CIASEM
Value proposition

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SUSTAINABLE PLACES 2025

Collaborative Intelligent Agents for Smart Energy Management (CIASEM)

CIASEM R&D Project Overview

Background

- Our energy usage doesn't match with available renewable energy production in real-time.
  - Leading to volatile and increasing energy costs and CO_2 emissions.
- Need for energy flexibility is increasing due to systemic transition towards fluctuating renewable energy production.
- The energy flexibility potential of real estate has not been widely aggregated and connected to energy markets or energy networks control.
- The global markets for digital and AI –based solutions for energy management of real estate are growing and estimated to reach over 40 billion USD by 2034.
- *How can we enable fair, collaborative and flexible energy management in real estate to decrease energy costs, cost variation and CO2 emissions?*

Project Mission

- CIASEM Mission:

  To co-innovate and demonstrate a value co-creation driven highly automated multi-agent system,

  - enabling energy flexibility flow between energy users, energy distributors and energy producers via energy or flexibility markets,
  - with a fair renumeration between the involved stakeholders via new business models.

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Goal & Consortium

- Driven by use cases the goal is to research, specify, design, develop, demonstrate, and evaluate a novel CIASEM multi-agent system for electricity markets and grid control connected aggregated energy flexibility of real estate.
- Use cases:
  - Flexible site-level energy management
  - Cross-sector district energy management
  - Flexibility aggregation for multi-market integration
- Consortium of 14 Finnish companies:
  - 7 core partners with Business Finland funded R&D projects (technology and service providers)
  - 7 steering partners (District heating and DSO companies, renewable energy producer, real estate owners, TSO, and a global building automation provider)

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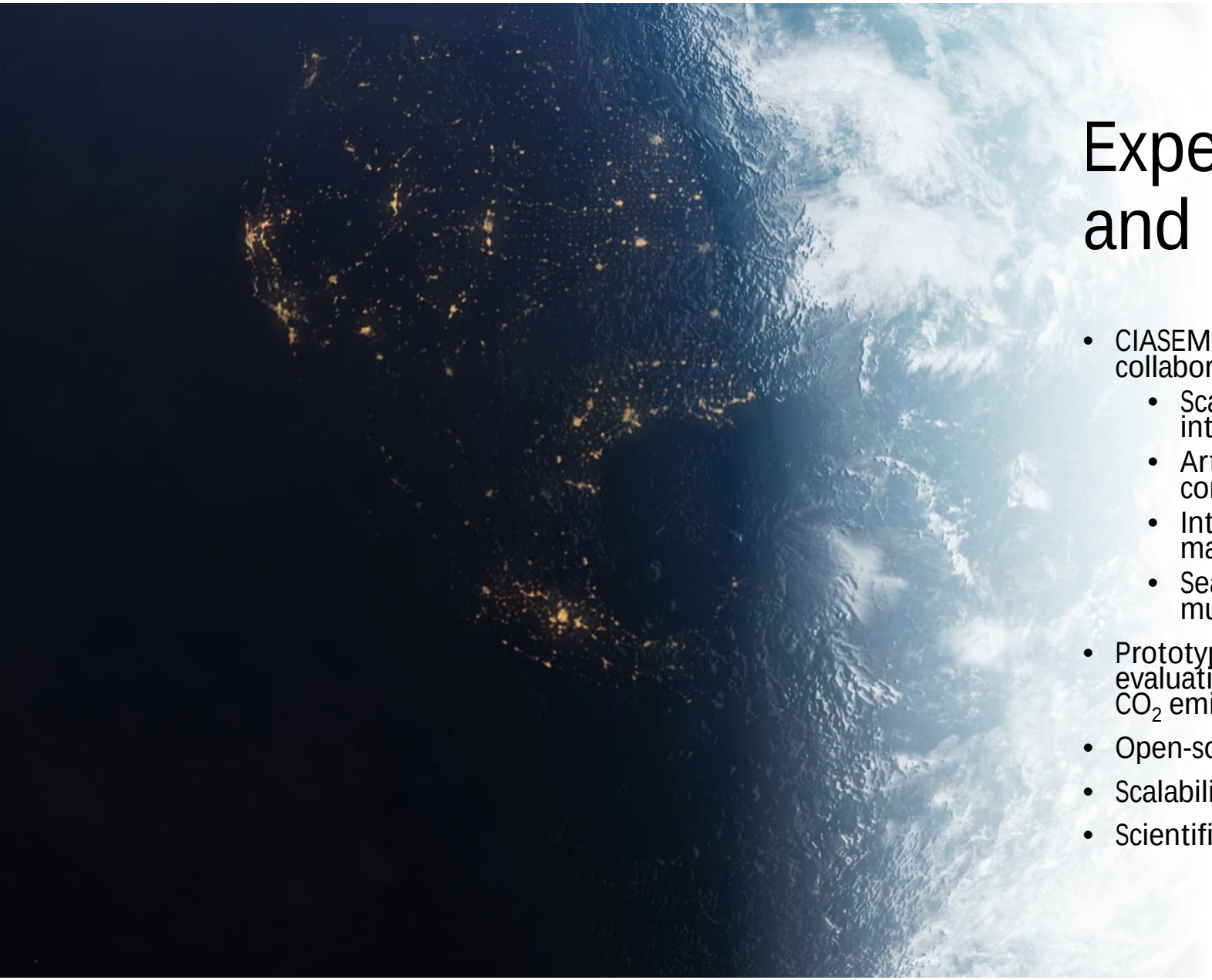

Expected Results and R&D Themes

- CIASEM Multi-agent system for collaborative energy flexibility
  - Scalable business models, user interaction, and architectures.
  - Artificial intelligence and edge computing.
  - Interoperability and data management.
  - Seamless flow of flexibility towards multiple markets
- Prototypes, demonstrations and evaluation of decreased energy costs and CO_2 emissions
- Open-source contributions
- Scalability and impact analysis
- Scientific publications

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Demonstrations

- Proof-of-concept demonstrations and impact evaluation on multiple different real estate types:
  - Apartment buildings,
  - Elderly care buildings,
  - Office buildings,
  - Supermarkets, and
  - Office & factory combination.
- The data collected from the demonstrations is extrapolated for scalability and impact analysis on the real estate reachable for the consortium.
  - Over 3000 buildings globally.

Contact for CIASEM project in general

Project manager:

Daniel Pakkala,

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The three use cases in CIASEM

- UC1: Flexible site-level energy management
- UC2: Cross-sector district energy management
- UC3: Flexibility aggregation for multi-market integration

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Key stakeholders recognised earlier in the project

DSA	SEMA	EDMA	DH/CMA	DEMA	FAA

- Agents:
  - DSA – Device Subsystem Agent
  - SEMA – Site Energy Management Agent
  - EDMA – Electricity Distribution Management Agent
  - DH/CMA - District Heating/Cooling Management Agent
  - DEMA – District Energy Management Agent
  - FAA – Flexibility Aggregation Agent
- Stakeholders:
  - DSA: Device manufacturer, Automation system provider, Device subsystem provider, Device subsystem operator, Site/building owner.
  - SEMA: Site energy management system/service provider, Site/building owner, Facility management provider, facility user, regional energy distribution network operator, Energy flexibility aggregator.
  - EDMA: DSO, Site energy management system/service provider, Energy flexibility aggregator.
  - DH/CMA: District heating/cooling provider, Site energy management system/service provider.
  - DEMA: Regional energy company, District heating/cooling provider, DSO, Energy flexibility aggregator.
  - FAA: Energy flexibility aggregator, Electricity retailer, TSO.

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Basics of Business Model Development

1. Define the most relevant customer or customer sector
2. Recognise the customer needs
3. What (products/services) are you/your company/ecosystem able to provide to fulfill the needs (and more)?
4. What makes you better than the competitors?
   > Value proposition
5. Go through all the relevant aspects affecting the business model

Useful tools: Business Model Canvas & Value Proposition Canvas

In addition: e.g. PEST* & SWOT**

* Political, Economic, Sociocultural, Technological

** Strengths, Weaknesses, Opportunities, Threats

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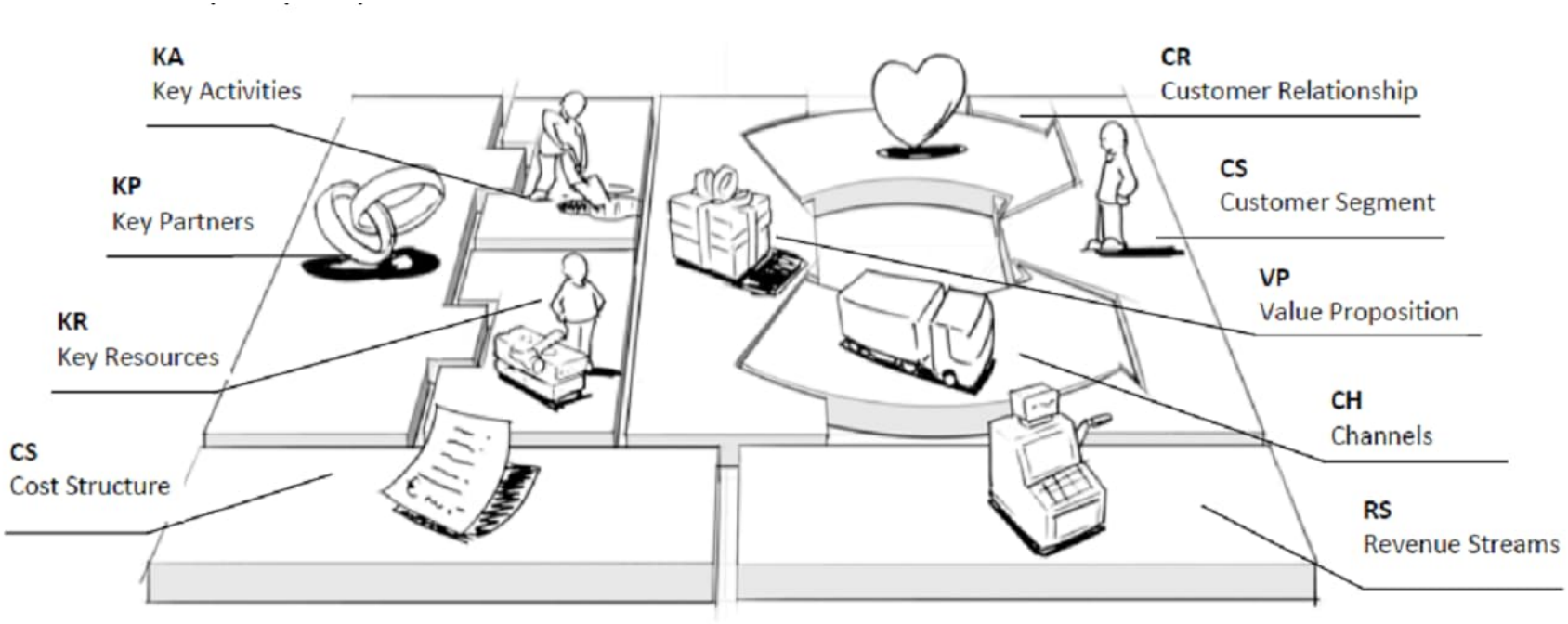
Business Model Canvas (BMC)



The nine blocks of BMC cover the four main areas of a business:

1. Customers
2. Offer
3. Infrastructure
4. Financial Viability

Source: Ostervalder & Pigneur 2010

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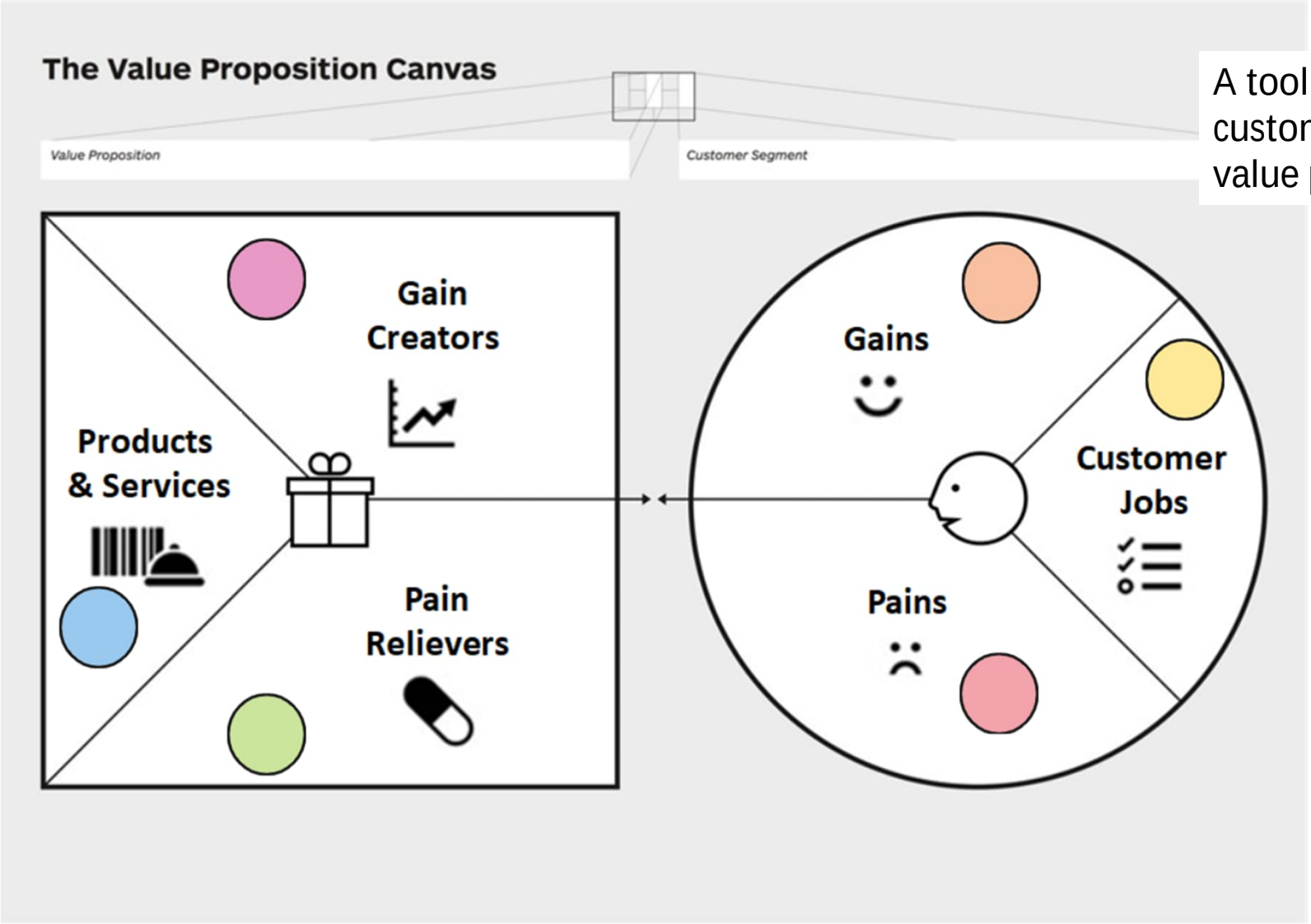

A tool to dig deeper in the customer needs and related value proposition

Analysed in a workshop with the project partners using Microsoft Whiteboard tool

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Value proposition canvas - questions

1. The Customer: Have a discussion about who the customers actually are from a high level, whereupon you can make some decisions about who you are designing for.
2. Customer Job(s): What are the jobs your customer is trying to get done in work or life? These could be both functional and social. What basic needs do your customers have (emotional and/or personal)?
3. Gains: What would make your customer happy? What outcomes does he or she expect and what would exceed their expectations? Think of the social benefits, functional, and financial gains.
4. Pains: What is annoying or troubling your customer? What is preventing him or her from getting the job done? What basic What is hindering your customer's activities?
5. Gain Creators: What can you offer your customers to help them fulfill the gains? Be concrete (in quantity and quality)!
6. Pain Relievers: How can you help your customer relieve his pains? Be explicit about how they can help.
7. Product & Services: What are the products and services you can offer your customer so he can get his job done? How is it not a silver bullet?

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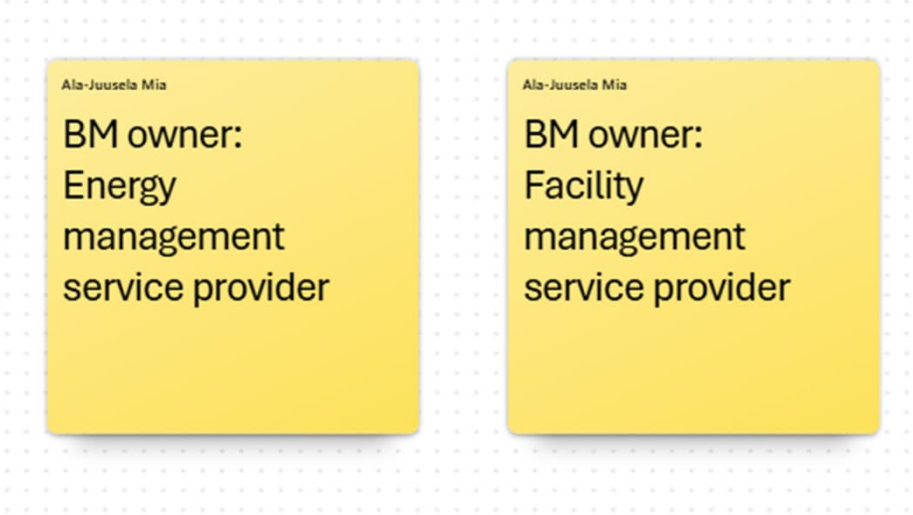
BM Owner?

Before we start:
Who is the owner of the BM?
Who will provide the value proposition to the customer?
Is it an ecosystem or one company with key partners?



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Analysis in a WS with Microsoft Whiteboard

1. The Customer

1. The Customer: Have a discussion about who the customers actually are from a high level, whereupon you can make some decisions about who you are designing for.

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Note!
Customers for the full system, not only one agent

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Site owner

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Customer's customer: end user; e.g. residential user or site user

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Customer Jobs, Gains & Pains

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3. Gains: What would make your customer happy? What outcomes does he or she expect and what would exceed their expectations? Think of the social benefits, functional, and financial gains.

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Gain creators, Pain relievers, Product & Services

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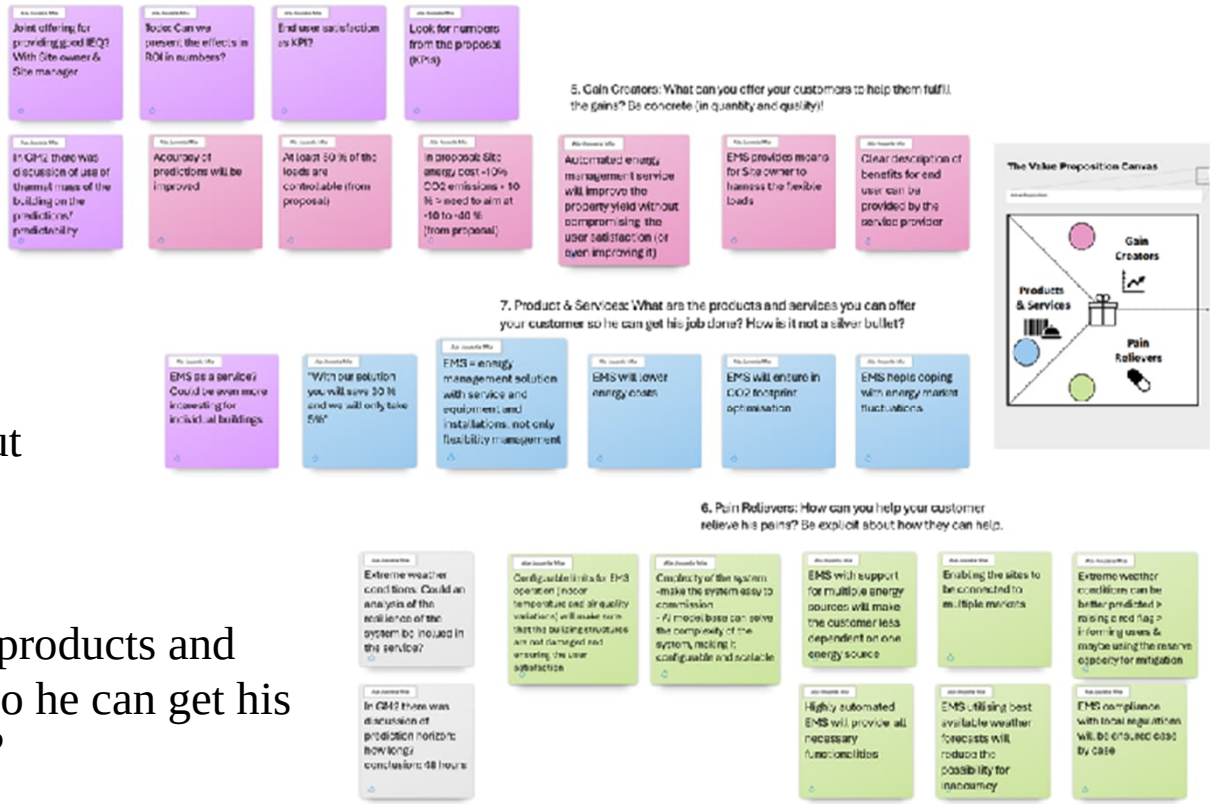

Value proposition

Our automated energy management service
enables the building owners to optimise the energy costs while minimising CO_2 emissions, ensuring the health and wellbeing of the building users and health of the building structures

by reducing the risks and investments related to the complexity of the energy market and the prediction of different aspects of energy demand and availability

and by increasing property yield and share of controllable loads
unlike any other service available on the market.

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Contact for the Value proposition

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