

DC Power - Potential Applications



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- showcase potential innovations
- catalyse new collaborations
- facilitate access to funding opportunities
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The KTN works with leading industry stakeholders to establish where innovation can add real value to the built environment.

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I INTRODUCTION

Recent years have seen a rapid growth in the number of items in the home that use direct current (DC). Every purchase of portable consumer electronics, from phone and IT equipment to electric toothbrushes, seems to arrive with yet another plug-top power supply which more than likely cannot be used with anything else. Moreover, that power supply may be left plugged in and consuming electricity whether or not the associated product is attached.

Even in the realm of fixed equipment we now have low voltage lighting, environmental controls and energy efficient DC motors. Despite the fact that power is universally supplied to homes as 230 volts alternating current (AC) there are few appliances that do not internally rectify the incoming power or could not use DC directly if it were available.

At the same time, it is increasingly common for houses to generate a small amount of electricity from photovoltaic (PV) panels. Does it make sense to generate DC power, convert it to AC at 230V and then back to DC with the inefficiencies inherent in each stage of the process? Would it be possible to create a DC power distribution network to use the generated power more directly? These questions are more complex than may first appear since there are issues of voltage matching and import/export or storage to balance supply and demand. Nevertheless, there are sufficient potential benefits for the ideas to be explored through community scale demonstration projects in the UK and elsewhere.

This report discusses the principles, opportunities and challenges for small DC power networks within individual buildings and how the technology may develop in the future.