THE ASSOCIATION FOR RENEWABLE ENERGY & CLEAN TECHNOLOGY

Flexible Futures report summary

The energy transition: assessing the potential for distributed flexibility services

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The need for power system flexibility

- **Growth of renewable generation** to meet Net Zero targets
- **Growth in distributed energy resources**, also offering generation flexibility, storage and demand response
- **Reduction in large synchronous generators** and their flexibility services, for frequency, reserve, inertia, voltage, resilience
- **Electric vehicles** – expected rapid growth adding to demand

National Grid's latest **future energy scenarios** forecasts between 14 and 28 GW of storage needed for 2050, from c4GW today

The National Infrastructure Commission identify as much as £8 billion of savings per year by 2030 by new flexibility services

- **Distributed flexibility services** are expected to make a significant contribution to these savings

A new approach for understanding customers and the distributed flexibility market

The report uses data from ElectraLink to explore:

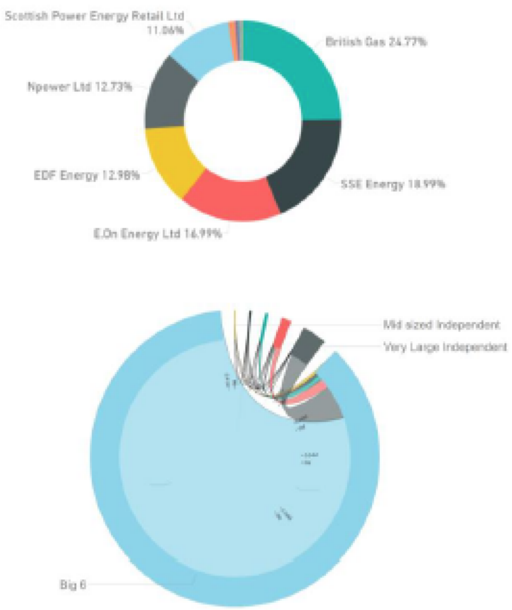
- How customers are becoming more engaged with their electricity supplies and the low carbon agenda
- How the transition to decentralised, decarbonised energy is progressing for domestic and C&I customers
- The numbers of customers likely to engage with flexible energy services such as storage and demand response

The report presents data trends since 2012 from all distribution connected customers.

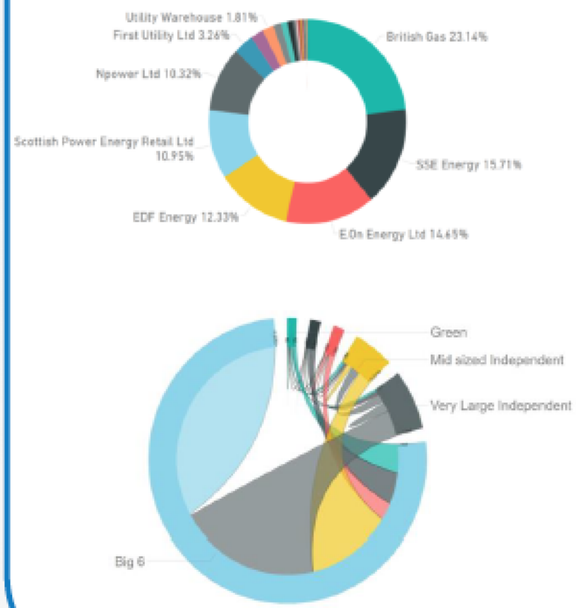
It introduces a new approach to market segmentation to identify relevant trends from this data.

First step – investigate switching trends

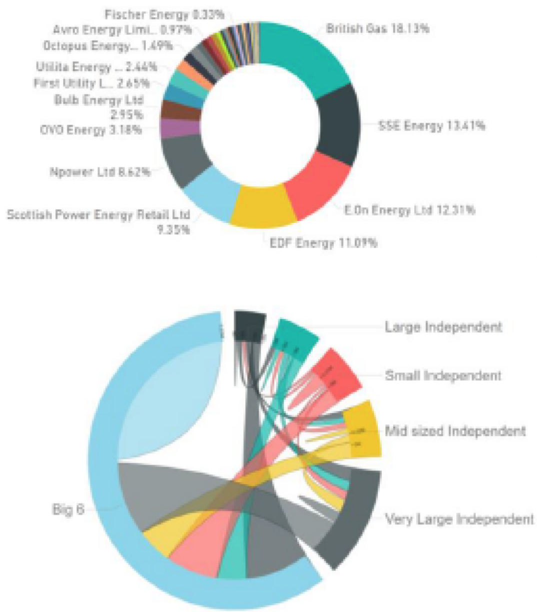
2012



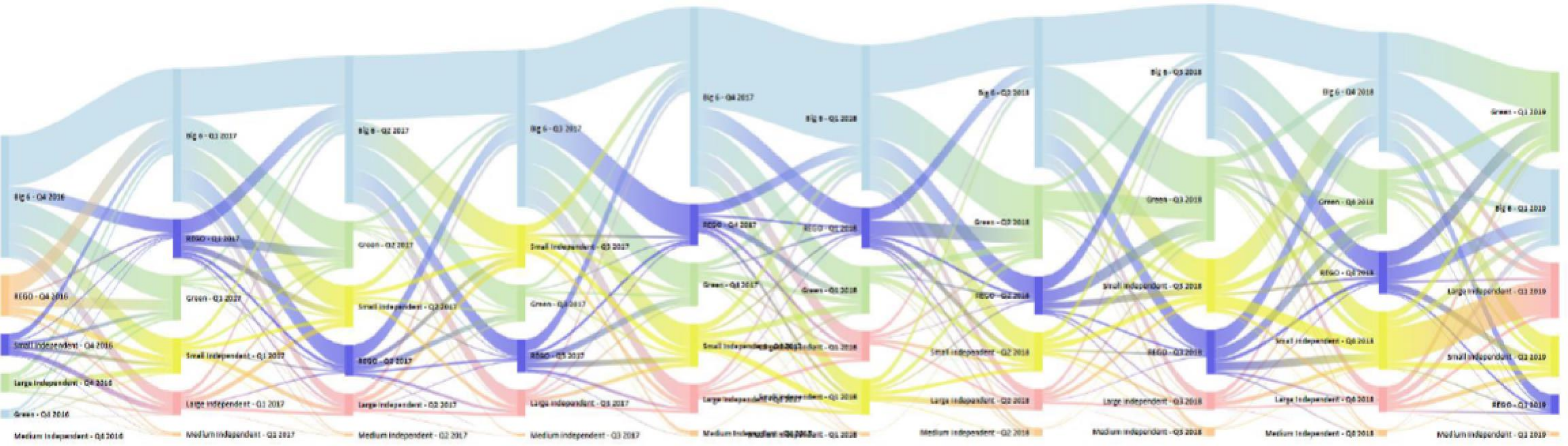
2016



Now



First step – investigate switching trends



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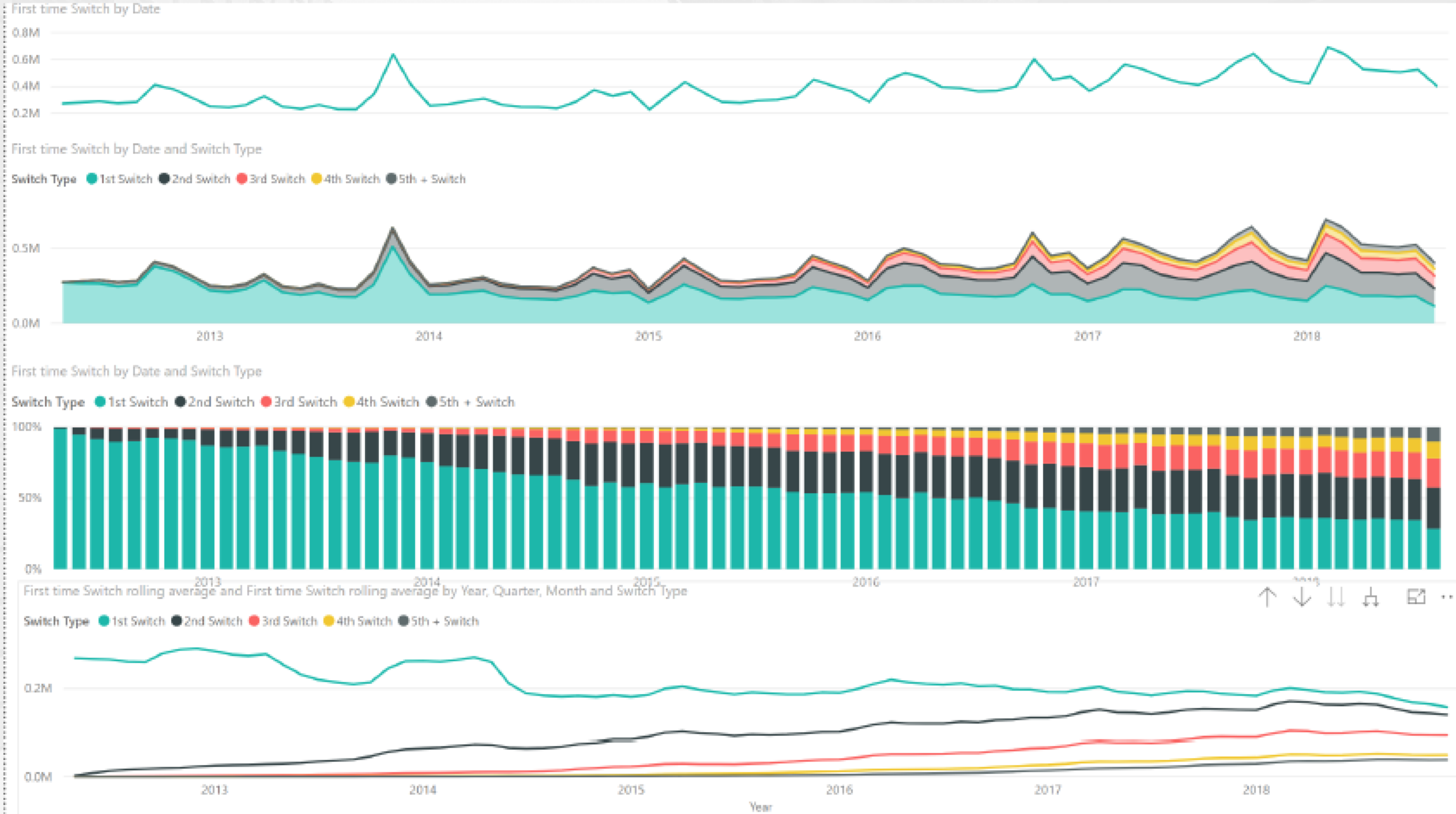

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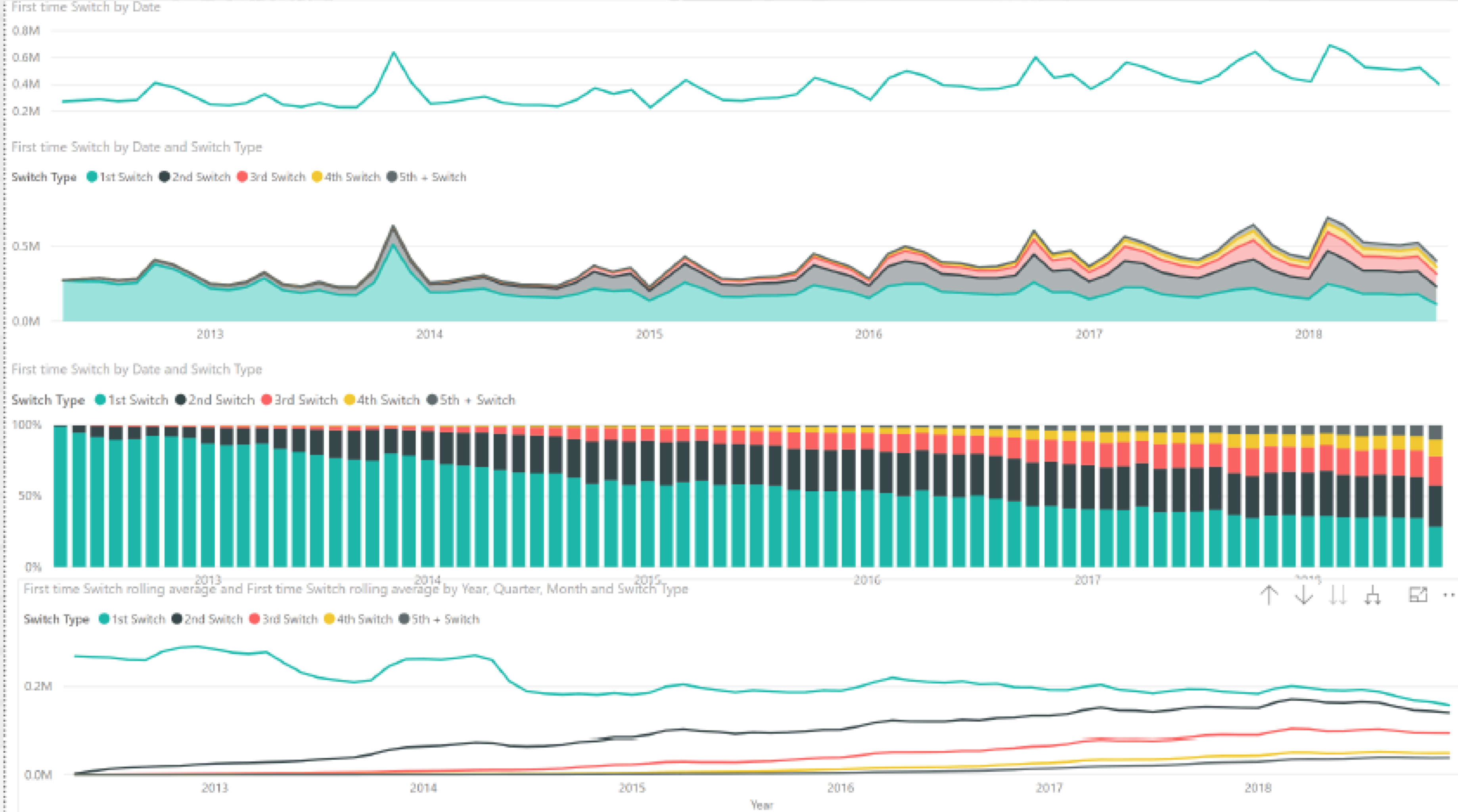
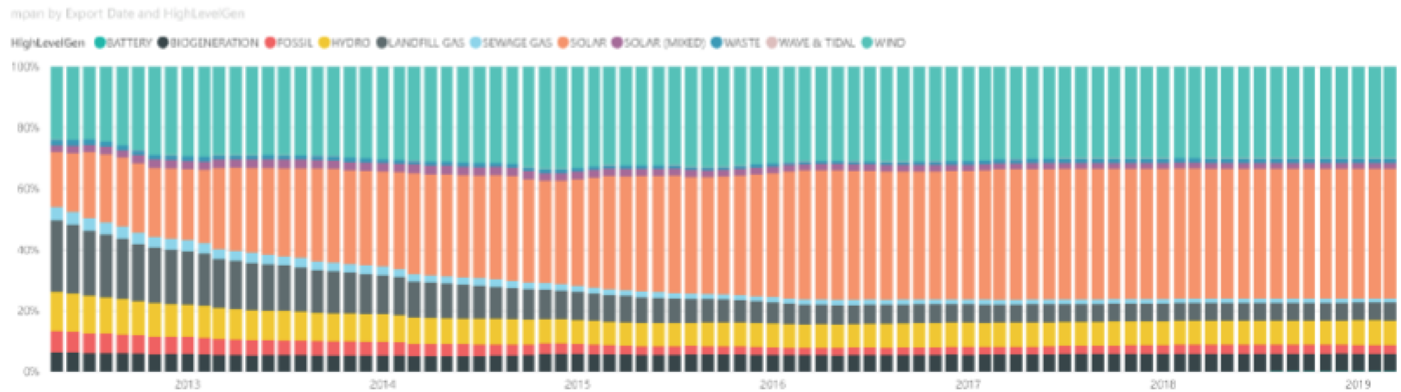
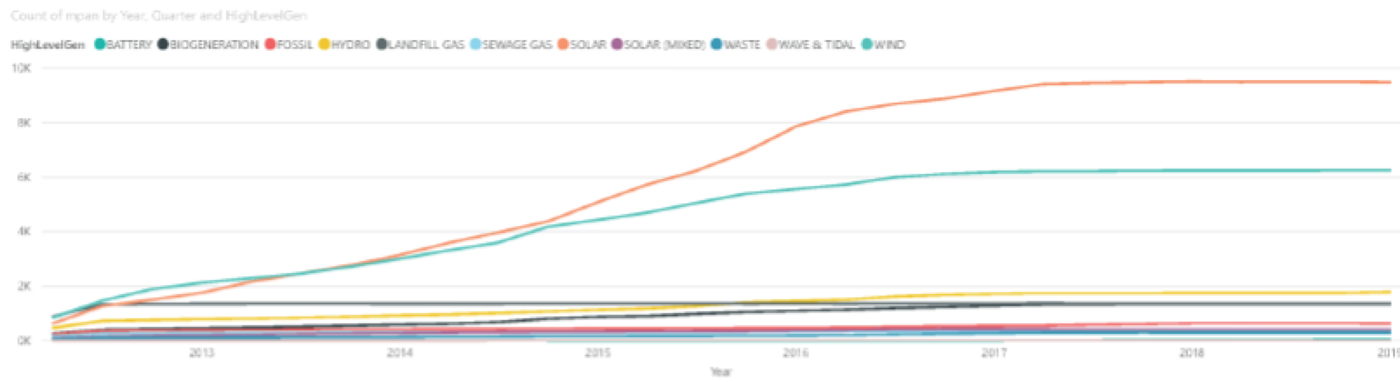


Second step – what’s being exported to the DN?

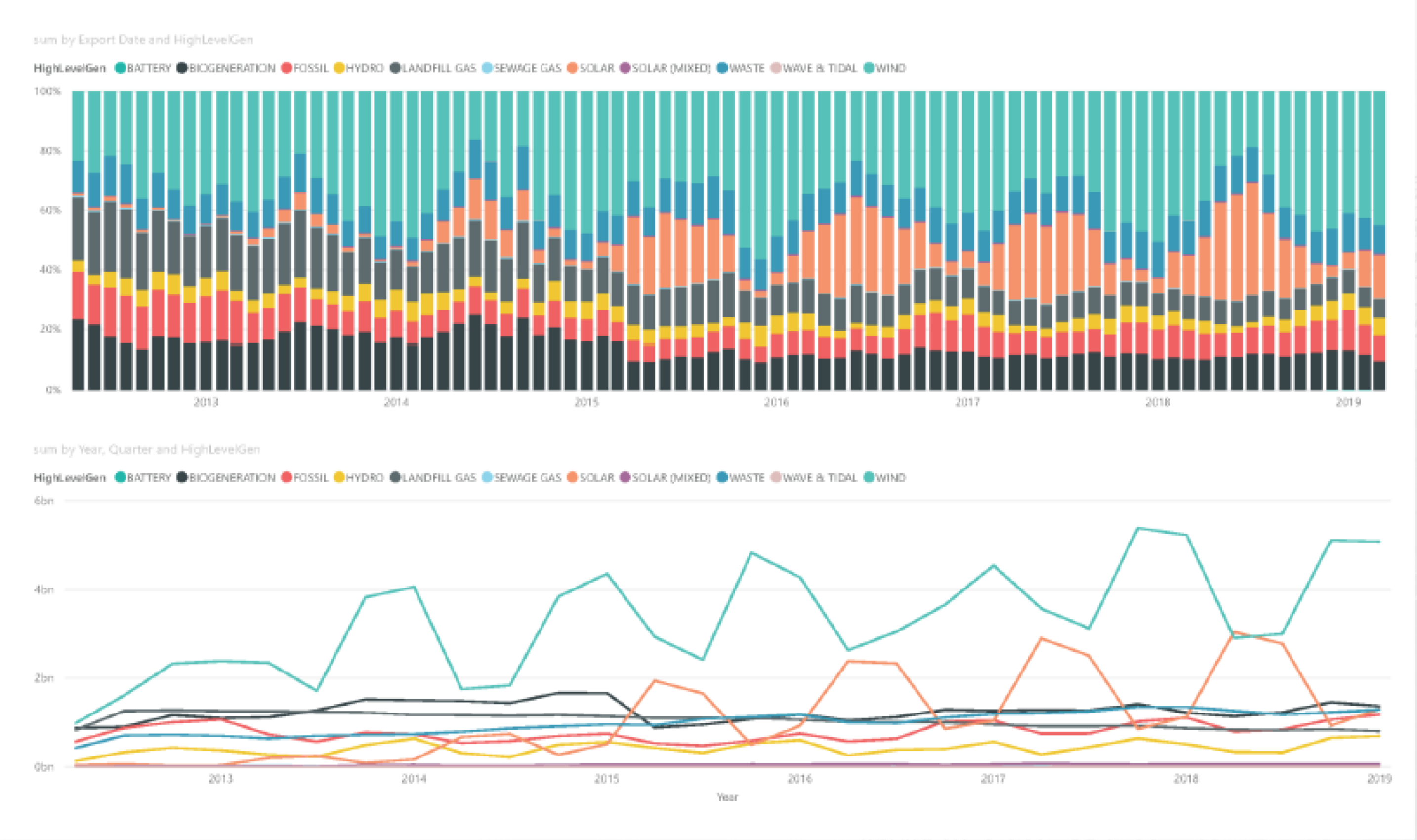




- The number of EG sites is increasing with the majority of growth in solar
- From a numbers perspective the growth appears linear

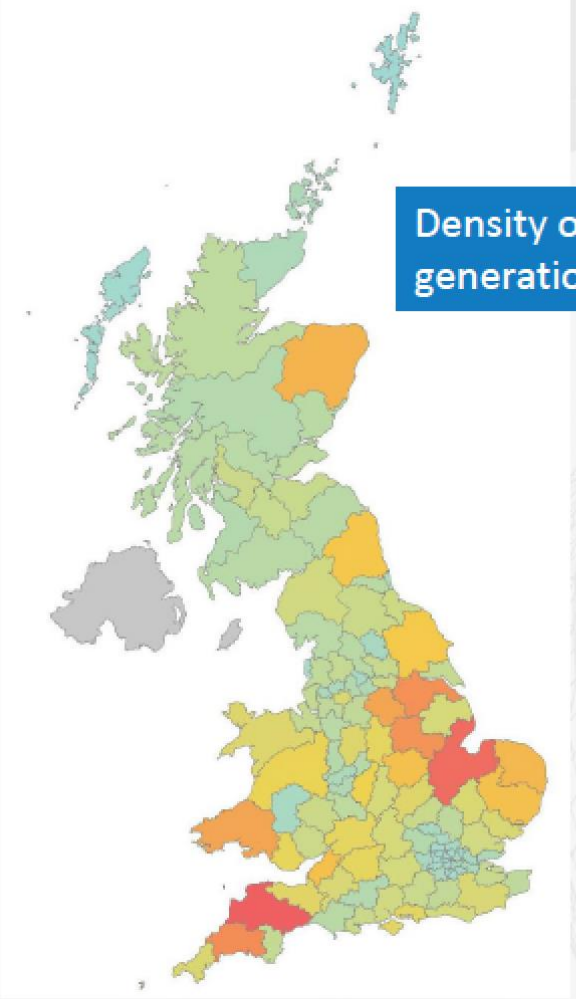
Second step – what's being exported to the DN?

- However the actual outputs of sites show the inherent variability associated with renewable generation
- The ESO only sees the calmative impact of this generation
- Providing visibility of this dataset has improved the ability of the ESO to forecast



Second step – what's being exported to the DN?

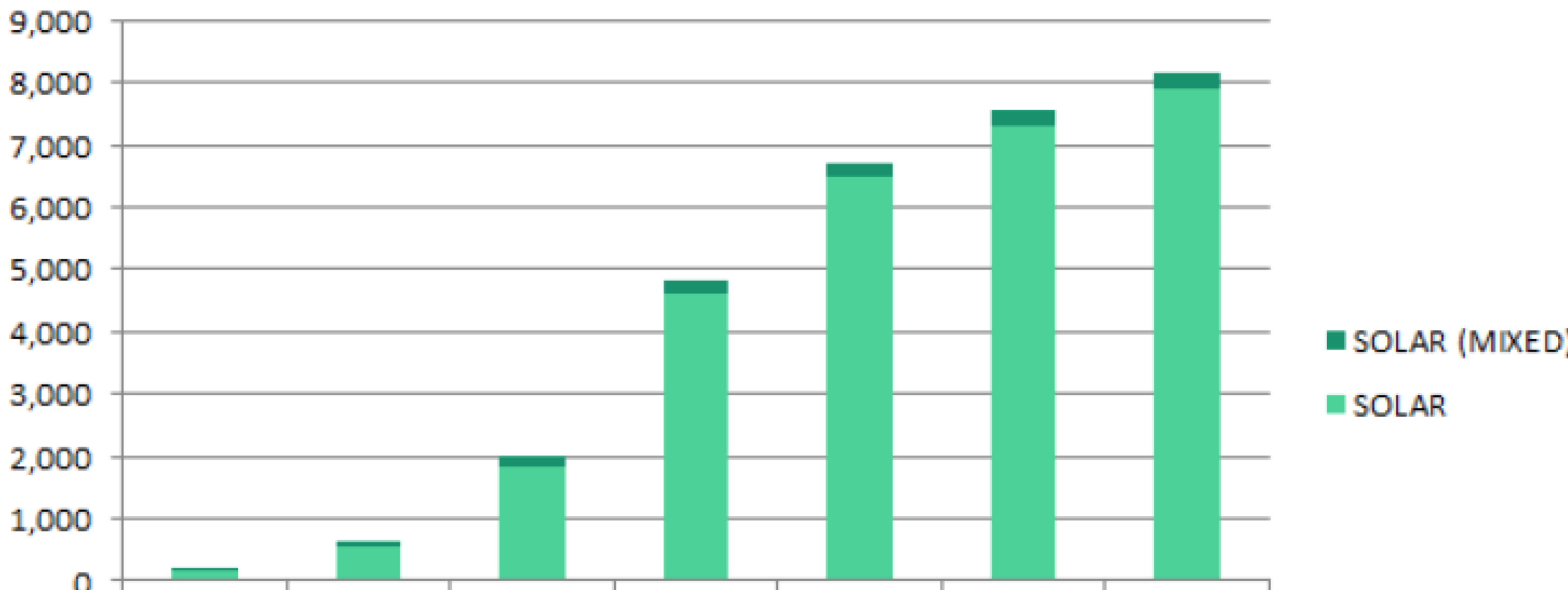
- Geographical variances are significant in both output and generation type.
- Proliferation of other flexible and distributed energy resources will add additional complexity but also opportunity's to deliver network level system operation



Density of embedded generation output

Second step – what's being exported to the DN?

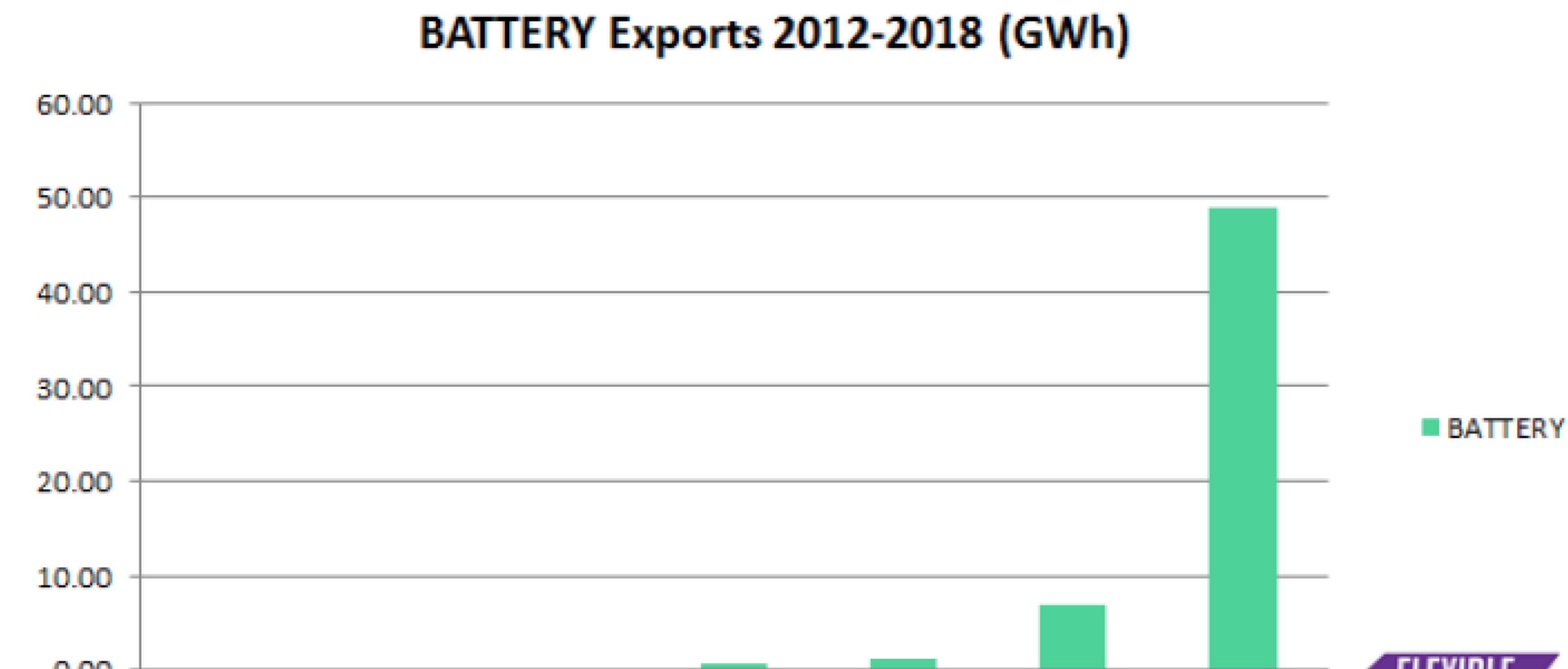
Solar PV and Solar PV (Mixed) Exports 2012-2018 (GWh)



	2012	2013	2014	2015	2016	2017	2018
SOLAR (MIXED)	44	84	137	205	218	249	250
SOLAR	150	574	1,853	4,611	6,497	7,294	7,888

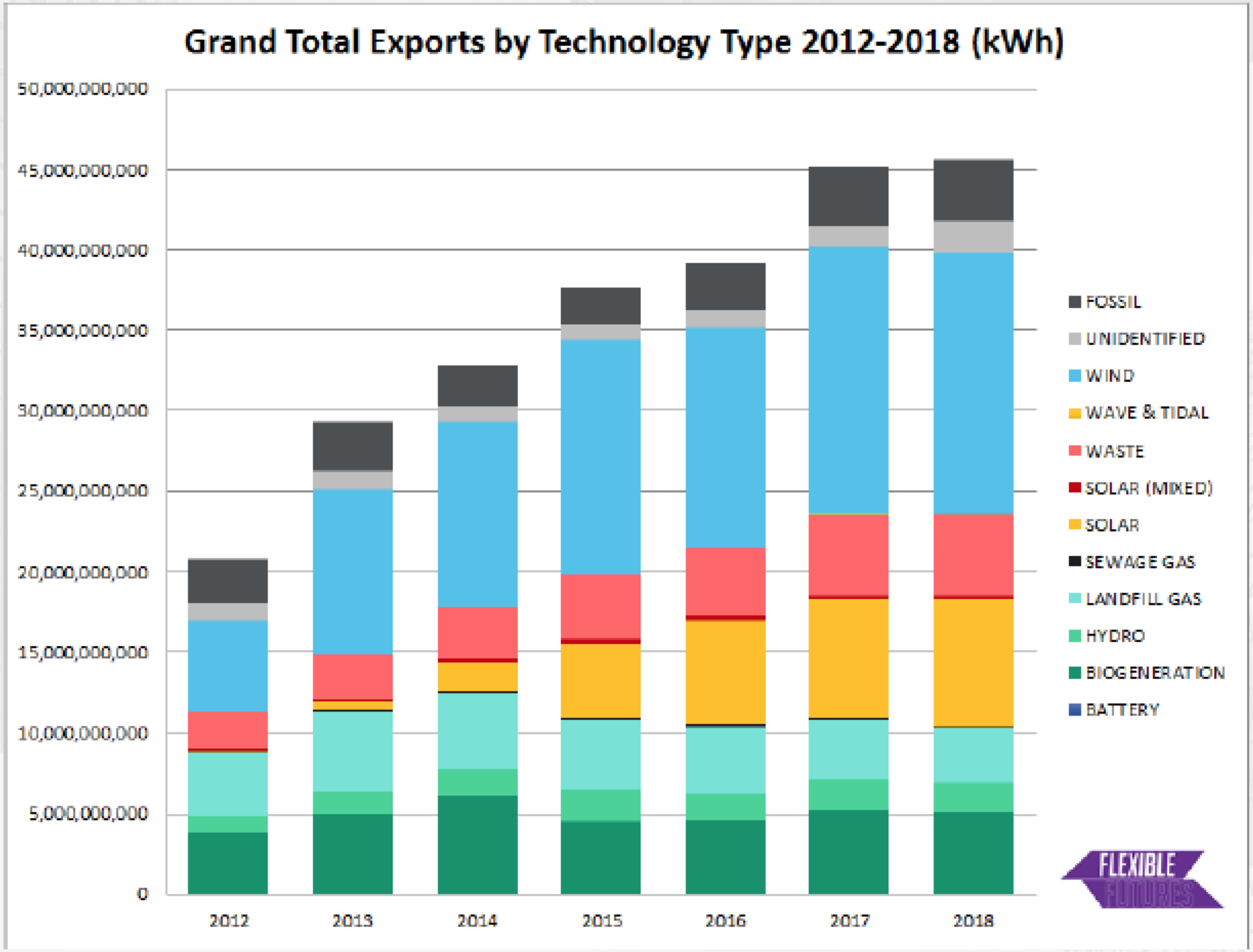
FLEXIBLE FUTURES

Second step – what's being exported to the DN?



	2012	2013	2014	2015	2016	2017	2018
BATTERY	0.00	0.00	0.05	0.66	1.13	7.02	48.93

Second step – what's being exported to the DN?



Exports pose questions about future grid operation

REA View: The balance between wind and solar, complemented by fueled renewable technologies, is achievable from an overall supply perspective. However, the electricity system, including distribution networks, must be flexible enough to cope with days when wind and solar is fully available, and days when it is not. This is why we need more national and local flexibility capacity.

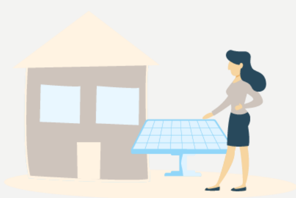
- How will flexibility markets be co-ordinated?
- How will data be shared to facilitate market engagement?
- How will conflicting flexibility actions be mitigated?
- How will flexibility actions be validated?
- How do we ensure co-operation between the DSO and ESO?
- How are the requirements to be enabled by regulation?

Third Step: Identify Five Flexibility Customer Types

Unengaged – hasn't switched since 2012

Somewhat engaged – has switched at least once since 2012

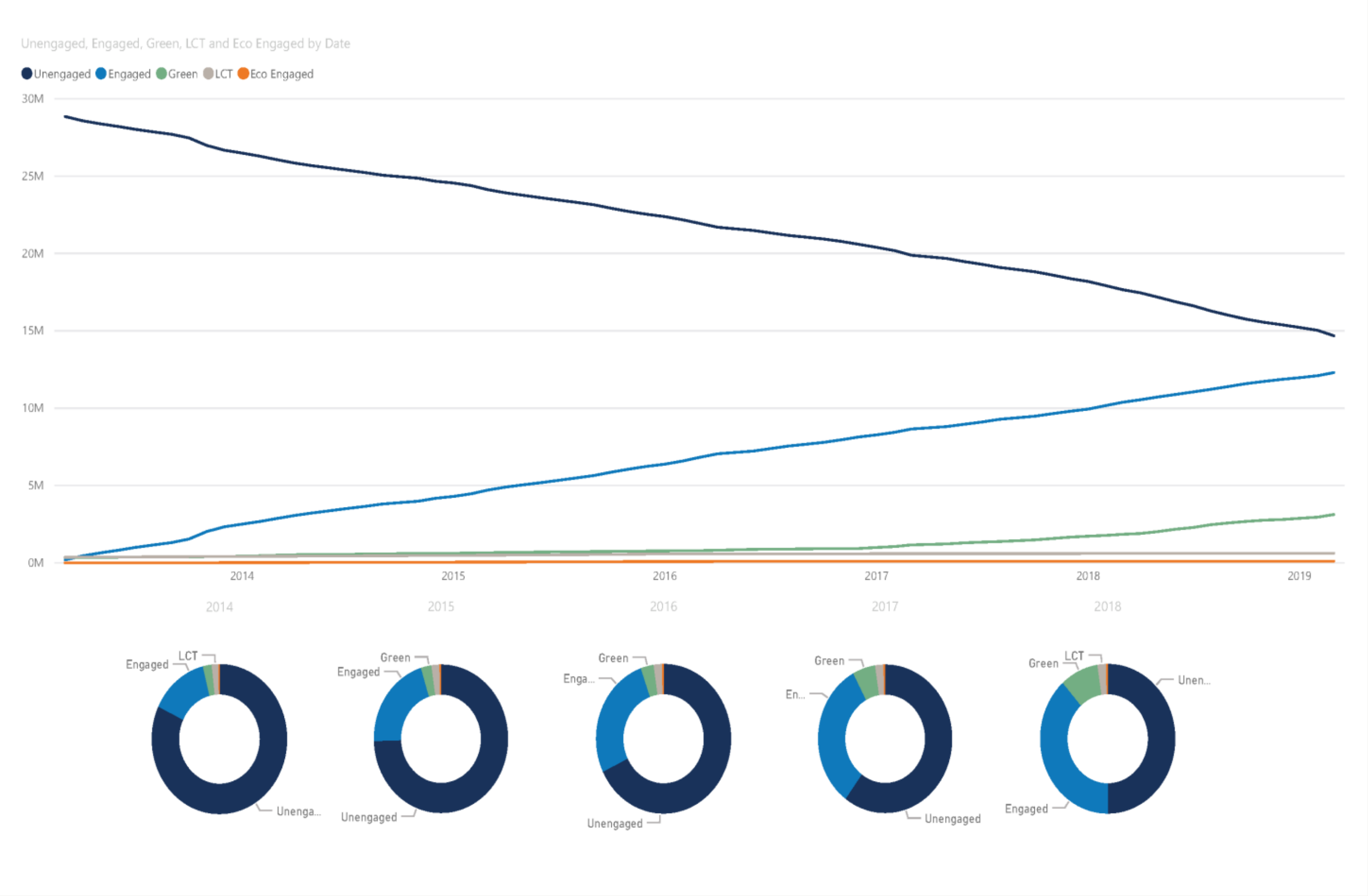
Green – has switched to a supplier that only offers 100% renewable electricity supply tariffs



Green investor – has installed a low-carbon technology since 2012 (Flexibility)

'Eco-engaged' – has both a 100% renewable power supplier and installed LCT (Flexibility)

All customer trends from 2012

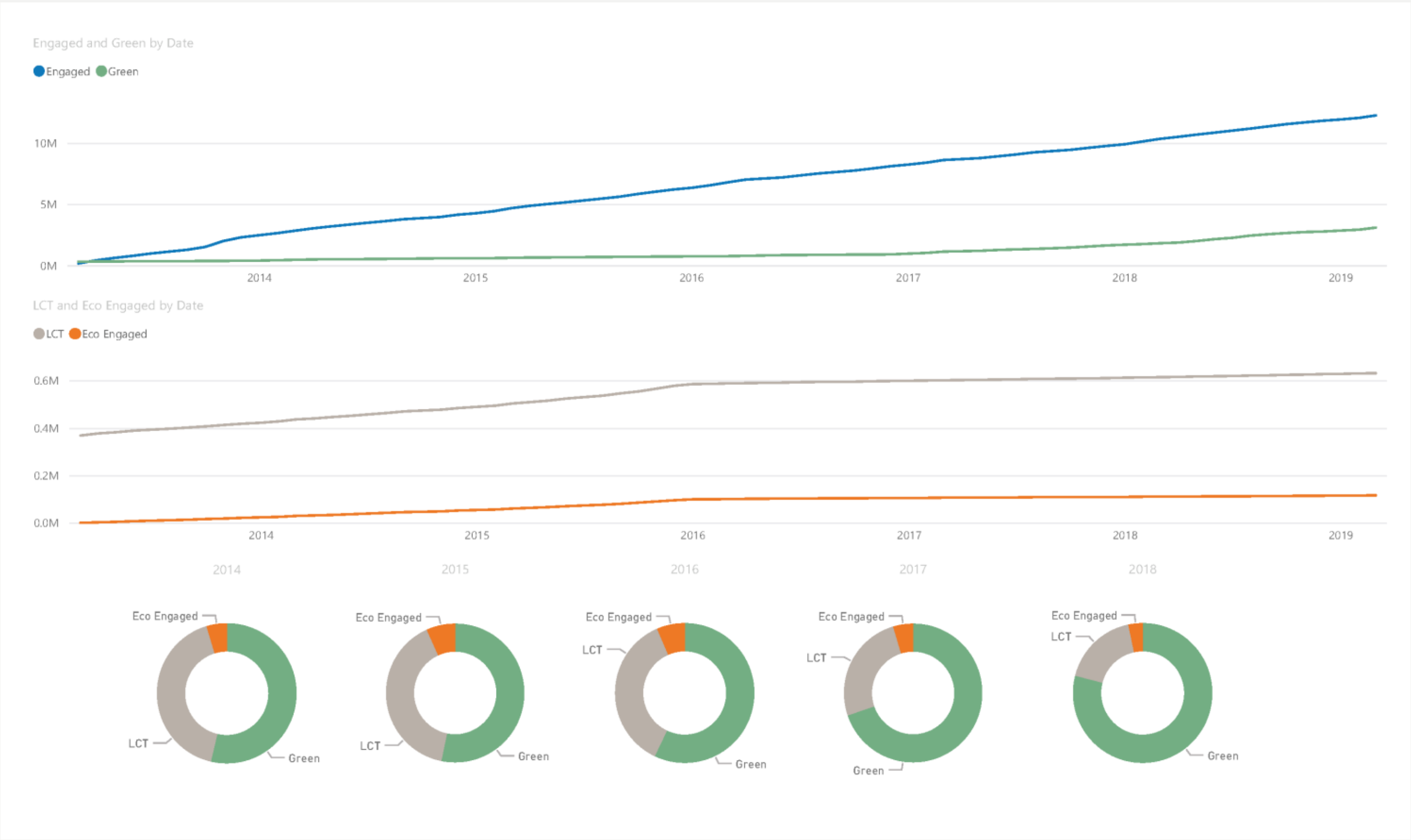


Almost 50% of customers have switched once since 2012

Almost 50% of customers are not engaged

Green tariff customers now total 3m

All customers: green tariff and LCT trends



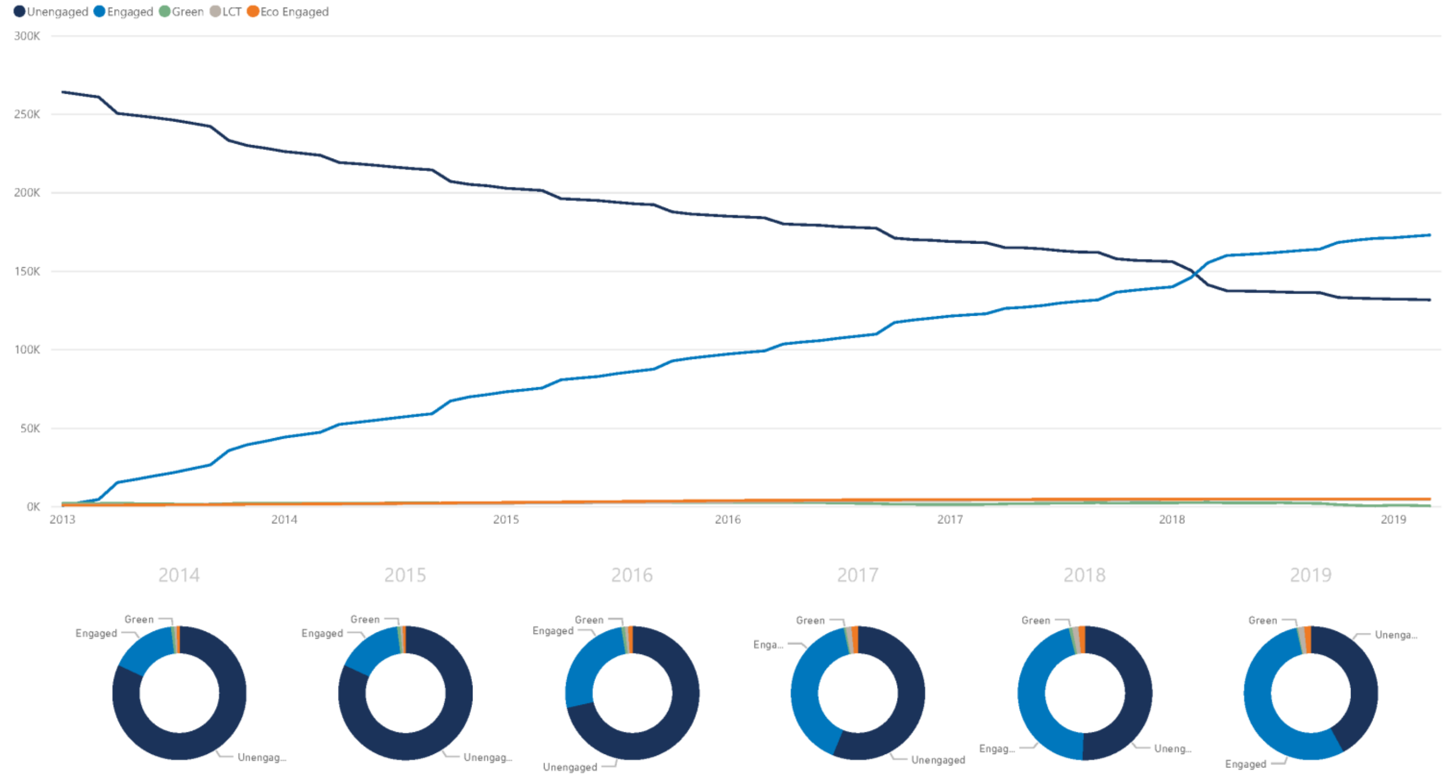
Green customers are c25% of engaged customers; both appear to increase at a similar rate

LCT investors reached 600k customers by 2019 but flat after 2017

ECO engaged reached 100k customers by 2019 but flat after 2016

Little evidence of link between green tariff and LCT investor

Industrial & Commercial trends

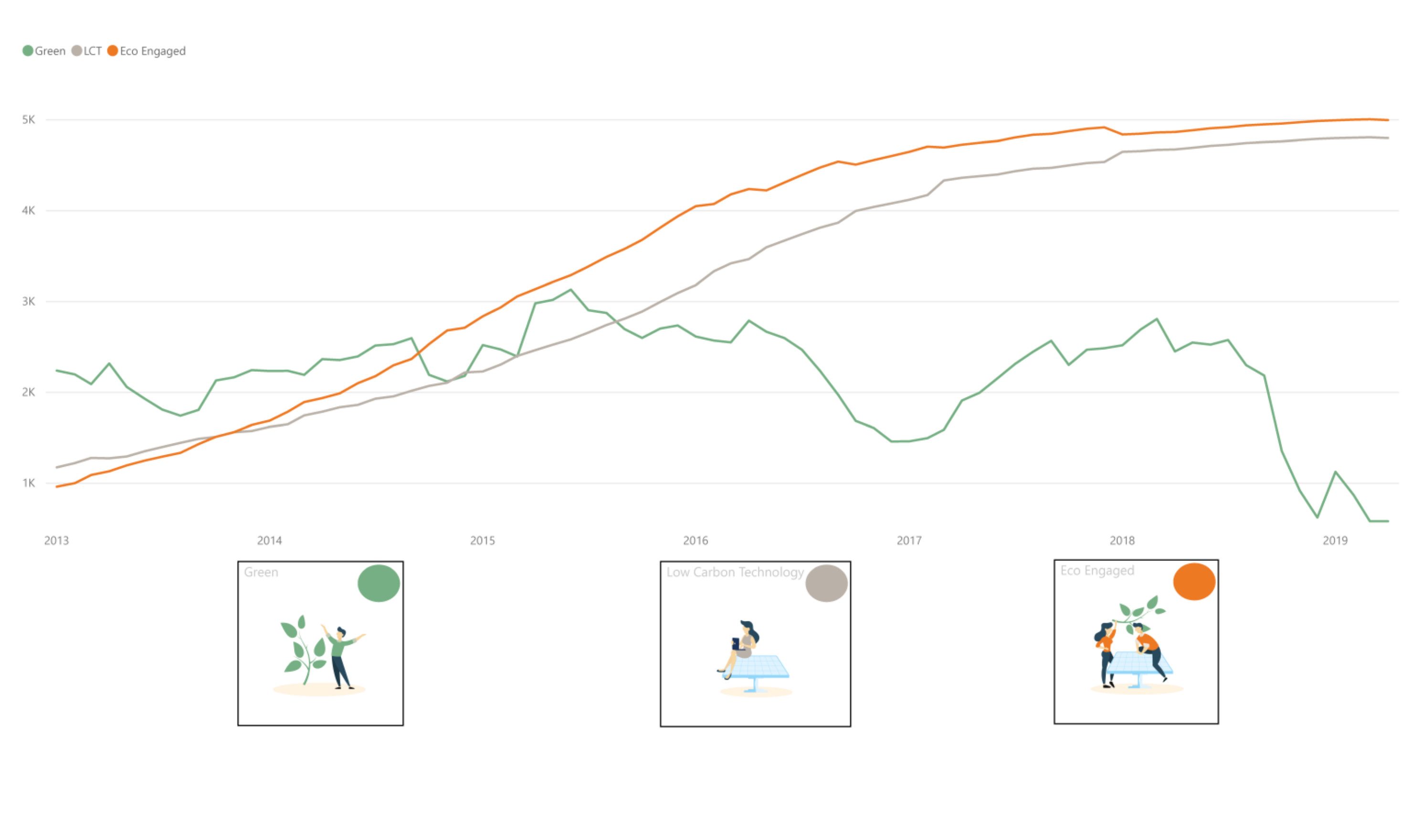


Around 60% of customers have switched once since 2012

Around 40% of customers are not engaged

Adoption of LCT remains very low

Industrial & Commercial Green tariff and low carbon trends



LCT investors and ECO engaged are growing slowly post 2017

Our analysis shows that the majority of these customers originally had a green tariff

This appears to show a migration from green tariff to LCT investment.

This may also indicate the future potential to engage with flexibility services

Key findings

- **Customer engagement** with the electricity sector is growing, with around 50% of consumers having switched at least once since 2012
- **Green suppliers** - Of the12m customers who have switched, around 5m have chosen a ‘green supplier’ at least once since 2012; over 3m are currently with a renewable supplier.
- **Low carbon Technology** - The number of customers investing in low carbon technology has been relatively flat since 2017 when subsidies were removed.
- **Domestic customers** - there seems to be little evidence of customers choosing a green tariff and then investing in low carbon technology.
- **C&I sector** - adoption of a green supply tariff may be a leading indicator for future low carbon and flexibility technology adoption
- **Untapped potential** - Despite huge potential for distributed energy resources to provide flexibility services, there is little evidence of growth; barriers include high costs and the lack of easily accessible markets.

Thank you

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