

Westmill Community Energy Focus - Power to The People

Proposal to Link Westmill Wind Farm and Solar Farm Via the UK's First Community Smart Hybrid Energy Power Station

- ✧ Shareholder in Westmill Solar and Wind Farms
- ✧ Founding Director of Westmill Smartgrid and Storage CIC
- ✧ 30 years as an RAF Communications Officer
 - Head of MOD Sustainable Procurement Strategy
 - Led military deployed Smart Energy/grid Trials
- ✧ Sustainability Consultant
- ✧ Developing smart clean energy for remote sites
- ✧ Advocate of community power generation & trading

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Westmill 6.5MW Wind Farm
(5 x Siemens Bonus 1.3mW)

UK's first 100%

**Community owned Wind
Farm - 2008**

Westmill 5MW Solar Farm
(20,000+ PV panels – 4.8GWhr/yr)

UK's first 100%

**Community owned Solar
Farm - 2012**

**Westmill Sustainable
Energy Trust (WeSET)
Charity providing
education and local clean
energy initiatives**

**Westmill Smartgrid
and Storage
Community Interest
Company – Nov 2015**



Westmill Smart Hybrid Energy Power Station - The Vision

“Bring together the Westmill Solar PV Farm and the Westmill Wind Farm, add other appropriate renewable energy technologies, and remove intermittency with grid storage to provide a ‘base load and demand response/surge’ capable low carbon power station”



Local community smart energy grid, and local smart charging and refueling station

The Vision For The Site

Clean Energy
R&D Park

Hydrogen
Production
& Storage
R&D Park

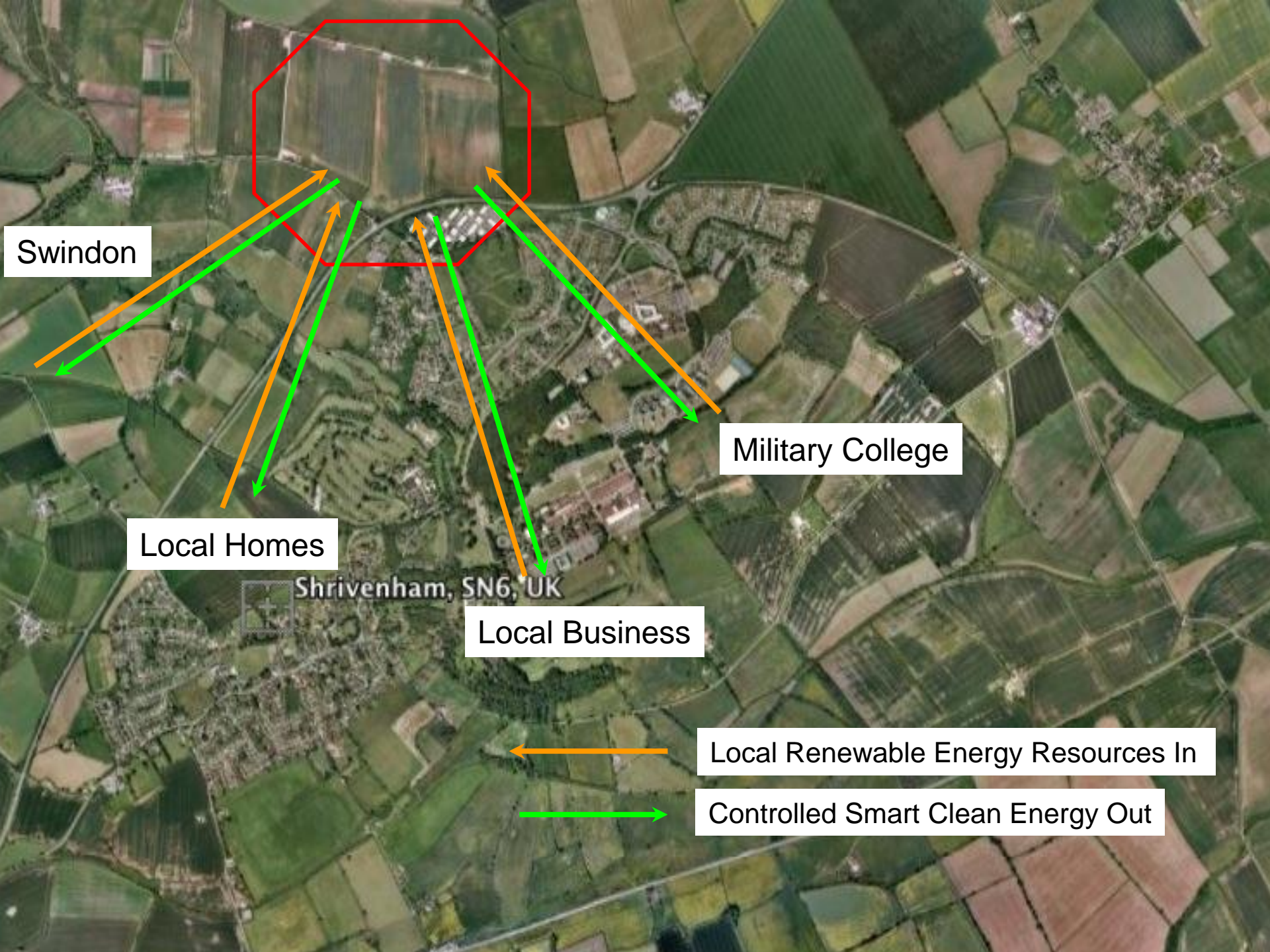
Smart Storage
R&D Park

AD, biogas
and W2E

Clean Energy
Community
'living laboratory'
agriculture,
transport,
domestic, industrial

Smart Low Carbon
Energy Business Park





Swindon

Local Homes

Shrivenham, SN6, UK

Local Business

Military College

Local Renewable Energy Resources In

Controlled Smart Clean Energy Out

The Journey Roadmap

- ❖ Optimise current solar and wind farms for maximum productivity and income
 - ❖ Maintenance schedules and approaches to minimise downtime
 - ❖ Contract incentivisation to maximise availability and address fault causes
 - ❖ Technology updates and repowering opportunities through-life
- ❖ Investigate innovative commercial and legal opportunities and restrictions
- ❖ Investigate local problems that intermittency causes for DNOs and Energy Supply Companies – perhaps become a smart clean energy ESCO working with DNO to improve local grid
- ❖ Investigate partnering with business, government, academic and technology stakeholders
- ❖ Investigate interest from local community, especially Defence Academy as part of MOD needs to reduce GHG emissions, reduce dependency on fossil fuels and increase local area energy security and resilience
- ❖ Investigate and collaborate with any similar projects/approaches in Europe
- ❖ Engage with government to gain project support and influence change
- ❖ Provide feedback on project and stakeholder buy-in to cooperative members
- ❖ Develop a funded timeline and implementation strategy

The Journey So Far

- ❖ Launch of Westmill Smartgrid and Storage Community Interest Company in Nov 2015.
- ❖ Investigate innovative commercial and legal opportunities and restrictions with local DNO – on-going discussions depending on storage technology partner and customer needs.
- ❖ Investigate local problems with grid access with DNO – grid access agreement obtained in principle, Capacity connection prices obtained, actual grid-connection now in negotiation but linked to project timescales.
- ❖ Investigate partnering storage technology stakeholders – discussions on-going with two potential storage technology partners.
- ❖ Investigate interest from local community, especially Defence Academy – local community interested, currently engaging with Defence site to investigate interest and options.
- ❖ Engage with government to gain project support and influence change – seeking appropriate decider/influencer stakeholders to engage.
- ❖ Provide feedback on project and stakeholder buy-in to cooperative members – Westmill Solar and Wind farm AGMs briefed and support shown, depending on commercials.
- ❖ Develop a funded timeline and implementation strategy – fluid!

Linked Opportunities – Implement and Install to Learn and Evolve

UK Sustainable Community initiatives such as
Sustainable Brampton

<http://www.sustainablebrampton.org>

My local community near Bishop Auckland Co Durham
Potential 'living laboratory' project site

Household Supplier Energy Market
(HOSEM) Academic project – University of Bristol led

<http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/P031838/1>

Untitled Map

Write a description for your map.

Legend



Google Earth

Image © 2018 Getmapping plc



700 m

Household Supplier Energy Market - HOSEM

Towards peer-to-peer electricity trading in the UK

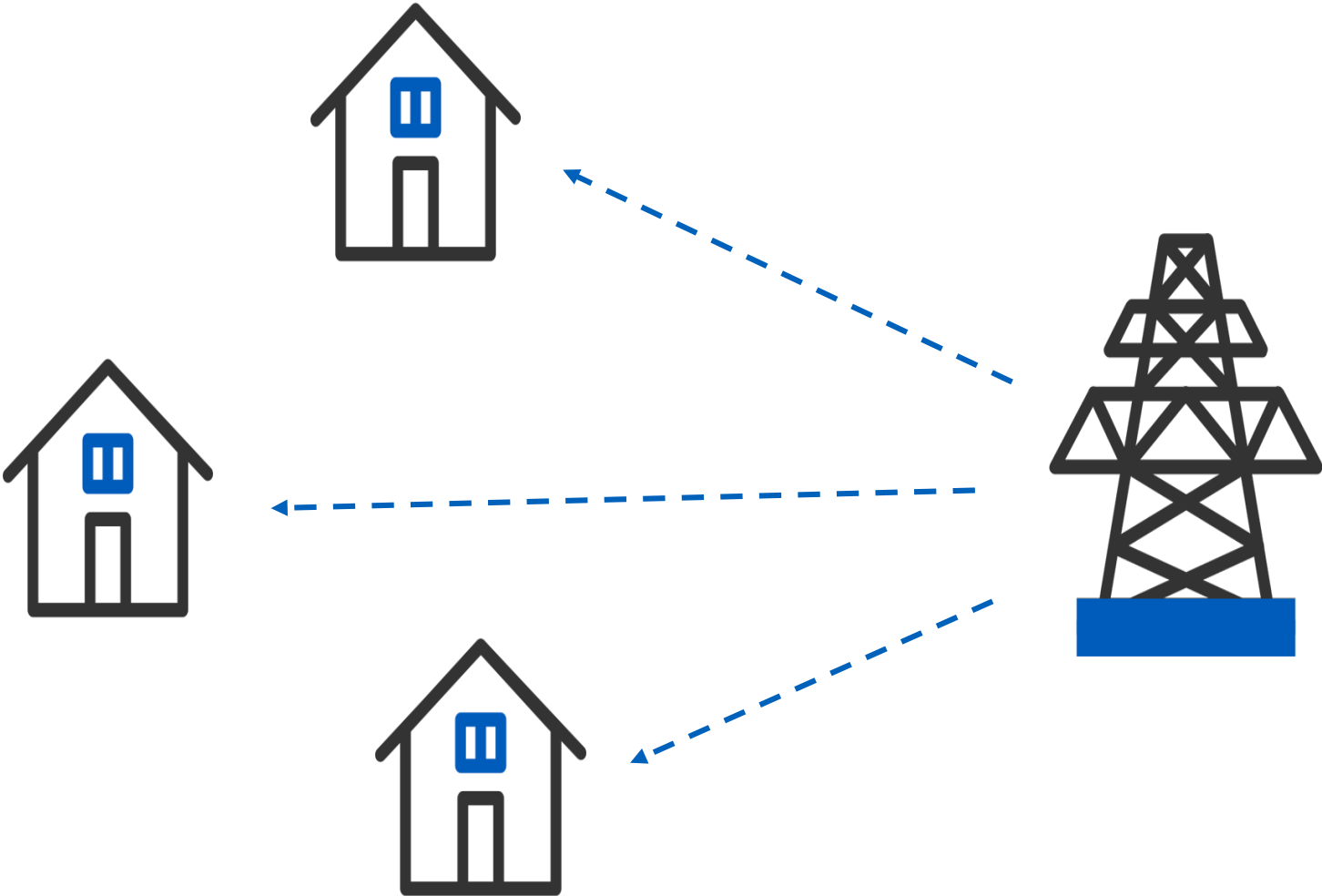
Jordan Murkin, Ruzanna Chitchyan, David Ferguson

J. Murkin, R. Chitchyan, D. Ferguson. (2017). Goal-Based Automation of Peer-to-Peer Electricity Trading. In "From Science to Society (pp. 139-151). Springer.



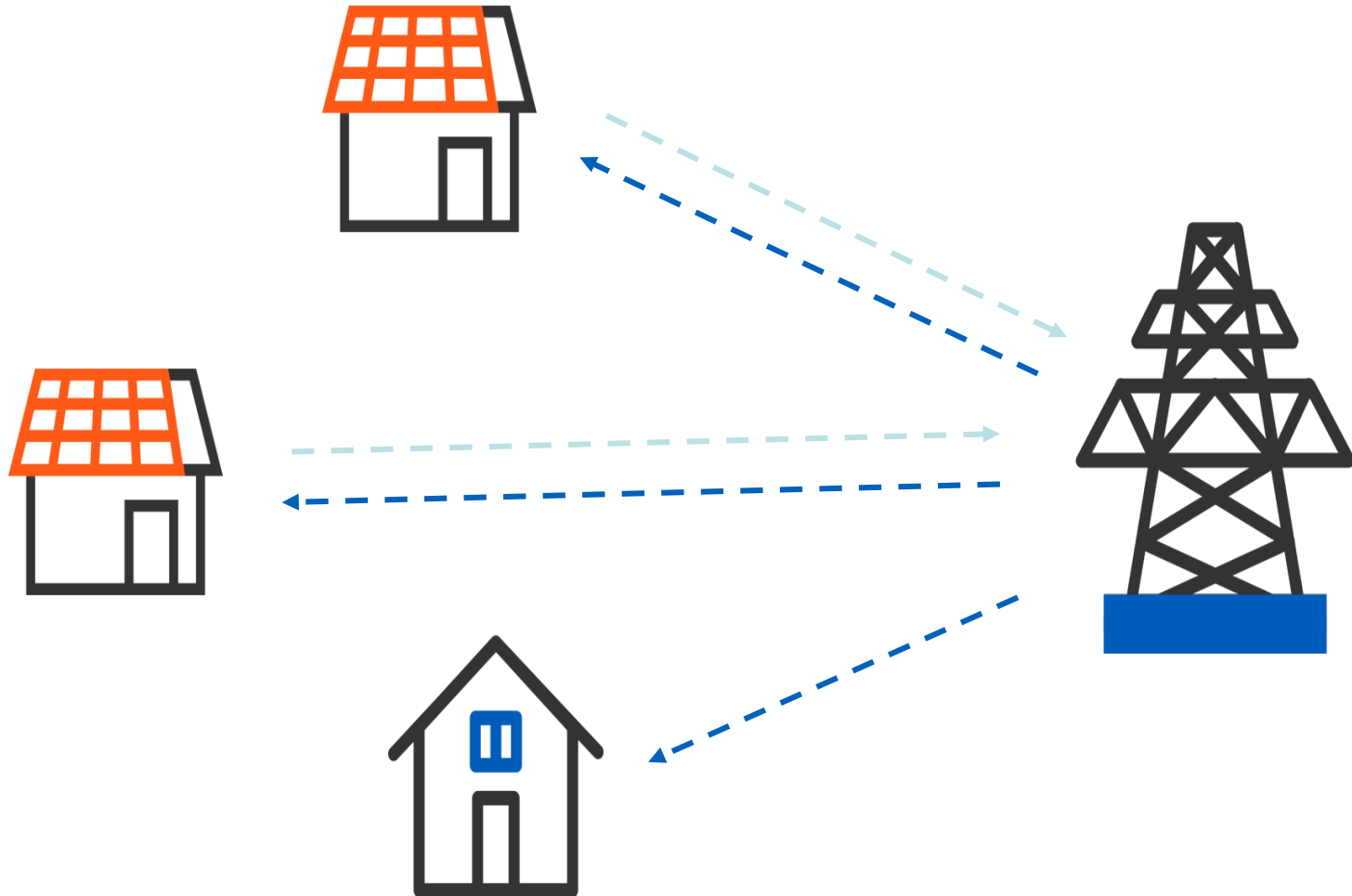
Past

Electricity is purchased from the grid



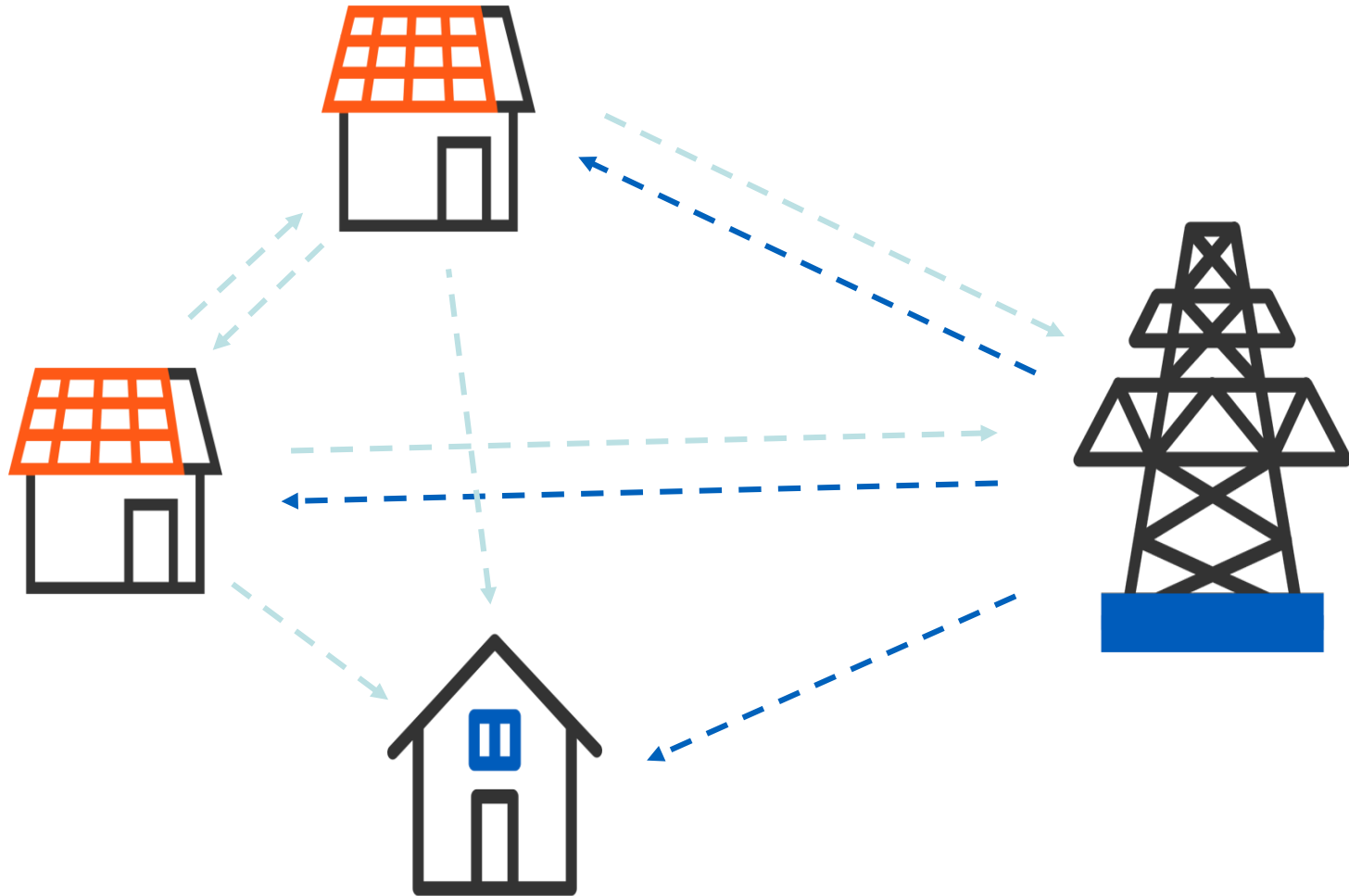
Today

Electricity is purchased from, and sold to, the grid



Peer-to-peer

Electricity is generated and sold between households as well as the grid



Benefits

- ✓ Extra income stream to households with microgeneration
- ✓ Increased value proposition of microgeneration and energy storage
- ✓ Increased control over source of supply (distance, type of generation, etc)

Requirements

- **Electricity generation must be verified**

We must be able to trust that electricity generation and consumption recorded for an individual at any given time are accurate.

- **Trading should be fair**

No individual should have an unfair advantage over others in regards to their capability to trade.

- **Trades must be traceable and auditable**

Ensuring full traceability of electricity from source to consumer, and allowing electricity suppliers to accurately bill their customers.

Blockchain

A technology that can support these constraints is blockchain. Blockchain can be thought of as a shared database with a few unique characteristics:

- Data is controlled by everyone on the network, instead of being managed by a single entity;
- Data cannot be altered inside of a blockchain, instead it can only be added;
- Data added to the chain must be checked and verified by all participants in the network.



Blockchain



Transparency

All data stored is visible to anyone;



Auditability

Data is immutable and visible, thus transactions can be audited by anyone;



Trust

Interactions between individuals are direct, i.e., no third party can interfere or control transactions.

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Any
Questions?



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