POWERING PROGRESS

Exploring the socio-economic impacts of Keadby 2 Power Station

October 2020

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About this report

In addition to its role in generating flexible and efficient power, the Keadby 2 project is delivering significant socio-economic benefits in the local area and across the UK.

From construction jobs, to support for the local supply chain, to charity donations, SSE Thermal and Siemens Energy are working with local people and organisations to ensure an enduring positive legacy from the project. This report looks at some of the socio-economic benefits that have been generated by the investment in Keadby 2, with economic contribution analysis undertaken by BiGGAR Economics.

About SSE Thermal

SSE Thermal, part of the FTSE-listed SSE plc, is a leading developer, owner and operator of electricity generation and energy storage assets. Its portfolio includes five of the most flexible and efficient gas-fired power stations across the UK and Ireland.

The business has a strategy to create value for shareholders and society by developing, owning and operating low-carbon energy infrastructure in a sustainable way. Its vision is to become the leading provider of flexible thermal energy in a net-zero world. As part of this ambition, it has a core focus on further decarbonising its energy generation through emerging carbon capture and hydrogen solutions.

SSE plc employs 12,000 people directly across the UK and Ireland and is proud to be a real Living Wage and Fair Tax Mark accredited company.

About Siemens Energy

Siemens Energy is one of the world's leading energy technology companies. The company works with its customers and partners on energy systems for the future, thus supporting the transition to a more sustainable world. With its portfolio of products, solutions and services, Siemens Energy covers almost the entire energy value chain – from power generation and transmission to storage.

The portfolio includes conventional and renewable energy technology, such as gas and steam turbines, generators and transformers, together with a portfolio to address the energy transition such as eletrolysers, hydrogen-capable turbines and 'Power-to-X' technologies. More than 50% of the portfolio has already been decarbonised. A majority stake in the listed company Siemens Gamesa Renewable Energy (SGRE) makes Siemens Energy a global market leader for renewable energies. An estimated one-sixth of the electricity generated worldwide is based on technologies from Siemens Energy. Siemens Energy employs 91,000 people worldwide in more than 90 countries and generated revenue of around €29 billion in fiscal year 2019. Siemens Energy is a registered trademark licensed by Siemens AG.

FOREWORD

At SSE Thermal and Siemens Energy, we share a commitment to supporting the UK's transition to a more sustainable energy system in a way that delivers a positive lasting legacy for the communities in which we live and work.

The Keadby 2 project brings together SSE Thermal's ambition to provide flexible and reliable energy in a net-zero world with Siemens Energy's ground-breaking gas turbine technology. As project partners, we set out to create the cleanest and most efficient power station on the electricity grid.

With unparalleled efficiency, Keadby 2 will help the UK to move away from older, more carbon intensive generation in the decades ahead. With the ability to reach full power in just 30 minutes, it will also provide vital flexibility to complement the increasing amount of renewable energy on the system and maintain security of supply.

However, as responsible developers, we are acutely aware that the impact of a project of this scale goes far beyond its role in power generation. From the outset, we wanted to deliver a project that was best-in-class for local engagement and community impact. We are committed to ensuring our investment in Keadby 2 is felt within our neighboring communities, from creating high-quality jobs, supporting the regional supply chain, to providing donations to local charities.

We are proud of the efforts of our team, particularly through the coronavirus pandemic, to continue to progress the project safely and efficiently, while minimising disruption to the local area. We take our responsibilities seriously and we want to continue to build on our strong relationship with the local community to ensure the project delivers benefits that endure long into the future.

Through cutting edge infrastructure projects like Keadby 2, we believe North Lincolnshire, and the wider Humber region, can lead the way in the transition to a cleaner energy future and help rejuvenate our economy in the process.

We hope you find this report valuable in demonstrating the socio-economic impacts of the Keadby 2 project. We look forward to completing the construction and continuing to deliver significant socio-economic benefits through the delivery of this world class energy generation asset.

Stephen Wheeler
Managing Director, SSE Thermal

Steve Scrimshaw
Vice President Siemens Energy UK&I

TRANSITION TO NET ZERO: **THE ROLE OF GAS**

The role of gas-fired generation will evolve as the energy system decarbonises, but gas will still play a crucial role. As the volume of renewable generation on the system increases, other forms of generation will be required to respond to market changes and ensure security of supply.

Keadby 2 brings first-of-a-kind, high-efficiency gas turbine technology to the UK

Providing flexible and efficient power

Analysis from National Grid and the Committee on Climate Change shows a clear role for carbon-abated gas in all scenarios they describe.[1] Fundamentally, this role is to support the mass expansion of renewable energy in the UK by providing:

- a flexible and efficient energy source when renewable energy output is low;
- system stability services to support grid with high penetration of renewables; and,
- improved system diversity and security of supply.

As we progress through the 2030s and 2040s, gas-fired generation will become a low carbon electricity source in its own right whilst providing a crucial role by supporting an electricity system underpinned with very large volumes of renewable electricity, predominately from offshore wind.

This starts with highly efficient gas-fired generation, like Keadby 2, but there's an imperative for the next projects to move to decarbonised technologies like post-combustion carbon capture and storage or using hydrogen as a fuel. For this to happen, routes to market need to become available and government commitment to develop business models for carbon capture and storage and hydrogen are welcome developments.

What is carbon capture and storage?

Carbon capture and storage (CCS) is a technology that can capture at least 90% of the carbon dioxide emissions produced from the use of fossil fuels in electricity generation and industrial processes, preventing the carbon dioxide from entering the atmosphere.

The CCS chain consists of three parts; capturing the carbon dioxide, transporting the carbon dioxide, and securely storing the carbon dioxide emissions underground, in depleted oil and gas fields or deep saline aquifer formations.

What is hydrogen-fired generation?

Hydrogen can replace natural gas as the fuel for flexible thermal power stations. As an energy vector that does not contain carbon, there are no carbon dioxide emissions at point of use. Instead, when burnt with oxygen, the by-product is water.

Both 'blue' and 'green' hydrogen can be used to generate low-carbon electricity. Blue hydrogen is produced from natural gas with the resultant carbon emissions captured and stored at this point. Green hydrogen is created through the electrolysis of water. This process uses renewable electricity and is therefore carbon-free.

1. National Grid Future Energy Scenarios 2020, Committee on Climate Change's Net Zero Technical Report, SSE Transition to Net Zero: the role of gas.

2. Keadby 2 will have a Transmission Entry Capacity of 893MW – the maximum amount of power it will be able to put on the system at any one time. The turbine, manufactured by Siemens Energy Ltd., is guaranteed to provide a minimum of 830MW power.

INTRODUCING **KEADBY 2**

The UK's most-efficient gas-fired power station

Keadby 2 is a new 893MW[2] gas-fired power station in North Lincolnshire owned by SSE Thermal and being constructed by Siemens Energy, who will also provide long-term maintenance for the facility once operational.

The project is located close to the village of Keadby near Scunthorpe. Construction of the project began in 2018 and is expected to be completed in 2022. The site is located adjacent to the existing Keadby 1 Power Station, which entered full commercial operation in 1996.

Keadby 2 brings first-of-a-kind, high-efficiency gas turbine technology to the UK, and is expected to become the cleanest and most-efficient gas-fired power station in Europe. The power of the new Siemens Energy HL-class turbine equals that of 1,400 Porsche 911 Turbos. Just 21 of the machines would roughly match the power of a space shuttle at take-off - true rocket science!

Keadby 2 will also be capable of being upgraded to further decarbonise its generation through carbon capture or hydrogen technology, as routes to market develop.

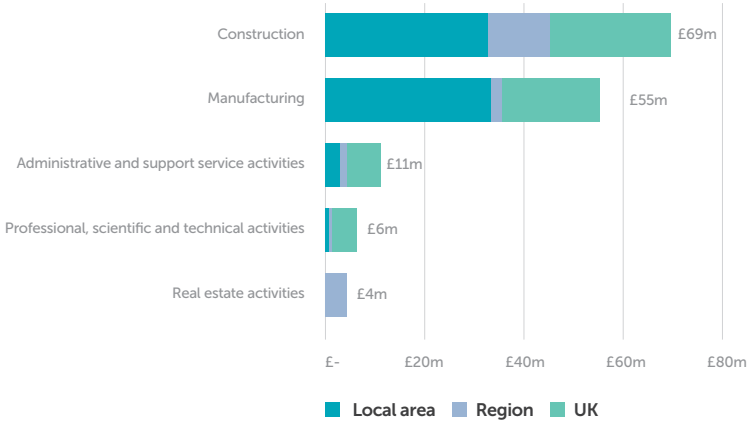
INVESTING LOCALLY **AND ACROSS THE UK**

Keadby 2 is one of the largest infrastructure projects to be built in the North Lincolnshire region. The investment by SSE Thermal associated with the project, from development through construction and to the end of its operational life, is expected to total £1.2bn.

Analysis undertaken by BiGGAR Economics[3] showed that around 77% of this £1.2bn is estimated to be spent in the UK, 45% will be spent in the region (Yorkshire and the Humber and the East Midlands) and 33% will be spent in the local area (Doncaster, East Riding of Yorkshire, Kingston upon Hull, Lincolnshire, North East Lincolnshire, North Lincolnshire and Nottinghamshire).

Just under £330m is being invested by SSE Thermal[4] to develop and construct Keadby 2, the majority of which is spent with Siemens Energy, the project's principal contractor. Data provided by the two companies showed that almost half (£158m) of this investment has been, or is expected to be, secured in the UK. Just under 30% of the construction cost is expected to be secured in the region, with the majority of this spent in the local area.

The top five industries invested in as a result of SSE Thermal and Siemens Energy's UK investment during the development and construction of Keadby 2 are shown in the graph below.



Source: BiGGAR Economics analysis

Whilst a significant amount of money is being spent on Keadby 2's construction, the majority of total project spend for Keadby 2 will happen during its operational life. It is estimated that just under £920m will be spent on the operation of Keadby 2 up to the end of financial year 2046. with an estimated 87% of this expenditure spent in the UK, 51% spent within the region, and 37% spent within the local area.

3. The full report is available to download at sse.com/sustainability/reporting.

4. This excludes risk/contingency. Including this budgeted expenditure would take the total investment in development and construction to £344m. £305m was spent by the end of August 2020.

CONTRIBUTING TO **LOCAL, REGIONAL AND NATIONAL ECONOMIES**

Through its development, construction and operation, Keadby 2 has generated and will continue to generate substantial local, regional and national economic benefits. These benefits are driven in part by efforts made by SSE Thermal and Siemens Energy to support a domestic supply chain over the project's lifetime.

Undertaking socio-economic analysis

To understand the scale of this economic contribution, SSE Thermal and Siemens Energy commissioned BiGGAR Economics to calculate the economic impact of the project. The full technical report is available to download on **ssethermal.com/keadby2** and **www.siemens-energy.com/keadby2**

Investment in Keadby 2 drives economic activity through the value it adds to the economy (referred to as Gross Value Added or GVA) and the years of employment it supports. To fully capture the impacts of this spending, the economic contribution results detailed below include activity further down the supply chain (indirect impacts) and activity that results from the spending of salaries (induced impacts), as well as direct impacts.

Local benefits

BiGGAR Economics analysed the contribution made by Keadby 2 in the local area (defined as Doncaster, East Riding of Yorkshire, Kingston upon Hull, Lincolnshire, North East Lincolnshire, North Lincolnshire and Nottinghamshire).

Over £1bn

Keadby 2's expected contribution to the UK economy over its lifetime.

During the development and construction of Keadby 2, the analysis showed that £51m is expected to be contributed to the local economy, with 790 years of employment supported. Over the operational phase, it was estimated that £13m will be added to the local economy each year, with a total of 220 jobs supported on an annual basis. This means that over Keadby 2's lifetime, £361m is expected to be added to the local economy.

These results include the local people employed on site, with jobs ranging from providing technical expertise and labour to delivering catering facilities, as well as the wider impact of the spending of employee wages in local restaurants, hotels, petrol stations and shops.

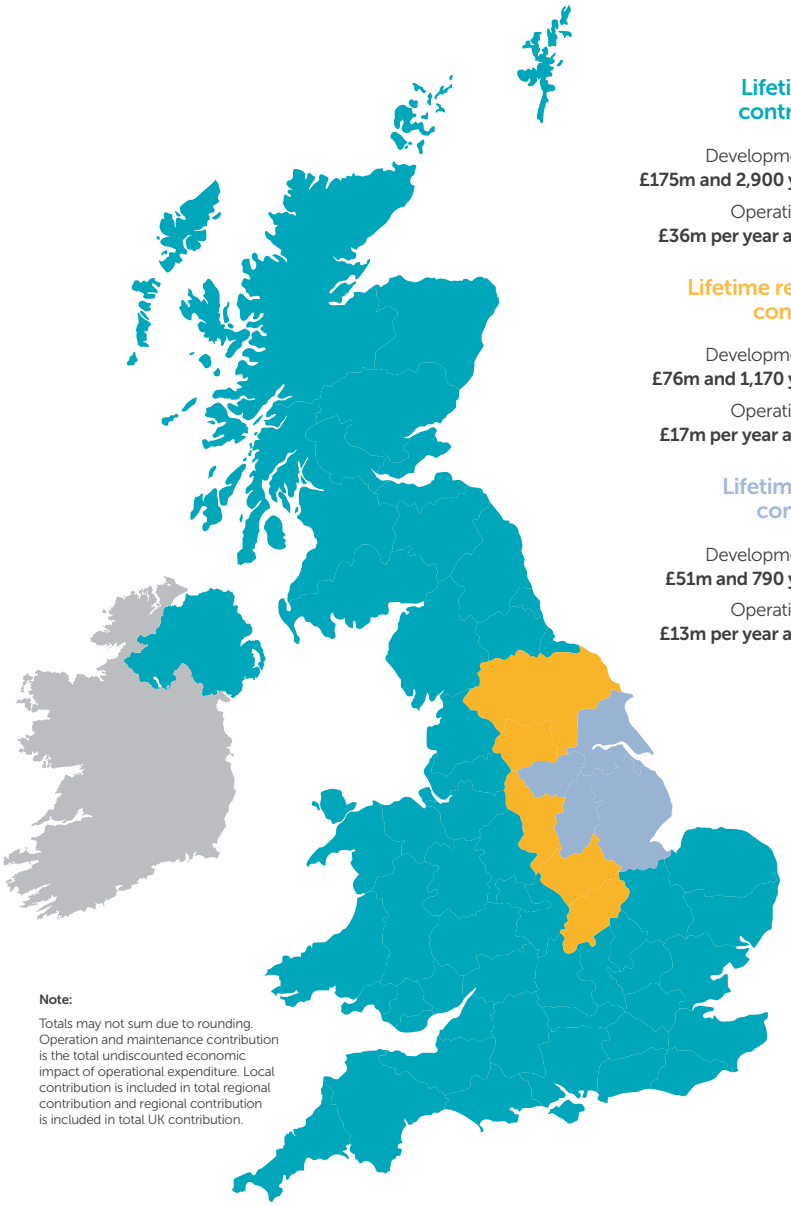
Regional benefits

During development and construction, BiGGAR Economics estimated that £76m would be contributed to the regional economy, defined as Yorkshire and the Humber and the East Midlands, with 1,170 years of employment supported. Over the operational phase, it was estimated that £17m will be added to the regional economy each year, with a total of 290 jobs supported on an annual basis. This means that over Keadby 2's lifetime, £494m is expected to be added to the regional economy.

UK benefits

At a UK level, the analysis by BiGGAR Economics showed that £175m was contributed to the UK economy, with 2,900 years of employment supported as a result of investment in the project during development and construction. Over the operational phase, it was estimated that £36m will be added to the UK economy each year, with a total of 550 jobs supported on an annual basis. This means that over Keadby 2's lifetime, £1,035m is expected to be added to the UK economy.

KEADBY 2 POWER STATION'S **ECONOMIC CONTRIBUTION**



Lifetime UK economic contribution: £1,035m

Development and construction:
£175m and 2,900 years of employment

Operation and maintenance:
£36m per year and 550 jobs annually

Lifetime regional economic contribution: £494m

Development and construction:
£76m and 1,170 years of employment

Operation and maintenance:
£17m per year and 290 jobs annually

Lifetime local economic contribution: £361m

Development and construction:
£51m and 790 years of employment

Operation and maintenance:
£13m per year and 220 jobs annually

Note:

Totals may not sum due to rounding. Operation and maintenance contribution is the total undiscounted economic impact of operational expenditure. Local contribution is included in total regional contribution and regional contribution is included in total UK contribution.

SUPPORTING LOCAL **SUPPLY CHAINS**

Both SSE Thermal and Siemens Energy are committed to maximising the use of local companies wherever possible. The case studies on the following pages showcase some examples of local businesses which have benefited from the project.

The Keadby 2 project team hosted a local 'Meet the Buyer' event in December 2018, prior to the commencement of the main construction works. Over 75 local businesses attended the event, held at the DoubleTree Forest Pines Hotel near Scunthorpe, which gave each company the opportunity to pitch their goods and services to a member of the Siemens Energy procurement team.

CASE STUDY: **COMPLETE WEED CONTROL**

As a locally based company, Complete Weed Control provides a range of ground maintenance services to the South and East Yorkshire and North and South Lincolnshire areas.

Following its attendance at the project's Meet the Buyer event, the company secured an ongoing contract with the Keadby 2 project providing winter gritting services along with weed control and vegetation clearance as required. Peter Lindley, Group Manager for Complete Weed Control, said: "Having worked with SSE Thermal for a number of years, providing services to the operational Keadby 1 station, securing business on the Keadby 2 construction project has been a real positive for us, giving us the opportunity to provide local operatives with ongoing employment."

CASE STUDY: **CGB HUMBERTHERM**

Keadby 2 has been able to secure specialist expertise from within the local area during the construction of the power plant.

CGB Humbertherm is a specialist thermal insulation company that was formed in 1974 and is based in Immingham, 20 miles away from Keadby 2. Its main areas of expertise are the design, supply and installation of all types of insulation for use on power generation plants.

The number of people that CGB Humbertherm employs will vary depending on the level of work it has, but typically it will directly employ between 60 and 70 people who live within a 35km radius. This will include thermal insulation operatives, sheet metal workers, labourers and apprentices.

CGB Humbertherm has worked for years on the neighbouring Keadby 1 power plant and as a result has been able to demonstrate to SSE Thermal the expertise that is available locally. As a result, CGB Humbertherm secured work worth approximately £2m for the installation of thermal insulation at the new Keadby 2 power plant. This is a significant contract for the local company and is equivalent to a third of its annual turnover.

The long-term relationship with Keadby 1 and the significant contract awarded by Keadby 2 provides the stability that CGB Humbertherm needs to develop its workforce. The installation of thermal insulation is a skilled trade and the operatives will do a four-year apprenticeship. The company employs young people from the area and offers them the ability to train, earn and progress.

The retention rate for their apprentices is higher than most other trades and the majority of their current employees originally started off in the company as apprentices. CGB Humbertherm currently employs three apprentices.

The relationship and experience that CGB Humbertherm has developed from its work on Keadby 2 has also enabled it to win work with Siemens Energy further afield. This has included outage maintenance contracts for existing power plants in the UK and Ireland. Prior to this, Siemens Energy had typically imported expertise in power station thermal insulation.

CASE STUDY: **CLS ENGINEERING**

Local contractors have built on their relationship with SSE Thermal and Siemens Energy at Keadby 2 to secure projects further afield.

CLS Engineering is a civil contractor based in Brigg, Lincolnshire that specialises in demolition and construction work. It is a family company that was established in 1972 and has completed over 1,300 civil engineering and demolition projects.

CLS Engineering was awarded two contracts for the Keadby 2 power plant, with a combined value of £5.7m. These were important contracts for the company and was equivalent to half of its annual turnover. The scope of works required for these projects was a strong match for CLS Engineering's core activities and included demolition activity and site clearance, where a coal-fired power plant had previously existed, as well as the relocation of the contractor's village and fencing.

CLS Engineering was awarded two contracts for the Keadby 2 power plant, with a combined value of £5.7m.

These contracts directly supported the employment of over 75 people, including 60 employees of CLS Engineering and 15 subcontractors who worked on the site. This was a local workforce, and 90% live within a 50km radius of the site at Keadby 2. The jobs that were supported included:

- site manager and foreman;
- plant operatives;
- skilled labourers; and
- operatives

This was the first direct contract CLS Engineering had with Siemens Energy. CLS Engineering impressed Siemens Energy with their approach to the work and the skillset of their employees. CLS Engineering have used the skills and experience from the Keadby 2 work to secure further contracts with Siemens Energy, including enabling works in South Wales and groundworks for a substation extension to facilitate the expansion to the combined installed capacity of Keadby 1 and Keadby 2.

LOOKING AFTER **PEOPLE ON SITE**

Construction of Keadby 2 commenced in August 2018 and since then the team have inducted over 3,400 people on to the project site.

SSE Thermal and Siemens Energy share a commitment to prioritising the wellbeing of everyone on the site, which has enabled the team to build a first-class health and safety culture.

Everyone on site is empowered with the message: 'If it's not safe, we don't do it'.

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The Magnificent 7

Safety is a topic that involves everyone on site and creating an inclusive culture is something that has been important from day one of the project. Monthly site audit scores are awarded to teams based on 7 Key Safety Principles, with the team scoring highest each taking home a prize.

Health and Safety Steering Group

Senior leaders from SSE Thermal and Siemens Energy established a dedicated Health and Safety Steering Group at the outset of the Keadby 2 project.

The group, which is attended by senior management from both companies, meets regularly to discuss performance at the site and look at new ways of working to foster a positive culture.

Best-in-class facilities

Up to 800 people are expected on site per day during peak construction so providing industry-leading facilities has been key to the project's success.

Each individual has access to the project's dedicated team of full-time site medics, provided by MediWright. This service not only covers the essentials, such as first aid and emergency rescue, but also a host of additional facilities.

Over 3,400 people inducted at site

1,204,488 safe hours worked

Over 99% safe days

Well Man Clinics were introduced early in the project, providing a free-to-access service for general medical checks such as testing for cholesterol, blood pressure and BMI, as well as as a listening ear to anyone that may need extra support or signposting.

Monthly wellbeing initiatives

Alongside the essential services and Well Man Clinics, MediWright promotes a topical health and wellbeing initiative each month to raise awareness and engage everyone on the site about a key issue e.g. prostate cancer awareness, drink driving and suicide prevention.

Responding to COVID-19

There is no doubt that the biggest challenge of 2020 came in the form of the coronavirus pandemic.

At Keadby 2, the number one priority from the beginning of the crisis was the wellbeing of everyone working on site and their loved ones.

Immediate action was taken to make changes throughout the site's construction, welfare and office areas in line with the evolving guidelines issued by the UK Government, HSE and UK Construction Leadership Council.

A number of strict processes were put in place, including social distancing, increased hygiene measures and deep cleaning regimes, as well as reducing numbers at site where possible.

As with any new guidance and changes, the success of the measures could not havebeen achieved without the co-operation of everyone at the site.

Tony Duckitt, a site-based GMB Union Representative, said:

"As a site, our response to the COVID-19 pandemic has been robust and reassuring for the workforce. The HSE and management teams have worked closely with Industrial Relations and Trade Unions to ensure that any necessary additional measures were implemented. The site's first class facilities manager and cleaning team have played a key role in making sure that communal facilities were cleaned and maintained to a high standard. Introducing a shift pattern and staggered start and finish times has meant workers have been able to achieve social distancing while still working to deliver the project."

Living Wage Employer

SSE has been a leading Living Wage accredited employer since 2013. This means that everyone who works directly for SSE or regularly on its behalf, including at Keadby 2, is paid at least the real Living Wage as set by the Living Wage Foundation.

KEADBY 2
IN THE COMMUNITY

Working together to create a positive culture throughout the project has been a key focus for both the SSE Thermal and Siemens Energy teams.

As part of ongoing engagement, members of the team regularly attend careers events at local schools and colleges.

The Keadby 2 charitable donations scheme, introduced in 2018, provides an opportunity for a monthly donation of £1,000 to a local charity. The donation is linked to the site's safety performance and efforts are made to encourage members of the site team to nominate a local charity.

To date over £20,000 has been awarded locally, including to:

- Isle of Axholme Lions
- Lincolnshire Air Ambulance
- Lindsey Lodge Hospice Scunthorpe
- Crowle Primary Academy
- Crowle Regeneration Group
- Disney Ward at Scunthorpe General Hospital
- Keadby with Althorpe Primary School
- Epworth School Playgroup

CASE STUDY:
ENCOURAGING NEXT GENERATION ENGINEERS

Keadby with Althorpe Primary School – Greenpower Project

During 2019, the Keadby 2 team was approached with a request for funding and support by Keadby with Althorpe Primary School, which is local to the site.

The team were delighted to provide £1,000 towards the purchase of a 'KIT' car so that the school could join the Greenpower Project.

Project engineers Christopher Whitely and Tim Simpson also volunteered their time each week to help out with the after-school Greenpower Club.

Mrs Appleyard from Keadby with Althorpe Primary who leads the after school Greenpower Club, said:

"Throughout this build the children are having to work together as a team, sharing out jobs and responsibilities as well as learning from each other. Thanks to Chris and Tim the children who are used to being involved in these types of activities are still learning and developing their own skills, broadening their mechanical knowledge of how to work effectively with tools and put different components together. Both Chris and Tim have developed good working relationships with the children. They allow the children to have a go at something and when the children have difficulties, they encourage them to think about why something went wrong or how they could approach a task differently rather than just showing them how it is done."

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