

Integrating wind power into the UK energy mix through dynamic demand-side response

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BIEE September 2016

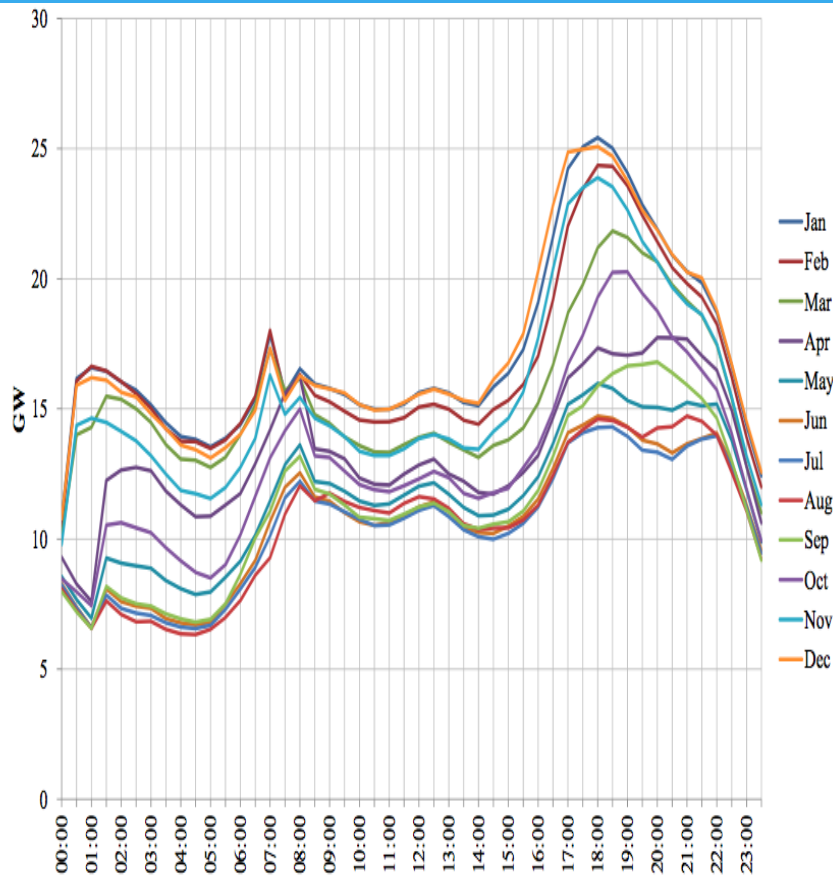
Overview

- Background
- Trial design
- Response to trial ‘events’
- Measures for increasing response - interviews
- Summary

“Demand-side response is a scheme where customers are incentivised financially to lower or shift their electricity use at peak times.”

UK Power Networks

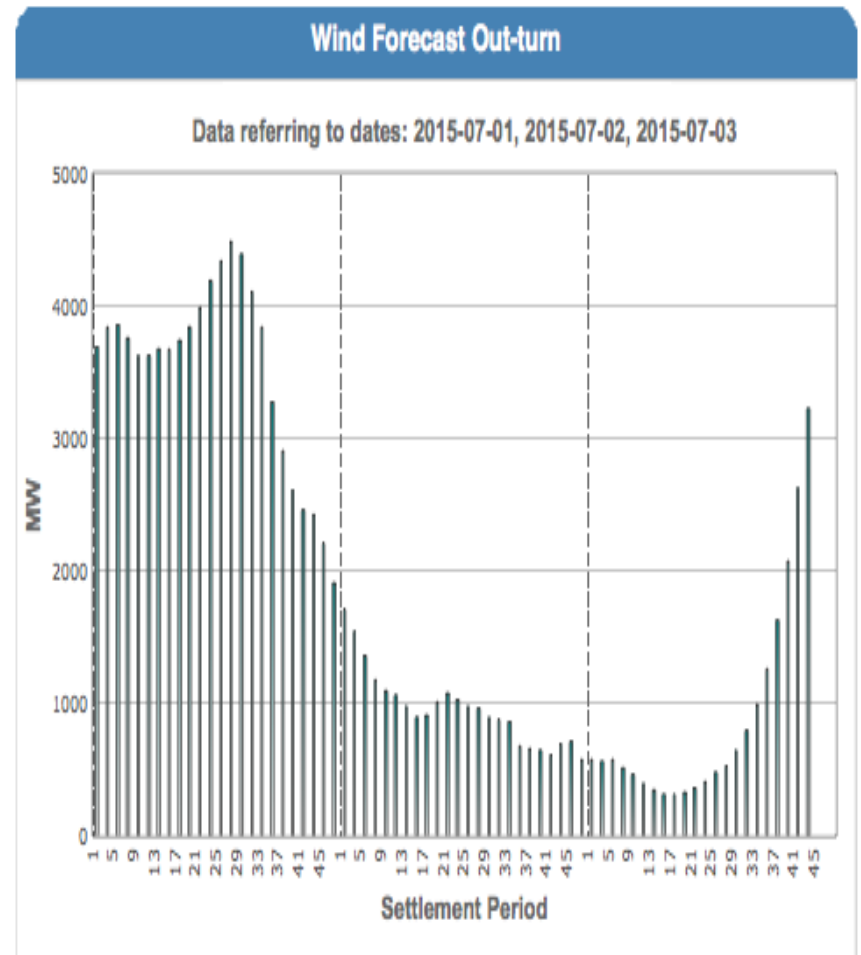
Reducing peaks and wind following with DSR



Average GB Half-Hourly Domestic Demand on Weekdays by Calendar Month

Source: Sustainability First Paper 11

Peak shifting - static time-of-use



Source: National Grid Balancing Mechanism Reporting System

Supply following - wind twinning

Willingness to switch to demand-side response tariffs

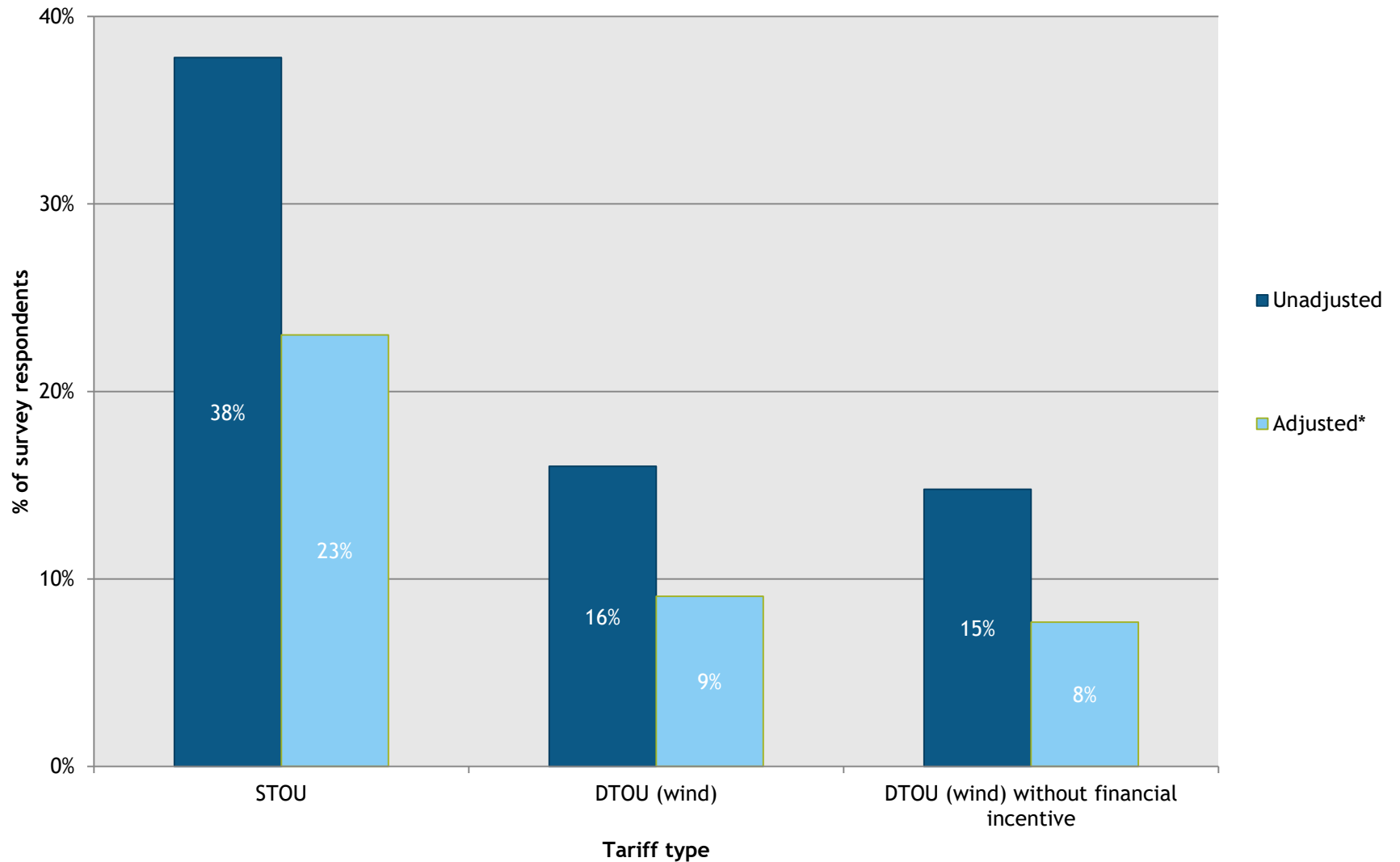


Internet survey of 1,312 UK consumers

Three tariff options:

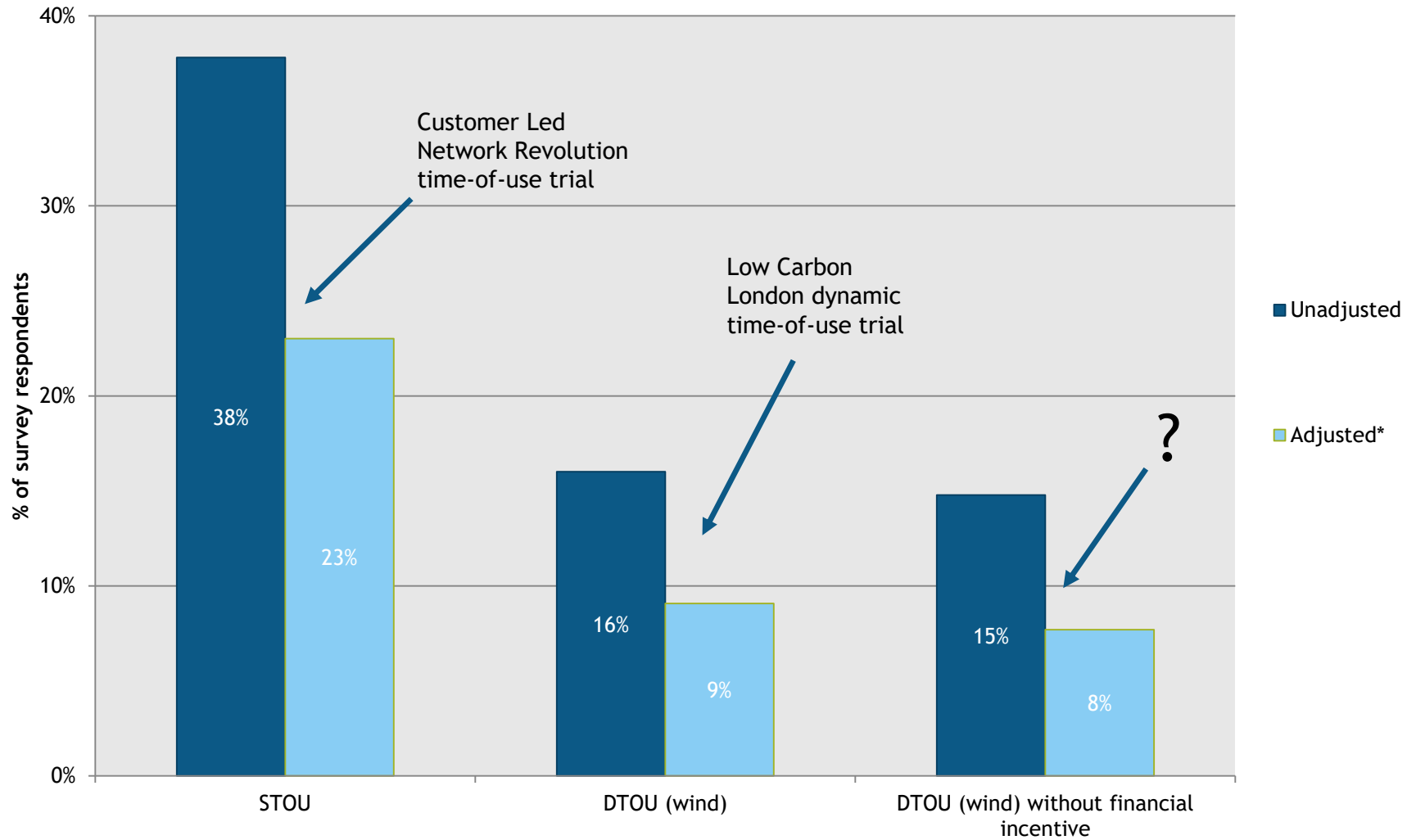
1. Static time of use - morning and evening peak prices (reduce peaks)
2. Dynamic time of use - prices one day in advance (supply following)
3. Dynamic time of use without financial incentive - notifications only, one day in advance (supply following)

Survey responses: willingness to switch



STOU = Static time of use; DTOU = Dynamic time of use
* Adjustment to remove uncertainty of switching tariff expressed by some respondents

Survey responses: willingness to switch



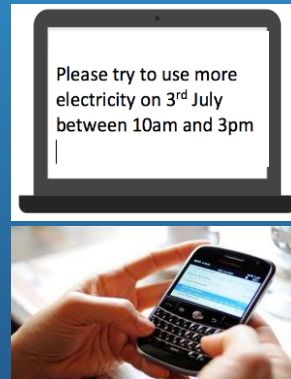
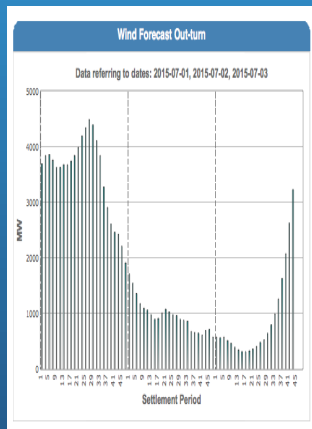
Tariff type
STOU = Static time of use; DTOU = Dynamic time of use
* Adjustment to remove uncertainty of switching tariff expressed by some respondents

Environmental alert trial

46 households in England recruited

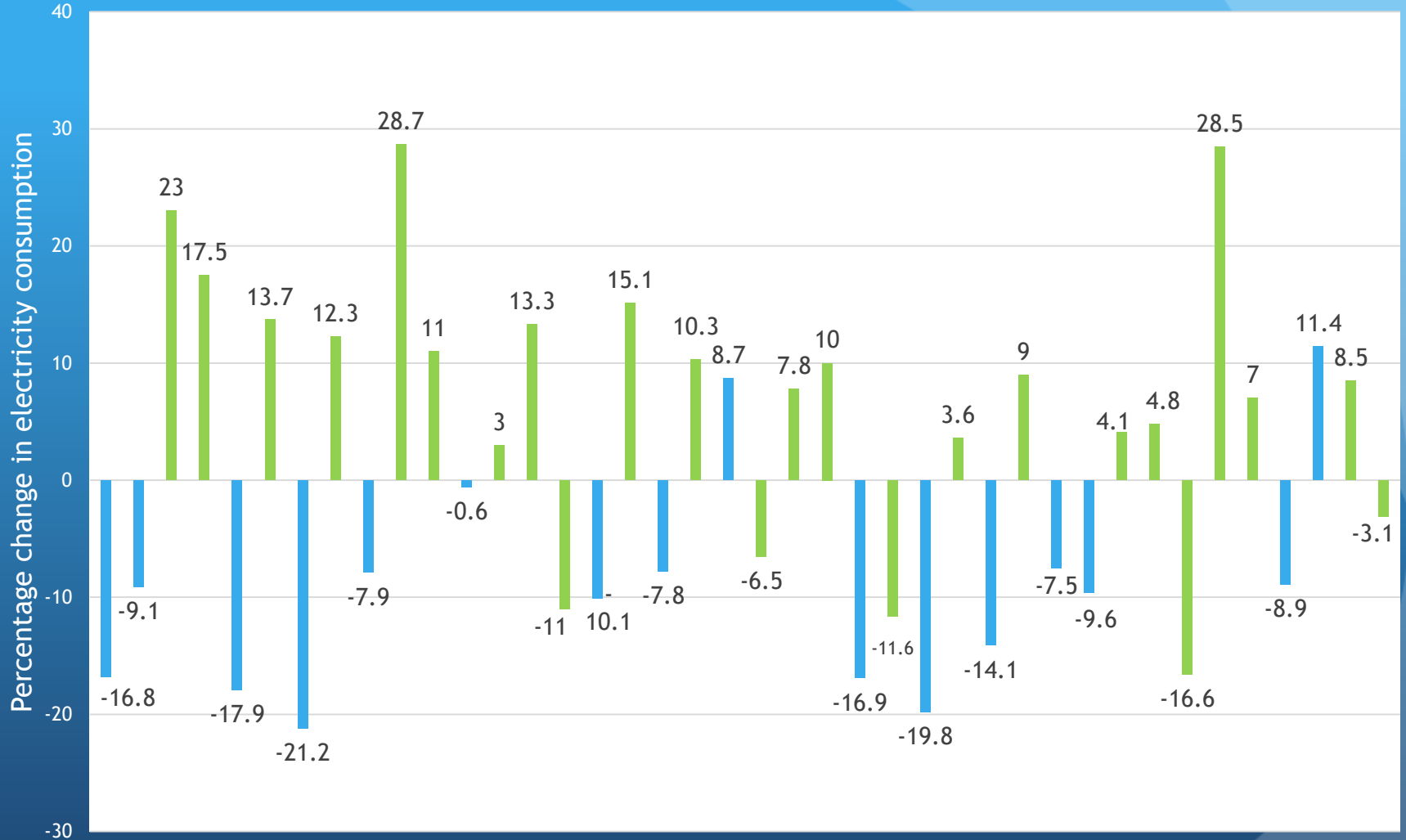
Provided with in-home displays and an internet bridge

5 weeks of baseline consumption data followed by 40 'events'



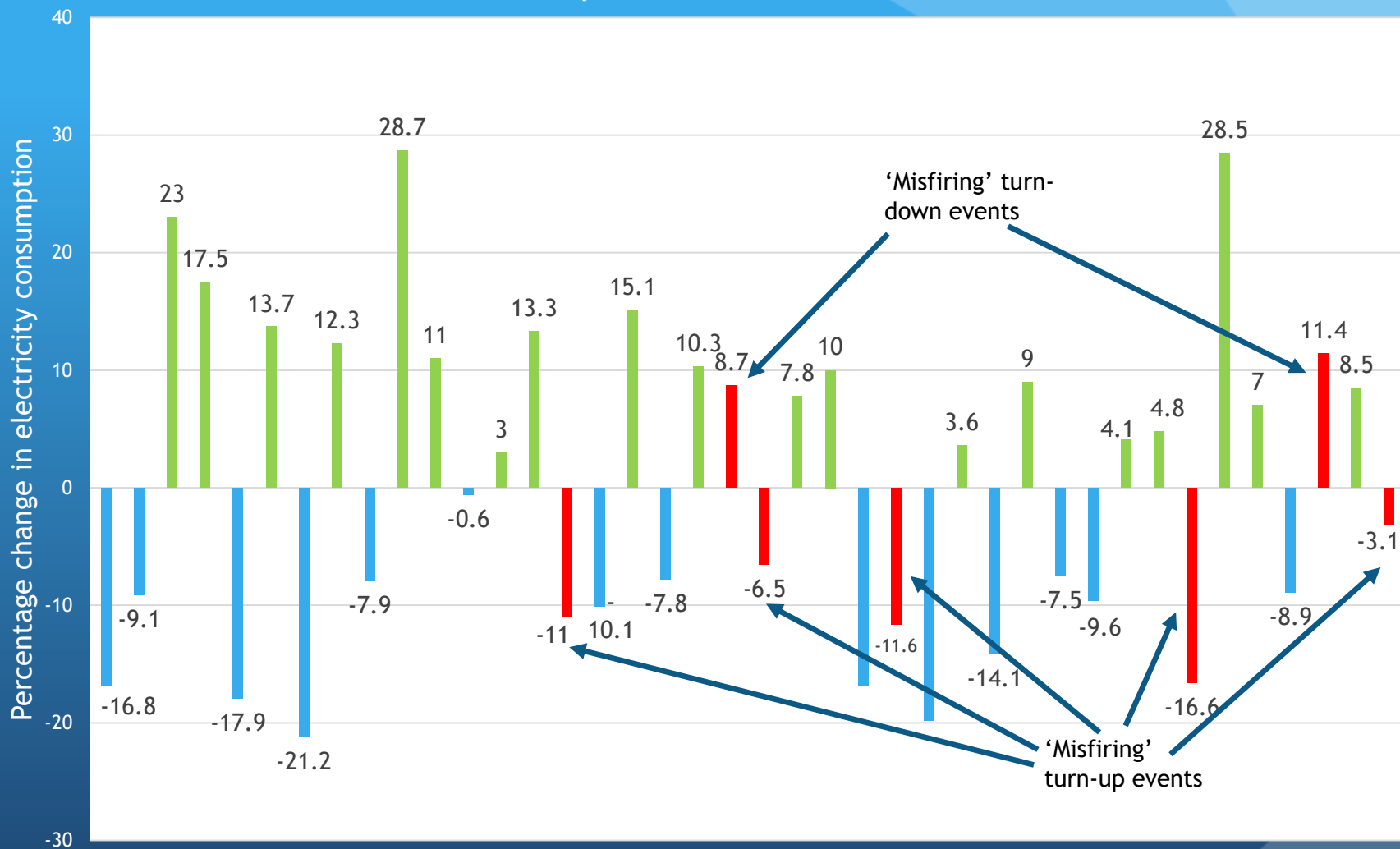
Response estimated by comparing reference load with event consumption

Event response - all 46 households



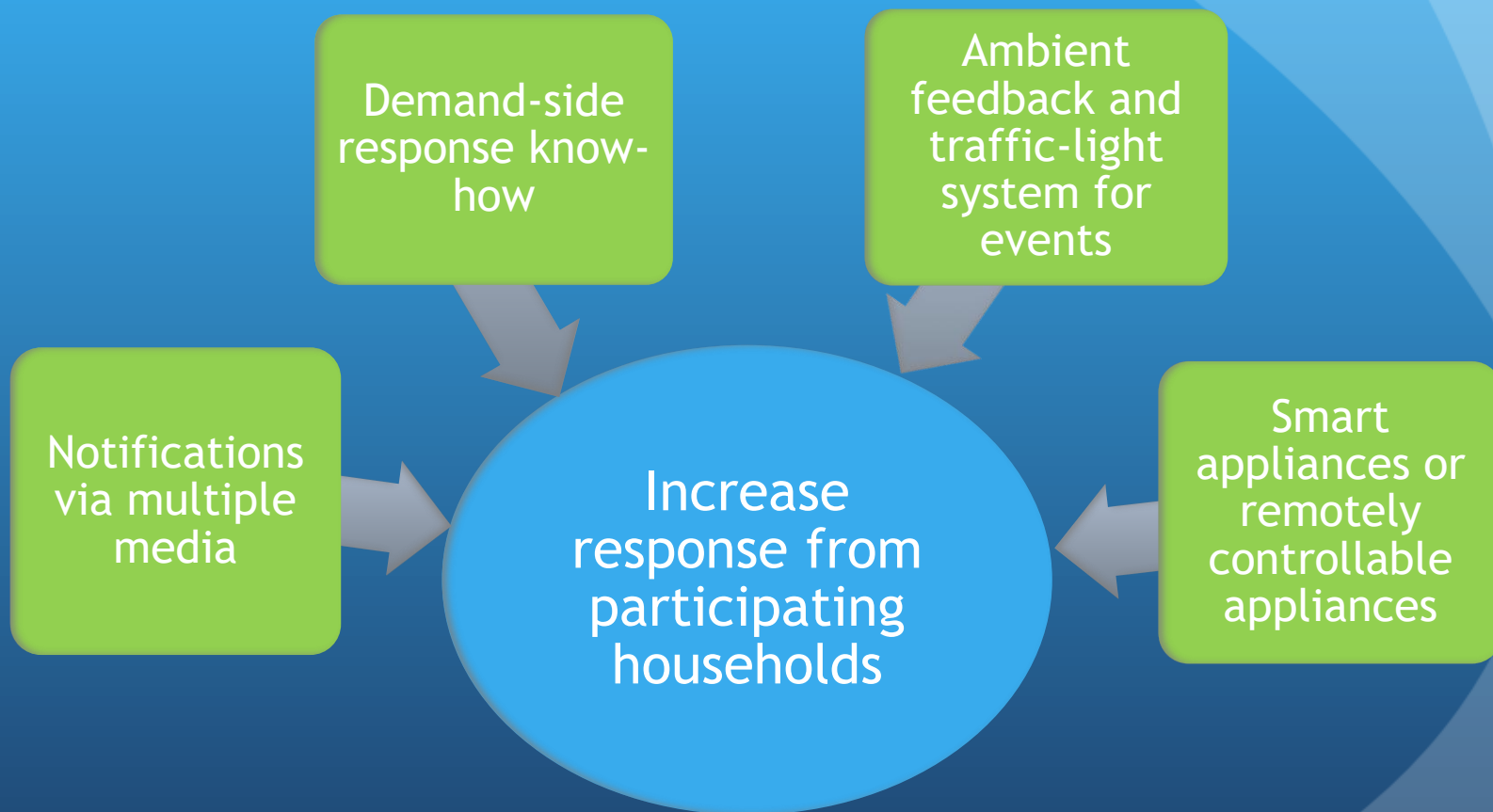
Turn-down events = 10% (44 watts per hour)
 Turn-up events = 4.5% (18 watts per hour)

Event response - all 46 households



Turn-down events = 10% (44 watts per hour)
 Turn-up events = 4.5% (18 watts per hour)

Enablers of response identified through participant interviews



Summary

- Some consumers willing to respond to wind energy supply by making changes to demand
- Enablers of response -notifications via multiple media, ambient signalling, smarter appliances, demand-side response know-how
- Whether response would have continued over a longer timeframe is unknown

Thanks for listening

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