Department of Energy & Climate Change

Technical annex

DECC/John Lewis energy labelling trial

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Annex A – Methodology

Trial design

The trial was a cluster parallel randomised controlled trial (RCT), where the intervention and control groups were tested concurrently and the interventions were purposefully designed. The cluster specification signifies that the randomisation between the intervention and control groups occured at the John Lewis store level as opposed to the individual consumer level. This was due to the practicality of rolling out new labels to products in stores, and possible cross-contamination between staff in the same store. This store level clustered design was also selected since it was not possible to randomly allocate each consumer to either the control or intervention group when they first entered a John Lewis store.

The design was also single-blind for the consumers, meaning that the delivery Partners know which stores had been allocated to the intervention and control groups, while the individual consumers themselves did not.

Table 1 - Allocation of stores to intervention or control group

Intervention group	Control group
Aberdeen	Brent Cross
Bluewater	Cheadle
Cambridge	Croydon
Cardiff	Edinburgh
Chester	Exeter
Chichester	Glasgow
High Wycombe	Kingston
Ipswich	Leicester
Knight & Lee	Liverpool
Milton Keynes	Newcastle
Newbury	Peter Jones
Norwich	Poole
Nottingham	Sheffield
Oxford Street	Southampton
Peterborough	Stratford

Reading	Swindon
Solihull	Tamworth
Tunbridge Wells	Trafford
Watford	Welwyn

Randomisation and sampling strategy

Randomisation for the trial occured at the cluster (store) level, since simple random sampling at the customer level was not possible due to practical constraints described above. Randomising over short periods of time (day/week), may have been possible, but would have risked contamination due to (a) learning by sales staff, or (b) returning customers.

As well as clustering at the store level, the sample and randomisation was stratified by store location (town-centre and out-of-town). This decision was based on prior information that out-of-town and town-centre store characteristics may vary systematically across important characteristics (particularly customer segmentation). Therefore, stratification by store location helped reduce the variance within the outcome measure.

An objective method to classify stores was adopted since it was not immediately clear which stores should be classified as out-of-town or town-centre. For example Edinburgh (in-town) and Bluewater (out-of-town) were both originally classified as Shopping Centres. In order to determine store classification, a 0.5mile circle radius was drawn around each town centre according to Google maps. If the corresponding John Lewis store fell within the radius, it was considered town-centre, otherwise, it was considered out-of-town (falling outside 0.5mile circle).

Table 2: John Lewis stores with stratification allocation.

Shaded cells signify a different town centre than store name

Cluster ID	Cluster name	TOWN_CENTRE? (0=no, 1=yes)	Closest town/city
2	Bluewater	0	Dartford
3	Brent Cross	0	Brent Cross
6	Cheadle	0	Manchester
7	Chester	0	Chester
8	Chichester	0	Chichester
9	Croydon	0	Croydon
13	High Wycombe	0	High Wycombe
14	Ipswich	0	Ipswich
26	Poole	0	Poole
29	Solihull	0	Birmingham
33	Swindon	0	Swindon
34	Tamworth	0	Tamworth
35	Trafford	0	Manchester
36	Tunbridge Wells	0	Tunbridge Wells
1	Aberdeen	1	Aberdeen
4	Cambridge	1	Cambridge
5	Cardiff	1	Cardiff
10	Edinburgh	1	Edinburgh
11	Exeter	1	Exeter
12	Glasgow	1	Glasgow
15	Kingston	1	Kingston
16	Leicester	1	Leicester
17	Liverpool	1	Liverpool
18	Milton Keynes	1	Milton Keynes
19	Newbury	1	Newbury
20	Newcastle	1	Newcastle
21	Norwich	1	Norwich
22	Nottingham	1	Nottingham
23	Oxford Street	1	Oxford Street
24	Peter Jones	1	Peter Jones
25	Peterborough	1	Peterborough
27	Reading	1	Reading
28	Sheffield	1	Sheffield
30	Southampton	1	Southampton
31	Knight & Lee	1	Knight & Lee
32	Stratford	1	Stratford
37	Watford	1	Watford
38	Welwyn	1	Welwyn

Table 3 lists the stores by strata and treatment group allocation. The randomisation procedure followed a covariate-constrained algorithm[1] for cluster RCTs, which minimised the risk of covariate imbalance at baseline. Considering the covariates during randomisation was important, because an imbalance at baseline would have decreased statistical power and the precision of the final results. This approach was

[1] Carter & Hood, Balance algorithm for cluster randomized trials, BMC Medical Research Methodology, 2008

demonstrated as being more robust for clustered RCTs than traditional balance randomisation techniques[2,3].

As well as using a convariate-constrained allocation procedure, an element of randomness was also introduced in the final selection as per Carter & Hood[6].

Table 3: John Lewis stores with treatment group allocation

Cluster ID	Cluster name	TOWN_CENTRE? (0=no, 1=yes)	Treatment (0=no, 1=yes)
3	Brent Cross	0	0
6	Cheadle	0	0
9	Croydon	0	0
26	Poole	0	0
33	Swindon	0	0
34	Tamworth	0	0
35	Trafford	0	0
2	Bluewater	0	1
7	Chester	0	1
8	Chichester	0	1
13	High Wycombe	0	1
14	Ipswich	0	1
29	Solihull	0	1
36	Tunbridge Wells	0	1
10	Edinburgh	1	0
11	Exeter	1	0
12	Glasgow	1	0
15	Kingston	1	0
16	Leicester	1	0
17	Liverpool	1	0
20	Newcastle	1	0
24	Peter Jones	1	0
28	Sheffield	1	0
30	Southampton	1	0
32	Stratford	1	0
38	Welwyn	1	0
1	Aberdeen	1	1
4	Cambridge	1	1
5	Cardiff	1	1
18	Milton Keynes	1	1
19	Newbury	1	1
21	Norwich	1	1
22	Nottingham	1	1
23	Oxford Street	1	1
25	Peterborough	1	1
27	Reading	1	1
31	Knight & Lee	1	1
37	Watford	1	1

[2] Xiao et al. , Comparison of dynamic block randomization and minimization in randomized trials: a simulation study, Clinical Trials, 2011

[3] Ivers et al., Allocation techniques for balance at baseline in cluster randomized trials: a methodological review, Trials, 2012

The following provides documentary evidence of the independence of the randomisation process, and tests for balance across covariates (controlling variables). Following the balance checks, the regions were also compared against each other using Indices of Deprivation. Below are details of the calculations and results indicate no statistical difference between the treatment and control group with respect to Indices of Deprivation.

The covariate-constrained allocation procedure minimises imbalance; however, it is possible to also independently validate the results using a conditional independence test. Specifically by using the standardised mean differences along each covariate, with and without the stratification, and testing for the conditional independence of the treatment variable and the covariates within strata.

Table 4 presents the results of the balance check that demonstrates that there is no significant difference between strata or treatment groups, i.e. the randomisation is well balanced.

Table 4: Conditional independence test for covariate balance

	strat					
vars	TREAT=0	TREAT=1	adj.diff	adj.diff.null.sd	std.diff	z
as.numeric(X75_KW_TDC)	7.98e+04	7.89e+04	-8.58e+02	1.48e+04	-1.84e-02	-5.80e-02
as.numeric(X75_KW_TDV)	2.29e+04	2.34e+04	5.61e+02	4.98e+03	3.66e-02	1.13e-01
as.numeric(X75_KW_WD)	1.18e+05	1.09e+05	-8.67e+03	3.77e+04	-7.29e-02	-2.30e-01
as.numeric(X75_KW_WM)	1.76e+05	1.83e+05	6.43e+03	3.33e+04	6.06e-02	1.93e-01
as.factor(STORE_TYPE)-1	7.37e-01	7.37e-01	0.00e+00	1.25e-01	0.00e+00	0.00e+00
as.factor(STORE_TYPE)1	2.63e-01	2.63e-01	0.00e+00	1.25e-01	0.00e+00	0.00e+00
as.numeric(ELEC_SELLING_SPACE_SQFT)	2.18e+03	2.19e+03	1.28e+01	2.05e+02	1.95e-02	6.24e-02
as.numeric(NUM_OF_PARTNERS)	5.86e+02	6.10e+02	2.36e+01	1.33e+02	5.52e-02	1.77e-01
as.numeric(A_RATED_PLUS_LAUNDRY_SALES)	6.95e+05	7.11e+05	1.59e+04	1.50e+05	3.38e-02	1.06e-01
as.numeric(TOTAL_LAUNDRY_SALES)	1.20e+06	1.20e+06	6.91e+03	2.69e+05	8.19e-03	2.57e-02
as.numeric(MIX_OF_A_ABOVE)	5.96e-01	6.03e-01	7.31e-03	1.53e-02	1.56e-01	4.78e-01

---Overall Test---

	chisquare	df	p.value
strat	1.57	10	0.999

Signif. codes: 0 ‘***’ 0.001 ‘** ’ 0.01 ‘* ’ 0.05 ‘. ’ 0.1 ‘ ’ 1

Indices of Deprivation Check

As well as checking the covariate balance, a secondary balance check was done using the Office for National Statistics (ONS) Indices of Deprivation. The balance check was made at the local authority level for each store to compare the socio-economic differences between the surrounding areas. Specifically, the ONS Indices of Deprivation (ID 2010) was used, which was constructed using the following weights for a series of indicators.

- Income Deprivation (22.5%)
- Employment Deprivation (22.5%)
- Health Deprivation and Disability (13.5%)
- Education, Skills and Training Deprivation (13.5%)
- Barriers to Housing and Services (9.3%)
- Crime (9.3%)
- Living Environment Deprivation (9.3%)

Two variables were specifically used from the Indices: the first, the local authority ranking (ranking of 1 signifies the worst area of deprivation); and second the proportion of each local authorities population living in the 10% more deprived SOA's in the country.

Table 5 is a summary of the results. It was not possible to include John Lewis stores in Scotland or Wales as no comparable measure was available.

Table 5: John Lewis stores with local authority area of deprivation ranking

Cluster ID	Cluster name	Town centre? (0=no, 1=yes)	Treatment (0=no, 1=yes)	Rank of average score	Extent
3	Brent Cross	0	0	176	6%
6	Cheadle	0	0	151	13%
9	Croydon	0	0	107	18%
26	Poole	0	0	183	7%
33	Swindon	0	0	178	13%
34	Tamworth	0	0	140	14%
35	Trafford	0	0	167	13%
2	Bluewater	0	1	175	6%
7	Chester	0	1	171	13%
8	Chichester	0	1	222	1%
13	High Wycombe	0	1	222	1%
14	Ipswich	0	1	83	26%
29	Solihull	0	1	179	16%
36	Tunbridge Wells	0	1	249	1%

10	Edinburgh	1	0		
11	Exeter	1	0	141	12%
12	Glasgow	1	0		
15	Kingston	1	0	255	1%
16	Leicester	1	0	25	43%
17	Liverpool	1	0	1	63%
20	Newcastle	1	0	40	37%
24	Peter Jones	1	0	103	22%
28	Sheffield	1	0	56	33%
30	Southampton	1	0	81	23%
32	Stratford	1	0	3	77%
38	Welwyn	1	0	243	1%
1	Aberdeen	1	1		
4	Cambridge	1	1	193	4%
5	Cardiff	1	1		
31	Knight & Lee	1	1	76	22%
18	Milton Keynes	1	1	192	11%
19	Newbury	1	1	288	1%
21	Norwich	1	1	70	29%
22	Nottingham	1	1	20	50%
23	Oxford Street	1	1	87	22%
25	Peterborough	1	1	71	30%
27	Reading	1	1	129	13%
37	Watford	1	1	197	2%

Table 6 provides the descriptive statistics (mean and standard deviation) for the Indices of Deprivation Rank and Extent variables by treatment group allocation and in/out-of town segmentation

Table 6 - Descriptive statistics for Indices of Deprivation rank and extent

	Treatment	Rank.m	Rank.s	Extent.m	Extent.s
1	0	120.5882	77.93351	0.2329412	0.2128898
2	1	154.3529	75.22295	0.1458824	0.1378885

	TOWN_CENTRE	Rank.m	Rank.s	Extent.m	Extent.s
1	0	171.6429	43.67292	0.1057143	0.07271803
2	1	113.5500	87.30375	0.2480000	0.21254349

Using a t-test for the Extent variable (interval data type) and a Mann-Whitney U test for Rank (ordinal data type), it was possible to check if there was a significant difference between the treatment and control John Lewis stores with respect to the Rank and Extent variables. The null hypothesis was no difference.

Table 7 is the results of the t-test and Mann-Whitney U test for independence with respect to Rank and Extent Indices of Deprivation between the treatment or control stores.

Table 7: Mann-Whitney U and t-test results between control and treatment group, stratified by town-centre

Town-Centre	Rank (W)	p-value	Extent(t-test)	p-value
0	36	0.315	0.7214	0.4908
1	14	0.2008	1.3781	0.1884

The results indicate no difference between the treatment and control group with respect to Indices of Deprivation.

Conversely, there was a statistical difference between the Indices of Deprivation for town-centre and out-of-town stores ($W = 199$, $p = 0.041$; $t = -2.77$, $p = 0.01$); thereby supporting the decision to use store location as a stratifying variable.

Assumptions

Costs were not discounted. Key assumptions underpinning this calculation are:

- The annual energy consumption (and the implicit number of cycles per year[4]) varies by product. Agreed with Defra, DECC, BIT, EST and JL.
- Lifetime of 9 years. Source: WRAP. Agreed with Defra, DECC, BIT, EST and JL.
- The electricity price is based on the overall UK price for a Standard Tariff marginal unit of electricity in 2012. Source: Quarterly Energy Prices September 2013, Table 2.2.4. Agreed with Defra, DECC, BIT, EST and JL.

Hypotheses

The hypothesis was that if consumers were shown energy labels with a monetary estimate of the running costs of the appliance, they would be more aware of the total cost of appliance ownership. This increased awareness would result in an overall decrease of household energy use through the purchase of more energy efficient appliances. The hypothesis under test was:

> ***H0***: the new labelling has no effect on the average energy efficiency of consumers' white-good purchases
>
> ***H1***: the new labelling decreases the average annual energy consumption of consumers' white-good purchases

Secondary to the main hypothesis, the trial investigated the following two questions:

- Does the new labelling change the distribution of consumers' white-good purchases with regard to energy consumption? i.e. does the new labelling shift the average energy rating of purchased white-goods?
- From a retailer point of view, what is the revenue difference associated between an energy label with running costs versus an energy label with kWh per year alone?

Partner focus groups

The following table outlines the attendance at each session.

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[4] Number of cycles per year: tumble dryers 160, washer dryers 200 and washing machines 220 (data from EU labels).

Table 8 – Dates and attendance of John Lewis Partner focus groups

Dates and attendance of John Lewis Partner focus groups	
Date	**Total no. Partners attended**
Wave 1 24 October 2013 30 October 2013	12
Wave 2 30 January 2014 7 February 2014	11
Wave 3 17 July 2014 18 July 2014	7 (including 2 from control stores)

Given the dispersed geographical locations of the Partners all the sessions were conducted by phone conference (with the exception of the first wave 2 session which was conducted by video conference).

The focus groups were designed, facilitated and analysed by a social researcher in DECC. A copy of the topic guides and detailed analysis from each wave is available on request.

Annex B - Analysis

Evaluation design

The evaluation design and analysis method was determined by BIT prior to sales data being received and quality assured by the Office for National Statistics.

Trial model

For the final evaluation of the trial, a regression model was used to determine if the intervention was successful, as well as provide an estimate for the size of any detected effect. Regression modelling is a standard technique used for the analysis of randomised controlled trials and allows for the control of a wide range of variables that might otherwise affect the outcome of the trial. Particularly for this trial, the regression model included baseline sales data for each store, which is a key variable likely to explain a considerable portion of between-store variance in the absence of the intervention.

Because the outcome measure is a normal interval variable (kWh/year), a standard Ordinary Least Squared (OLS) linear regression was appropriate for the evaluation. OLS regression is a simple and straightforward analysis technique. Other regression techniques within OLS, such as difference-in-difference or regression discontinuity, are useful in quasi-experimental settings; however, these techniques were not necessary in this study since we were able to achieve true randomisation. For example, difference-in-difference and regression discontinuity are more appropriate for the evaluation of post-hoc historic data that was not collected as part of a pre-designed trial. The following trial model and evaluation strategy was quality assured by DECC and the Office for National Statistics.

Regression model

A regression model allowed an examination of the effects from a set of predictive variables on an identified outcome variable. In this case, the outcome variable was average kWh/year and it is influenced by a set of predictor variables as specified below:

$$kw\_annual_{ist} = \alpha + \beta_1 T_{st} + \beta_2 C_i + \beta_3 Y_i + \theta_t + u_i$$

Where:
kw_ annual = interval outcome measure denoting the kWh/year for a given product type purchased.

Subscript *i* denotes an individual level characteristic (such as product type: tumble dryer vented; tumble dryer condensed; washer dryer; and washing machine), subscript s a store level variable (such as cluster ID), and subscript *t* as a variable dependent on time (such as month)

α = time and store invariant constant, normal regression variable

T = a binary variable denoting assignment to the treatment group. Set to 1 if the store s is in the treatment group at time *t*, and 0 otherwise.

C = a vector of store-cluster fixed-effects, such as store location and selling

space

Y = a vector of white-good type fixed-effects, such as brand

θ = a linear time trend, i.e. the month component of the sales data

u = a clustered error term

The estimated explained variance of each covariate, with confidence intervals, was to be examined through an analysis of the model coefficients. The overall statistical significance was to be checked by hypothesis tests, specifically an overall F-test, followed by one-tailed t-tests of individual parameters.

The overall model goodness of fit and underlying assumptions for OLS regression were to be tested. Specifically, that the sample data for both arms, control and intervention, are drawn from a Normal distribution with similar variance, and that this variance is orthogonal on the regressors (homoskedasticity). It is important to note that clustering affects the variance of the data and to the extent that clusters are few, will decrease the sensitivity of the tests. As such, it is important to correct the error term in the regression specification to account for the increased variance.

As well as specifying an OLS regression model, the analysis was to include a secondary non-parametric analysis of the same outcome measure using a Mann-Whitney U test. This will test a hypothesis similar to that tested in primary analysis:that purchases made in the treatment group tend to be of appliances that use less energy than those made in the control group. We can express the null andalternative hypotheses for this test as follows:

H0: the new labelling has no effect on the distribution of consumers’ whitegood purchases with regards to energy consumption

H1: the new labelling tends to shift the distribution of consumers’ whitegood purchases towards goods that use less energy.

The control variables (store level fixed effect covariates) were based on available information provided by John Lewis.

The current covariates and data types for each cluster in the model are:

- Store location (categorical: town-centre or out-of-town)
- Store type (categorical: full line or other [at home, small line])

- Large electrical selling space (interval: square feet as of 28/01/13)
- Number of partners (staff) (interval: count as of 9/1/12)
- A rated or above laundry sales 2012 (interval: amount in £)
- Total laundry sales 2012 (interval: amount in £)
- Mix of A rated or above (interval: percent)
- Monthly sales (interval, amount in £)

Specifying the evaluation with historic data

In order to test the regression model specification, it was possible to analyse historic 2012 sales data obtained from John Lewis. The purpose of this analyse was to test the data assumptions, goodness of fit, and model statistical power.

An important distinction between the historic data and the live trial data is that monthly sales are not available in the historic data set, only the total annual sales. Therefore, it was not possible to include a time component (θt) in the historic data analysis. As such, these results are more conservative than what will be for the final evaluation where the time component will be included. The model used on the historic data was specified as:

$$kw\_annual_{is} = \alpha + \beta_1 T_s + \beta_2 C_i + \beta_3 Y_i + u_i$$

The historic data consisted of 70,050 observations, which was the total number of white-good products sold during 2012 across all John Lewis Stores. Based on John Lewis feedback, the winter months in 2012 comprised approximately 54% of total sales (Oct, Nov, Dec, Jan, Feb, and Mar), therefore the total sales was adjusted by a factor of 0.54, resulting in 37,827 observations As such, each observation represents an individual product sale during the winter months.

Initially, all the store and product covariates were included in the regression analysis; however only the following variables were found to be significant at the 95% confidence level:

$A\_laundry\_sales_i$ = the annual revenue from A+ rated laundry white goods of the store in which purchase *i* was made

$Total\_laundry\_sales_i$ = the annual revenue from all laundry white goods of the store in which purchase *i* was made

$Type_i$ = a vector of type fixed effects (e.g. "Washing Machine")

$Brand_i$ = a vector of brand fixed effects (e.g. "Bosch")

The other covariates were found to be either insignificant or jointly insignificant, in the case of fixed effects, at the 95% confidence level. As such, they were not kept in the final specification for the historic data. However, with the full data set at the end of the trial, all the covariates will were again included and a similar strategy adopted, where insignificant covariates were not used in the final analysis.

The excluded variables were:

- Store-level fixed effects (cluster_id)
- Town centre fixed effects (town_centre)
- Number of partners (num_of_partners)
- Electrical selling space per store (elec_selling_space_sqft)
- The proportion of A+ laundry sales to total laundry sales (mix_of_above)
- Store type fixed effects (store_type)

By excluding these insignificant variables, we increase the degrees of freedom by 43; thereby helping avoid artificially increasing our measure of goodness of fit, and increasing the accuracy of the model estimates. Excluding insignificant variables also reduces the potential for omitted variable bias[5].
Therefore, the final specification for the historic data was specified as:

$$kw\_annual_s = \alpha + \beta_1 A\_laundry\_sales_i + \beta_2 Total\_laundry\_sales_i + \beta_3 Type_i + \beta_4 Brand_i + u_i$$

Analysis with historic data

In order to test the regression model specification, it was possible to use the 2012 sales data provided by John Lewis. The model was analysed in STATA using a robust
standard error Ordinary Least Squares approach[6]. The statistical results are shown Table 8 below.

The results show the regression coefficients and their corrected standard errors. For example, if all else is held constant in this sample, the results indicate that an increase of £1m in A+ laundry sales between stores decreases kWh/year on average by 57.2. To simplify the results, the coefficients for individual product types and brand fixed effects were omitted from Table 7.
With respect to testing the model’s goodness of fit, the adjusted R2 value was 0.89, indicating that the model is a good fit, i.e. it explains a large portion of the observed variance in sample.

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[5] Omitted variable bias occurs when a covariate is correlated with the error term (*ci u*), thereby biasing the results of the model. Including insignificant covariates increases the potential for omitted variable bias, and therefore they were removed from the specification.

[6] As is common when studying cross-sectional datasets, all of our regression results exhibited heteroskedasticity. The STATA option , robust was used in all cases to correct for this heteroskedasticity and estimate standard errors using the White estimator for the error variancecovariance matrix. This also accounted for an increase in variance introduced by the clustering
effect. The heteroskedasticity of the error term was confirmed by performing a Breusch-Pagan test, which tests weather the estimated variance of the residuals from the regression are dependent on the values of the covariates.

Table 9 shows the statistical results of applying the historical 2012 sales data to the regression model specification. The results indicate a good model fit. Table 10 is the effect size calculations by product type.

Table 9 - all Types (OLS) – standard errors in parenthesis

	(1) kwh_annual
A+ laundry sales	-57.173***
	(10.192)
Total laundry sales	32.160***
	(5.562)
Type fixed effects	Yes***
Brand fixed effects	Yes***
Constant	351.716***
	(2.995)
Observations	37827
Adjusted R^2	0.890

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 10: effect size calculations by product type

Product type	Mean (kWh/year)	SE	Nominal Control (N_n)	Nominal Treatment (N_n)	Between cluster variance (σ_b^2)	Within cluster variance (σ_w^2)	ICCR (ρ)
Tumble dryer condenser	372.82	89.69	2,750	3,622	379.44	13,470.53	0.027
Washer dryer	1042.4	233.96	1,333	1,755	1131.49	55,488.38	0.020
Washing machine	186.48	10.37	11,577	14,846	4.94	269.31	0.018
Tumble dryer vented	327.27	127.7	824	1,120	763.43	15,577.63	0.047

Product type	Cluster size (m)	Design effect (D)	True N Control (N_t)	True N Treatment (N_t)	Cohen's d (adjusted)	Minimum detectable effect size (kWh/year)	% Change from mean
Tumble dryer condenser	226	7.16	384	505	0.16	14.35	**3.8%**
Washer dryer	165	4.28	312	411	0.18	42.11	**4.0%**
Washing machine	923	17.61	657	843	0.12	1.24	**0.7%**
Tumble dryer vented	70	4.22	195	265	0.23	29.37	**9.0%**

Trial treatment effect size calculations

The effect size measurement is an estimate of the minimum change required to detect a significant effect between the treatment and control arms. It is important as it defines the minimum magnitude of change required by the intervention on the outcome measure, kWh/year.

Based on an ONS methodological review conducted in August 2013, it was recommended that the predicted values and residual variance from the model be used to estimate the minimum detectable effect size. In this case, this represents the model's predicted sample mean kWh/year and its standard deviation. Since the kWh/year mean and standard error varies significantly by product type, it was more meaningful to calculate the minimum detectable effect size for each different type separately.

This was done by first applying the regression specification to each product type, in order to calculate the fitted values and the root mean squared error (RMSE) term from the results[7]. The constant term from the regression was taken as the mean kWh/year and the RMSE term was taken as the estimate for the standard deviation.

Following the regression, the constant term and the RMSE were used to calculate Cohen's d for a one-tailed test with a significance level of 0.05 and power of 0.8[8]. A correction also needed to be applied to adjust for the added variance of clustering the treatment at the store level, as opposed to the product level. This was done by calculating the Intra-Cluster Correlation Rate (ICCR) for each of the product types. Following Kerry and Bland (1998)[9], the ICCR, ρ was calculated as:

[7] Restricted models of the full specification were used for the following types: washer dryer, and tumble dryer vented, since not all the covariates were significant for those product types.

[8] R command: pwr.2t2n.test(n1=,n2=, sig.level=0.05, power=0.8,one tail test)

[9] Kerry and Bland, 1998, Trial which randomize practices II: sample size, Family Practice

$$\rho = \frac{\sigma_b^2}{\sigma_b^2 + \sigma_w^2}$$

Where σ_b^2 describes the variance between clusters and σ_w^2 denotes variance within clusters.

From these values for ρ, the design effect, D, was calculated as:

$$D = 1 + (m - 1)\rho$$

Where m is the average size of a cluster.

The design effect was used to calculate the “True” N, or the number of independent bservations in the data, which was used to conduct the power calculations.

$$N_t = \frac{N_n}{D}$$

Where subscript t denotes a “true” value and subscript n denotes a nominal value.

Analysis

Primary analysis

The final specification used to test the treatment effect on energy consumption is described below. This specification does not include the originally specified interaction between treatment and store type because the final number of observations within that interaction was very small.

$$\begin{aligned} kw\_annual_i = \alpha + \beta_0 Treatment_i + \beta_1 (Treatment_i \times Town\_center_i) \\ + \beta_3 AverageHistoric_i + \beta_4 W_i + \beta_5 Town\_center_i + \beta_6 Store\_type_i + \varepsilon_i \end{aligned}$$

Secondary analysis

To estimate the treatment effect on product price, the following specification was used. This is similar in form to that used in primary analysis. Here, the dependant variable was changed to the price point of the purchased product (instead of the kWh Annual figure) and the historic average figure was removed (since there was no historic data on prices).

historic data on prices available).

$$price\_point_i = \alpha + \beta_0 Treatment_i + \beta_1(Treatment_i \times Town\_center_i) + \beta_4 W_i + \beta_5 Town\_center_i + \beta_6 Store\_type_i + \varepsilon_i$$

The secondary analysis on price point was also re-run to include the interaction between treatment and store type

Detailed results - labelling effect

Table 1: the effect of treatment on annual energy consumption with interaction between town centre (kWh/year).

Type: (1) Tumble Dryer Condenser

Estimated interaction effects

Town Centre	Not Town Centre
1.16 (kWh)	-1.06 (kWh)

Type: (2) Tumble Dryer Vented

Estimated interaction effects

Town Centre	Not Town Centre
4.61 (kWh)	-9.28 (kWh)

Type: (3) Washer Dryer

Estimated interaction effects

Town Centre	Not Town Centre
-3.49 (kWh)	-15.26*** (kWh)

Type: (4) Washing Machine

Estimated interaction effects

Town Centre	Not Town Centre
0.24 (kWh)	0.48 (kWh)

Table 12: the effect of treatment on price point (£) with interaction between town centre (kWh/year).

Type: (1) Tumble Dryer Condenser

Estimated interaction effects

Town Centre	Not Town Centre
-9.13 (£)	2.44 (£)

Type: (2) Tumble Dryer Vented

Estimated interaction effects

Town Centre	Not Town Centre
-0.92 (£)	-1.86 (£)

Type: (3) Washer Dryer

Estimated interaction effects

Town Centre	Not Town Centre
4.08 (£)	17.69 (£)

Type: (4) Washing Machine

Estimated interaction effects

Town Centre	Not Town Centre
5.82 (£)	3.51 (£)

*statistically significant at the 10% level (p≤0.1); **5% level (p≤0.05); ***1% level (p≤0.01)

Descriptive statistics

This section provides a summary of the main variables used in analysis, including the scatter plot of price and kWh/year characteristics for each product type.

Tumble Dryer (Condensing)

Table 13: descriptive statistics for tumble dryer (condensing)

	Mean	Standard Deviation	Minimum	Maximum
kWh Annual	430.75	148.94	171.79	623.93
% Sales in Full Line Stores in Treatment	43.70%			
% Sales in Town-Centre Stores in Treatment	32.05%			
Historic Average	401.25	19.65	369.98	446.99
% Sales in Town Centre Sales	66.56%			
% Sales in Full Line Stores	88.15%			

Tumble Dryer (Vented)

Table 14: descriptive statistics for tumble dryer (vented)

	Mean	Standard Deviation	Minimum	Maximum
kWh Annual	454.6252	87.59137	266.6667	584.6154
% Sales in Full Line Stores in Treatment	44.24%			
% Sales in Town-Centre Stores in Treatment	31.40%			
Historic Average	354.1836	34.58941	264.7343	429.1269
% Sales in Town Centre Sales	63.47%			
% Sales in Full Line Stores	89.37%			

Table 15: descriptive statistics for washer dryers

	Mean	Standard Deviation	Minimum	Maximum
kWh Annual	1132.474	93.83869	747.8632	1223.932
% Sales in Full Line Stores in Treatment	44.28%			
% Sales in Town-Centre Stores in Treatment	35.34%			
Historic Average	1082.43	11.41266	1049.038	1118.182
% Sales in Town Centre Sales	71.53%			
% Sales in Full Line Stores	89.61%			

Table 16: descriptive statistics for washer machines

	Mean	Standard Deviation	Minimum	Maximum
kWh Annual	182.3233	18.55832	127.3504	258.1197
% Sales in Full Line Stores in Treatment	44.54%			
% Sales in Town-Centre Stores in Treatment	33.68%			
Historic Average	186.0753	1.836585	178.5859	192.4044
% Sales in Town Centre Sales	68.78%			
% Sales in Full Line Stores	88.70%			

Outlier analysis

The primary analysis was repeated after excluding for the two outliers. The specification was kept the same, i.e:

$$kw\_annual_i = \alpha + \beta_0 Treatment_i + \beta_1 (Treatment_i \times Town\_center_i) + \beta_3 AverageHistoric_i + \beta_4 W_i + \beta_5 Town\_center_i + \beta_6 Store\_type_i + \varepsilon_i$$

The treatment effect results are shown below.

Table 17: the effect of treatment on kWh/year excluding outliers, with interaction between town centre.

Type: (2) Tumble Dryer Vented

* Estimated interaction effects

Town Centre	Not Town Centre
-.55	-1.08

Type: (3) Washer Dryer

Estimated interaction effects

Town Centre	Not Town Centre
-3.27	-9.10***

statistically significant at the 10% level (p≤0.1);

**5% level (p≤0.05); ***1% level (p≤0.01)

The results showed that with outliers removed, there is no change for vented tumble dryers, while the results for washer dryers still remain significant with a reduced point estimate (-9.1 instead of -15.26 kWh).

This result for washer dryers supports the main finding that the lifetime running cost labels were effective at demonstrating the value of energy efficient appliances to consumers and shifting purchasing habits.

Time trend analysis

As well as including an overall week/time fixed effect in the primary specification, a more detailed time trend analysis was conducted to examine if there was any specific time trend in the results. The 27 weeks were split into 5 equal sized week groups of 5 weeks except for the first group that contained 7 weeks to account for Christmas and New Year. The specification and results are below.

$$kw\_annual_i = \alpha + \beta_0 Treatment_i + \beta_1 (Treatment_i \times Town\_Center_i) + \beta_2 (Treatment_i \times Week\ Group_i) + \beta_3 AverageHistoric_i + \beta_4 W_i + \beta_5 Town\_center_i + \beta_6 Store\_type_i + \varepsilon_i$$

Table 18: time trend results examining the effect of treatment on kWh/year

Type: (1) Tumble Dryer

Estimated interaction effects

	Town Centre	Not Town Centre
1	-4.85	-6.78
2	4.57	2.64
3	-5.37	-7.30
4	3.86	1.93
5	16.36	14.44

Type: (2) Tumble Dryer

Estimated interaction effects

	Town Centre	Not Town Centre
1	8.87	-4.68
2	2.23	-11.31
3	-2.78	-16.32
4	-0.65	-14.19*
5	8.95*	-4.60

Type: (3) Washer Dryer

Estimated interaction effects

	Town Centre	Not Town Centre
1	-4.95	-16.54***
2	-1.74	-13.33
3	2.43	-9.16
4	-9.87*	-21.46***
5	-3.84	-15.43*

Type: (4) Washing Machine

Estimated interaction effects

	Town Centre	Not Town Centre
1	-0.41	-0.17
2	0.43	0.66
3	0.79	1.02
4	0.12	0.35
5	0.85	1.09

*statistically significant at the 10% level (p≤0.1); **5% level (p≤0.05); ***1% level (p≤0.01)

The expanded time trend analysis further supported the main conclusions from the primary analysis, i.e. a significant result for washer dryers that is consistent over time.

The time trend also revealed two interesting results for vented tumble dryers, the first a consistent direction (negative) in non-town centre stores with one week being significant, and an unexpected positive significant result for week 5 in town centre stores.

These two results for vented tumble dryers are most likely spurious given the smaller number of observations for this product type. Overall, these smaller results from the expanded time analysis did not affect the overall Null result from the regression analysis.

Special-buy and energy rating analysis

Weekly profile of special buy products

Within the final list of products, there were two products that were introduced by John Lewis as special-buy promotions without lifetime running costs: a condenser tumble dryer and a washing machine

The balance of these products was examined to ensure they were equally represented between control and treatment stores. The figure below shows the sales of both products across treatment and control stores.

The sales figures showed that the two products were roughly equally distributed between treatment and control stores, and therefore did not unduly influence the results. Had they not been equally distributed across treatment groups, then the choices that consumers faced in the control group would not have been the same as those facing consumers in the treatment group with respect to special-buys.

Product energy ratings analysis

In addition to looking at the difference in energy use of the products purchased in the intervention stores there was also an interest in determining whether the lifetime running cost labels shifted consumer choice by energy ratings, for example, did the labels move consumer choice from a C to B appliance?

Figure 1: Box whisker plots of energy ratings versus kWh/year for each product type

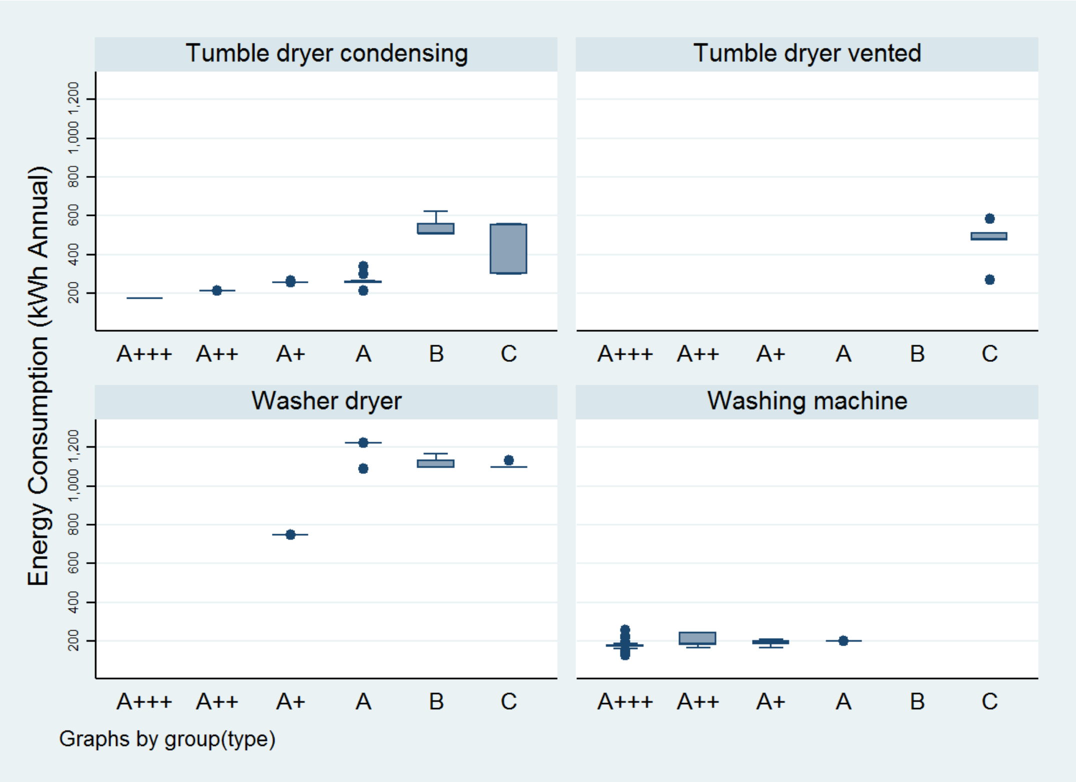


Figure 1 displays the distribution of energy ratings versus kWh/year for each product type. It can be seen that for some products it is possible for products to have a better energy rating but have lower energy consumption. For example within condenser tumble dryers, there was a 'C' rated appliance with a substantially lower kWh/year value than 'B' rated appliances. For washer dryers and washing machines there is no difference in kWh/year performance across rating, and for vented tumble dryers, all the products in the trial were C rated.

This reflects the fact that products that are classified as more energy efficient according to the EU energy label do not necessary use less energy and contribute to the reason hypothesis that consumers find energy ratings confusing (what's the difference between an A++ or A+++?). For example a highly efficient tumble dryer with a large drum that takes greater loads may use more energy than a smaller machine that is also energy efficient. Given that the lifetime running costs were calculated based on the energy consumption rather than the energy efficiency it was not considered to be informative to conduct an energy rating analysis across intervention and control stores.

Regression analysis with interactions

Primary analysis

The primary analysis was re-run to examine the effect of including an extra interaction between treatment and store type. $kw\_annual_i = \alpha + \beta_0 Treatment_i + \beta_1(Treatment_i \times Town\_center_i) + \beta_2(Treatment_i \times Store\_type_i) + \beta_3 AverageHistoric_i + \beta_4 W_i + \beta_5 Town\_center_i + \beta_6 Store\_type_i + \varepsilon_i$

Table 19: the effect of treatment on annual energy consumption with interaction between store type (kWh/year).

Type: (1) Tumble Dryer Condenser

Estimated interaction effects

	Town Centre	Not Town Centre
Full line	1.19	-0.48
Not full line	-0.75	-2.42

Type: (2) Tumble Dryer Vented

Estimated interaction effects

	Town Centre	Not Town Centre
Full line	4.86	-19.38**
Not full line	40.75***	16.51**

*statistically significant at the 10% level (p≤0.1); **5% level (p≤0.05); *1% level (p≤0.01)

Type: (3) Washer Dryer

Estimated interaction effects

	Town Centre	Not Town Centre
Full line	-3.50	-15.63***
Not full line	-2.43	-14.57**

Type: (4) Washing Machine

Estimated interaction effects

	Town Centre	Not Town Centre
Full line	0.26	0.75
Not full line	-0.56	-0.08

The results from this analysis, which includes the interaction between treatment and store type, supports the primary conclusions for washer dryers, i.e. a significant negative effect.

An interesting result that appeared within this analysis is the positive significant result for vented tumble dryers; however and examination of the interaction effects in Table A.2 show that this is primarily driven by the not-full line and town centre observations. Given that there were only 8 sale observations in that cell within the treatment stores, this result is most likely spurious.

Secondary analysis

The secondary analysis was also re-run to examine the effect of including an extra interaction between treatment and store type on price point. The specification and results are shown below, full regression table is shown in Appendix B.

Specification

$$price\_point_i = \alpha + \beta_0 Treatment_i + \beta_1(Treatment_i \times Town\_center_i) + \beta_2(Treatment_i \times Store\_type_i) + \beta_4 W_i + \beta_5 Town\_center_i + \beta_6 Store\_type_i + \varepsilon_i$$

Table 20: the effect of treatment on price point with interaction between store type (£).

Type: (1) Tumble Dryer Condenser

Estimated interaction effects

	Town Centre	Not Town Centre
Full line	-9.12	2.85
Not full line	-10.45	1.51

Type: (2) Tumble Dryer Vented

Estimated interaction effects

	Town Centre	Not Town Centre
Full line	-0.94	-3.35
Not full line	4.91	2.50

Type: (3) Washer Dryer

Estimated interaction effects

	Town Centre	Not Town Centre
Full line	4.57	32.92**
Not full line	-44.05	-15.70

Type: (4) Washing Machine

Estimated interaction effects

	Town Centre	Not Town Centre
Full line	5.77	1.71
Not full line	11.47	7.41

*statistically significant at the 10% level (p≤0.1); **5% level (p≤0.05); ***1% level (p≤0.01)

The overall regression results supported the main conclusions from the secondary analysis, i.e. no significant effect on price. Within the detailed analysis of the interaction effects, a significant result for washer dryers in non- town centre, full-line stores was observed. The positive significance indicated that consumers in the intervention stores spent on average £32.92 more on washer dryers than in the control stores. This is in line with the result that more efficient washer dryers were being purchased in treatment stores as a result of the lifetime running cost label.

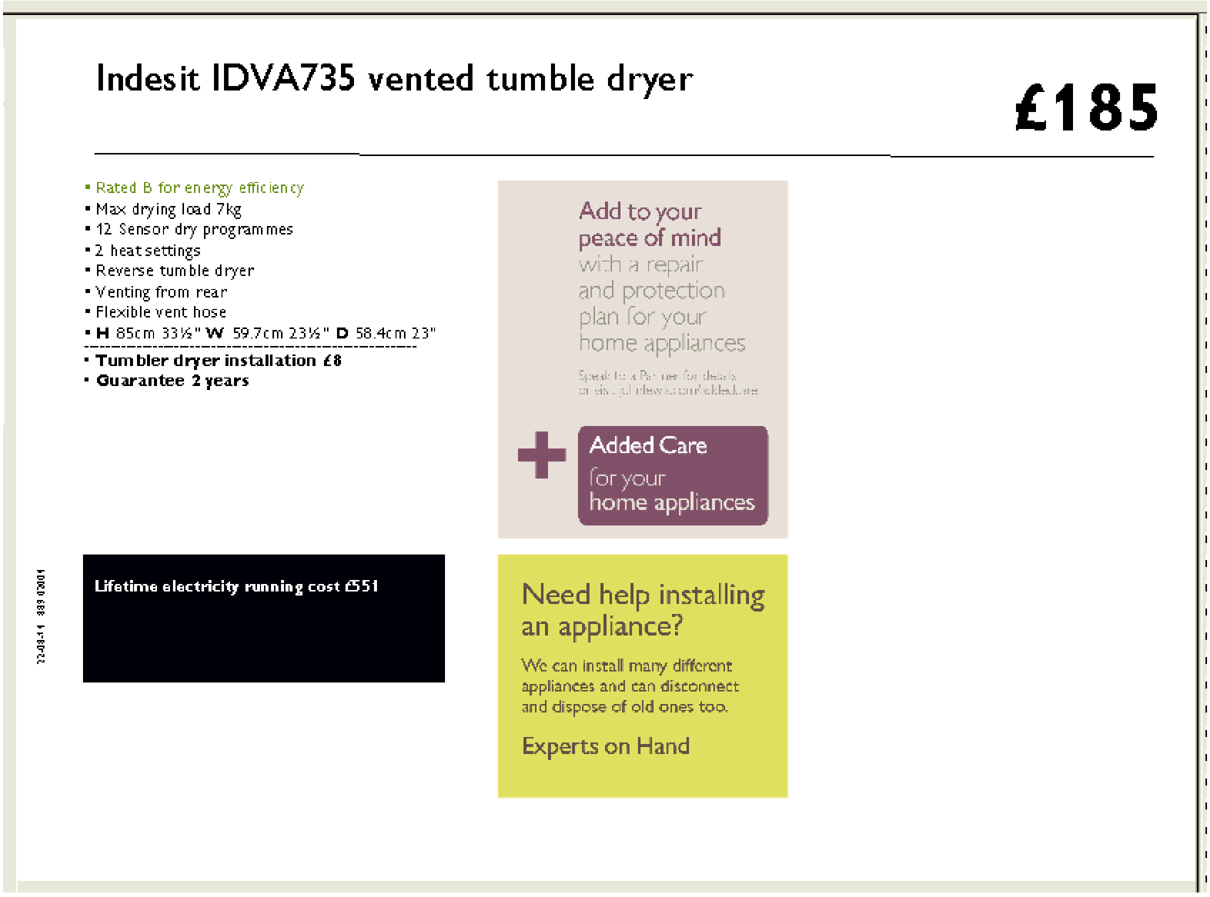
While this result is interesting and helps support the primary analysis, overall the analysis shows no effect on price point between treatment and control stores.

Annex C – supporting materials

Appliance label design

The running costs appear in the black box on the lower hand side of the appliance label. In control stores the space where the black box would appear is empty.

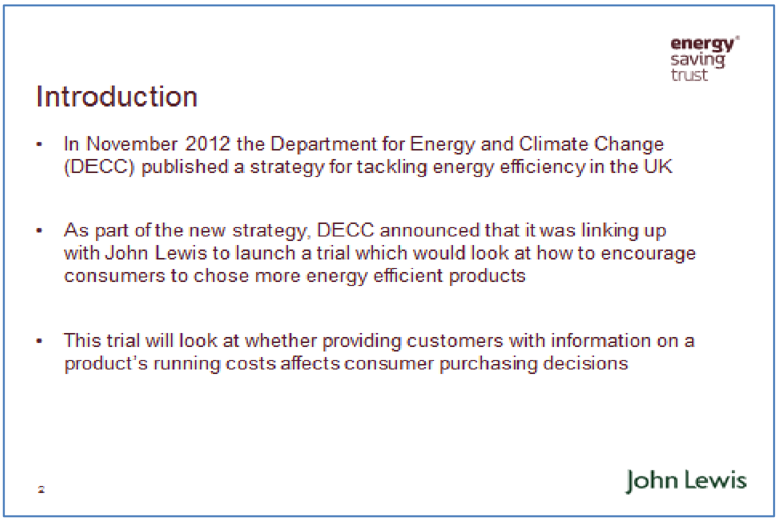
Figure 2 - Example label with lifetime running costs



Due to practical restrictions on design, it was not possible to substantially change the design between the treatment and control labels. Therefore, in order to help draw attention to the new information, additional measures were introduced:

Partner training

Pro-active training to staff in the treatment John Lewis stores, enabling them to fully understand the new labels and confidently help customers select the appliance of their choice. A copy of the slides included in the training follows:



John Lewis & Energy Efficiency

- It is our aim, through Bringing Quality to Life, to help our customers to live more sustainable lives
- We do this by selling products which have high sustainability credentials and providing customers with information which enables them to make informed choices. An example of this is our sustainable product identifier
- We're participating in this trial with the Department for Energy and Climate Change because it fits with these aims and our values
- By giving customers information on the lifetime electricity running costs of large laundry products, we're helping them to take into account the cost of using a product, in a meaningful and accessible way

John Lewis

How the Trial will work

- Across all brands of washing machines, tumble dryers and washer dryers, each product ticket will show an estimated lifetime electricity running cost
- In order to assess the effect on sales of providing this information to customers, stores have been divided into 2 groups:
  - "Participation" stores which will receive tickets with this information
  - "Control" stores which will receive tickets without this information
  - All stores have been randomly allocated to one of these groups
- johnlewis.com will be part of the "control" group and will not display lifetime electricity running costs
- The trial will run for 6 months from September 2013 to February 2014

4 John Lewis

Trial Objectives

- The Department for Energy and Climate Change's objective is see whether providing information on running costs at point of sale encourages consumers to purchase products which are more energy efficient
- For John Lewis, we also want to assess whether providing running cost information encourages customers to trade up to more energy efficient models

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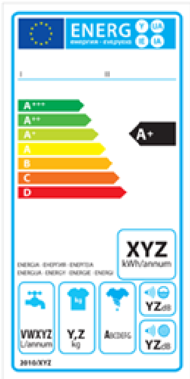
Participating and Control Stores

Participating Stores	Control Stores
Bluewater	Brent Cross
Chester	Cheadle
Chichester	Croydon
High Wycombe	Poole
Ipswich	Swindon
Solihull	Tamworth
Tunbridge Wells	Trafford
Aberdeen	Edinburgh
Cambridge	Exeter
Cardiff	Glasgow
Milton Keynes	Kingston
Newbury	Leicester
Norwich	Liverpool
Nottingham	Newcastle
Oxford Street	Peter Jones
Peterborough	Sheffield
Reading	Southampton
Knight & Lee	Stratford
Cribbs Causeway	Welwyn
Watford	

Current information available to customers on energy efficiency

- The EU Energy Label ranks products at the point of sale based on their relative efficiency. This A to G label now extends to A+++
- But this Label reports energy use in KWh / year not in £££
- There is an opportunity to provide clearer and more meaningful information about energy efficiency to customers to enable them to make better informed purchasing decisions
- Buying a more energy efficient product can be cheaper in the long run, when you weigh up the often higher purchase price and lower lifetime running costs



7

John Lewis

Customer communication: tickets

Customer communication: posters

We have designed **posters** to go in stores to draw customers' attention the availability of this new information on running costs

These posters are being used to communicate to customers how the lifetime running costs have been calculated

energy saving trust

How the lifetime electricity running costs have been calculated

John Lewis

Calculation of the Lifetime Electricity Running Costs (1)

To estimate the lifetime running cost of each machine we've used a series of assumptions, including how frequently the machine is used (number of cycles).

The lifetime running cost of each product has been reached by multiplying the following factors:

Machine's energy consumption per cycle ✖ Average number of cycles used per year ✖ Price of electricity ✖ Average product lifetime

Calculation of the Lifetime Electricity Running Costs (2)

Here is the basis for these assumptions:

- **Energy consumption per cycle:** sourced from the manufacturer
- **Average number of cycles per year** are the same as those used for the EU energy label:
  - washing machines 220 cycles/year (approx. 4 cycles/week)
  - tumble dryers 160 cycles/year (approx. 3 cycles/week)
  - washer dryers 200 cycles/year (approx. 4 cycles/week – wash & dry)
- **Price of electricity:** the average UK 2012 energy price - £0.13 per KwH
- **Average product lifetime:** 9 years - sourced from WRAP, an environmental advisor to Government

Example

Washer dryer: AEG L87695WD, 9kg Wash/7kg Dry Load, A Energy Rating, 1600rpm Spin, White

Machine's energy consumption per cycle	✖	Average number of cycles per year	✖	Price of electricity	✖	Average product lifetime
6.12KwH	✖	200 cycles	✖	13p per KwH	✖	9 years

Lifetime electricity running cost = £ 1,432

Your Role

- ➢ Proactively point out the availability of the lifetime running cost information to customers by directing customers to the tickets and the posters. The aim is to encourage customers to factor the lifetime electricity running cost into their purchasing decision
- ➢ Do not proactively add any new pieces of information about the running costs, or go into the detail of how the running costs have been calculated, unless the customer requests more detail
- ➢ A Job Aid Card will be available to support you in explaining the assumptions behind the running cost calculation to customers. This will be on Selling Academy and will be sent to your branches.

15 John Lewis

FAQs

Appliance lifetime

We have used a 9 year lifetime to determine the lifetime running cost of each appliance.
This is the average replacement cycle of washing machines, washer dryers and tumble dryers as determined by WRAP – an organisation which advises the government on recycling.
The lifetime of the appliances we sell may well be longer than 9 years and **you should continue to advise customers of the most accurate lifetime of the appliance**.
The important thing is that whilst the lifetime running cost may not be truly reflective since our appliances may last longer than 9 years, this information does still provide a meaningful way of comparing appliances against the same base line.

Energy consumption per cycle

The lifetime running cost calculation uses the energy use per cycle (KwH) of the appliance. This is the same energy use per cycle figure that is used to calculate the EU energy rating.
Energy consumption per cycle is calculated using the following:

- Washing machines: standard 60° full load, standard 60° partial load and standard 40° partial load
- Tumble dryers: standard cotton programme
- Washer dyers: full cycle (wash, spin & dry) and wash only

If customers ask for the energy consumption per cycle in KwH and you are able to provide them with this information, then you should still do so in addition to giving them the lifetime energy running cost in £s.

Partners were also provided with a job aid card for reference. A copy of the job aid card is available as a separate pdf document.

Posters

Posters were used in stores to advertise the new labels and draw attention to the ability to compare appliances by average lifetime running costs. The posters were clearly be displayed on shop floors and the intention was to raise awareness about the new labels to customers and help consumers understand them better.

BIT used insights from behavioural science to make recommendations about how to the design the posters in a way that was as simple as possible, so that customers could quickly and easily understand the message. However, there were limits to the extent to which John Lewis were able to take on board these recommendations.

The text content of the poster was as follows:

Lifetime running costs explained
To help you make more sustainable choices, all the washing machines, washer dryers and tumble dryers in this shop now show a label telling you how much they could cost you to run over their lifetime, based on how much electricity they use. This figure is called the lifetime running cost and it's worked out like this:

Annual electricity use
Based on electricity use per cycle and an average number of cycles per year
x
Product lifetime
Based on an average replacement cycle
x
Electricity price
Based on the average UK 2012 electricity price
=
Lifetime electricity running cost (£)

If you'd like to know more, please talk to one of our Partners.

Annual running costs card

Following the first wave of Partner focus groups Partners were provided with a card of annual running costs for each appliance. A copy of the content of the annual running costs card can be found below:

Annual Electricity Running Costs (£s) of Large Laundry Appliance

Annual Running Costs Explained

To help you in your conversations with customers about running costs, in addition to the job aid card explaining lifetime running costs we have produced this card which gives details of the annual running cost of each large laundry appliance in our shop floor range.

The assumptions we've made to estimate the annual running costs are very similar to those we made to estimate lifetime running costs. The only difference is that these costs are for one year's usage, not for the nine years we estimated as the average lifetime of large laundry appliances.

The annual running cost of each product has been reached by multiplying the following factors:

- **Energy consumption per cycle:** sourced from the manufacturer
- **Average number of cycles done in a year:** this is the same data as that used for the EU energy label - for washing machines 220 cycles/year; tumble dryers 160 cycles/year; washer dryers 200 cycles/year
- **Price of electricity: the average UK 2012 energy price:** £0.13 per KwH

Annual Running Costs of Washer dryers

Appliance	Annual electricity running cost (£)
BOSCH WVH28360GB	147
AEG L87695WD	159
HOTPOINT WDPG9640BC Signature	159
HOTPOINT WDUD9640P	159
INDESIT IWDD7123 WD WH ABB/1200/7+5KG	142
JOHN LEWIS JLWD1611 WD	141
WD806U4SAGD	159
WT2780 W/DRYER WHT	97
SIEMENS W/DRYER WD14H420 WH	147
ZANUSSI ZKG7125	143

Annual Running Costs of Tumble dryers (vented)

Appliance	Annual electricity running cost (£)
AEG T65170AV	67
Zanussi ZDEB47209W	67
BOSVH WTA74200GB	63
Indesit IDVA735	61
Hotpoint TVEL75C6P	61

Annual Running Costs of Tumble dryers (condenser)

Appliance	Annual electricity running cost (£)
BOSCH CON DRY WTE84106GB WH	66
BOSCH WTW84161GB COND TD WH	28
BOSCH WTW863S1GB	28
AEG T65270AC	66
AEG T862801C	73
ZTH485	33
TCEL87B6B	73
TCUD97B6B Signature	80
INDESIT IDCA8350	73
JLTDH16 TD COND	34
JLTDH17 TD COND	34
SAMSUNG DV70F5E0HGW	27
T8812C TD B RATED 7KG	81
T8822C COND TUMBLE DRY	81
MIELE T8860	44
MIELE T8164 Heat Pump	33
PANASONIC NH-P80G2	28
SIEMENS WT46W381GB	28

SIEMENS WT46E381GB	66
SIEMENS WT48Y801GB	22
ZANUSSI ZDC68560W	73
ZANUSSI ZDC37202W	72

Annual Running Costs of Washing machines

Appliance	Annual electricity running cost (£)
BOSCH WAE24167UK	20
BOSCH WAQ283SOGB	23
BOSCH WAS32462GB	25
BOSCH WAQ28461GB	23
BOSCH WAE24369GB	21
BOSCH WAK28160GB	25
AEG L76475FL	19
AEG L98699FL	20
AEG L87680FL	21
BEKO WM7043CW WM A++AB/1400/7KG	25
BEKO WM8063CW WM A+++AA/1600/8KG	25
HOTPOINT WML720P	30
HOTPOINT WML721P	26
HOTPOINT WMEF943P	28
HOTPOINT WMEF722BC Signature	24
HOTPOINT WMUD843BC Signature	25
HOTPOINT WMUD9627P WH WM	32
HOTPOINT AQ113F497E WM A+++AB/1400/11KG	34
INDESIT XWE91282XW W/MACHINE WH AAB/1200/69G	32
INDESIT IWC61451 W/MACHINE WH A+AB/1400/6KG	25
JLWM1205	22
JLWM1412	22
JLWM1200 WM A+AB/1200	25
JLWM1411	23

JLWM1606	23
WF70F5E0W4W WH	22
WF80F5E5U4X Graphite	20
PANASONIC NA-148VG4WGB A+++AA/1400/8KG	17
PANASONIC NA-140VX4WGB	22
PANASONIC NA-140ZX4WGB STEAM	22
MIELE W3164	26
MIELE W3370 WM 1400/A+++/7kg	23
MIELE W5872 WM 8kg/A+++ 1600	25
W5000 Supertronic WM 1600/A+++/8kg	24
MIELE W5877 WM A+++/1600 8kg	25
SIEMENS WM12Q390GB WM 1200/A+++/8KG	23
SIEMENS WM14Y890GB WM 1400/A+++/8KG	25
WM14E461GB	21
WM14Y590GB	25
ZANUSSI ZWJ7140W	30
ZWG6120K	24
ZANUSSI ZWH7122J W/MACHINE 1400/7KG A-10%	27
ZWJ14591W	24

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