Business plan

The Solar Artefacts Initiative (featuring modular elements like Solar Terrazas and Umbrellas) offers a decentralized, elegant, and sustainable solution to accelerate the energy transition, urban decarbonization, and climate adaptation. By transforming underused infrastructure, public furniture, and urban spaces—such as parking lots, plazas, traditional terraces, public parks, and markets—into solar-powered micro-ecosystems, the initiative integrates solar generation, battery storage, and EV charging infrastructure into compact, multi-functional structures. These solar artefacts not only produce clean energy but also provide shade, seasonal comfort, and social spaces, reimagining how public and commercial areas can contribute to a just energy transition. The current phase focuses on a working prototype and demonstration project. Priority use cases include: powering retailers in the hospitality sector (bars, restaurants, coffee shops); converting grid-powered EV charging points into solar stations; transforming gas stations into clean-energy hubs; and decarbonizing public food markets by replacing fossil fuel generators, delivery vans, and farm irrigation systems with solar solutions. This business plan outlines a lean, scalable model for impact and investment—tailored for cities seeking cleaner air, greater resilience, and equitable access to energy and mobility infrastructure..

**The Solar artefacts Initiative: Building a Beautiful, Resilient Urban Energy Future**

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Business Plan

Powering Cities Beautifully:

The Solar artefacts Initiative

for a Just Energy transition and the democratization of pleasant Electric Mobility through the Transformation of Underused Infrastructure and Public Urban Spaces

**Building a Beautiful, Resilient Urban Energy Future**

**Subtitle:**

*A Modular Microgrid System That Powers Public Spaces, Electric Mobility, and Local Food Systems with Intelligent Solar Infrastructure*

# **Abstract**

The **Solar Artefacts Initiative** (featuring modular elements like Solar Terrazas and Umbrellas) offers a decentralized, elegant, and sustainable solution to accelerate the energy transition, urban decarbonization, and climate adaptation. By transforming underused infrastructure, public furniture, and urban spaces—such as parking lots, plazas, traditional terraces, public parks, and markets—into solar-powered micro-ecosystems, the initiative integrates solar generation, battery storage, and EV charging infrastructure into compact, multi-functional structures.

These solar artefacts not only produce clean energy but also provide shade, seasonal comfort, and social spaces, reimagining how public and commercial areas can contribute to a just energy transition. The current phase focuses on a working prototype and demonstration project. Priority use cases include powering retailers in the hospitality sector (bars, restaurants, coffee shops); converting grid-powered EV charging points into solar stations; transforming gas stations into clean-energy hubs; and decarbonizing public food markets by replacing fossil fuel generators, delivery vans, and farm irrigation systems with solar solutions.

This business plan outlines a lean, scalable model for impact and investment—tailored for cities seeking cleaner air, greater resilience, and equitable access to energy and mobility infrastructure. Each chapter begins with a brief description which is supported by appendixes

# **Executive Summary**

## Brief Description

The **Solar artefacts Initiative** (Terrazas & Umbrellas among others) offers a visionary yet pragmatic solution for powering cities beautifully — combining solar energy generation, with creation of spaces for shade and freshness, public comfort and the experience of electric mobility. Our innovation integrates multifunctional solar artefacts and umbrellas into public and semi-public spaces (such as street parking lots, Terrazas, plazas, food markets) to create decentralized energy ecosystems that are elegant, accessible, and just. These micro-infrastructures serve as power sources for nearby buildings, EV charging stations, and even on-site needs like refrigeration or heating. The project is beginning with a pilot phase in several cases restaurant, pizza place, bar and a food market transitioning from fossil fuels to fully solar-powered operations. With a clear path to scalability, a modular design, and the support of public and private partners, this initiative promises measurable environmental impact, economic viability, and social equity.

## Vision

To transform, underutilized street parking lots, public spaces, urban furniture and infrastructures, into local self-sufficient, solar-powered ecosystems using modular, elegant, and multifunctional solar artefacts, umbrellas and Terrazas that supply clean electricity to buildings, charge electric vehicles, and reduce urban heat, while creating spaces for social conviviality.

## Problem

Dense cities and their mix use areas, face rising energy costs, limited rooftop availability, heat islands, and slow deployment of renewables and EV infrastructure. Small businesses and buildings often lack space or capital for clean energy systems, while urban electric mobility still depends on fossil fuel-based grids.

## Solution

The Solar artefacts, Terrazas and Umbrellas Initiative introduces a transformative energy and mobility solution tailored for dense urban and mix use environments, where traditional rooftop solar and large land-based solar farms are not viable.

Our patented **solar artefacts, umbrellas** and **Terrazas** solve this by creating decentralized, street-level energy hubs. By integrating solar panels into the architecture of street-level umbrellas and Terrazas, the system produces clean electricity on-site. Each umbrella or terraza integrates high-efficiency solar panels, battery storage, and smart charging ports for electric vehicles, bikes, vans, or scooters. These can supply power to adjacent buildings, (e.g., bars, restaurants, etc), energize EV charging stations, enable urban logistics decarbonization, provide shaded public areas, support urban comfort with heating and cooling features, and create spaces for social encounters — all from a clean, elegant structure.

## Innovation

Our solar artefacts and Terrazas can be scaled up from a single solar patio to a cluster of solar gardens and to solar forests. Such modular, scalable microgrid ecosystems and virtual power plants, combine solar generation, battery storage, digital energy management, and electric mobility. The integrated smart system and digital layer, is a major competitive differentiator. They not only lower energy costs and reduce carbon emissions but also enable a more productive, competitive, and sustainable urban life. The project launches with a prototype and demo, then scales through public-private partnerships. Other innovations include:

* Urban-ready design: compact, foldable, and modular solar artefacts
* Energy-as-a-Service model for affordability and scalability
* Combines solar generation, EV infrastructure, and local energy resilience
* Designed for dense cities and mix use urban areas where rooftop solar is unfeasible

Target Market

Restaurants, cafés, logistics companies, retailers, office buildings, shopping malls, food markets, and municipalities across Spain and Europe seeking energy savings, climate compliance, and visible sustainability impact

Business Model

Revenue through leasing, direct sales, charging station subscriptions, and bundled energy services. Early projects target pilot urban corridors and mix use areas in cities with EU climate funding potential.

## Impact

* Up to 10 kW clean energy per unit and solar artefact
* Enables 100% green logistics for small urban businesses
* Reduces energy bills, CO₂ emissions, and heat in cities
* Accelerates a just energy transition for underserved areas

## Funding Needs

An initial investment of €150,000–€300,000 (loan/equity/grants) to finalize **prototypes**, deploy **pilot** units, and **scale** through early clients. Break-even is projected within 3–4 years, with scalable profitability from grouped deployments.

## Call to Action

Join us in building energy-positive cities, one solar artefact at a time.

# **Company Overview**

Company Name: Carlos H Betancourth SLU  
Legal Structure: SLU  
Founded: 2019  
Location: Barcelona, Spain

## Mission Statement

We aim to democratize access to clean energy and electric mobility, in dense cities and urban areas by designing and delivering modular, beautiful, scalable, and functional solar systems, through transforming streets, parking lots, urban infrastructures, public spaces and urban furniture, into micro-energy hubs that supply clean, affordable electricity to street-facing businesses (including urban food markets located in public squares and gardens), and EVs charging stations, reducing emissions and accelerating the energy transition. Our intelligent solar artefacts (e.g., umbrellas and Terrazas) work as decentralized energy nodes in a virtual power plant, enabling flexible energy flows, lower grid pressure, and zero-emission mobility — all while enhancing the urban experience

## Vision Statement

We envision a future where every business, apartment building, electric vehicle, and street corner in mix use areas and dense cities runs on **locally harvested solar energy**. Our solar artefacts, Terrazas and umbrellas bring sustainable power down from the rooftops to the people — powering cities beautifully.

## Company Description

Carlos H Betancourth SLU is an innovative climate solutions and sustainable products start-up focused on developing clean energy and electric mobility solutions by deploying **urban solar systems**, specifically **solar artefacts** such as umbrellas and modular Terrazas, designed for mix use areas, commercial streets, restaurants, logistics operators, and municipalities. We aim to fill the renewable infrastructure gap in cities where traditional rooftop solar is impractical due to limited access, ownership constraints, or architectural preservation.

Our product combines functionality, aesthetic urban design, and energy resilience. Each unit and solar artefact, can power small businesses, support electric vehicle charging, and reduce the heat footprint in high-density areas.

## Founders & Team

* **Founder-Carlos H Betancourth:** – Background in strategic spatial planning and design (e.g., climate solutions; integrated multifunctional eco infrastructures for climate mitigation and adaptation; climate policy; integrating renewable energy and electric mobility in urban development, and strategic master planning).  
  Passionate about sustainable cities and decentralized solutions, Carlos H Betancourth brings a cross-sector approach to the energy transition, decarbonization and climate adaptation.
* **Partners & Advisors**:
  + Engineering & design specialists
  + Solar and battery suppliers
  + Legal/financial advisor for EU funding
  + Installers and logistics partners

*We are currently building a* ***small, agile team focused on*** *R&D, pilot deployment, and securing early partnerships.*

## Milestones & Status

* Concept design completed for solar artefacts (solar terraza with solar umbrellas) and for both, fixed and foldable prototype (See Carlos H Betancourth. Executive Summary, and Narrative 2025)
* Preliminary financial model and ROI analysis developed (See Carlos H Betancourth. Investment report 2025)
* First use case identified: urban pizzeria/restaurant/logistics clients/urban food market
* In process of applying for €150–300k in European climate funding (**IDAE**)
* Pilot partnerships and street-scale prototypes planned for (Target City/Region: Barcelona, but open to other interested cities)

# **Problem & Opportunity**

## Brief Description

Cities face overlapping crises and mounting pressures to reduce greenhouse gas emissions, meet climate targets, address energy insecurity, pollution, transform outdated infrastructures, and provide cleaner energy alternatives. Current infrastructure often lacks the agility to support this transition, especially in dense, urban environments where rooftop space is limited. Meanwhile, small businesses, public parks, residences, open food markets, transport and the *electrification of everything*, rely on grid power, stressing electricity networks. The transition to localized renewable energy and electric vehicles (EVs) is stalling in many urban areas due to the lack of charging infrastructure. This transition is essential to meet EU climate goals, reduce operating costs, and increase resilience. There's an urgent need for adaptable, elegant systems that merge solar generation, storage, and EV charging, while also delivering public value through shade, comfort, and beauty. There is a major opportunity to unlock underutilized street-level real estate (terraces, plazas, sidewalks) as distributed energy generation hubs.

## The Problem

Cities and their mixed-use neighbourhoods, are facing a **triple urban energy challenge**:

1. **Limited Rooftop Space for Solar**  
   In dense cities and their mix used urban areas, small businesses and residential/apartment buildings often lack accessible rooftops for solar panels due to:

* Shared or unavailable ownership (*La comunidad de propietarios*)
* Heritage restrictions on modifications
* Structural limitations and shading from nearby buildings

1. **High and Volatile Energy Costs**  
   SMEs-particularly restaurants, cafés, logistics providers, and shops-, are burdened by:

* Increasing electricity prices
* Dependence on central grids powered by fossil fuels
* Inability to invest in clean energy infrastructure due to cost or space

1. **Slow Urban EV Infrastructure Deployment**  
   The shift to electric vehicles is accelerating, but:

* EV charging infrastructure is lagging behind
* Charging is often grid-dependent, costly, and centralized
* Urban logistics companies and local delivery services lack reliable green charging options close to their routes

## The Opportunity

Urban sustainability and decarbonization are now **policy priorities** at EU, national, and local levels. This creates a **window of opportunity** for decentralized, compact solar systems that support:

### Clean Energy

* On-site renewable generation, even in space-constrained areas
* Energy resilience during grid stress or outages
* Lower energy bills and CO₂ emissions for small businesses

### Green Mobility

* Localized EV charging for vehicles, bikes, scooters, and vans
* Enables clean last-mile logistics and delivery services
* Supports climate-neutral commercial corridors and mix use urban areas

### Climate Adaptation

* Reduces urban heat islands by providing shaded structures
* Enhances liveability, public comfort, and social encounters
* Aligns with growing demand for greener and more aesthetic public infrastructure

## Timing & Market Shift

* **EU Climate Funding** (Next Generation EU, Green Deal, LIFE, and Horizon): incentivizing decentralized clean energy and infrastructure innovation
* **Regulatory Pressure**: emissions zones, energy performance standards, EV transition mandates
* **Consumer Awareness**: more businesses and municipalities want visible, tangible climate actions
* **Technology Readiness**: solar panel and battery prices continue to drop, enabling viable micro-generation units

## Our Advantage

While rooftop solar and centralized EV chargers are useful, they **exclude** many urban businesses and citizens, due to space, cost, or accessibility issues. Our **Solar artefacts, Terrazas and Umbrellas** fill that gap with a:

* **Flexible, modular, and replicable solution**
* Designed for the **urban ground level**, not for rooftops
* Easy to install, elegant to display, and powerful in function
* Ready to be grouped into citywide mix use areas and corridors of clean energy and mobility

# **The Solution:** Our Products

## Brief Description: Integrated Solar Ecosystems

We introduce a modular solar ecosystem composed of artefacts such as:

* Solar Umbrellas: 3x3 or 4x4 meter structures with embedded solar panels.
* Solar Terrazas: equipped with heating/cooling and comfort features.
* EV Charging Stations: powered by stored solar energy.
* Battery Storage: across umbrellas, Terrazas, and charging stations.
* Digital Platform: an intelligent system (powered by AI and IoT), to manage energy flows and payments between system nodes.

Each component interacts within a multi-node urban microgrid, functioning as a virtual power plant, optimizing when and where energy is stored, used, or monetized. The proposed pilot cases will demonstrate this system (See below (5) Market Analysis). For instance: The pilot in a public temporal food market (localized in a public square) will demonstrate the decarbonization of the full value chain, from farms (solar-powered irrigation) to transport (electric vans) and final market consumption (solar Terrazas for supplying refrigerators and ovens used for the operation of the market, as well as for the charging stations feeding the fleet of vehicles of the market parked next to it during its operations).

## Solar artefacts (Terrazas and Umbrellas)

We offer a groundbreaking solution for cities that need clean energy but lack infrastructure: **modular solar artefacts, Terrazas and solar umbrellas**, elegant urban structures that integrate solar panels, EV charging capabilities, battery storage, shading and social life. These units are designed to **harvest, circulate and use solar energy at the street level**, power small businesses, and enable electric mobility. Each system is adaptable, attractive, and fast to deploy.

Our solar umbrellas are mounted above **multi-functional** **solar Terrazas**, which serve as outdoor spaces for hospitality venues, waiting lounges for EV users while charging their vehicles, and local energy hubs. Our solution is an intelligent, modular solar infrastructure combining:

### Key Features of the basic unit

* **Solar Energy Generation**. High-efficiency **solar panels** mounted on foldable or fixed solar artefacts (umbrellas) and structures (3x3m or 4x4m), optimized for dense urban areas.
  + **Solar Umbrellas & Terrazas**: Lightweight solar canopies with integrated panels, seating, and comfort systems (heating/cooling).
* **Batteries for energy Storage.** Each module includes batteries to store energy and optimize self-consumption.
  + Integrated storage embedded in the umbrellas, the Terrazas, and the EVs, enables energy use at night and peak demand times, reducing reliance on the grid and offering resilience.
* **EV & E-bike Charging Ports.** Integrated into the terraces to allow users to charge while they rest or dine.
  + On-site EV charging **stations** adjacent to the Terrazas for electric vehicles, cargo bikes, and scooters — tailored for restaurants, logistics providers, and urban commuters.
* **Smart digital Energy Management platform.** Energy flows between umbrellas, terraces, EV chargers, and buildings.
  + Digital interface monitoring systems to optimize energy usage, storage, circulation of energy flows across nodes (umbrellas, EVs, buildings), and to facilitate payments (resale to nearby businesses or buildings)
* **Urban Cooling & Aesthetic Design**. Optional **thermal comfort features** (heating in winter, mist cooling in summer).
  + Canopy-style shading lowers ambient temperature and improves comfort while enhancing the visual appeal of streets and plazas.
* **The clean energy generated:** 
  + Powers the Terraza's own needs (lighting, heating/cooling, point of sale, etc.)
  + Supplies electricity to the **adjacent business or building**
  + Charges **electric vehicles** parked at or near the site

### Why It Works — Our Strategic Advantage

#### Addressing Urban Space Limits

Traditional solar and EV infrastructure rely on large surfaces or rooftops. Our solution fits where others can’t: *narrow streets, public parking, public plazas, private courtyards, sidewalks, and small terraces*.

#### Accelerating EV Adoption

By c**ollocating** clean power and charging infrastructure where mobility happens-near restaurants, shops, and delivery routes-, we remove a key bottleneck in the transition to electric vehicles.

#### Driving Down Energy Costs

**Locally generated** solar power helps businesses lower operational costs. It also **relieves pressure on centralized electricity grids**, avoiding peak-time surges and infrastructure strain.

#### Minimizing Land Use Pressure

Cities no longer need to rely solely on large-scale solar or wind farms that require vast land areas. Our **distributed model** **makes every street a micro-power plant**.

#### Enhancing Competitiveness and Urban Sustainability

This solution boosts the productivity of small businesses (e.g., through reduced utility costs and delivery efficiency) while strengthening the urban clean-tech ecosystem.

### Synergies Unlocked

Our innovation sits at the intersection of three high-impact sectors:

* **Solar Energy**: Democratized, localized, and affordable
* **Sustainable Mobility**: Democratized, localized, and affordable, Powered at the source, cleaner and smarter
* **Urban Resilience & Design**: Infrastructure that improves quality of life

Together, these synergies address **climate urgency, economic competitiveness**, and **citizen well-being**. while turning solar infrastructure into a **visible symbol of transformation**.

## The Urban Solar Microgrid (with Solar artefacts, Umbrellas & Terrazas)

When the above **basic unit is scaled up**, we can offer a **modular, intelligent energy ecosystem** that transforms how clean energy is generated, distributed, stored, and consumed in dense urban environments. At the heart of this system are our **Solar Artefacts** (Umbrellas and Solar Terrazas), forming a distributed, multi-node **virtual micro power plant**. Energy is **stored, shared, and dynamically routed** through an intelligent system of interconnected batteries.

### System Components

* **Solar Umbrellas**: Umbrellas of different sizes) equipped with photovoltaic panels, designed for urban spaces (streets, plazas, restaurants, etc.).
* **Solar Terrazas**: Functional outdoor terraces integrated beneath the umbrellas, offering comfort, solar shading, and hosting battery systems.
* **EV Charging Stations**: Installed adjacent to or beneath the terraces, enabling customers to charge e-bikes, e-scooters, or EVs while enjoying the space.
* **Energy Storage**: Batteries are embedded in the umbrellas, terraces, and charging stations, enabling dynamic storage and release and local circulation of energy.
* **Thermal Comfort Features**: Heating systems for winter and mist cooling or ventilation for summer, powered by the system itself.

### How It Works

1. **Energy Generation**  
   Solar panels on the umbrella tops generate clean electricity during daylight hours.
2. **Local Consumption & Sharing**  
   This electricity:
   * Powers the **Terraza** itself (lighting, heating/cooling, digital services)
   * Supplies the **adjacent building** (bar, café, restaurant, store, etc.)
   * Charges **electric vehicles** waiting at the Terraza or nearby
3. **Battery Storage & Management**  
   Each element — the umbrella, Terraza, charger, the EVs — includes **battery storage**. Energy can be stored when solar production is high or when grid electricity is cheap.
4. **Digital Energy Platform**

Energy is **stored, shared, and dynamically routed** through an intelligent system of batteries. Our **digital energy management platform** manages energy flows and payments, acting as the **central nervous system** of the network:

* Monitors production and consumption across all components
* Balances supply and demand locally and across the microgrid
* Directs energy where it is most needed in real time (e.g., from an umbrella to a charger, or from the Terraza to a restaurant)
* Coordinates battery uses and peak shaving[[1]](#footnote-1)
* Enables real-time pricing, automated payments and billing for charging and usage, and performance monitoring
* Optimizes energy flow based on time-of-use pricing and solar availability
* Allows users to **track and trade** energy between locations if needed

This **localized, AI-supported energy ecosystem** reduces dependence on the central grid, increases energy resilience, and offers a smarter, more flexible way to power modern cities, while turning every terrace into a **mini clean energy node**.

1. **Virtual Power Plant (VPP) Functionality**. Each component interacts within a multi-node urban microgrid, functioning as a virtual power plant, optimizing when and where energy is stored, used, or monetized

The system operates as a **virtual micro power plant**, balancing production, consumption, and storage across multiple users and uses. When deployed at scale, this network acts as a **virtual** micro power plant, stabilizing demand, reducing grid pressure, and providing clean energy services locally:

* Mitigates the need for centralized grid upgrades
* Avoids land-intensive solar and wind farms in peri-urban areas
* Enhances **resilience and autonomy** in energy management

### Urban Impact

This innovative system reinvents solar energy deployment by:

* **Decentralizing generation** into useful infrastructures and public spaces
* Integrating with **urban lifestyles** (EVs, terraces, hospitality)
* Providing climate comfort and modern infrastructure to cities
* Supporting the **transition to sustainable mobility and cleaner air**

# **Market Analysis**

## Brief Description

This initiative targets multiple urban markets:

* Restaurants, cafes, and terraces: with **outdoor seating** that can host solar umbrellas.
* EV users: looking for conveniently located, sustainable **charging points**.
* Municipalities: seeking to meet carbon reduction targets with visible public investment.
* Public food markets and parks: often underserved by clean energy infrastructure.
* Urban Farmers and short food supply chains: requiring clean power for transport, refrigeration, and irrigation.

The addressable market includes thousands of such locations across Spain, Europe and beyond, where solar and mobility demand converge.

## Target Market Segments

Our solution is designed for **urban stakeholders** that face high energy costs, lack rooftop solar access, and need to decarbonize operations. We target the following core customer groups:

### Urban Hospitality & Food Businesses

Restaurants, cafés, pizzerias, and bakeries that:

* Operate energy-intensive equipment (e.g., ovens, fridges)
* Would like to use electric bikes or EVs for delivery
* Want energy independence and visible sustainability
* seek to reduce energy bills and improve outdoor experience

Public markets and street vendors,

Use Case: A public park food market

* Currently relying on fossil fuel generators for refrigerators and ovens as well as on
* fossil fuel vans for transport of food from farms to the market
* Transitions to renewables through our solar artefacts (Terrazas and umbrellas).
* EV vans replace fossil fuel vehicles for farm-to-market transport.
* Solar-powered irrigation supports the farms.
* The entire value chain becomes clean, resilient, and circular.

The pilot in a public food market will demonstrate the decarbonization of the full value chain, from farms (solar-powered irrigation) to transport (electric vans) and final market consumption (solar Terrazas supplying refrigerators, kitchens and chargers for the market fleet of EVs).

### Urban Logistics & Delivery companies and Operators

Small and medium-sized delivery companies that:

* Face growing pressure to electrify fleets
* Need on-street or near-office charging infrastructure
* Operate short-distance routes in dense city cores
* Need to transition to EVs cargo vans

### Municipalities, regions & Public Agencies

Cities and regions aiming to:

* Invest and deploy visible climate-resilient infrastructure
* Green and cool public plazas, sidewalks, or food markets operating in public squares and gardens
* Support local EV adoption without large grid expansion

### Real Estate & Commercial Property Owners

Developers or landlords that:

* Want to increase asset value through green retrofits
* Lease to retail tenants seeking lower operating costs
* Are constrained by heritage or structural limitations on rooftop solar

## Market Trends & Dynamics

### Trends driving adoption:

* EU Green Deal and urban decarbonization mandates
* EV sales growth and need for distributed charging infrastructure
* Declining costs of solar, batteries, and digital energy platforms

### Decentralized Energy Revolution

Urban energy strategies are shifting toward **localized generation**. Cities want to:

* Reduce dependence on centralized grids
* Encourage energy democracy
* Improve energy security and self-sufficiency

### Surge in EV and E-bike Adoption

EU targets for **zero-emission urban fleets** and **electrified last-mile delivery** are creating a critical need for:

* Micro-charging solutions
* Non-grid-dependent systems
* Distributed infrastructure on city streets

### Solar as a Service (SaaS) & Infrastructure Innovation

* Customers increasingly prefer **leasing or service-based models** for clean energy
* Cities are embracing **multi-functional infrastructure**: combining energy, mobility, and climate adaptation in one system

### Climate Resilience & Heat Adaptation

With urban heat waves intensifying, cities are investing in:

* Shade structures
* Cooling solutions
* Green public realm strategies

Our system meets these needs **in one integrated product**.

## Market Size & Potential

While exact figures depend on geography, the opportunity is significant:

* **EU Urban Businesses**: 25+ million SMEs, with a large share in hospitality, logistics, and services
* **EU Clean Energy Market**: Projected to reach €1 trillion by 2030
* **EV Charging Market**: Expected to grow over 30% CAGR, with cities as key deployment zones
* **Public Infrastructure Investment**: €100+ billion earmarked through EU Green Deal, Just Transition Fund, and Horizon Europe for urban sustainability and mobility

Even capturing **0.1–0.5%** of these markets would represent **tens of thousands of units** deployed across Europe over 5–10 years.

## Competitive Landscape

Most existing solutions fall into one of three categories:

|  |  |  |
| --- | --- | --- |
| Category | Weakness | Your Advantage |
| Rooftop Solar | Inaccessible in dense cities | Street-level, flexible, modular |
| Centralized EV Chargers | Grid-reliant, few locations | Localized, solar-powered, multipurpose |
| Public Shade Structures | No energy value | Dual-purpose: comfort + clean power |

We are entering a **market gap** with limited direct competition and strong cross-sectoral appeal.

# **Business Model & Revenue Streams**

## Brief Description

Our business model is built around **modular, service-oriented solar infrastructure** tailored to urban environments. It combines clean energy generation, mobility support, and smart urban design; delivered through flexible deployment and financing options. The digital platform enables *energy trading*, *dynamic pricing*, *peer-to-peer flows*, etc.

Our revenue model is modular and adaptable and includes:

* Direct **Hardware** Sales: Selling solar Terrazas and umbrella systems to businesses (and municipalities)
* **Energy-as-a-Service** (EaaS) subscriptions for energy use and storage: Leasing systems or charging for usage (per kWh or per session), of solar umbrellas to businesses (existing Terrazas and municipalities)
* **EV Charging Revenues**: Direct from EV users or through partnerships with mobility apps
* **Data Services & digital Platform Access for energy optimization:** Monthly **Platform Fees**; or usage-based fees for the digital energy management platform.
* **Grants & Carbon Credits**: Where applicable, for emission reductions and green public infrastructure.
* Public-private partnerships for infrastructure deployment.
* Pricing strategies will be tailored to affordability, with tiered models[[2]](#footnote-2) and potential co-financing through EU funds or municipal climate budgets.
* Business customers save on electricity, attract more clients, and improve their sustainability profile.

## Core Business Models: Energy-as-a-Service (EaaS)

Clients don’t buy the system — they subscribe to receive energy or services (charging, storage, etc.) from it.

We offer **Solar Terrazas and Umbrellas** as an integrated service, enabling clients to access clean energy and EV charging **without the need for upfront investment or technical expertise**.

Our model includes:

* **Design & Installation**  
  Our partners manufacture and install solar structures tailored to site conditions and client needs (e.g., a pizza restaurant, logistics hub, or public plaza).
* **Operation & Maintenance (O&M)**  
  Handle all monitoring, maintenance, and optimization, ensuring maximum performance with minimal client effort.
* **Battery Management**  
  Systems include storage for day/night use, peak shaving, or EV charging, managed via digital control systems.
* **Smart Metering & Billing**  
  Clients can track energy use, savings, and performance in real time. Energy may be billed at flat rates or performance-based pricing.

## Revenue Streams

We operate across multiple revenue streams, ensuring financial resilience and scalability:

|  |  |  |
| --- | --- | --- |
| Stream | Description | Target Clients |
| 1. Leasing / Subscription | Monthly or annual rental of the system with maintenance included | SMEs, restaurants, delivery firms |
| 2. Sale of Units | Full ownership offered to clients who want to invest upfront | Property owners, cities, investors |
| 3. Energy Sales | Charge per kWh of clean energy consumed | Businesses, households, public agencies |
| 4. EV Charging Fees | Charging services for bikes, vans, scooters, per use or subscription | Delivery operators, EV users, commuters |
| 5. Advertising / Sponsorship | Branded umbrellas or stations in public areas | Retailers, local governments |
| 6. Public-Private Partnerships (PPPs) | Joint projects funded with municipalities or EU funds | Cities, regional authorities |

## Pricing Strategy

We balance **affordability for clients** with **high system utilization** to maximize return. For example:

* A small restaurant can lease a unit for €400–700/month, including:
  + 8–10 kW solar output
  + Battery storage
  + EV charging
  + Lower energy bills and delivery costs
* A logistics company might:
  + Purchase a full system for €12,000–€20,000
  + Or lease for €600–1,000/month depending on services included

*Custom packages can be tailored for grouped clients (e.g., a shared solar street with 3–5 businesses).*

## Scalability

The business is **modular by design**, allowing rapid scaling by:

* Clustering multiple clients per umbrella or terrace
* Expanding by street, neighbourhood, or city
* Leveraging EU grants or green municipal procurement
* Licensing or franchising the model in new regions

This positions us to **grow sustainably**, with increasing margins as deployment density rises

# **A go-to- Market Strategy (GTM)**

## Brief Description

* **Phase 1** – **Prototype & Demo**: Launch in a restaurant, pizzeria, cafe or public space and food market with clear, measurable decarbonization targets.
* **Phase 2** – **Replication**: Deploy in other restaurant, pizzeria, cafe public space and food market with similar energy needs.
* **Phase 3** – **Scaling:** Partner with municipalities, utilities, and private firms to expand across cities.
* **Phase 4** – **Platform Monetization**: Use platform insights and energy flows for new value streams.

Communication will target sustainability departments, public space managers, and green mobility operators, emphasizing both functionality and aesthetics.

## Phased Entry with High-Visibility Pilots

We will launch the project through a **phased rollout**, beginning with strategic demonstration pilots in high-visibility urban spaces, including high-traffic urban areas such as **commercial streets**, public plazas**, hospitality hubs** andrestaurant districts, mobility hubs (e.g., near train stations or airports), public **parks**, and **food markets**. These sites serve as **live, multi-functional testbeds** for the ecosystem, demonstrating how clean energy, electric mobility, and climate comfort can transform everyday city life. These pilot installations will serve as **live showcases** to:

* Prove system functionality and ROI
* Attract public attention and media interest
* Convince early adopter clients and municipalities

Initial target cities may include those with **climate goals**, **electric mobility incentives**, and **limited rooftop solar space**, where demand for visible and multifunctional renewable infrastructure is high.

### Phase 1: Prototype & Pilot (Year 1)

Pilot markets include Spanish (and southern European) cities with high solar exposure and dense commercial activity.

* Deploy 1–3 demo installations in partnership with a municipality, food market, and urban restaurant (café, pizza place, bar, etc)
* Gather user feedback, refine the product, and validate technical/financial performance.

### Phase 2: Commercial Rollout (Years 2–3)

* Target dense commercial streets and public spaces.
* Engage logistics companies and hospitality chains.
* Co-develop solutions with municipalities (climate plans, urban renewal, mobility hubs).

### Target Clients

Our early outreach will focus on:

* **Hospitality venues**: cafés, restaurants, bars, and pizzerias seeking outdoor space transformation and energy savings
* **Urban logistics operators**: EV delivery fleets requiring compact and sustainable charging infrastructure
* **Commercial property owners**: who want to add value, reduce grid reliance, and offer EV services
* **Municipalities & smart city initiatives**: eager to deploy visible green infrastructure without large land use
* **EV charging networks**: who can benefit from clean, distributed charging solutions
* **Urba food markets**: with value chains extending to rural areas

We will also develop **group client models**, where a single solar umbrella or Terraza supplies multiple co-located businesses or EV users, making the economics more attractive and scalable.

### Marketing Channels

**Public Demonstrations & Events-** Direct outreach and public tenders

* Public visibility via pilot projects
* Interactive installations in city plazas or green festivals will showcase the product and educate the public on its value.

**B2B Direct Sales & Partnerships-** Strategic partnerships with EV providers, solar suppliers and installers, and energy cooperatives

* Targeted outreach to hospitality groups, EV operators, and real estate developers through:
* Direct meetings and proposals
* Collaborations with clean energy consultants
* Co-marketing with EV manufacturers or solar equipment vendors

**Government & EU Programs**  
We will actively pursue:

* Climate innovation funding
* Public-private partnerships
* City-level sustainability and resilience tenders

**Digital Campaigns**  
Use storytelling and visual campaigns to highlight:

* Energy savings
* Comfort & aesthetics
* Climate and community impact

**Flagship Partnerships**  
Aim to secure partnerships with:

* High-profile restaurants or venues
* Urban innovation centres
* Municipal energy agencies

### Distribution & Installation

We will begin by partnering with:

* **Local installation teams** trained to deploy and maintain the modular umbrellas and energy systems
* **Battery and solar tech providers** for procurement and supply chain coordination
* **Smart energy platform developers** to integrate and manage the digital infrastructure

Over time, we will develop a **franchise-ready deployment model**, enabling rapid replication in other cities or regions through trained local partners.

### Scaling Strategy

Following successful pilots and market validation, we will scale by:

* Expanding umbrella- and Terraza-based microgrids across entire commercial streets
* Licensing or franchising the technology in new cities
* Leveraging data from the digital platform to optimize design, placement, and pricing

## Illustration-pilot case: Decarbonizing an Urban Food Market

### Decarbonizing a Public Food Market Through Solar-Powered Terrazas, EV Charging, and Smart Energy Management

One of our flagship pilot sites will be a **public food market operating in a city park**, which currently relies on:

* **Fossil fuel generators** for energy (stoves, refrigerators, lighting)
* **Diesel vans** for product delivery from peri-urban farms

We will transform this site into a model for full value chain decarbonization:

* **Replace fossil fuel generator** with our **solar umbrellas and Terrazas**, supplying clean energy to all stalls.
* Replace diesel powered transport with green logistics, and i**nstall a solar-powered EV charging station** at the market to charge **electric delivery vans** while they are parked during marets operations
* **Deploy solar-powered irrigation systems** at participating farms to enable clean agriculture from source to plate.

This not only removes fossil fuel dependence but also:

* Improves air quality and reduces noise in public parks
* Enables local farmers to save on fuel and energy costs
* Demonstrates how cities can **meet food, energy, mobility and climate goals** **together**

This pilot will be showcased as a replicable model for **urban-rural circular economy**, **resilient food systems**, and **climate-positive public space activation**. The **urban food market model** will also be scaled to:

* Seasonal and weekly outdoor markets
* Urban farms and cooperatives
* Agri-parks and educational farms within cities

# **Operations Plan**

## Brief Description

Operations for This prototype and demo phases will focus on:

* **Design & Manufacturing**: Centralized design, with outsourced manufacturing to local or regional/EU partners.
  + Engineering & Installation of 1–3 solar umbrellas and Terrazas.
* Digital Platform Development for energy management.
  + **Digital Platform**: Developed with a technology partner, integrating sensors, energy data, user interface, and payments.
* **Installation & Maintenance**: Through trained local contractors; standardized kits and installation manuals.
  + Local Partnerships with retailers (bars, restaurant, etc), EV and charging providers, food market, and urban farmers

The digital platform enables dynamic optimization: storing energy when prices are low, sharing across nearby nodes, and ensuring reliability. As a virtual micro power plant, it will optimize both energy flows and financial returns. The digital platform will oversee:

* Battery charge/discharge optimization.
* EV charging scheduling.
* Real-time payments and data analytics.

## System Architecture & Deployment

Our operations will centre around the **design, deployment, and management** of modular, high-efficiency solar umbrella systems integrated into **solar Terrazas**, charging stations, and digital energy flow platforms. Each deployment is treated as a **micro-node** in a larger decentralized **urban solar microgrid** — capable of functioning independently or as part of a wider virtual power plant.

Each installation includes:

* **Solar panel-equipped umbrellas or pergolas** (Terrazas)
* **Battery storage** at the umbrella/Terraza level, the EVs, and the charging station
* **Charging ports** for electric vehicles (cars, vans, bikes)
* **HVAC/heating support** for comfort in hospitality spaces
* **Digital platform** for energy management, demand response, and payments

This setup allows us to:

* Maximize local solar use
* Reduce stress on the public grid
* Optimize production, storage, and consumption at the node (terraza) level

## Modular, Scalable Installation Workflow

We will build an **installation and maintenance model** based on local partner networks, trained to deploy the technology and ensure smooth long-term operation.

1. **Pre-Installation Assessment**

* Energy demand survey
* Space and shade analysis
* Client needs (restaurant, logistics hub, food market, etc.)

1. **System Design & Customization**

* Select umbrella/Terraza size and orientation
* Configure battery capacity and EV ports
* Integrate into nearby building systems, if applicable

1. **Installation**

* Construction and anchoring of modular infrastructure
* Panel mounting and wiring
* Software integration with energy management platform

1. **Commissioning**

* System test and safety check
* Client onboarding into the platform
* Monitoring and maintenance schedule setup

## Digital Platform Operations (Energy Flow + Payments)

**Developed with a technology partner,** integrating sensors, energy data, user interface, and payments

The digital platform enables dynamic optimization: storing energy when prices are low, sharing across nearby nodes, and ensuring reliability. As a virtual micro power plant, it will optimize both energy flows and financial returns.

Since our system functions as an *intelligent urban microgrid* and *virtual power plant*, this platform is **key to our innovation**. The platform enables *energy trading*, *dynamic pricing*, *peer-to-peer flows*, etc.

The **digital layer** of the ecosystem is the intelligent backbone of operations. The digital platform is the **intelligent engine** that powers the entire ecosystem. It coordinates energy production, storage, and distribution across all nodes—solar umbrellas, Terrazas, charging stations, EVs, and associated buildings—forming a **dynamic urban solar microgrid**. The digital platform ensures the smooth and smart functioning of the solar Terrazas, umbrellas, EV charging stations, batteries, and connected buildings, transforming each system into a **dynamic, responsive urban microgrid node.** Collectively, these nodes function as a **virtual power plant** across the city.

### Key functions

Key platform capabilities include:

The **digital layer** of the ecosystem plays a critical operational role:

* **Real-time monitoring and diagnostics** of solar generation, battery status and levels, energy usage, and EV charging activity across nodes, and energy consumption patterns
* **Demand-based storage and export through Smart energy routing** between local components (e.g., Terrazas, buildings, charging stations, and EVs), using algorithmic prioritization (e.g., heating or cooling the Terraza first, then charging EVs when solar surplus is available, or exporting to feeding the host adjacent building), reducing costs and maximizing usage
* **Energy arbitrage, Load balancing and demand forecasting,** ensuring that energy is stored during low-cost/high-generation periods and released and distributed during peak demand when needed most, reducing stress on the central grid.
* **Automated billing and payments**, allowing clients ad users to pay for energy usage and services (EV charging, Terraza consumption, etc) through QR-based codes and systems, contactless cards, energy credits, or app-based digital wallets.
* **Client-facing dashboard** that visualizes energy savings, payments, services requests, carbon offsets, and usage in real-time[[3]](#footnote-3).
* **Predictive maintenance alerts** to minimize downtime and increase efficiency.

Looking ahead, the platform is designed for:

* **Optional peer-to-peer energy sharing**, allowing nearby nodes to exchange energy based on demand (optional, future roadmap)
* **Integration with** local incentives and **carbon credit markets**, turning surplus clean energy or avoided emissions into added revenue, allowing users or site operators to earn and trade verified emission reductions.
* **Peer-to-peer energy trading** between Terrazas and adjacent nodes during surplus generation periods.
* Acting as a **virtual micro power plant**, aggregating the capacity of distributed installations to participate in grid services or city-level resilience planning.

The platform functions as a **virtual power plant manager**, coordinating multiple nodes across a city and intelligently responding to, market energy prices, grid availability and client usage patterns. This digital infrastructure ensures the entire system remains flexible, efficient, and scalable while promoting energy equity and user empowerment in cities. This, software layer enables **remote system control**, **predictive maintenance**, and **the long-term scalability of the business model** into a smart, modular, and sustainable energy network embedded within urban life.

## Manufacturing & Procurement

Centralized design, with outsourced manufacturing to local, regional or European partners.

In the initial phase:

* **Umbrella structures** will be manufactured through select partners using sustainable materials
* **Solar panels, inverters, batteries**, and **charging components** will be sourced from established suppliers in Europe to meet regulatory and performance standards
* **Customization and assembly** will be performed locally, when possible, to reduce transport costs and stimulate local and regional economic activity

## Maintenance & Support Strategy

* Through trained local contractors; standardized kits and installation manuals.
* Preventive and corrective maintenance managed via digital alerts
* **maintenance can be a local green job creator**, especially in urban neighbourhoods
  1. Partnerships with local electricians, clean-tech installers, and EV tech specialists
* Optional client service packages for maintenance, upgrades, and energy-as-a-service subscriptions
* **remote diagnostics and predictive maintenance** — made possible via the digital layer

## Sustainability & Circularity

Operations will follow strict environmental and circular economy principles:

* Use of recyclable or biodegradable materials where possible
* Upgradable modular design to extend system life
* Planned second-life usage of batteries
* Lifecycle emissions tracking and transparency

# **Team & Management** (Prototype & Demo Stage)

## Brief Description

It is smart to **adapt the team structure** to our current phase: **prototype and demo project.** In the prototype phase, we are focusing on a lean, strategic team:

* Founder & Project Lead: overseeing vision, financing, and partnerships.
* Technical Advisor: for solar, battery, and platform integration.
* Urban Designer/Architect: to ensure beautiful, context-sensitive installations.
* Operations Coordinator: managing suppliers and schedules.

We will outsource fabrication, transport, and maintenance in this phase. As the project scales, we will bring on full-time roles in platform development, energy operations, customer support, and city partnerships.

### Mission-Driven, Interdisciplinary Team

The success of our solar artefacts (umbrella and Terraza) microgrid system hinges on a mission-driven, interdisciplinary team **capable of bridging** solar technology, digital infrastructure, urban planning, and clean mobility. At this early prototype stage, our project is guided by a lean, highly strategic core team designed to **advance the development of the first working prototype and launch a high-impact demo project in an urban environment**. Rather than building a large in-house team, we operate through a flexible model that combines core leadership, targeted freelance expertise, and partnerships with fabrication, engineering, and digital development collaborators.

**At the prototype stage**, the core team will remain lean, focusing on strategic functions:

* Vision and coordination
* Prototyping and testing
* Early partnerships and funding
* Digital architecture (even if minimal MVP[[4]](#footnote-4))

## Lean Core Team for Prototype & Demo Stage

#### Founder & Project Lead:

Our leadership brings together expertise from the energy transition, smart cities, and climate resilience fields, with hands-on experience in project design, deployment, and public-private partnerships. Background in climate resilience, energy transition, and investment-ready project design. Leads the vision, business model design, coordination of partners, and funding strategy. Leads the integration of solar and EV systems into a coherent business model, drives funding and partnership development, and oversees the pilot deployment, the development and testing of the integrated system and maintains relationships with public and private stakeholders.

* Lead vision, partnerships, and coordination (public sector engagement)
* Oversee business model, grant writing, and investor relations

#### Technical Advisor / Engineer (freelance / consulting /or part-time)

Provides guidance on system design, sizing of the energy systems and energy efficiency, solar production, battery storage, and integration of the electric charging components, including solar umbrellas, battery integration, and charging infrastructure. Supports prototype development and installation logistics. Collaborates closely on performance testing and safety standards**.**

* Help design the structure of the solar umbrella/Terraza
* Oversee solar generation, battery sizing, and energy flow logic

#### CTO-Digital Platform Developer (freelancer or studio-based)

Leads the development of the platform that manages energy flows, automation, and payment systems. Focuses initially on building an MVP for the prototype stage. Develops the MVP of the digital energy platform, enabling basic energy flow tracking, device connectivity (e.g., umbrella-to-battery-to-charger), and early-stage automation and payments logic[[5]](#footnote-5). May be outsourced to a clean tech development studio or university partner.

* System architecture and platform design: Build a minimal viable platform to monitor and simulate flows
* May be a backend developer with energy tech or IoT experience

#### **Product Designer**/Engineer **(freelance/on demand/ or part-time)**

Creates technical drawings and visualizations of the system, including the modular Terraza and umbrella, tailored to different site needs (e.g., street café, food market, logistics hub). Supports the industrial and functional design of the umbrella and Terraza system, including technical drawings for fabrication, materials selection, and site adaptation. Ensures alignment with public space use, durability, and aesthetic standards.

* Oversees technical specs, assist with the prototype design and testing, structural drawings, visuals, installation requirements

#### Operations Coordinator

Manages installations, logistics, and local partners

#### **Strategic Advisor (optional, honorary role)**

* Supports the Founder in navigating funding opportunities and clean energy finance, city-level deployment strategies, and connections to innovation ecosystems or accelerators.

For more on these Core Strategic Roles and team see **Appendix A**

## Execution through partners**:**

### Functions to Outsource or Partner (Strategic Partnerships)

To stay agile and cost-effective, core operations during the prototype and demo stage will be supported by:

* **Manufacturing of solar umbrellas / modular structures** (with fabrication studio or engineer, with EU-compliant standards)
  + Fabrication partners for solar panels, structural components and umbrella manufacturing
* **EV and Battery tech suppliers** with integration support
  + **Battery integration** (from existing manufacturers or through a tech integrator, with EU-compliant standards)
* **Local Maintenance & Installation partners** (via local urban infrastructure or clean energy cooperatives)
  + **partners** for structural components
  + **Local electricians and installers** for the pilot
* **Digital and fintech**[[6]](#footnote-6) **developers** for platform, billing, and mobile app
  + **Digital UX[[7]](#footnote-7) and mobile app** (MVP[[8]](#footnote-8) handled by small dev shop or student team)
* Renewable energy integrators[[9]](#footnote-9)
* **Other functions** (legal, accounting, PR[[10]](#footnote-10), etc.) will be outsourced.
* **Public space authorities.** Municipal or public space partners to host and co-promote the demo
  + City governments and urban mobility agencies
* Public food markets and logistics cooperatives
* Academic or NGO partners for monitoring and evaluation
  + **University or research partners** for impact assessment and monitoring
  + **Universities and R&D labs** for pilot testing, impact assessment, and materials innovation

This model allows us to rapidly prototype, launch a high-visibility pilot, and demonstrate both technical feasibility and systemic potential before scaling up the full operational team

### Summary

This allows for agility and focus while minimizing overhead. We’re aiming for a **project-led, partnership-powered model** at this stage — where our small team coordinates **a pilot**, secures visibility, and then grows **organically** with funding.

## Scaling Plan (Team Expansion Post-Demo)

Once the demo project proves viability and secures its first strategic partners and/or customers, the team will scale in three key directions: **Technical & Operations Team, Digital & Product Team, Commercial & Strategic Team**

* Technical & Operations Team
  + Add full-time Operations Manager to coordinate installations, logistics, and system maintenance
  + Establish a Customer Support & Maintenance Crew for umbrella units and charging stations
  + Recruit an Energy Systems Engineer for ongoing optimization of microgrid and battery operations
* Digital & Product Team
  + Build a small in-house Product Development Team for the digital platform
  + Hire a Data Analyst to manage platform performance, energy flows, and customer usage patterns
  + Expand user experience (UX) and user interface (UI) and app development to support end users (e.g., EV drivers, café, restaurant, terraza operators, etc)
* Commercial & Strategic Team
  + Hire a Business Development Lead to expand city partnerships and pilot replication
  + Add a Finance/Grant Manager to manage contracts, loans, and sustainability-linked financing
  + Form an Advisory Board including experts in solar, urban infrastructure, sustainable mobility, and policy

The team will remain agile, guided by the project's core principles of scalability, replicability, and impact, growing in line with customer demand and strategic funding.

### Growth Strategy for Team

The team is designed to **scale alongside deployment**:

The team will remain agile, guided by the project's core principles of **scalability, replicability, and impact**, growing in line with customer demand and strategic funding.

This model allows us to **rapidly prototype**, **launch a high-visibility pilot**, and demonstrate both **technical feasibility and systemic potential** before **scaling up** the full operational team.

# **Impact & Sustainability**

## Brief Description

Our project contributes to the following SDGs:

* #7 Affordable and Clean Energy
* #11 Sustainable Cities and Communities
* #13 Climate Action

Impact metrics:

* CO₂ avoided per installation
* Fossil fuel replacement rates
* Number of EVs charged and trips decarbonized
* Energy cost savings for local businesses
* Jobs created in clean energy and urban innovation

This project is rooted in the belief that cities must undergo a **rapid and just energy transition**, and that this can happen street by street, in ways that **improve daily life, reduce emissions, and empower local economies**.

## Environmental Impact

* **Clean Energy Generation in Urban Spaces**  
  Replaces fossil fuel generators and grid dependency with **localized solar generation**, reducing CO₂ emissions and air pollution.
* **Electric Mobility Integration**  
  Supports the shift away from combustion engines by creating **decentralized charging nodes** powered by renewable energy, easing pressure on the national grid and eliminating the need for large- farms for the production of solar and renewables.
* **Microgrids & Energy Efficiency**  
  Introduces a **multi-node solar microgrid** in dense city environments, increasing energy autonomy and system resilience. Energy storage and redistribution algorithms ensure optimal use and minimize waste.
* **Circular Value Chains**  
  Demonstrates a clean energy solution across entire systems—for example, powering food markets from **farm to table**, integrating solar irrigation at farms, electric logistics, and clean cooking at urban stalls.

## Social & Economic Impact

* **More Liveable Cities**  
  Provides shading, warmth, and comfort through solar Terrazas, improving outdoor experiences and stimulating economic activity in cafés, parks, and public spaces.
* **Democratized Access to Energy**  
  Offers clean energy access to small businesses, food vendors, and community spaces that are often excluded from traditional rooftop solar programs.
* **Green Job Creation**  
  Spurs demand for local installation, maintenance, platform development, and energy services, particularly in underserved neighbourhoods.
* **Scalable Innovation**  
  Establishes a model that is modular and replicable across cities, scaling through partnerships and creating new market opportunities in solar mobility infrastructure.

## Sustainability & Long-Term Vision

The platform operates not only as a business, but as an **urban energy ecosystem**, a **virtual power plant** made up of solar Terrazas, EV batteries, charging nodes, and digital coordination. This new paradigm reduces the need for land-intensive solar, and wind farms and brings the benefits of the energy transition **closer to the people**, at the very heart of public life.

This initiative contributes directly to:

* **Climate Mitigation**: Displaces fossil fuels in mobility, markets, and hospitality.
* **Pollution Reduction**: Improves air quality and reduces noise.
* **Urban Equity**: Brings clean infrastructure to underserved communities and public spaces.
* **System Resilience**: Reduces grid stress through distributed generation and storage.
* **Job Creation**: Local manufacturing, installation, and maintenance.

The system’s modularity means small investments can unlock large-scale climate and social benefits.

# **Financial Overview**

## Brief Description

* Prototype (demo) Budget: €300,000
  + Design & Prototype: €80,000
  + Digital Platform (MVP): €60,000
  + Demo Installations (3): €120,000
  + Operations, Legal, Contingency: €40,000
    - Umbrellas, Terrazas, and charging stations
    - Platform development
    - Logistics and installation
    - Operations and outreach
* **Revenue Model**:
  + Demo revenue through lease-to-own or shared savings contracts
  + Monetization of EV charging and energy optimization
  + Post-demo: scaling via multi-client installations with recurring revenues
* Revenue Forecast (Pilot Year): €35,000–€70,000
  + Mix of EaaS, charging, and leasing fees
* Breakeven Point: Estimated within 3–4 years (based on replication and service expansion). Estimated within 3–4 years, assuming a 3x scale-up after pilot success[[11]](#footnote-11).
* Growth Potential: Scaling to 10+ city markets could generate >€1M annual recurring revenue by Year 5. (For more on this see ***appendix Growth potential***)

## Initial Investment & Capital Requirements

To develop and deploy launch the prototype and first working demo of the **Solar Terraza System**, an estimated **€200,000-300,000** in upfront capital is required. These funds will cover:

* **R&D, Design, engineering, and Prototype Construction** of 1–2 fully functional solar umbrella + Terraza prototypes
  + Materials, fabrication, testing, and installation of the first **solar Terraza + umbrella system** integrated with batteries and a compact EV charging station.
* **Battery storage systems** integrated with solar production and charging nodes
* A **compact EV charging station** for EVs and light electric vans and/or urban delivery EVs, including e-bikes
* Development of the MVP[[12]](#footnote-12) **of the intelligent digital platform**, including interfaces for energy flow management and user billing
  + **Digital Platform MVP**  
    Design and build of the core software platform to manage energy flows, payments, and monitoring.
* **Operations & Deployment Costs**  
  Site preparation, permits, legal setup, logistics, technical personnel, and insurance.
* **Installation, testing, logistics, and operation** at the pilot site
* **Advisory & Technical Services**  
  Contracting specialists in solar engineering, EV integration, energy policy, and urban infrastructure.
* Legal, advisory, insurance, and **communications strategy**

The initial funding will be sourced through a combination of:

* IDAE investment
* Public innovation grants or European climate transition funds
  + European climate or innovation grants (e.g., LIFE, Horizon Europe, REPowerEU)
* Impact investment or green infrastructure loans
* Strategic partnerships or pilot co-funding by cities or businesses
  + Public-private partnerships with municipalities or commercial districts
* **Blended finance models** combining loans, grants, and impact investment

## Business Model & Revenue Streams

To finance our **solar Terrazas and umbrella project** — particularly in the **energy efficiency (EVs, charging stations)** and **renewable energy (solar-powered infrastructure)** sectors — innovative financing schemes are key to unlocking capital, accelerating adoption, and improving affordability for clients. Key Revenue generation and streams in the prototype and early scale-up phases will come from a range of innovative mechanisms such as:

### Energy-as-a-Service (EaaS)

* Clients do not buy the system — they subscribe to receive energy or services (charging, storage, etc.) from it.
  + Monthly subscriptions payments by host businesses (e.g., cafés, markets) for use of clean, stable energy via solar Terraza systems
  + Dynamic pricing based on energy demand and generation availability. Tiered pricing based on kWh usage, peak demand coverage, and battery autonomy

#### EV Charging Services

* Pay-per-use or subscription fees for customers charging their vehicles
* Optional integration with delivery fleets, public mobility programs, or tourist zones
* Fees from public or semi-public users for charging EVs under the solar umbrella network
* Potential integration with city mobility platforms and loyalty programs

### Pay-As-You-Save (PAYS) or Pay-As-You-Go (PAYG)

* Clients pay **only from the savings** or energy generated by the system, often through their utility bill or mobile app.

### Leasing & Licensing

* Medium-term leases of solar umbrellas and Terrazas for seasonal or permanent use
* Licensing of the digital platform to third parties managing solar microgrids
* Leasing solar Terraza systems to restaurants, cafés, food markets, and public institutions
* Licensing of the digital microgrid platform to third-party operators or municipalities

### Infrastructure-as-a-Service for Municipal Projects

* Deployment of the system in **public parks, food markets**, plazas, and schools
* Bundled public infrastructure offerings (solar + EV + digital platform)

#### Integrated Projects

* Joint development of climate-positive public infrastructure (e.g., energy-transitioned food markets, clean logistics hubs, outdoor cultural venues)

### Performance-Based Contracts / Energy Performance Contracting (EPC)

#### Description:

We guarantee a certain level of performance (e.g. kWh savings or EV charge cycles), and clients pay based on actual delivered performance **Example:**

* Restaurants or logistics companies pay a **monthly fee** for energy delivery, EV charging, or storage access.
* You retain ownership of the asset and ensure maintenance, maximizing long-term revenue.

#### Benefits:

* Low upfront cost for client
* Recurring revenue for us
* Attracts SMEs that are risk-averse

## Financial Projections

Assumptions based on preliminary modelling[[13]](#footnote-13):

### Year 1: Prototype & Demo

1–2 pilot installations

* Revenue: €25,000–€45,000, from limited energy service contracts and EV charging at the demo site (mainly from EaaS and EV charging)
* High initial CapEx and O&M costs[[14]](#footnote-14)
  + Operating costs remain high due to prototyping and development
* **Goal:** validate technical feasibility, demonstrate user experience, and secure follow-on funding

### Year 2–3

**Early Scale-Up**

* 6–12 installations and deployments in urban settings across mixed-use environments (e.g., cafés, logistics hubs, food markets)
* Revenue: €150,000–€300,000
* Breakeven likely in late Year 3 or early Year 4, assuming strong EaaS and EV charging uptake, (depending on adoption and licensing uptake)

### Year 4–5

**(Expansion and Growth Phase)**:

* Potential profitability begins in Year 4 with strong recurring revenue
* 30+ urban microgrid nodes deployed across multiple urban areas and/or cities
* Revenue scaling to €750,000–€1.2M annually
* Increased profitability due to standardized production and software deployment

10-Year Horizon:

* Wide deployment across multiple cities
* Potential revenues in the €4M–€6M range
* Strong cash flow from energy sales, platform licensing, and infrastructure partnerships
* Operating margin: 25–35%, depending on platform adoption and scale of EV charging services

## Cost Structure

Key cost categories and components include:

* Solar Hardware (solar modules (solar Terrazas and umbrellas), panels, battery systems, EV chargers)
* Software Platform development and maintenance and licensing
* Installation and operations and system integration
* Maintenance and customer support
* Insurance, permits, and legal compliance
* Strategic communications and business development
* Staff and outsourced expertise

As scale increases, **unit costs will decrease** due to bulk procurement, manufacturing improvements, and process standardization.

**Economies of scale** will drive costs down with each new deployment, especially for fabrication, software, and logistics.

# **Risks & Mitigation**

## Brief Description

|  |  |
| --- | --- |
| Risk | Mitigation Strategy |
| Tech integration challenges | Build modular, testable prototypes |
| Regulatory hurdles | Early engagement with municipalities |
| High initial capex | Leverage EU funds, green loans, co-financing |
| Adoption resistance | Focus on aesthetics, comfort, and public benefits |
| Grid instability or oversupply | Use batteries + smart platform to manage timing |

Launching a novel clean energy infrastructure solution comes with both market and operational risks. These include:

## Technological Risk

* **Risk**: Failure of hardware integration (solar + battery + charging) or software platform
* **Mitigation**: Use proven components; phase testing; start with low-complexity pilot configurations

## Permitting & Urban Regulation

* **Risk**: Delays or restrictions related to city regulations, public space use, or grid interconnection
* **Mitigation**: Early engagement with municipalities and local authorities; design for modularity and off-grid readiness; use of temporary or modular permits.

## Capital Access Risk

* **Risk**: Upfront costs; Difficulty in securing initial €300,000 investment
* **Mitigation**: Diversify funding (grants, green loans, PPPs); engage investors focused on urban innovation and decarbonization; use **blended financing and leasing** to reduce capital barrier for clients

## Market Adoption Risk

* **Risk**: Slow uptake from businesses or users unfamiliar with solar microgrids
* **Mitigation**: Strong communication strategy; focus on high-visibility high-benefit, pilot in visible public spaces (e.g., parks, markets) to build demand; emphasize economic and environmental value

## Maintenance and Operational Risk

* **Risk**: System degradation, vandalism, or lack of long-term serviceability
* **Mitigation**: Durable design, preventive maintenance program, local technical partners

## Platform Complexity

* **Risk**: Underperformance or bugs in digital platform coordinating energy flow
* **Mitigation**: MVP approach, with essential features first; pilot in controlled environments before scaling, testing phase to debug before scale; partnerships with proven tech providers.

# **Funding Strategy & Partnership Map**

## Funding Strategy

At this prototype and demo phase, the project will rely on a **blended financing strategy** that combines public grants (e.g., European Green Deal, Just Transition Mechanism), municipal or regional development funds, and mission, climate-aligned private capital. An initial investment of **€300,000** will be used to develop and install one to three demo units in high-impact locations such as a public park food market, a logistics hub, or a dense urban street.

This approach lowers and minimizes risk for private investors, and aligns with policy priorities, while showcasing the system’s environmental, social, and financial returns. Once the pilot proves viability, the next phase will unlock **scaling funds and capital** through climate infrastructure funds, ESG-focused investors, and energy-as-a-service partners.

## Partnership Map

The project’s success depends on building a **multi-stakeholder ecosystem**. Early partnerships include:

* **Municipalities & Public Space Authorities**: Site access, permitting, and co-investment in public infrastructure (e.g., parks, streets, food markets).
* **Retailers in the hostelry and tourism sectors**: pilot users and early adopters transitioning from diesel generators to solar-powered stoves and refrigeration (restaurants, bars, coffee shops, etc)
* **Farmers’ Markets & Urban Vendors**: pilot users and early adopters transitioning from diesel generators to solar-powered stoves and refrigeration.
* **EV Logistic fleets & Food Delivery Operators**: logistics firms transitioning to clean transport, Deployment of charging stations and EVs powered by solar umbrellas.
* **Tech firms & Platform Developers**: Digital energy platform development and hardware integration for real-time energy management, payments, and optimization.
* **Local Installers & Maintenance Teams**: local capacity-building to support deployment, training, and service logistics.

As the demo succeeds, this partnership base will expand toward urban developers, mobility hubs, and even hotel chains or universities.

# **Appendix**

## Brief Description

* Appendixes in support of the business plan
* Prototype Designs: Solar umbrella + Terrazas illustrations
* Food Market Case Study: Details on decarbonization targets
* Partnership Map: Local and European partners (tech, municipal, energy)
* Presentation Materials: Slide deck for lenders and public agencies
* Funding Use Breakdown: Allocation of €300,000 across components

The Appendix includes

* Technical schematics (Solar Umbrella + Terraza concept designs. See Carlos H Betancourth, Executive summary, 2025, and Narrative and conceptual framework, 2025)
* Use case summaries (e.g., food market, logistics, bar/restaurant applications. See Carlos H Betancourth, Executive summary, 2025, and Narrative and conceptual framework, 2025)
* Climate impact projections and **Metrics** (emissions avoided, kWh generated, etc.) (See, Carlos H Betancourth investment report 2025)
* Preliminary financial tables (See, Carlos H Betancourth investment report 2025)
* Letters of **of Intent /** support (in progress)
* Reference **& Data Sources** (market trends, EU policy frameworks, EU Green Deal, mobility stats, etc.)

1. Peak shaving is a strategy to reduce electricity consumption during peak demand periods to minimize costs and ensure a stable power grid. It involves temporarily decreasing energy usage, often by using **on-site power generation**, battery storage, or by temporarily scaling down production, to avoid high electricity costs and grid strain.  [↑](#footnote-ref-1)
2. Tiered models, whether in pricing, support, or other contexts, break down a product, service, or system into distinct levels or tiers, each offering a different set of features, benefits, or price points. This approach allows businesses to cater to a wider range of customer needs and budgets, providing options from basic to premium [↑](#footnote-ref-2)
3. A client-facing dashboard for energy savings, payment, and service requests would provide a central hub for clients to manage their energy usage, track their payments, and submit service requests. [↑](#footnote-ref-3)
4. In product development, an MVP (Minimum Viable Product) is a version of a product that allows a team to collect the maximum amount of validated learning about customers with the least effort. It's a streamlined, stripped-down version of the product that includes only the most essential features necessary to address a core need and get initial user feedback [↑](#footnote-ref-4)
5. A chief technology (or technical) officer, a senior executive with responsibility for managing the technological requirements of a company or other institution [↑](#footnote-ref-5)
6. computer programs and other technology used to support or enable banking and financial services. [↑](#footnote-ref-6)
7. Digital User Experience (DUX), often referred to as Digital Experience (DX), is the overall feeling a user has after interacting with a digital product or service. It encompasses all aspects of the user's interaction, including usability, design, accessibility, and overall satisfaction [↑](#footnote-ref-7)
8. In product development, an MVP (Minimum Viable Product) is a version of a product that allows a team to collect the maximum amount of validated learning about customers with the least effort. It's a streamlined, stripped-down version of the product that includes only the most essential features necessary to address a core need and get initial user feedback [↑](#footnote-ref-8)
9. Renewable energy integration refers to the process of incorporating renewable energy sources, like solar, wind, and hydro, into existing power grids. It involves developing technologies and strategies to effectively manage the intermittency of renewable sources and ensure grid reliability [↑](#footnote-ref-9)
10. PR, which stands for Public Relations, is the practice of managing and disseminating information to the public to shape a positive image or influence their perception of an organization, individual, or brand. It's a strategic communication discipline focused on building, managing, and sustaining positive relationships with key stakeholders [↑](#footnote-ref-10)
11. A "3x scale-up after pilot success" means a project or initiative that has been successfully tested in a pilot program is being expanded to a significantly larger scale, in this case, three times the size of the pilot. This usually indicates the project is achieving its goals and is being implemented on a wider, more significant scale [↑](#footnote-ref-11)
12. The minimum viable product is **a product with just enough features to satisfy early customers**, and to provide feedback for future development. [↑](#footnote-ref-12)
13. See Investment report. 2025 [↑](#footnote-ref-13)
14. Operation and maintenance (O&M) costs encompass all expenses related to keeping a system, facility, or asset operational and in good working order. This includes costs for staffing, materials, repairs, and other ongoing expenses necessary for maintaining the system's functionality [↑](#footnote-ref-14)