



ACT 1.5

POWERING LIVE MUSIC: CONVERGENCE, THE TRANSITION TO GRID POWER and RENEWABLY POWERED BATTERIES.

Introduction and Overview

Module 3 of the ACT 1.5 project focused on power provision. In the first iteration, this related to what might be achieved in terms of experimental decarbonisation of free-standing Massive Attack shows ([postponed](#)), and in the second iteration, taking a more expansive look at the issue of power in the overall decarbonisation picture.

We decided to focus on 3 core areas within this module: **Venue Convergence** – looking at theatre sized venue transitions to renewable power providers, with new solar provision bolted on; a prospective test project looking at the implementation of **Grid Power** to a multi-use festival ground, and the availability of **renewably powered batteries** for portable power use, over the course of the next five-year period. In order to decarbonise at a rate compatible with the critical IPCC 1.5 targets¹, the Tyndall Centre for Climate Change Research [Report \[2021\]](#) presented two key staging posts:

≥ “**Outdoor events** such as festivals should set a deadline to phase out the use of diesel generators by 2025 and seek to at least match the contemporary carbon intensity of the UK electricity grid going forward. “

≥ “The **(indoor) live music sector** can set a more ambitious target for energy emissions in venues, offices and other premises it uses of zero emissions by 2035. An interim goal of a 50% cut from 2015 levels by 2025 would also help track required progress.”

¹ [The Paris Agreement | UNFCCC](#)



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1) Venue Convergence

The ACT 1.5 project – working alongside technicians from renewable energy power company [Ecotricity](#) – designed a convergence plan for indoor music venues which, while including elements relating to staff training and vegan food options, had at its core the transference to a genuinely renewable energy supplier, and the generation of new renewable electricity onsite with technologies such as solar PV. Our decision to work with Ecotricity was cemented by a stipulation in the Tyndall Centre report:

“Switch to energy tariffs that directly support renewable energy projects. This does not affect the physical carbon emissions of operating a building, but it directs revenue to support the overall decarbonisation of the electricity grid. It should be ensured that these meet the highest levels of green accreditation (i.e., purchasing and investing in renewables directly) and decision-makers should consider whether they wish to work with a supplier that only offers green tariffs.”

Most “green” power providers publicise “green provider” status by trading green certificates or REGO vouchers – which are effectively “green” certificates that can be completely detached from the source of the power itself, and even traded – as such they are cited as a key source of “greenwashing”. In terms of renewable energy and reaching zero carbon emissions, building new sources of clean renewable power is the key action that makes a difference & moves the dial. Britain presently has an average² of around 36% - 41% renewable energy in the grid supply mix, and we obviously need to get to 100% as fast as is possible. This can only be achieved by building more solar, wind and sea power resources; trading REGO certificates will not get us there; indeed, the UK government ... has announced an investigation into this system with a view to urgent reform. So, the central question posed in this context is, how much of any live music venue’s energy bill would be spent on building new sources of green energy?

² [Energy Trends and Prices statistical release: 24 February 2022 - GOV.UK \(www.gov.uk\)](#)



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The ACT 1.5/Ecotricity programme would (by design) not only provide 100% renewable energy to the user, but also directly invest profits into building more renewable energy capacity for the UK power grid overall. In addition to taking on a convergence partnership with Ecotricity which would allow any participating venue to directly invest in new renewable energy every time they turn on their lights, or power an amp, the Ecotricity team could then assist in the provision of a bespoke solar infrastructure to venue buildings, ensuring an even cleaner source of power for all activities and productions, or – where feasible - a solar legacy project for the community within which each venue is located – increasing community relations and creating more renewable power for all.

Following a round of positive exchanges with a variety of venues, we explored and are continuing to explore convergence plans with a number of venues, including [The Factory](#) (Manchester), [Usher Hall](#) (Edinburgh), and most notably, [The Troxy](#) (London). With regards to the Troxy, this (most advanced) proposition is extremely exciting given a high capacity of space for Solar PV, the recent refurbishment of the venue into what is now London’s only “plug and play” ready theatre sized venue (meaning touring operations can carry minimal haulage for a London date, reducing surface travel emissions), and it’s close proximity to a well-served DLR station – meaning the venue could have all the ingredients to become the most sustainable venue of its size in the capital.



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Owing to global volatilities in the global energy market 2022-23, the convergence partnership programme is currently in hiatus. But it is envisaged that in late 2023, a more stable market projection picture will allow the development phases of this work to reactivate, and we envisage the ACT 1.5 project being in a position to handover final stage plans to the venue and energy provider in at least one of the case examples identified above; and possibly more.

1) Outdoor Live Music Events

It is self-evident that the challenges for festival sites (almost invariably off-grid and reliant on portable power) are far greater than for live music venues such as theatres or arenas, where the core imperatives remain a) transfer to a genuinely renewable energy provider (consumer agency *Which* recommend three energy providers – Ecotricity, GEUK and Good Energy as certified “eco providers³”) b) the utilisation of available space for on-site solar and c) energy efficiency/insulation and power management.

Following a prolonged phase of almost total inactivity in the off grid/Festival sphere, positive explorations have emerged in the European festival landscape. Notably in Holland, the DGTL Festival continued to develop it’s 100% renewable grid/green battery formula⁴ with plans to install permanent solar provision on-site; the Lowlands Festival utilised their 90,000 bifacial solar panel carport⁵ to power their event (and others), but perhaps most significantly (and intriguingly), the Mysterylands Festival announced that their 2023 festival will run almost entirely on “green grid power”, in a pioneering 6-year grid power & solar partnership⁶ with the local authority (Municipality of Haarlemmermeer) and a renewable energy company (Tegenstroom).

³ [Which? Eco Provider energy companies revealed for 2022 - Which? News](#)

⁴ [ENERGY - DGTL](#)

⁵ [Lowlands Festival hits high notes for being sustainable | Innovators magazine](#)

⁶ [Mysteryland will run on locally-generated green grid power in 2023 as sustainability efforts grow - FindYourSounds](#)



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Elsewhere in 2022, festivals ... continued the short term experimentation with drop-in HVO biofuels (with some reporting full or nearly full HVO fuel coverage) and in an extremely positive development, Festival Republic announced a “long term” commitment to transfer 5 major festivals to grid power “in the long term”⁷ – while in Sweden (Stockholm) the 10,000 per day capacity Rosendal Garden Party in Stockholm, Sweden deployed a mobile battery system⁸ to power lights, drink stands and food trucks.

≥Mote Park

The ACT 1.5 project has worked collaboratively for many months with [Maidstone Borough Council](#), Ecotricity and more recently, [Power Logistics](#) to propose, then plan and develop the conversion from 100% portable diesel generated power to 100% grid power of Mote Park in north Kent - a multi-usage ground regularly used for outdoor entertainment events, with an average annual attendance of 95,000.

This project includes the construction of a new sub-station to serve the grounds, and the installation of a power ring to direct power to all facets of the site. We have developed this project to an exciting final phase, to the extent that we hope and expect to see the UK’s first multi-usage, grid powered festival grounds completed and ready for show productions in the 2024 season. There are several relatively minor junctions to overcome, but all agencies are committed to this outcome. In terms of timeframe and process, it is our reasonable expectation that final internal and cabinet approval within the council could be completed by May this year, the planning and Distribution Network Operator processes to proceed from June and August this year (respectively)...

⁷ [Live Nation creating guidelines to help festivals connect to the national grid - Access All Areas \(accessaa.co.uk\)](#)

⁸ [Powered by Northvolt: a cleaner kind of festival | Northvolt](#)



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... with sub-station construction commencing in late 2023. In terms of potential carbon savings resulting from this power conversion, present UK grid data⁹ estimates carbon share at 193 gCO₂e/kWh – thus, with a diesel emissions variable subject to how efficiently generators are being operated (live industry workshops indicate that high efficiency is uncommon) but in industrial literature ranging from 955 gCO₂e/kWh to 1,940 gCO₂e/kWh: on present un-expanded Mote Park programmes, this conversion would save a maximum of 147 tonnes of carbon per year.

⁹ at <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022>



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≥ Battery Providers: A Five-Year Projection

SUPPLIER: [GEOPURA](https://www.geopura.com) / CONTACT: info@geopura.com / +44 (0)1509 882 340

EXAMPLE STAGE SIZE	EXAMPLE REQUESTED CONNECTIONS	ESTIMATED / MEDIAN POWER OUTPUT <i>(Incl peak power)</i>	EXAMPLE LOW CARBON PORTABLE SOLUTIONS	2023 AVAILABILITY <i>Equivalent output</i>	2025 AVAILABILITY <i>Equivalent output</i>	2027-28 AVAILABILITY <i>Equivalent output</i>
A (festival headline)	2 x 400A P/L LX 2 x 125A 3ph Vid 2 x 125A 3ph Snd	Median = 400A 3ph Peak = 750A 3ph	4 x 300KW batteries 1 x 1MVA (charge and back up) X4 HPU'S	Anytime with 5 months or greater notice.	Anytime with 3 months or greater notice	Anytime with 1 month or greater notice
B (festival support)	200A P/L LX 125A 3ph Snd 63A 3ph Vid??	Median = 90A 3ph Peak = 150A 3ph	1 x 300kwh battery 250kva (charge and back up) X1 HPU'S	Anytime with 3 months or greater notice. Earlier in case of cancelation.	Anytime with 1 month or greater notice	Anytime with 1 week or greater notice
C (community)	125A 3ph LX 63A 3ph Snd 32A 3ph Vid??	Median = 50A 3ph Peak = 80A 3ph	1 x 100kwh battery 150kva(charge and back up) X1 HPU or x1 HPU Agile	Anytime with 3 months or greater notice. Earlier in case of cancelation.	Anytime with 1 week or greater notice	Anytime with 1 week or greater notice



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SUPPLIER: [GREENER POWER SOLUTIONS](https://www.greenerpower.nl/) / CONTACT: info@greener.nl / +31 20 244 0100

EXAMPLE STAGE SIZE	EXAMPLE REQUESTED CONNECTIONS	ESTIMATED / MEDIAN POWER OUTPUT <i>(Incl peak power)</i>	EXAMPLE LOW CARBON PORTABLE SOLUTIONS	2023 AVAILABILITY <i>Equivalent output</i>	2025 AVAILABILITY <i>Equivalent output</i>	2027-28 AVAILABILITY <i>Equivalent output</i>
A (festival headline)	2 x 400A P/L LX 2 x 125A 3ph Vid 2 x 125A 3ph Snd	Median = 400A 3ph Peak = 750A 3ph	4 x 300KW batteries 1 x 1MVA (charge and back up)	Total confirmed fleet: 40x 336 kWh/318 kVA 75x 422 kWh/318 kVA + new systems with bigger capacity	400 – 500 batteries with larger and smaller capacity / power	Continue the growth
B (festival support)	200A P/L LX 125A 3ph Snd 63A 3ph Vid??	Median = 90A 3ph Peak = 150A 3ph	1 x 300kwh battery 250kva (charge and back up)	Total confirmed fleet: 40x 336 kWh/318 kVA 75x 422 kWh/318 kVA + new systems with bigger capacity	400 – 500 batteries with larger and smaller capacity / power	Continue the growth
C (community)	125A 3ph LX 63A 3ph Snd 32A 3ph Vid??	Median = 50A 3ph Peak = 80A 3ph	1 x 100kwh battery 150kva(charge and back up)	N/A	N/A	N/A



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SUPPLIER: [ZENOBE](#) / CONTACT: secondlife@zenobe.co.uk / +44 (0)20 3912 7853

EXAMPLE STAGE SIZE	EXAMPLE REQUESTED CONNECTIONS	ESTIMATED / MEDIAN POWER OUTPUT <i>(Incl peak power)</i>	EXAMPLE LOW CARBON PORTABLE SOLUTIONS	2023 AVAILABILITY <i>Equivalent output</i>	2025 AVAILABILITY <i>Equivalent output</i>	2027-28 AVAILABILITY <i>Equivalent output</i>
A (festival headline)	2 x 400A P/L LX 2 x 125A 3ph Vid 2 x 125A 3ph Snd	Median = 400A 3ph Peak = 750A 3ph	4 x 300KW batteries 1 x 1MVA (charge and back up)	N/A	5 x 1MW/1.2MWh batteries	20 x 1MW/1.2MWh batteries
B (festival support)	200A P/L LX 125A 3ph Snd 63A 3ph Vid??	Median = 90A 3ph Peak = 150A 3ph	1 x 300kwh battery 250kva (charge and back up)	39 x 100kW/150kWh batteries	25 x 100kW/150kWh batteries	200 x 100kW/150kWh batteries
C (community)	125A 3ph LX 63A 3ph Snd 32A 3ph Vid??	Median = 50A 3ph Peak = 80A 3ph	1 x 100kwh battery 150kva(charge and back up)	N/A	25 x 60kW/100kWh batteries	200 x 60kW/100kWh batteries



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SUPPLIER: [PLUS ZERO](https://www.pluszero.co.uk) / CONTACT: info@pluszero.co.uk /

EXAMPLE STAGE SIZE	EXAMPLE REQUESTED CONNECTIONS	ESTIMATED / MEDIAN POWER OUTPUT <i>(Incl peak power)</i>	EXAMPLE LOW CARBON PORTABLE SOLUTIONS	2023 AVAILABILITY <i>Equivalent output</i>	2025 AVAILABILITY <i>Equivalent output</i>	2027-28 AVAILABILITY <i>Equivalent output</i>
A (festival headline)	2 x 400A P/L LX 2 x 125A 3ph Vid 2 x 125A 3ph Snd	Median = 400A 3ph Peak = 750A 3ph	4 x 300KW batteries 1 x 1MVA (charge and back up)	3 x 100kVA hybrid synch'd green hydrogen generators. Continuous output up to 250 kW (160kW with redundancy), peak output up to 450kW (300kW with redundancy) – could potentially run Video and/or Sound	5 x 200kVA hybrid synch'd green hydrogen generators. Continuous output up to 800kW (600kW with redundancy), peak output up to 1200kW (900kW with redundancy)	As 2025
B (festival support)	200A P/L LX 125A 3ph Snd 63A 3ph Vid??	Median = 90A 3ph Peak = 150A 3ph	1 x 300kwh battery 250kva (charge and back up)	3 x 100kVA hybrid synch'd green hydrogen generators. Continuous output up to 250 kW (160kW with redundancy), peak output up to	As 2023	As 2023



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				450kW (300kW with redundancy).		
C (community)	125A 3ph LX 63A 3ph Snd 32A 3ph Vid??	Median = 50A 3ph Peak = 80A 3ph	1 x 100kwh battery 150kva (charge and back up)	3 x 100kVA hybrid synch'd green hydrogen generators. Continuous output up to 250 kW (160kW with redundancy), peak output up to 450kW (300kW with redundancy).	As 2023	As 2023

NB: Plus Zero are a green hydrogen producer, distributor and operator, and anticipate a range of battery options available to us from 2023 that could be combined with green hydrogen generators to provide efficient solutions for any given deployment.