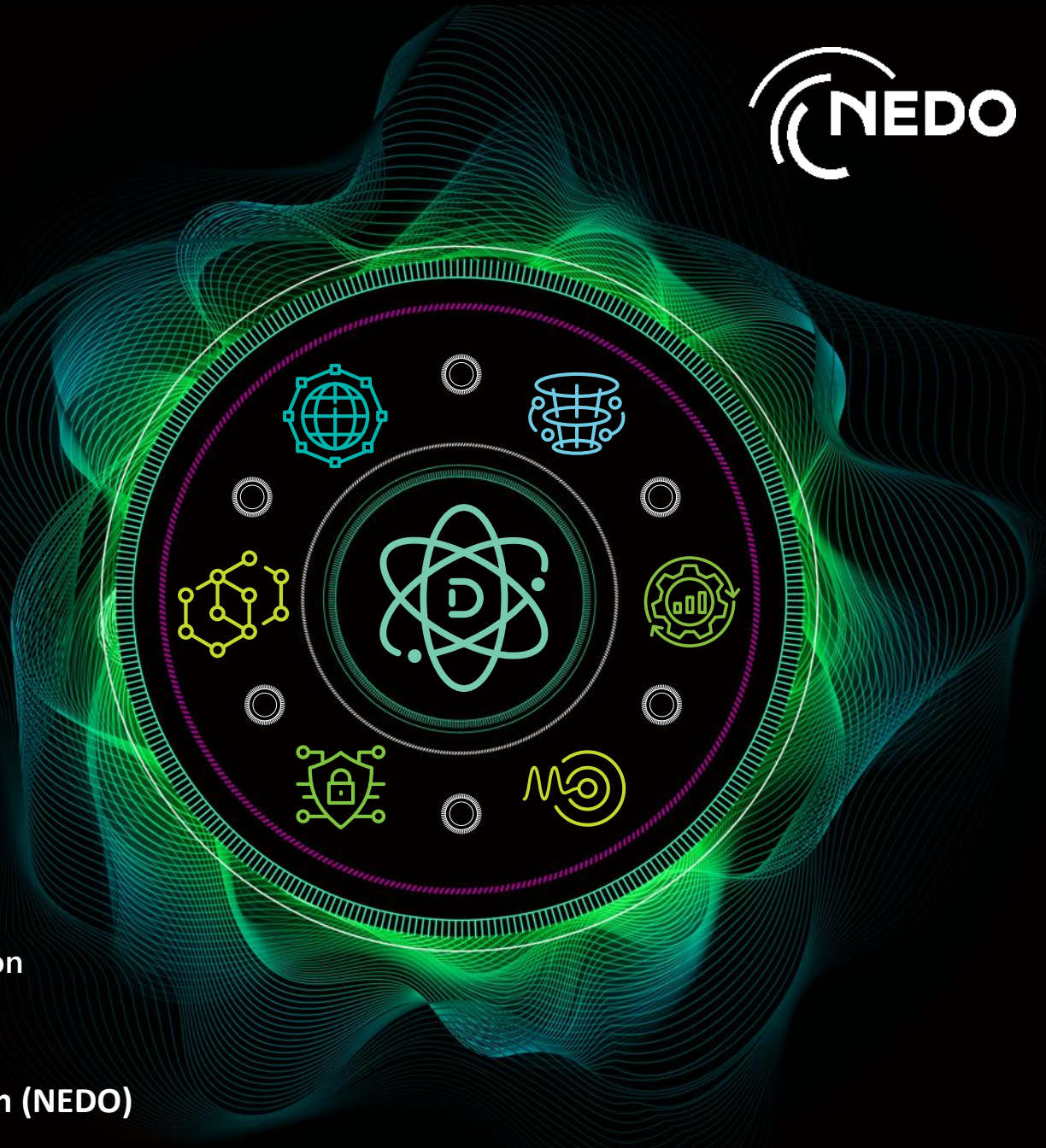
Quantum Computing Use Cases

Visualization, evaluation, and trading of environmental value



Promotion of SDGs with Quantum Technology

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New Energy and Industrial Technology Development Organization (NEDO)

環境価値の可視化・評価・取引
Visualization, evaluation, and trading of environmental value

NO IMAGE

ユースケース概要 Use Case Overview	環境価値の実現を可視化し、第三者機関が評価 Visualize the realization of environmental value and have it evaluated by a third-party organization.
解決できる課題と効果 Issues to be addressed and their effects	環境負荷削減の適正な評価と環境価値取引の実現 Proper evaluation of environmental impact reduction and realization of environmental value trading.
量子技術の貢献 Contributions of quantum technology	環境価値データのセキュア通信およびP2Pマッチングの高速化 Secure communication of environmental value data and acceleration of P2P matching.

実現予想時期 Expected realization period	(Year)2030～2035
産業分類 Industry classification	コンシューマ・その他 Consumer・Others
関連するQRAMI階層 Related QRAMI layers	機能層 Functional layer
関連する量子技術 Related quantum technologies	量子通信・セキュリティ 量子コンピュータ Quantum Communication・Security Quantum Computer

新規性 Novelty	軽微な改良 Minor improvements
達成難易度 Difficulty of achievement	容易 Easy
社会貢献度 Social contribution level	幅広い業種に貢献 Contributions to a wide range of industries
市場規模 Market size	1,000億～1兆円 100B～1T¥

Detail

Visualization, evaluation, and trading of environmental value

Issues to address

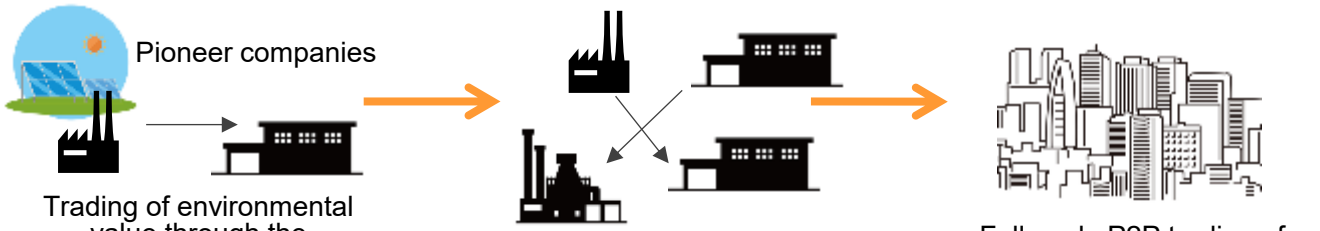
- Due to differences in environmental initiatives, trading must be carried out after properly evaluating the reduction of environmental impact

Use case overview

- Visualization of the achievement of environmental value by each company/individual and evaluation by a third-party organization
- Trading environmental value through P2P without going through a central system

Implementation vision

Achievement target period: 2030



- Enable flexible trading by each company/individual even on a small scale
- Maximize the environmental value of distributed renewable energy and CO_2 emission reductions of each company by matching the supply side and the demand side of environmental value

Expected benefits

- Appropriate evaluation of each company's emission reductions as environmental value and their conversion into profits (sale)
- Procurement of the environmental value of companies that lack the means to enhance the environment through environmental value trading between companies and individuals (purchase)

Action plan

QRAMI hierarchy	Action
Business	Establish an environmental value consulting scheme and environmental trading market (currently still many players offering similar services)
Function	Environmental value trading (P2P matching) Establish methods for estimating environmental impact and reduction effects
Information	Handling of environmental value data (including security)
Integration	Establish an environmental information integration platform for evaluating environmental impact and reduction effects for the entire supply chain
Asset	Further spread of quantum computers (matching) and IoT sensors

Roadmap

Visualization, evaluation, and trading of environmental value

2023

Adjust with thermal power generation and fossil fuels in accordance with energy demand

Conventional energy supply and demand adjustment

Supply ← Demand

- ✓ Final adjustment of power generation with thermal power
- ✓ Use as much energy as needed

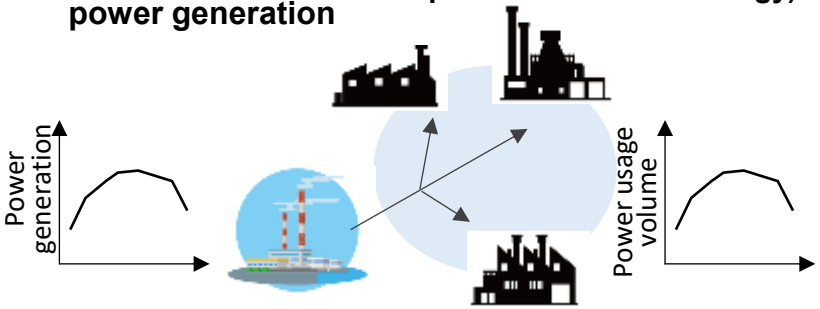




Blast furnace　Gasoline-powered vehicles

Mainly thermal power generation; possible to control the amount of power generation

Many non-electrified equipment (possible to store petroleum-derived energy)



Supply-demand adjustment with grids and fossil fuels

Around 2030

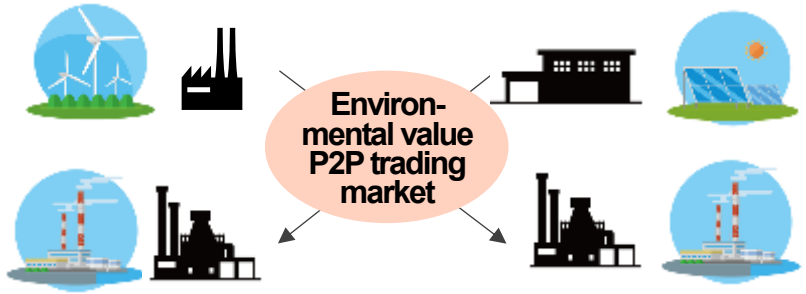
Acceleration of decarbonization (introduction of renewable energy and electrification)

Visualization, reduction, evaluation, and trading services for environmental value

Supply ⇔ Demand

- ✓ Disparities between companies in decarbonization
- ✓ Evaluate and trade the value of environmental improvement

Transition period



P2P trading of environmental value by companies/individuals

Around 2050

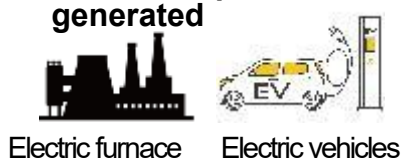
Zero environmental impact with 100% renewable energy and full electrification

Behavior change services in accordance with the volume of renewable energy generation

Supply → Demand

- ✓ Accurately predict power generation through environmental forecasts
- ✓ Change in behavior of individuals/companies depending on the amount of power generated

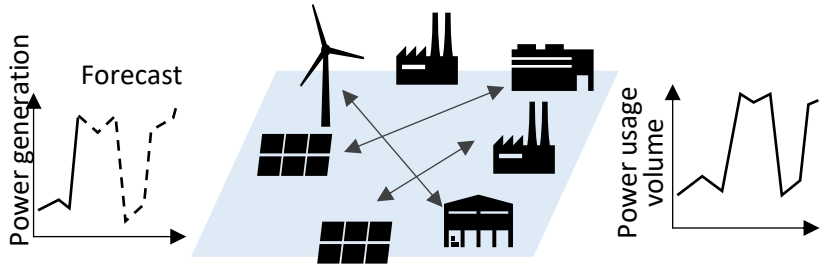




Electric furnace　Electric vehicles

Almost 100% renewable energy generation (unstable power generation)

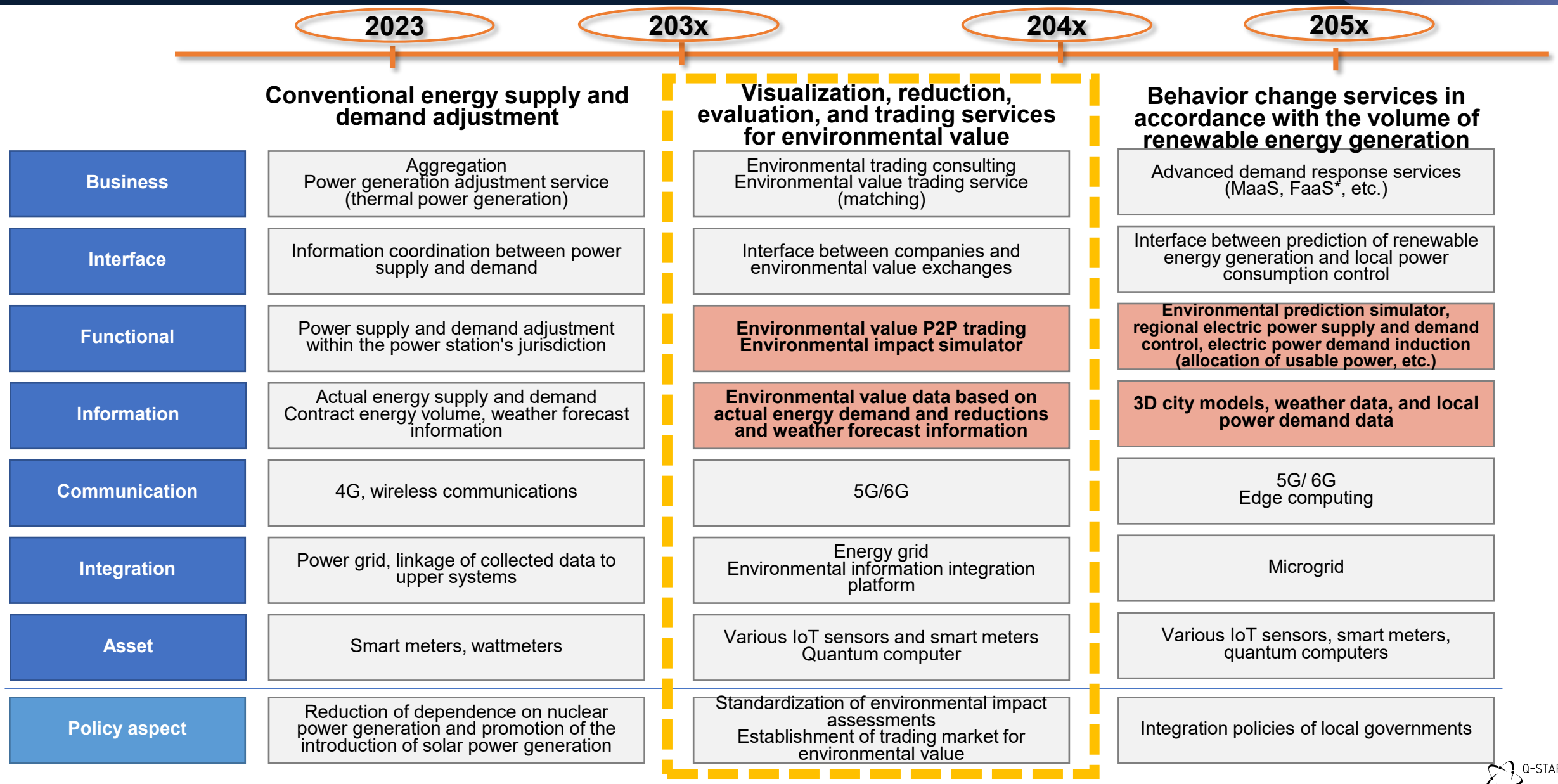
Electricity demand fluctuates depending on equipment operating status



Local production for local consumption of energy

Roadmap

Visualization, evaluation, and trading of environmental value



* Mobility as a Service (MaaS), Factory as a Service (FaaS, concept of service connecting factory and client)

More use cases are available on our website. We invite you to explore them.
https://www.quantum-computing-use-cases.nedo.go.jp/english/

More Use Cases

New Energy and Industrial Technology Development Organization (NEDO)
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This collection of use cases was obtained as a result of the work commissioned by the New Energy and Industrial Technology Development Organization (NEDO) "Cyber-Physical Development Business of Quantum/Classical Hybrid Technology/Study of Use Case of Quantum Technology" and the “Post-5G Information and Communications System Infrastructure Reinforcement R & D Project (Quantum Industrialization)/Comprehensive Study for Promoting the Industrialization of Quantum Computers ”.