve real world problems and hence contributes to the subject of study where it is applied.

In applying CRA, the goal is to develop a capital investment plan combining capital budgeting and business development strategy methods and theories, where the creation of the investment plan requires constructing new knowledge in the field based on existing theories and collected data in order to create a holistic and tested applicable model for capital investment in renewable energy for hospitality SMEs.

The empirical data in this thesis was obtained from several sources, primarily from contacting industry actors and enquiring data and information, secondly obtaining needed information by utilizing online research. The latter approach is used if data or information is inaccessible through primary sources. For example, banks do not provide interest rate quote on a loan for solar panel investment until they examine financial statements and economic disposition of specific company, which means getting involved with commercially classified information and company turning down due too high commitment required. In such case Interest rate is taken from online available sources; solar panel vendor quote, earlier conducted research for the same market or available bank rates on their websites.

In order to find answers, research utilizes a mixed method (Saunders, Lewis & Thornhill 2016. 169). This is when the combination of quantitative and qualitative analysis leads to finding answers and solutions for the central questions of the thesis. One such method used in financial evaluation within this thesis is simulation, this is to replicate possible business operation. It is used to analyze how a system behaves by modelling with both existing and conceptual systems (Abbana 2021, 46). Thus, in this capital investment appraisal simulation real world existing data is combined to create a model. It is defined as; an entity that is used to represent some other entity for some defined purpose (White & Ingalls 2009, 12). The construct of capital investment appraisal of this thesis is simulated and modelled using available accessible data from different sources on the existing market in Finland and immediate proximity of European Union common marketplace.

Thus, provided financial and energy cost calculations are not based on concrete project, since interest rates on loans and solar panel installation costs vary on case to case basis. From insights gathered through inquiries with solar energy solution providers and financial institutions, following

non exhaustive list of factors are affecting determination of cost of the solar energy project of hospitality establishment.

- Location of the site
- Geography of location (e.g., forest, seaside, urban)
- Building type and construction specifications (e.g., roof type, angles, height)
- Grid system connection possibilities
- Financial performance of organization
- Financial outlook in the future
- Permits and regulations

These factors produce differing financial data for every hospitality establishment, consequently it would not be possible to determine two equally costing projects. Alternatively, in this thesis it is a simulated and modelled construct to serve as an illustration of investment appraisal techniques based on real market accessible data.

Additionally, the thematic analysis adoption allows the linking of three topics that are finance, sustainability, and hospitality. The themes are intended to be explored, connected, and strategized through interviews, existing theoretical frameworks, and stakeholder analysis. Overall, thematic data analysis is an effective tool for providing a structured and systemic approach that gives the ability to researcher capture participants perspectives and link them with the theoretical base.

2 Review of Finnish hospitality sector

Before laying out any strategic work it is essential to understand the underlying business environment and its structural content. Understandably, Finnish hospitality sector can be reviewed extensively, for the reason that structurally it encompasses wide range of services and products, such as accommodation, food and beverage, tourism activities and services, events and conferences, online platforms, and travel agencies. Tourism accounted 4.9% of all employed workers in 2021, the number of workers before the pandemic consisted around 154000, representing 5.8 % of all employed persons in Finland (Ministry of Economic affairs and Employment of Finland n.d.). According to Finnish hospitality association MARA (n.d.). figures, in 2019 hospitality sector brought 16.3 billion Euro to the Finnish economy, out of which foreign visitors brought 5.3 billion Euro.

Evidently pandemic had a significant negative impact on hospitality industry together with in 2022 war started by Russia. Although scope of the latter is still to be determined due to its ongoing impact. This chapter will try to explain impact of COVID-19 on Finnish hospitality sector, since it has actualized environmental issues even more vividly, affecting national tourism along with increasing energy costs.

Transition towards zero emission goals requires major commitment and allocation of resources from business organizations, and while hospitality sector is still recovering from pandemics impact, small companies in this sector may struggle to dedicate funds towards eco investment and access to required competencies to successfully make changes in operational level to reach sustainability goals and receive benefits that added value of green tourism could deliver.

2.1 SME company In Finnish hospitality market

In this research focus is placed on small and medium size companies, colloquially referred to as SME (small and medium size enterprise), the emphasize of which is in Finnish hospitality market segment, although not limited to by any means. According to the description of the government agency Business Finland (2023), SMEs are companies with fewer than 250 employees and turnover no more than 50 million or balance sheet of no more that 43 million. One more indicator is to meet criterion on independence (Statistics Finland n.d.).

Conceptually in this research hospitality SME refers to a single hotel, resort, inn, or any type of establishment that provides overnight lodging services to travellers and holiday makers as the means to achieve economic benefit and the same time falls within aforementioned SME criteria and additionally can be placed in eligibility for electricity contracts suitable for SMEs (Helen 2023). The goal

is to determine investment strategy in renewable energy and ways of its evaluation for singe hospitality SME in geographic domain of south Finland.

Many hospitality SMEs are unique in their community engagement, customer service and agility in the market. They could be pioneers in sustainability practices, by means of their adaptability, fast decision-making potential and relatively low investment funds required for the capital projects. Their strength in sustainable business promotion is in their local community engagement, which could be one of the influential means for sustainable business success.

2.2 COVID-19 impact on Finnish hospitality sector

Tourism industry in Finland experienced major negative social and economic impact from coronavirus outbreak. Many years of steadily growing national hospitality sector faced an uncertain future and almost overnight slashed revenues. The COVID-19 crisis also destroyed the majority of pre-crisis developed tourism strategy planning theories and foresight analysis (Heikkinen and Kaivo-Oja August 2022). This meant significant downturn in performance indicators of the industry and employment policies, inevitably affecting Finland's economic development.

Tourism is the important part of the Finnish economy and employment, its direct share in GDP before the pandemic was 2.7 per cent in 2019 and the total demand of tourism was more than 16 billion EUR, the revenue of tourism business totalled almost 21 billion EUR in 2019, whereas in 2020 the GDP share went down 1.7 per cent and total demand went down to 9.7 billion EUR (Nordic Council of Ministers 2023). Despite such crisis, the domestic tourism kept afloat large part of the Finnish tourism industry aided by efficient vaccination campaign and effective anti-COVID-19 measures.

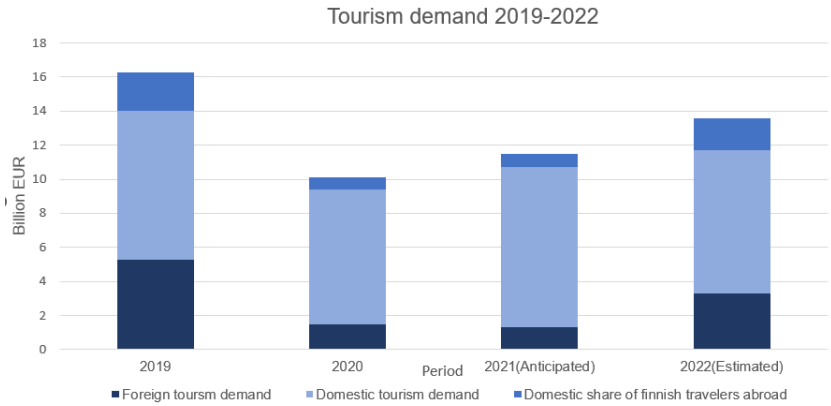

Figure 3. Tourism Demand in Finland 2019-2022 (Ministry of Economic Affairs and Employment of Finland)

Demand in terms of domestic and foreign overnight stays in 2019 reached 23.1 million of overnights, while during the pandemic fell to 14.3 million, following with total overnights stays projections of 22.2 million in 2022 and 26 million in 2023. Projects for 2022 indicate growth in total demand to 13.5 billion Euro. Has to be noted the effect of decrease in domestic demand from peak year of 2021(Ministry of Economic Affairs and Employment of Finland n.d.).

The number of domestic overnight stays went down by 4 per cent from the pre pandemic levels, meanwhile foreign overnight stays fell by 70 per cent. In the period of first eight month of 2022, the domestic share of overnight stays has been 79 per cent (Nordic Council of Ministers 2023).

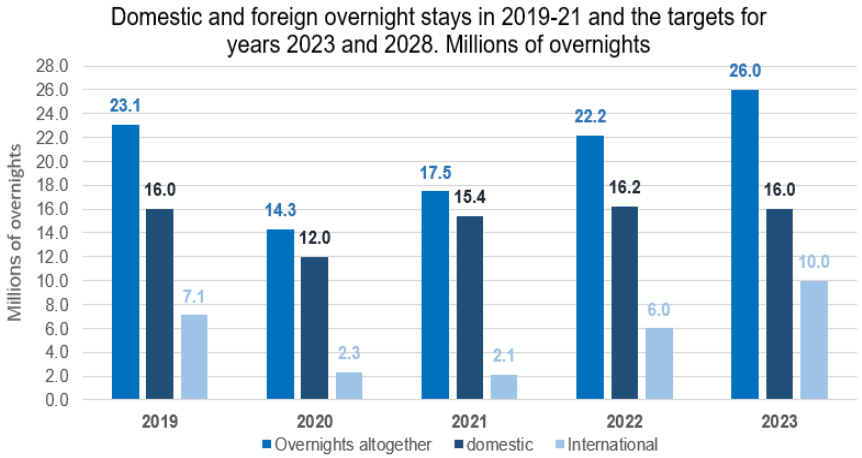

Figure 4. Domestic and foreign overnight stays in 2019-21 and the targets for years 2023 and 2028. Millions of overnights (Nordic Council of Ministers and Statistics Finland)

According to Statistics Finland 2023 data, Hotel occupancy rate of bedrooms have not yet recovered to pre pandemic levels which was 56.1 per cent in 2019, falling to 37.9 per cent in 2020 and making post pandemic 9.8 per cent so called *bounce-back* effect in 2022 reaching 49.7 percentage points, consequently projecting slower growth in 2023 by 3.6 per cent growth.

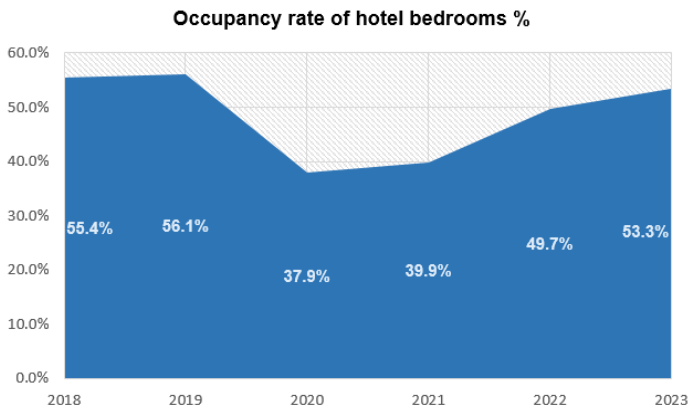

Figure 5. Occupancy rate of hotel bedrooms 2018-2023 (Statistics Finland)

Post pandemic projections indicate growth trend for the tourism sector despite ongoing geopolitical instabilities which have a negative impact on global economic development, consequently dragging backwards tourism development.

Organizations operating in tourism and hospitality require holistic foresight and risk thinking and uncertainty thinking and new week signal indicators and continuity of monitoring (Heikkinen & Kaivo-Oja August 2022). Although this type of foresight development can be effectively only harnessed by organisations such as MaRa, Visit Finland, National economic and tourism agencies, and companies such as NoHo, S Group, Finnair. It is important that foresights could be shared with smaller actors in Finnish tourism and hospitality sector, as they represent important clusters of their regional economy.

2.3 Eco strategy and planning towards green transition

Evidently, high energy costs largely caused by ongoing global issues in recent years such as pandemics, politics and environmental issues influence hospitality SMEs agenda on how to adapt and succeed in their own market segments. Renewable energy production and sustainable consumption definitely adds significant value to sustainable economic development and could address vast number of strategic issues, although as long as it does not compromise on profitability for the investor and based on free market initiatives.

Definitely there is an effort within European Union that dependence on fossil fuel import with volatile deals could be risky in many ways beyond economics. The new EU initiative proposes Solar Energy strategy that will introduce a legally binding EU solar rooftop obligation to provide accelerated installation of solar panels on buildings, help create needed skilled workforce for production, installation and maintenance of solar panels, and support EU industry in expanding and the domestic production oh photovoltaic panels (EU Solar Energy Strategy 20 March 2024). The important part of this initiative is that it concerns directly to many hospitality SMEs. Since, the installation of rooftop solar energy will be compulsory for all new public and commercial buildings with useful floor area larger than 250 m2 by 2026 and all existing public and commercial buildings with useful floor area of 250 m2 by 2029 (EU Solar Energy Strategy 20 March 2024). This initiative raises lot of questions from Finnish hospitality stakeholders, especially mandatory transition to solar installation systems could be unviable for some industry actors, for example not all property owners might be motivated by this initiative. In addition, big question is the climatic aspect of the Nordic location that plays significant role in generating solar energy.

Thus, it is most important at this stage for Finnish hospitality SMEs to directing efforts towards finding ways to make solar energy investment beneficial for their business. Although such initiatives definitely need to consider economic realities and solar energy production capacity of the region.

Transition towards sustainable business requires strategic thinking and competences. As Sini Maunula (July 2023) points out that green knowledge is key to realizing the green transition. Further explaining that green know-how does not only mean, for example, technological know-how that enables the development of more environmentally friendly innovations, but it includes many different skills that can be linked to the green transition either directly or indirectly.

SME companies need to analyse their green or sustainable transition on fundamental level and ask questions what and who are causes or drivers of required change, who are those who make new policies and action plans, and what are their goals? What is our stance on the issue as an entrepreneur, do we see opportunities or disadvantages? These questions can be attributed to external drivers and internal factors of the organizational strategy to develop prospective plans.

Consequently, transition process may include application of technological competencies to the existing conditions in which company operates and identification of inner organisational motivation and willingness to allocate resources for the changes that are needed in order to achieve sustainable operations on continuous basis.

Sustainable business transition requires planning based on competence in green know-how. This is a green know-how which is prerequisite for performing green work or enables work to be modified in such way that it can be used to support the green transition (Maunula July 2023). Companies in hospitality industry transitioning towards sustainable green models definitely need to develop multidisciplinary competences to enable their investments in sustainability to pay off profitably. For example, intentionally crafted service design model to enhance energy efficiency in the hotel premises.

3 Strategizing the capital investment in solar energy for hospitality SME

Capital budgeting in renewable energy production involves dealing with various complexities due to its span over several different industries and governmental statutory instruments, such as environmental legislation and international policy alignment.

The most important part for the company taking on a capital expenditure is the ability to forecast and then plan accordingly the return in monetary terms and the impact on stakeholders from value and environmental viewpoints. This is when company strategy comes into work. From this perspective, this chapter provides a strategy groundwork for the hospitality company on three essential factors identified within this research when making the investment in own solar energy production, these comprise: Sustainability impact, value proposition and capital budgeting plan. First two parts of the chapter provide the context on sustainable transition and insights on Finnish hospitality SME's concerning COVID-19 and its impact.

Essentially, strategy phase analysis range of subjects that are impacting the go-ahead or halt the project decision. This may seem chaotic from the start, although insight development and formation should lead to the connecting the outcomes of the analysis, thus allowing insight based sensemaking for the further decisions.

3.1 Defining strategy and planning

At this stage, it is essential to define and distinguish strategy and planning, as both are core elements to have for capital investment project. First of all, Martin (2022) argues that strategy and planning are different things, and plan is a set of activities that the company declares that it's going to do. Further, He distinguishes strategy as:

> "An integrative set of choices that positions you on a playing field of your choice in a way that you win" (Martin 2022).

In modern business situation *winning* comprises setting the right direction for the organization through the periods of change and ensuring its competitive well-being over time (Tovstiga 2015, 6). This is when businesses win by creating, delivering, and capturing superior value. The strategy thus involves activities of achieving greater financial performance and customer value by outperforming competition in the market. One of the classic descriptions of this in business literature is a competitive strategy, which means the deliberate choice of different set of activities to deliver a unique mix of value (Porter 1996).

One of the main uses of planning is linked to resource utilization and cost management. For example, the sequence of activities the company takes to expand production capacity, or make installation of the new plant cost-effectively, as well as setting up budgets. Planning can be viewed as a tool for achieving operational effectiveness, referring to any number of techniques that allow a company to better utilize its inputs (Porter 1996). From this view, cost saving and environmental impact from the production of own carbon emission-free renewable energy for the hospitality company is a result of successful planning, although inception of the plan, foreseeing of the value creation and competitive outcome is a work of strategy. Ultimately, the plan is an integral part of the strategy process since it serves the achievement of a strategic goal of winning the competition.

3.2 Strategizing in practice

The term strategizing in the heading reflects the strategy work more precisely process of insight driven strategy development and deployment. There are numerous definitions of strategy in management literature, relevantly reflecting business actualities of their time and context. Although, for the hospitality market player who is starting a new capital investment in the sustainability project requires some type of explanation that reflects the of central point of the strategy and guidance through its stages from the ideation to strategy formation and implementation. Practical pattern could be provided with modification of the insight-driven strategic thinking process schematic (Tovstiga 2015, 19).

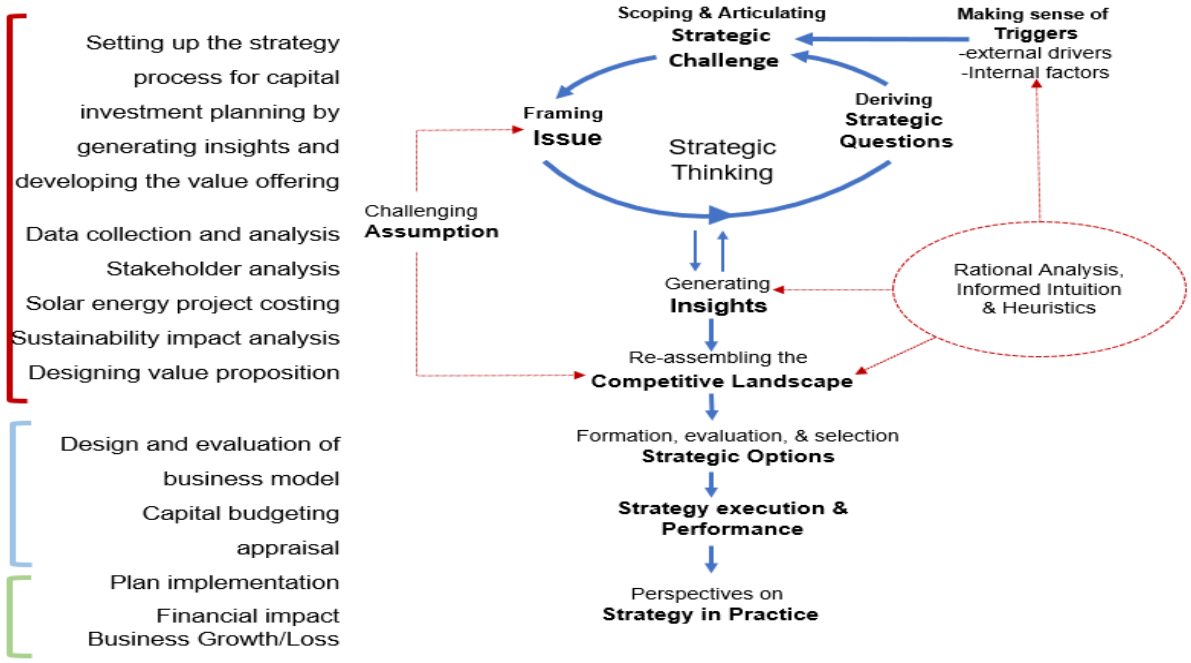

Figure 6. Strategy process for capital investment in solar energy production for Hospitality company (adapted and modified from Tovstiga 2015, 19)

The left column in the red bracket reflects ideation of strategy of capital investment, formulation of the central issues and themes and their impact analysis. This process provides insights and the ability to outline strategy in terms of the sustainability, value proposition and capital budgeting that leads to the strategic options of developing the sustainability value driven business model that is evaluated by measuring return from investment in renewable solar energy production. This process is reflected along the blue bracket.

The practical implementation of the whole project and monitoring of level of the success in final stage is represented by green bracket in Figure 3. This also means constant update of the process as required by continuous assessment of the internal factors and external drivers.

A number of challenges arise beyond the control capacity of the business manager. This leads to triggering of the strategic questions by problems in the firm's external environment (Tovstiga 2015, 31). Examples are, change in compliance policy towards environmental issues or challenges in competitive landscape. Conversely, problems can be triggered by internal factors such as, inefficiency in operations management, customer service failures, lack strategic vision to implement innovative changes in order to reach unique competing position.

3.3 Goal of the strategy process

From the viewpoint of the capital investment in renewable solar energy production, the endgame is creation of value in the competitive market to the stakeholders whether result is cost saving or offering green (low carbon) accommodation experience or both. Tovstiga (2015, 97) points out that business compete by differentiating themselves apart from competitors through the creation, bundling, and delivery of value offering. As the strategy is considered as ultimate means of winning in competitive marketplace. Businesses win by creating and delivering a uniquely superior value offering to their stakeholders (Tovstiga 2015, 97).

Different and superior value is an important notion that implies superior economic performance in the market by competitive advantage, meaning that company creates value for customers and is able to capture value for itself because positioning chosen in the industry effectively defends the company from the profit-eroding impact of Porter's five forces (Magretta 2012, 93). According to such logic, the investment in renewable energy solution gives hospitality company opportunity to create differentiated value offering, hence positioning business in growing sustainable segment.

4 Solar energy application and sustainability impact on hospitality SME

Considering the latest official data from UNWTO (Hotel Energy Solutions, UNWTO, 2023) that indicates hospitality accommodation sector's 2% share in tourism sector's 5% global CO2 emission. In addition, increasing public awareness and national governments pressure on environmental protection puts pressure on hospitality property owners and operators to look for more sustainable ways to continue creating value. Already the Finnish hospitality association MaRa in partnership with sustainable business consultancy Gaia have developed low-carbon roadmap for the tourism and restaurant industry which calculates the sector's current carbon footprint and estimates the development of emissions until 2035 (MaRa n.d.).

The effect of production and use of solar energy for hospitality SME companies in this thesis is studied from the perspective of its economic and environmental benefits, that potentially creates value for both the entrepreneur and the consumer through sustainable value proposition. Application of solar energy can have a positive indirect effect on environment when it replaces or reduces the use of other energy sources that have a larger effect on the environment (U.S. Energy Information Administration). The main premise of this part of the research is identify how solar energy utilization can be an effective measure for hospitality SMEs in Finland.

According to Finland's National Energy and Climate Strategy to 2030 is to increase the renewable energy share in energy end-consumption to more than 50% (Ministry of Economic Affairs and Employment of Finland 2023). The Finnish energy system is undergoing swift transition driven by concurrent advancements in the regulatory environment, consumer tastes, technological improvements, and investor attitude (KPMG Finland 2022). This means for hospitality business as one of the integral sectors of national economy the necessity to transition towards more sustainable business operations and gain benefits, instead of being late to necessary transition and ending up in a costly affair.

It is important to acknowledge the sustainable development mode of the current socio-economic environment and define it beyond environmental responsibility of the business, since sustainability development includes economic and social aspects. This notion is provided by Word Business Council on Sustainable Development (WBCSD) defining it as the forms of progress that meet the needs of the present without compromising the capabilities of the future generation to meet their needs Investment in solar energy is in line with sustainability development since it promotes environmental sustainability reducing greenhouse gas emissions, mitigating climate change, conserving resources, and fostering a cleaner and diversified energy system, further contributing with socio-economic value to stakeholders.

4.1 Solar panel electricity generation

Although the physics and engineering technicalities are beyond the scope of this thesis it is important to understand the type of solar energy production for hospitality sector applications in little more detail. Electricity produced by solar panels is generated using the *photovoltaic effect* (Boxwell 2019). Panels with layers of semi-conducting material are directed to the sun, in this position panel absorbs the electromagnetic radiating particles called photons which brings the electrons into motion, moving them between layers and resulting in an electrical charge, hence producing clean and renewable energy.

Photovoltaic (PV) solar panel consists of modules of solar cells which by itself produces insignificant amount of electricity. Thus, cells are merged into a module, then modules into a panel, and panels into arrays for more significant power applications (Nelson 2011, 103). In order to be able to use PV generated electricity *Inverter* device (AC/DC Inverter) is required for the conversion direct-current (DC) solar electricity to alternate-current (AC) type that is produced by grid-electricity system which is established energy supplier for households and organizations.

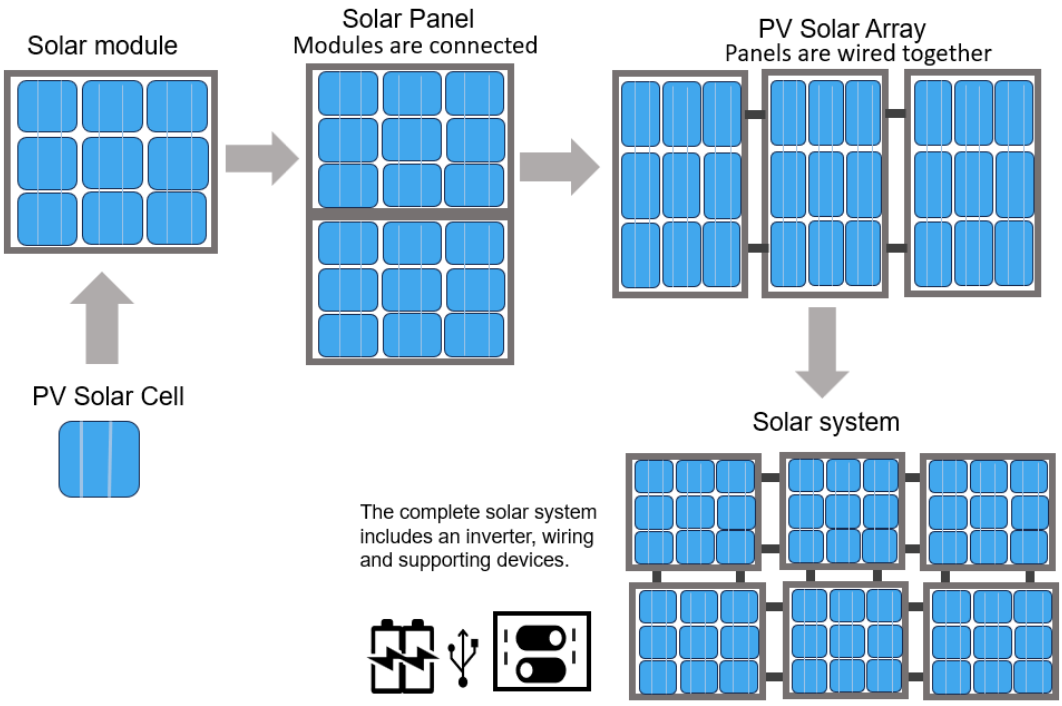

Figure 7. Configurations of photovoltaic solar panels

The most effective way of solar energy application in the hospitality sector seems in resorts and similar accommodation and guest service providing areas where there is sufficient space for the

cost-effective capacity of solar panels to be positioned to the sun for the maximum energy generation, and the same time they are out of the way from guests during their daily recreational activities.

4.2 Solar electricity production and application

Despite having set up an effective solar energy generating system it is still essential that guest service and accommodation facilities to be able to switch to the grid connection when solar energy production capacity is falling short. In this setup, the PV system is the parallel source to the grid, where the inverter switches DC-to-AC to the appropriate frequency. All electricity that is produced by the PV system may be used on-site, sometimes depending on the capacity of the PV system, energy could be fed back to the grid (Nelson 2011, 107). Such system allows a higher degree of flexibility in energy consumption and avoidance of guest disturbance. Coupling with the grid supply the solar energy system ensures hospitality facilities uninterrupted energy flow at all times.

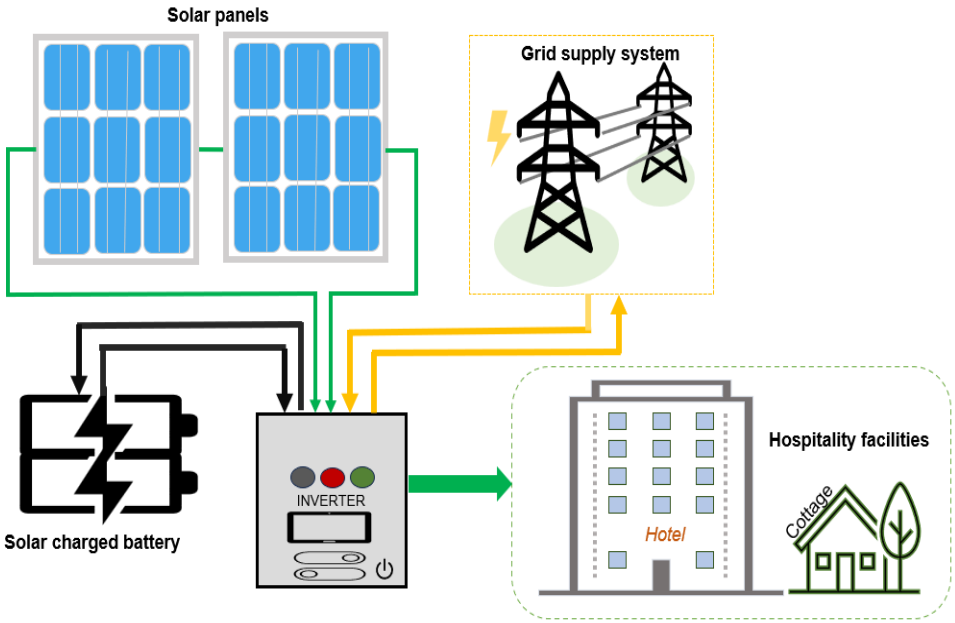

Figure 8. Basic schematics of solar energy and grid supply in conjunction, with conversion by inverter to the utility electricity

Utilizing solar panels and grid supply in conjunction fits into grid-tie system, that could be attractive proposition for many hospitality operators. Boxwell (2019) provides an explanation.

> "The benefit of grid-tie solar installations is that they reduce your reliance on the big electricity companies and ensure that more of your electricity is produced in an environmentally efficient way" (Boxwell 2019).

Hospitality facility operators can achieve greater energy efficiency, although it is worth understanding the estimated capacity of solar energy production. Allen and Tynan (August 2023) provide simple formula, where with the rated wattage of a solar panel anyone is able to estimate the electricity production of a solar panel applying the following formula:

> "Power in Watts X Average hours of direct sunlight = Daily Watt-hours" (Allen & Tynan August 2023)

Rating of solar panels is tested and determined by manufacturers, although it is worth noting that the efficiency of the system is dependent on the location of the system and climatic conditions, thus definite electricity output for business viability purposes could be difficult to determine with the highest degree of accuracy. It is rather important from the hospitality business perspective to achieve enough ratio of on-site electricity production compared to grid electricity usage that justifies investment in the project by achieving considerable financial savings.

In more scientific terms, according to United States Environmental Protection Agency (2023) calculating annual PV solar system electricity production is a function of the equation (figure 9):

$$E = A * r * H * PR$$

- A = Total solar panel Area (m^2)
- r = Solar panel Efficiency (%)
- H = Annual average solar radiation on tilted panels
- PR = Performance ratio, the coefficient for losses
- E = Energy

Figure 9. Formula of PV solar system electricity generation (United States Environmental Protection Agency 2023)

Electricity output calculations based on application of these formulas for the concrete project will depend on the product-type of solar panel and its efficiency, as well as geographical conditions such as average annual sun hours and insolation (amount of sun radiation absorbed on particular surface area in given time) impact on solar panels. Although, according to associate professor of LUT, Kosonen (14.4.2023) Finland's low atmospheric temperature improves efficiency of solar PV cells, hence giving the country advantage.

4.3 Environmental impact and stakeholders

Using the sun's limitless energy to generate power for running the business is an attractive proposition from stakeholder environmental perspective, this commitment instantly affects the perception of the people involved around the business. Understandably so, solar power is a step towards saving natural resources for future generations and at the same time making the planet more liveable from the current generation perspective.

There are several environmental benefits from solar panel electricity production that include clean energy production without releasing air pollutants, and minimal water usage compared to water consumption heavy power stations that are hydroelectric, coal and nuclear power generating plants. In addition, one of the main benefits is attributable to lesser energy dependence on imported fossil fuels. One might consider land use a drawback, although solar panels can be integrated into infrastructure in many configurations such as roofs and neutral spaces where they do not interfere with guests' daily activities.

It is essential to acknowledge that promotion of environmental proactive action such as opting for renewable and clean(non-polluting) energy production is a part of the multidimensional sustainable business practice or action towards sustainable development according to its definition as in the beginning of the current chapter. These dimensions certainly include social and business aspects alongside the strong efforts to make positive environmental impact. As a practical framework, proposition of three dimensions of sustainable hospitality which considers all management and operational decisions to be made with the consideration of environment, society, and operational profitability (Legrand & al. 2017, 27). Thus, solar panel installation and renewable electricity generation viewed from environmental, social, and business perspectives, achieving set priorities in all three dimensions lead to successful sustainable capital investment projects.

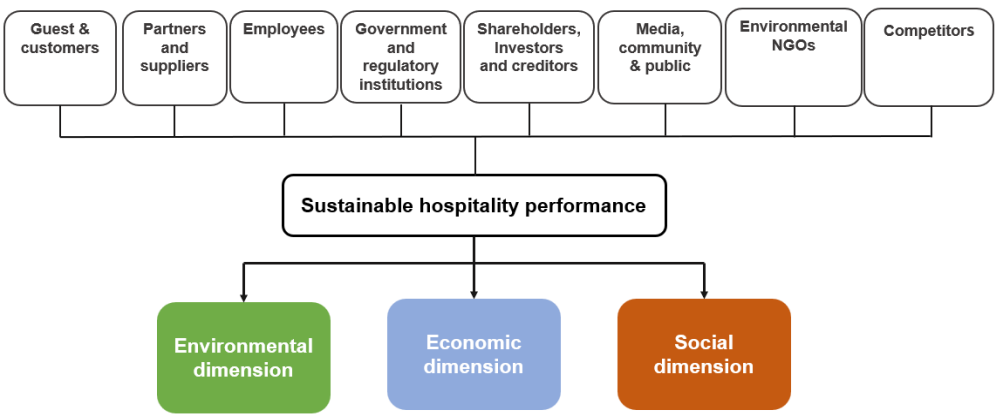

Figure 10: Sustainable hospitality framework applied to a capital investment project in renewable solar energy (Adapted from Legrand & al. 2017, 28)

Sustainable hospitality framework in figure 10. Includes main identified stakeholders' perspectives, concerns, and impacts when hospitality business organization is deciding on investment in on-site solar panel electricity generation. This enables organizations to create systematic collaboration and ability to prevent unforeseen challenges, thus reaching the goals towards all three, environmental, economic, and social dimensions.

5 Value proposition of sustainability project in hospitality sector

Investment in sustainable project of on-site renewable energy source provides one more dimension to the project, in addition of cost savings on electricity expenses. This is a consumer centric dimension, around which revolve other stakeholder groups. By developing sustainable business operations organization creates sustainable value in the market and this itself could be communicated with consumers and in the bigger picture incorporated or developed into sustainable business model (SBM).

It is important to understand value proposition before adding to it sustainability component which is becoming increasingly mainstream due to processes concerning global trends in environmental realities, policies, and consumption patterns. In the domain of hospitality SME, the value proposition could be defined according to Osterwalder, Pigneur, Bernarda & Smith (2014, 6) where the value proposition represents the benefits customers can expect from offered products and services. The key addition with sustainable value proposition is that company mission reflects the core business value and competitive strategy, where sustainability vision implies the vector of social responsibility the company aims to follow (Aagaard 2018, 11). For the real-world hospitality business this means creation and delivery of the products and services that are in line with sustainability goals of the stakeholders who could be divided in two categories; the institutional which are environmental policy makers and regulators. The second category comprises customers and business partners.

The goal of this chapter is to explain the impact of capital investment in solar energy as a key component in the big picture of eco-investment value proposition. The following subchapters showcase models and examples on how hospitality establishment in Finland could integrate eco-investment into value proposition and achieve shareholder wealth growth, as well as reach sustainability objectives.

5.1 Changing consumer behaviour

There has been a major trend in consumer demand growth for environmentally conscious value offering in hospitality sector. Consumption patterns slowly but steadily move from awareness phase of ecological and social impact of their consumption, but also become more actively engaged in demand formation and policymaking. This consumer engages with individual responsibility in the state and economic systems and more specifically in social equity and environmental protection (Legrand & al. 2017, 255). This pattern can be considered worldwide although consistently consumers in northern European states demonstrate willingness to make one practical step for-

ward and integrate eco-friendly consumption in their everyday life. According to the survey commissioned by Sitra, most people in Finland acknowledge it important to live sustainably and believe that consumption choices influence mitigation of climate change (Autere 12 October 2019). And this pattern can be observed clearly in everyday situations. Following charts (figure 11.) indicate consumption choice patterns just before pre-Covid-19 years.

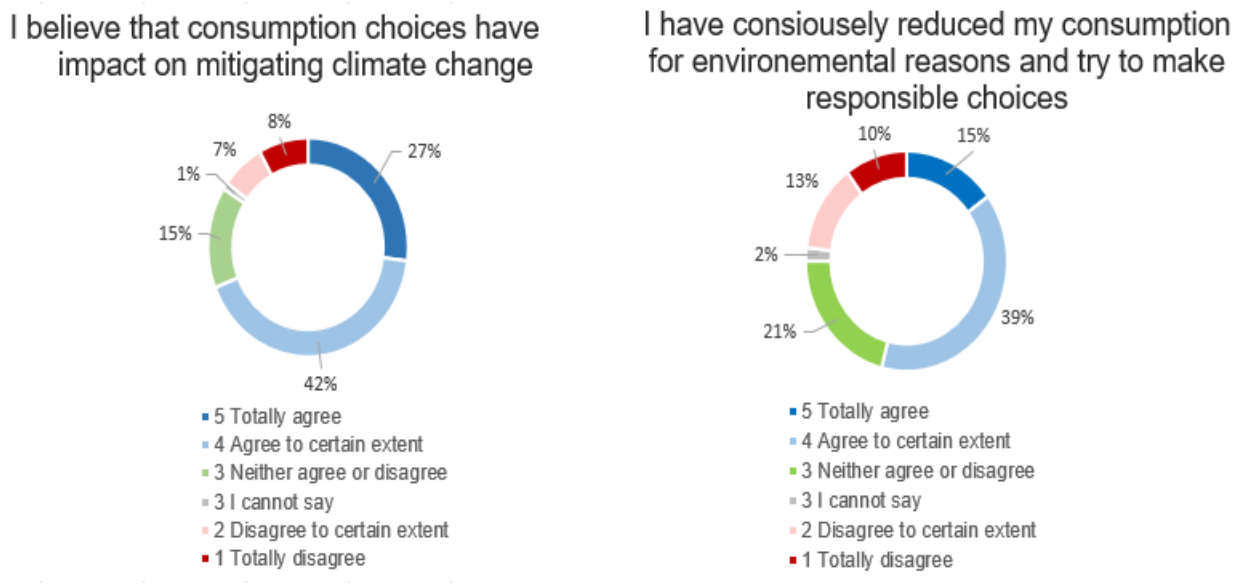

Figure: 11. Charts describing Finnish consumer behaviour towards sustainable consumption for 2019 (adapted from Autere 12 October 2019)

In addition to consumers awareness and increasing action towards environmentally friendly consumption behaviour, Finnish tourism bodies and a state at large are actively promoting sustainable tourism in the country and internationally. Visit Finland strategy 2021-2025 in its action plan is targeting Finland to be recognized as world's leading sustainable travel destination (Visit Finland 2021). In addition, national Sustainable Travel Finland (STF) programme was developed for the tourism industry as a tool for reaching sustainable development and climate goals (Visit Finland 2023). Furthermore, according to Visit Finland (2023), 89% companies in STF programme take measure to improve energy efficiency, and 68% of energy use comes from renewable sources.

Conclusively, there is a definite nationwide effort towards sustainable development of the tourism and hospitality sector in Finland and it is essential that companies no matter the size and operating market segment make eco-investment, provided that state is providing dedicated grant programs and consumers are voting with own money.

Promotion of Finland as an international sustainable destination can boost local hospitality SMEs outreach globally, bringing additional cashflows. Study conducted in USA by Kang, Stein, Heo &

Lee (2012, 564-572) found positive and significant impact of environmental concern, as measured by the new ecological paradigm, on willingness to pay a premium for environmentally friendly practices. Such trend in consumer behaviour can be observed globally, especially in economically and socially developed regions. Conclusively, eco-investment such as solar energy project for hospitality establishment can have consumer approval and be in line with national effort of green transformation. This implies growth in revenues and aids available for eco-investment initiatives.

5.2 Perspective from partners in tourism sector

In line with growing consumer demand and government effort tourism industry partnerships are driven along by incentivized programmes of eco-labelling. Although not all customers might be interested in sustainability agenda, nevertheless being environmentally proactive organization elevates its status to a responsible tourism company, that considers the social, cultural, economic, and ecological impacts of its operations (Visit Finland 2022, 16). B2B partners in tourism sector take this paradigm seriously and insist on environmental action and evidence from their counterparts. Kumar and Christodoulopoulou point out that business customers have a higher risk sensitivity, and they are concerned about reputational damages, and therefore they are selective with whom they do business (Strömberg 2023, 9). from this view, eco-labels provide type of necessary evidence of brand image or responsible business reputation for hospitality sector partners such as travel agencies and tour operators, who in turn are driven by customer demand and national policies.

Ecolabels are certification schemes with a clear focus on environmental management and sustainability issues (Legrand & al. 2015, 390). As mentioned previously not all customers are interested in or need green holiday, although entrepreneurial judgment that drives investment in renewable energy for hospitality company could aim at value proposition to those customers who care about sustainability and expand its market share. And in conjunction, gain higher synergy from partnerships in the tourism industry. For example, if investment in solar energy project for hospitality SME allow the establishment to cut costs and offer competitive price simultaneously elevating its environmental effort and thus gaining eco-friendly status could potentially increase interest from tour operators and agents.

5.3 Shared value model

The traditional economic dichotomy of shareholder wealth growth as the single motivating factor for the business organization is no longer seen as the only legitimate reason for their reason of existence by consumers and largely modern society. The main reason lies in how consumers perception of socio-economic, political, and environmental challenges influences their spending decisions.

Corporate social responsibility (CSR) in many regards had been hit or miss for many organizations and not always for real societal impact, rather for public image. Modern consumers could embrace more profound approach, where societal issues are embedded in organizations business strategies, thus providing value that aligns economic interests of the business and societal needs of consumers as members of communities.

Hospitality companies especially in the SME segment are particularly vulnerable in their business decisions that influences local communities and their target customer segment, perhaps even more than large companies due to their limited resources to mitigate wrong decisions. An effective approach could be embedding shared value principles in capital investment decisions.

The concept of shared value can be described as policies and operating practices that improve the competitiveness of a company while concurrently advancing economic and social setting in its domain community (Kramer & Porter 2011, 63-77). Hospitality company that is able to design value proposition offering with embedded shared value principle has a greater opportunity capturing customer loyalty and legitimacy.

Shared value proposition does not contradict shareholder wealth growth, contrary, it ultimately creates higher sustainable returns for investors. Using *Grow the Pie* idea proposed by Edmans (26 March 2020 min. 4:20-5:21) which implies running business with the desire of creating social value to make products that transform customers lives for the better, provide employees with healthy benefits and reserve environment for the future generations. By doing these investors are not donating part of the pie, rather they are growing the pie and ultimately, they will benefit.

5.4 Sustainable value proposition design

One of the most strategic tasks of the hospitality organization is to create and capture value by using the business model where financial performance goals are effectively combined with environmental and social missions and targets. Although business model is discussed in dedicated separate chapter, this part of the thesis attempts to identify sustainable value proposition (SVP) design methods and its main elements that investment in solar energy could deliver to its stakeholders.

Two distinct approaches can be combined to design SVP for hospitality establishment investing in solar energy in southwest Finland. The first approach is value proposition canvas (Osterwalder & al 2014). Understanding of the customer profile and achieving the fit with value map which describes how business intends to create value for that customer is the practical application of the canvas. Although, profiling the customer and achieving the fit is iterative process in real world situations.

Notwithstanding, investment in solar energy from business perspective and considering consumer behavioural trend discussed in previous section is conceptualised in figure 12.

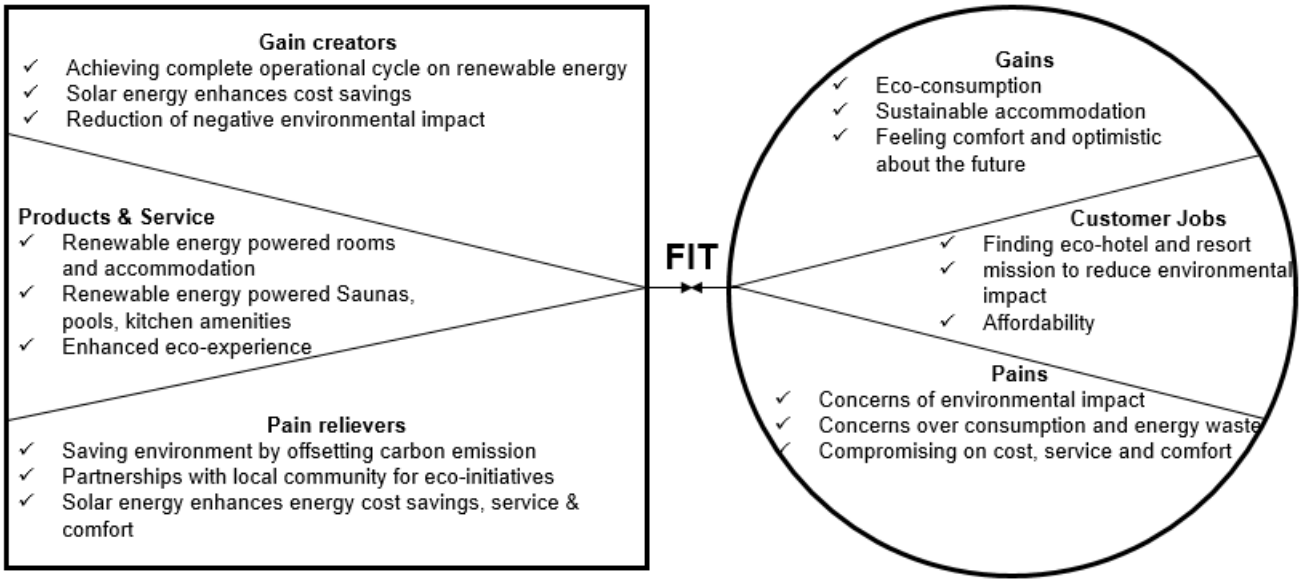

Figure 12: Value proposition of solar energy investment applied to value proposition canvas proposed by Osterwalder, Pigneur, Bernarda & Smith (2014)

While value proposition canvas is centred mostly around customers' profile it is worth considering how company creates and delivers value through its business processes as part of the sustainable business model (SBM).

Concerning the value creation within sustainable SBM, Aagaard (2018, 9) explains, that business models are analysed through sustainable value they generate and consist of three main elements: the value proposition, value generation and delivery, and value capture. Figure 13 demonstrates value creation framework in business model based on these elements.

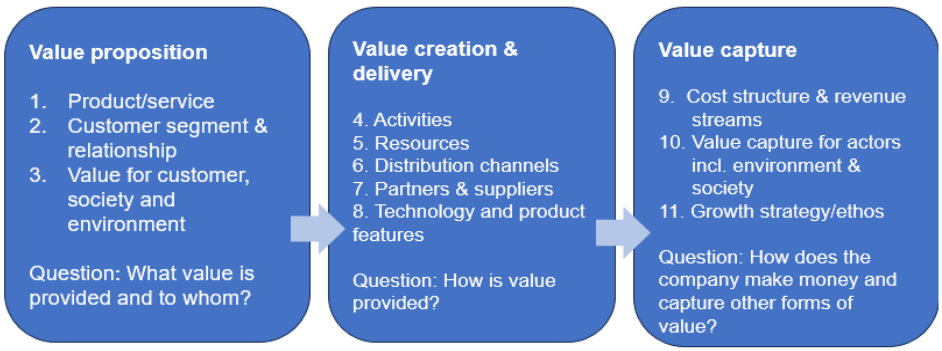

Figure 13. Business models' value creation framework by Bocken, Rana and Short (adapted from Aagaard 2018, 9)

Value proposition in the context of hospitality SME investing in renewable energy creates favorable conditions for the economic exchange between company's sustainable product offering and customers willingness to purchase hotel accommodation and additional services.

Value creation and delivery comprises of identifying opportunities in sustainability shift of hospitality market and making eco-investments to increase revenue streams and market share. This includes also improved brand image through communicating sustainability action and compliance of the company. Business deciding to invest fully in environmental and social responsibility can gain significant rewards in terms of image (Legrand & al. 2017, 262). Which means, Eco-certificates and labels recognized by government and international environmental bodies through effective communication campaign can lead to well recognized and valid sustainable company brand.

Value capture relates to achieving company goals through successful strategizing and its implementation, this is manifested in sustainable demand of products and services offered by hotel converted into cashflows, not to forget central issue of positive environmental contribution and social development.

6 Solar energy investment evaluation results and strategy proposition

Every commercial investment decision is motivated by the expectation of higher future financial benefits. The nature of capital investment is distinct with its usually high value of financial commitment to the capital expenditure. Normally, this is the most important decision organizations make by committing substantial resources to actions that are likely to be irreversible (Drury 2015, 309). The are two main considerations, these are time, and financial capacity of the project. Figure 2. In chapter one illustrates the character of capital investment.

This chapter provides capital investment appraisal and of results of investment in solar energy for hospitality company located in the southwest Finland whose energy consumption falls into regional SME electricity usage capacity. Investment appraisal is used to make financial assessments of value of potential investments to ensure financial resources are used effectively by the organization (Jones & al., 2012, 227). In order to achieve accuracy and reliability there are several operational factors such as annual electricity consumption and expense as well as associated costs and benefits to be considered in detail which are provided within this chapter.

Later part of the chapter presents enhancing solutions to improve successful outcome of investment in solar energy project. Evaluating the opportunity of solar energy investment has broader implications beyond its financial evaluation. Environmental and social implications need to be considered and new strategy formation is crucial to enhance financial and business image while making effort towards sustainable value creation. The new strategy proposes designing sustainable value offering and configuration of old BM to new SBM. The resulting model is the strategy framework which includes levels and stages of strategic insight formation and actions.

6.1 Identifying data sources and collecting financial information

Once again to clarify how data and information was collected it is important to recall that this thesis attempts to follow constructive research methodology. This gives necessary versatility in collecting data and information from various sources and parties.

Since the goal of the constructive research aims at developing improvements to the organization, the needed data should be collected using several methods (Moilanen & al., 2022, 85). Accordingly, this allowed to utilize a wider spectrum of methods and obtain most possible relevant data and information, in addition gain new knowledge in new technology such as operation and capabilities of solar panels. In other words, research methodology may lack in uniformity due to reasons that will be mentioned further, although it gains in developing new knowledge for SME operating in

Finnish hospitality sector who are looking for the opportunities in developing environmentally sustainable and same time profitable investment projects. The following methods were used for data collection and information for insight development:

- Group meeting and discussion
- Online research methods
- Correspondence with market players
- Inquiries and interviews

It is essential to disclose construct of the data used in capital investment appraisal, reason is the closed nature of accessing quoted pricing on solar panels from some dealers in Finland's local solar panel market. It seems to be a common practice not to disclose prices on unit panels or arrays and solar systems at least at the initial stage of B2B contact. Nevertheless, multiple contacts were made with different solar panel vendors and information was provided on requirements including inquiring on the subject. The main pattern was that solar panel vendors were mostly keen on obtaining information and even data on the company further asking for more specific commitments such as organizing visit and making estimations on site, hence this involved additional financial resources, time, and engineering expertise.

In the defence of solar panel vendors could be said following, in order to make an accurate quote it is necessary to know the details of the premises of the hospitality organization's operational basis and actually get there and make measurements. On the other hand, it should be possible to provide an approximate estimation, when provided parameters could make price quote provision possible.

Consequently, it was decided to look in close proximity across the border, particularly Estonia. Where at least one solar panel vendor had an entire price list and panel specifications declared on its website, in addition when contacted provided approximate quotation (Table 1).

Table 1. Approximate estimating quote provided by Vilpra. Estonia based solar energy solutions provider

Solar energy	Annual yield kWh	Cost €
30% solution	70 500	62 693
50% solution	117 500	107 103

The solution in Table 1. Is capable of transferring excess electricity to grid system to be sold at the exchange price.

Hence the solar system is grid connected and pricing includes:

1. Solar panels
2. Inverter
3. Fixings
4. Cable
5. Transport
6. Installation
7. Additional consumables

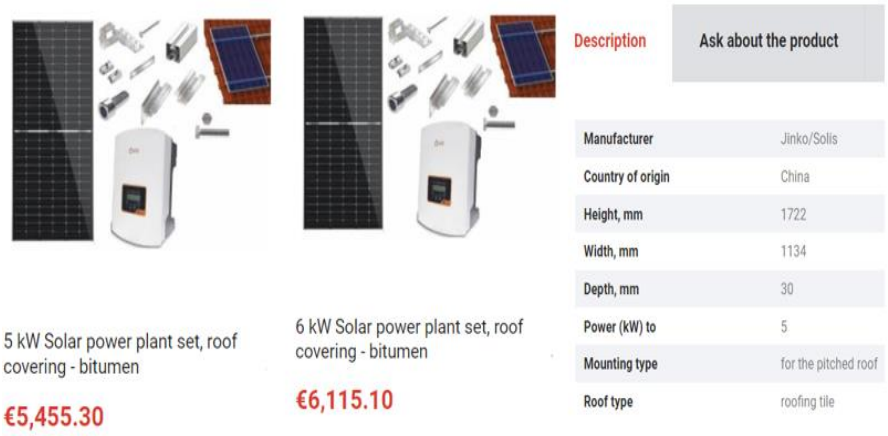

Figure 14. Extract from online catalogue and specification page (Vilpra.ee product catalogue)

The information available on pricing of turnkey PV solar panels in Finland provided by Ahola (2019, 11) estimates 0,7-1,05 €/Watts for small commercial usage of 10-100kW. If this data used in estimating required annual yield of 30% and 50% of total energy consumption of one particular hospitality establishment in southwestern Finland (Table 1.), then following cost are associated with above provided prices.

Table 2. Estimation of turnkey building applied photovoltaic system (BAPV) cost using 2019 prices

Units of electricity power:
1 kw = 1000 watts
71 kW system = 71 000 Watts
118 kW system = 118000 Watts
Cost of 30% solar energy solution
71 000 watts * 0,7 € = 49 000 €
71 000 watts * 1.05 € = 74 550 €
Cost of 50 % solar energy solution
118 000 watts * 0,7 € = 82 600 €
118 000 watts * 1.05 € = 123 900 €

The only problem with year 2019 pricing information is that, since that year two major global cataclysm occurred, the Covid-19 and war in Ukraine followed by dramatic changes in energy prices, from this perspective current available pricing on solar panels arguably holds applicable relevance even if it is imported from neighbouring country, although within common EU market.

6.1.1 Electricity consumption data

Second major disclosure concerns the real electricity consumption data, this is obtained from SME scale hospitality company operating in southwest Finland. The electricity consumption provided includes 11 months and one day of 2022 calendar year. This data has been extrapolated using linear forecasting to include the month of December in the year 2022 calendar year. Hence the data is modified. Although it stays within the category of SME suitable electricity contracts, which are mostly under 300 000 kWh (Electricity contracts for small and medium-sized businesses, Helen n.d.).

Consumption year 2022

	Month	kWh
1	January	16528
2	February	17855
3	March	21541
4	April	21488
5	May	20453
6	June	15756
7	July	12866
8	August	18888
9	September	22201
10	October	17716
11	November	27462
12	December	21703
	Total	234457

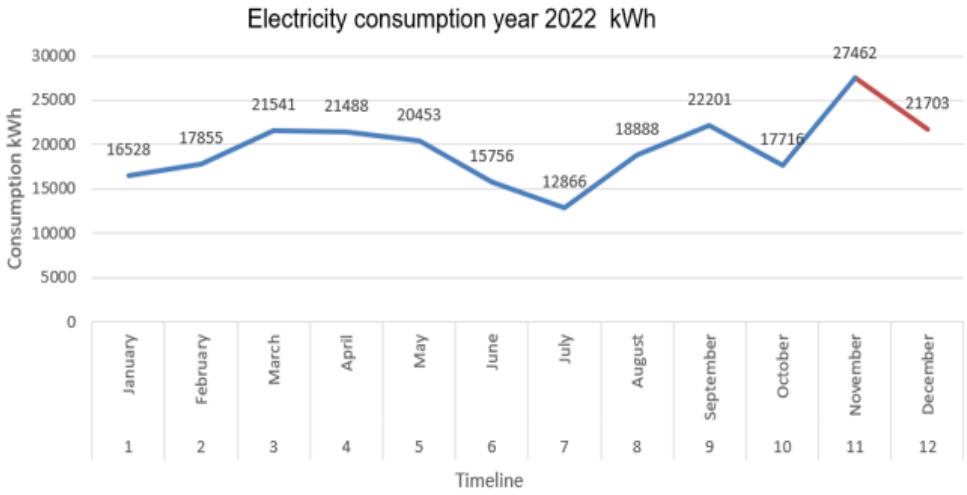

Figure 15. Electricity consumption model of 2022 calendar year of one SME category hospitality establishment in southwest Finland

The total consumption amount in Figure 9. 234 457 kWh is rounded to 235 000 kWh in order to match with quotation provided in Table 1. This makes the figure 235 000 kWh exactly 100% of total electricity consumption.

In order to make estimations of the PV solar system's impact on energy efficiency and potential financial benefits. Monthly consumption given in Figure 9. Needs to be compared with PV energy production in the same timeframe. This is consistent with estimation of energy production from solar power. Typically, energy production from PV system is estimated by month from average solar

radiation for a flat plate (Nelson 2011, 111). Thus, following step requires identifying monthly electricity production from PV system.

The modeling tool for monthly PV electricity production is provided by United States based NREL (National Renewable Energy Laboratory) website that utilizes PVWatts calculator (NREL 2023). The closest to Annual PV system output of 70500 kWh that is 30% simulated in the calculator tool in the figure below.

PVWatts® Calculator

NREL

My Location | Helsinki | » Change Location | English | Español | Українська | HELP | FEEDBACK

RESOURCE DATA | SYSTEM INFO | RESULTS

Go to system info

RESULTS

70,954 kWh/Year*

Print Results

Month	Solar Radiation (kWh / m² / day)	AC Energy (kWh)
January	0.39	730
February	1.45	2,820
March	2.41	5,147
April	4.14	8,316
May	5.91	12,005
June	6.16	11,859
July	5.95	11,750
August	4.53	8,995
September	2.78	5,470
October	1.43	2,935
November	0.39	718
December	0.14	209
Annual	2.97	70,954

Figure 16. Extract from PVWatts calculator (NREL 2023)

The result in Figure based on the geographical location of the Helsinki city, since the data point on the website automatically generates location on the map. Although, this data does not correspond directly to southwest Finland location, from where hospitality establishment electricity consumption was obtained (Figure 9), It still reflects relevant climatic conditions affecting PV systems located in south and southwest of Finland.

The annual solar energy production of 70954 kWh (Figure 10) is reached by inputting 81 KW size system in NREL PVWatts calculator, this is due to the standard 14,08% operational system loss (NREL 2023). This leads to discrepancy between stated solar panel efficiency sold by Vilpra and figures calculated by NREL calculator, ultimately it leads to investigation of technical characteristics of the product and performance, which could be achieved by real time testing at the location of the hospitality establishment, this is beyond of the scope of this thesis. Although, simulation allows to estimate the required electricity generation applying technical tool such as NREL PVWatts calculator to PV systems offered by vendors, this brings into account location where PV system is installed, hence based on these results solar system achieving 70954 kWh electricity supply corrected by NREL PV Watts tool in Figure 10. Requires 81 kW capacity PV system (Appendix 2).

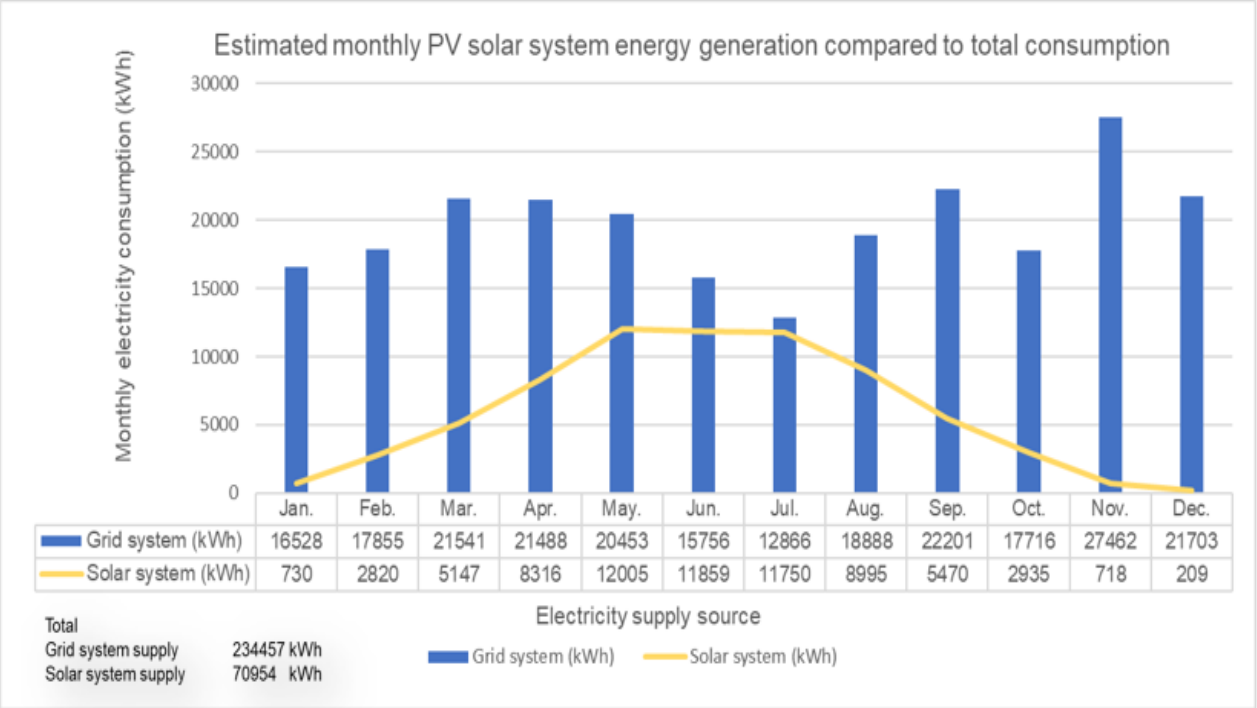

Figure 17. Simulated table and graph of 30% (rounded to nearest whole percent) solar produced electricity impact on one year electricity consumption of SME hospitality establishment in south-west Finland

Comparatively solar energy covers just over 30% (70954 kWh/234457kWh*100) of total electricity supply needed to run the operations throughout the year. The graphics in Figure 10. Indicate lower solar energy share in total supply during cold months of the compared to the summer season. Although, from financial perspective consideration has to be taken of savings and expenses affecting whole financial year period.

6.1.2 Energy strategy and cost of electricity

Next step after determining the consumption and supply sources of electricity it is necessary to agree on electricity price rate that will be used in investment in solar energy appraisal simulation. Since there are wide range of electricity contract offerings from various suppliers, it is important to identify right rate-per-kWh, and additionally the source of energy, particularly this is an important consideration for hospitality company in the context of investing in renewable energy.

Decision making on energy purchase for hospitality business that intends to make sustainability commitment should derive from careful evaluation of strategic options (Figure 6) analysis, where options are narrowed with consideration of costs, competition, and stakeholder evaluation. Consequently, making effort towards sustainable operations in order to make environmental impact, capture value to stakeholders and achieve financial efficiency, entire energy strategy should be aligned with the energy purchase and production configuration that leads towards optimal option. In Finland's energy market there seems to be a possibility for such option to possible with Helen two-year contract offer of hydropower electricity.

In the context of financial simulation assumption are made that contract renewal will be allowed with the same price. The contract concerns SME and it is made up of a fixed price for energy 9.06 c/kWh and monthly basic charge 3.99 € in this case business price is 0% VAT, hence value added tax free (Electricity contracts for small and medium size businesses, Helen 2023) Following figure presents energy composition and cost for model hospitality company in the Southwest Finland.

Table 3: Electricity source and cost share table of one energy consumption

Electricity source and cost share	kWh	share %	Cost 0.0906 €/kWh
Total consumption year	234457	100%	21242
Grid supply share	163503	70%	14813
Solar energy share	70954	30%	6428

The solar energy share in Table 3. is used in financial projections in investment evaluation process. The note has to be made concerning the estimated numbers of consumption and costs, they simulate methodology for investment framework with real market variable conditions combined and calculated with the aim of demonstration. In the case of concrete projects the number of variables may change frequently until the point when all permissions are granted, agreements are made with financial institutions and installed PV system starts generating electricity at the location.

6.2 Application of capital investment appraisal methods to solar panel installation

It can be said certainly that every company strives to accurately measure capital investment benefits and expenses. In this study, due to high variability of the factors influencing the data required for investment evaluation of particular project, as is explained in previous subchapters. The focus is on providing appraisal by combining data from various sources in the solar energy market and simulating the possible outcome. This way demonstrating the capital investment appraisal methods and possible applications for hospitality companies operating as SMEs.

According to conducted research, there are basically four methods used by businesses to evaluate investment opportunities, accounting rate of return (ARR), payback period (PP), net present value (NPV) and internal rate of return (IRR) (Atrill & McLaney 2018, 282). These methods differ in their ability to consider more sophisticated factors into account, this could be due to complexity of the investments and size of company. Research conducted in small SME identifies less use of the more complex capital investment appraisal methods (Jones & al, 2012. 228). Nevertheless, in this study all four methods mentioned will be applied to capital investment in solar energy for hospitality organization model proposed in this thesis.

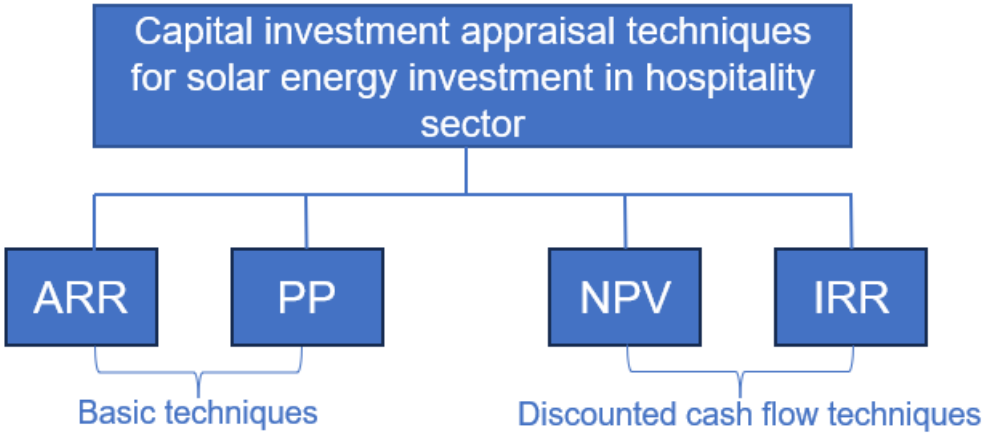

Figure 18. Capital investment appraisal techniques for solar energy investment project in hospitality sector

There are three important factors to consider when applying Investment appraisal techniques: discounting, relevant cash flows, the cost of capital. Cash flows will include cash payments and cash received, or the inflows may be represented by savings in cash outflows (Drury 2016, 319). The latter approach is used in investment appraisal techniques in this study. Since future energy savings are translated as a future cash inflow.

Discounting converts projected future cash inflow to present value, this is due to time value of money. To make a useful comparison of the different flows, they must all be converted to a common point in time, that is present day, thus cash flows are discounted (Kaplan Financial 2023, 60).

The cost of capital refers to rate of interest for discounting, this takes account of time value of money when applying formulas by aiding in calculating of discount factor for cash flows. Often referred with different terminology such as cost of capital, discount rate, required returned. Despite the term is used, rate of interest used for discounting reflects the cost of finance tied up in the investment (Kaplan Financial 2023, 60). With the specific appraisal techniques in this study the rate used for discounting will be identified according to loan interest used for investment in solar energy projects.

6.2.1 Accounting rate of return (ARR)

This method of investment appraisal evaluates the level of expected returns earned compared to the level of expenditure made for the investment. Fundamentally it estimates future cost and revenue over the project's life. ARR differs from other methods in its use of profits rather than cash flows (Drury 2016, 325). Thus, it takes depreciation as non-cash expense into account. Following the formula used by Drury (2016, 325) for calculation of ARR (Figure 19):

$$\text{ARR} = \frac{\text{Average annual profits}}{\text{Average investment}} \times 100$$

Figure 19. Formula to calculate accounting rate of return (ARR) (Drury 2016, 325)

In order to be able to use this formula for the simulated solar energy investment evaluation, the annual profits and average investment need to be determined.

Average investment can be derived with known method used in ARR calculation. This is one half of the initial investment plus asset's residual value, the latter according to product specification of the 30 year efficiency guarantee, can be assumed to be nil at the time of passing the efficiency period. Additionally, Business Finland Energy aid of 15% in renewable energy investment project could be applied and used (Business Finland 2023). This financial aid could be deducted from solar system asset investment amount once it is determined. Thus, applying quoted price of €62693 and adding €11570 the additionally needed solar systems to reach 81 kW energy generation in order to achieve 70954 kWh annual solar energy generation in southern Finland according to NREL PVWatts Calculator. Consequently, initial investment can be determined to be € 74263, and applying 15 % renewable energy investment aid decreases asset total carry amount to € 63124. Lastly, the average investment final figure can be derived to be € 31562 (€ 63124/2).

Average annual profit could be determined by deducting annual solar system depreciation of €2104(€63124/30yrs.), from the annual electricity savings € 6428 (Table. 3), lastly determining €4324 as the average annual profit amount. The estimated ARR of investing in solar energy for the hospitality establishment in southwest Finland based on the model parameters of this research is as follows (Figure 20):

$$\frac{€\ 4324}{€\ 31562} \times 100 = 13.7\%$$

Figure 20: Accounting rate of return of solar energy investment project of model hospitality establishment

This result indicates that the hospitality establishment could get 13.7% annual return on investment if the company decides to go forward with the solar energy investment project. Due to the same approach on capital investment appraisal, ARR is often referred to as return on capital employed method (ROCE). With this approach, business's operating profit is expressed by the percentage of value of the assets that generate it (Atrill & McLaney 2018, 285). It is important to realize that general purpose of capital investment project is creation of asset that is used to generate long term benefit for the company and the specific costs attributed for creation such asset is used initial investment consideration.

Generally, advantages of ARR method are attributable to its relative simplicity and link to accounting measures. However, its disadvantage considered to be inability to take in account the time value of money and relevant cash flows.

The decision whether return rate is indicative of project acceptance depends on target rate of the company considering alternative investment options. Although in the case of hospitality company, could be argued that applying fully renewable energy policy as in the simulation of this study could influence value offer to its guest and improve competitive position.

6.2.2 Payback period

The second basic method used for capital investment appraisal is Payback Period (PP). This measures time taken for an initial investment to be repaid out of project's net cash inflows (Atrill & McLaney 2018, 288). The superiority of PP over ARR is considered to be its consideration of cash received in time period rather than accounting profit to cover the investment. The PP is the time a project will require to pay back the money spent on it (Kaplan Financial 2023, 42). With this approach importance is placed on earliest possible repayment of the investment and liquidity.

Decision criteria primarily for management is the concern of fastest payback when there are options presented. As follows formula for PP calculation (Figure 21):

$$\text{Payback Period (PP)} = \frac{\text{Initial investment}}{\text{Annual cash flow}}$$

Figure 21. Formula to calculate PP of capital investment (adopted from Kaplan Financial 2023, 42)

Following the model hospitality establishment of this study, solar electricity generation future cash flows could be attributed to the annual energy saving amount €6428 as constant yearly cash inflow and initial investment €63124. hence, using formula:

$$\frac{€\ 63124}{€\ \ 6428} = 9.8 \text{ years}$$

This implies that hospitality company investing in solar energy with the modelled parameters could repay spent investment in 9 years and 10 months. Certainly, from payback perspective investment might not look too attractive in solar energy particularly when project aims to cover 30 % of electricity consumption. Although, it could serve as a vivid illustration of effectiveness of PP method and same time indicator of its major weakness. That is its inability to consider profitability of the project during its whole life from investment to disposal of the asset. Notwithstanding, it is considered the most widely used method. It is an especially useful way for ranking projects where a company faces liquidity constraints and needs rapid repayment of investment (Drury 2016, 324). It could be noted that PP in conjunction with ARR could provide a more complete picture by providing liquidity measure from the project with ARR account of overall project profitability.

6.2.3 Net present value

One of the methods that uses discounted cash flow (DCF) techniques is the net present value (NPV). It considers all of the costs and revenues from the project with consideration of time. The NPV of the project is determined by discounting all inflows and outflows to present value and subtracting the present value of all outflows from present value of all inflows (Keat & Young 2006, 441). The key concept with DCF technique is the time value of money. This means money received today is worth more than the same amount received in the future, which occurs for three reasons: cost of finance/interest, inflation, and effect of risk (Kaplan Financial 2023, 57). The NPV is also considered to be the most superior approach of all four capital investment appraisal methods.

When using DCF technique it essential to identify cost of capital, usually in complex businesses this is determined by mix of financial sources, although for the relatively small investments it is relevant to use interest rate for the loan that is required for the particular investment project. According to National Survey Report of PV power Applications in Finland, average rate of loans for commercial installation by privately owned companies is higher than 1-2% (Ahola 2019, 14). Currently advertised interest rate of 5 % can be obtained from Summarum loan for solar panels (Summarum 2023). This rate as cost of capital could be applied in simulation for the solar energy investment NPV calculation.

As an established assumption in this study the estimated annual savings of €6428 is considered as a constant cash flow, during solar system's efficient useful life of 30 years. Thus, establishing constant cash flows, cost of capital and number of cashflow years, It is possible to determine present value of a project with even cash flows, using annuity factor (Figure 22):

Present value = Annual cash flow x AF

$AF = 1 - (1 + r)^{-n} / r$

Annuity Factor (AF)
r= cost of capital
n = number of years

Figure 22. Finding present value using annuity formula (adapted from Kaplan Financial 2023)

Applying formulas from Figure 22. Will provide results as follows (Figure 23):

€ 6428 x 15.37 = € 98814

$1 - (1 + 0{,}05)^{-30} / 0{,}05 = 15.37245$
Cost of capital = 0,05
Number of years = 30

Figure 23: Present Value of all cash inflows from solar energy investment project of model hospitality establishment in southwest Finland

The resulting figure of € 98814 is a present value of the cash inflows from the project, consequently the NPV can be derived subtracting initial investment of €63124 from present value of all cash inflows from the solar energy investment project. And this gives the NPV of € 35690 (€ 98814-€63124) of the project.

Calculation presented in Figure 22. Is presented as a graph in its more extended version in Figure 23. Showing yearly cumulative cash inflows as electricity saving, starting after one year of the investment, represented in green bars yielding to a positive first year figure at the end of 14th year

from the investment. It is important to note, that growth of positive yield will continue next 16 years and will reach net positive return as NPV figure of € 35690.

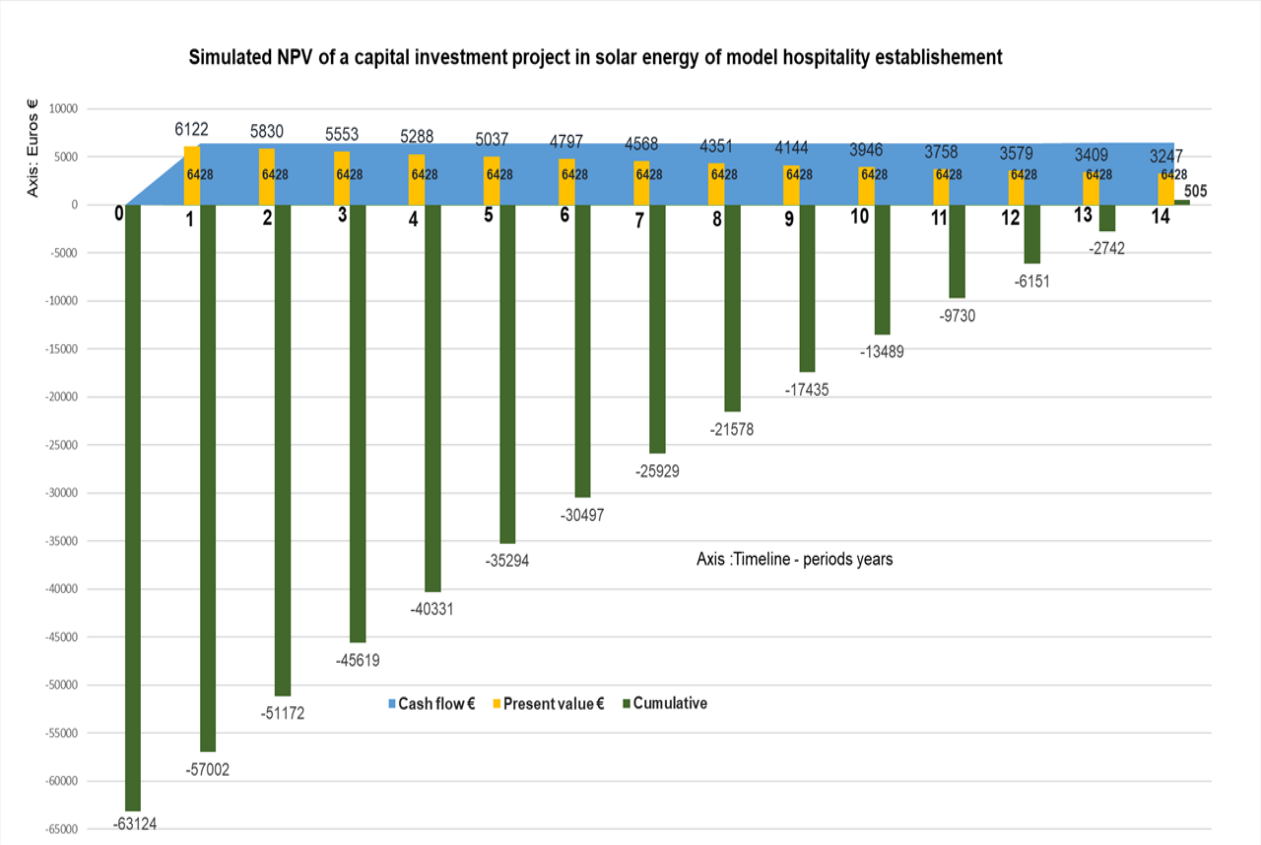

Figure: 23. Simulated NPV of a capital investment in solar energy for model hospitality establishment operating in southwest Finland. Chart provides 14-year cashflow period out of 30

If NPV is positive, then project is financially acceptable. if NPV is negative than rejection is indicated. And if NPV is zero, this proposal is just earning the cost of capital (Keat & Young, 2006, 442). NPV of simulated investment in solar energy shows that investment in solar energy will yield positive return over the half-life of the project and it also indicates amount of shareholder growth in more relevant financial figures with consideration of time value of money and cash flows. The main disadvantage is considered to be its complexity for some SME managers, especially when it concerns determining cost of capital, due to variability of sources of capital.

Although NPV provides relevant information, in many cases it would be effective if management considers this figure in terms of whole value chain by asking the question to themselves: How significant is a return on investment compared to alternatives? How will this investment affect value offering and ultimately competitive advantage? Does this investment enable us to strengthen brand and charge bit more? It can be said, that when NPV is not significantly high in shortest possible timeframe all these questions become relevant for the hospitality business operators. In cases

when NPV is high and positive and investment is recouped within a short timeframe, it is direct indication of highly profitable capital investment project.

6.2.4 Internal rate of return

The fourth major investment appraisal method applied to model hospitality establishment's investment opportunity is internal rate of return (IRR), This approach of capital investment appraisal considers discounted future cash flows and uses NPV in its calculations. This is an IRR of the investment that, when applied to its future cash flows, will result in NPV of precisely zero (Atrill & McLaney 2018, 301). In its essence, it represents a breakeven cost of capital (Kaplan Financial 2023, 72). This means when NPV is set to zero according to the cost of capital percentage, the IRR has to result in greater percentage than that of cost of capital, for the capital investment project to be accepted. Hence, the project with higher IRR than cost of capital is worth pursuing due to expected profitability.

IRR calculated usually using two NPV figures with respective low and high discount rates. normally, iteration is adopted as an approach (Atrill & McLaney 2018, 301). Farly straightforward formula provided by Kaplan Financial (2023, 72) using linear interpolation (Figure 24):

$$IRR = L + \left(\frac{N_L}{N_L - N_H} \right) X\ (H - L)$$

L = Lower rate of interest

H = Higher rate of interest

N_L = NPV at lower rate of interest

N_H = NPV at higher rate of interest

(Note: If N_H is negative, its value will be added to that of N_L at the denominator of the equation).

Figure: 24. Formula to find IRR (Kaplan Financial 2023, 72)

In order to put above formula in action to find IRR of the solar energy investment project of model hospitality establishment operating in southwestern region of Finland, new NPV figure needs to be introduced by raising interest rate from 5% to 10 % and applying annuity factor (AF) same way as in Figure 22. This allows to produce two NPV figures to determine IRR and compare it to the interest rate used as established cost of capital of 5%.

Table 4. NPVs that can be applied for IRR simulation for the model hospitality company

Cost of capital	30 years annuity factor (AF)	Annual cash inflows €	Present value of cumulative cash inflows €	Initial investment €	NPV of the project €
5%	15.37245	6428	98814	-63124	35690
10%	9.42691	6428	60596	-63124	-2528

Since first step of the IRR calculation identified needed NPV figures, second step involves applying formula from Figure 17. To the NPVs from Table 4. Consequently, resulting (Figure 25):

$$5\% + \left(\frac{35690}{35690 - (-2528)} \right) \times (10\% - 5\%) = 9.67\%$$

$L = 5\%$

$H = 10\%$

$N_L = 35690$

$N_H = -2528$

Figure 25. Calculating IRR for model hospitality establishment operating in southwest Finland

Thus, IRR equals 9.67% cost of capital which results in NPV of cashflows to value of zero(breake-ven). This simulation provides measure of IRR of 9.67% at which 5% cost of capital is acceptable rate for project to go ahead. Decision rationale being, that projects should be accepted if their IRR is higher than the cost of capital (Kaplan Financial 2023, 72). In case of competing projects, the one with greater IRR should be selected (Atrill & McLaney 2018, 303). Usually, IRR and NPV provide indicators for the decision making relatively in line with each other, although NPV is considered to give more precise and complete picture, although resulting percentages of IRR are easier for the management to understand.

6.2.5 Analysis on financial indicators of solar energy investment

Simulated capital investment in solar energy for model hospitality SME operating in southwest Finland with available energy market conditions and financing possibilities indicates overall financial viability of investment in solar energy project. This could be motivating towards more eco-investment at least for those who are operating in southern Finland. Although this is by no means is definitive conclusion due to circumstances of each individual hospitality company's business outlook, changing factors in the energy and financial market, not to mention global geopolitical impact on energy logistics and interest rates.

Despite numerous variables it is important that eco investment or sustainable investments can be profitable in current market. Sustainability or green investments similar to stocks or funds are investment instruments involving particular company's or businesses improvement in environmental operations (Legrand & al. 2017, 445). Definitely it is worth observing the long-term trend on sustainability investment viability in the regional hospitality market. According to northern Finland located resort company, Katinkullan pallohalli Oy managing director Antikainen (Adams, 2017)

> "The payback periods of solar power plants are still long, but environmental values are measured in more than money. This is definitely the future." (Adams, 2017).

Above statement could be interpreted as capital investment in solar energy does not provide quick returns but the values it brings should be identified beyond financial indicators and this is a future direction and reality for the industry.

Nevertheless, the financial return of the project is still central indicator, in addition to other indicators that need to be considered in order to increase values of economic, environmental, and social dimensions of the hospitality SME company.

Following to the above discussion it is worth taking closer look at the capital investment appraisal indicators of simulated model hospitality establishment:

ARR	PP	NPV	IRR
• 13,7 %	• 9 years & 10 months	• € 35690	• 9,67%

Figure 26: Simulated capital investment appraisal results of model hospitality establishment operating in southwest Finland

Immediately it is apparent that ARR 13.7% indicates low margin of profitability from the project coupled with 9 years and 10 month of payback time does raise question if it is worth pursuing the project due to low profit and long term tied capital. The answer depends on what is required rate of return considering the objectives of the hospitality establishment. Since, even with discounted cashflows company can still achieve profitability of € 35690 from the project and IRR of 9.67 % compared to 5% cost of capital gives marginal indication of profitability.

Hospitality company that considers capital investment in solar energy in order to avoid loss, needs to make sure it can acquire financial resources at lower possible cost of capital. This disqualifies loans with high percentage interest rates or altogether using loan could be better to avoid, instead

focus could be shifted on mixture of grants, subsidies, and own capital, since investment stays within five-digit figure in euros.

6.2.6 Strategic evaluation

In conclusion marginal profitability and relatively low initial investment suggests overall acceptability of the capital investment in solar energy for hospitality establishment. Although, in most cases marginal profitability is not enough for approval of the investment project. The big business picture needs articulation of strategic question, what is the possibility of achieving strategic goals of the company with given capital investment in sustainability project of solar energy? This could be approached by evaluation of costs and benefits of the project, using the sustainability performance cost-benefit framework (Legrand & al. 2017, 459). Figure 27 provides framework that could be applied to company's investment project and overall simulated environmental performance in order to determine effectiveness of sustainability strategy.

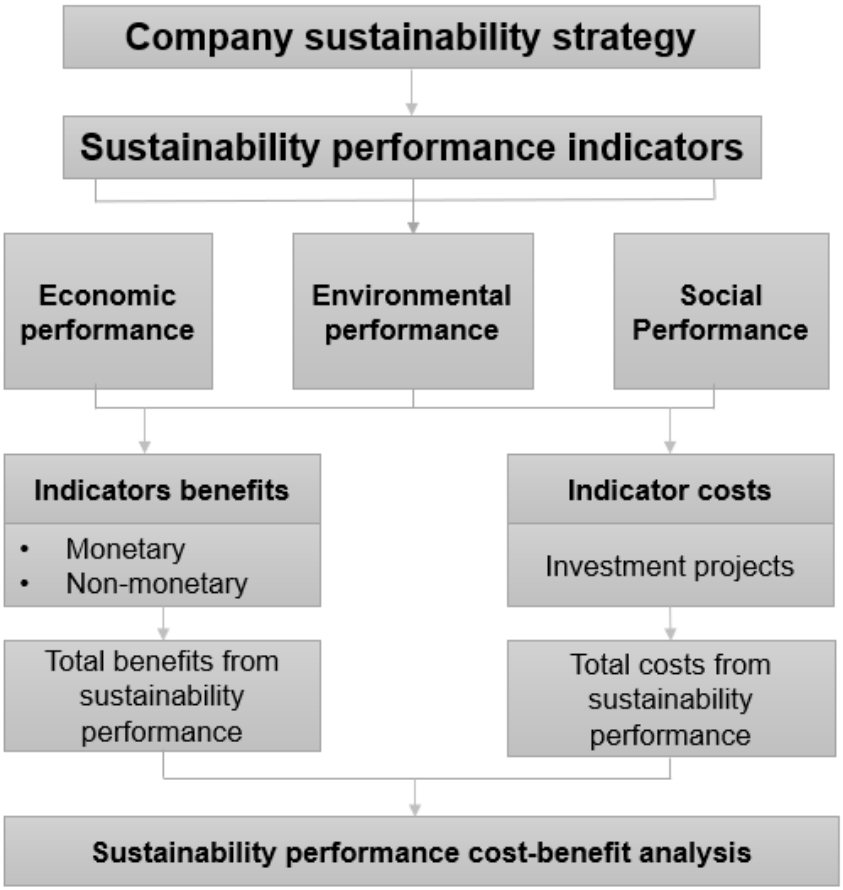

Figure: 27. sustainability performance cost-benefit framework (adaptive from Legrand & al. 2017, 459)

When sustainability capital investment project doesn't immediately indicate high profitability, consideration of wider spectre of benefits and costs should provide more comprehensive big picture. This process could be described as strategic sense making. The goal of sense making is to generate ample number of insights, that are linked in the way that produces coherent and connected picture (Tovstiga 2015, 50). There is no guarantee that, strategic sense making, or analysis will provide definitive solution, nevertheless consideration of benefits from the project versus its costs influenced with variable factors and data provide insightful sense making process that has higher degree of chance making successful decision on investment project.

Once again considering marginal profitability of the capital investment project in solar energy for the hospitality establishment as shown in simulation, the profitability of the project can be enhanced by transformation of the business into sustainable business model. This allows company to bring in more business through logically trending sustainability promotion and awareness within local and international corporate and leisure tourism market.

Sustainable business model involves designing such value proposition that enhances revenue through competitive advantage. One of the main means of achieving this is through capital investment in renewable energy to transition the hospitality establishment's operations towards complete renewable energy consumption. Therefore, achievement of the sustainable business operations is considered key to advantageous market positioning, environmental compliance, and increased revenue streams.

6.3 Proposing application of sustainable business model and eco-investment strategy framework to solar energy project for hospitality SMEs

According to Dow Jones's 2011 perspective, a growing number of investors view sustainability as a catalyst for enlightened and disciplined management and, therefore, as a key success factor (Wells 2014, 16). Fast forward a decade and the understanding of sustainability impact of investment on business's value offering has become only more relevant, especially considering the unfolding climate change, past pandemic, and even recent geopolitical struggles.

Following to this thesis, the aim of sustainable investment is achieving economic growth coupled with improving environmental condition of local community. The realizing instrument of creating successful investment outcome in this study is considered to be a sustainable business model. As it can provide an articulate framework for reaching strategic sustainability and financial goals of hospitality SME. Consequently, the following section will attempt to identify suitable SBM understanding and configuration.

6.3.1 Understanding business model in hospitality context

In its most famous definition, a business model expresses the rationale of how an organization creates, delivers, and captures value (Osterwalder & al 2010, 14). Amit and Zott describe business model as 'activity system' that illustrates business model design or architecture: the content, structure, and governance of main business activities (Bocken 2021). The inner configuration of Business model (BM) is the major driving force of successful value capture. There are several authors that propose applicable BM in different contextual settings, although they all include major components of the business process. Osterwalder & al (2010, 14) describe them as building blocks and comprised of customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure.

In the hospitality sector, there are various BM to consider depending on customer segments and concept of the establishment, non-exhaustive list includes city hotel, eco-hotel, hostel, bed and breakfast, resort, and vacation rentals. Hospitality BM in its typical form provides accommodation, food and beverage, events, and well-being services. The differentiated key value proposition of hospitality establishment can be identified as guest experience. Thus, BM design of hospitality establishment configures and orchestrates its building blocks with the goal of delivering highest possible guest experience in target customer segment that leads to generating higher revenue streams and achieving competitive advantage.

BMs are also subject to change or become redundant. Despite the general view that there is similarity in the structure of business models of companies in the same sector, business models are not fixed over time (Wells 2014, 24). This notion applies to the shift of hospitality industry towards sustainability due to environmental and social issues being raised and regulatory policies implemented by stakeholders. In this paradigm a new strategy and thus new sustainable business model (SBM) is required to be developed in response, in order to stay relevant in the hospitality market.

Business strategy is realized by BM. It is kind of a blueprint for a strategy to be implemented through organizational structures, processes, and systems (Osterwalder & al 2010, 15). Casadesus-Masanell and Ricart see the BM As a realized emergent phenomenon, that is developing from the strategy, and then providing information or setting the stage for tactics (Wells 2014, 28). BMs describe how an organization creates, delivers, and captures value and in essence they represent a blueprint of the company strategy. Alignment and careful development of the BM into the strategy work in the hospitality industry is important. BMs may allow or constrain certain strategic options, thus by accident or design open up or restrict certain market opportunities (Wells 2014,

28). In application to eco-investment by hospitality establishment it is essential that company considers re-configuration of the BM and aligns it to its sustainability strategy, delineating each building blocks of BM to achieve strategic goals in the market and company vision.

6.3.2 Sustainable business model and hospitality SME

As discussed in previous sections, the urgency of addressing sustainability issues derives from the increased stakeholder concerns on both institutional and consumer level. This is reflected in regulatory policies and consumer behaviour shift towards more environmentally friendly and ethical consumption. Hence the hospitality industry is at the core of strategically addressing sustainability urgency. Effective response to this urgency in this study is considered development of sustainable business model through capital investment in solar energy, thus, to achieve hospitality establishments complete shift towards the renewable energy consumption. This in turn actualizes the development of SBM that effective process for value creation, delivery, and capture. Based on Stubbs and Cocklin SBM defined as follows:

> Sustainable business models (SBMs) draw on economic, environmental, and social aspects of sustainability in defining an organization's purpose; use a triple bottom line (people, profit, planet) approach in measuring performance; consider the needs of all stakeholders rather than giving priority to shareholder expectations; treat 'nature' as a stakeholder and promote environmental stewardship; and encompass a system, as well as a firm-level perspective (Bocken 2021).

SBM creation is inherently multidisciplinary and requires input from various different kinds of stakeholders (Aagaard, 2019. 120). In this regard there are multitude of scopes that are out of the reach within this study that required to build SBM which includes well researched social and environmental issues with embedded metrics, this could be done by larger corporations owning multiple hospitality business portfolios. Although, in the context of hospitality SME with its limited resources, it is still achievable to develop viable SBM having strategic insight in hospitality market trend, knowing its stakeholders, and conducting financial assessment of the investment project.

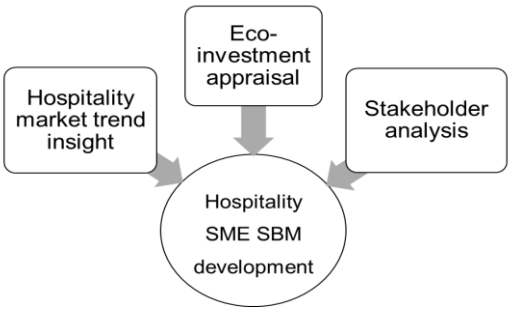

Figure. 28. Key strategic insights required to develop SBM for hospitality SME based on new value offering

Once the strategic insights are determined, the next step is to start building the architecture of the SBM based on key strategic insights, thus showing the logic of how the company intends to generate revenue stream.

Managing to Build the SBM for any SME is a significant achievement and certainly not an easy task. SBMs present an ideal type of BM that focuses on generating positive environmental and social impact through the role of business (Bocken 2021). Although, reaching ideal SBM can definitely be a distant goal to pursue even for hospitality companies with substantial financial resources. Nevertheless, developing successful SBM for hospitality SME could be inspirational for the entire hospitality sector.

6.3.3 The triple bottom line approach to sustainable business model

The triple bottom line is a framework evaluating sustainability of an organization as a measure of successful business beyond financial gains of its shareholders. Elkington insists that measuring success means capturing, analyzing, and reporting ecological and social performance of an organization (Legrand & al. 2017, 23). Ultimately a sustainable organization is one that generates wealth for its shareholders whilst having concern for the environment and the interest of society in general (Jones & al, 2012. 281). To reflect these concerns in business operations, Elkington (1997) proposed social, economic, and environmental bottom lines. They provide a measure and accountability on company's impact beyond financial profitability.

By addressing and balancing issues of triple bottom line hospitality company can lead towards sustainable value creation and SBM. Based on original concept, Jones & al (2012. 281) propose triple bottom line with three key areas: economic (profit), environmental(planet), and social (people).

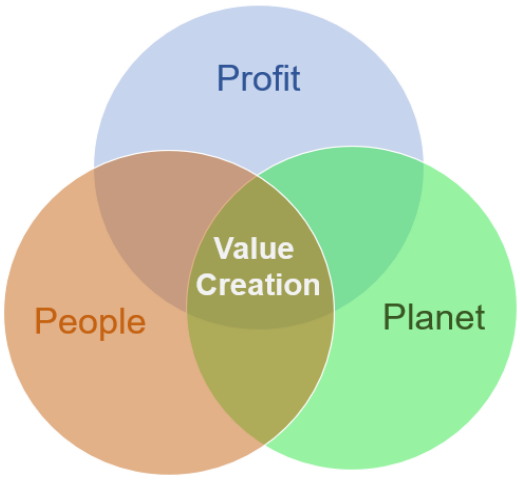

Figure 29. Value creation through triple bottom line framework (adapted from Jones & al 2012, 281)

The profit dimension is dealt with usual financial performance management methods; return on investment (ROI), return on capital employed (ROCE) as in financial analysis section of this study. In addition, other typical hospitality industry key performance indicators (KPIs) such as occupancy, revenue per available room (RevPAR), average daily rate (ADR) and cost per occupied room.

Planet objective represents company's disposition and effort towards environmental issues. Eco-investment in solar energy is a practical step from shareholders of the business to make positive impact towards preserving natural resources and complying with national environmental improvement campaign.

The people dimension considers the impact of a company's activities on employees working for the establishment, customers, local community, and society generally. This includes Labour practices, human rights, community engagement, diversity, and inclusion. Thus, positive contributions to society through sustainability include significant social elements. Consequently, triple bottom line approach from eco-investment perspective, can create holistic sustainable value offering incorporated in BM components, hence developing potentially successful SBM.

6.3.4 Sustainable business model design for Finnish SMEs investing in solar energy

This section of the study is the final stage in developing strategy framework for capital investment in solar energy in Finnish hospitality SME sector. The previous section provided strategizing based on research into the solar energy market in order to obtain financial data for financial evaluation as well as understand principles of solar energy application for hospitality SME. Capital investment appraisal of solar panels needed to cover an estimated 30% of hospitality establishment's energy consumption produced low margin of profitability based on current market data accessible to the author of this study.

Despite low profitability of capital investment project, the global trend towards sustainable business operations and tightening regulatory policies strongly suggest that it is becoming essential to start finding environmentally clean and cheap energy sources. SBM can be used as configurator of the business operations in a way that embedded in the SBM design sustainable value creation, delivery and capture enhances profitability of the hospitality SME through its capital investment project in solar energy.

6.3.5 Enhancing eco-investment with sustainable business model canvas

Integration of sustainability dimensions into BM is proposed by Bocken & al. (2018) with their business model canvas. This is in essence embedment of triple bottom line concept into BM. Consequently, SBM canvas outlines entire process of value creation, proposition, delivery, and capture, and applies to it profit, planet and people dimensions.

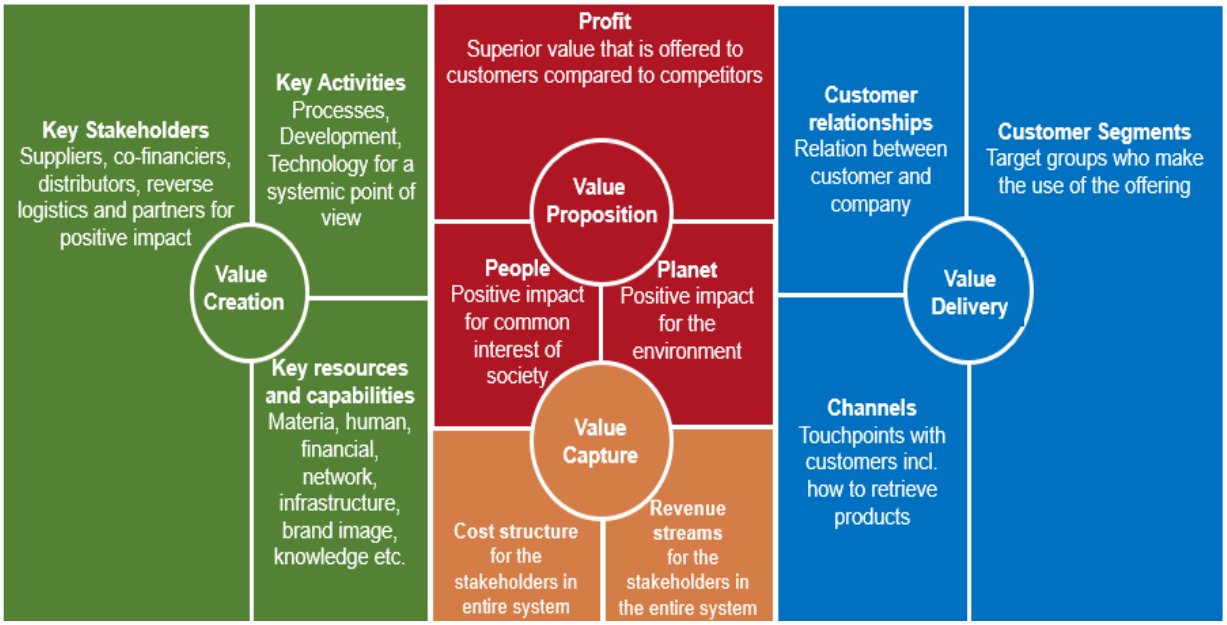

Figure 30. Sustainable Business Model Canvas (Bocken & al. 2018)

Adopting SBM canvas (Figure 30.) for model hospitality SME in southern Finland provides following picture, where value creation process in green includes key activities associated with developing SBM. Center red provides a value proposition associated with the sustainably designed product offering, which in this case is renewable energy powered accommodation, food and beverage and other additional services. Value capture in orange is a profit achieved by revenues and savings from investment overweighing expenditures on capital investment and operational expenses. The blue area represents value delivery, through sales channels, customer relationship through effective communication and service and target market segmentation.

SBM canvas components for hospitality establishment can be organized under Jones, Atkinson, Lorenz, and Harris (2012, 281) three key areas of triple bottom line. This type of categorization allows integrated approach, effective focus and measuring of sustainability and business processes simultaneously.

1) Profit

- Revenue streams: Explore different revenue models that are economically viable.

- Key metrics: Define, measure, and manage KPIs to access profitability targets.

2) Planet

- Key Resources and Capabilities: The material and resources required to produce environmental value proposition.
- Key Activities: Core activities that make sustainable business processes reality.
- Cost Structure: Financial analysis of eco-investments, total costs associated with sustainable value creation and delivery. Need to align these costs with revenue generation.
- Environmental impact: Report internally and externally how business activities impact on the environment and set goals for further action as new opportunities allow.
- Key metrics: Define environmental KPIs to measure SBM effectiveness.

3) People

- Customer Segments: Identify customer segments interested in sustainable value proposition.
- Value Proposition: Define the sustainable value proposition establishment has to offer.
- Channels: Create socially sustainable distribution and communication channels.
- Customer Relationships: Create relationships that promote and value social and environmental sustainability.
- Key stakeholders: Identify partners, stakeholders and connect with them to support sustainable business practices.

There could be numerous possibilities of SBM canvas application for every specific hospitality SME business case. Although, It is important to understand that sustainability component of SBM cannot be the only determinant of hospitality SMEs business model success. Consequently, this study limits itself from designing concrete SBM canvas and claiming universal assumption knowing its futility from the begging due to individuality of every business case. Although, value proposition design in solar energy investment (Figure 9.) still holds merit because of it being one component of whole BM. SBM canvas gives entrepreneur map of its strategic landscape, where insights in each building block, sense making and right configuration leads to successful value capture.

6.3.6 Proposing eco-investment strategy framework

Capital investment planning in an environmental project is a process of strategic decisions on how to direct resources towards development or upgrading of capital assets, as a result improving environmental sustainability and financial performance in sync. It is important to clarify that synchronized improvement may and should allow a certain degree of disproportionality between environmental and financial performance while both indicators are providing positive outcomes.

The sensemaking of insights found in this study suggest that eco-investment in solar energy project can bring benefits in a long-term perspective, although earlier the hospitality SME is able to implement SBM in conjunction with eco-investment sooner the value capture starts to become reality, indicating increased cash inflows and positive brand image.

Proposed strategy framework for solar energy investment by hospitality SME based on this study provides three level analysis and decision-making process in the shape of triangular pyramid (tetrahedron), such design stands for the three triangular dimensions of eco-investment that are: profitability, environment, and people. Each level represents phase of strategy implementation of tetrahedron and stands on actions of previous level, further narrowing towards the top as reaching results of the strategy implementation.

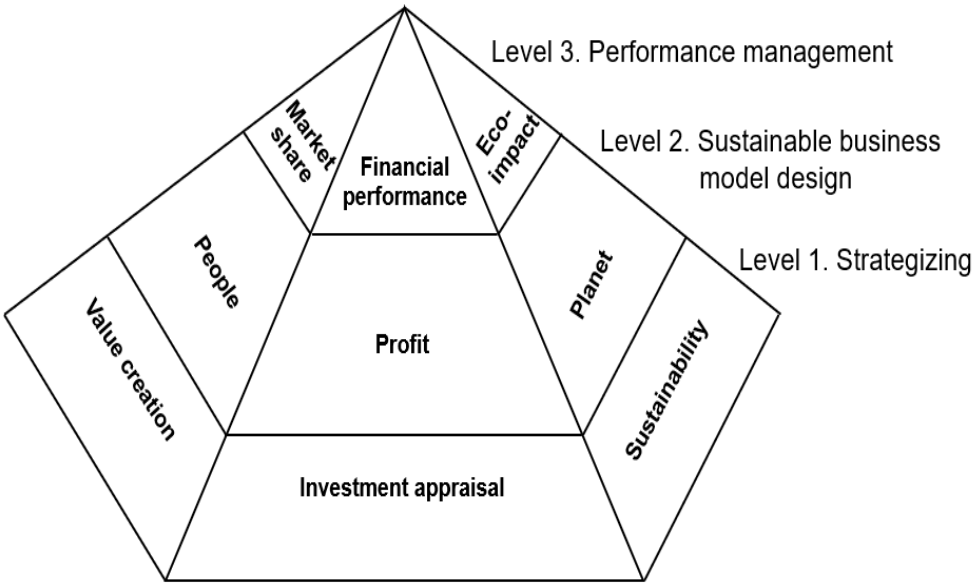

Figure 31. Eco-investment strategy framework for hospitality SME investing in renewable energy

The design of the above framework stands on the studies and models of authors reviewed in this thesis and proposes an integrated strategy plan, incorporating essential components that are affected by investment in renewable energy. The principal conceptual underpinning was provided by sustainable business model canvas (Bocken & al. 2018), value proposition design (Osterwalder & al. 2014), Value creation through triple bottom line (Jones & al 2012), strategy in practice (Tovstiga 2015).

This framework (Figure 31) is an outcome of the research and learning development of this thesis as it is a structure of the strategy and evaluation for the investment in renewable energy by hospitality SME conducted in collaboration with model hospitality company. In other words, it is a graphic model of the distinct topics that had been analysed at the particular stages of research in

order to develop an insights, and on this basis to construct a new strategy plan that could be applied by hospitality SMEs in Finland and potentially beyond to their renewable energy investment projects.

Starting from level one, strategizing involves formation of value offer and sustainability strategy based on capital investment projections. As an example, case of capital investment appraisal simulated on model hospitality establishment in this study showed, developing long term strategy, and designing SBM when making investment in solar energy could be more beneficial to the hospitality establishment rather than only relying on financial projections, since eco-investment investment overlaps with sustainability, which has wider implications on environment, society, economy, and state policy.

On level one there are three sides or blocks, investment appraisal, value creation and sustainability. These blocks to be strategized for the purpose to develop an insight into each topic. At this level three important insights are maid. First, the profitability of the capital expenditure purely on its profit or money saving capacity from the asset. In second block sustainability impact of the project needs to be evaluated, where environmental benefit from the project and its compliance with the laws and regulations is established. Third block is dedicated to analysis of market research, the identifying of customer segments and stakeholder acceptance. At this block will be tested if value created from investment in the project could be relevant in the market. For example, if hotel or resort could earn eco-labels and reputation as sustainable businesses and offer relevant pricing for the services. Thus, on the first level strategizing of the eco investment project attempts to lay basis for the viability of the project, and once the strategizing phase at level one provides sufficient projections, than project strategy is moved to level two.

Level 2 builds on strategic insights of level one and forms the action plan around sustainable business. Here value proposition of the environmental project is synergized with complete SBM, and it becomes prospective model of continuing business, with clear plan of how to generate revenues, make tangible progress in green transition and consider partners, personnel, local community, and customers. hence, profit people and planet at the core of SBM. On level two of the strategy framework SBM, hospitality establishment is ready to deliver value to the consumers and make positive impact on environment and local community while projecting higher revenues compared to costs of SBM, thus aiming for profit.

Final level three is top of the strategy where strategy is implemented, results are observable, and performance analysed. At this level the impact of the investment project is measured in all three

dimensions and decisions on further actions are made. At this level it becomes apparent if the estimations made at strategizing level were correctly measured and if design of SBM on level two adequately converts investment input into the eco project into the planned profitability.

7 Discussion

The final chapters of this study concern analyzing results of the research, its limitations and how this research can be used best and/or perhaps understood. The thesis topic covered a range of themes such as hospitality, business strategy and model, capital investment appraisal and solar energy production.

The topic *Capital Investment Planning in Renewable Energy in Hospitality Sector: Strategy and evaluation* aimed at identifying and evaluating the optimal strategic framework of capital investment in environmentally sustainable project for hospitality SME operating in Finland. The eco-investment project intends to improve the financial performance of the hospitality establishment and at the same time contribute to environmental sustainability.

The simulation of capital investment appraisal in solar energy was conducted using available and accessible current market data required for solar panel purchase and installation, thus identifying initial investment cost of € 63124 and estimated annual solar energy generation as equivalent to cash inflow from saved electricity cost, hence forming share in electricity expense which indicates cash outflow.

It is important to clarify that, electricity expense is based on 2022 electricity consumption data of hospitality SME establishment in southwest Finland. Although, this data represents one year figure, it is useful representation, particularly in terms of the electricity consumption scale of SME business. Helen (2023) provides electricity contracts that are suitable for small and medium-sized businesses (SMEs) consuming under 300 000 kWh in a year. Thus, price per kWh and yearly electricity usage in this study are based on information available in 2023 for the electricity contracts suitable for SMEs.

7.1 Benchmark cases

There is a definite interest from Finnish hospitality business in opportunities of investing in on-site renewable energy generation on the operating premises. One such case is Resort Condominiums International (RCI) affiliated Holiday Club Katinkulta, which invested in solar panel generated electricity, producing approximately 240 000 kWh annually. This solar power plant is the third largest in Northern Finland and among the top twenty nationwide (Adams 2017). The significance of this project is also in its cooperation with Oulun Energeia which is also a plant supplier, thus creating collaborative space between hospitality business and national level energy suppliers, which is in line with Finland’s effort of reaching carbon neutrality.

Despite all the effort, business venturers still need strong financial motivation to make considerable investments in sustainability projects. The general outlook of the investment in renewable energy according to Oulu Energeia's project manager Antti Korkala:

> "We are pleased that companies are increasingly interested in using renewable energy even though energy projects do not generate quick profits. Environmental awareness is a strong driver, and so are long-term energy savings" (Adams 2017).

According to the same source, Katinkulta Palohalli's managing director Ilpo Antikainen explained that they are aware and interested in environmental issues (Adams 2017). Hence this eco-investment case demonstrates enterprises long term strategy and value proposition in Finnish and international hospitality market. The aim of such an investment is to sustain the interest of the hospitality establishment's customers while further growing the market segment, due to increasing demand for sustainable value offering.

The second case is an Original Sokos Royal Hotel Vaasa modernization for 2024 by investment in eco-project of hotel energy efficiency. This case resonates closely with this study, here hotel value offering strategy can be identified by investing in solar energy generation on the premises which will fill 10% of the hotel's electricity consumption. The remaining electricity needs will be covered by renewable natural resources and without carbon emissions (Sokos Hotels 2023). This way completely transforming hotel energy consumption to renewable sources and shifting hospitality operations towards environmentally sustainable, which enables hospitality establishment to create sustainable value offering and business model.

7.2 Limitations

There were several limiting factors affecting the research process of this study. Surprisingly out of all was the difficulty to establish communication window with local sustainability and hospitality research institutions. There was an intention from the beginning of the research to record multiple interviews with sustainability researchers and access the qualitative aspects for insight development, nevertheless there were numerous academic and business articles and information which compensated at to some degree.

Another limitation concerns the sample of the population from statistical perspective, since the electricity consumption was obtained from one hospitality organization. It would have been indicating higher representation of hospitality SMEs in the region if electricity consumption data was accessed from larger population. Nevertheless, from a business perspective electricity consumption that stays within the general SME electricity consumption range can be viewed as reliable data for business insight and not as concrete data pattern for specific decisions.

The most challenging part came from the realization of need for understanding many technical parameters when getting involved in solar energy investment project, especially when tackling this task as a student rather than team with multidisciplinary expertise.

It proved challenging to determine with certainty the performance of the solar panels due to their susceptibility being influenced by many geographical and meteorological factors. In real life situations can be advised to test the systems first and base other financial or environmental projections on data obtained from the tested system.

7.3 Personal learning process

The thesis was envisioned as an application of my studies in finance to the hospitality industry. This created need for finding the project which could provide the potential for two-dimensional synergy being finance and hospitality.

Project of investment plan in solar energy for small hospitality company was one of the proposed options within Haaga-Helia institution. This project involved additional dimension of environmental topic, which added third dimension to the thesis project. Despite widening of the research scope and expertise domain to synergize three areas of the study: finance, hospitality and environment, thesis potential and learning capacity from the research project seemed immensely promising.

The research process ran into difficulties during the data collection phase. Solar panel vendors and banks were not keen giving even approximation on costs and loans, conversely, they were keen to collect information on the project and receive certain commitments and engagements in exchange to give out any sort of basic information. Consequently, I have relied mostly on open-source data available for investment appraisal and had to look for pricing outside of Finland. Despite having full set of formulae for investment appraisal and possibility to design coherent investment strategy framework. The data for precise calculations was difficult to obtain, hence there are lot of approximations. Although this perhaps reflects the real world, since in business analysis there is not always possible to have all the information required. This case definitely was an experience to understand and plan in data collection in advance of the project commencement.

The one of the challenging parts was understanding and employing in research the technical knowledge that requires solar electricity generation and costing. The nature of constant energy price fluctuations, frequent energy policy updates on national and international level, makes it difficult to identify and locate one particular result that could be used as a reference point for further research or estimations. Nevertheless, in this regard I chose straightforward approach as from small business perspective.

The research process on this thesis enabled me to study and learn closely sustainability issues and various perspectives on environmental topic, one of which is green transition perspective. Inclusion of sustainability issues gave me understanding of its applicability and importance in business and financial context.

Overall complexity and multidimensionality of the thesis project posed many challenges and obstacles which were dealt methodically. Despite gaps and limitations my learning curve from the beginning and the final stages of the thesis shows significant progress and the experience gain in the subject matter, which is: capital investment application in close to real life situation, understanding solar energy production and application and grasping of hospitality business perspective on sustainable development.

7.4 Application of the study

This thesis can be viewed as formation of insight in solar energy investment in hospitality sector in Finland, despite geographical constraints due to northern location, the insights still can be interpreted for almost any location, simply by deploying tools used in this research.

It is important to emphasize that this study attempts to provide a new knowledge or one step towards understanding sustainable investment topic for hospitality business community. Admittedly the intention from the beginning intention was to conduct study and provide financial advice on one particular hospitality eco-investment case, although study led to more universal result, leading to a capital investment in solar energy strategy framework.

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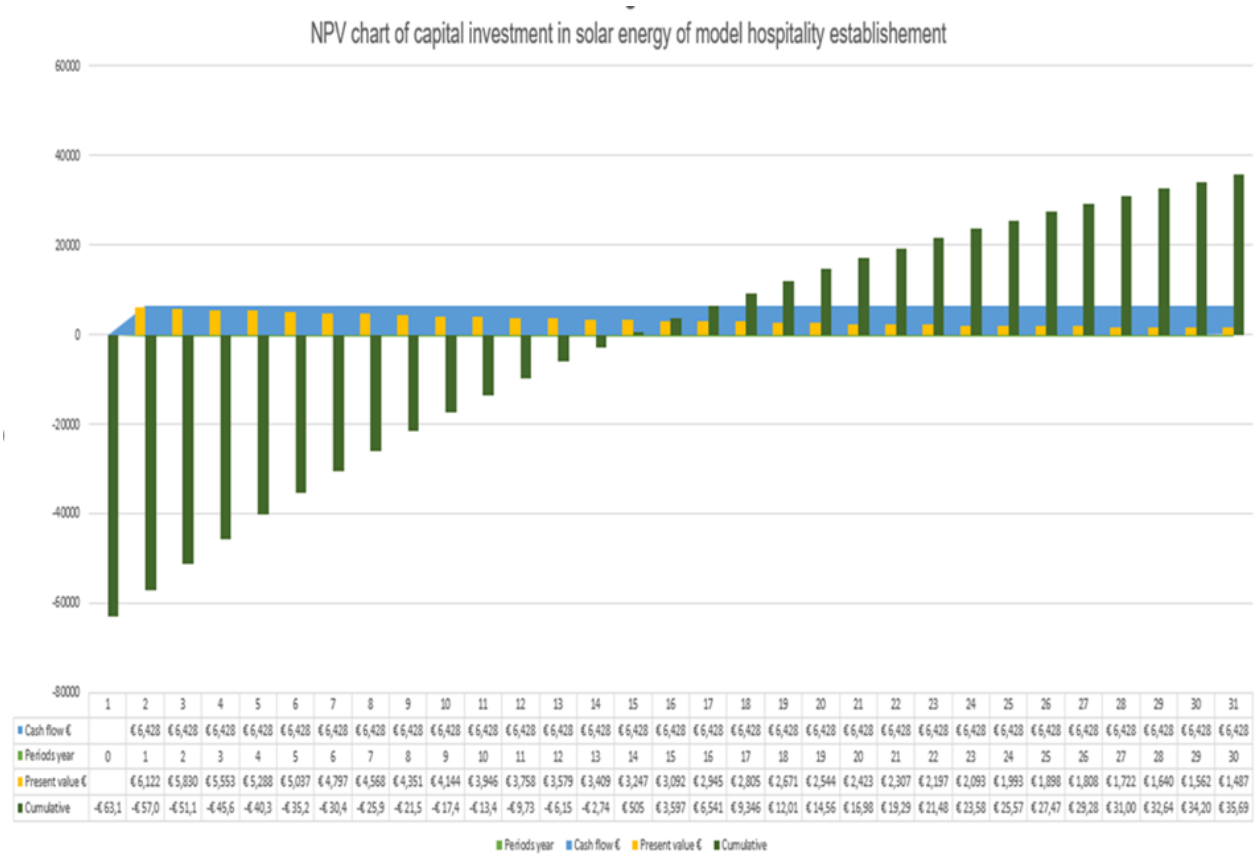
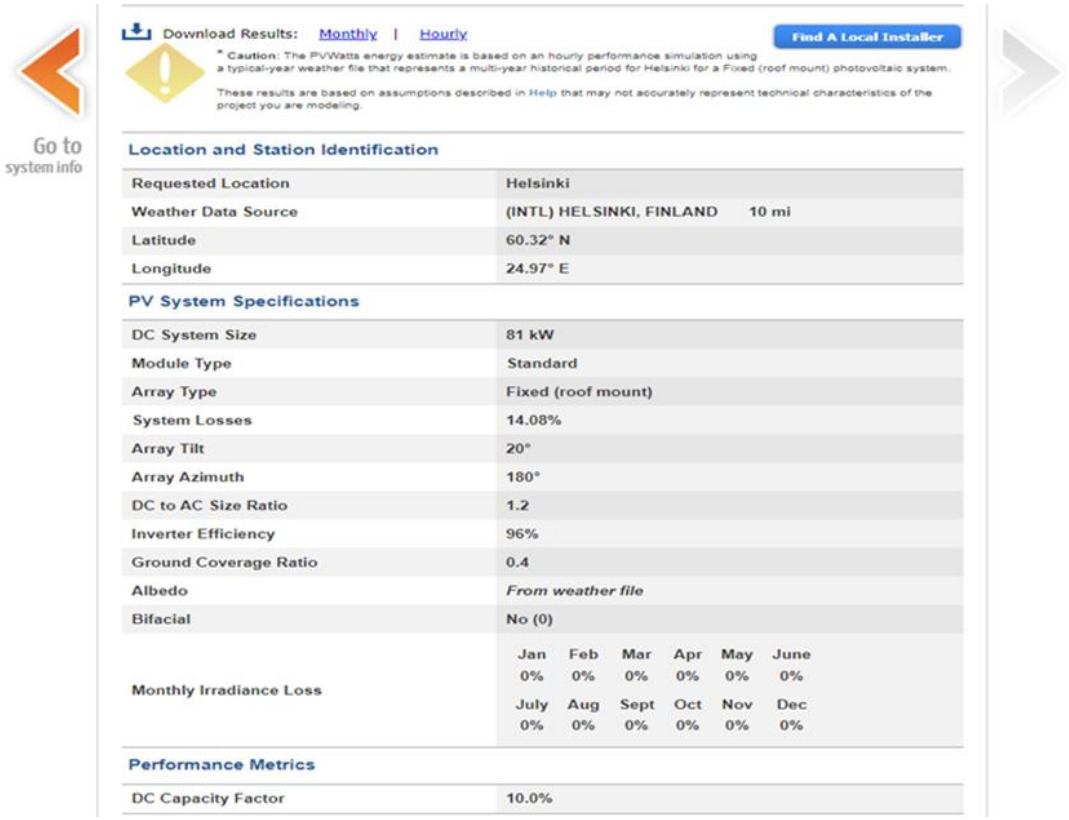
Attachments

Appendix 1. Net Present Value manual excel simulation of capital investment in solar energy for model hospitality establishment

Capital investment in solar energy project				
Periods year	Discount factor 5%	Cash flow €	Present value €	Cumulative
0				-€ 63,124
1	0.95238	€ 6,428	€ 6,122	-€ 57,002
2	0.90703	€ 6,428	€ 5,830	-€ 51,172
3	0.86384	€ 6,428	€ 5,553	-€ 45,619
4	0.8227	€ 6,428	€ 5,288	-€ 40,331
5	0.78353	€ 6,428	€ 5,037	-€ 35,294
6	0.74622	€ 6,428	€ 4,797	-€ 30,497
7	0.71068	€ 6,428	€ 4,568	-€ 25,929
8	0.67684	€ 6,428	€ 4,351	-€ 21,578
9	0.64461	€ 6,428	€ 4,144	-€ 17,435
10	0.61391	€ 6,428	€ 3,946	-€ 13,489
11	0.58468	€ 6,428	€ 3,758	-€ 9,730
12	0.55684	€ 6,428	€ 3,579	-€ 6,151
13	0.53032	€ 6,428	€ 3,409	-€ 2,742
14	0.50507	€ 6,428	€ 3,247	€ 505
15	0.48102	€ 6,428	€ 3,092	€ 3,597
16	0.45811	€ 6,428	€ 2,945	€ 6,541
17	0.4363	€ 6,428	€ 2,805	€ 9,346
18	0.41552	€ 6,428	€ 2,671	€ 12,017
19	0.39573	€ 6,428	€ 2,544	€ 14,561
20	0.37689	€ 6,428	€ 2,423	€ 16,983
21	0.35894	€ 6,428	€ 2,307	€ 19,290
22	0.34185	€ 6,428	€ 2,197	€ 21,488
23	0.32557	€ 6,428	€ 2,093	€ 23,581
24	0.31007	€ 6,428	€ 1,993	€ 25,574
25	0.2953	€ 6,428	€ 1,898	€ 27,472
26	0.28124	€ 6,428	€ 1,808	€ 29,280
27	0.26785	€ 6,428	€ 1,722	€ 31,001
28	0.25509	€ 6,428	€ 1,640	€ 32,641
29	0.24295	€ 6,428	€ 1,562	€ 34,203
30	0.23138	€ 6,428	€ 1,487	€ 35,690



Appendix 2. Extracts from NREL PVWatts simulation



Go to system info

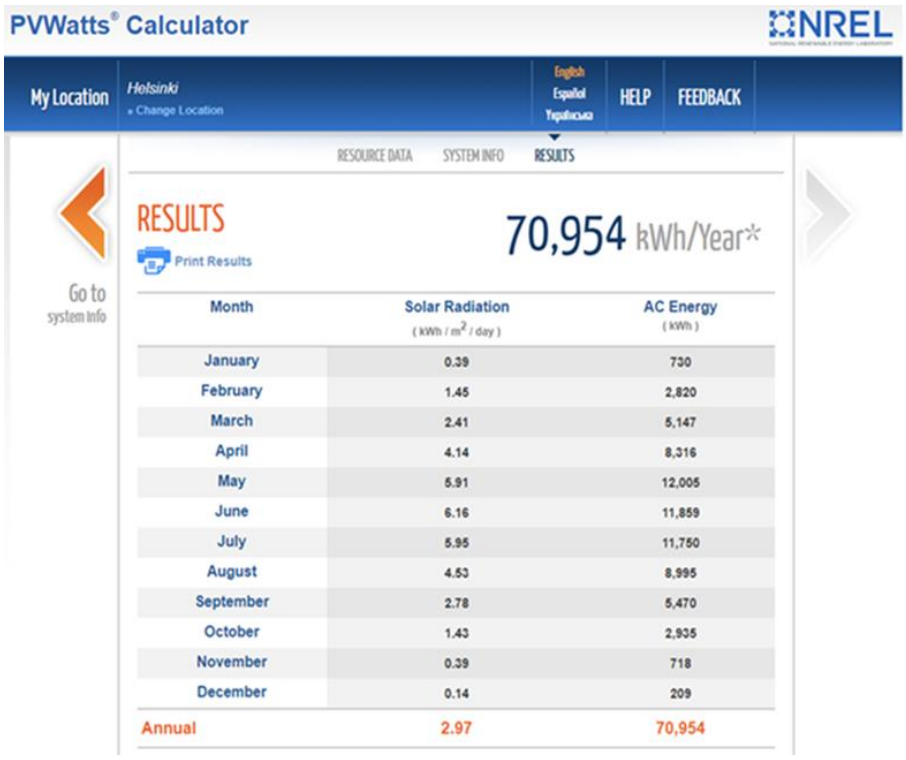
Download Results: Monthly | Hourly

Find A Local Installer

* Caution: The PVWatts energy estimate is based on an hourly performance simulation using a typical-year weather file that represents a multi-year historical period for Helsinki for a Fixed (roof mount) photovoltaic system.

These results are based on assumptions described in Help that may not accurately represent technical characteristics of the project you are modeling.

Location and Station Identification	
Requested Location	Helsinki
Weather Data Source	(INTL) HELSINKI, FINLAND 10 mi
Latitude	60.32° N
Longitude	24.97° E
PV System Specifications	
DC System Size	81 kW
Module Type	Standard
Array Type	Fixed (roof mount)
System Losses	14.08%
Array Tilt	20°
Array Azimuth	180°
DC to AC Size Ratio	1.2
Inverter Efficiency	96%
Ground Coverage Ratio	0.4
Albedo	*From weather file*
Bifacial	No (0)
Monthly Irradiance Loss	Jan 0% Feb 0% Mar 0% Apr 0% May 0% June 0% July 0% Aug 0% Sept 0% Oct 0% Nov 0% Dec 0%
Performance Metrics	
DC Capacity Factor	10.0%



PVWatts® Calculator

NREL

My Location Helsinki » Change Location English Español Türkçe HELP FEEDBACK

RESOURCE DATA SYSTEM INFO RESULTS

Go to system info

RESULTS

Print Results

70,954 kWh/Year*

Month	Solar Radiation (kWh / m² / day)	AC Energy (kWh)
January	0.39	730
February	1.45	2,820
March	2.41	5,147
April	4.14	8,316
May	5.91	12,005
June	6.16	11,859
July	5.95	11,750
August	4.53	8,995
September	2.78	5,470
October	1.43	2,935
November	0.39	718
December	0.14	209
Annual	2.97	70,954