Slide 1:

Hi,

To begin, let imagine a problem about energy reponse demande in 24h of a home energy environment with a step every 15 mns.

There are there controllable appliances : EV charger, Washing Machine, and Dish Washer.

each has its own problem space with unique contraints.

• EV Charger: Requires a 4-hour block, but can only run overnight.
• Washing Machine: 1-hour block, but only run during the day.
• Dishwasher: a 1.5-hour block, only run in the evening or early morning.

These appliances create a massive search space of 2**101 possibilities..

Addionally, when we look the input data : Baseline Load, energy prise, and the free renewable energy; presented in your right hand side

Slide 2:
We figure out that the renewable energy is not always available when the demand is high !

and it's typically a problem. We want to compensate as much as possible with clean energy to reduce the peak load.

Slide 3:

Today's grid faces a perfect storm: volatile prices punish consumers, peak demand threatens blackouts, and clean solar power is wasted daily. This trilemma demands a smarter solution than simple cost-shifting.

Slide 4:

Hi, I'm Binh. I'm the team leader of team beerantum.

Today, I'm here to share our solution to deal with the energy trilemma using quantum Optimization & quantum annealing.

Slide 5:

Our goal is straightforward: to use the new power of quantum optimization to solve three critical problems for the energy grid.

First, we minimize the total cost of electricity.
Second, we stabilize the grid to prevent blackouts.

And third, we guarantee that the service you rely on is always delivered.

We do this not with more power plants, but with smarter software.

Slide 6:

We translated this complex trilemma into a single, smart objective function. Think of it as a sophisticated balancing act with three dials we can control.

The first dial minimizes your electricity cost.
The second stabilizes the grid by shaving peaks.
And the third acts as a guarantee, ensuring every appliance runs exactly once.

By tuning these dials—our hyperparameters A, B, and C—we find the perfect balance for the grid's needs, delivering the lowest energy and the optimal outcome

Slide 7:

What the different between our approach and the greedy trap?

In greedy algorithm, the peak term is completely removed it means that solves three independent problems instead of one connected system.

Slide 8:

With using QUBO & annealers, we were able to take into account the entire search space with > 2300 interactions within the system. It takes only 306 seconds to find the best solution on our local machine.

The result is presented on the left hand side.

Slide 9:

to increase the visibility of our result, we represent it into the table below.

With our QUBO, we obtain 55.57 dollars and a peak load of 3.18 kW.

We obtain cheaper total cost with greedy method but a created massive surge. The grid disaster.

Especially, with QUBO, we obtain 73 % of peak reduction.

Slide 10:

Let's talk about the three massive pressures crippling the energy sector today.

For Utility Companies, it's a financial hemorrhage: billions spent on temporary 'peaker plants' and forced grid upgrades, all while facing heavy penalties for unreliability.

For Smart-Home Providers, it's a value crisis. Their hardware is seen as a convenience, not a necessity, making it hard to justify the cost and retain customers.

And for Grid Operators, it's an existential threat. The unpredictable nature of renewables is creating dangerous instability, risking blackouts and making frequency regulation a nightmare

Slide 11:

We offer

The utility companies with A predictable & dispatchable peak-shaving resource. Our formulation guarantees performance, making us more reliable than competitors.

Smart-Home Providers with
A virtual power plant (VPP) platform that can be tuned for multiple grid services (peak shaving, frequency response) by adjusting hyperparameters.

Lastly, Grid Operatorswith A white-label "Energy & Cost Optimizer" service that turns their devices into money-saving assets, increasing customer retention and product value.

Slide 12:

Our market scope is very big.

In 2025, The market size was estimated 1.67 bilion dollars in europe by Business Research insights and 35. 2 billion in the world for demande response market

Slide 13:

Our business model is a simple, scalable B2B API. We will license our "Grid-Aware" QUBO for
mulation as a backend "quantum brain."

Our customers have already spent millions acquiring users for their smart-home apps. Their prob
lem is that their current schedulers are "dumb" and "greedy." We provide the immediate, high performance upgrade that solves the peak-load crisis, turning their existing products into state-of
the-art grid management tools.

Slide 14:

We have moved from theory to validated proof. At TRL 4, our model has already demonstrated a 73% reduction in peak demand using real-world data.

Our path forward is clear and lean. To reach TRL 6—a working prototype in a test home—we will do two things:

Connect to live utility data.

Command real smart plugs in a controlled demonstration.

This technical depth is matched by our team. One co-founder is the architect behind our core quantum-hybrid model. The other is the validator who engineered the tests proving it's the optimal solution.

We have the proven model, the executable plan, and the right team to deliver commercial success.

Slide 15:

To put it simply: the 'Greedy' solution is the problem. Our 'Grid-Aware' optimization is the answer.

And this isn't just a theory. We have experimental proof that our solution is 73% more effective at stabilizing the grid.

We have the model. We have the validation. We have the team.

Now, we are seeking funding and strategic partnerships to complete our transition from the lab to the real world. This investment will fund our path to a operational prototype and our first commercial pilot programs