A417 Missing Link

prolectric™ SMART CLEAN TECHNOLOGY + KIER

Case Study Kier Transportation

Project Savings

833,689	270,574	638,180
Carbon Savings (kg of CO_2e)	Fuel Savings (litres)	Cost Savings (GBP)

By addressing long-standing challenges, this scheme will enhance safety, improve traffic flow, and create a more reliable route for both local and long-distance travel.

PROJECT OVERVIEW

The A417 is a vital transport link connecting Gloucester and Swindon, serving as a key route between the Midlands/North and the South of England. It provides an alternative to the M5/M4 corridor via Bristol, making it essential for regional connectivity and economic activity.

A critical three-mile stretch - known as the "Missing Link" - between the Brockworth Bypass and Cowley Roundabout in Gloucestershire has long been a bottleneck. This single-lane carriageway leads to frequent and unpredictable congestion, causing many motorists to divert onto unsuitable local roads.

As a result, nearby communities face increased traffic, noise, and road safety concerns. Additionally, poor visibility and road design contribute to a high incidence of serious accidents.

To resolve these issues, a comprehensive improvement scheme is underway.

KEY ENHANCEMENTS

- 4 miles of new dual carriageway, seamlessly linking the A417 Brockworth Bypass with the existing dual carriageway south of Cowley.
- A reconfigured route west of the Air Balloon roundabout, following the current A417 corridor, while a new section to the south and east of the roundabout will be built offline, away from the existing road.
- A new junction at Shab Hill, improving access between the A417, the A436 (towards Oxford), and Birdlip.
- A new junction near Cowley, replacing the existing Cowley Roundabout for smoother traffic flow.
- Repurposing the existing A417 between Air Balloon and Cowley Roundabout - some sections will be transformed into dedicated routes for walkers, cyclists, and horse riders, while others will be retained for local access for residents.

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SUSTAINABLE SOLUTIONS FOR THE A417

Kier and Prolectric collaborated to address the environmental and wildlife considerations of the A417 'Missing Link' project, located within the sensitive Cotswolds National Landscape.

Given the site's ecological significance, Kier sought sustainable and cost-effective alternatives to traditional diesel generators and tower lighting. Working with National Highways on this landscape-led design project, Kier ensured that sustainability remained at the core of the development.

To explore the viability of solar-powered solutions, Kier initially trialled Prolectric's solar site lighting across key areas of the site.

The trial proved successful, leading to a large-scale deployment of solar-powered lighting solutions, tailored to different applications:

01. Patented Solar Site Lights with autonomous adaptive lighting were installed on active areas, including roads, roundabouts, and operational zones requiring reliable illumination for tasks.

02. Solar Street Lights on moveable concrete blocks were positioned along walkways within site compounds.

03. Permanent Solar Street Lights were installed in staff car parks, providing long-term, maintenance-free lighting.

EXPANDING USAGE OF SOLAR HYBRID POWER

Following the success of the solar lighting rollout, Kier explored the potential of solar hybrid power to further reduce reliance on diesel generators.

An initial deployment of a ProPower Solar Hybrid Generator in place of a traditional 24/7 diesel unit demonstrated fuel savings of over 75% within a month. This led to a broader shift toward hybrid power across the site:

- An 8-Panel Solar Hybrid Generator replaced a diesel unit previously used for site overnight accommodation (bunker bins). The system reliably powered three accommodation units while eliminating the noise and emissions of a continuously running diesel generator. To ensure uninterrupted operation, Prolectric developed an adaptive mode where the integrated diesel backup would charge the batteries before 5pm if the state of charge was low, ensuring silent operation throughout the night.
- Four additional Solar Hybrid Generators were deployed to replace diesel generators powering security huts around the Missing Link site. These generators efficiently provided lighting, heating, and power for laptops, significantly reducing fuel use by matching power output to the actual load requirements. Previously, large diesel generators ran 24/7 despite low energy demand.
- A ProCharge 3-Phase Solar Battery Energy Storage System (BESS) was introduced to site to support a large cabin setup, leading to substantial fuel and carbon savings. At its peak, this system saved over £200 per day in fuel costs, in addition to cutting operational and maintenance expenses.

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Working with Prolectric has been a game-changer for the A417 'Missing Link' project. From the outset, their team understood our environmental and operational challenges and provided innovative, sustainable solutions that exceeded our expectations. The transition from diesel to solar-powered lighting and hybrid generators was seamless, delivering significant cost savings and reducing our carbon footprint without compromising performance.

The ability to remotely monitor and manage our site lighting has improved efficiency, while the reduction in noise and emissions has created a far better working environment for our operatives. The fuel savings alone - over 75% in some cases - demonstrate the real-world impact of these technologies.

We are delighted that our partnership with Prolectric has already saved us over £250,000 within just a few months, with projected annual savings exceeding £638,000. As a business, we are committed to reducing - and ideally eliminating - diesel from our sites. By adopting Prolectric's Solar Hybrid Generators and Solar Lighting solutions, we are on track to cut over 800,000 kg of CO_2e per year, reinforcing our commitment to sustainability and smarter, cleaner construction practices.

Prolectric's expertise and hands-on support made this transition effortless. Their solutions have not only helped us meet our sustainability goals but have also set a new benchmark for how we power major infrastructure projects.

Gavin Jones
Project Manager
Kier Transportation - Highways Major Projects

RESULTS

By adopting Prolectric's solar lighting and hybrid power solutions, Kier achieved:

- Significant fuel and carbon savings, reducing emissions in a sensitive environmental location.
- Lower operational costs, cutting unnecessary diesel consumption and generator maintenance.
- Improved site conditions, eliminating noise pollution from diesel generators, particularly in accommodation areas.
- Enhanced sustainability, aligning the A417 Missing Link project with Kier's environmental commitments and the project's AONB requirements.

Prolectric's off-grid renewable technology has demonstrated the practicality and financial benefits of transitioning to solar and hybrid power on large-scale infrastructure projects - helping Kier deliver a more sustainable and cost-efficient construction site.

BENEFITS

By integrating Prolectric's solar lighting and hybrid power solutions, Kier achieved a range of efficiencies and operational improvements, including:

Fuel & Carbon Savings

- Over 75% fuel savings from switching to solar hybrid power, significantly reducing operational costs.
- Substantial carbon emission reductions, aligning with sustainability commitments for the AONB project.

Improved Operational Efficiencies

- Reduced generator maintenance due to fewer moving parts and lower operational strain.
- Less frequent refuelling, cutting both costs and logistical demands.
- Portal access for remote monitoring, allowing real-time management of performance and energy usage.

Enhanced Team Wellbeing & Site Conditions

- Eliminated noise pollution in accommodation areas by replacing diesel generators with silent hybrid units.
- Improved air quality on-site, benefiting workers and surrounding communities.
- User confidence built through comprehensive training and live performance data, reinforcing trust in solar technology.

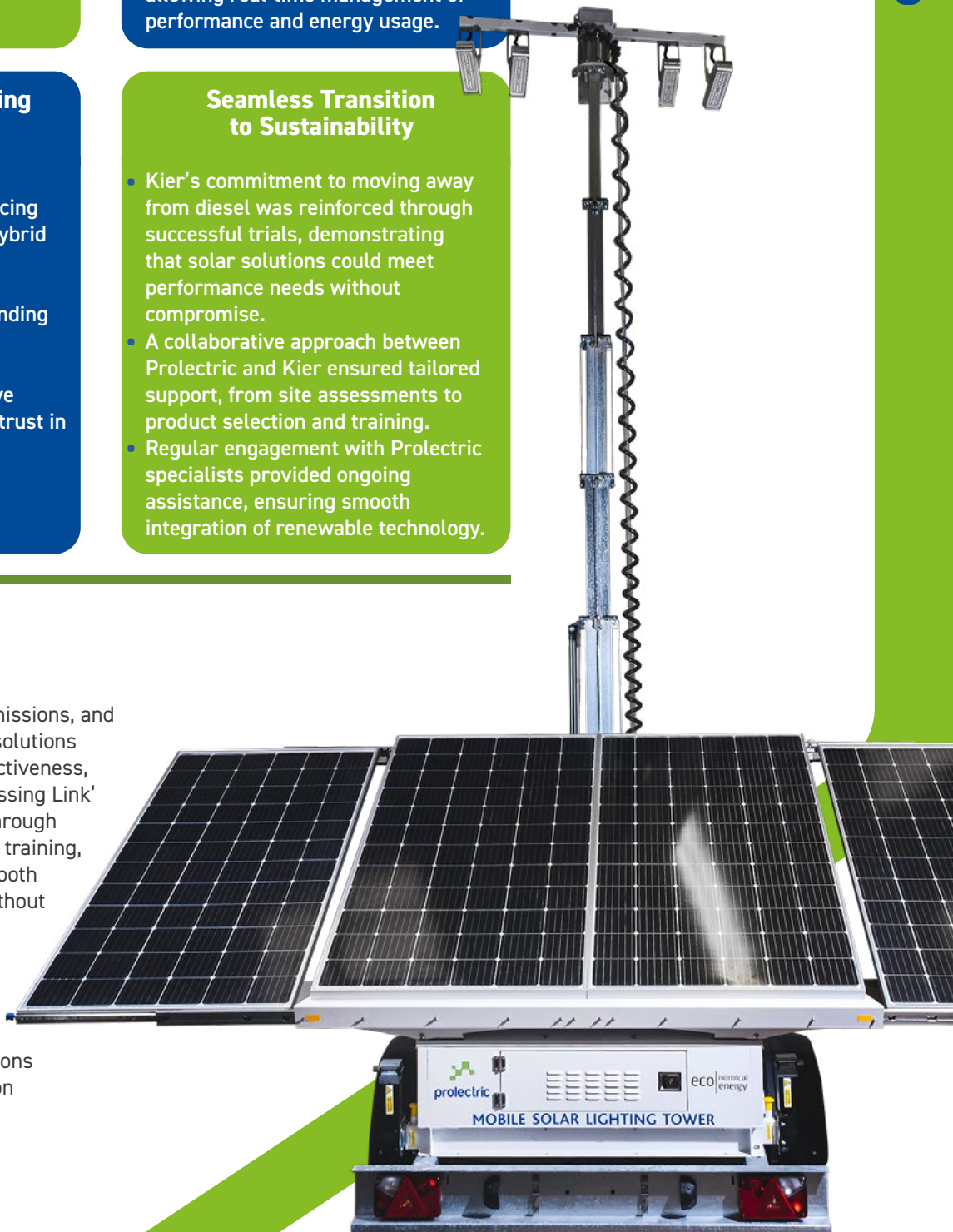
Seamless Transition to Sustainability

- Kier's commitment to moving away from diesel was reinforced through successful trials, demonstrating that solar solutions could meet performance needs without compromise.
- A collaborative approach between Prolectric and Kier ensured tailored support, from site assessments to product selection and training.
- Regular engagement with Prolectric specialists provided ongoing assistance, ensuring smooth integration of renewable technology.

IMPACT

By reducing fuel consumption, emissions, and maintenance needs, Prolectric's solutions enhanced the efficiency, cost-effectiveness, and sustainability of the A417 'Missing Link' scheme. The confidence gained through real-time data tracking, hands-on training, and expert support enabled a smooth transition from diesel to solar, without disrupting site operations.

The success of this collaboration sets a benchmark for future infrastructure projects looking to adopt off-grid renewable solutions for a more sustainable, low-carbon construction approach.



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KIER A417 PROJECT SAVINGS

ProPower Solar Hybrid Generator
2x units: 09/2024 - 04/2025
3x units: 01/2024 - 04/2025

- 52,654 kg of CO2e
- 19,647 litres of fuel
- £36,050 saved in fuel, refuelling and maintenance

ProCharge BESS - 3phase
1x unit: 08/2024 - 04/2025

- 107,021 kg of CO2e
- 11,520 litres of fuel
- £48,640 saved in fuel, refuelling and maintenance

ProLight Solar Tower Light
4x units: 02/2024 - 04/2025
4x units: 11/2024 - 04/2025
15x units: 12/2024 - 04/2025

- 178,752 kg of CO2e
- 66,698 litres of fuel
- £131,642 saved in fuel, refuelling and maintenance

ProTemp Column Lighting
2x units: 07/2024 - 04/2025
15x units: 11/2024 - 04/2025

- 35,736 kg of CO2e
- 13,336 litres of fuel
- £38,480 saved in fuel, refuelling and maintenance

Solar Street Lighting
31x units: 04/2024 - 04/2025

- 150,802 kg of CO2e
- 56,275 mains power
- £162,384 saved in installation and monthly bills

TOTAL PROJECT SAVINGS THUS FAR

524,966 kg of CO2e

167,476 litres of fuel

£417,196 operational cost savings

Savings to be made with all products deployed and in use for a full year

833,689 kg of CO2e

270,574 litres of fuel

£638,180 saved in operational costs

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