



# AS ENERGY POWERS THE TRANSITION TO A LOW CARBON ECONOMY, TOMORROW'S CUSTOMER WILL LIVE IN A WORLD WHERE THEIR PRODUCTS HAVE MANY LIVES, NOT JUST ONE.

Where durable goods are returned not because they're faulty, but because they've reached the end of their first stage of life.

Where one company's waste material will become another's resource, or a renewable biofuel that trims down operating costs and harmful emissions.

Where machinery and equipment can lead a double life as both a maker of products and a revenue generator in a demand-sharing platform.

Where every unit of energy is used and reused as productively as possible through innovative energy solutions.

That's because tomorrow's economy won't be linear, it'll be circular.

This isn't science fiction. Nor is it academic theory. It's an inevitable moment already on its way.

#### But who will it belong to?

Pioneering companies across industry, commerce and services are already unlocking this opportunity to create incremental profits that are people and planet positive too.

#### And why wouldn't they?

They're exploring new business models that turn their waste into profit-generating opportunities, they're adopting the latest technologies, and gaining new capabilities. They're turning resources, like energy, into a value-generating asset instead of a cost-controlled commodity.

#### Are you ready?

After all, doing so doesn't require leaps of faith, complex plans, radical transformation or massive investment. It requires simply a series of practical, everyday changes in your business, that will also resolve your very real business issues on a journey towards sustainable profit and profitable sustainability. Starting wherever you are today.

So what will your one change be?

#### VINCENT DE RUL

Director of Energy Solutions at EDF Energy In this paper, we will outline the potential of the circular economy for business.

We'll show how forward-thinking companies, supported by progressive policies, are putting their money where their mouth is – and are already reaping the rewards.

And we'll reveal practical everyday changes your business can make, so you too can take your share of this growing opportunity.

Starting wherever you are, starting with your energy.

After all, uncertain times call for new ways of thinking about, and doing, business. We know. We're already applying our own energy solutions to our business.

Join us. And together let's make progress on the journey towards sustainable profit and profitable sustainability.



TODAY'S WORLD IS COMING
UNDER UNPRECEDENTED
COMMERCIAL, ENVIRONMENTAL
AND SOCIETAL PRESSURES.
THESE IN TURN ARE THROWING
INTO QUESTION THE ECONOMIC
MODEL OUR BUSINESSES HAVE
RELIED ON TO DRIVE PROFIT AND
GROWTH. HOW WE RESPOND WILL
SHAPE THE FUTURE OF BUSINESS.

#### Resource costs hike

Since the turn of the millennium, the supply of finite resources that our profits rely on have been getting more costly, rare and volatile.

Prices of raw materials have been on the rise since the early 2000s.



#### **Regulatory pressure**

Governments are increasing obligations to curb emissions and waste to meet national and global targets, protect our environment and tackle climate change.

#### **Green consumerism**

There's mounting pressure from consumers, and business customers, to offer more environmentally friendly products and services (though without passing on the costs).

#### **Legacy infrastructure**

As we shift towards decentralised, smarter energy provision and distribution, the old buyer-supplier relationship is changing.

#### A vicious cycle

These challenges are only set to get bigger. The global population is growing fast, urbanising faster. Indeed, the middle class is set to double by 2030. So, there'll be higher demand for the same dwindling resources and even greater levels of harmful waste.

#### The rise of sustainability

Responsible businesses and their leaders have been doing their bit to address these challenges. They're putting sustainability at the heart of their business strategy. Indeed, many are already taking strides toward practices that are more peopleand planet-positive.

#### The limitations of the linear model

However, even these businesses are held back by the legacy of the linear economic model we've depended on for the last 250 years since the Industrial Revolution: take-use-waste. It's a model developed when there were plentiful natural resources available and no cost associated with waste. But as is becoming clear, it's putting real gains in profitability at odds with real progress in sustainability. And it's not fit for the world we live and work in today.

It's time to draw the line. And it's circular.

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The circular economy is ... an innovation engine that puts the 're' into resources. This is the largest business opportunity ever seen. Why would we want to miss that?

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William McDonough Consulting Professor, Civil and Environmental Engineering, Stanford University

#### CIRCULAR THINKING IN ACTION

Since the 1960s, economists have been working on a new economic model. Then Ellen MacArthur broke the world record in 2005 for the fastest circumnavigation around the globe, retired from sailing and devoted the rest of her career to promoting circular thinking and getting companies to join the CE100 list.

True story.

#### Closing the loop

The circular economy liberates us from the limitations of the linear model by focusing on one thing: eliminating waste and pollution. In the linear model, there is a straight line from take-to-make-to-dispose.

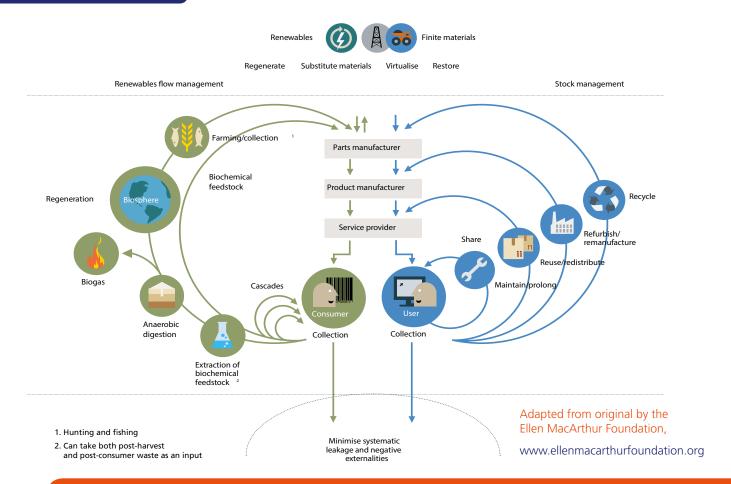
In contrast, the circular model creates a loop, by taking waste materials and discarded products to the beginning of another useful life as a resource. This is repeated in as many loops as possible to drive the most value from finite raw materials.

#### **Growth unleashed**

Shifting from a linear to a circular model, enables a business to decouple its growth potential from new raw materials which are, by definition, finite.

Instead, it empowers them to create new value from existing materials and renewable resources.

The result? Every product is long lived, used to its maximum potential, then reused, repaired, remanufactured and ultimately recycled.



#### Definition: the circular economy (Ellen MacArthur Foundation)

Looking beyond the current take-make-dispose extractive industrial model, a circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It's based on three principles:

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems

#### BUSINESSES ARE MAKING CIRCULAR HAPPEN, RIGHT NOW

While economists may have originated the ideas behind the circular economy, it's businesses that are making them real.

#### Not a trend but a movement

Ordinary businesses – large, small and micro – are slowly, steadily, creating a movement. And it's happening around the corner, across the country, all over the world.

#### Values into value

Circular is changing the relationship between founders, leaders and managers - and their teams. They're all bringing more of themselves to work, putting their values into their businesses, making more of their resources, and experimenting with new ways of working to create new kinds of value.

In short, they're putting circular thinking into action and proving that good-for-business and business-for-good can, in fact, be reconciled.

#### **Models of change**

Perhaps their greatest achievement though, wherever they are in their journeys, is that they're developing new business models that others can copy, adapt and build on.

And as they do, Government policy is keeping in step. It's introducing strategies, incentives and collaborative initiatives designed to help support and speed the move toward the circular economy.

A good example is the signing by the EU and China of a Joint Memorandum of Understanding in Circular Economy Cooperation, paving the way for the world's two largest economies to align on policies to accelerate the transition to the circular economy.<sup>3</sup>

Getting down to business,
the circular economy is a sound
business case for reducing our reliance
on increasingly scarce and expensive
resources, meeting obligations to protect the
environment and achieving new growth.



#### THE EMERGING CIRCULAR BUSINESS MODELS DELIVERING VALUE TODAY

# FIVE CIRCULAR BUSINESS MODELS IN USE

## Circular supplies

Switch to fully renewable, recyclable or biodegradable resources throughout the production chainto replace single-life materials and resources.



# FROM CIRCULAR MODEL TO CIRCULAR BUSINESSES

#### **Tata Motors**

A pioneering after-market product support service, Tata Prolife helps customers extend their vehicle's life expectancy by offering reconditioned products such as engine blocks, gear boxes, turbo chargers, air compressors, starter motors and alternators.<sup>5</sup>

#### Product life extension

Extend the lifecycle of products and assets by repairing, upgrading, remanufacturing or remarketing them to gain maximum value from the resources that go into them.

#### Sharing platforms

Empower multiple users to use a single product or assets to maximise its usage and share costs of ownership.



#### Product as a service

Provide an alternative to ownership where users pay for access or performance, enabling makers to retain ownership and gain the ability to manage the product or asset.



Recover useful components, materials or energy from discarded products or waste materials.



#### **Philips**

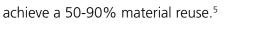
A global electronics company and member of the CE100, Philips is providing new solutions to healthcare providers where they share the risk for results through partnerships. They can now directly manage when to upgrade equipment, refurbish systems, reuse parts and repurpose materials to extend product lifetimes and

#### Copersucar SA

Brazil's largest exporter of sugar and ethanol, Copersucar's partner mills reuse 100% of their by-products and generate enough electricity for self-sufficiency during the harvest season. The sugarcane industry is highly effective in reusing by-products with over 150 alternative uses.<sup>5</sup>









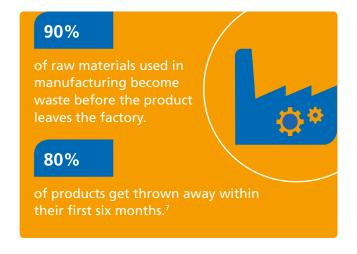
PUTTING THE NEW BUSINESS MODELS, TECHNOLOGIES AND CAPABILITIES INTO PLAY DOESN'T JUST HAVE BENEFITS FOR THE PLANET AND THE PRESERVATION OF NATURAL RESOURCES.

IT'S GOOD FOR THE BOTTOM LINE TOO, AS MANY BUSINESSES ARE ALREADY DISCOVERING.

HERE'S A SNAPSHOT OF THE KEY BENEFITS YOUR BUSINESS CAN UNLOCK BY STARTING ON THE JOURNEY TOWARDS A CIRCULAR MODEL.

#### **Drive down resource costs**

Any company tied to finite natural resources is likely to be in an increasingly vulnerable position as the availability of resources reduces and costs increase. As well as raw material costs, there's also the potential for savings in component recovery and additional income from reselling repurposed materials and products - including energy - while developing more durable products can help to reduce warranty risks.



#### **Achieve sustainability targets**

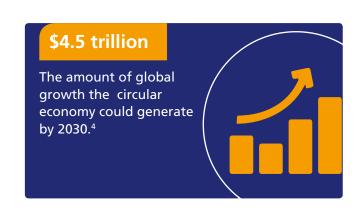
Not just an ideal, the preservation and restoration of our environment is essential to the wellbeing and growth of our people and businesses.

Adopting circular business practices - including the efficient use of low carbon energy - offers significant opportunities for businesses to strip out harmful waste and emissions as well as tackle environmental issues that are set to disrupt business as usual, like climate change.



#### **Build operational resilience**

Growing price volatility in increasingly unstable global markets is likely to lead to supply risks for businesses dependent on finite raw materials. Shifting the economic balance away from primary resource extraction to a more circular model focused on the repurposing and reuse of existing materials can help to offset those risks and minimise disruption.



# f162 million The amount set aside to fund innovation in clean growth in the Government's 2017 Clean Growth Strategy.

#### **Grow through diversification**

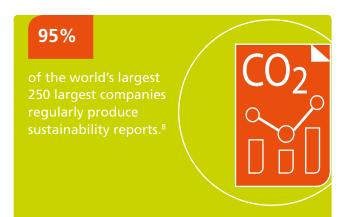
The new business models, processes and services that will be developed to enable a product to have an extended and multi-cycle lifespan offer new opportunities for innovative, collaborative businesses to diversify and drive additional value.

#### **Benefit from regulations and incentives**

As the UK government continues its drive to achieve the national aim of reducing CO2 emissions by 80% of 1990 levels before 2050 (2008 Climate Change Act), it continues to introduce a number of policies, schemes and regulations your business can benefit from by doing its part. From incentives to generate your own renewable energy, to participating in energy demand-management schemes, or even winning funding to innovate new solutions to help curb greenhouse gases.

#### **Gain competitive advantage**

With consumers becoming increasingly aware of the drawbacks of waste culture and built-in obsolescence, they're seeking out longer-lasting products that are environmentally sound. Equally, investors and business customers are increasingly looking to buy into businesses that can prove they are able to help them meet their own ambitious sustainability targets.



#### Real change, real returns.

As the UK economy has already gone 20% circular, businesses on the front foot are already beginning to see real returns.<sup>6</sup>

They're making a series of changes to how much productivity they can drive through efficient use of resources, changing to new business models that gain maximum value from these resources and their assets, and changing the way they work to build new capabilities.

The question then becomes not so much theoretical, "Should I make change?", but something much more actionable.

"How can I make a change?"

For every business, energy powers every activity, every cycle and every interaction that creates value. So for any business, it's the ideal first step in the journey towards a circular business model.

#### **Powering businesses**

Take product manufacture. Energy is needed to deliver materials, process them and convert them into components. It's needed to assemble those components into products, finish them and pack them. It's needed to transport those products to the sales point. And then, on the other side of product use, it's needed to recycle them for a second life. Through every cycle, every product has more energy invested in it, and if that energy's source is a fossil fuel, it has more carbon invested in it too.

So, every small, achievable change you make to how you purchase, use or generate energy will flow through your entire value chain, creating multiple opportunities to bring greater resource, cost and carbon efficiency to every stage of the product's multiple lifecycles.

Those companies taking a circular approach to their energy are driving down their operating costs, increasing their supply resilience, developing new revenue streams, creating more sustainable production methods and cutting harmful emissions.

POWERING YOUR CIRCULAR BUSINESS



#### **Powering tomorrow**

But they're not just choosing to improve their own businesses today, they're choosing to help create the energy system of tomorrow – one that's decarbonised, decentralised and digitised – for a cleaner, more efficient, more agile system that's capable of powering a new circular economy.

After all, an energy system that's better suited to powering Britain, is better for every business too.

And going circular is more achievable to all businesses than most managers realise, thanks to advances in energy technology, service and commercial models available right now.

#### THE 3D'S OF OUR FUTURE ENERGY NETWORK

THE TRANSITION TO THE FUTURE-READY NETWORK THAT WILL POWER BRITAIN'S CIRCULAR FUTURE IS ALEADY UNDERWAY. IT HAS THREE DEFINING FEATURES THAT WILL BE BUILT ON, STEP BY STEP, AS EACH BUSINESS MAKES SMARTER CHOICES IN HOW THEY MANAGE THEIR ENERGY.

#### Decarbonised

The future-ready energy network is increasingly decarbonised, cutting businesses' carbon emissions and decreasing our reliance on fossil fuels. There are government schemes to incentivise businesses to switch to decarbonised energy, changing energy buying decisions now to help meet our longer-term climate change goals.



The future-ready network is facilitating a mix of larger central generators, smaller distributed generators, and self-generating businesses and homes. This empowers businesses to not only generate the energy they need, helping to reduce the waste of energy incurred through losses in transmission from generation to use, but also sell excess energy back to the grid.



## 3 Digitised

The future-ready network is being connected and enabled by cutting-edge technologies, like advanced data management and the Internet of Things (IoT), to facilitate smarter management of energy. On a business level, it means management can access more insight into how, when and how much energy is being used across their operations and then make more intelligent decisioning about the energy they buy and the energy solutions they implement to cut their bills, reduce carbon, even generate energy for added income. At a national level, it makes it easier for the Grid to balance supply and demand across the network, driving greater overall energy efficiency and reducing the need to top up our supply from fossil fuel sources.



EDF Energy believes in a decarbonised future. And, as the UK's largest generator of low-carbon energy and leading partner to business, it's our mission to help our customers unlock the business opportunities of the democratic and tech-enabled energy system that is taking shape in Britain today.

Rich Hughes
Director of Sales and Marketing, EDF Energy

# GOING CIRCULAR STARTS WITH ENERGY SOLUTIONS THAT ARE READY, NO RISK AND NO DISRUPTION

Like every business leader, you have businessas-usual to get on with, operational problems to resolve and quarterly targets to reach. So while you and your leadership team may commit strategically to adopting a circular business model, and readying your business to take its share of the circular economy, you'll also know only too well the challenges of managing growth and change at the same time.

That's why it's best to think of 'going circular' less like an action, more like a journey. And that's also why it's best to start that journey with the resource that powers your whole business: energy.

By changing the way you power your business, you can get greater efficiency with reduced operating costs. You can get value-optimised assets with reduced carbon emissions. You can earn more profit with additional revenue streams. You can make your business leaner, cleaner and a lot more attractive to your investors, customers, and staff. And you can start your changes with no risk and no disruption.

#### **Energy is primed for change**

The energy industry shares the same ambitions and challenges as many of our customers. So, it would come as no surprise that EDF Energy, as one of the most trusted energy partners to British business, has been deeply invested in creating solutions to make better use of energy.

In the spirit of partnership, we've embraced new energy technologies, innovated with the latest energy solutions, forged joint ventures and acquired companies, like Imtech, so we can combine strengths and offer our customers truly end-to-end energy solutions capabilities.

#### **Action-ready energy solutions**

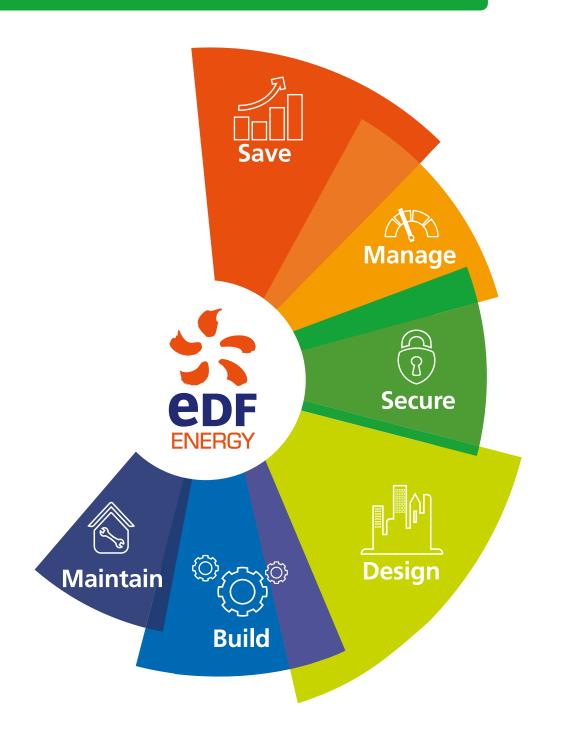
So, right now EDF Energy has a suite of energy solutions and the expertise to help you unlock greater value from your operations. From trimming down your costs by re-purposing waste heat; to gaining zero emissions status with low carbon supply; or creating a new revenue stream through Demand Side Response. There's a change every business can make. And an energy solution that can help you make it.

#### So, what change will you make today?

Re-shaping a circular business is not done in one overnight transformation. By partnering with British businesses of different sizes, and through driving our own transition at EDF Energy, we've learned an important thing about effective transformation: it's best done ONE change at a time.

One change makes it easier to business case.
One change makes it easier to get stakeholders to listen. One change offers more certainty in decisioning. One change means less hassle and more speed in implementation. And one change makes the next change that much simpler on your journey to powering a circular value chain.

Of course, no two businesses are the same. And no two businesses are at the same point in their journey. That's why EDF Energy partners with customers to identify the right 'one change' to make. To help explore the options within a business context, our consultants use a proprietary decisioning tool called the 'Energy Solutions Wheel'.



# POWER YOUR BUSINESS BY DOING ENERGY DIFFERENTLY

To help you think about energy differently, not just as a commodity but a value-generating resource, EDF Energy has developed this proprietary decisioning tool, the 'Energy Solutions Wheel'.

It simplifies the energy solutions available to six things we can do to together take a more sustainable and profitable approach to your business' energy: save, manage, secure, design, build and maintain.

What's reassuring is that EDF Energy helps you choose which energy change to do next. Then they do the full implementatation for you.

EDF Energy has the end-to-end energy solutions, capabilities and expertise to partner your business on your end-to-end energy journey.

One change at a time.

#### MAKE ONE CHANGE TODAY

As you begin to consider the next change your business can make in how it powers its operations, it's helpful to consider the benefits you can deliver in three key areas. You can boost your business' energy efficiency to trim down costs. You can lower your business' carbon emissions to hit sustainability goals. And you can flex your assets to turn energy to an additional revenue stream.

So, what one change will your

business make today to get the circular edge?

#### Switch to low carbon supply

One change: Switch your supply contract to one that's certified or guaranteed with low carbon sources like renewable and nuclear power. It means that your energy consumption is matched unit for unit by low-carbon energy that's being sold to the grid – and you can report your zero emissions to establish your sustainability credentials.



Lower your carbon

#### **High Performance energy insight**

One change: Install a PowerNow live energy consumption tracker to take your energy insights to the next level with a digital dashboard connected to smart monitors installed throughout your operations to track your business' energy saving opportunities and performance.







#### Turn waste into bio-energy

One change: Recover the energy locked inside calorie-rich waste materials and by-products like wood, plant-based fibres, agricultural slurry, or food and drink ingredients by using anaerobic digestion to convert them into biofuels for your own Combined Heat and Power (CHP) generation to cut your bills and even sell excess energy.







#### Hassle free energy insight

One change: Get a PowerReport remote audit for a quick hassle-free energy insight report, based on your existing meter data, and get a breakdown of your consumption across different sites, processes and assets to identify where you can save and how much.













#### Generate your own renewable energy

One change: Generate your own energy onsite from sources such as solar, wind or biofuel. Cut your energy bills, contribute to your carbon-reduction targets, and generate an additional revenue stream.







#### **KEY**



**SAVE COSTS** 



**CUT CARBON** 



**BOOST REVENUE** 

The bigger the icon, the greater the benefit

#### Earn for being responsive

One change: Participate in Demand Side Response (DSR) schemes by reducing your consumption when called on by the Grid. It's automated, disruption-free, and you can manage it via our flexible platform,

**PowerShift**, to get your business a double pay back: new revenue for participating plus cost savings from reduced consumption.







DSR

"Right now our customers are creating new business models, deploying new technologies, and gaining new capabilities to take their share of the growing opportunity in the circular economy. And they're starting with the energy they use, how they use it

Vincent du Rul, EDF Energy Solutions Sales Director

and the value they drive from it."



#### Use heat twice

One change: Recover the heat energy that's currently going to waste in your business, like low intensity heat from lighting or heat left over after manufacturing. Then repurpose it to heat your own site, convert it to electricity, or sell it to your local community via district heating.









### Flex to earn







#### MAKE ONE CHANGE TOMORROW

Opportunities to change the way you power your business are constantly emerging. As innovation in energy accelerates, new technologies, systems and models are being developed, tested and made available all the time. Meanwhile, EDF Energy's R&D department and Blue Lab are working to find ingenious ways to unlock their - sometimes hidden - value for businesses like yours.

So, what changes could you plan in for your business' future?

#### An energy sharing economy enabled by blockchain

One change: EDF Energy are working towards empowering you through blockchain to sell, buy, or share energy directly with other businesses and households. This will mean there's no need for an intermediary, and yet you will still be able to transact fairly, safely and securely.









#### Accelerate the fossil fuel phase-out

One change: EDF Energy are exploring and testing two new ways that Electric Vehicles can deliver more value to your business:
1) by selling their unneeded energy back to grid with Vehicle-to-Grid technology;
2) by repurposing their batteries at the end of their auto-life for commercial energy storage.











# EDF Energy's Research & Development mission

Accelerating the transition to a sustainable, low carbon society through the development and testing of new technologies and business models.







#### Supercharge your value-generating powers

One change: With EDF Energy you could be able to install an on-site battery behind your meter so you can store cheaper energy, or excess renewable energy, and use it later when it would cost more to buy - or sell it if it's not needed. This will boost your ability to purchase and sell energy at the best possible price whilst maximising your carbon reductions.







#### FOR SOME, THE JOURNEY OF CHANGE IS PAYING OFF ALREADY

Building innovations into our energy solutions offering while they're hot, EDF Energy's ongoing aim is to deliver cutting-edge energy solutions, underpinned by an expertise in commercial, operational and market expertise, to give your business the circular edge - one change at a time.

But more importantly, EDF Energy is committed to avoiding built-in obsolescence by ensuring that every change we help your business make, lays down the foundations for the next change, and the next ... with a view to achieving your business' long-term goals.

Here are some examples of how our customers are already partnering with EDF Energy to identify the one change they can make in powering their business towards a circular model.

#### Turning wasted heat into safer parking

Harrogate Hospital partnered with EDF Energy on an overall restructure of its mechanical and electrical operations with the aim of saving a total of £15m over 25 years. Part of the programme of change included recovering low-grade heat from their main system and repurposing it to de-ice their car park. This innovation alone delivers a saving of £25,000 per annum, which would normally have been spent on gritting.

#### Using solar energy before sunrise

Western International Market worked with EDF Energy to identify that their peak energy demand was in pre-dawn hours, when 75 independent vendors move and prepare their goods using energy-hungry electric forklifts.

To take full advantage of the solar energy potential in their 11,000 square meters of roof (the largest solar array in London), EDF Energy installed two battery units to charge up during the day - ready for the early birds the next morning.



#### EDF Energy's R&D Challenge

Just how renewable could EDF Energy make a listed 50-bed residential training facility?

To create tomorrow's innovative, future-ready energy solutions we regularly challenge our

Research & Development department to tackle new and tricky approaches - in our own buildings. So our customers get all the clever thinking and none of the hassle.

**This challenge:** To make an historic building in a tight site as renewable as possible by generating as much of its own electricity, hot water, heating and cooling as possible.

**The solution:** The team spotted that the big win was in heating and so designed a Renewable Energy Centre around innovative, deep borehole, ground source heat pumps (GSHP) supported by solar heat collection matting, borehole recharging, heat recovery and rooftop solar panels.

**The innovations:** Delivering ultra-low carbon solutions on a tricky site resulted in ground-breaking techniques:

- Using oil and gas exploration techniques to create fewer longer diagonal boreholes to outperform traditional shorter, vertical boreholes.
- Created a patented method for recovering the waste heat from IT server rooms and chillers, combining it with solar heat collection matting to re-charge the boreholes.
- Saved cost of cooling IT server rooms by re-purposing the chilled water produced from heat pump evaporators.

#### The results:

**100%** heating and cooling generated from onsite renewables.

**50%** of the total energy from on-site renewables. **60%** reduction carbon emissions.

#### IT'S TIME TO GO CIRCULAR

All it takes to become part of the circular economy is one change.

One change to one part of your value chain.

One change to take a step away from finite fuels.

One change to turn waste into a resource.

One change to cut costs and carbon.

One change to earn revenue from flexing how you use energy.

One change to generate your business' own energy.

One change to create a new revenue stream from your excess energy.

One change to get the circular edge in your market.

And each change is one change towards taking your share of a trillion dollar opportunity.

All it takes to make that one change is one changemaker in your business.

# Are you ready?

# Make your change

If you'd like to talk about what change is right for your business, get in touch with me at

Vincent.DeRul2@edfenergy.com

To find out more about our energy solutions, visit edfenergy.com/energysolutions



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