Online Appendix to the Research Article "Towards a Persuasive Decision Support Interface for the Sustainable Use of Dynamic Electricity Tariffs"

Lorenzo Matthias Burcheri[1], Gilbert Fridgen[1], Hanna Marxen[1], Jyoti Kumari[1]

[1] SnT – Interdisciplinary Center for Security, Reliability and Trust, University of Luxembourg, 29, JF Kennedy, Luxembourg, L-1855, Luxembourg
lorenzo.burcheri@uni.lu

1   Introductory Disclaimer

We created this online appendix as an addendum to the full research paper "Towards a Persuasive Decision Support Interface for the Sustainable Use of Dynamic Electricity Tariffs" at the 20th International Conference on Design Science Research in Information Systems and Technology in Montego Bay, Jamaica in 2025. The information presented in this document is attributed to the full research paper and does not stand alone but complements it.

2   Design-Questionnaire and Choice Experiment Layout of Large-Scale Survey

How familiar are you with dynamic electricity tariffs ?

Please rate your knowledge on a scale from 1 (not at all familiar) to 7 (extremely familiar). Please select 0 if you never heard about it.

1	0 - never heard of it
2	1 - not at all familiar
3	2 - not very familiar
4	3 - a little familiar
5	4 - moderate
6	5 - familiar
7	6 - very familiar
8	7 - extremely familiar

Feedback Design Construct:

Please answer the following questions :

	Dis-like	Ra-ther dis-like	Un-sure	Ra-ther like	Like
Do you like to be informed about consequences of your energy consumption behaviour ?					
Do you like to receive advice and recommendations for advantageous behaviour. E.g. electricity saving options ?					
Do you like to receive feedback about your past electricity consumption behaviour ?					
Do you like to receive information on how other people consume energy compared to you ?					

Customization Design Construct:

In the past how often did you use customization options within a smartphone application to adapt the features to your individual preferences ?

1	Rarely
2	Rather rarely
3	Unsure
4	Rather often
5	Often

Defaults Design Construct I:

In the past how often did you use default settings within a smartphone application ?

1	Rarely
2	Rather rarely
3	Unsure
4	Rather often
5	Often

Feedback Design Construct II:

Do you agree that default settings in apps are sufficient, and you do not wish for any personalization ?

1	Disagree
2	Rather disagree
3	Unsure
4	Rather agree
5	Agree

Preferred Information Construct:

Which electricity related information do you consider as relevant and interesting for your own electricity consumption

1	Price
2	Environmental impact
3	Share of locally/regionally generated electricity
4	Share of nuclear-based electricity
5	Share of renewable-based electricity
6	Share of fossil-based electricity
7	Other, please indicate : *Open *Fixed

Choice Experiment: Visualisation Design

(Note: this choice experiment considers three subsequent decision scenarios, in which survey participants choose each time between three notification designs with regard to format (table, line chart, column chart, pie chart), resolution (half-daily, quarter daily, 24 hours) and color coding (yes/no). The options are visualized accordingly using excel diagrams.) (single choice)

Please tell us which form of app communication do you prefer ? E.g., in which format and in which frequency would you like to receive information about your energy consumption?

1	Option 1
2	Option 2
3	Option 3

Please tell us which form of app communication do you prefer ? E.g., in which format and in which frequency would you like to receive information about your energy consumption?

1	Option 1
2	Option 2
3	Option 3

Please tell us which form of app communication do you prefer ? E.g., in which format and in which frequency would you like to receive information about your energy consumption?

1	Option 1
2	Option 2
3	Option 3

Choice Experiment: Notification Design

(Note: this choice experiment considers three subsequent decision scenarios, in which survey participants choose each time between three notification designs with regard to format (email, in-app, sms, none) and frequency (hourly, daily, alert). The options are visualized by an smartphone screen.) (single choice)

Please tell us which form of app communication do you prefer ? E.g., in which format and in which frequency would you like to receive information about your energy consumption?

1	Option 1
2	Option 2
3	Option 3

Please tell us which form of app communication do you prefer ? E.g., in which format and in which frequency would you like to receive information about your energy consumption?

1	Option 1
2	Option 2
3	Option 3

Please tell us which form of app communication do you prefer ? E.g., in which format and in which frequency would you like to receive information about your energy consumption?

1	Option 1
2	Option 2
3	Option 3

3   STATA Code for the Choice Experiments

For Choice Experiment 1 (Visualisation Choices)

```
import excel "/PathToExcel", sheet("Sheet 1") firstrow
cmset ID DecisionIndex OptionNum
// Null model
cmxtmixlogit Choice
// Modell
cmxtmixlogit Choice ChartTypLineChart ChartTypPieChart ChartTypColumn Far-
boptionColor AuflösungHD AuflösungQD
```

For Choice Experiment 2 (Notification Choices)

```
import excel "/PathToExcel", sheet("Sheet 1") firstrow
cmset ID DecisionIndex OptionNum
// Null model
cmxtmixlogit Choice
// coding categorical attribute character of notification frequency
gen Level = 0
replace Level = 1 if FrequencyAlerts == 1 & FrequencyHourly == 0 & Frequen-
cyDaily == 0
replace Level = 2 if FrequencyDaily == 1 & FrequencyHourly == 0 & Frequency-
Alerts == 0
replace Level = 3 if FrequencyHourly == 1 & FrequencyAlerts == 0 & Frequen-
cyDaily == 0
// Modell
cmxtmixlogit Choice FormatApp FormatEmail FormatSMS Level
```

4   Choice Experiment Results

For Choice Experiment 1 (Visualisation Choices)

```
Mixed logit choice model                 Number of obs      =       9,045
                                         Number of cases    =       3,015
Panel variable: ID                       Number of panels   =       1,005

Time variable: Decisio~x                 Cases per panel: min =           3
                                                          avg =         3.0
                                                          max =           3

Alternatives variable: OptionNum         Alts per case:   min =           3
                                                          avg =         3.0
                                                          max =           3

Integration points:            0         Wald chi2(6)       =      284.20
Log likelihood =       -3158.5174        Prob > chi2        =      0.0000
```

Choice	Coefficient	Std. err.	z	P>|z|	[95% conf. interval]	
OptionNum						
ChartTypLineChart	-.0653377	.0596343	-1.10	0.273	-.1822186	.0515433
ChartTypPieChart	-.6474858	.0643642	-10.06	0.000	-.7736372	-.5213344
ChartTypColumnChart	-.7594109	.0636486	-11.93	0.000	-.8841598	-.634662
FarboptionColor	-.0462153	.0447632	-1.03	0.302	-.1339496	.0415189
AuflösungHD	-.4050934	.0554414	-7.31	0.000	-.5137565	-.2964303
AuflösungQD	.0007111	.053803	0.01	0.989	-.1047409	.1061632
1						
_cons	-.0295805	.0451651	-0.65	0.513	-.1181024	.0589414
2						
_cons	-.1062051	.0459968	-2.31	0.021	-.1963571	-.0160531
3	(base alternative)					

For Choice Experiment 2 (Notification Choices)

```
Mixed logit choice model                 Number of obs      =       9,045
                                         Number of cases    =       3,015
Panel variable: ID                       Number of panels   =       1,005

Time variable: Decisio~x                 Cases per panel: min =           3
                                                          avg =         3.0
                                                          max =           3

Alternatives variable: OptionNum         Alts per case:   min =           3
                                                          avg =         3.0
                                                          max =           3

Integration points:            0         Wald chi2(4)       =      291.64
Log likelihood =       -3149.3817        Prob > chi2        =      0.0000
```

Choice	Coefficient	Std. err.	z	P>|z|	[95% conf. interval]	
OptionNum						
FormatApp	1.40106	.108888	12.87	0.000	1.187643	1.614476
FormatEmail	1.474987	.1090433	13.53	0.000	1.261266	1.688708
FormatSMS	.8222187	.1094824	7.51	0.000	.6076371	1.0368
Level	-.1821439	.0276518	-6.59	0.000	-.2363405	-.1279473
1	(base alternative)					
2						
_cons	-.097802	.0460777	-2.12	0.034	-.1881125	-.0074914
3						
_cons	-.0304333	.0451957	-0.67	0.501	-.1190152	.0581486