Analytics in Business Case Study

GROUP H

OUR TEAM MEMBERS

Aarnav Pathak
Strategy

Aditi Kandhari
Market Research & Creatives

Anushka Goyal
Analytics

Chinmay Marathe
Strategy - Pricing

Harsh Malhotra
Analytics

Ishan Mukherjee
Strategy - Marketing

Saloni Halwai
Analytics - Pricing

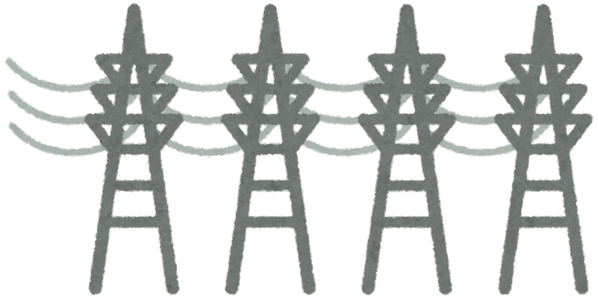
Senalka Wickramaratne
Market Research & Creatives

Content Index

Problem Statement

How can we empower Orkney households to adopt smart heating that reduces wind energy waste, cuts fuel costs, and supports clean energy adoption across the islands?

Wind Farmer



Wind Provider

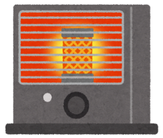
Consumer

MARKET RESEARCH AND EDA

Average Rooms ~ 3-5

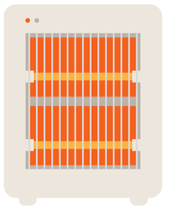
No. of Households. ~ 10,385

Households with heater



Traditional heater

~ 40%



Storage heater

~ 60%

ORKNEY

Households for heating

Uses Electricity

~ 43%

Uses Fossil Fuels

~ 57%

Electricity Prices

Wind Farmers

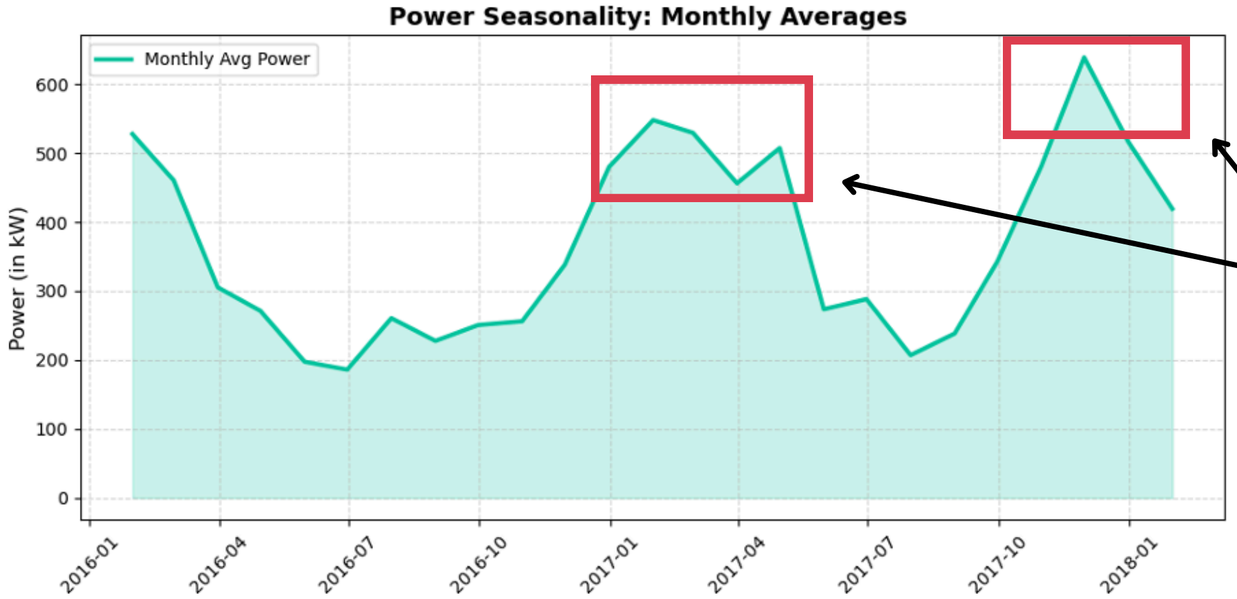
Energy Providers

Consumers

~ £12.7 + £0.03

~ £15

MARKET RESEARCH AND EDA

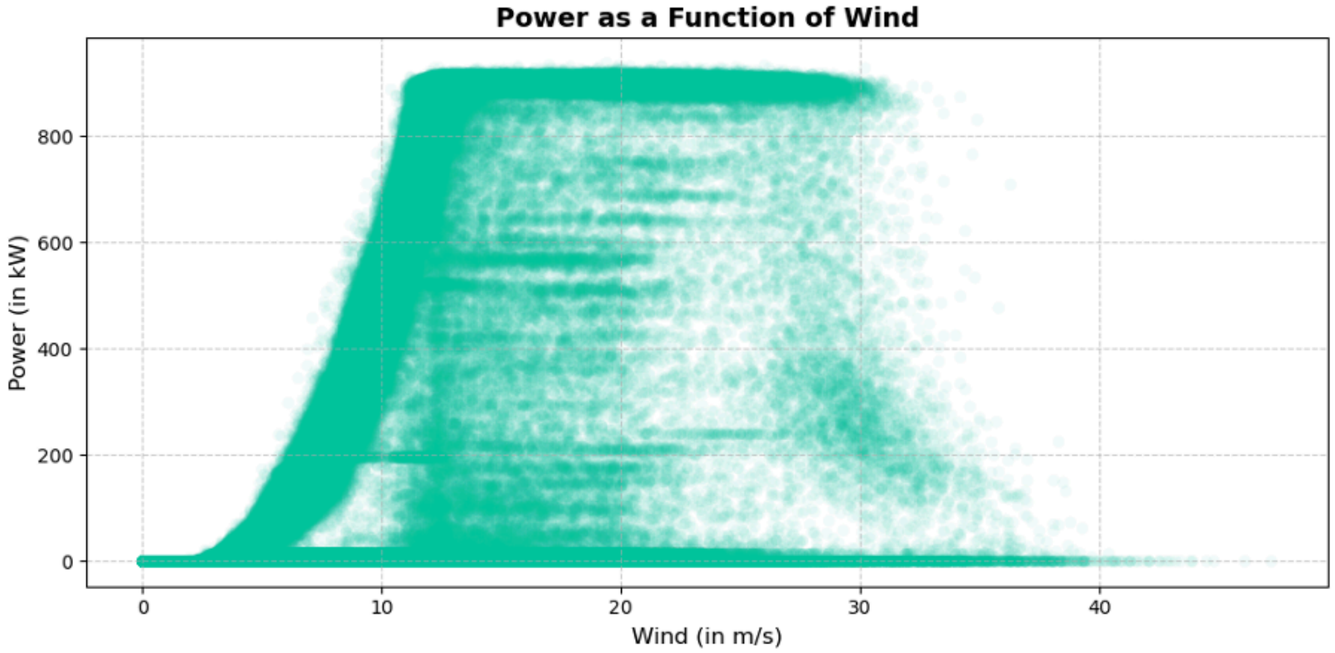


Power generation exhibits clear seasonality, with noticeable peaks in early and late months of each year.

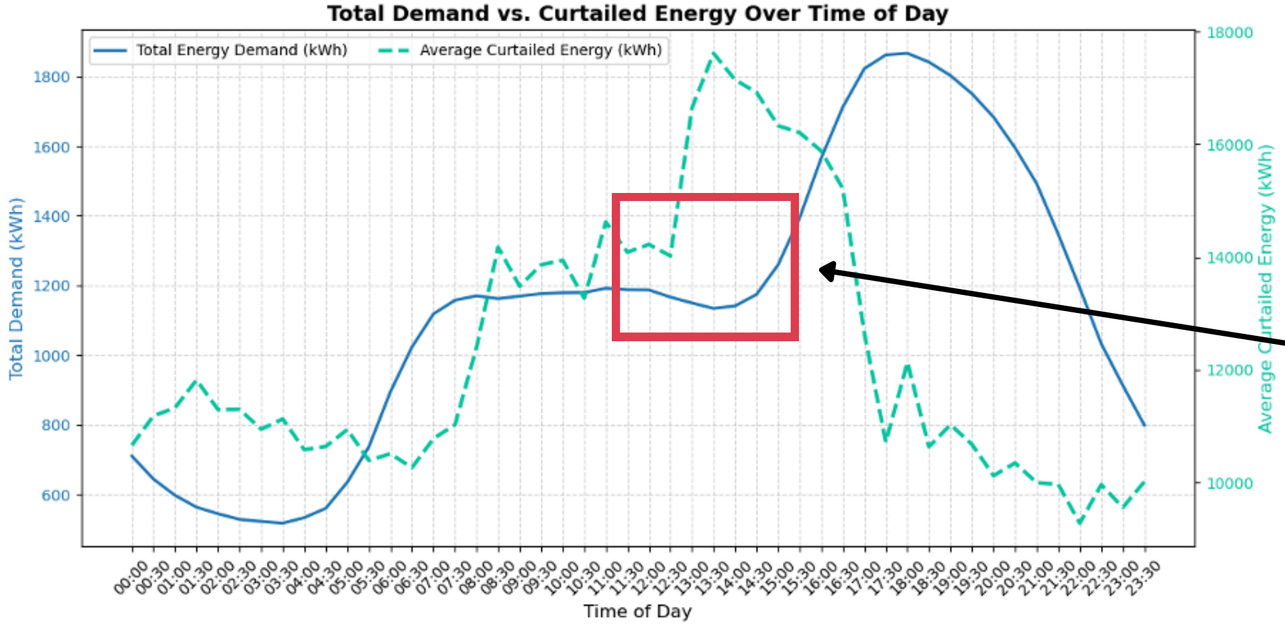
Higher Wind Months → March, October–December

Power output increases sharply with wind speed up to around 12–14 m/s, after which it plateaus, indicating turbine capacity limits.

Beyond 25 m/s, power drops off due to turbine cut-off thresholds for safety, highlighting operational curtailment zones.



MARKET RESEARCH AND EDA

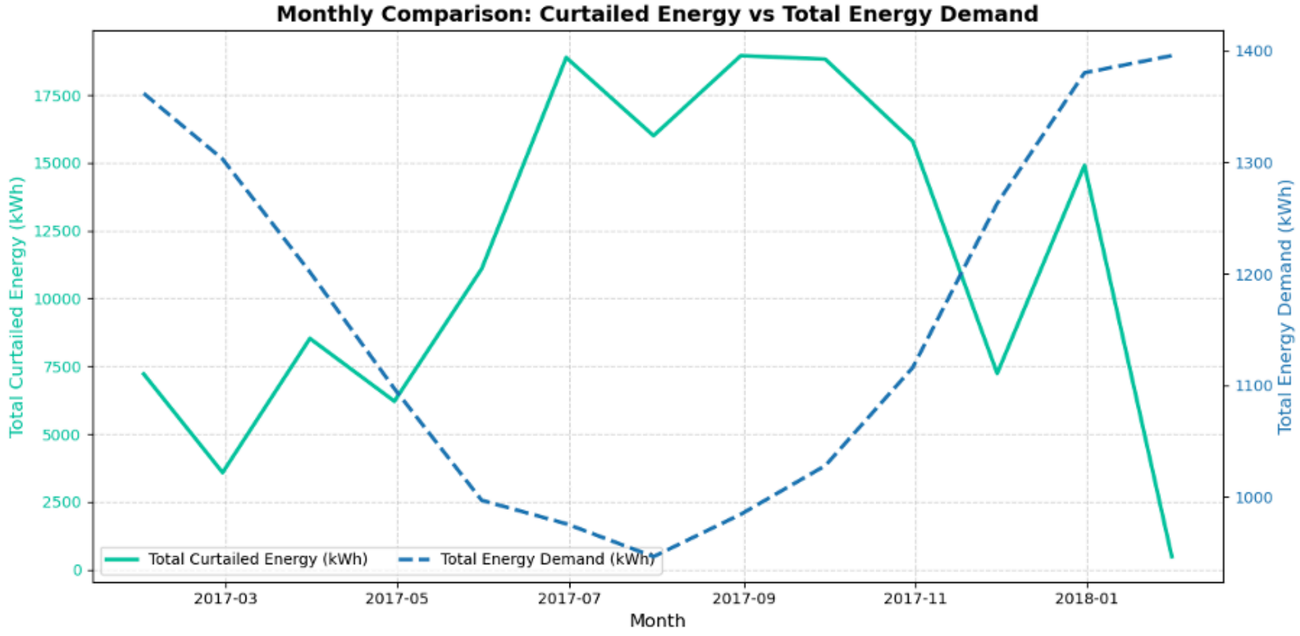


Curtailment peaks during mid-day hours when wind generation exceeds consumption capacity.

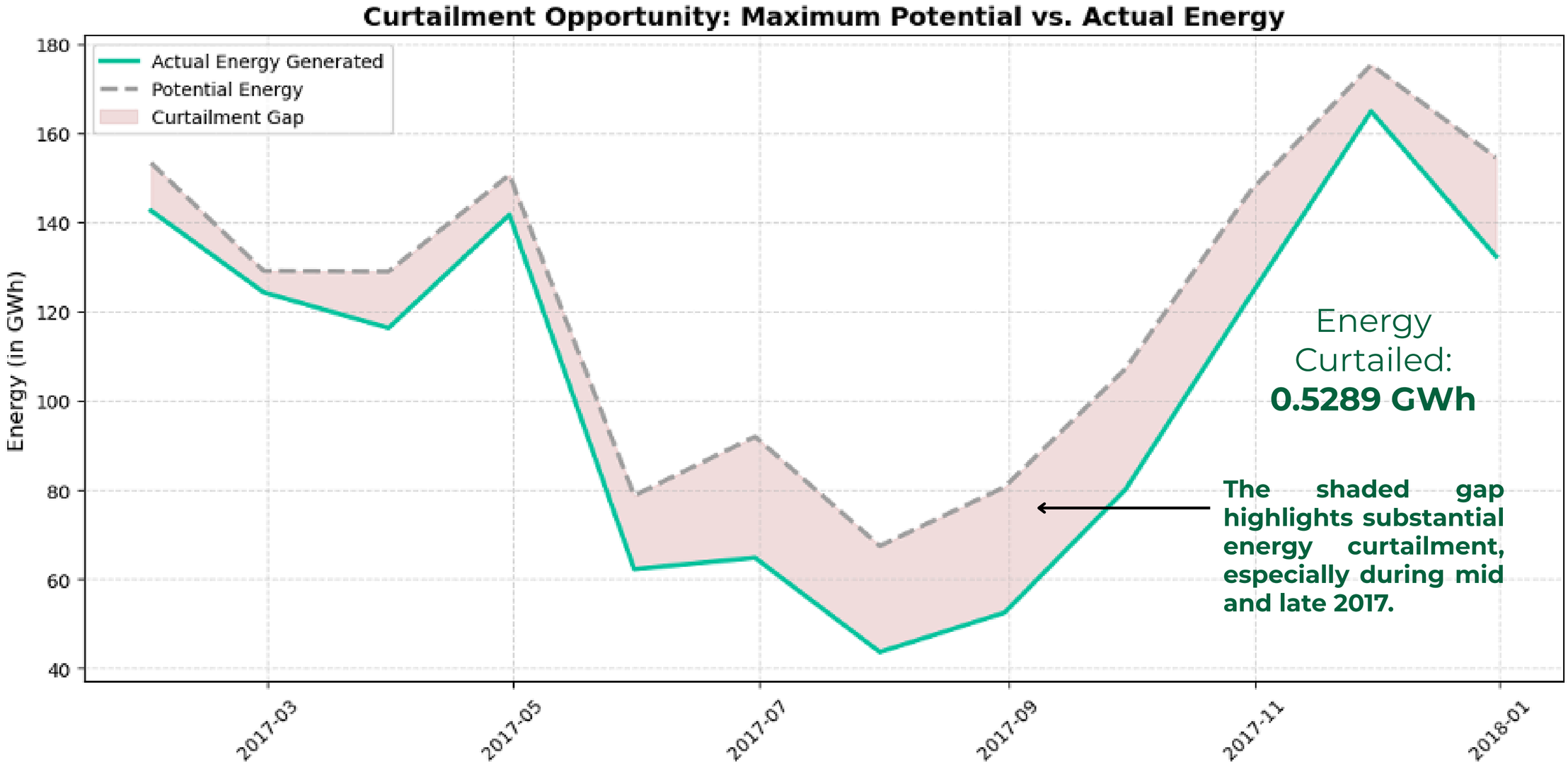
Mismatch Window → 11:00 to 15:00, indicating a key opportunity for demand-shifting or storage solutions.

Curtailment is highest during months when demand is lowest, especially between June and September.

Curtailment-Demand Divergence → Summer months, indicating seasonal inefficiency in energy utilization.



MARKET RESEARCH AND EDA



Maximum Curtailment Gap → June & December 2017, indicating underutilization during peak wind availability.

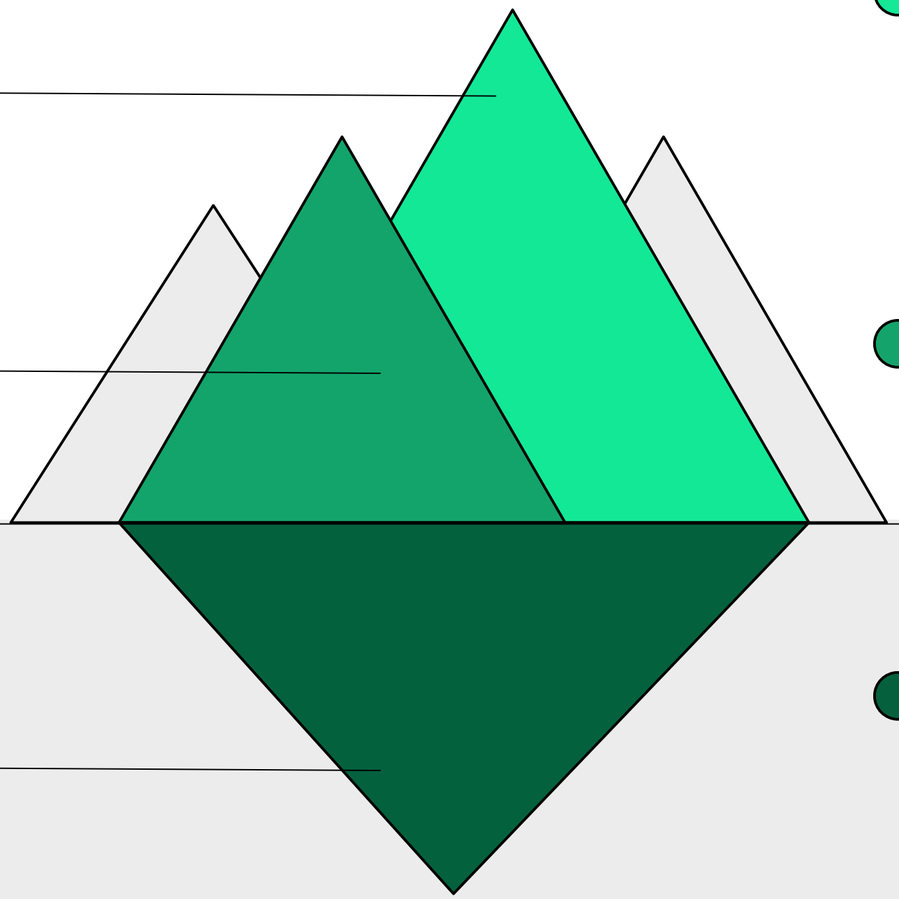
BUSINESS MODEL

Storage Heater Manufactureres

Enables large-scale, hardware-integrated adoption by reaching new customers at the point of appliance purchase

Internet Service Providers

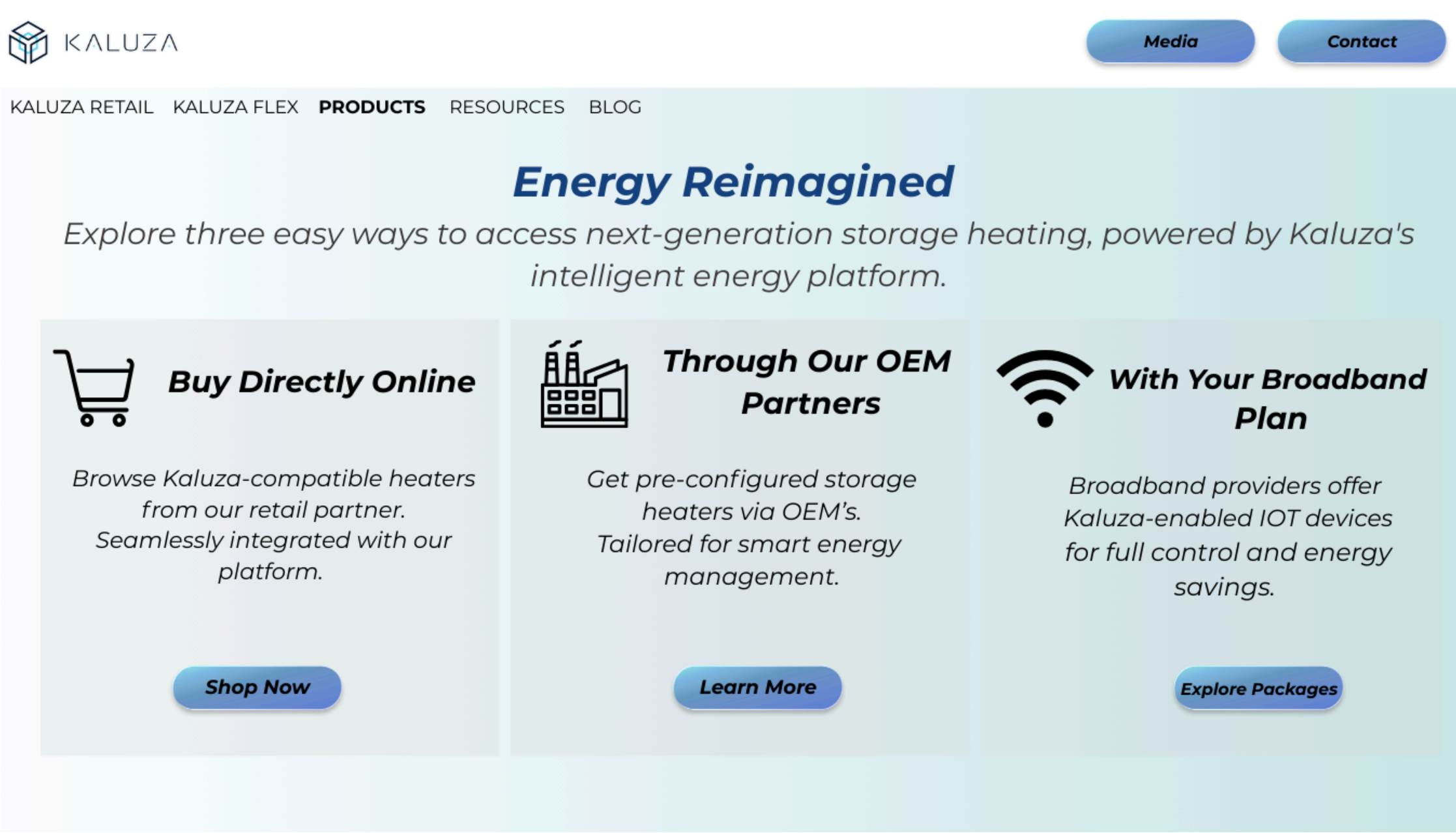
Drives rapid household penetration by removing upfront cost barriers and leveraging existing subscription habits



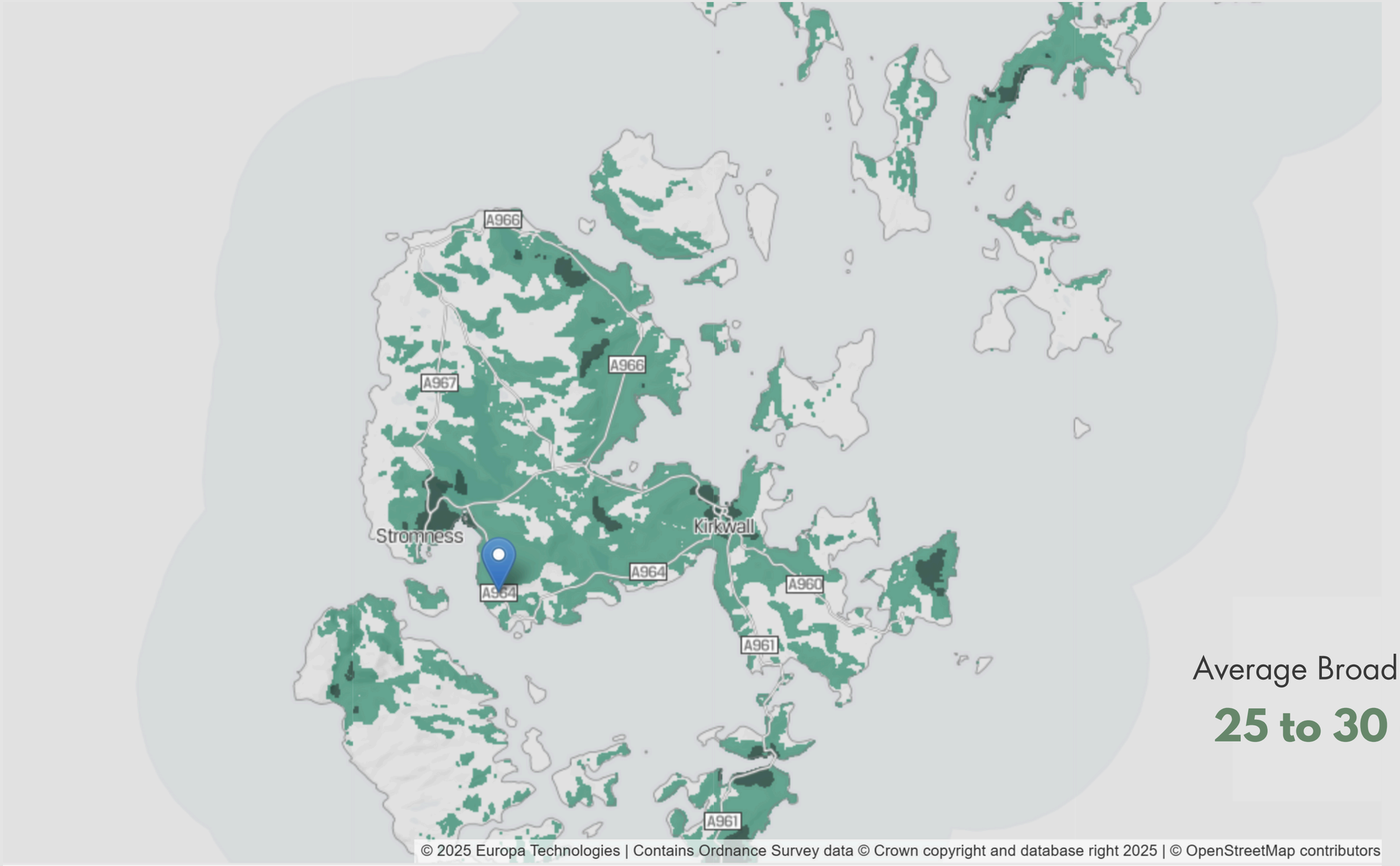
Kaluza & Retailers

Maximizes revenue and customer control through direct sales, while building long-term platform loyalty

BUSINESS MODEL



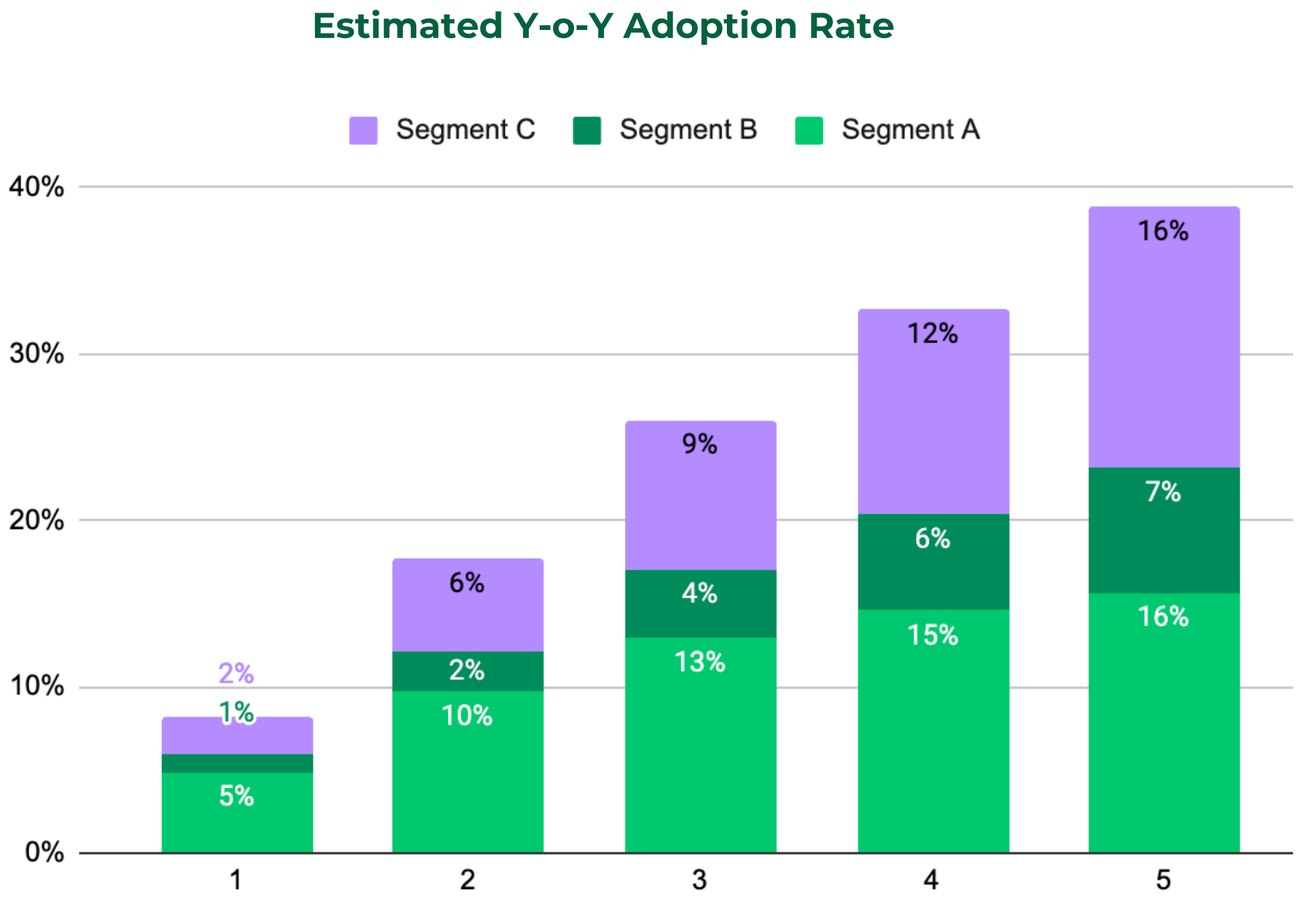
BUSINESS MODEL



Average Broadband Plan

25 to 30 (£/m)

SALES FORECASTING



Total Households: **10,385**

Storage Heaters (Segment A):
27% → 2,804 homes (Low Barrier – IoT only)

Traditional Electric (Segment B):
17% → 1,768 homes (Medium Barrier – Combo: Heater + IoT)

Non-Electric Heating (Segment C): 56% → 5,816 homes (High Barrier – Combo + Transition from fossil)

OKR

39%

Target household adoption across all Orkney in 5 years

MARKETING OBJECTIVE

Build Awareness and Informed Trust

Maximise Early Adoption in Low-Barrier Households

Maximise visibility during winter

Educate and Encourage

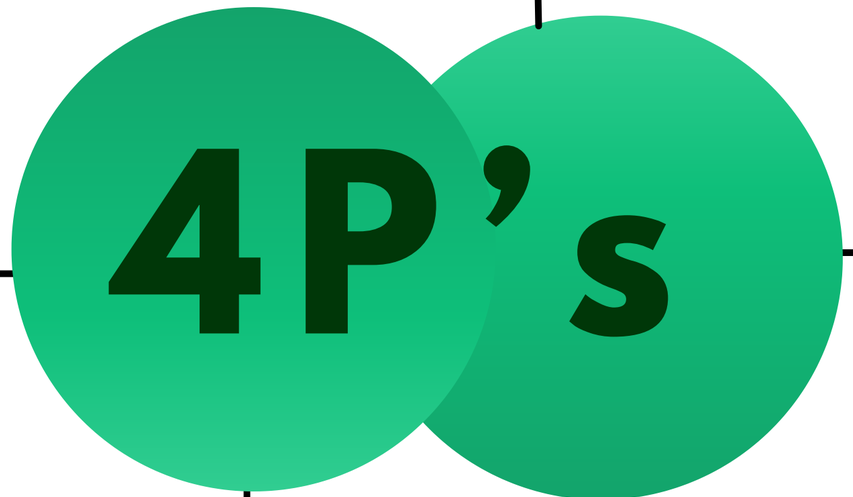
MARKETING PLAN

Product

IoT Device + cloud platform

Place

Website of Kaluza/ OEM
ISP plan combo
Local Electronics Retailers



Price

Monthly Subscription:
Basic/ Bundle/ Add - on
IoT Device

Promotion

Digital/ Offline/ TV /Radio
Campaigns

MARKETING PLAN

BUDGET ALLOCATION

Segment A and C

Receive the highest allocations due to their size and strategic importance.

Segment B

Receives less due to its smaller target base.

Estimated CAC = ~£70

	Adoption %	Budget
Segment A	16%	£339,000
Segment B	7%	£170,000
Segment C	16%	£339,000

MARKETING PLAN

BUDGET ALLOCATION

	Segment A	Segment B	Segment C
Digital Ads	£71,190	£47,600	£47,460
Offline Ads	£71,190	£23,800	£94,920
TV Ads	£47,460	£23,800	£47,460
Radio Ads	£47,460	£23,800	£47,460
Campaigns	£101,700	£51,000	£101,700

Segment A
Balanced investment across all channels

Segment B
Heavily digital strategy

Segment C
Highest offline spend to support trust-building in rural areas.

MARKETING PLAN

MARKETING TACTICS

Core Offering: **IoT Controller + Cloud Platform**

Smart, flexible heating for focusing on rural energy needs without complex upgrades

Campaigns (Cross-Channel)

- Smart Start Upgrade
- Warm Neighbours Referral
- Try Smart Heat – 60 Days
- Scrappage (Panel/Oil/Coal)
- Winter Warmer Loyalty Club

Radio Ads

- Calm tone: “Didn’t know I needed it—until…”
- Dialogues: “Panel heaters weren’t enough…”
- Rural voice: “Set it & it’s warm when I’m in”

TV Ads

- Older couple with easy install testimonial
- Family switching to app-based warmth
- Rural storytelling, tank removal to smart heat

Offline Ads

- Flyers, bill inserts, posters
- Retrofit guides, brochures
- Local papers, mailers

Digital Ads

- Facebook carousel, signup landing page
- Facebook retargeting, SEO blog pages

MARKETING PLAN

Sample Flyer

Sample Article

Especial Edition

TIMES OF SCOTLAND

KALUZA

Orkney, Scotland — A new smart heating upgrade is helping local households save on energy bills this winter — and the best part? The technology is free to eligible homes for the first year.

Kaluza, an award-winning energy tech provider, has launched a community-wide initiative offering free IoT heating controllers and cloud access to Orkney residents. The system lets households take full control of their electric storage heaters using a simple app — helping them heat homes more efficiently, lower energy bills, and use more of the island's abundant wind power.

The move is part of a larger effort to reduce wasted renewable energy on the islands. Orkney often produces more wind energy than it can export to the mainland, resulting in curtailment — or 'lost energy.' Kaluza's solution shifts household heating to those periods when wind power would otherwise go unused.

How It Works

Kaluza's IoT controller connects to your existing storage heaters. The smart app lets you schedule heating to match your routine. Residents on participating tariffs can even join energy saving events that reward off-peak heating use

Who Can Benefit

Homes with existing electric storage heaters (over 2,800 in Orkney). Properties using expensive panel heaters or off-grid fossil fuels can also apply for scrappage rebates. Special partnerships are available for Orkney HousingAssociation tenants and rural households

Why Now

With heating bills on the rise and winter approaching, the smart heating rollout offers a timely and cost-saving solution. Early adopters have reported more comfort, fewer cold spots, and lower bills.

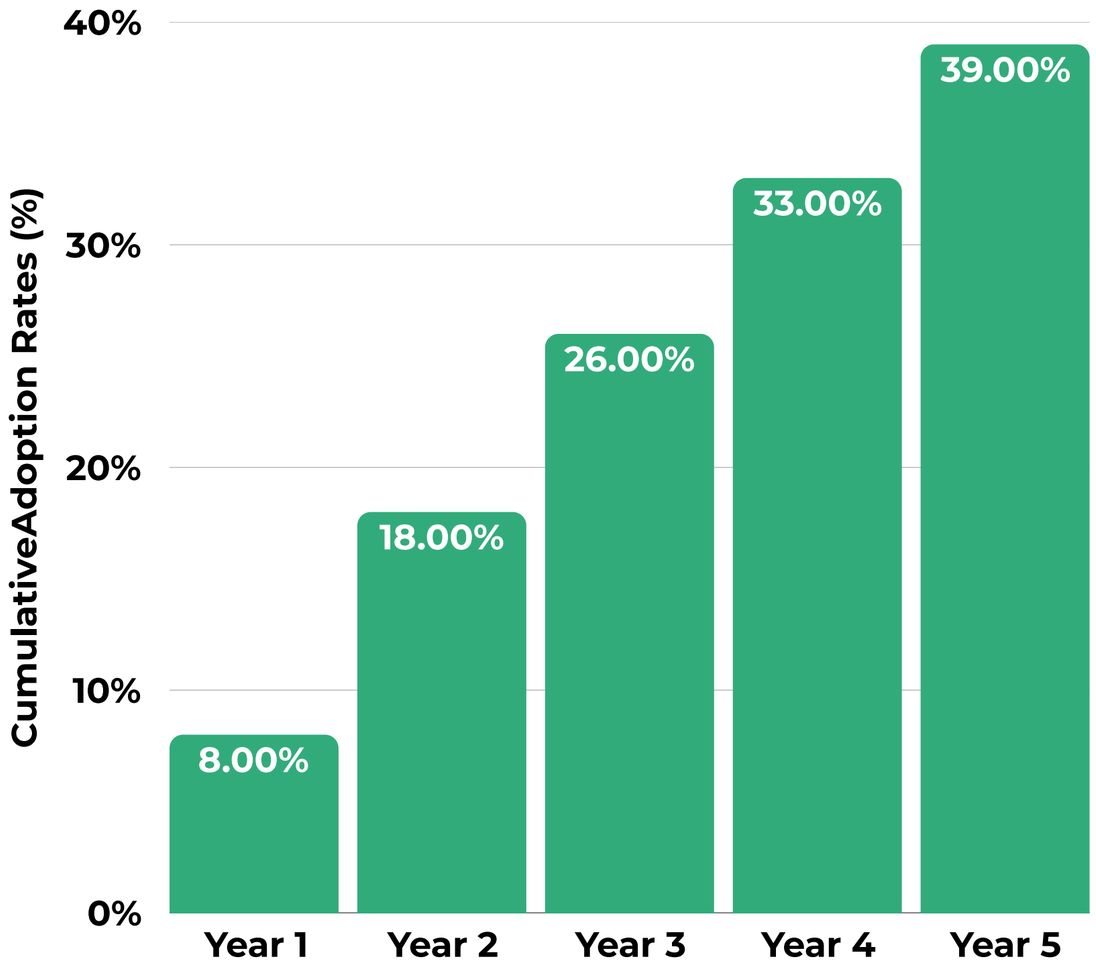
JULIET TELLS US HOW SHE PREPARED FOR HER PARTY.

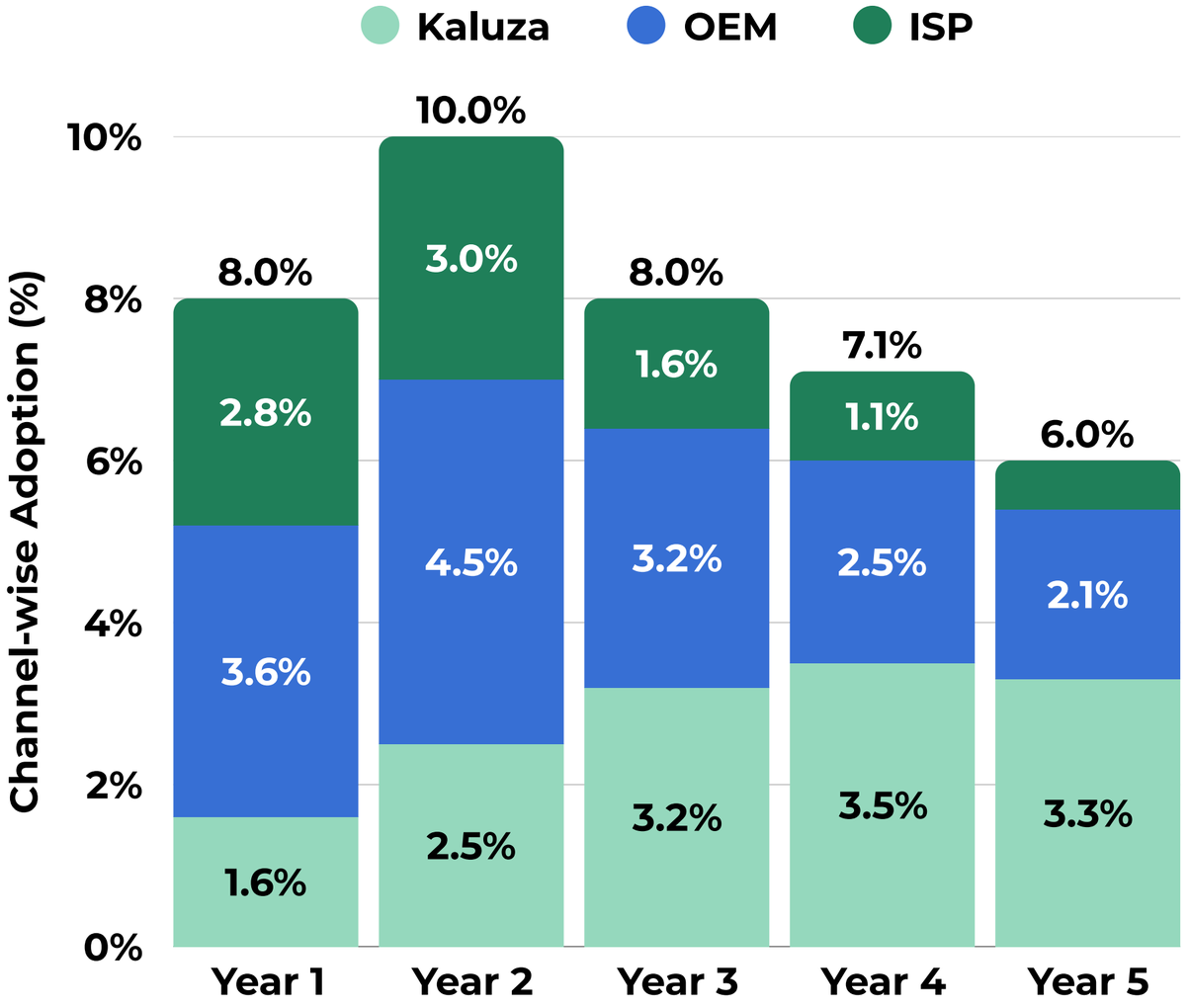
Lorem ipsum dolor sit amet, consecte tur adipiscing elit. Integer nec odio. Praesent libero. Sed cursus ante dapibus diam. Sed nisi.

MOM AND DAD, THE MOST ELEGANT OF THE NIGHT.

PROJECT PRICING

ADOPTION RATE





PRODUCT PRICING

	Kaluza	OEM	ISP
Product Price	100	80	0
Subscription Price	4.9	4.9	5.9
Devices per Household	3	3	1
Installation Costs (£)	60	0	40
Mnufacturing Costs	50	50	50

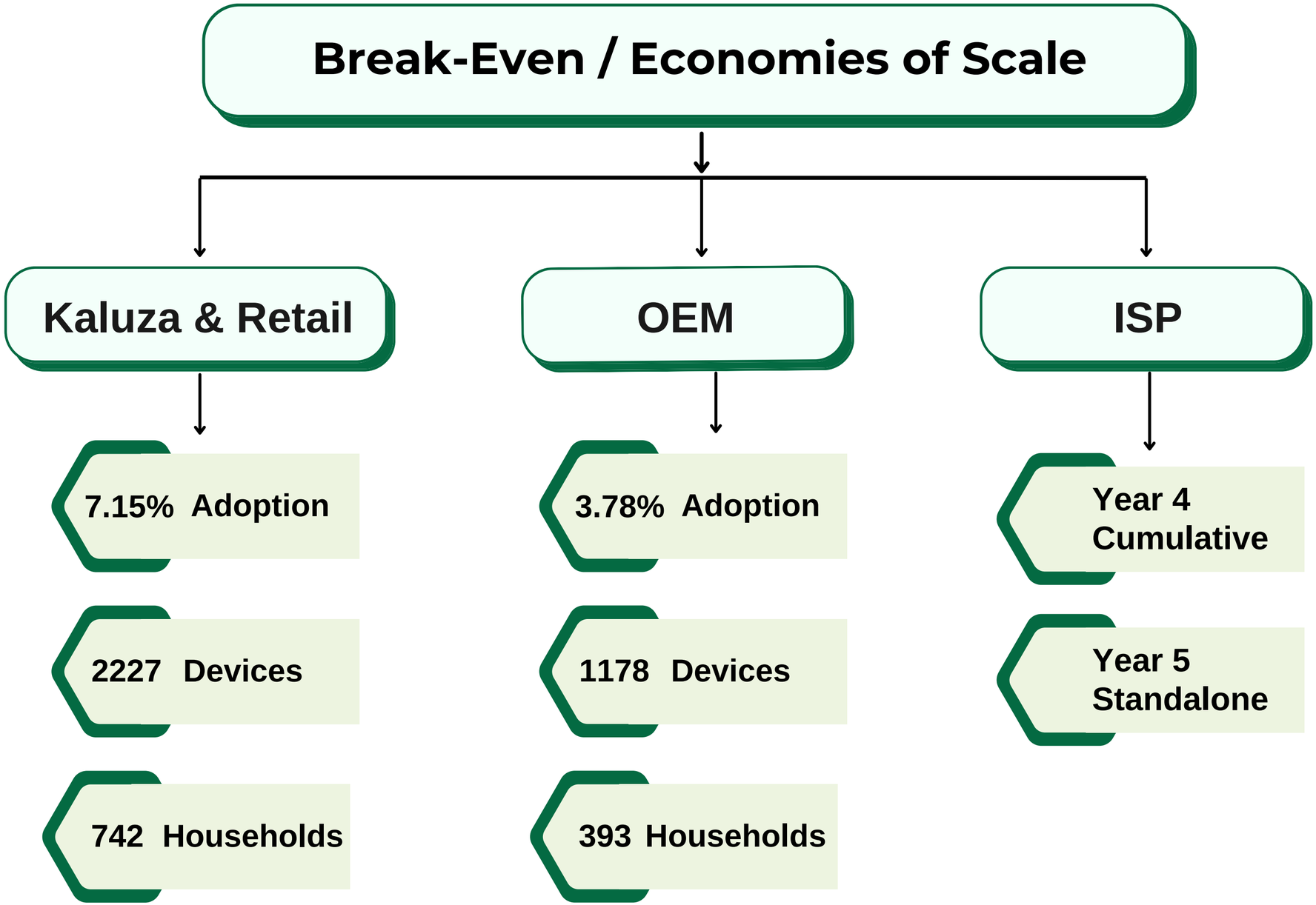
PROJECT PRICING

YEAR-ON-YEAR PROFITABILITY REPORT

NPV £3,862,429.43

	Kaluza + Retail	OEM	ISP	Cumulative Profit
Year 1	-55,735	-404	-105,583	-161,722
Year 2	-29,950	153,989	-172,390	-48,350
Year 3	163,379	567,147	-153,156	577,370
Year 4	689,006	1,503,386	15,086	2,207,479
Year 5	1,870,132	3,492,161	474,001	5,836,293

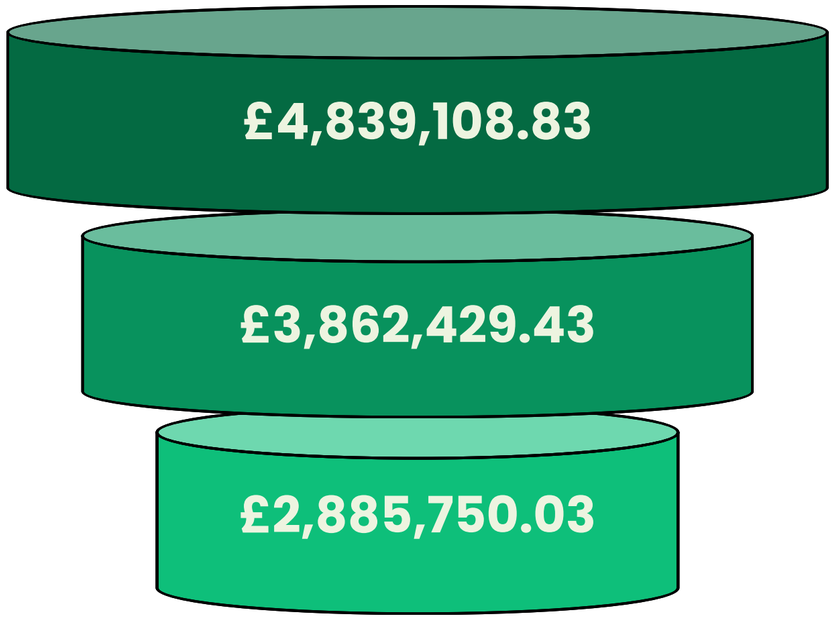
PROJECT PRICING



PROJECT PRICING

SUBSCRIPTION PRICE SENSITIVITY

NPV



+1£ (5.9 / 5.9 / 6.9)	Year 2 cash pay-back
Base Strategy (4.9 / 4.9 / 5.9)	±£1 causes ~25% impact on returns
-1£ (3.9 / 3.9 / 4.9)	Still breaks even at Year 3

PROJECT PRICING

PRICING ASSUMPTIONS

Adoption Plan (% of Households):
Year 1 to 5: 8%, 10%, 8%, 7%, 6%

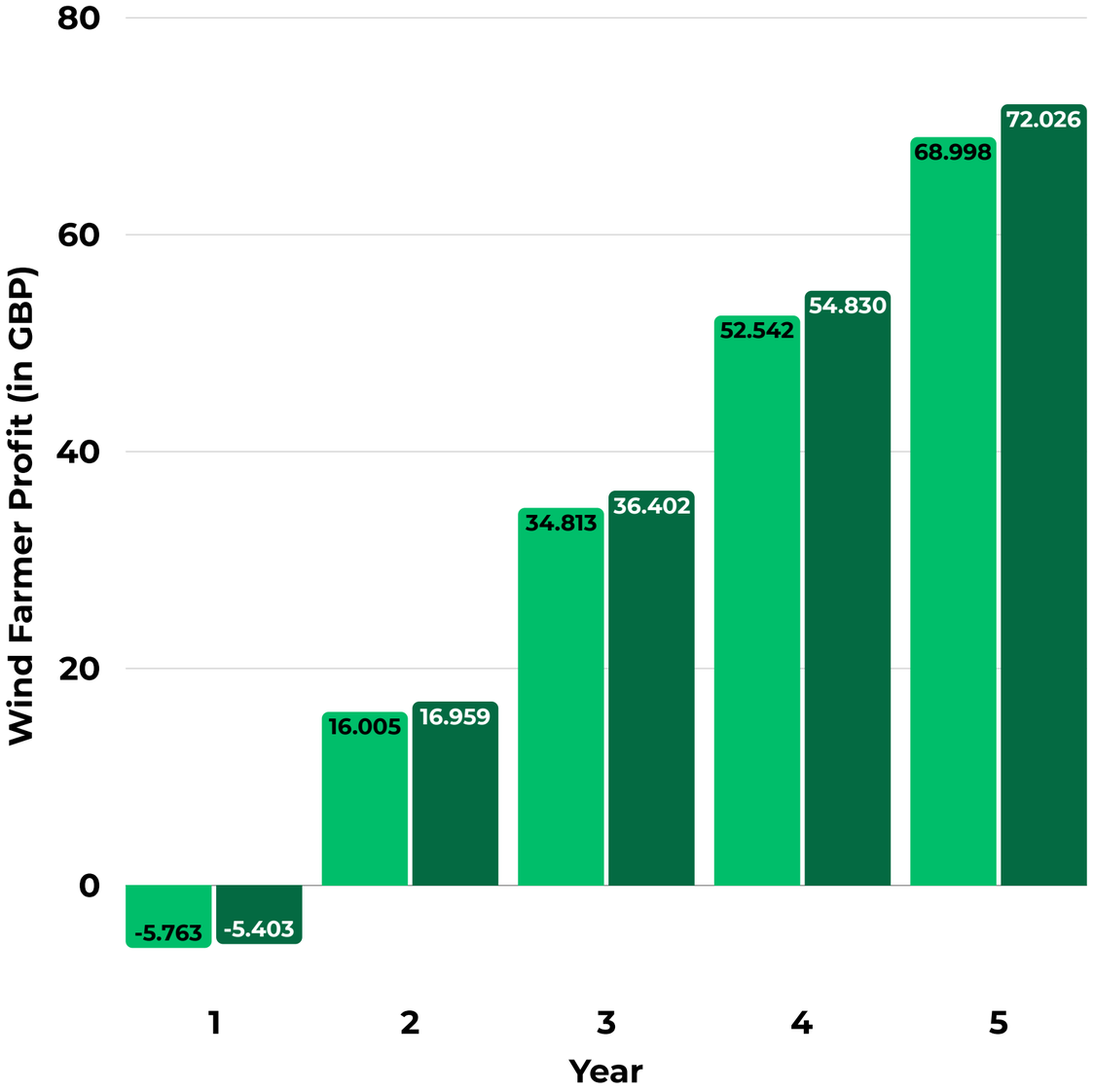
Demand Growth:
Year-on-year: 1% increase of previous year's total + current year's new adopters

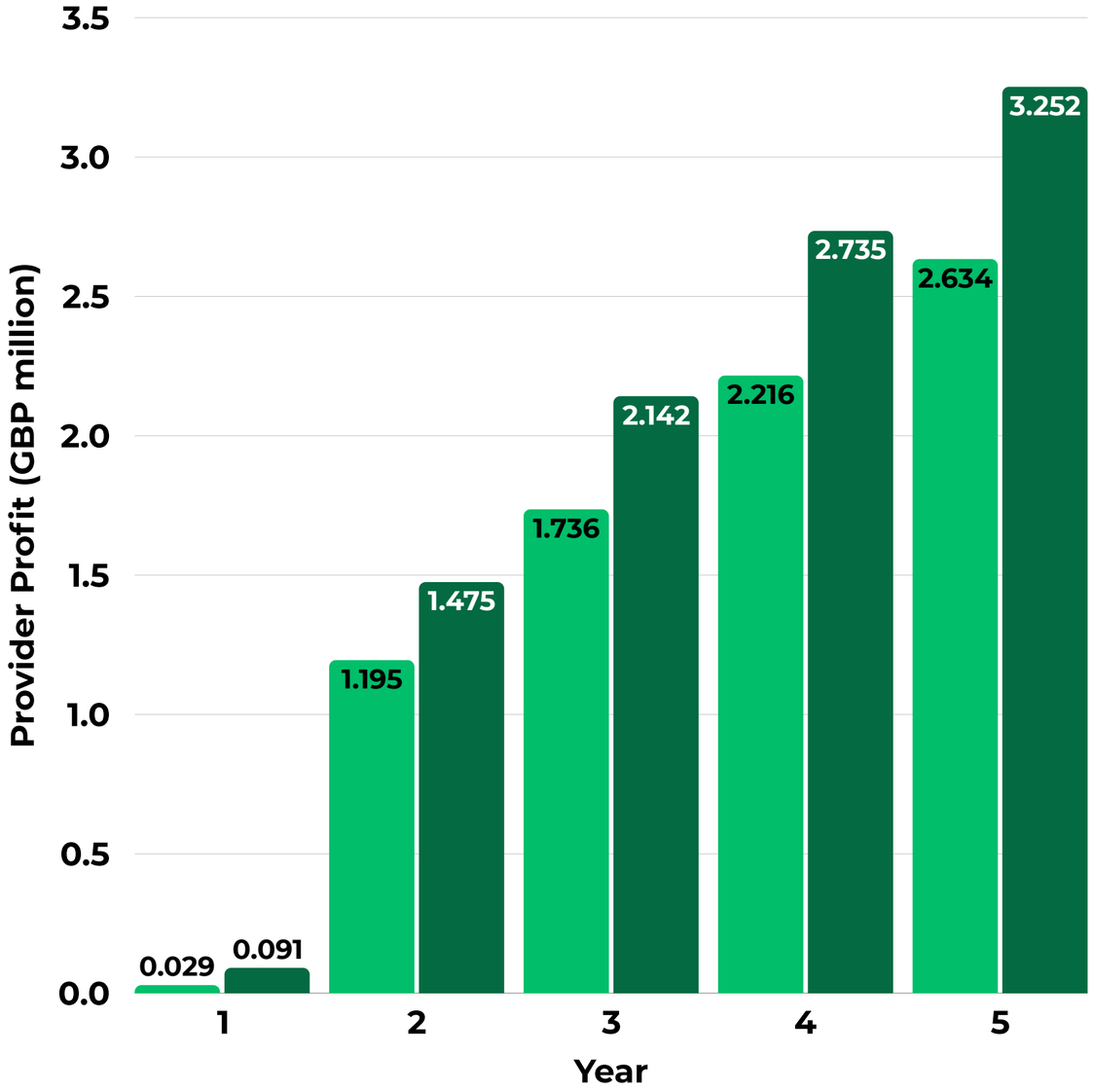
Price Increments:
- Wind Farmer: +0.5p (by year)
- Energy Provider: +0.5p (by year)

Base & Maintenance Costs:
- Initial Investment: £45,000 × 500 units
- Maintenance: +2% yearly from Year 2

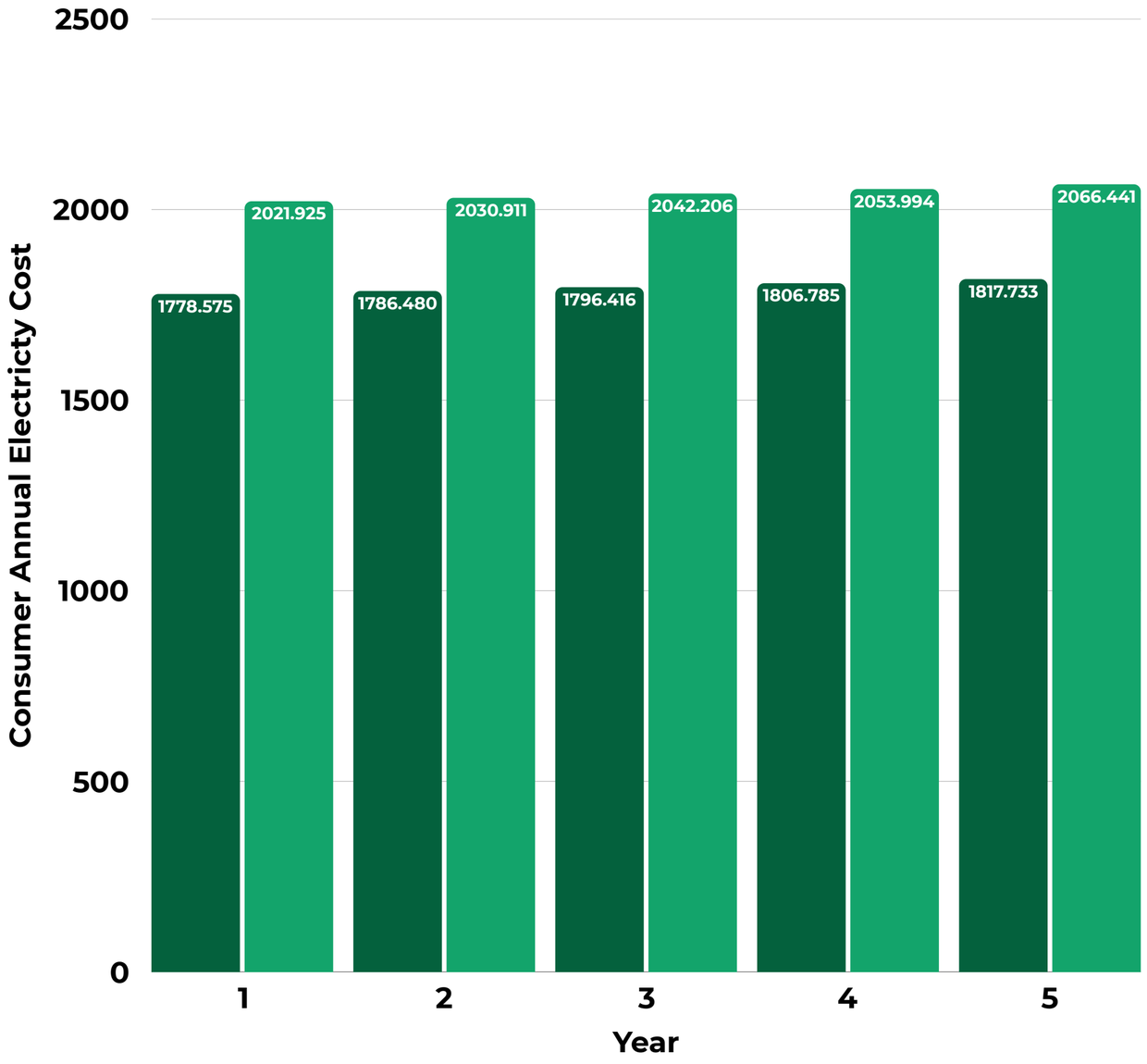
Category	Old Price Range (p/kWh)	New Pricing Approach
Wind Farmer	12.7p FiT + 3–5p variable	–1p (low curtailment), –1.5p (medium), –2p (high)
Energy Provider	16.5p – 17.7p	Fixed: 15.2p (low), 15.3p (avg), 15.4p (high)

STAKEHOLDER BENEFITS

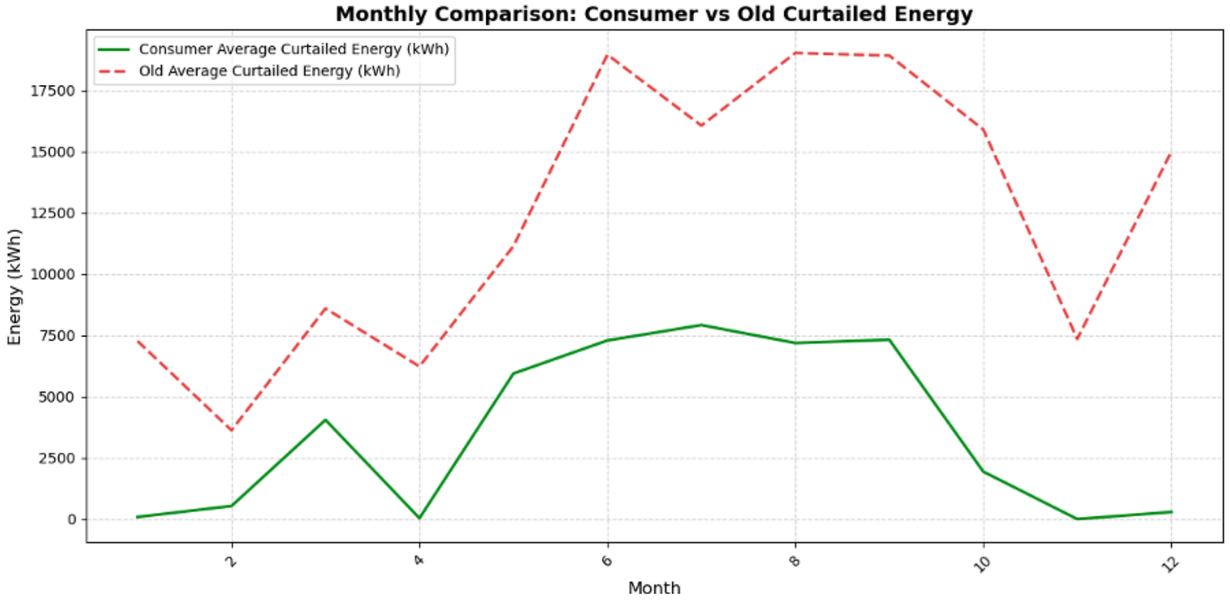




STAKEHOLDER BENEFITS



Higher demand reduces curtailment as consumers react to the lowered electricity bills.



CONCLUSION

FUTURE PLANS

- **Expand to commercial buildings:** Deploy DR-enabled heat storage in high-consumption sites like supermarkets (e.g. Tesco), offices, and public sector buildings to maximize demand shift impact.
- **Export the Orkney model:** Replicate the DR-curtailed wind integration strategy in other constrained renewable regions across the UK and internationally.
- **Target farms and rural households**: Extend the solution to remote and agricultural areas where residents face high energy costs and poor grid access, ensuring equitable benefits.
- **Engage government for subsidy-backed rollout:** Collaborate with local and national governments to fund deployment in low-income homes through energy poverty grants and rural innovation programs.
- **Add hybrid storage capability with small batteries** to capture curtailed energy not used for heating, expanding use cases (e.g., EV charging, appliance power).

WINS

Consumers (People of Orkney)

Lower energy bills
Better heating comfort

OEMs

Premiumization of products
Increased adoption
Additional revenue stream

Government

Promote Renewal Energy Consumption
Reduce Carbon Footprint
Reduce Energy Inequality

ISPs (Internet Service Providers)

Attract new customers
Lifts ARPU
Cuts customer churn

Energy Providers

Improved grid efficiency
Better customer retention
reduce peak demand risks.

Wind Farmers

Monetize curtailed energy
Improve revenue stability
Reducing curtailment losses

Kaluza

Scalable Operational Profit
Accelerated Market Adoption
Increased Brand Awareness

CONCLUSION

- **The HSO project offers a scalable solution to wind energy curtailment in Orkney by redirecting surplus energy to smart residential heating.**
- **With a 39% target adoption, £3.86M NPV, and strong stakeholder alignment, the plan balances environmental impact and economic value.**
- **This model not only reduces energy waste and household costs but also sets a precedent for wider deployment across the UK.**

THANK YOU!

APPENDIX

LIMITATIONS

Grid dependency – Still constrained by local grid infrastructure, which may limit how much curtailed energy can be redirected without upgrades.

Capital cost barrier – Upfront cost of heat storage devices may deter adoption without subsidies, especially for low-income households.

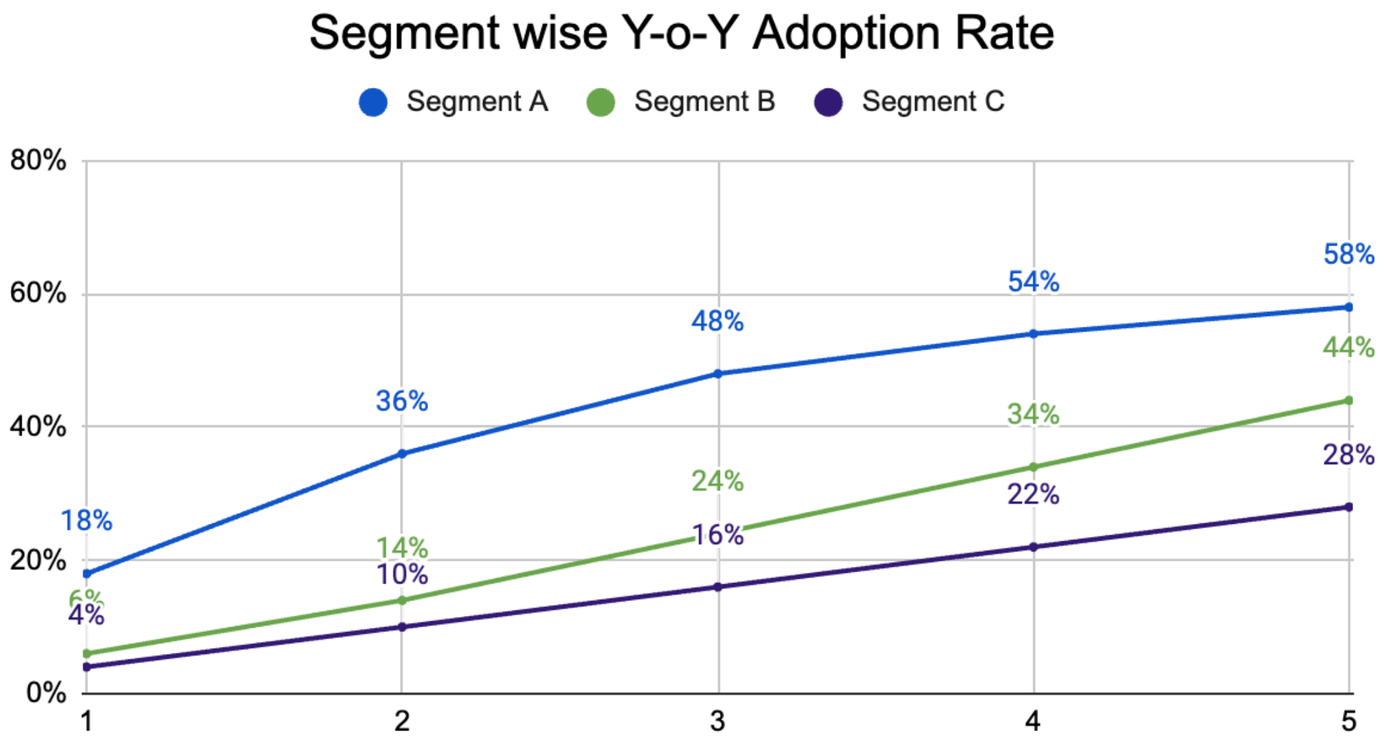
Behavioral inertia – Some users may resist or override automated heating controls due to comfort preferences or lack of awareness.

Forecasting accuracy – Effectiveness depends on reliable wind and demand forecasts; poor prediction reduces efficiency.

Limited storage flexibility – Heat storage has finite capacity and may not fully align with peak curtailment periods or varied energy uses.

SALES FORECASTING

Segment A



Interpretation

- Adoption nears saturation by Year 4–5.
- This aligns with low-friction, infrastructure-ready households responding well to initial campaigns and incentives.

Curve Shape

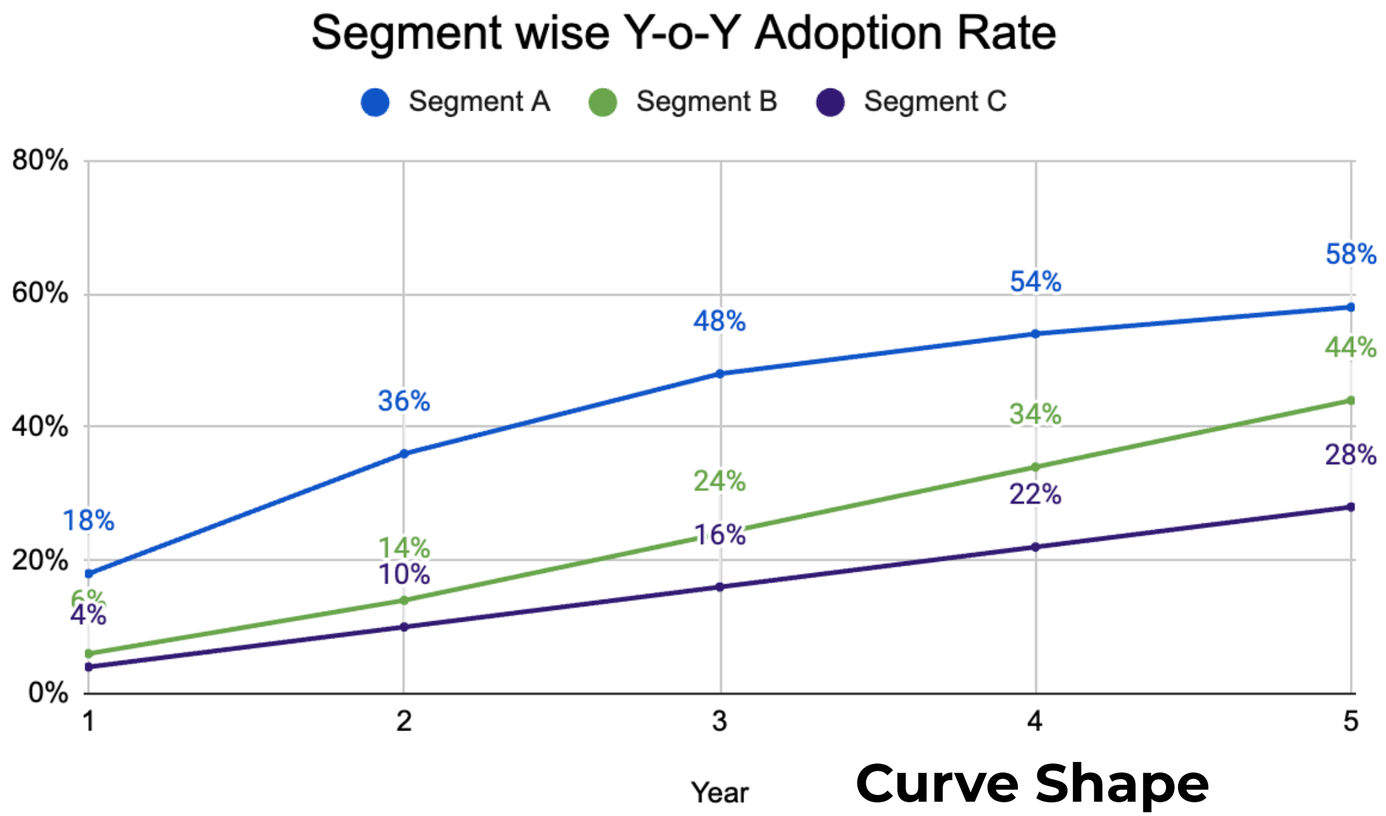
Rapid initial growth that slows down logarithmic plateau.

Nature

Early adopters convert quickly due to minimal barriers (no need to change heater, just add IoT).

SALES FORECASTING

Segment B



Interpretation

- Reflects medium barrier households requiring heater replacements.
- Growth is campaign-driven and trust-led and boosted by visible success stories.

Curve Shape

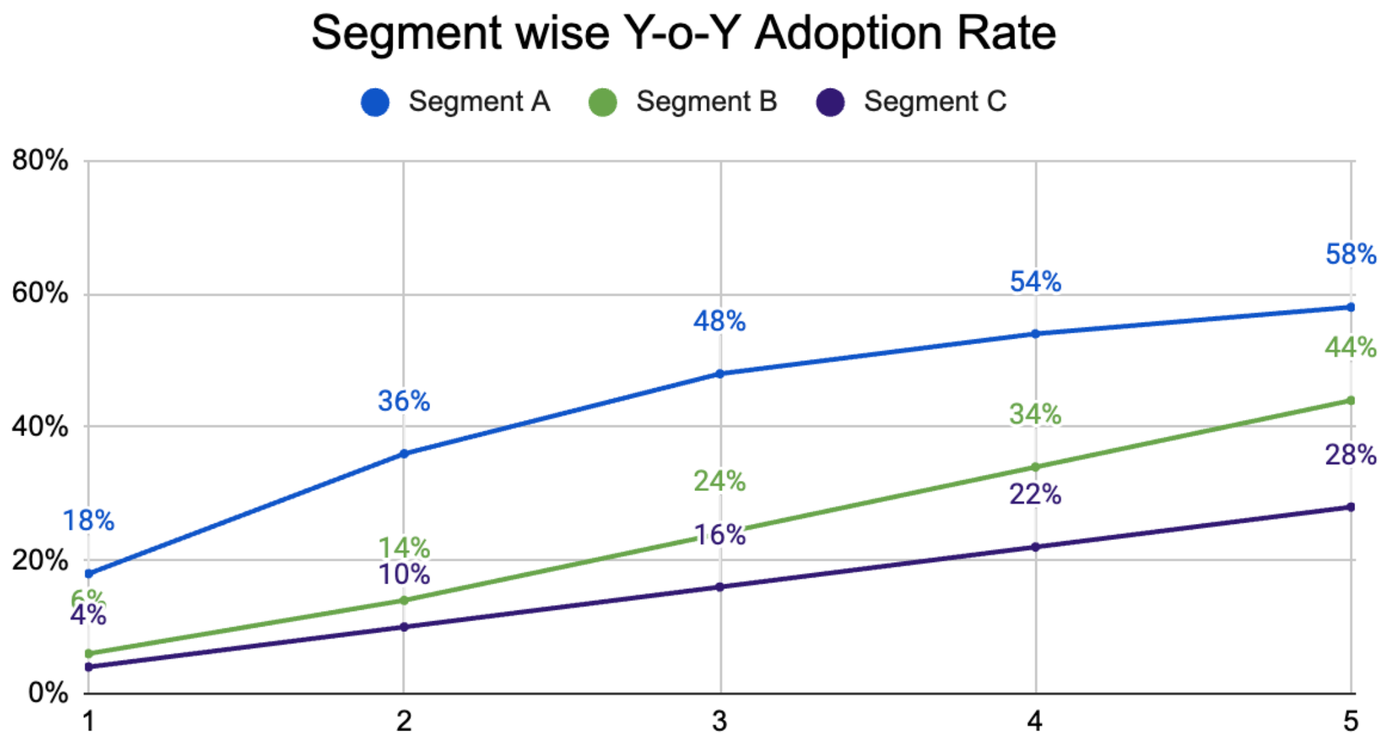
Steady linear to slightly growth.

Nature

Adoption grows as word-of-mouth, peer validation, and trust in retrofit offerings increase.

SALES FORECASTING

Segment C



Interpretation

- Typical of late majority/laggard curves.
- Success hinges on scrappage schemes, community case studies.

Curve Shape

Slow early adoption with acceleration.

Nature

Households face the highest inertia due to infrastructure, cost, and behavioural shifts.

BUDGET ALLOCATION

Objective: Achieve 39% adoption (4032 households) across Orkney in 5 years

User LTV: £5.99 monthly subscription for 5 years leading to **£400 LTV** per device

Total Addressable Market (TAM): £4.8M

Marketing Budget: £848,000 (17.5% of TAM)

Strategy: Segment-specific, phased campaigns using B2C and B2B2C channels

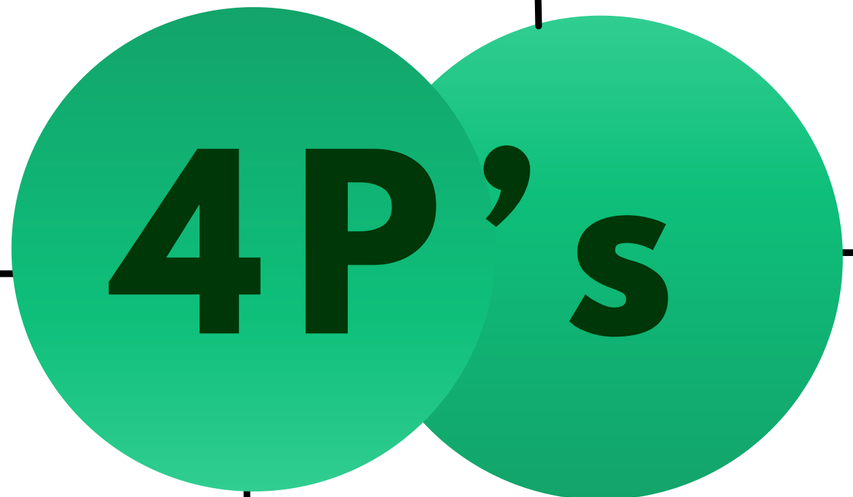
MARKETING PLAN

Product

IoT controller + cloud platform

Place

Via website of Kaluza/ OEM
Via ISP plans
Local Electronics Retailers



Price

Monthly Subscription:

- £5.99 - single device
- £11.99 - Bundle pack (3 devices)
- £4.99 - Each device on bundle

Device cost: £99.99/device

Promotion

Digital Ads
Offline Ads
TV Ads
Radio Ads
Campaigns

MARKETING TACTICS

SEGMENT A

Digital Ads

Facebook carousel ads, simple signup landing page

Flyers, bill inserts, posters

Offline Ads

TV Ads

Testimonial: older couple using smart heater

Calm voiceover, e.g. “I didn’t think I needed smart heat - until I tried it.”

Radio Ads

MARKETING TACTICS

SEGMENT B

Digital Ads

YouTube pre-rolls, Facebook video, Google Search Ads

Retrofit guides, installer brochures, mailers

Offline Ads

TV Ads

Family switching from panel heaters -> app-controlled warmth

Dialogue: “Panel heaters just weren’t cutting it. Then we found smart storage.”

Radio Ads

MARKETING TACTICS

SEGMENT C

Digital Ads

Facebook retargeting, organic SEO landing pages

Comparison sheets, local newspaper ads, physical application forms

Offline Ads

TV Ads

Rural home switching from oil tank to quiet smart storage unit.

Local voice: “We used oil for years - now I just set the app and it’s warm when I get home.”

Radio Ads

MARKETING PLAN

ADTYPES

Ad Type	Segment A	Segment B	Segment C
Digital	Supportive, simple CTAs	**Primary driver (ROI, video)**	Secondary (educational, passive)
Offline	**Primary (flyers, mail, door to door)**	Installers + stores	**Primary (rural print, outreach)**
TV	Trust-building (retirees)	Peer influence support	Narrative-driven education
Radio	Conversational, soft CTA	Functional messaging	Trust-based awareness

MARKETING PLAN

DIGITAL ADS

Segment	Use Case	Platform & Format	Execution Notes
A – Storage Heater	Support/Reminders	Facebook carousel ads, simple signup landing page	Geo-target 55+ in Orkney; show “free upgrade” visuals with comfort themes
B – Electric Non-Storage	**Primary CTA channel**	YouTube pre-rolls, Facebook video, Google Search Ads	Focus on ROI, app control, heater upgrade process. Use ROI calculators & A/B test CTAs like “Get a quote” vs
C – Fossil Fuel / No Heater	Passive education	Facebook retargeting, organic SEO landing pages	Focus on fuel cost comparison tools. Reach adult children who influence older residents’ heating

MARKETING PLAN

OFFLINE ADS

Segment	Use Case	Format	Placement & Timing
A – Storage Heater	**Primary awareness & trust driver**	Flyers, bill inserts, posters	Partner with Orkney Housing, post offices, GP clinics. Pre-winter blitz (Oct–Nov) with return-by-date CTA
B – Electric Non-Storage	Conversion aid	Retrofit guides, installer brochures, mailers	Given via tradespeople or distributed at community fairs/DIY stores. Schedule during early autumn
C – Fossil Fuel / No Heater	**Primary driver of interest**	Comparison sheets, local newspaper ads, physical application forms	Rural door-to-door delivery, churches, and vets. Use winter energy cost anxiety to trigger action

MARKETING PLAN

TV ADS

Segment	Use Case	Concept & Tone	Broadcast Plan
A – Storage Heater	Trust-building	Testimonial: older couple using smart heater, “Set and forget” ease	Air during regional news and daytime TV (STV/BBC Scotland) in Year 1–2 only
B – Electric Non-Storage	Validation	Family switching from panel heaters → app-controlled warmth	Run in early evenings or weekend slots. Use “real Orkney family” authenticity
C – Fossil Fuel / No Heater	Education & emotion	Rural home switching from oil tank to quiet smart storage unit. “No deliveries. No tank. No stress.”	Peak winter ads (Dec–Feb), integrated with storytelling campaigns. Sponsor weather or farming news

MARKETING PLAN

RADIO ADS

Segment	Use Case	Script Style	Station & Timing
A – Storage Heater	Repetition & comfort messaging	Calm voiceover, e.g. “I didn’t think I needed smart heat—until I tried it.”	Super Station Orkney. Run during morning and lunchtime. Reinforce referral incentives
B – Electric Non-Storage	Conversational/persuasive	Dialogue: “Panel heaters just weren’t cutting it. Then we found smart storage.”	Drive time and weekend mornings. Rotate spots by heating pain points
C – Fossil Fuel / No Heater	Local trust	Local voice: “We used oil for years—now I just set the app and it’s warm when I get home.”	Sponsor local interest programs (e.g., rural life, farm updates). Emphasise familiarity & savings

MARKETING PLAN

CAMPAIGNS

Campaign Name	Description	Target Segment(s)
Smart Start Upgrade	Free IoT install + 1st year subscription for storage heater users	Segment A
Warm Neighbours Referral	£25 bill credit for both referrer and new adopter	Segment A
Scrappage Scheme (Electric)	£150–£600 rebate for removing panel heaters	Segment B
Try Smart Heat – 60 Days Risk-Free	No-commitment trial for new system installs	Segment B
Scrappage Scheme (Oil/Coal)	£400–£750 for removing fossil-based systems	Segment C
Cold Home Makeover Giveaway	Win a full retrofit by sharing your heating struggle	Segment C
Winter Warmer Loyalty Club	Rewards for DR engagement, referrals, or consistent app use	Segments A, B, C
Fuel Bill Challenge	Submit your heating bill to get personal savings projection	Segment A, B, C

PRODUCT PRICING

Component / Cost Type	Estimated Cost (£)	Details
Microcontroller (MCU)	£3–£5	Onboard connectivity
Relay or Solid-State Switch	£2–£4	For switching power to the heater safely
Wireless Connectivity Module	£1.50–£3	Wi-Fi module (if not integrated into MCU)
AC–DC Power Supply	£2–£3	Converts mains voltage to 3.3V/5V
Custom PCB + Assembly	£4–£6	Printed circuit board + factory production in batches
Plastic Enclosure	£1–£2	Molded housing, branded or plain
Safety Components	£1–£2	Fuses, surge protection, filter capacitors
Cloud Firmware	£1–£2 (amortised)	Cost share for software stack, DR logic, and over-the-air updates
Packaging, QC & Labelling	£1–£2	Final testing, device ID, box, manual

Subtotal (Hardware + Assembly):
£18 – £29

PRODUCT PRICING

Cost Type	Estimated Cost (£)	Notes
Certification	£1–£3	Safety testing, emissions, etc. (spread across batch production)
Logistics & Fulfilment	£1–£3	Shipping, warehousing, last-mile delivery
Customer Support	£1–£2	App login, onboarding queries, warranty returns
R&D Amortisation	£5–£10	Hardware design, app integrations, backend cloud infrastructure

Final Estimated Total Cost per Unit:
£30 – £45 (at 5,000+ units scale)

This cost supports:
Retail pricing at **£99–£120** with healthy margins