redT
energy storage

Your industrial energy storage experts

redT energy at a glance

We are experts in energy storage. Delivering low risk, sustainable energy infrastructure which enables you to:

- **use more renewable energy**
- **save more on your energy bills**
- **make more from grid services**

redT specialises in creating economic business models for energy storage. We develop, supply, install and operate both energy (vanadium redox flow machine) and power (battery) storage technology solutions.

redT energy has been operating in the energy industry since 1989 and active within energy storage since 1999. Listed on the London Stock Exchange (AIM:RED), today we are recognised as a leading global provider of industrial energy storage solutions, with offices around the world.

London • Wokingham • Livingston • Munich
Denver • Johannesburg • Melbourne • Bangkok

Letter from the CEO

Energy storage is transforming how the world generates and consumes energy

Whether energy storage infrastructure is being used to create 24/7 renewables, to balance electricity grids or to bring energy security to remote areas, the fact remains that our entire energy system is changing. Energy storage is driving this change.

We are in the middle of the Fourth Industrial Revolution.
At redT, our mission is to cut through the noise of a crowded and complex industry. We arm you with the expertise we've gained from almost 30 years in the energy industry.

How we do it is simple. We design and sell industrial-scale, bankable energy storage solutions that meet your needs and provide attractive investment returns.

> "... our entire energy system is changing. Energy storage is driving this change."

We guide you in designing a solution that meets your needs.
My team of engineers, software developers, finance analysts and project managers are a one-stop-shop for your project.

Let us know how we can help.

Scott McGregor
CEO of redT energy

About us

We specialise in energy storage solutions that deliver cost effective, sustainable energy infrastructure with attractive economic returns for our customers

We do this using a range of technologies; our own vanadium flow machines, lithium batteries, or a combination of both in a hybrid system.

We've been in the energy industry since 1989 and our patented flow machine technology is backed by 20 years of product development.

Simplifying energy storage

At redT, we scope, design, manufacture, install and operate energy storage systems that give you control over your energy use and associated costs.

We are your one-stop-shop for energy storage.

We also take our environmental responsibilities seriously. The chemistry in our flow machines is 70% water, non-toxic and non-flammable. It is also 100% re-usable and does not degrade with use.

Coupling renewables with storage

redT's storage solutions work with renewables in on-grid, off-grid and weak-grid settings.

Our industrial storage machines can be run continually with no degradation: charging and discharging for over 25 years, matching the life of renewable assets.

Therefore, they make ideal storage partners for solar, wind and tidal generation assets.

- **Low Levelised Cost of Energy (LCOE)**
  Deliver energy for $0.08-$0.16/kWh. (Solar + Storage)
- **100% depth of discharge**
  Manage long duration, high-cycling and deep-discharging storage situations.
- **Non-toxic, non-flammable and recyclable**
  No risk of thermal runaway. redT machines contain no heavy metals and are emission free. The vanadium electrolyte is fully reusable and recyclable.

What we do for you

Our industry expertise and product know-how combine so you can get an affordable, long-lasting energy storage solution that's simple, economic and fits your needs

Energy storage for business

Maximise your use of renewable energy. Reduce your business' energy costs and invest in your own flexible, energy infrastructure.

Off-grid energy

Couple solar with durable, robust storage for cheap 24/7 energy. Reduce your reliance on diesel generators to reduce costs and CO_2.

Utility-scale solar & wind

Create baseload generation from utility-scale renewables. Generate clean energy at the lowest LCOE for private wire projects.

Grid-scale storage

Trade energy, earn revenue from grid services and reinforce networks with fast responding, MW-scale storage systems.

redT energy storage solutions are put to work in many industrial and commercial situations around the world to:

- Maximise renewable energy generation
- Save more on energy energy bills
- Earn revenue by providing all available grid services including frequency response, energy trading and grid balancing

redT machines are heavy duty, flexible platform assets, capable of withstanding extreme temperatures and harsh climates. They are built to meet changing energy requirements with minimal maintenance or replacement costs.

Products

We offer a complete range of energy storage technologies. Our solutions are suitable for projects ranging in size from micro off-grid to multi-megawatt grid-scale systems

Power, energy or both?

We offer both power and energy storage solutions, as well as hybrid systems for more complex energy requirements.

- **Energy storage (over 4 hours):** Vanadium redox flow machines deliver high energy capacity which does not degrade. This 'energy centric' technology is fully flexible, making it ideal for heavy, daily industrial use, as well as short-term and back-up applications.
- **Power storage (1-2 hours optimal):** Lithium batteries deliver short bursts of power. This 'power-centric' technology is ideal for occasional, managed use.
- **Hybrid storage:** Combines energy centric flow machines with power-centric lithium batteries to create a unique solution, capable of serving complex energy requirements and maximising revenue generation for large grid-connected projects.

Purpose designed for the best financial returns

Our systems are designed specifically to create the most attractive financial returns possible for your project. Our products can be combined to size any project. Here are some popular solutions.

Grid-scale energy storage

redT 10000-50000

- **10MW, 50MWh vanadium flow**
- **5 hour 10MW discharge**
- **High-power pulse capability**
- **Sub-second response**

Ideal for:
Network reinforcement, energy trading & arbitrage, grid balancing, grid services

Utility scale solar & wind

redT 5000-25000

- **5MW, 25MWh vanadium flow**
- **5 Hour 5MW discharge**
- **High-power pulse capability**
- **Sub-second response**

Ideal for:
Renewable firming & timeshifting, energy trading & arbitrage, grid services, constraint management, private wire, PPA

Off-grid mining & heavy industry

redT 2000-12000

- **2MW, 12MWh vanadium flow**
- **6 Hour 2MW discharge**
- **High-power pulse capability**
- **Sub-second response**
- **Low maintenance**
- **Stable at high temperatures**
- **Back-up functionality**
- **Spinning reserve**

Ideal for:
24/7 operation & energy security, mini grid, diesel genset optimisation, opex reduction

Commercial-scale energy storage

redT 1000-5000

redT 60-300

- **Modular solution for different energy requirements**
- **25+ year service life**
- **Sub-second response**
- **Safe, low maintenance**

Ideal for:
Renewable firming & timeshifting, peak shaving, grid services, carbon emission reduction

Small business & micro off-grid

redT 15-75

redT 5-40

- **Modular solution for different energy requirements**
- **25+ year service life**
- **Sub-second response**
- **Safe, low maintenance**
- **Capable of operating in harsh environments**

Ideal for:
Renewable firming & timeshifting, reducing electricity costs, securing electricity supply, downsizing diesel generation

Power storage: lithium-ion solutions

In addition to our own proprietary vanadium redox flow machines, we also provide off-the-shelf lithium-ion solutions which are ideal for high power, short duration applications.

We offer a range of products with power ratings from 5kW to 10MW, dependant on the requirements of your project.

Contact us for further information about our lithium-ion range.

Hybrid storage

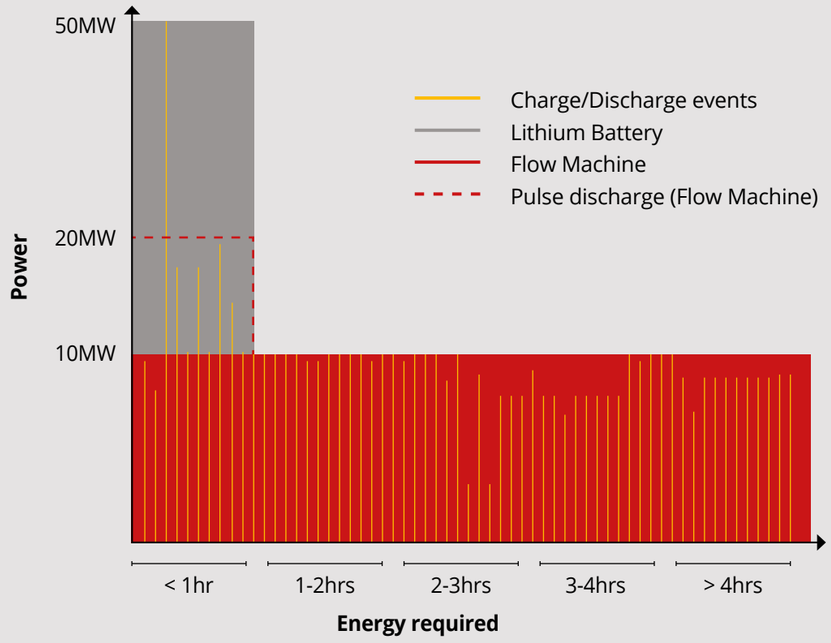
Hybrid energy storage systems combine power-centric batteries with energy centric flow machines to meet complex energy needs.

Use non-degrading flow machines as a “workhorse” for **all** energy requirements. Also use them for low power frequency and trading services. This protects and preserves the more delicate lithium batteries, which can be called on infrequently to provide a high power boost when required.

Australia, a first

redT are pioneers in this space. We are delivering the largest commercial behind-the-meter system ever to be installed in Australia. The system has 900kWh of flow machine hybridised with a 120kW C1 lithium battery.

Are you considering a hybrid storage system? Call us and we’ll give you a full assessment and recommendation.



Business case modelling

We work with you to create an independently verified financial returns model for your project

Our experienced team of energy analysts use your data to produce a solution that meets your requirements, reduces risk and maximises the return on your investment.

Our service covers:

- Site energy flow report
- 25-year project cashflow
- Technology solution proposal and system design
- Optimised run strategies
- Internal Rate of Return and Levelised Cost calculations
- Energy tariff analysis

How we work together

Your project benefits from our technology, financial modelling and engineering skills to make more money and save more on your bills

redT's expertise comes from commercialising our vanadium redox flow storage technology for today's dynamic energy market.

Discover

We assess your project needs and recommend a solution that works best for you.

- Data gathering
- Financial modelling
- Site appraisal
- Solution specification
- Project proposal
- Sign contract

Design

We design the system and highlight what needs to be done prior to delivery.

- Site survey
- Design proposal
- Site preparation
- Equipment manufacture
- Delivery schedule

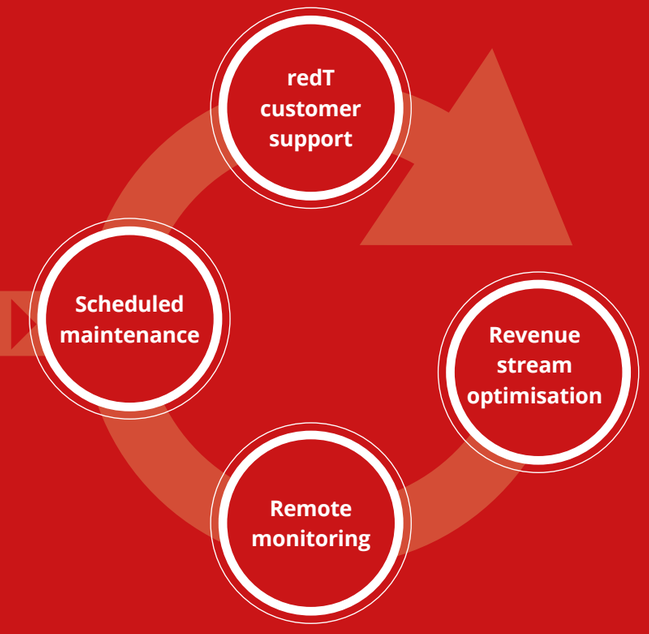
Deploy

We install and set up the system at your site.

- Safety inspection
- Engineering standards compliance
- Acceptance testing
- Commissioning sign off
- Customer handover

Operate

We make sure you get the best economic return from your system and remain available should you need us.



For business

Energy storage for business

Use more renewable energy.
24 hours a day, 365 days a year for over 25 years

Your own distributed energy infrastructure

By investing in energy storage infrastructure, your business can benefit by using more renewables, allowing you to make greater savings on your energy costs, hedge against future price rises and open up new revenue streams through the provision of grid services.

Use more renewable energy
(infrastructure return)

- Utilise cheap renewable energy onsite
- Increase your energy independence
- Reduce your business' CO_2 footprint

Save more on your energy bills
(infrastructure return)

- Reduce your energy purchases from the grid
- Minimise consumption at peak times
- Save money on demand charges

Earn more from grid services
(variable upside)

- Perform all grid services
- Stack multiple services together
- Adapt to changing policies quickly and easily

Trade energy to earn revenue
(variable upside)

- Take part in local energy trading schemes
- Buy energy at low prices
- Sell energy at high prices

Case study

Time shifting solar at farm holiday business, UK

The Olde House is a 600-acre farm and 28-cottage holiday retreat in Cornwall, UK.

- Grid-connected
- Peak demand over 100kW
- 350kWp solar array

Results

Using redT's energy storage units mean that the agri-business imports 34% less electricity from the grid. This lowers energy bills significantly.

And solar power is no longer wasted. Time shifting excess daytime solar via redT's machines to the night means the business now uses significantly more self-generated solar power than before. These machines were the first industrial energy storage to connect to Centrica's groundbreaking Local Energy Market (LEM) trial.

Watch case study video about The Olde House

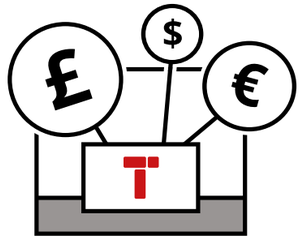
"We generate loads of electricity. But unfortunately, it is in the middle of the day when our guests are out."

Shaun Hawkey,
Manager of The Olde House

The redT advantage

1MWh energy storage from six redT machines:

- **Time-shifts solar from day to night**
- **Uses more self-generated solar power**
- **Earns revenue from grid services**
- **Reduces grid imports**
- **Cuts electricity bills**



Grid services

A flexible asset for all grid services. Reduce risk in a constantly changing market

Make more money by supplying the full range of grid services to the network.

Our machines give you the ability to maximise your returns from grid services whilst remaining flexible to policy changes.

Frequency response

- Get paid to charge or discharge your asset to stabilise network frequency

Capacity market

- Bid into your local capacity market to provide standby power to your local network for an agreed price

Demand side response

- Use your asset to take part in different schemes which pay you to either lower or shift your energy usage at peak times

Operating reserve

- Bid into local reserve markets and use your asset to meet shortfalls in energy supply for an agreed price

Black start

- Make yourself available to provide the power required to restart a network after an outage

Case study

Firm solar and grid services combine at diversified farm estate, UK

An agricultural feed mill, running 24 hours a day, to dry organic matter for livestock in Dorset, UK.

- Grid-connected
- Peak demand 130kW
- 250kWp solar array

Results

The estate will use their redT machines as a flexible platform to sell balancing services to the UK's electricity system operator National Grid.

This also means the business relies less on imported electricity, uses more self-generated energy and makes additional money by exporting to the grid.

The redT advantage

300kWh energy storage from a 60-300 redT system:

- **Unlocks new revenue streams**
- **Time shifts excess solar from day to night**
- **Uses more self-generated solar power**
- **Offers financial benefits from peak shaving**
- **Reduces grid imports**

Off-grid energy

Secure power supplies, reduce carbon emissions and cut diesel costs

Off-grid locations often suffer from unreliable, expensive energy connections.

By storing and time shifting generated energy, redT flow machines provide dependable power to keep sites running around the clock.

redT machines work in harsh environments where conventional batteries often fail or need costly environmental management systems to operate safely.

Use more cheap solar energy

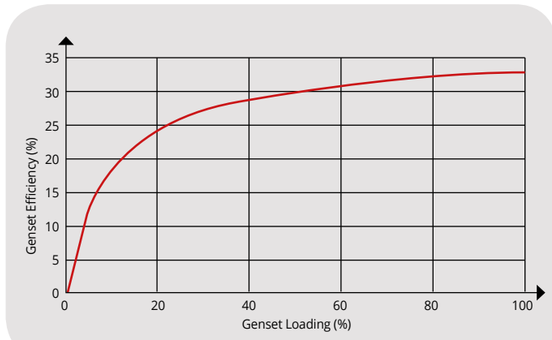
- Utilise clean, cost effective generation
- Gain energy independance

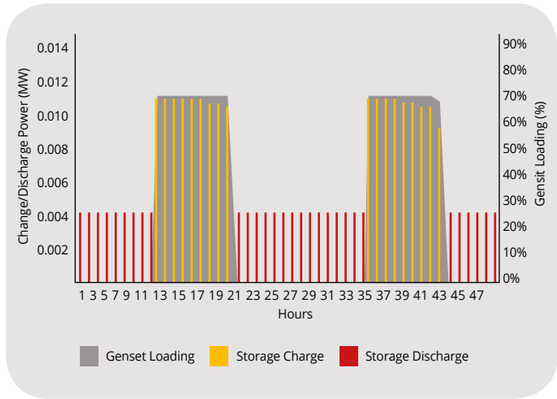
Reduce diesel consumption

- Downsize existing generation
- Run generators more efficiently
- Significantly reduce fuel costs
- Provide spinning reserve

Robust, durable technology

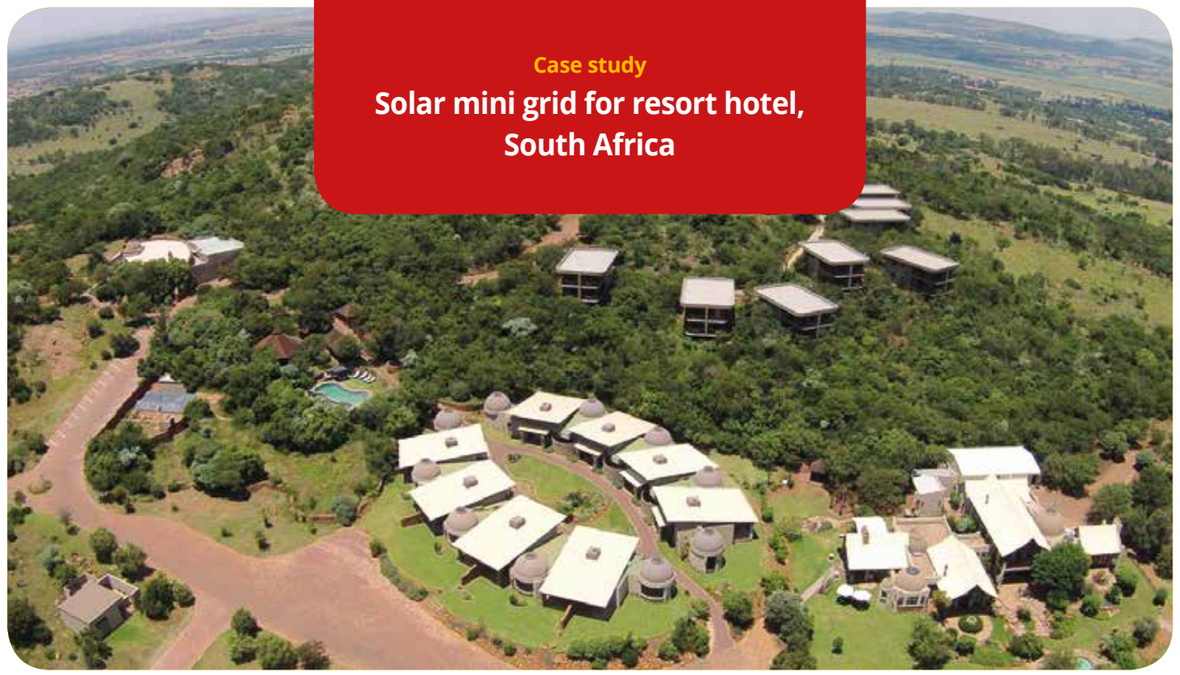
- 25+ year service life
- Able to operate in high temperatures
- Low maintenance requirements
- Remote monitoring options





Case study

Solar mini grid for resort hotel, South Africa



The Thaba Eco Hotel is in the Klipriviersberg Nature Reserve near Johannesburg, South Africa.

- Weak grid, frequent power cuts
- 100kWp solar array
- Backup diesel generators

Results

The redT energy storage means that a section of the hotel's guest rooms and lodges are totally off-grid: using clean, reliable solar power and protected from both planned and unplanned power outages.

The hotel's mini grid is cheaper to run than diesel generators and more reliable than importing energy from the grid. This provides the hotel with secure, cheap and environmentally responsible power.

Watch drone footage of the Thaba Eco Hotel mini grid

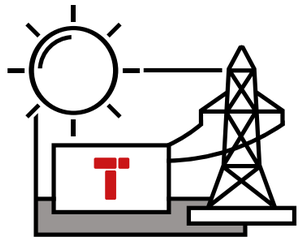
"redT machines fit with our ecological ethos and set a benchmark for our industry in South Africa."

Reuben Louw,
CEO of Thaba Eco Hotel

The redT advantage

75kWh energy storage from a redT 15-75 machine:

- **Makes a PV + solar mini grid**
- **Replaces diesel generators**
- **Cuts fuel costs and emissions**
- **Time-shifts solar from day to night**
- **Secures electricity supplies**



Grid-scale storage

Long duration, fast-response flexible storage infrastructure with pulse discharge functionality

Utilise grid-scale, front-of-meter storage systems to manage energy flows, trade energy and reinforce the network

Large-scale redT solutions provide long duration energy storage (over 4 hours), with sub-second response times and pulse discharge functionality. This allows for output up to 2x rated power for short periods of time.

Utilise vanadium flow or hybrid solutions to trade energy, provide grid services, reinforce the network or a combination of all three. redT machines have a service life of 25+ years.

Energy trading & arbitrage

- Use your asset to trade energy on the day-ahead or intraday markets and through network balancing mechanisms to earn revenue

Grid services

- Perform all grid services and utilise redT machines' sub-second response times

Network reinforcement

- Locate at network hotspots and key interconnectors
- Decommission and move systems to new locations as required

Transform your business energy use

To help understand how redT energy storage can benefit your business, ask yourself these five simple questions:

1. Do you want to be energy resilient?
2. Is your average electricity demand over 60kW?
3. Do you already have renewables generating power onsite?
4. Do you want to eliminate fluctuating electricity bills?
5. Do you want to access new revenue contracts by providing flexibility to the grid?

Email us on enquiries@redTenergy.com with details of your project and we will be in touch.

Acknowledgements
All images are reproduced with the kind permission of their owners. The photos of redT energy storage machines were taken by redT staff including Chloe Alcock, David Hunter, Rich Howden, Stephen Marais, Daniel Maskell, Eric Rigg, John Senff and Joe Worthington.

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