Delivering A Sustainable Future

With Data

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A Message from the Co-founders of Digital Bucket Company:

Dear Friends,

We are a start up with a big passion for sustainability and innovation. We are already contributing to global challenges where we have recently teamed up with the Cop26, United Nations and the European Commission. Our focus has been to discover ways we can leverage data and innovation to bring down carbon emissions by 2025, 2030 with the big aim for zero carbon by 2050 in guidelines with the governmental bodies.

As, a start-up we have a vision to make a world a better place and to leave a legacy in the work we deliver. So, it is obvious why we are focusing on solving sustainability problems with Data and Innovation to have a positive impact on the world. We believe good data combined with the right technology can deliver solutions for the most complex of challenges.

We are proud to inform you we have developed a solution that allows for uniform reliability of renewable energy and high efficiency of energy use in properties of any scale., Our data driven approach that demonstrated to homes and business owners that they can be self-sufficient in the electricity they use, with some who didn't use electricity for 75% of the year. We would welcome you on our journey to help build a carbon neutral world.

Best wishes,

Kwame & Humayun

Co-Founders of Digital Bucket Company

Building a carbon zero future through data

The Digital Bucket Company specialises in leveraging data to develop sustainable energy Solutions. Our four step process allows for a future proof solution to energy and carbon efficiency. We have spent many years understanding how data can be leveraged with innovation to making energy work better in a property and rest assured It is not simply a case of installing some solar panels in a building.

Data enables us to understand a buildings complete energy behaviour, so we work with our clients to evaluate the data that is available and whether this is enough to understand the complete energy ecosystem in their property. If not, we devise a data strategy to understand when and how energy is being used in a building. This data is then fed through our internal systems to provide a visual map of the entire energy system.

By taking a data-centric approach we are then able to develop a novel solution to minimise the amount of energy used and provide the technology to automate a sustainable solution. Our solutions are measurable in the savings both during and after transforming from a high carbon reliant energy source to a green or even in some cases self-sufficient energy infrastructure allows for costs and time to be

measured against the investment made.

4 Steps to sustainable energy

Step 1 Understanding the current energy situation

With data we can establish the energy behaviour, where and when it's being used. With this type of information, we are able to work out better energy models that ensures the solution we design provides the most effective energy saving solution. These sensors will eventually work as the controller to the entire building, automating the energy sources to deliver a green future.

Step 2 Developing the data strategy

This step involves identifying the key data points in the building and our engineer will scan the entire building identifying the key areas sensors need to be fitted. Once they have identified the key areas they will then insert sensors that collect data about the energy usage in the building.

This data is then fed into a central system where we then get our data specialists to begin analysing to identify pattern of use. Our engineers are qualified energy specialists who understand energy systems used in buildings. They are best placed to identify and place the necessary sensors in the building.

Step 3: The energy transformation plan [EDP]

The EDP identifies the key areas any solution needs to focus on to achieve the desired outcome. This can range from lighting, heating or even switches, once we establish the cause of high energy consumption, we then formulate an EDP.

The EDP is a fluid process and doesn't just rely on one solution, instead it relies on the data to see which solution is the most effective. The solution can range from, changing to energy efficient bulbs or it can involve developing the IoT system to recognise when to switch off certain appliances or electrical features at a given time or it might involve adding renewable energy sources such as solar or wind. The EDP will dictate which options are the best and provide our clients with the best options.

Step 4: Implementation of energy reduction plan

The implementation is a phased in process, whereby every phase is tested and implemented according to the results shown. We initially focus on reducing the larger energy consumption challenges. All work that is implemented for our clients are planned in advance so any potential disturbance is kept to a minimum and our real time project monitor will keep you posted how the work is progressing.

CASE STUDY: Making home fit for future energy demands

DIGITAL BUCKET COMPANY www.digitalbucketcompany.com

The aim was to evolve it into a smart, sustainable and energy efficient with two key objectives:

- To ensure the home is sustainable and plays a small part in reducing climate change
- To provide savings for the owner over the mid to long term

The owner of the house had single glazed windows, little in the way of loft insulation and all energy and heat was from fossil fuel sources.

Existing Improvements

1. **Thermostatic Radiator Valves (TRVs**). The smart thermostat to supply heat when the house is occupied at the right level and only to rooms that are occupied.
2. **Solar Panels to generate electricity**. The benefits are year-round with electricity being generated even on cloudy days. During the lighter less cloudy days the panels generate far more than the house needs with the excess being handed to the grid.
3. **Hot Water Generated Energy** energy Utilise excess generated energy rather than hand it to the grid. When the panels are generating more energy than needed the excess is diverted to the immersion element of the hot water cylinder. Generated energy is now used to heat the water in place of gas.
4. **Battery Storage** The solar panels work during daylight hours when the suns radiation can penetrate the clouds. During the evening and night, the house must draw from the grid. With a family that is predominantly not at home during the day this means a lot of generated energy was wasted. The solution was to install a battery that is charged by the solar panels during the day and then released to power the house during the evening.
5. **"Economy 7" type tariff**.

   On days when there is not enough sun to charge the battery, it is charged using

cheap electricity in the middle of the night. The cheap rate of 5p per kwh makes for a big saving compared to the standard rate of around 13p per kwh.

Leveraging data through a smart controller

Without the smart controller each component operated independently and added to the frustration of the homeowner It showed the sustainable challenge of using renewable sources when operated independently of each other. An example of this is the battery control system which is manually configured with the amount of cheap rate electricity to use. During the darker half of the year, it was configured to fully charge the battery overnight. It means the battery is guaranteed to be charged from cheap rate electricity but what if the following day is a pleasant day? If the battery is fully charged overnight any excess energy generated the following day is handed back to the grid rather than being used by the house. What was needed was an intelligent system that could take account of the weather forecast.

Smart Controller – Energy Transformation

The last component added to the house was a *smart controller* that starts integrating the components enabling them to co-operate with each other to improve the benefits and savings.

The smart controller is a computer program running in the home that takes its data from a number of sources but not limited to: -

- The solar panels
- The battery
- Home energy monitor

- The weather forecast

The smart controller looks at the weather forecast for the following day together with the current battery level. Based on this it determines how much or how little cheap rate electricity is needed to charge the battery and sets the charge point on the battery controller accordingly.

The result is a system that charges the battery just enough to see it through to when the solar panels take over. When the forecast is good no cheap rate electricity is used and the house is self-sufficient. When the forecast is poor the battery is charged 100% from cheap rate electricity or more typically during the darker half of the year it is somewhere in between

The result

The image below shows a day in the life of the house on the 13th of March 2021.

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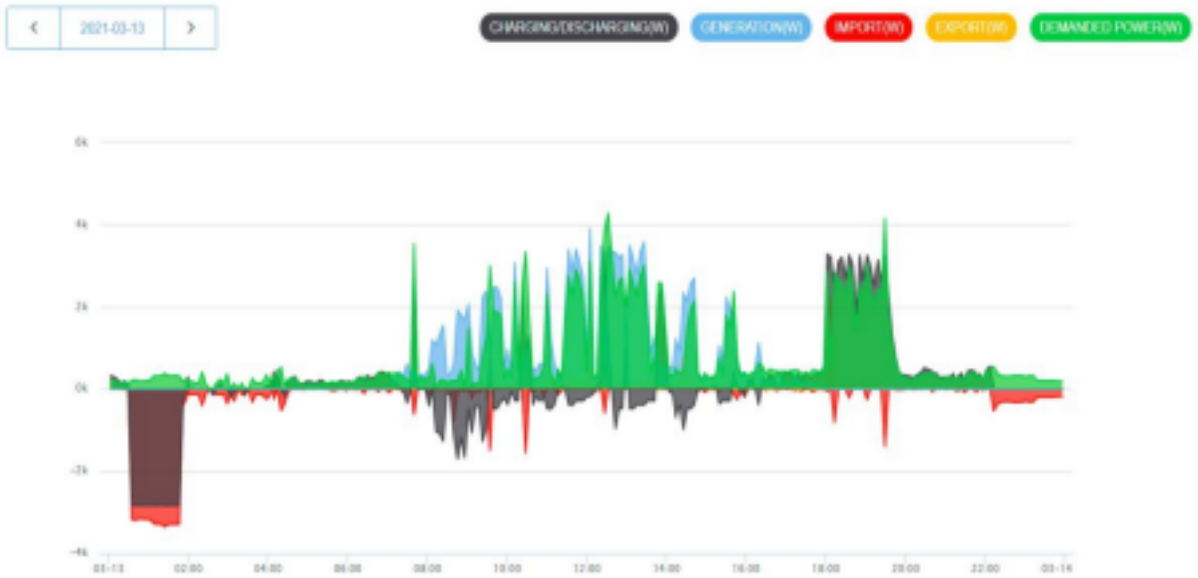

- The smart controller determined the battery needed to be charged with cheap rate electricity between 12:30 and 02:00
- This weather forecast was accurate as the battery combined with energy generated during the day meant very little (red) energy was pulled from the grid. •

From 08:00 to 16:00 excess electricity was used to top the battery up (black) ● There was heavy energy consumption (green) between 18:00 and 20:00 while the oven and hob were on, all of which was provided by the battery

● Carbon usage could be monitored

The "smart controller" is automated, it works 24 by 7, 365 days a year with no intervention. The addition of the smart controller provided additional benefits and savings with little outlay. It can be implemented to build or new build properties with the same concept being easily adoptable to commercial properties. The smart controller's journey has only just begun, its evolution puts it at the heart of the smart home.

Further Information & Contact Details:

Should you require any further information or interested in moving forward please email us info@digitalbucketlabs.com