From Energy Expense to Energy Income

Operating precedents in retail, water, district heating, telecommunications and transport

13 MAIN CASES	5 SECTORS	EVIDENCE FIRST
Owned generation and managed energy infrastructure	Europe, North America and Asia	Operating assets, external sales and financial boundaries

The inversion thesis

An organization that once bought all the energy needed to deliver its core service can also own, operate or control assets that produce energy and earn revenue. The change can reach beyond a smaller utility bill: it can create an energy business, monetize infrastructure and fund better service economics.

This report examines what has already happened, the form of income each case supports and the additional evidence needed to establish that energy has become a net source of cash for the organization as a whole.

> **A documented energy seller is a real commercial precedent. A claim of complete financial inversion additionally requires a defined boundary and a reconciled net cash result.**

Prepared for XPower
English edition 1.1 | Research cut-off: 19 September 2026
Published in the XPower Inversion / Inverted section.

EXECUTIVE FINDINGS

The transition is real. Its financial depth varies.

The strongest precedents show organizations using an existing operating footprint as the foundation for a second business: rooftops and capital in retail, sludge and process expertise in water, heat demand in district heating, network batteries in telecommunications and energy infrastructure in transport.

OBSERVED RESULT	REPRESENTATIVE CASE	WHAT THE EVIDENCE ESTABLISHES
Sale of surplus power	EBMUD	An external buyer confirms a wastewater plant's renewable electricity exports. [S05]
Energy income lowers service bills	Hvide Sande	The operator links surplus electricity sales to lower district heating charges. [S15]
Creation and monetization of an energy asset	Colruyt / Virya	A retail-linked platform completed the sale of an offshore wind business. [S01]
Generation plus a disclosed commercial ledger	CIAL Infrastructures	Accounts identify power revenue and parent-company power transactions. [S26]
Energy becomes a separate business capability	NTT Anode Energy	The group created an energy company and acquired operating generation. [S19] [S20]
Existing infrastructure earns grid income	Elisa	Telecom batteries obtained access to the electricity reserve market. [S22]

The central finding for XPower

The repeatable opportunity is to combine a reliable core-service load with control of energy assets, market access and settlement. Ownership alone does not establish commercial success. Export volumes, external receipts, operating costs and capital obligations determine the result.

How to read “already inverted”

Several cases have demonstrably crossed from buying energy into producing or selling it. Public disclosures reviewed here do not establish that every organization has eliminated its entire consolidated energy cost and generates a positive recurring cash surplus after all capital costs. Each profile therefore states its achieved result explicitly.

The smaller municipal systems are included because they expose the mechanism particularly clearly. They complement the large corporate and infrastructure operators requested for this review.

SCOPE AND METHOD

What qualifies as inversion?

The unit of analysis matters. A treatment plant, a generation subsidiary, an airport and a consolidated group can all report different results from the same physical assets. The report uses the narrowest boundary the evidence supports.

EVIDENCE CATEGORY	MEANING	CLAIM IT CAN SUPPORT
Commercial generation	Operating generation supplies a customer or sells surplus.	Energy has become a source of gross receipts.
Energy business	A company operates generation, retail, infrastructure or energy services commercially.	A new business exists; profit requires financial evidence.
Physical surplus	Annual energy production exceeds energy use within a stated boundary.	Physical self-sufficiency over that period; cash profitability remains a separate question.
Capital realization	An energy asset or equity stake is sold.	A transaction creates proceeds; recurring operating income must be assessed separately.
Flexibility income	Controlled load or storage participates in grid markets.	An energy service earns or can earn market receipts; storage does not create primary energy.
Full financial inversion	External energy receipts cover residual energy purchases, operating costs and capital obligations.	Energy is a net source of cash at the defined boundary and for the stated period.

Evidence standard

The review favors company reports, audited accounts, public authorities, named counterparties and direct project participants. Industry-association material supplies technical corroboration. Supplier accounts are identified where used. Public targets and construction pipelines are separated from operating assets. Historical transactions retain their original dates and ownership boundaries.

Reading guide

Pages 4-6: financial method and comparative register.
Pages 7-20: thirteen organization profiles, including a separate CIAL financial analysis.
Pages 21-23: sector comparison, XPower operating implications and publication structure.
Pages 24-26: linked source register.

Selection is purposive rather than exhaustive. “Large” describes the principal corporate and infrastructure operators; Hvide Sande and Strass are explicitly smaller technical reference cases. No ranking of investment returns is implied.

FINANCIAL METHOD

Count external value once

Strict cash test: external energy and energy-service cash receipts minus residual energy purchases, generation and market operating costs, and the chosen capital cash obligations. A positive result establishes financial inversion for that boundary and period.

LINE ITEM	TREATMENT IN AN XPOWER ASSESSMENT
Avoided purchases	Use in the comparison with the baseline. In the post-project ledger they already appear as a lower purchase bill; adding the same saving again would double count value.
Electricity, heat and gas sales	Include realized receipts from external customers. Record volumes, settlement prices, fees and taxes consistently.
Grid services and other energy income	Identify reserve, capacity, balancing and eligible environmental-attribute receipts separately. Check that the same availability or attribute has not been sold twice.
Internal power invoices	Useful for subsidiary accountability. Eliminate them when assessing the consolidated group.
Fuel, feedstock and operating costs	Include generation fuel, maintenance, staffing, purchased electricity for heat pumps, waste handling and commercial settlement costs attributable to the project.
Capital and financing	Choose one consistent view: project cash flow with actual investment, or annualized investment recovery, or equity cash flow after debt service. Do not subtract the same capital twice.
Asset-sale proceeds	Show separately as a capital event. Deduct the relevant investment and transaction costs to assess a realized return.

Two results answer two different questions

Improvement from baseline measures whether the project makes the organization better off. **Absolute post-project energy cash balance** measures whether energy has become a source of net cash. A successful project can deliver large savings while the organization still has a remaining energy bill.

Physical and financial units

MW measures power capacity; MWh and GWh measure energy over time. MWp denotes solar nameplate capacity. A battery's MWh rating does not establish its deliverable MW or reserve-market revenue. Annual renewable matching does not establish supply in every hour. Electricity, heat and biomethane must retain their separate quantities and prices.

COMPARATIVE REGISTER / 1 OF 2

Retail and water

ORGANIZATION / BOUNDARY	ASSETS AND CHANGE	ACHIEVED RESULT / LIMIT
Colruyt-linked Virya / Parkwind *Belgium; historical transaction*	Retail-linked investment platform developed and owned an offshore wind business.	Completed capital monetization in 2023. Proceeds belong to the transaction boundary; they are not annual supermarket energy income. **Page 7.**
Ingka Group / Ingka Investments *International retail group*	Owned wind and solar portfolio alongside retail-site generation.	Historical annual production surplus and a large operating portfolio. Full consolidated net energy cash surplus is unproven in reviewed disclosures. **Page 8.**
EBMUD main wastewater plant *California, United States*	Biogas generation and process improvements created exportable electricity.	External power sales confirmed by the Port of Oakland. Evidence concerns the treatment plant, not every EBMUD energy use. **Page 9.**
Marselisborg / Aarhus Vand *Denmark*	Process optimization, sludge digestion and combined heat and power.	Documented annual electricity surplus and heat production. Published technical results do not provide a reconciled net cash margin. **Page 10.**
Severn Trent Green Power *United Kingdom*	Water-group energy subsidiary expanded into organic waste, digestion and a renewable portfolio.	Established commercial energy and waste business. Mixed energy output is not equivalent to electricity profit. **Page 11.**
Strass wastewater treatment plant *Austria; technical reference*	Efficient treatment and sludge-energy recovery supported energy self-sufficiency.	Completed physical inversion. External-sales income is not demonstrated by the reviewed technical sources. **Page 12.**

The profiles provide source-level support and distinguish current corporate information from historical performance. Inclusion in this register does not certify full financial inversion.

Why these sectors matter

Retail contributes distributed property and investment capacity. Water utilities contribute continuous demand, digestible material and process expertise. Both can establish an operating energy capability; the saleable surplus and the path to external revenue differ materially.

COMPARATIVE REGISTER / 2 OF 2

Heat, communications and transport

ORGANIZATION / BOUNDARY	ASSETS AND CHANGE	ACHIEVED RESULT / LIMIT
Hvide Sande Fjernvarme *Denmark; local reference*	District heating utility purchased wind turbines and coordinated power and heat.	Surplus power sales supported lower customer bills. A favorable reported year does not establish a permanent negative heat cost. **Page 13.**
Fjernvarme Fyn Produktion *Denmark*	Heat production combined with generation, including a completed woodchip turbine addition.	Electricity supplied to the market; production company reports a profit. Electricity-only profit is not separately established here. **Page 14.**
NTT Anode Energy *Japan*	Telecom group established an energy business and acquired a generation platform jointly.	Operating generation, supply and energy services. Group-wide energy cost reversal is unproven. **Page 15.**
Elisa *Finland*	Telecom backup batteries aggregated as a virtual power plant.	Reserve-market participation and a commercial flexibility offering. This is storage-based monetization. **Page 16.**
SoftBank Group / Japanese SB Energy *Japan; historical transaction*	Diversified group built a renewable energy business and sold a controlling stake.	Completed strategic asset monetization; disclosed sources do not quantify a realized investment return. **Page 17.**
CIAL / CIAL Infrastructures *India*	Airport-linked solar and hydro generation with parent and external offtake.	Power revenue and a profitable infrastructure company. Most disclosed power receipts are internal to the airport group. **Pages 18-19.**
DB Energie *Germany*	Railway energy infrastructure and expertise serve railway and external customers.	Commercial energy infrastructure and supply business. Gross energy turnover cannot establish a net group surplus. **Page 20.**

01 / RETAIL / BELGIUM

Colruyt, Virya and Parkwind

A retail-linked energy platform created an asset that could be sold at industrial scale.

Achieved result: a completed energy-asset sale. This is strong evidence of capital monetization, with a clearly dated ownership boundary.

What changed

Colruyt-linked investment activity grew into a dedicated renewable energy platform. Parkwind's corporate history describes its development within that ecosystem. Virya subsequently owned the offshore wind company and sold it to a specialist energy buyer. [S02]

DISCLOSED AT THE 2023 CLOSING	VALUE / SCOPE
Transaction	Sale of 100% of Parkwind to JERA Green
Completion date	26 July 2023
Final consideration	Approximately EUR 1.6 billion, net of debt and transaction costs at Virya level
Colruyt interest in Virya at that time	59.94%
Estimated effect announced at closing	EUR 650-700 million positive one-off effect on Colruyt Group net result

These figures come from the closing announcement. The announced accounting effect was an estimate, and the sale consideration was measured at Virya level. [S01]

How value was created

The economic chain is development, ownership, operation and eventual sale of generation assets. Value can accrue through operating distributions and through a buyer's payment for future cash flows. The reviewed closing release establishes the latter event; it does not supply a full lifetime return calculation for the retailer.

What the case proves

A business associated with food retail can develop energy expertise and create a separately valuable generation platform. The transaction also shows that a completed inversion can change form: after an asset sale, proceeds replace the seller's interest in that asset's future operating cash flows. The former generation should not continue to be attributed to the seller.

XPower relevance

Separate an operating-income story from a capital-realization story. For a retail portfolio, assess whether XPower would retain and operate assets, share their returns, or develop them for sale. Track the ownership share, invested capital and distribution rights at every stage. The most defensible Inverted entry is “retail-linked creation and monetization of renewable energy assets,” with the transaction date visible.

02 / RETAIL / INTERNATIONAL

Ingka Group / Ingka Investments

A major retail group became an owner of offsite generation as well as a consumer of renewable electricity.

Achieved result: a large owned generation portfolio and a reported historical annual generation surplus. The reviewed disclosures do not establish a consolidated net cash energy surplus.

What changed

Ingka Investments built a wind and solar portfolio alongside the IKEA retail operations within Ingka Group. In May 2022 the company reported EUR 2.9 billion invested in renewable energy since 2009 and said its investments enabled more annual renewable generation than the group consumed globally. It also reported 180 MW of operating Polish wind farms producing about 450 GWh annually, exceeding its Polish retail and distribution electricity needs. [S03]

Recent evidence uses a different measurement

Ingka's May 2026 explanation of FY2025 sourcing reported 94.8% renewable electricity on an annual matching basis. Its breakdown was 7.8% onsite generation, 49.1% attributed owned wind and solar and 37.9% energy attribute certificates. The article listed 49 wind farms and 26 solar parks. [S04]

METRIC	INTERPRETATION
Total portfolio generation	Measures the energy output of the owned assets over a stated period.
Renewable electricity attributed to operations	Measures procurement and attribute matching against the group's consumption boundary.
Net financial result	Requires sales, avoided purchases, operating costs, settlement and capital data.

How money can flow

Offsite assets can sell output into a market or to an offtaker, while retail operations procure electricity in their own locations. These flows require settlement even when both activities belong to the same group. Generation in one market does not automatically cancel a bill in another, and physical output does not by itself establish who retains the renewable attributes.

Evidence and limits

The historical generation-surplus statement and the later sourcing percentage describe different measures. They should be published with their dates and definitions rather than joined into a single trend. The reviewed sources do not reconcile external energy sales, internal transfers and all energy costs into one consolidated cash balance.

XPower relevance

Retail inversion can extend beyond store rooftops into an investment and operating platform. An XPower proposal should specify the asset perimeter, geographic relationship to demand, retained energy attributes and customer rights to cash distributions. The portfolio must be assessed on its own commercial ledger as well as its contribution to retail procurement.

03 / WATER / UNITED STATES

EBMUD: wastewater becomes an energy source

The external electricity buyer independently confirms the commercial step beyond plant self-sufficiency.

Achieved result: surplus renewable electricity sold from the main wastewater treatment plant to the Port of Oakland. This is a direct commercial-generation precedent.

What changed

East Bay Municipal Utility District turned the energy resources associated with wastewater treatment into onsite power and a saleable surplus. Its board records identify the historical achievement in 2012. The relevant reference point in this review is the main wastewater treatment plant, rather than every drinking-water and wastewater activity in the district. [S06]

What the buyer confirms

The Port of Oakland reports that an efficient gas turbine installed in 2011 helped the EBMUD plant produce more renewable electricity than it needed in 2012. In October 2022 the Port described ten years of purchases under a power purchase agreement and announced a further two-and-a-half-year extension. It connected the arrangement to savings for both sets of ratepayers. [S05]

BEFORE	AFTER
Treatment requires purchased electricity.	Onsite generation serves treatment demand.
Organic material is a treatment responsibility.	Energy recovery creates an additional productive use.
The utility has no saleable electricity surplus at that plant.	An external infrastructure customer buys exported generation.

How the economics work

The first contribution is displacement of imported plant electricity. Only the remaining output can be sold externally. The export contract provides the link from a physical surplus to realized commercial value. A complete margin calculation would then deduct the incremental costs of energy recovery, generation, maintenance, connection and settlement.

Evidence and limits

The buyer's account is particularly valuable because it corroborates a transaction outside the generator's own marketing material. It does not publish contract prices, annual sales revenue or full project costs. The 2022 extension is historical evidence of operation and trade; this report does not infer a currently valid 2026 contract from that extension alone.

XPower relevance

The case pairs two essential-service operators: a wastewater plant with recoverable energy and a port with electricity demand. For replication, identify a stable external offtaker, determine the reliably exportable volume after treatment needs, and keep waste-service economics visible alongside power economics. A credible entry can already state “wastewater plant selling surplus power,” without a claim about the entire district's net energy expenditure.

04 / WATER / DENMARK

Marselisborg / Aarhus Vand

Treatment optimization and energy recovery created an annual electricity surplus.

Achieved result: documented physical surplus at a wastewater treatment plant, supported by electricity and heat production. The reviewed material provides technical performance rather than a complete profit ledger.

What changed

Aarhus Vand describes Marselisborg as more than self-sufficient in energy. Sludge digestion supplies gas engines that produce electricity and heat. Energy recovery is integrated into the treatment process instead of being treated as a separate renewable installation attached to the site. [S07]

The International Water Association's Aarhus case describes a reduction in electricity consumption and electricity production roughly 50% above the plant's own demand. Danfoss, a technology participant, describes the role of process control and optimization in achieving surplus generation. [S08] [S09]

The operating mechanism

The numerator and denominator both change. Better treatment control reduces the energy required for the same service, while digestion and combined heat and power convert a process resource into useful output. That combination can reach a surplus with less additional generation than an approach that leaves inefficient demand untouched.

VALUE STREAM	WHAT MUST BE MEASURED
Electricity used onsite	Metered displacement of purchases at the treatment boundary.
Electricity surplus	Export volume, sales settlement and associated market charges.
Useful heat	Delivered volume and temperature, buyer, network costs and contract price.
Treatment performance	Water-quality outcomes and continuity while energy operations are optimized.

Evidence and limits

A ratio above 100% is a physical result. It does not establish the price received for surplus electricity, the cost of maintaining the engines or the return on invested capital. Heat and electricity should remain separate in the commercial model: adding their energy quantities into one self-sufficiency percentage can conceal their different usefulness and selling prices.

XPower relevance

Begin with the treatment process and its controllable demand. The transferable lesson is that efficiency and generation form one operating design. XPower would need agreed treatment constraints, dispatch authority, energy metering and a commercial arrangement for every exported product. The defensible headline is “wastewater treatment with annual surplus energy,” followed by a separate financial claim only when settlement and cost data are available.

05 / WATER / UNITED KINGDOM

Severn Trent Green Power

A water-group capability expanded into a commercial organic-waste and renewable-energy business.

Achieved result: a dedicated operating business in energy generation and organic resource processing. Its commercial perimeter is broader than the water utility's own energy recovery.

What changed

Severn Trent Green Power traces its establishment to 2009 as a Severn Trent subsidiary, initially with a small anaerobic-digestion project using crops. Its history records subsequent management of group renewable assets and acquisitions of Agrivert in 2018 and Andigestion in 2023. This is evidence of an operating platform built through both development and acquisition. [S10]

The company describes conversion of organic waste and crops into electricity, biomethane and useful material products. Its website reports approximately 330 GWh of annual renewable energy output. That is an energy figure across its portfolio, not a disclosure of electricity-only generation or profit. [S11]

The renewable portfolio also includes 36 solar sites, six wind turbines and five hydro turbines, according to its asset-service page, with energy supplied into the wider business. [S12]

Where the income comes from

The business model combines a service for material owners with energy production. Potential contract cash flows include organic-waste treatment charges and sales of electricity or biomethane. The value retained depends on feedstock terms, plant performance, product specification, digestate handling and offtake arrangements. Each activity should have its own revenue and cost line.

Why it is a useful large-utility precedent

A water organization can turn technical expertise in digestion, site operations and infrastructure into an adjacent commercial business. Acquiring operating companies can add customer contracts and feedstock access as well as equipment. The inversion therefore concerns a business capability and a portfolio, rather than one water plant becoming electrically self-sufficient.

Evidence and limits

The reviewed corporate pages verify the operating business and portfolio, but do not provide a reconciled standalone energy profit or establish that the entire Severn Trent group has a positive net energy cash balance. Planned portfolio additions should be checked against commissioning records before being included as operating capacity.

XPower relevance

Assess whether the customer brings only an electricity bill or also a resource stream, operating team and sites. A scalable arrangement could combine asset management with commercial waste and energy contracts. The revenue-sharing agreement should allocate income by product and distinguish external sales from electricity supplied internally to the utility.

06 / WATER / AUSTRIA

Strass wastewater treatment plant

A smaller technical reference shows how far process efficiency can move the energy balance.

Achieved result: long-established physical energy self-sufficiency and surplus production. External-sales revenue is not demonstrated by the technical sources reviewed.

What changed

The Strass plant is presented by AEROSTRIP / Aquaconsult as energy self-sufficient since 2005. The case describes sidestream nitrogen treatment and later process upgrades. The supplier's current profile gives a capacity of approximately 250,000 population equivalents and daily treatment volume around 30,000 cubic metres. [S13]

Aquaconsult's 2022 account describes a coordinated retrofit involving treatment-process design, aeration and blowers. It is useful evidence of implemented process engineering, while remaining a technology-participant source rather than an independently audited financial statement. [S14]

Why it belongs in the review

A power project sized against an inefficient process can lock in avoidable capital expenditure. Strass illustrates the alternative sequence: reduce the treatment energy requirement, preserve service performance and increase the share covered by recovered energy. The technical result can materially improve the starting economics of any subsequent export project.

STEP IN THE TRANSITION	COMMERCIAL IMPLICATION
Reduce process electricity demand	Lowers the amount of generation required for self-supply.
Recover energy from treatment resources	Converts part of the residual resource stream into useful energy.
Reach annual physical self-sufficiency	Demonstrates an operating energy balance at the plant boundary.
Establish priced external sales	Requires additional contract and settlement evidence beyond the reviewed case.

Evidence and limits

The report does not label Strass as a proven energy-income business. The public material reviewed does not identify a buyer, realized sale proceeds or a full energy cost base. It is included as a completed physical-inversion benchmark with a specific limit on the financial claim.

XPower relevance

Use this case when explaining the engineering prerequisites of inversion. A commercial dossier would add import and export meters, generation costs, capital history and sale contracts. For a water-sector customer, efficiency is part of asset sizing and dispatch design; it should be evaluated before surplus revenue is forecast. Strass also shows why a small reference plant can be valuable alongside large utility groups: its operating mechanism is easier to isolate.

07 / DISTRICT HEATING / DENMARK

Hvide Sande Fjernvarme

A local heating utility used owned wind generation to earn revenue and lower customer charges.

Achieved result: surplus electricity sales with a documented effect on heating bills. This smaller system is a particularly clear example of customer-facing inversion.

What changed

An operator interview published by METRO THERM describes Hvide Sande Fjernvarme's purchase of three wind turbines in 2018. Wind generation became part of a heating system also using solar thermal energy and other production equipment. The article identifies operations manager Morten Rauhe as the source of the commercial explanation. [S15]

The evidence of income

The same account says excess electricity was sold at prices above the utility's budget assumptions, enabling lower heating charges. It reports a 63.5% reduction in household heat bills during 2022. This is a historical outcome linked to that year's circumstances; it is not presented here as a continuing tariff or a guaranteed return. [S15]

OPERATING CHOICE	SOURCE OF VALUE
Use electricity for heat production	Displace another heat-production cost when the relative economics favor conversion.
Sell exportable electricity	Receive external market income when generation exceeds economical internal use.
Coordinate heat production across assets	Choose an affordable combination while meeting the required heat service.
Return value through customer charges	Translate system economics into a visible benefit for heat customers.

Why the mechanism is distinctive

The utility has both a product to deliver and a choice about how to produce it. Owning generation introduces a second commercial option: electricity can be used within the heat system or sold outside it. The decision depends on the opportunity value of electricity and the marginal cost of alternative heat production, including any storage or operating constraints.

Evidence and limits

The source is a supplier-hosted interview with a named operator, rather than audited accounts. It establishes the operator's reported link between exports and customer bills. It does not reveal a complete project return, all financing terms or an annual series of net cash results. A single favorable power-price year is insufficient to establish durable profitability.

XPower relevance

This is an intuitive Inverted story because external energy income reaches the customer's service bill. A replication study should model hourly heat demand and power prices, then allocate the value between the operator, asset investor and customers. The agreement should state who controls dispatch and how tariff benefits are calculated.

08 / DISTRICT HEATING / DENMARK

Fjernvarme Fyn Produktion

A large heat system combines public-service demand with market electricity revenue.

Achieved result: electricity sold to the market and a profitable production company. The completed addition of a turbine provides a specific asset-level conversion of heat infrastructure into additional power output.

Scale and completed change

Fjernvarme Fyn describes a municipally owned district heating system serving roughly 250,000 people. Its group production report records 490,133 MWh of net electricity production in 2025. [S16] [S17]

The production company's annual report identifies 2025 as the first full operating year of a new turbine at the woodchip plant. The turbine supplied 103,969 MWh to the electricity market. [S18]

2025 DISCLOSURE	AMOUNT	ACCOUNTING BOUNDARY
Electricity sales	DKK 315.651 million	Fjernvarme Fyn Produktion A/S
Heat sales	DKK 1,151.539 million	Same company; separate revenue line
Profit before tax	DKK 175.877 million	Entire production company
Cash from operations and investment before financing	DKK 349.423 million	Entire production company

Financial amounts are from the income statement, cash-flow statement and revenue note 3. The report also identifies electricity prices and weather as important performance drivers. [S18]

How the economics work

A heat-led system can earn revenue from electricity produced alongside heat. A turbine addition changes the useful output of an existing thermal production chain. The commercial decision must account for fuel, useful heat demand, power prices, maintenance and the capital cost of the additional equipment.

Evidence and limits

The electricity-sales line is stronger evidence than an undifferentiated energy-business turnover figure. Nevertheless, the company's profit and cash flow include heat and other activities. Assigning the entire result to electricity would overstate the proven margin. The group production figure also has a wider perimeter than the production-company accounts.

XPower relevance

This case supports examination of existing heat assets that could gain generation capability, alongside acquisition or management of established cogeneration. Measure the incremental power output and its incremental costs. Keep the heat-service obligation and the power business in separate analytical lines, then reconcile their combined result. XPower's role would depend on asset rights, dispatch responsibility and the agreed share of external value.

09 / TELECOMMUNICATIONS / JAPAN

NTT Anode Energy

A telecommunications group turned energy capability into a dedicated operating business.

Achieved result: an energy subsidiary with operating generation, supply and energy services. Ownership and completed acquisitions are documented; a full reversal of NTT's consolidated energy cost is not established.

What changed

NTT created NTT Anode Energy in 2019 with a commercial remit spanning generation, energy supply, storage and related capabilities. The founding announcement explicitly connected the initiative to expanding the group's business opportunities and earnings. [S21]

The current corporate history records the integration of NTT Facilities' power operations in 2022 and completion of the Green Power Investment acquisition in August 2023. The April 2026 profile identifies NTT Anode Energy as wholly owned by NTT. [S19]

Operating generation entered through acquisition

JERA's May 2023 acquisition announcement described Green Power Investment's operating Japanese portfolio as 56 MW of solar and 281 MW of onshore wind. NTT Anode Energy and JERA acquired the platform jointly. These are gross portfolio capacities reported at announcement, with project ownership interests embedded; they should not be assigned wholly to NTT. [S20]

CAPABILITY	COMMERCIAL ROLE
Generation ownership	Produces a marketable energy product and investment cash flows.
Energy supply and retail	Connects generation and procurement to paying customers.
Engineering and operations	Applies the group's infrastructure expertise to energy assets.
Aggregation and storage	Coordinates distributed resources and their market participation.

Why it is more than a telecom efficiency project

The organizational shift gives energy its own assets, management and customers. It allows a communications group to participate in the supply side of the energy market while continuing to operate a large energy-consuming network. That is a credible business-model inversion even when the group remains a net energy purchaser overall.

Evidence and limits

The reviewed disclosures establish the platform and completed investment. They do not reconcile external energy profit against all NTT electricity purchases or provide an attributable return for the acquired generation portfolio. Development and construction capacity mentioned in acquisition materials is excluded from the operating figures above.

XPower relevance

The transferable model is a dedicated energy function with rights to operate and settle assets. For a network operator, XPower would need to specify which sites, batteries and generation interests are under management, how core-service availability is protected, and how external energy income is distributed between the platform and the communications business.

10 / TELECOMMUNICATIONS / FINLAND

Elisa: network batteries enter the power market

Backup infrastructure gains a commercial function through aggregation and dispatch.

Achieved result: reserve-market participation and a commercial distributed-storage offering. This is an extension of inversion through controlled energy capacity, rather than primary generation.

What changed

Elisa describes a virtual power plant based on mobile-network batteries, with permission from Fingrid to participate in the reserve market. Its published material describes charging when electricity is inexpensive and using or exporting stored energy when prices are higher. It refers to a 150 MWh distributed-battery programme; that figure should not be treated as verified fully deployed or continuously available market capacity. [S22]

The company also markets distributed energy storage services under its commercial offering, applying the model to telecommunications and other customer segments. [S23]

How a cost asset becomes a revenue asset

A backup battery is installed primarily to preserve communications during a power interruption. Aggregation can make part of its available capacity useful to the wider electricity system during normal operation. The added service depends on control software, reliable communication with the assets and access to an eligible market product.

POTENTIAL RECEIPT	CORRESPONDING COST OR CONSTRAINT
Availability or reserve payments	Capacity must remain deliverable under the market's product requirements.
Activation and energy settlement	Dispatch uses stored energy and may require subsequent recharging.
Time-dependent energy value	Price differences must cover conversion losses and relevant charges.
Commercial service fees	Aggregation, equipment operation and customer support must be provided.

Evidence and limits

The reviewed company material supports market access and the commercial mechanism. It does not disclose a complete realized revenue or profit series, nor establish that grid income exceeds Elisa's entire electricity cost. Battery energy capacity in MWh is distinct from contracted reserve power in MW. Both are needed to assess the economics.

XPower relevance

This model is particularly relevant where substantial energy equipment already exists. The investment may concern better control and added battery capability as well as generation. A project assessment should price degradation, losses, reserve-state requirements and lost availability during maintenance. The customer's communications service sets the feasible operating envelope, and only the capacity inside that envelope should be sold.

For Inverted, publish it as “telecom energy infrastructure earns grid-service income,” with the scope of verified operation stated beside any programme target.

11 / TELECOMMUNICATIONS-LINKED GROUP / JAPAN

SoftBank Group / Japanese SB Energy

A historical example of creating a renewable energy business and selling control.

Achieved result: a completed sale of a controlling interest in a generation business. The Japanese business and the diversified parent group must be identified precisely.

What changed

SoftBank Group built a Japanese renewable energy business through SB Energy. The company operated in generation and related energy activities, extending the group's scope beyond its original telecommunications association. The seller announced a controlling-stake transfer in February 2023. [S25]

Toyota Tsusho confirmed completion on 28 April 2023: it acquired 85% of SB Energy, which was renamed Terras Energy. SoftBank Group retained 15% at that transaction date. The buyer described the company's activities as including renewable generation, storage, electricity and heat supply, equipment operations and supply-demand adjustment. [S24]

Identity and timing

ENTITY OR NUMBER	CORRECT INTERPRETATION
SoftBank Group	Diversified parent involved in the transaction; do not substitute the separately listed telecom operating company.
Japanese SB Energy / Terras Energy	The business whose controlling interest changed hands in April 2023.
United States SB Energy business	A separate business explicitly excluded from this transaction.
85% / 15% ownership	The completed transaction's ownership split, not an assertion of the current 2026 structure.

The distinction concerning the United States business is explicit in the buyer's announcement. [S24]

How value is realized

The group can build value through project development and operation, then transfer some of the future economic rights to another owner. A sale can release capital for other uses and change the seller's exposure to energy markets. Establishing an investment gain requires sale proceeds and the relevant cost basis; establishing recurring income requires the operating accounts.

Evidence and limits

The reviewed transaction announcements verify the change of control. They do not disclose a transaction price sufficient for this report to calculate a realized return. The case also does not establish that telecom network energy bills were fully offset. Its strongest use is as a historical precedent for energy-business creation and capital realization.

XPower relevance

Record whether a customer wants to own energy assets indefinitely, monetize a developed portfolio or share control with a strategic energy operator. Inverted should preserve historical cases while updating their ownership status. Otherwise a successful exit can accidentally become an inaccurate claim of continuing generation ownership.

12 / TRANSPORT INFRASTRUCTURE / INDIA

Cochin International Airport / CIAL

An airport-linked generator supplies its parent and an external utility, with unusually useful public accounts.

Achieved result: operating solar and hydro assets, disclosed power sales and a profitable infrastructure subsidiary. Consolidated airport economics require elimination of internal power invoices.

What changed

CIAL's solar project history records an initial 1 MW installation in 2013 and a 12 MW project in 2015 associated with the airport's fully solar-powered milestone. CIAL Infrastructures describes long-term power supply to its airport parent. Its history also records relocation of canal-top generation after flood damage, illustrating the physical exposure of infrastructure assets. [S27]

Operating perimeter in the latest reviewed accounts

For the year ended 31 March 2026, CIAL Infrastructures reports 50 MWp of solar and a 4.5 MW hydro plant. Solar generation billed was 47.549 GWh; Arippara hydro generation billed to KSEBL was 13.488 GWh. Payyannur solar output has been wheeled to the airport under a long-term open-access arrangement since 1 May 2025. [S26]

Why the buyer boundary matters

The generator and the airport can both benefit from the arrangement. At subsidiary level, a power invoice is revenue. At consolidated group level, the same invoice is an internal transfer. The group's economic benefit comes from reduced external purchases, genuinely external sales and the costs of owning and operating generation.

BOUNDARY	WHAT “SOLAR-POWERED” CAN MEAN
Airport electricity operations	Generation and grid settlement can match the relevant electricity requirement over a period.
Every operating hour	Requires separate interval data, imports, storage and dispatch evidence.
All transport energy	Would additionally include energy uses outside the airport electricity boundary, including aircraft fuel.

Evidence and limits

This is a grid-connected energy and settlement model. A solar milestone should therefore be published with its measurement period and operational scope. The subsidiary also has non-power activities, so its total profit cannot be assigned exclusively to generation. The following page separates the disclosed revenue categories and shows the group-level adjustment.

XPower relevance

Transport hubs combine substantial demand with potential generation sites and long-lived infrastructure. An XPower structure could use a dedicated energy entity and a parent offtake agreement, but its performance report should show both the subsidiary ledger and a consolidated customer view. The difference is essential when presenting energy as income.

CIAL / FINANCIAL ANALYSIS

CIAL's power revenue, reconciled

A worked reconciliation using the year ended 31 March 2026.

ITEM	INR MILLION	INTERPRETATION
Power-sales revenue	374.748	Revenue from operations, note 25
Power sales to parent CIAL	313.229	Related-party transaction disclosure
Balance after parent power sales	61.519	Calculated: 374.748 - 313.229
Hotel operation and maintenance revenue	52.589	A separate non-power activity
Company profit after tax	110.542	Entire subsidiary; excludes other comprehensive income

Source: CIAL Infrastructures annual report 2025-26, revenue note 25, related-party disclosures and financial statements. Figures converted from INR thousands. One crore is INR 10 million. The calculated balance is not a separately audited segment. [S26]

What the arithmetic tells us

The disclosed parent power transaction represents approximately **83.6%** of power-sales revenue. The remaining balance is approximately **16.4%**. These percentages are calculated from the two revenue disclosures. The residual is the amount outside the disclosed parent power sale, subject to reconciliation of counterparties and eliminations. It is not a measure of energy profit.

> **At the airport-group boundary, eliminate the parent-company power sale. Compare external energy receipts with remaining external energy purchases and generation, market and capital costs. Report savings from the baseline separately.**

What remains to establish complete financial inversion

A complete airport-group test would require the residual imported electricity bill, the relevant generation operating costs, financing or capital recovery and the treatment of grid banking. It would also need to separate non-power earnings and reconcile all intercompany transactions. The published power revenue and company profit are valuable evidence, but neither alone answers that consolidated question.

An important reporting distinction

Revenue is recognized on an accounting basis; cash collections may occur in another period. The table therefore uses “revenue” and “sales,” rather than presenting every amount as cash received. Similarly, company profit after tax is not identical to cash available for distribution or an energy-only margin.

Transferable lesson

The subsidiary structure makes energy economics visible and contractible. XPower should preserve that visibility while also presenting the customer's consolidated result. Both views can be useful: one assesses the energy business; the other tests whether the customer's former expense has become net external income.

13 / TRANSPORT SYSTEMS / GERMANY

DB Energie

A railway's energy infrastructure and operating expertise serve a commercial customer base.

Achieved result: an established energy supply and infrastructure business with railway and external customers. This is the review's principal example of inversion through managed energy systems.

What changed

Deutsche Bahn identifies DB Energie as a wholly owned business founded in 1997. Its profile describes customers in railways, industry, trade and commerce, with traction power, stationary electricity, gas, heat and related services. Its scope includes specialized railway electricity systems as well as conventional customer supply. [S28]

DB Energie's operating website presents the associated traction-energy infrastructure and customer services. The case therefore extends beyond a company installing generation for its own buildings: energy has become a dedicated commercial function serving multiple users. [S29]

The managed-infrastructure route

A railway needs specialized power delivery, conversion, metering and operational coordination. When those capabilities are offered to additional users, an internal support function can generate external receipts. The value lies in dependable delivery and system operation as well as the energy commodity itself.

BUSINESS ACTIVITY	HOW TO ASSESS ITS CONTRIBUTION
Procurement and resale	Measure the retained margin after energy acquisition and commercial costs.
Infrastructure operation	Identify permitted customer charges, asset costs and operating obligations.
Energy management and technical services	Separate service revenue from pass-through energy purchases.
Internal railway supply	Eliminate internal invoices in a consolidated Deutsche Bahn assessment.

Evidence and limits

This is not presented as proof that DB owns enough generation to offset every railway energy requirement. Nor does gross energy-business turnover establish a group cash surplus: purchased electricity can pass through the business, and some customers belong to the parent group. A strict inversion claim would require external contribution margins and the group's remaining energy costs.

Why it is relevant to the user's management criterion

Taking control of energy infrastructure can create value even when the principal asset is a network or operating capability rather than a power station. The case demonstrates the commercial perimeter such a business can develop. The particular generation ownership and market arrangements should be documented project by project.

XPower relevance

For transport customers, define the managed system and the right to serve external users. The economic model should distinguish commodity resale, infrastructure charges and technical services. A credible Inverted headline is “railway energy capability becomes a commercial infrastructure business,” with any claim about net railway energy income requiring additional financial evidence.

CROSS-SECTOR FINDINGS

Five routes from service demand to energy value

SECTOR	STARTING ADVANTAGE	COMMERCIAL ROUTE	DECISIVE QUESTION
Retail	Property, recurring demand and investment capacity	Owned generation, portfolio income and asset monetization	Who receives external sales and retains asset value?
Water	Process resources, continuous operations and technical expertise	Recovered-energy exports and commercial resource processing	What surplus remains after treatment needs and recovery costs?
District heating	A heat customer base and flexible production choices	Power sales, cogeneration and coordinated power-to-heat operation	What dispatch choice maximizes value while meeting heat demand?
Communications	Distributed sites, batteries and control infrastructure	Generation ownership and grid-service income	What capacity is available after the network's service requirements?
Transport	Large energy systems, demand and long-lived assets	Dedicated generation, infrastructure services and external supply	Which receipts survive consolidation and commodity pass-through?

Useful comparators with a narrower claim

REWE / EHA: a long-term corporate power purchase agreement with Orsted illustrates renewable procurement. A purchase contract alone does not demonstrate ownership of generation or external energy income. [S30]

JR East: its energy disclosure combines purchased supply and self-generation. Owning generation is relevant, but the reviewed disclosure does not by itself establish a reconciled net energy-income result. [S31]

Scottish Water Horizons: its low-carbon portfolio demonstrates operating energy capability and recovery projects. Future generation targets should remain separate from realized output and financial results. [S32]

Stockholm Exergi: an established seller of heat and electricity provides a structural comparison. A specific transition from customer-side energy expense into new generation income requires its own dated project evidence. [S33]

The common operating pattern

The organization contributes an asset, a resource or a dependable demand base. An energy function converts that advantage into a controlled product. A buyer or market supplies revenue. A clear allocation of costs and economic rights determines who actually receives the resulting value.

IMPLICATIONS FOR XPOWER

Build the commercial system around the assets

The following is an analytical synthesis of the cases, rather than a description of XPower's current product.

The most useful XPower proposition would connect engineering, asset control and a measurable customer financial result. Installing capacity is one component. The operating and contractual arrangement determines whether the customer participates in the energy income.

WORKSTREAM	CONCRETE OUTPUT
1. Establish the baseline	A dated energy ledger and load profile for a named site, subsidiary or group. Include service output so changes in demand are explainable.
2. Identify usable resources	An inventory of generation sites, recoverable energy, existing equipment and controllable demand, with ownership and operating condition.
3. Define control and responsibility	A contract allocating dispatch authority, maintenance, investment, outages and the required core-service performance.
4. Secure a route to revenue	A documented buyer, offtake contract, supply arrangement or eligible market product, with metering and settlement responsibilities.
5. Allocate economic rights	An explicit distribution of external receipts, savings, operating charges, capital costs and residual asset value.
6. Report the actual result	An import/export ledger, external revenue, attributable costs and a consistent net result compared with the baseline.

Ownership and management can both work

In an ownership model, the customer finances assets and retains an agreed share of their earnings. In a management model, another owner can supply the assets while the customer provides operating rights, demand or resources. A joint structure can combine both. Each model should identify who owns the output, who bears market exposure and who receives cash.

Choose the testable opportunity

For water, begin with treatment energy and recoverable resources. For heating, examine heat demand and the value of dispatch alternatives. For communications, establish usable battery availability. For retail and transport, map generation locations against demand, grid access and external customer opportunities. These are screening priorities drawn from the mechanisms in the reviewed cases, not forecasts of investment returns.

A reviewable XPower project should produce two numbers: the customer's improvement from baseline and its post-project net energy cash balance. Show the boundary and the calculation beside both.

INVERTED / PUBLICATION STRUCTURE

Make the achieved result visible

The future Inverted section can present these organizations as evidence of distinct completed transitions. Readers should be able to see the commercial achievement immediately and then inspect the underlying figures, asset rights and sources.

FIELD ON EACH CASE PAGE	CONTENT TO PUBLISH
Organization and service	Legal entity, country, sector and the core service it delivers.
Before and after	The former energy arrangement and the completed operational change.
Assets under control	Technology, operating capacity, ownership share and management rights.
Income mechanism	External power, heat, gas or grid services; commercial energy activity; or a completed asset sale.
Achieved result	A plain-language label such as “surplus power seller,” “commercial energy business,” “physical surplus” or “completed asset monetization.”
Verified figures	Reporting period, quantities, currencies and accounting boundary. Identify calculations made by XPower.
Source and status	Primary evidence, relevant counterparty and whether the ownership or contract is historical.

Suggested editorial opening

Organizations across essential services are taking control of the energy assets around their operations. Retail groups have built renewable portfolios. Wastewater plants export electricity. Heating systems earn income from power sales. Communications networks put batteries to work for the grid. Transport operators have created dedicated energy businesses. Inverted documents the completed changes and explains the economics behind them.

Use the strongest evidence for each story

Lead with EBMUD for external surplus sales; Hvide Sande for the effect on service bills; Fjernvarme Fyn and CIAL for financial disclosure; Colruyt for capital realization; and NTT for the creation of a dedicated energy platform. Ingka and the treatment-efficiency cases explain physical and organizational progress. Elisa extends the discussion to managed storage and grid services.

What this edition establishes

The report documents operating precedents across all five requested sectors. Some prove revenue, some demonstrate a profitable company or a completed asset sale, and some establish physical surplus. The next level of evidence for any full financial-inversion claim is a reconciled net result at the stated organizational boundary.

Editorial status: published in the XPower Inversion / Inverted section.

SOURCE REGISTER / 1 OF 3

Sources and verification

Source numbers throughout the report are clickable. Links below open the underlying publication. Dates distinguish the reporting period from the research cut-off. Titles of Danish sources are translated for navigation.

S01 | Virya Energy
Parkwind sale completed
26 July 2023. Transaction value, ownership at closing and estimated accounting effect.

S02 | Parkwind
Company history
Undated; reviewed September 2026. Development of the Colruyt-linked offshore wind platform.

S03 | Ingka Group
Ingka Investments expands its renewable energy portfolio
31 May 2022. Historical owned generation, investment and annual generation surplus.

S04 | Ingka Group
How Ingka Group is tackling the last 5% of its renewable electricity target
6 May 2026. FY2025 electricity sourcing and current portfolio counts.

S05 | Port of Oakland
Renewable energy
21 October 2022 announcement. Buyer confirmation of purchases from EBMUD and the plant surplus.

S06 | EBMUD
Board of Directors minutes
12 March 2013. Historical recognition of net electricity production in 2012.

S07 | Aarhus Vand
Wastewater treatment and energy production
Undated; reviewed September 2026. Marselisborg digestion, electricity and heat production.

S08 | International Water Association
Climate Smart Story: Aarhus
Undated; reviewed September 2026. Plant electricity surplus and efficiency improvements.

S09 | Danfoss
Generating surplus power from wastewater treatment
Undated; reviewed September 2026. Technology participant account of process optimization.

S10 | Severn Trent Green Power
Our history
Undated; reviewed September 2026. Company formation and completed acquisitions.

S11 | Severn Trent Green Power
Corporate homepage and services
Undated; reviewed September 2026. Commercial organic waste, electricity and biomethane activities; reported annual energy output.

SOURCE REGISTER / 2 OF 3

Sources and verification

Primary and direct-participant sources used in the profiles. Undated pages were reviewed by the research cut-off of 19 September 2026.

S12 | Severn Trent Green Power
Wind, solar and hydro
Undated; reviewed September 2026. Owned generation sites and supply to the water business.

S13 | AEROSTRIP / Aquaconsult
Case studies: Strass wastewater treatment plant
Undated; reviewed September 2026. Physical energy self-sufficiency, size and treatment upgrades.

S14 | Aquaconsult
Triple revolution in the primary clarifier
4 March 2022. Technology participant account of the Strass retrofit.

S15 | METRO THERM
Hvide Sande has perhaps Denmark's cheapest district heating
Undated; reviewed September 2026; reports 2022. Named operator interview connecting surplus power sales to lower heat bills.

S16 | Fjernvarme Fyn
Company overview
Undated; reviewed September 2026. Municipal ownership and population served.

S17 | Fjernvarme Fyn
Annual narrative report 2025
2026; reporting year 2025. Group production table, PDF page 21.

S18 | Fjernvarme Fyn Produktion A/S
Annual report 2025
2026; reporting year 2025. Management review and accounts, including power output and financial results.

S19 | NTT Anode Energy
Corporate profile and history
Profile dated 1 April 2026. Ownership, business scope and completed corporate milestones.

S20 | JERA
Acquisition of Green Power Investment with NTT Anode Energy
18 May 2023. Operating generation portfolio at announcement and joint ownership structure.

S21 | NTT
Establishment of NTT Anode Energy
10 May 2019. Commercial purpose and integration of energy capabilities.

S22 | Elisa
Virtual power plant
Undated; reviewed September 2026. Fingrid market permission, battery programme and dispatch mechanism.

SOURCE REGISTER / 3 OF 3

Sources and verification

Primary and direct-participant sources used in the profiles. Undated pages were reviewed by the research cut-off of 19 September 2026.

S23 | Elisa
Distributed energy storage / Gridle
Undated; reviewed September 2026. Commercial services based on distributed batteries and flexibility.

S24 | Toyota Tsusho
Completion of the acquisition of 85% of SB Energy
28 April 2023. Completed Japanese transaction, renamed company, ownership and business activities.

S25 | SoftBank Group
Transfer of shares in SB Energy
9 February 2023. Seller announcement and scope of the Japanese renewable energy business.

S26 | CIAL Infrastructures
Annual report 2025-26
2026; year ended 31 March 2026. Directors' report, revenue note 25 and related-party disclosures; operating and financial data.

S27 | CIAL Infrastructures
Solar power projects
Undated; reviewed September 2026. Airport solar development, parent offtake and flood-related relocation history.

S28 | Deutsche Bahn
DB Netze Energy business unit profile
Undated; includes historical figures. Wholly owned energy business and railway / third-party customers.

S29 | DB Energie
Corporate website
Reviewed September 2026. Traction energy, energy infrastructure and customer services.

S30 | EHA / REWE
Corporate PPA with Orsted
7 February 2025. Long-term renewable procurement example and distinction from asset ownership.

S31 | JR East
Carbon neutrality and energy supply
Undated; reviewed September 2026. Mixed purchased and self-generated railway energy supply.

S32 | Scottish Water Horizons
Low carbon energy
Undated; reviewed September 2026. Generation and energy recovery activities; future targets distinguished from operation.

S33 | Stockholm Exergi
About Stockholm Exergi
Undated; reviewed September 2026. Established commercial heat and electricity utility as a structural comparator.

Interpretation: XPower implications, comparisons and financial tests are the report's analysis. Missing public profit data is recorded as an evidence limit; it does not establish that a business is unprofitable. No uniform currency conversion or unsupported return estimate has been applied.