Consumers' Choices among Alternative Electricity Programmes in Geneva – An Empirical Analysis

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Abstract

Services Industriels de Genève (SIG) is the monopoly which delivers natural gas, water and electricity in the Canton of Geneva (Switzerland). A few years ago, SIG offered to Geneva households the possibility to choose among 6 different types of electricity products. Those new electricity products differ in particular because of the origin of their production (natural gas, hydraulic, solar, etc.) and of their price. Through a survey research, we collected information about households' choices among the different electricity products. By a series of logistic regressions, we assess what determines households' knowledge of the different electricity products which are offered by SIG, as well as the factors explaining their choices among them.

Keywords: Energy prices; consumer choice; electricity programmes; logit models; Geneva (Switzerland).

1 Introduction

Energy production and consumption is at the hearth of many policy initiatives in order to achieve sustainable development objectives and to decrease greenhouse

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gas and other harmful emissions. In this context, green electricity programmes, which propose to consumers alternative electricity products based on renewable energies, have received a widespread interest. As a result, green power markets have grown worldwide quite substantially in recent years, although market penetration is still relatively low, i.e., in the order of 1% (see Bird et al., 2002). From a policy perspective, the reasons explaining such a low penetration rate are of course of primary importance. In the literature, authors have pointed to several causes (see e.g., Borchers et al., 2007): failure in marketing campaigns; education or communication failure; lack of adequacy between households' green energy products demand and the products that are supplied (for a discussion on the diffusion of green energy products in Switzerland, see Wüstenhagen et al., 2003).

The present paper investigates the low market penetration rate of green electricity products in the Canton of Geneva (Switzerland). Since a lack of information about the product itself may be at the origin of a low penetration rate, we first investigate if consumers are well inform or not, and why. Thereafter, we explore what leads a consumer to choose a renewable electricity product instead of a cheaper non-renewable one. We base our analysis on the fact that the *Services Industriels de Genève* (SIG), the only supplier of electricity in Geneva, proposed on the 1st of June 2002 a new range of electricity products, from which households can freely choose. Indeed, concerned by sustainable development, SIG proposes to Geneva customers 6 electricity products, differentiated by the type of energy and its provenance (local or from abroad), which are the following:

- *Initial* (Initial): 100% natural gas, 23.5 cts/kWh.[1]
- *Vitale Bleu* (Blue): 100% hydraulic, 23.8 cts/kWh.
- *Vitale Jaune* (Yellow): 100% renewable energies produced in the canton of Geneva, 25.8 cts/kWh.
- *Vitale Vert* (Green): new renewable energies (solar, etc.), 28.8 cts/kWh.
- *Vitale Découverte* (Discovery): 80% Blue + 20% Green, 24.8 cts/kWh.
- *Vitale Engagement* (Engagement): 50% Yellow + 50% Green, 27.3 cts/kWh.

We emphasise that the customer is obliged to notify its choice to SIG if she does not want the default product, which corresponds to the Blue one. There is only one product (the Initial) which is composed by fossil, non-renewable energy. In addition, nuclear power is not represented in the proposed products. In this context, it should be noted that the Geneva Constitution explicitly mentions that cantonal authorities should promote renewable energies and opposes to nuclear utilities in the Geneva territory and nearby.

In February 2007, 212,000 customers, corresponding to about 82% of the total, had chosen the Blue option, 9.4% the Discovery, 3.5% the Initial, 3% the Horizon (a new product composed of 60% Blue + 40% Green that replaced the Yellow and Engagement at the beginning of February 2007), and 1.7% the Green.[2] From those data, we first observe that the great majority of customers is with the Blue option, which corresponds to the default option assigned by SIG. Second, we notice that the most expensive product (the Green) ranks last in the choices.

The aim of this paper is to assess the main factors explaining households' choices among the different electricity products. There is an extensive literature on green energy programmes, most papers assessing the willingness-to-pay (WTP) for them (see e.g., Zarnikau, 2003), often using stated preferences approaches, analyzing potential biases, e.g., hypothetical bias in contingent valuation method (see e.g., Whitehead & Cherry, 2007). Concerning more specifically Switzerland, Wüstenhagen (2000) and Wüstenhagen et al. (2003) show for instance that WTP for green electricity is apparently higher in Switzerland than in Germany, UK and Sweden. However, with respect to the literature, the aim and methodology of the present paper is somehow peculiar, since our analysis is neither based on a hypothetical scenario (the electricity products are actually offered by SIG), nor on actual data, since we had no access to SIG individual household consumption data. We rely on a survey and thus on public perceptions in order to explain households' real choices.

The paper is organised as follows. In Section 2, we present the survey research design and briefly analyze some descriptive statistics. In Section 3, we explain the methodology, which is based on logistic regressions. In Section 4, we describe the main results provided by two different logistic regression models. The conclusions summarise and provide further research directions.

2 Database and Descriptive Statistics

Our database is composed by 545 individuals who were randomly selected and interviewed face-to-face in the streets, during the period August-September 2006. The only conditions for being included in the sample were:

1. to be living in the Canton of Geneva

2. to be at least 18 years old.

These two conditions ensure that the interviewed people are SIG customers. Note that the entire sample could not be fully used in the empirical analysis in Section 4, because of some missing answers.

Table 1 reports the answers to the question: "Which one among the SIG electricity products do you have at home?".[3] The first interesting surprising result is the huge proportion (almost 40%) of the interviewed people who does not know the electricity type they are consuming. This results confirms the findings reported in Jensen (2008), who reports studies in Denmark showing that very few families knew how much electricity, heating or water they actually consume per year. In the same vein, Ek & Söderholm (2008) report that 18% of the respondents on a survey in Sweden state that they do not know they can change electricity supplier, while they actually can. In a paper based on consumer focus group in Alabama (USA), Hite et al. (2008) show that a majority of citizens are not aware of the potential for alternative energy, and that there is a widespread lack of knowledge of energy programmes available to consumers. Our first empirical question in Section 4 will

Table 1: Electricity products distribution

Product	**N**	**%**	**% without "does not know"**
Initial	88	16.15	26.35
Blue	123	22.57	36.83
Yellow	58	10.64	17.37
Green	26	4.77	7.78
Discovery	22	4.04	6.59
Engagement	17	3.12	5.09
Does not know	211	38.72	–
Total	545	100.00	–

thus be devoted to exploring the factors having an impact on the knowledge of the electricity product available at home, in order to highlight who knows own electricity product and who does not.

Among the people able to say which product has been chosen, the biggest proportion indicates the Blue one. Since this is the option assigned by default by SIG (when no other one is explicitly chosen), this result is not really surprising. Most people probably decide not to do anything and thus get the Blue product, be it by affinity or convenience. A similar result is mentioned by the behavioural literature, which shows evidence of inertia in household decision-making process, so that statu quo is usually chosen (Samuelson & Zeckhauser, 1988). This kind of behaviour is often encountered in various industries. For instance, after 20 years of opportunities to change telephone provider, Littlechild (2005, quoted in Brennan, 2007) reports that about 80% of households remain with the incumbent operator in UK. Likewise, marketing services are aware that customers are attached to brands. Applied to electricity markets and the choice of electricity providers, Brennan (2007) affirms that consumer prefer not to choose, also because prior to market libearlisation consumers already had a supplier, i.e., the incumbent. In our survey, we show that this kind of behaviour is also confirmed in relation to electricity products. For a more general analysis of inertia in decision-making processes, see Thaler & Sunstein (2008).

Comparing the share of the products in our sample with the data on effective product choice provided by SIG (see above), we observe important disparities. In fact, even if a large proportion (37%) of those knowing their product declared to have chosen the Blue one, this figure remains quite distant from the actual 82%. Consequently, we observe much higher proportions of the other products in our sample than in the population. These observations strengthen our initial hypothesis that most people do not know the product they are consuming at home. Some people probably answered without being certain of the product they had at home, even if we explicitly stressed them to tick the "I do not know" answer if they were unsure about it.[4]

The descriptive statistics as well as the definition of all the variables that were collected are reported in Table 2. Most of the variables are binary and their mean (N / #Observations) can thus be interpreted as the percentage of the sample displaying the corresponding characteristic. We first note that the socio-economic characteristics of our sample match quite well those of the whole Geneva population. Concerning the distribution between genders, the male population is slightly over-represented in our sample: 60% against only 48% in the population in 2006 (OCSTAT 2007). The proportion of foreigners (41%) corresponds with what is observed in the whole population (39%). The mean age of the individuals in the sample is 35 years, with a minimum of 18, a maximum of 77 and 50% of the individuals being between 26 and 42 (first and third quartiles). Regarding the household composition (not reported in Table 2), 25% are living by themselves, 62% live with their family and 13% with roommate(s).

The WTP for green energy is relatively low in our sample, with most people (38%) not willing to pay anything, and 27% only willing to pay up to 5% more in order to be supplied with green energy. One has moreover to note that the amounts respondents declare they would pay probably overstate what they would actually pay if faced with a real choice. This relatively low WTP has to be related to the prices of the products. Indeed, more than half the respondents indicate their choice of an electricity product is primary driven by the price. Such an observation is completely in line with the findings of Diaz-Rainey & Ashton (2008), who explain that "while environmental issues are important to most people, these concerns are often subsidiary to cost considerations." Moreover, 56% estimate that SIG prices are expensive or very expensive. This could provide an additional explanation for the low WTP we observe, since Hansla et al. (2008) show that WTP for green products decreases when electricity costs increase.

The goal of the present study is not to identify what determines the WTP for green products. This topic is analysed by several papers in the literature. For example, Roe et al. (2001) show that WTP differ across population segments defined by location, income, and education. Nomura & Akai (2004) find that people who see renewable energy technologies being used in the future are willing to pay more than others. In general, we retain that WTP for green product is quite low, even though most people are aware of the environmental problems caused by energy consumption and regard them as important. Our observations are thus globally in line with the literature.

To conclude with the presentation of our sample, note that some particular variables possess missing values, as can be seen from the column '# Obs' of Table 2. For instance, only 482 people answered the question about income, which still corresponds to a relatively high response rate of about 90%. The number of individuals with absolutely no missing values amounts to 443, which will be the sample used for empirical estimations.

Table 2: Variables description and descriptive statistics

Variable	Category	Description	N	Mean	# Obs
Gender	gender0	Man	322	0.60	540
	gender1	Woman	218	0.40	540
Nationality	nation0	Swiss, from Geneva	194	0.37	531
	nation1	Swiss, but not from Geneva	114	0.21	531
	nation2	Foreigner	223	0.42	531
Age in years	age	(continuous variable)	–	35.24	523
Number of people in HH	npers	(continuous variable)	–	2.73	531
HH monthly income	income0	$<$ CHF $3,000$	64	0.13	482
	income1	CHF $3,000 - 5,000$	95	0.20	482
	income2	CHF $5,001 - 7,000$	140	0.29	482
	income3	CHF $7,001 - 9,000$	102	0.21	482
	income4	CHF $9,001 - 15,000$	57	0.12	482
	income5	$>$ CHF $15,000$	24	0.05	482
Interested in SIG bills	bills0	No	208	0.38	544
	bills1	Yes	336	0.62	544
Person responsible for paying bills in HH	resp0	No	174	0.32	541
	resp1	Yes	367	0.68	541
Did already visit SIG internet website	web0	No	352	0.65	545
	web1	Yes	193	0.35	545
Interested in booklets distributed by SIG	booklet0	No	282	0.52	545
	booklet1	Yes	263	0.48	545
Electricity choice criterion	crit0	Price of energy	306	0.57	540
	crit1	Cleanliness of energy	191	0.35	540
	crit2	Geographical origin of energy	36	0.07	540
	crit3	Other reason	7	0.01	540
Willingness-to-pay for green energy	wtp0	Nothing	205	0.38	542
	wtp1	$1 - 5\%$	148	0.27	542
	wtp2	$5 - 10\%$	103	0.19	542
	wtp3	$> 10\%$	41	0.08	542
	wtp4	Does not know	45	0.08	542
Perception of SIG prices	price0	Cheap or very cheap	19	0.03	544
	price1	Reasonable	160	0.29	544
	price2	Expensive or very expensive	303	0.56	544
	price3	Does not know	62	0.11	544
Liberalization would lower price	liberalp0	Strongly disagree or disagree	72	0.13	545
	liberalp1	Neither agree nor disagree	77	0.14	545
	liberalp2	Agree or strongly agree	330	0.61	545
	liberalp3	Does not know	66	0.12	545
Liberalization would increase product quality	liberalq0	Strongly disagree or disagree	155	0.28	545
	liberalq1	Neither agree nor disagree	130	0.24	545
	liberalq2	Agree or strongly agree	193	0.35	545
	liberalq3	Does not know	67	0.12	545
Implication of SIG in sustainable development	sd0	Weak/nil	74	0.14	541
	sd1	Moderate	177	0.33	541
	sd2	Strong/very strong	180	0.33	541
	sd3	Does not know	110	0.20	541
Importance of energy saving	es0	Weak/nil	53	0.10	542
	es1	Moderate	100	0.18	542
	es2	Strong/very strong	362	0.67	542
	es3	Does not know	27	0.05	542
Actions to reduce electricity consumption	reduc0	Turn off light	486	0.90	542
	reduc1	Turn off device (no standby)	324	0.60	539
	reduc2	Use of low intensity bulbs	279	0.52	537

3 Methodological Approach

Most econometric applications in the field of electricity are used to produce estimates of price and income elasticities (see for instance Dubin & McFadden, 1984, for a well know example). As already mentioned, we do not have information concerning the amount of electricity consumed at the household level. Therefore, traditional demand analysis quantifying e.g., the sensitivity of electricity demand to price cannot be implemented. However, since we have to rely on a survey, we have the chance to test whether households even know electricity prices, the amount of electricity they consume and the type of electricity product they have at home. The aim of our paper is thus broader, since it intends to explain the consumers' knowledge of the electricity product and their attitude towards the different available products.

The first interesting point to investigate is the knowledge or ignorance of the electricity product available at home. We therefore construct a binary variable y_i (described in Table 3 for our sample) and use it as a dependent variable:

$$y_i = \begin{cases} 1 & \text{if individual } i \text{ knows his product,} \\ 0 & \text{if he does not.} \end{cases}$$

In order to analyze such a binary dependent variable, we have developed logistic regression models to assess negative/positive effect of many independent variables. This latter approach is rather employed in social sciences to capture the qualitative nature of interdependencies in multivariate analysis (see Jaccard 2001, for a more detailed explanation). The statistical technique to analyze dummy variables are called binary response models, the most widely used being the logit and probit models. The idea of these models is to predict the probability that an individual will be in which group, knowing her personal characteristics. In this paper, we will make use of a logit model[5], which specifies the probability that individual i knows his product as follows:

$$p_i = Pr[y_i = 1|x_i] = \frac{exp(x_i'\beta)}{1 + exp(x_i'\beta)} \tag{1}$$

where x_i is a vector containing the characteristics of individual i and β is the vector of parameters to be estimated. The likelihood function of a sample composed of

Table 3: Knowledge of the electricity product available at home

Knowledge	**Whole sample**		**Sample Table 5**	
	N	**%**	**N**	**%**
No (0)	211	38.72	159	35.89
Yes (1)	334	61.28	284	64.11
Total	545	100.00	443	100.00

N individuals writes:

$$\mathcal{L}(\beta) = \sum_{i=1}^{N} f(y_i|x_i) = \sum_{i=1}^{N} p_i^{y_i} \cdot (1-p_i)^{1-y_i} \tag{2}$$

The estimation of the parameters of interest is finally obtained by maximizing the log-likelihood function:

$$\ln \mathcal{L}(\beta) = \sum_{i=1}^{N} \ln f(y_i|x_i) = \sum_{i=1}^{N} y_i \cdot \ln p_i + (1-y_i) \cdot \ln (1-p_i) \tag{3}$$

where the p_i are given by (1).

The coefficients of a logistic regression can only be interpreted in a qualitative manner. Because of non-linearity, the coefficients are indeed only qualitatively related to the impact of the covariate on the probability of knowing the available product: a positive (negative) coefficient indicates that the probability of knowing the product consumed at home increases (decreases). In order to have an idea of the quantitative effect of each covariate, one has to compute the marginal effects for the "mean" individual (or for any individual of the sample). Marginal effects measure the change in the probability of knowing the electricity product if an independent variable increases by one unit, everything else being constant.

In a second step, we concentrate in unravelling the factors determining the choice of the electricity product. In this step, we will only use the data of those individuals who know the type of electricity product they are using. Since people who answered having the Yellow, Green, Discovery and Engagement products are very sparse, it would be difficult to obtain reliable estimates for each of these categories separately. We thus decided to bring them together in what we call the "Other renewable energies". We then have to explain the choice among the three different alternatives given in Table 4, which means that the variable we want to explain now writes:

$$y_i = \begin{cases} 0 & \text{if individual } i \text{ has the Initial product,} \\ 1 & \text{if he has the Blue product,} \\ 2 & \text{if he has one of the Other renewable energies.} \end{cases}$$

Given that the dependent variable has more than two possible outcomes, we have to use an unordered multinomial logit model, in which the probability that individual i has chosen alternative j among m possibilities is given by:

$$p_{ij} = Pr[y_i = j|x_i] = \frac{exp(x_i'\beta_j)}{1 + \sum_{\substack{k=1 \\ k \neq j}}^{m} exp(x_i'\beta_k)}, \qquad j = 1, \ldots, m. \tag{4}$$

As for the simple logit model, the estimation of the parameters is made by maximizing the log-likelihood function, which now writes:

$$\ln \mathcal{L}(\beta) = \sum_{i=1}^{N} \sum_{j=1}^{m} y_{ij} \cdot \ln p_{ij} \tag{5}$$

Table 4: Electricity products (grouped)

Products	**Whole sample**		**Sample Table 6**	
	N	**%**	**N**	**%**
Initial (0)	88	26.35	74	26.06
Blue (1)	123	36.83	100	35.21
Other renewable energies (2)	123	36.83	110	38.73
Total	334	100.00	284	100.00

where $y_{ij} = 1$ if alternative j is chosen by individual i and 0 if not, and p_{ij} is given by (4).

For the empirical estimations, we choose the Blue product as the base category because this is the electricity type attributed by default. However, the results do not depend of the base category and any of the three alternatives could play this role. The coefficients of this estimation have to be interpreted as deviations from the base category: a positive (negative) coefficient indicates that the person has a greater (lower) probability of being in the alternative category than in the base one. And marginal effects indicate the change in the probability of choosing the alternative electricity product against the Blue one if an independent variable increases by one, everything else being constant.

4 Empirical Results

The results concerning the knowledge of the electricity product consumed by the household are displayed in Table 5. Compared with all the variables that we included (see Table 2 for the list of variables), we report here only the coefficients that are statistically different from zero at the 10% level.

The age has a positive effect on the knowledge of the electricity product, which means that older people are better informed than younger ones. The latter are maybe not interested in energy markets. As can be expected, we find that people responsible for paying the households' bills know more often their electricity product, since they are probably also responsible for the choice of the product for their household. Similarly, having already visited the SIG internet website increases the probability to be in the "knowing group" (by 21%). The same remark applies to individuals who are interested in the SIG booklets received at home. By visiting the website or reading these booklets, they clearly show their intention of being informed.

The probability of ignoring the energy product is 24% higher when the individual is unable to judge whether SIG electricity prices are high or low. People are unaware of SIG's concern for sustainable development and those thinking that liberalizing the electricity market would not lower prices also have much lower probabilities of knowing their products. A possible explanation to these results

is that those people are not interested at all by the electricity market and make therefore no effort to be informed about it. The consequence is that they more often ignore the kind of electricity they consume.

Finally, some more variables are significant at the ten percent level (es3, reduc0 and reduc2), but the sign of their coefficient is hardly interpretable or even contradictory. If the respondent answered that she does not know the importance of energy saving (es3), the results indicate that she is more susceptible to know her electricity product. The opposite would have been logical. We also expected everyone acting so as to reduce his electricity consumption, even in different ways – turning off lights (reduc0) or using low intensity bulbs (reduc2) – to have a greater knowledge of the product available at home. We however do find opposite signs for these variables. The fact that the coefficients are only slightly significant proves that the effects are not well established.

The second part of our analysis intends to explain what influences the choice of an electricity product over another. The results of the multinomial logit regression run for that purpose are displayed in Table 6.[6] Once again, only a few coefficients are statistically significant, especially for the Other renewable energies.

The first column in Table 6 reports the factors explaining the choice between the only electricity programme with fossil fuels (Initial) vs the default one (the Blue product). Since the coefficient of the variable nation1 is negative and statistically significant, this means that Swiss citizens coming from another canton than Geneva are less likely to choose the Initial product than the Blue one.

Older people choose the Initial product with a lower probability as well. Younger people being usually more concerned with budget constraints, they probably seek the cheapest solution, neglecting environmental problems. Households pertaining to the lowest income class (less than CHF 3'000 per month) are also more likely to elect the Initial product, which is coherent since it is the cheapest. Similarly, people who indicate they are interested in SIG bills, those choosing their product on the basis of prices and those who perceive SIG prices as expensive or very expensive have a larger probability to be in the Initial group than in the Blue one. The quantitative effect of choosing the electricity product on the basis of its price is especially strong, with a 39% increase in the probability of choosing the Initial product. Surprisingly, people claiming they would agree to pay a surplus of 10% or even more to have green energy seem to have a higher probability of choosing the Initial product.

Respondents ignoring how liberalization would affect the electricity prices choose more frequently the Initial product, with a probability 64% larger. Finally, people thinking that energy saving is not important have a greater probability to be with the Initial product, which may indicate that such people do not give much credit to sustainable development and they choose the cheapest electricity product, despite it is non-renewable.

Table 5: Logit model explaining the knowledge of the available electricity product

Variable	**Coefficient**	**Marginal Effect**
nation1	-0.71^{*}	-0.16^{*}
	(0.36)	(0.09)
age	0.05^{***}	0.01^{***}
	(0.01)	(0.00)
resp1	0.70^{**}	0.16^{**}
	(0.30)	(0.07)
web1	1.06^{***}	0.21^{***}
	(0.28)	(0.05)
booklet1	0.54^{*}	0.12^{*}
	(0.28)	(0.06)
price3	-1.01^{**}	-0.24^{**}
	(0.50)	(0.12)
liberalp0	-1.02^{**}	-0.24^{**}
	(0.49)	(0.12)
sd3	-0.91^{**}	-0.21^{**}
	(0.44)	(0.11)
es3	1.48^{*}	0.23^{***}
	(0.77)	(0.07)
reduc0	-0.81^{*}	-0.15^{**}
	(0.45)	(0.07)
reduc2	0.52^{*}	0.11^{*}
	(0.27)	(0.06)
Log likelihood	-211.7	
Number of Obs.	443	

Notes:
- Only significant coefficients are reported. The complete list of variables contained in the estimation is the following: woman, nation1, nation2, age, npers, income0, income1, income3, income4, income5, bills1, resp1, web1, booklet1, crit0, crit1, wtp0, wtp2, wtp3, wtp4, price0, price2, price3, liberalp0, liberalp2, liberalp3, liberalq0, liberalq2, liberalq3, sd0, sd2, sd3, es0, es2, es3, reduc0, reduc1, reduc2, plus a constant term.
- Reference category is: man, nation0, income2, bills0, resp0, web0, booklet0, crit2 + crit3, wtp1, price1, liberalp1, liberalq1, sd1, es1.
- $^{*}/^{**}/^{***}$ indicates that the coefficient is significant at the 0.1/0.05/0.01 level.
- Standard errors in parentheses.
- The marginal effects are computed at the means of the independent variables.

Table 6: Multinomial logit model explaining the choice of the electricity product

Initial vs Blue		
Variable	**Coefficient**	**Marginal Effect**
nation1	-1.14^{**}	-0.13^{**}
	(0.58)	(0.06)
age	-0.04^{**}	-0.01^{***}
	(0.02)	(0.00)
income0	1.33^{*}	0.24
	(0.74)	(0.15)
bills1	0.88^{*}	0.15^{**}
	(0.50)	(0.06)
resp1	0.85^{*}	0.10
	(0.51)	(0.06)
crit0	1.85^{*}	0.39^{***}
	(1.08)	(0.15)
wtp3	2.27^{***}	0.19
	(0.88)	(0.16)
liberalp3	3.19^{***}	0.64^{***}
	(1.22)	(0.16)
es0	2.97^{**}	0.22
	(1.20)	(0.17)
Other renewable energies vs Blue		
Variable	**Coefficient**	**Marginal Effect**
crit0	-1.10^{*}	-0.41^{***}
	(0.61)	(0.12)
wtp3	1.90^{**}	0.14
	(0.78)	(0.16)
sd0	1.52^{***}	0.31^{***}
	(0.55)	(0.11)
sd2	0.70^{*}	0.23^{***}
	(0.39)	(0.09)
es0	2.56^{**}	0.16
	(1.14)	(0.17)
Log Likelihood	-235.01	
Number of Obs	284	

Notes:
- Only significant coefficients are reported. The complete list of variables contained in the estimation is the following: woman, nation1, nation2, age, npers, income0, income1, income3, income4, income5, bills1, resp1, web1, booklet1, crit0, crit1, wtp0, wtp2, wtp3, wtp4, price2, price3, liberalp0, liberalp2, liberalp3, liberalq0, liberalq2, liberalq3, sd0, sd2, sd3, es0, es2, es3, reduc0, reduc1, reduc2, plus a constant term.
- Reference category is: man, nation0, income2, bills0, resp0, web0, booklet0, crit2 + crit3, wtp1, price0 + price1, liberalp1, liberalq1, sd1, es1.
- $^{*}/^{**}/^{***}$ indicates that the coefficient is significant at the 0.1/0.05/0.01 level.
- Standard errors in parentheses.
- The marginal effects are computed at the means of the independent variables.

Moving to the second part of Table 6, one can discover which factors influence the specific choice between the Blue and the Other renewable energies products (which includes the Yellow, Green, Discovery and Engagement products). People whose criterion for choosing energy is the price do not often pick out the Other renewable energies. This is the most important factor, with a marginal effect of -41%. Indeed, these electricity products are more expensive, so that such a behaviour is coherent. On the contrary, a higher WTP for green electricity involves a greater probability of choosing one of the Other renewable energies products.

The results concerning the implication of SIG into sustainable development are somewhat contradictory. On the one hand, people considering SIG as poorly involved in sustainable development programmes elect more frequently the Other renewable energies. They might be thought as trying to push SIG toward more environmentally-oriented products. On the other hand, people considering SIG as being strongly implicated in sustainable development opt more often for the Other renewable energies as well. Taking both of these estimates together, the results are difficult to interpret in terms of public perception regarding SIG involvement in sustainable development.

Lastly, considering that energy saving is not very important increases the probability of choosing the renewable energies product. We note however, that the Initial product possesses almost the same coefficient. The results concerning the Other renewable energies are thus not really clear. Nevertheless, one should keep in mind that they are obtained by gathering together several different types of products because of a lack of observations.

5 Conclusions

In this paper, we analysed the choices of the inhabitants of the Canton of Geneva between several alternative electricity programmes. Our study is based on a questionnaire administered to 545 persons during the months of August and September 2006. The first interesting and surprising result to highlight is that a huge proportion (almost 40%) of the interviewed people does not know what kind of electricity is available at home. As found by other papers in the literature, this lack of knowledge concerning electricity products is in fact quite widespread.

We then studied the factors having an impact on the knowledge of the product itself as well as the factors influencing the choice between the different products. Because the variables we wanted to explain are either binary or categorical, we based our estimations on logistic regressions. Our results show that respondents who declare that they know about their electricity product tend to be older, be in charge of bills' payement, have visited the SIG website, have an interest in the SIG booklets sent at home and finally are aware of electricity prices. All these variables are somehow related to respondents' degree of involvment regarding electricity consumption. Additionally, we also learn about the main motivations for choosing a specific electricity product. Typically, young individuals, pertaining to low income households, and who admit that price is the primary criterion for their

choice of an electricity product are more inclined to opt for the non-renewable electricity product, which is also the cheapest one. On the other hand, people concerned by the environment and who have a high WTP for green product have likely adopted the renewable energy based products.

Our paper could be improved in several directions. First, if we had a larger dataset, we could apply a multinomial logit model without having to gather together several types of electricity. Second, we mention that a possible flaw of our questionnaire is that we cannot be sure that people were right when telling us which product they have at home. A more reliable analysis could be made either on the basis of the SIG files, or by interviewing people at home. However, both of these techniques would remove the possibility to observe if people do know or ignore the electricity type they consume.

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Notes

[1]At the time the survey used in this study was administered (August-September 2006), CHF 1 corresponded to about EUR 0.65 and USD 0.8.

[2]Source: http://www.sig-ge.ch (SIG website).

[3]The complete questionnaire (in French) is available from the authors on request.

[4]As mentioned by an anonymous referee, an alternative explanation for such a difference between our sample and the whole population could be that we did not reach a representative sample of the population with our survey. However, we do not believe that a difference of more than 40% is only due to chance, given that we surveyed more than 500 people. Note that even if it were the case, the results of our estimation methods would still be relevant, since they analyse deviations between individuals and do not depend on the representativity of the sample. Since we do not try to extend the implications of our results to the entire population of the Canton of Geneva, we do not have to pay attention to sample representativity.

[5]A probit model would have given very similar results. The interested reader is refered to Maddala (1983) for a thorough presentation of logit and probit models.

[6]All variables are the same as for the logit estimation except that we dropped the variable price0 on the perception of SIG's electricity prices because it induced some collinearity problems.