Aalto University
School of Electrical Engineering

School of Electrical Engineering
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Oriol Sementé Tarragó

DEMAND RESPONSE POTENTIAL OF RESIDENTIAL LOAD EQUIPMENTS

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Supervisor	Professor Matti Lehtonen
Instructor	M.Sc. Merkebu Zenebe Degefa

AALTO UNIVERSITY ABSTRACT OF FINAL PROJECT
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Author:	Oriol Sementé Tarragó
Department:	Department of Electrical Engineering
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Supervisor:	Prof. Matti Lehtonen
Instructor:	M.Sc. Merkebu Zenebe Degefa

Abstract

This thesis was conducted inside the Smart Grids and Energy Markets (SGEM) project and as a continuation of SGEM Task 6.11, which aims to investigate the utilization of AMRs for spatial load analysis for long term load forecasting of households providing calculating mechanism of hourly level appliance consumptions in the modelling of Demand Response.

The goals of this study are to disaggregate electrical loads of a sample of Finnish households to load device groups. Subsequently to divide these loads into critical and non-critical loads, which enables timely changes in operation, and as the final outcome, to present the Demand Response Potential of these households.

Data for this study was obtained from a database consisting of hourly metered power consumption (AMR) data from 1630 households from Kainuu (Finland) and background information of those costumers. The final dataset is compound by 337 households from the original data, those which have District Heating as their primary heating system.

Conditional Demand Analysis (CDA) is performed using regression analysis as a tool. The analysis was computed with MATLAB and the used regression technique is the Stepwise regression. The regression analysis consists of 24 independent equations multilinear regression for different models and as outcome the daily load profiles of the appliances included in each different model were obtained.

The obtained load profiles for different appliances and models are presented in the CDA results and appendices, in both graphic and numeric format, this last in tables containing the obtained estimated coefficients and the INMODEL matrix.

Subsequently, the obtained loads are divided into critical and non-critical loads, the latter ones being ones to allow for timey changes in operation. Demand Response (DR) analysis is performed defining the maximum allowed postponement in time of each load use within different scenarios. Subsequently, the DR potential for each scenario are graphically presented, according the defined time spans and seasons models and using the appliances load profiles obtained from the CDA.

Finally, in the conclusions chapter, the main finding are summarized and the author’s conclusions are presented, not only regarding the CDA and DR studies, but also about improvements in data collection and data analysis as well as further steps recommendations.

Number of pages: VIII+88	**Keywords:** AMR, CDA, Conditional Demand Analysis, Demand Response, Finnish households, Load Profile, Non-critical loads

Preface

The work on this Final Project was done at the Smart Grids and Energy Markets (SGEM) research group, on the Department of Electrical Engineering and Automation at the School of Electrical Engineering of the Aalto University, in Espoo, Finland. The focus areas of research in power systems are distribution networks, their system solutions and reliability engineering, power system components´ load capacity and ageing, control and monitoring systems including computer applications, automation and communication solutions, end use analysis and power quality. The head of research group is Professor Matti Lehtonen, who has a solid experience of more than 20 years within the above themes. The research work is done on close cooperation with manufacturing and energy industry.

First of all, I would like to sincerely thank my supervisor Professor Matti Lehtonen for giving me the chance of joining this research group and supervising my Final Project. I really appreciate his interest in this research and all the provided help. It was a pleasure to work in such environment.

I would really like to thank to my instructor M.Sc. Merkebu Degefa for his implication in my work and his helpful attitude. He have been supporting me since the beginning and his help and advices have been really valuable to me over all the research. It has been a pleasure to work with him.

A special mention to Pancho for all the shared experiences and to my work colleagues Nacho and Muhammad for all the shared hours in our office. As always, to my friends from home, and specially Nacho, Sergi and Tati for their visit.

I would also like to thank Aalto ELEC international students officer Niina Huovinen for all the help provided since I landed here and to my home university UPC to bring me the opportunity to live this great experience.

Final words go to my family for many reasons and for being always there.

Otaniemi, October the 23th, 2014.

Oriol Sementé Tarragó

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Abbreviations and Symbols

AMR	Automatic Metering Readings
CDA	Conditional Demand Analysis
DH	District Heating System
DR	Demand Response
EM	Engineering Methods
GSHP	Ground Source Heat Pump
HDD	Heating Degree Days
SM	Statistical Methods
SQM	Square meters variable
ToU	Time of Use
UEC	Unit Energy Consumption
WD	Workday
WE	Weekend or Holiday

Introduction

This thesis was conducted inside the Smart Grids and Energy Markets (SGEM) project and as a continuation of SGEM Task 6.11. The study was conducted during 9 months, from January 2014 to September 2014, under the supervision of Professor Matti Lehtonen.

The goals of this thesis are to disaggregate electrical loads of a sample of Finnish households to load device groups. Subsequently to divide these loads into critical and non-critical loads, which enables timely changes in operation and as the final outcome, to present the Demand Response potential of these households.

Therefore, this thesis is divided in two main parts. In Part I, the database is analysed, a final set of households is selected, in which is performed a Conditional Demand Analysis (CDA) in order to disaggregate the hourly Automatic Meter Reading (AMR) households' consumption into different load categories obtaining then their load profiles within the defined models. These load profiles are presented in the CDA results chapter, also they are provided in complete form in the appendices.

In Part II, the Demand Response (DR) Potential of these households is analysed, using the appliances' load profiles previously from the part I CDA. After analysing individually these appliances and close investigation for the potential of timely changes in operations, the individual appliances are grouped into critical and non-critical loads. The DR potential of these non-critical loads are presented in the DR results chapter, where the exposed graphics reflects, for different time-spans and models, the amount of energy that can be hourly postponed in time according the non-critical loads profiles.

Finally, in the conclusions chapter, the main findings are summarized and the author's conclusions are presented, not only regarding the CDA and DR studies, but also about improvements in data collection and data analysis as well as further steps recommendations.

Part I - Load Disaggregation

Introduction

The growing social consciences in environment and energy efficiency induced public institutions, industries and researchers to dedicate over the last year many efforts and resources in enhancing the world energy production, distribution and consumption to a more efficient and rational scenario.

The EU has adopted an integrated energy and climate policy aimed at cutting greenhouse emissions, increasing energy efficiency and increasing renewable share, all by 20 per cent by the year 2020. Focusing in the energy efficiency, there are many improvements to be considered to reduce energy consumption and especially in the residential sector.

On the other hand, the electric power companies are facing with major problems such as the balancing of the generation and consumption in real-time, which otherwise causes instabilities to the network. In this situation, the residential sector has become the major issue. In contrast of the industrial and commercial sector, whose behaviours and demands has been historically understood and modelled better, forecasting the demand of the residential sector and understanding their behaviours is a difficult task.

For those reasons, modelling the energy consumption in the residential sector has become a priority target over the last years.

Theoretical Background

In general, there are two approaches identified for modelling residential sector energy consumption: Top-down approach and Bottom-up approach. Swan and Ugursal described in their study [1] these approaches and reviewed their modelling techniques. The top-down approach treats the entire residential sector as a unit and not considers the individualities of end-uses and residents' particularities. On the other hand, the bottom-up approach works with the energy consumption of individual end-uses, individual households or group of households to extrapolate these results aiming to represent regional or national samples.

In a more specific level, focusing in these individual energy consumptions used by the bottom-up approach and aiming at explaining consumption of communities or group of households rather than national levels' objectives, two distinct methods are utilized inside the bottom-up branch to perform such analyses. These methods are divided as the Statistical Methods (SM) and Engineering Methods (EM). The application of this methods within the studies of end-use energy consumption in the residential sector were the focus of the reviewed literature.

The principal used method within the SM, in the reviewed studies, is the Conditional Demand Analysis (CDA), which is applied over a wide range of different approaches and objectives. On the other hand, regarding the EM, different models following engineering approaches were created by researchers producing valuable outcomes [2] [3] [4] . The differences between CDA and EM has been analysed in some of the reviewed studies [1] [5].

The divergences between each method rely in different levels of input information, different calculations or simulation techniques, and different applicability of the produced results. Both techniques have been very effective in their respective implementations, but also carried weaknesses that made them inaccurate for certain approaches. Therefore, most of the studied cases had a clear choice between both methods due to their needed outcome or the structure of their available data. In this last aspect, these two methods present a clear difference: While in the

EM big amount and very detailed data is needed from the households regarding appliances specifications and consumptions, and certain household's features. In CDA, the electrical consumption metering, simple appliances stock information and few features of the households are required. The main features of these methods are compared in the following Table I.

Table I - Comparison between Conditional Demand Analysis and Engineering methods

	Conditional Demand Analysis	Engineering Methods
Positives Aspects	- Uses metering data and basic survey information	- Non metering data needed out of appliances power ratings
	- Includes socioeconomic variables effects	- Effective and fast extrapolation to wide range of scenarios
Negative Aspects	- Results accuracy depends on the sample quality	- Non-sensibility to residents behavior or socioeconomic variables
	- Needed large survey sample to exploit variety	- Needed large and accurate input information
	- Multicollinearity problems	

Moreover, CDA implementation advisability could be explained from a different approach. Whether the household total electricity consumption is analysed from the end-use energy consumption point of view, could be stated the following:

The household total electricity consumption in a certain instant is produced by the direct use of certain owned appliances, by the active state of certain electricity end-use and by the standby consumption of certain appliances or end-uses even when they are not used in that instant.

Therefore, it is assumed that the aggregation of these 3 possibilities, and only these, results in the total electricity consumption in each instant. Consequently, the household metered electricity consumption must be totally explained by the set of appliances and electricity end-use owned in this household.

Following this thesis, considering the available data, and establishing the disaggregation of electrical loads of households to the load device categories as the aim of this first phase, the implementation of the CDA method seems to be the most valid choice[1].

To finish this theoretical background chapter and regarding the household energy consumption studies consulted in the literature, should be mentioned other methods used in this topic, that are considered of a significant relevance. Over the last years, various studies have been performed using high frequency metering data. In these studies, the high frequency AMR data is used to disaggregate the different appliances analysing their signatures and harmonics [6] [7] [8] [9]. However, this approach implementation is still not scalable to a wide range level due the high costs of the required appliance level metering system.

[1]In the conducted study, the discussions between CDA and EM approaches were only in a theoretical or conceptual way, since the available data directly leads us to perform the CDA.

Data Analysis

Firstly, should be defined some concepts in order to clarify to the reader the meaning of certain used words that without a previous clarifications might lead to misunderstandings. During results interpretation and analysis will be used usually the term *load profile* referring to the demand curves of certain loads. The term *load profile* is meant to refer to the obtained daily demand curve from the analysed loads, the 24h hourly demand profile. Further, during *load profiles* analysis, these might be referred as *load level*, willing to focus more on the amount of energy demanded by this load in certain time, or be referred as *load curve* or *load pattern*, willing to focus more on the hourly pattern or shape of this load; and understanding the use of the term *load profile* referring as a whole.

Prior to the presentation of CDA study, the nature and the source of data are briefly discussed in the following sub-section [10] [11]. In addition, both AMR and Survey data are analysed in order to find relevant features to perform the best setup possible for the CDA analysis.

Data Description

Data for this study were obtained from Aalto University Power Systems laboratory database, which collected among 1630 households from Kainuu (central Finland). The used data consists of hourly metered household electricity consumption and survey data from the respective households. The hourly consumption metered data were provided by AMR meters installed in the households, the obtained data are hourly measurements of the average power consumption during each period in kWh/h units. The measurements were taken during the period composed from 1st July 2008 to 30th June 2009, each household metered 8760 AMR readings corresponding to the 24 hours over the 365 days. Table II shows the time data structure.

Table II - Time Data Indexing

Time Data Indexing							
Month	Days	Days Index			Hours Index		
July '08	31	1	-	31	1	-	744
August '08	31	32	-	62	745	-	1488
September '08	30	63	-	92	1489	-	2208
October '08	31	93	-	123	2209	-	2952
November '08	30	124	-	153	2953	-	3672
December '08	31	154	-	184	3673	-	4416
January '09	31	185	-	215	4417	-	5160
February '09	28	216	-	243	5161	-	5832
March '09	31	244	-	274	5833	-	6576
April '09	30	275	-	304	6577	-	7296
May '09	31	305	-	335	7297	-	8040
June '09	30	336	-	365	8041	-	8760

Survey data was obtained from a questionnaire[2] sent to the metered households residents. From each questionnaire were obtained 93 variables that cover information about dwelling features, appliances stock and residents behaviours. These variables might be divided in two types, the dummy variables, which takes 0 or 1 value referring whether the household owes or not such appliance or feature, and the quantitative variables, which might reflect the number of specific owned appliance, quantifies certain feature or gives Time of Use (ToU) information[3] of certain appliances.

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[2] See *Appendix I: Household's Questionnaire*.

[3] Given as frequency of use of certain appliances. Not specific times.

Table III shows[4] a relation of the 93 variables provided by the questionnaires indicating their type, whether are Dummy variables or Quantitative variables. Regarding the presented variables, some of those variables might be modified during the study resulting in new variables, especially some quantitative variables which might be used as dummy variables. Those modifications might lead to the thought that the number of initial variables were bigger than 93. Modified variables would be accordingly indicated.

During the CDA study, additional variables than the initials were used as explanatory variables. One of these variables were the Heating Degree days (HDD) data. Calculated from the Finnish Meteorological Institute (FMI) temperatures database [12], the HDD is a measurement commonly used among the scientist studies to indicate the demand of energy needed to heat a building. HDD values are derived from outside temperature measurements and are defined relative to a base temperature, these values are calculated as the difference between the metered outside temperature and the established base temperature, being 0 for negative values, which means that there was no need for heating consumption. 15.5°C was used as base temperature for the Finnish weather environment [10] [11].

Regarding the difference between weekdays (WD) and weekends (WE), a dummy vector was created to implement this division. The date vector contains the information for the 365 days, where 1 corresponds to a workday and 0 corresponds to weekend or holiday. It was considered the official holidays in the Finnish calendar.

[4] See next page.

Table III - The 93 variables extracted from the Survey questionnaires. 'D' refers to dummy variable and 'Q' refers to quantity.

#	Variable	Type	#	Variable	Type	#	Variable	Type
1	'HTApp'	D	30	'VentMEV'	D	60	'tumbledryer'	D
2	'HTsdta'	D	31	'VentMEVEHP'	D	61	'tumbledryermonth'	Q
3	'HTOneF'	D	32	'VentMSEV'	D	62	'dryingcabinet'	D
4	'HTstoneOrBrick'	D	33	'VentMSEVHR'	D	63	'dryingcabinetmonth'	Q
5	'HTwood'	D	34	'Age0to7'	Q	64	'sauna'	D
6	'BuiltYear'	Q	35	'Age8to15'	Q	65	'saunaweek'	Q
7	'WindowsGlass'	Q	36	'Age16to30'	Q	66	'openanduseSauna'	D
8	'FloorNum'	Q	37	'Age31to50'	Q	67	'openanduseSaunaweek'	Q
9	'HeatedsqmOver15'	Q	38	'Age51to65'	Q	68	'electricstove'	Q
10	'HeatedsqmBn5and15'	Q	39	'Age66to75'	Q	69	'electricstoveweek'	Q
11	'CourtsqmOver15'	Q	40	'Age76andolder'	Q	70	'computerCRT'	Q
12	'CourtsqmBn5and15'	Q	41	'TotalResd'	Q	71	'computerLCD'	Q
13	'PrimDistrict'	D	42	'PresenceWD'	Q	72	'computerportable'	Q
14	'PrimDirectEle'	D	43	'PresenceWE'	Q	73	'CRTtv'	Q
15	'PrimElecStore'	D	44	'Refrigerator'	Q	74	'LCDtv'	Q
16	'PrimOil'	D	45	'Refriandfreezer'	Q	75	'hometheater'	Q
17	'PrimWood'	D	46	'Freezer'	Q	76	'consumerElec'	Q
18	'PrimGSHP'	D	47	'chestfreezer'	Q	77	'engineblock'	Q
19	'PrimOtherWood'	D	48	'Refriage10'	Q	78	'engineblockHours'	Q
20	'SuppWood'	D	49	'RefriFreezage10'	Q	79	'carcabin'	Q
21	'SuppSolar'	D	50	'Freezerage10'	Q	80	'carcabinHours'	Q
22	'SuppASHP'	D	51	'chestFreezerage10'	Q	81	'BulbNumIN'	Q
23	'SuppOther'	D	52	'dishwasher'	Q	82	'SavingLampNumIN'	Q
24	'Woodm3'	Q	53	'dishwasherweek'	Q	83	'HalogenNumIN'	Q
25	'UnderFloor'	Q	54	'dishwashertype'	D	84	'FluorescentIN'	Q
26	'CoolASHP'	D	55	'dishwasherwaterhot'	D	85	'OthersIN'	Q
27	'CoolAirC'	D	56	'washingMachine'	Q	86	'BulbNumOUT'	Q
28	'VentNVWORH'	D	57	'washingmachinemonth'	Q	87	'SavingLampNumOUT'	Q
29	'VentNVWRH'	D	58	'washerdryer'	D	88	'HalogenNumOUT'	Q
			59	'washerdryermonth'	Q	89	'FluorescentOUT'	Q
						90	'OthersOUT'	Q
						91	'IndoorTemp'	Q
						92	'StandbyMachinNum'	Q
						93	'SwitchedoffStandby'	Q

Automatic Meter Reading

The Automatic Meter Reading (AMR) is an extended way for collecting consumption, diagnostic and status data from energy metering devices and transferring these data to a central database for billing, troubleshooting and analysing. An AMR meter consists of an energy meter, collector unit and communication module. On the 1st of March 2009 the Finnish government set an addition to the electricity market regulation obligating network companies in Finland to install AMR meter to every household, aiming at metering 80% of all the costumers in 2013.

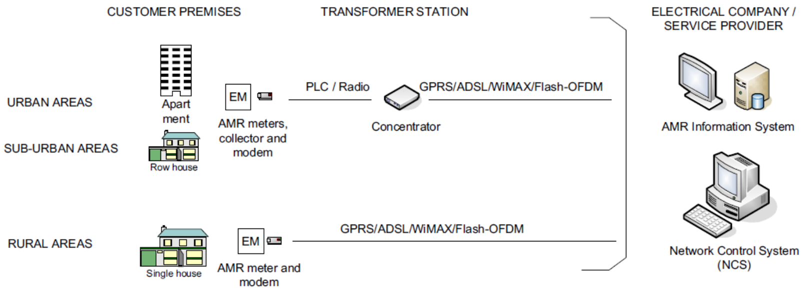

Figure I - The two communication layout types of AMR system. Source: Degefa (2010)

Metering consumption is important to obtain information of household's consumption levels and demand patterns, but metering itself does not reduce the energy consumption or change demand patterns. However, the data provided by this system might help in the implementation of energy efficiency policies or demand response.

AMR data analysis

In the AMR data analysis, the study was focused in the hourly demand curves of the metered households, their demand load and its variance among daily time, days, seasons and groups of households. The aim for this analysis was to obtain information that leads to define the most accurate models to analyse and implement. Further, considering that the aim of this first study part was to disaggregate the household loads in a 24h model, had to be found which might be the different models and which factors defined these models. According previous studies [13] and using engineering knowledge, was considered the residents behaviours or habits as the main factor, and this factor was implemented in the definition models process as timely differentiation and household features differentiation.

To determine the timely differentiation a set of timely data analysis was performed in order to observe the weekly and seasonally variations in the households' demand. As a result, the analysis results lead to affirm two statements: In the first, it is affirmed the existence of a clear distinction between workdays and weekends in terms of both load level and load curve. The second states that the daily load level and the daily temperature are directly correlated, basically due the heating system consumption. Thus, it was considered the existence of both seasonally models and heating system models.

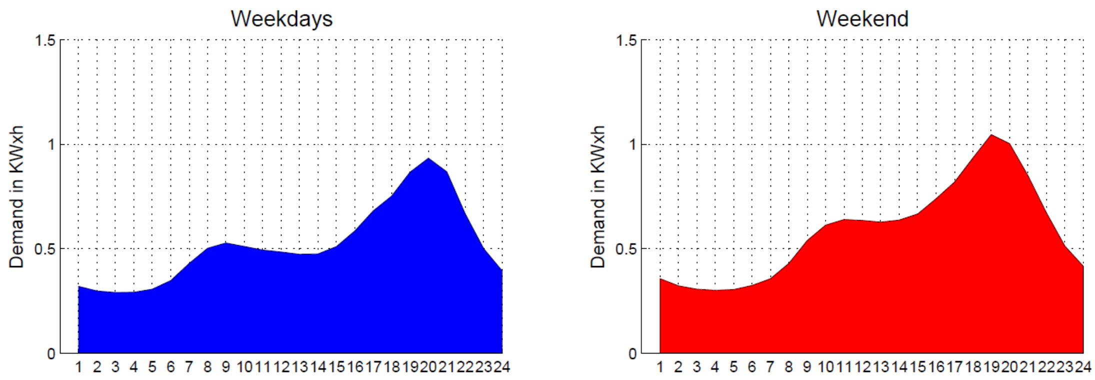

Figure II - Weekdays and Weekend Average Demand Profiles for District Heating households

Analysing the household features differentiation, it was found that the most important variation in the demand was caused by the presence of electric heating system, as was introduced in the second statement. These demand curve differences between groups of households with different heating systems are reflected in all the obtained results, both in terms of load profile and load level. The different heating system groups within the data households are presented in Table IV.

Table IV - Households heating system groups within the data

Primary Heating System	
Direct Electric Heating	717
District Heating	337
Electric Storage Heating	118
Oil Heating	298
Wood	100
Ground source heat pump	25

Regarding the significance of these different heating systems among the Finnish households, the District Heating system together with Electric Heating system take the most part. In 2012, the most common energy source for heating residential buildings was District Heating, followed by Electric Heating [14].

Figure III illustrates the averaged total daily demand over the metered period for each heating system household group. Although this figure shows the trends of each group in a clearly way, these results cannot lead to more conclusions than the temperature-demand relation and the heating system significance. These results showed the significance of the heating system, but not allowed to draw conclusions about the demand pattern differences between these groups, since in order to support this statement they should be analysed in hourly format. Furthermore, there might be other factors than heating system influencing in the demand

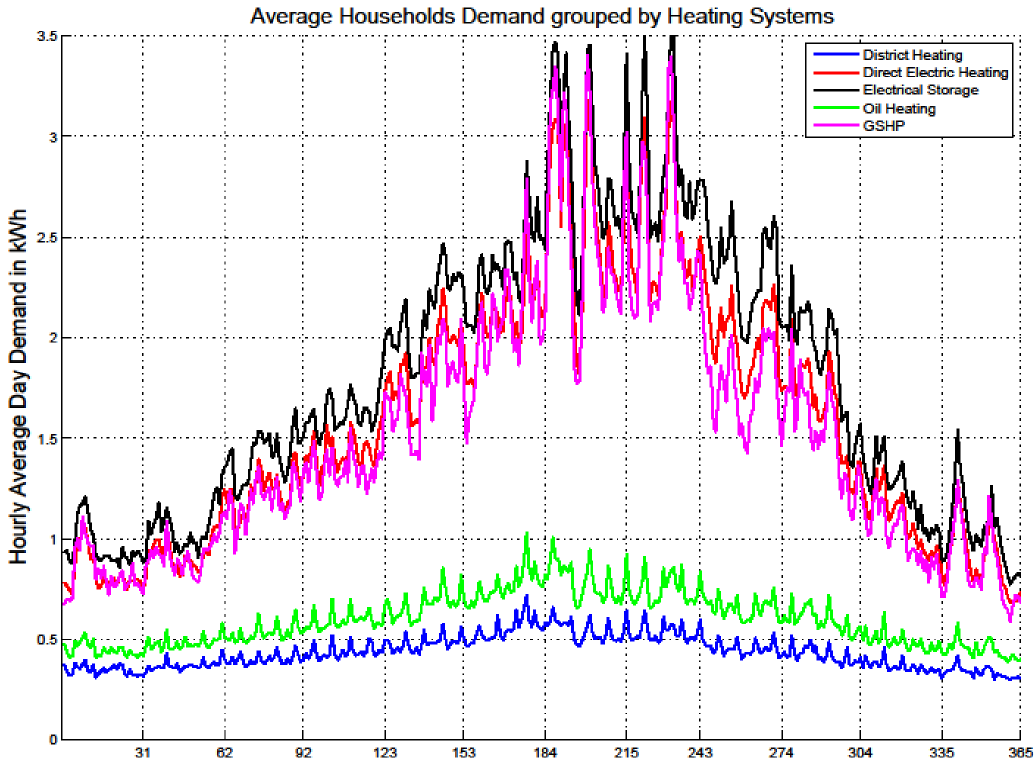

Figure III - Average household total daily demand grouped by heating systems

The presented Figure III shows the heating system influence in the household demand, as well as, the extreme differences between some of these groups. Focusing in the principal groups, these can divide in different models. One of these models formed by the households owning District Heating system and other compound by the households owning either Direct Electric Heating system or Electrical Storage system.

In the presented Figure III can be observed that District Heating households demand curve had a lower load level than the other groups as well as a clear differentiation in the demand pattern. This differentiation in the demand pattern is not only in the daily profile, but also in the whole period demand due the District Heating households demand is not affected by the heating consumption, as a result of this, DH households demand does not present a clear variation among seasons as it is observed in other groups. However, must be stated that part of this seasonally demand variation, which can be observed from the DH households curve, is produced by the wider residents' presence at home due to Finnish winter particular conditions and also due to high lighting consumption with the darker winter time. Consequently, part of this demand increase might be associated to this statement rather than only to heating system.

Figure IV illustrates the daily load profile of averaged households grouped by heating systems during two different periods. The left weekly graphs, correspond to summer time demand and graphs 4 weeks within July and August 2008. The right weekly graphs, correspond to winter time demand and show 4 weeks within February and March 2009.

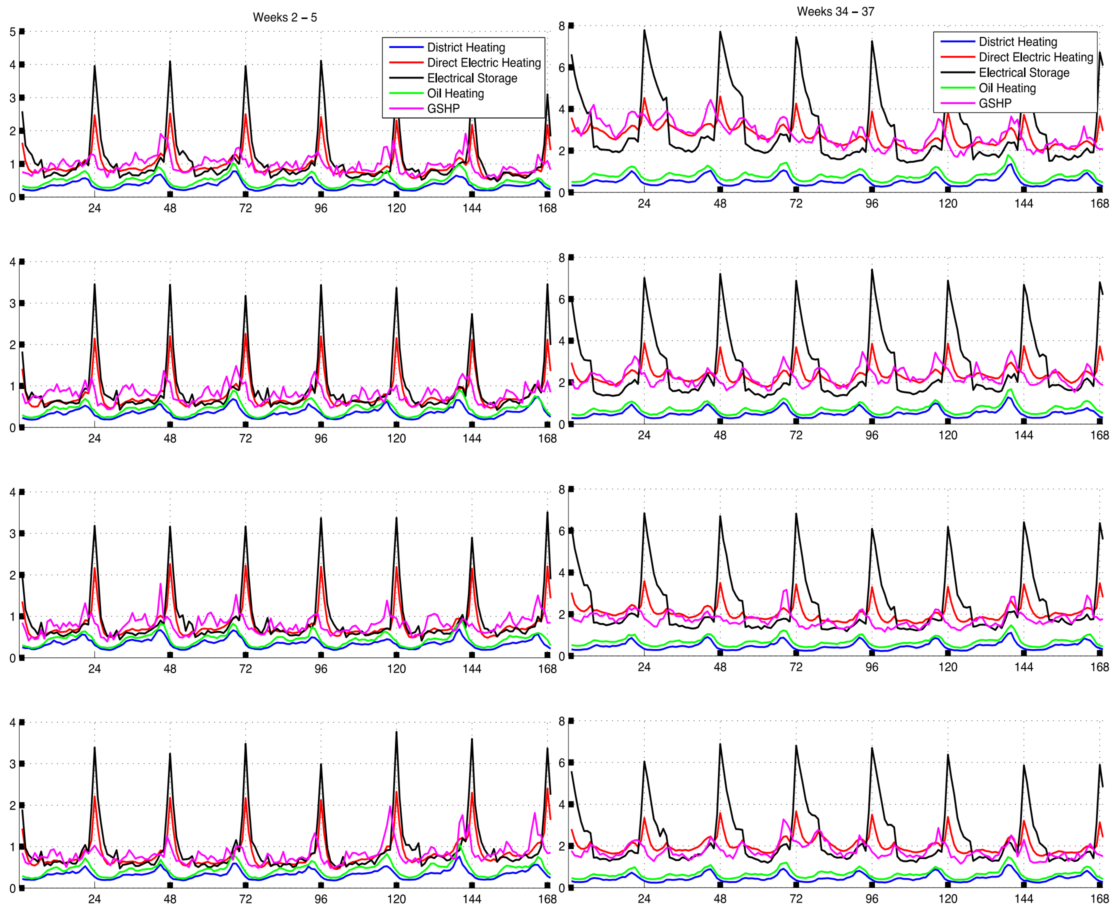

Figure IV - Summer / Winter average households hourly demand grouped by heating systems

The major fact showed in these graphs is the heating system influence in the household load profile. In the previous Figure III was showed that the owned heating system has a direct impact in a household load level. Further, Figure IV supports the previous statement as well as shows the heating system type influence in the household load pattern. Regarding the principal heating groups, District Heating households profile presents a clear difference with Direct Electric and Electrical Storage households.

This difference is especially reflected in the night time, when these seconds recharged their heating storage. During the daytime, the difference between these groups is still remaining as what can be considered a base load difference. During that time, although they might share some load curve pattern, the load level gap between District Heating and the others is always present[5].

For the observed reasons, and as will be analysed during the CDA specifications, is not effective to analyse together these households without classifying them by their heating system type, since their load level gap doesn´t allow an effective variance comparison.

[5]Author is not stating that exist different behaviours between households from the two groups just for fact of belonging to one of this groups.

Survey Data Analysis

From the survey data analysis was obtained information of the sample's characteristics as well as an overview of the household's structure and their appliances' stock. In the Table V is presented the penetration rates of the principal appliances among the sample.

As was mentioned in the *Data Description* chapter, the survey provides households data, which might be divided in two groups, the dummy variables and the quantitative variables. This last group, includes significant information regarding appliances' ToU, housing features, such SQM, building type or heating system, and residents' habits, such presence at home information or awareness of standby loads.

Table V - Principal Appliances Penetration Rates obtained from the survey sample.

Survey Data	
Principal Appliances Penetration Rates	
Refrigerator	80,43 %
Refrigerator with Freezer	22,58 %
Freezer	71,47 %
Chest Freezer	36,93 %
Electric Stove	91,17 %
Dishwasher	77,67 %
Washing Machine	94,23 %
Washer Dryer Combo	2,52 %
Tumble Dryer	13,19 %
Drying Cabinet	5,95 %
Sauna	66,07 %
TV	91,28%*
Computer	71,28%*

TV CRT:	65,21%
TV LCD:	44,48%
PC CRT:	20,25%
PC LCD:	33,62%
PC Portable:	37,61%

Although all this useful information was obtained from the survey analysis, also a lack of information from some households was detected. This lack of data is really important to be detected since as a statistical method is applied, which is based on the data variance, the obtained results might lead to invalid conclusions due the awareness of these lacks.

This lack of information can be divided in two groups. The first one compound by those households which didn't answer some questionnaire points and is reflected in the data as zero value where is not coherent to have it, i.e. number of bulbs or housing square meters. This variables and households should be identified in order to take some action during the CDA implementation, either removing those households from the study or not including those variables in the equations. The second group is compound by those households which owned certain appliance but didn't answer the additional information referring this appliance. In this case, the treatment might be not such drastic as with the first group since if it is not significance over the sample. Moreover, this lack impact to the results can be avoided or relativized through certain variations in the equation setup[6].

[6] See *CDA Equations Specifications* chapter.

District Heating Households Final Dataset

Once were analysed the household demand features and the differentiation between groups of households due their owned heating system, it was found the expected results considering the initial statements. The obtained results showed the District Heating households' independence from heating consumption. This is the DH major advantage for implementing the CDA analysis to these households, since heating systems has been historically modelled precisely, from a technical point of view, by EM through the model inputs such specific technical information and weather data [15]. Furthermore, although the EM exclude consideration linked to residents' behaviours, these play a minor role in extreme climates [16], such is Finland case.

Consequently, the dataset used for the study was compound by the group of households that have district heating as their primary heating system. The chosen group is compound by 337 households, which is considered a significant sample compared with the previous CDA performed in related studies [17]. Principal appliances' penetration rates within this groups are presented in table VI as well as their deviations from the whole sample.

Table VI - Penetration Rates from District Heating households group

District Heating Households		
Principal Appliances Penetration Rates		
Refrigerator	77,15 %	-3,28 %
Refrigerator with Freezer	25,22 %	+2,64 %
Freezer	70,03 %	-1,44 %
Chest Freezer	25,22 %	-11,71 %
Electric Stove	90,21 %	-0,96 %
Dishwasher	73,59 %	-4,08 %
Washing Machine	90,21 %	-4,02 %
Washer Dryer Combo	1,78 %	-0,74 %
Tumble Dryer	10,39 %	-2,80 %
Drying Cabinet	5,04 %	-0,91 %
Sauna	70,92 %	+4,85 %
TV	89,91%*	-1,37 %
Computer	68,54%*	-2,74 %

TV CRT:	60,53%	-4,68%
TV LCD:	40,95%	-3,53%
PC CRT:	17,80%	-2,45%
PC LCD:	29,97%	-3,65%
PC Portable:	35,91%	-1,70%

Using a group compound by only district heating households implies working with electricity consumption readings without any demand directly related with heating consumption. This feature produces two big benefits in the disaggregation study. First, as the electricity consumption associated to heating consumption represents a huge share of the total, even more in Finland [14], thus, the fact of removing this part from the demand analysis may lead to more effective demand disaggregation in only appliances and end-uses out of heating consumption. Second, the inexistence of heating loads allowed to use, in the CDA models specifications, a set of explanatory variables that were historically related mainly with heating consumption loads, for explaining other appliances behaviours, out of heating.

In addition, should be considered that District Heating households represent an important demand group in the Finnish energy market. District Heating system was the most common heating source among the Finnish households in 2012 [14] and has been a growing trend over the last years. Moreover, is considered one of the most efficient heating sources when is produced together with electricity in combined heat and power plants (CHP) [18].

In conclusion, the obtained results in this study for District Heating households might imply a larger impact in the future related Finnish studies compared to other heating systems.

Electric Heating System Households

CDA was performed to groups of households formed by the different electric heating systems with infructuous results. It was not possible to disaggregate the appliances demand profiles with enough confidence, especially due the impact of the heating system load in these appliances demand profiles.

As it was mentioned, the main problem for the households with this type of heating system is mainly that, from a statistical point of view, the heating demand is acting as a base load within the total demand, which is compound also by the appliances and electricity uses demand. Although the demand variance over the time is supposed to be equal to the District Heating group, (both groups presented similar sets of appliances), the demand part related to the heating systems is impossible to disaggregate through statistical methods. Remember that heating system demand for households in extreme climates are really well predicted through EM and top-down approaches, since individual behaviour plays a minor role [16]. This impossibility to disaggregate the heating consumption from the demand implies that the disaggregate appliances demands are inevitably influenced and disturbed by the demand associated to heating systems.

Furthermore, the lack of information regarding the ownership of hot water tanks in the survey is an important handicap in the CDA analysis for those groups. This information was not given in the available survey data.

As a conclusion, should be considered a pre-work with the AMR data aiming to disaggregate heating consumption and water tanks demand through engineering methods. The success of these aims might result in a disaggregated demand that would be only associated to appliances and electricity uses and consequently more appropriate to perform a CDA and obtain valid results.

Conditional Demand Analysis

CDA Introduction

CDA is an econometric method for estimating appliance-specific energy consumption without using theoretical engineering modelling or end-use appliance metering. The CDA assumes that average hourly metered consumption is explained by the specific use of certain appliances and electricity end-use during the metered period. Trough regression techniques, is aim to disaggregate the metered electricity consumptions in a set of explanatory products formed by the chosen explanatory variables and its estimated demand coefficients [19].

The CDA validity depends on the quality of its estimated coefficients, which depends on the type and combinations of the explanatory variables and their variance among the data set. The CDA model specification and data quality are the major facts that lead to accurate estimations. Consequently, CDA model might lead to imprecise results, poor estimations or multicollinearity problems depending on the data base quality and the equations setup. Mostly, appliances with high saturation cause multicollinearity problems. The main advantages and weaknesses of CDA are presented in the following table.

Table VII - CDA features summary table

Conditional Demand Analysis	
Advantages	Weaknesses
- Easy to implement	- Multicollinearity problems
- Sensitivity to socioeconomics effects and residents behaviors	- Not sensitive to appliances specifications differences over the sample
- Not requires detailed data	- Needed large sample
- Flexibility to a wide range of approaches	- Relies on the data content and quality
- Based on empirical data.	

Nevertheless, the CDA is the most proper method to use in our analysis considering the available data and the aims of this study. The other possible methods, as engineering methods or direct appliance metering, were discarded since not fit in the study approach due their features, weaknesses, or lack of data.

CDA Literature review

CDA was first introduced by Parti and Parti in their study [19], the authors set the theoretical basis of CDA subsequently used by other studies in different approaches. The CDA method presented by the authors aimed to obtain demand functions for a set of unobserved endogenous variables. The estimated demand function coefficients with the variables observations were used to obtain expected level of consumption for the specified appliances.

The data base used in the study was a detailed set of appliances ownership and demographic variables for 5.000 individual households, together with weather data. The monthly electric billing for the corresponding households were used as the dependent regression variable. The study presents, using this data base, the twelve month regression analyses of the household demand for electricity. The obtained demand functions are used to disaggregate the total household demand of electricity into particular appliances and latter to estimate the monthly and annual average energy use of these appliances as well as the corresponding price and income elasticities. Their estimates of appliance energy use were reasonably close to the engineering estimates.

Aigner et al [17] presented a closer approach to the conducted study. The authors used the CDA method and 15-min metered consumption data, which were recorded during the month of August over 3 consecutive years, to directly split the total household load into its constituent parts, each associated with a particular electricity-using end use or appliance. This paper presented similar CDA approach to the conducted study and produced very interesting results as well as presented useful conclusions and recommendations for further developments. Because of that, it had an important relevance as a reference source over the performed study.

The study used the metered data as the CDA dependent variable representing the hourly consumption averaged over the days of the month and included a set of independent variables with the purpose to disaggregate the household load. These variables were temperature and house-size variables as well as binary indicator variables, which indicate the presence or absence of certain end-use or appliance. Therefore, 24 regressions equations were fitted obtaining the estimate demand coefficient for a set of nine appliances.

In addition, the coefficients of certain of these appliances were restricted to be equal to zero at 2am, 3am, 4am and 5am due their probability to not be used in that time span as well as for the inconsistent obtained results in that time span for certain of these appliances. These appliances were the dishwasher, clothes washer, cooking range and clothes dryer.

The authors conclude that the obtained results showed a well defined load shapes for many appliances, although the load levels were questionable in some cases. They assume that appliances use pattern will differ across households and across time for and individual household. Thus, they considered that coefficients will vary randomly and not as “fixed effect”, which leads Aigner, together with other authors, to develop a new model with randomly coefficients [20].

Furthermore, several studies implemented CDA over the last year even though their approaches were different than ours. In these studies, CDA has been used for polices choosing [21], analyse consumption trends or regional consumption studies [15] [22], with long range data due its data structure simplicity. Their outcomes and results are not applicable to the conducted research since they are not aiming to disaggregate appliances demand in day-time use. However, the CDA equations specification presented in those studies are also interesting to analyse, especially their set of explanatory variables used. Those were good references for the explanatory variables study [5] [15] [23] [22].

Over the years, some authors aimed at improving the CDA results through the cover of some of the method’s weaknesses. One of this variations was the introduction of Direct-metering data into the CDA through Randomly Coefficients models [16] [24]. On the other hand, other authors cover CDA weakness by combining it with EM through Bayesian approaches [25] [26]. All these approaches were implemented obtaining valuable results.

In Finland, the only study reported using CDA was presented by Virve Rouhiainen in 2006 [27]. The presented study applied CDA to disaggregate Finnish household’s electricity consumption into appliance categories. Although the author didn´t approach to obtain appliance daily profiles, the obtained results and the presented conclusion were useful to get a scenario of Finnish households energy use since there were not such studies.

In addition, it is relevant to mention some studies performed in the Nordic countries related to load disaggregation that are considered of relevant significance. In Sweden, it was performed an end-use metering campaign to 400 households [28]. Although CDA is not implemented in this study, its results are considered as a relevant reference due the energy demand similarities among the Nordic countries households and the feasibility of their results to be compared or included[7] in the performed study. In Norway, an EM, named ERÅD model, was developed, and its differences with CDA were compared by Larsen and Nesbakken [4] [29].

[7] See *Demand Response*, *Refrigerator* and *Freezer* chapters.

CDA Equations Specification

Following the explained criteria, the CDA electricity model assumes that the total energy consumed in a household in a certain hour is the sum of the energy consumed by each of the owned appliances in that hour. Then, in a primary way, the average hourly metered consumption E_t in a certain hour t can be expressed as:

$$E_t = E_{0t} + \sum_{i=1}^{N} E_{it} \quad (1)$$

Where the constant term E_{0t} represents the electricity consumed by unaccounted appliances in t hour, and E_{it} is the energy consumed through certain of the N appliances and end-uses during the same time t.

Focusing in the appliances consumptions, it is assumed that the electricity consumption E_i of each appliance is given by a conditional demand function, which depends of a set of certain arguments if the appliance is owned or it is zero otherwise. These arguments, as are presented in some previous studies, are not related with the appliances specifications, but with household features, residents' habits information or even weather conditions.

A differentiation sub-index h is included in the E terms, which is used to point out the existence of 24 regressed equations representing the daily profile, and also in the explanatory variables terms to remark the possible hourly restrictions that can be imposed to certain appliances in particular day-times. However, in the following explanations, the hourly sub-index is avoided in order to not overcharge the expressions.

Starting with a Primary model, the appliances consumed energy E_i can be estimated with a basic set of arguments that are only dummy variables, so the metered consumption would be expressed as:

$$E = E_0 + \sum_{i=1}^{N} \bar{E}_i \cdot D_i \quad (2)$$

Where the dummy variable D_i is unitary if the household owns the i_{th} appliance and zero otherwise. After regressed, the obtained set of $\bar{E}_i$ coefficients represent the estimated average energy usage of the i_{th} appliance among the households that own this appliance. The estimated values for $\bar{E}_i$ coefficients are directly expressed in the same energy units as the metered input.

Although this estimation has solid basis and is used in previous studies, the nature of the available data and the aim of this study, push to develop further that expression in order to obtain more representative results with a Secondary model. The representativeness of this results lies in sensitizing the model to the weather conditions impact in certain appliances use, to the households' behaviour, to the temporality in the use of certain appliances and to the unique features of certain appliances. To sensitize the estimations to these features, the set of arguments is increased by introducing for certain appliances the interaction between its dummy variable and exogenous variables that might influence in such appliance.

This secondary model can be expressed by the following equation:

$$E = E_0 + \sum_{i=1}^{N} \left(\bar{E}_i \cdot D_i \cdot \sum_{j=1}^{M} V_{ij} \right) \quad (3)$$

Where V_{ij} variables are the M exogenous variables that might influence the i_{th} appliance consumption, in case that this appliance is owned. In this model, the obtained coefficient $\bar{E}_i$ also represents the estimated average energy usage of the i_{th} appliance among the households that own this appliance, but has to be weighted according the variables interacted with such appliance in order to keep the coefficient original energy units, the kWh/h units. Thus, the correct expression for the appliance average energy use, in terms of energy units, is the product of the estimated $\bar{E}_i$ coefficient with the average value of the interacted V_{ij} variables. This last, is the averaged value among the only households that owned the i_{th} appliance.

Another variation for the Secondary model was used in order to cover some of the database problems[8]. This variation was introduced to clarify certain V_{ij} variables purpose of creating more variance among the sample and to mitigate some possible V_{ij} missed values caused by some lack of data. The secondary model variation used is the following:

$$E = E_0 + \sum_{i=1}^{N} \left(\bar{E}_i \cdot D_i \cdot \left(1 + \sum_{j=1}^{M} V_{ij} \right) \right) \tag{4}$$

A unitary term was introduced without altering the $\bar{E}_i$ estimated coefficient meaning. Have to be remembered that the Secondary model is plan as an evolution from the Primary model, which already proved appropriate results, so this Secondary model cannot be an involution of the primary at any point. The introduction of this unitary term keeps the dummy variable strength regardless the possible exogenous variables values.

[8] See *Survey Data Analysis* chapter.

CDA Models

The performed CDA presents four types of model differentiation and every model implies an individual CDA setup. The first type is the workday-weekend differentiation that is stored in the WD/WE vector in the dataset and it differentiates between workdays and weekends or festivities according the load profile differences found in the previous data analysis.

The second type is the season or monthly differentiation and defines how the AMR data is grouped to analyse according the desired results. The AMR data can be grouped and analysed in monthly groups or season groups, this last grouping the AMR of consecutives months. The season model is aimed to estimate the daily profiles for the Finnish winter and the Finnish summer but might lead to inaccurate results if there are significant behavioural variations among the season months.

The third type differentiation is implicit in the final dataset since is the primary heating system differentiation and the final dataset is compound by the households that have District Heating as their primary heating system.

The fourth type is related with the explanatory variables setup and might be considered as model versions more than model differentiation, since once established a model in a specific period and group of households, a set of CDA can be implement with different explanatory variables setups, each one resulting in distinct results.

Table VIII - Models implemented in the CDA

District Heating Households	Winter	Season Period	Weekdays	→	CDA Iterations
			Weekend	→	CDA Iterations
		Monthly Period	Weekdays	→	CDA Iterations
			Weekend	→	CDA Iterations
	Summer	Season Period	Weekdays	→	CDA Iterations
			Weekend	→	CDA Iterations
		Monthly Period	Weekdays	→	CDA Iterations
			Weekend	→	CDA Iterations

The CDA was implement to the presented final dataset compound by the 337 households that owned District Heating system. A table with the different models included in the CDA is following presented.

The presented table shows the applied model differentiation according the first three presented types. The 4th type, regarding explanatory variable setup, was used to create more models during the CDA iterations.

Regarding the model differentiation, the SM, and especially the CDA, carry a disjunctive within the creation of models. In contrast of EM that require an accurate identification of the models, which is fundamental for the modelling and subsequently to extrapolate it to the top levels, SM present a disjunctive in the models creation since although accurate models differentiation might be advantageous for obtaining more representative results, when a model is differentiated, the sample is split it in two parts, the one belonging to that model and the rest, and this fact causes a loss of samples and consequently a loss of variance, producing a negative effect in the results confidence. We can observe this fact in the WD/WE differentiation, since the rate of WD/WE is roughly 5/2, which means that the obtained results from the WE model might be not such accurate as the WD model results due this fact.

Concluding, the model differentiation should be studied carefully in order to detect its negative effects in the aimed results, especially when you are dealing with a limited number of samples.

CDA Implementation

The regression technique used to implement[9] the CDA was the stepwise regression and it was implement, through the *stepwisefit* [30] function, with the software MATLAB as well as the whole study analysis. The stepwise regression is a systematic method for adding and removing terms from a multilinear model based on their statistical significance in a regression. The method begins with an initial model and will iterate while comparing the explanatory power of incrementally larger and shorter models. The p-value of an F-statistic is the reference for comparing between models with and without a potential term. The method converges to the final model when the p-values for all the terms are within the predefined tolerance.

The CDA setup for a model consists on a 24 independent multilinear regression equations representing each one of the daily AMR meters. The input data are vector Y and matrix X. The Y vector is formed by the metered consumption for a certain hour over the days and households included in the model. Thus, the Y vector dimension over the 24 hours is the result of the number of households included in the model multiplied by the number of days included in the model. The X matrix is compound by the set of explanatory variables corresponding to the households and days included in the model. The first dimension of the matrix is of course corresponding with vector Y; the second dimension is equal to the number of explanatory variables included in the model equation. Regarding the values of these explanatory variables, there is a variance among the households but not a daily variance within a household. The only timely variance within a household might be caused by the interaction of an exogenous variable. Household dummy variables are fixed over the analysed time although might vary between different models, i.e. heating system is not used in summer.

```
for h = 1:24
    [E(h,:),SE(h,:),PVAL(h,:),INMODEL(h,:),STATS(h,:)]= stepwisefit(X(:,:,h),Y(:,h));
end
E0=[STATS.intercept]; % Constant Consumption
for h = 1:24
    kWhAPP(h,:) = E(h,:).*INMODEL(h,:); %ONLY Coefficients IN model
end
```

Figure V - Stepwise regression code

For each regression is obtained the vector *E* of estimated coefficients, which are represented as $\bar{E}_i$ terms in the theoretical model equation. The intercept term for each regression, E_0 in the model equation, is obtained from the *STATS* vector. The obtained 24 vectors *E* of estimations form the appliances daily profiles matrix *kWhAPP*. This matrix doesn´t contain the entire *E* estimated coefficients, but only those which are included in each final model and counted by the *INMODEL* matrix, otherwise the coefficients takes 0 value. As it was explained, the stepwise technique only includes in the final model the coefficients that had a minimum significance among the data.

In addition, although an X matrix value might not have hourly variance over a day, are used twenty-four different X matrices allowing to implement night-time restrictions in certain appliances.

[9] See *Appendix IV – Matlab Code*.

```
app=[app1 app2 .. appX];
for j=app
    for h=2:5 % Night Time Period
        X(:,j,h)=X(:,j,h).*0;
    end
end
```

Figure VI - Code Appliances Nighttime restrictions

A conservative approach is used, as well as previous studies, of 4 hours restriction from 2am to 5am. Within this time span is assumed that there is not any activity of the residents, then appliances which need direct interaction with a resident might be removed from the estimations.

CDA Iteration process

Once all the CDA setup is settled, it is proceeded to perform various CDA iterations in order to determinate the set of explanatory variables that suits better to each model. These iterations were conducted following a top-down approach. Starting with the primary model while determining a setup of dummy variables enough representatives.

Once were found a representative setup, the group of appliances aim at disaggregating was set. This group were compound by a total of 18 appliances and end-uses grouped in 9 groups of loads. In these groups were included the most representative appliances in terms of consumption found among the studied households. These nine groups were maintained during all the study although the presented explanatory variables were modified, changed and even eliminated in some case.

Table IX - Analysed Appliances group

Appliances Groups	Explanatory Variables
Cold Appliances	'Refrigerator'
	'Refrigerator&Freezer'
	'Freezer'
	'ChestFreezer'
Electric Stove	'electricstove'
Washing Machines	'washingMachine'
	'washerDryer'
Drying Machines	'tumbleDryer'
	'dryingcabinet'
Dishwasher	'Dishwasher'
Sauna	'sauna'
	'openuseSauna'
Lighting	'BulbIN'
	'SavingLampIn'
	'HalogenIn'
	'FluorescentIn'
Television	'CRTtv'
	'LCDtv'
Computer	'ComputerCRT'
	'ComputerLCD'
	'ComputerPortable'

During the iteration processes to the final setups of both equation models were discarded some of these initial variables and appliances due their inconsistent results or level of significance. The main discards were:

- Open Use Saunas were discarded as study appliance since their low penetration rate within the sample as well as their unclear results in the daily profiles obtained in the CDA performances. The own of the open use sauna among the sample was removed.

- Washer Dryer appliance was discarded since the low penetration rate among the sample, which leaded to imprecise results due its lack of data. Since the Washer dryer is a machine that combines a washing machine programme with a subsequently drying programme, Washer Dryer owners were considered as washing machine and tumble dryer owners, merging the two variables and obtaining a unique coefficient representing the washing machine profile and same for tumble dryer profile. The obtained coefficient didn’t differ significantly from washing machine owners´ previous coefficient. However, the availability of a sample with larger ownership in washer dryer appliance would be interesting to analyse due the specification differences between these appliances and its relevance among the Finnish households.

- Indoor cooling were discarded from the beginning not only by their low penetration rate among the sample but also by their low significance among the Finnish households. In contraposition of most of the European countries, the air conditioner system ownership is nearly insignificant among the Finnish households. Moreover, the ownership of such equipment doesn't imply a significant consumption due the territory´s climate, which in a usual Finnish summer is not reached high temperatures.

- Car Engines Heater is neither included in the study due its controversial status. It is not located inside the building and neither directly connected in some cases, so there is not information regarding whether the AMR include the heaters readings. Furthermore, the inclusion of these variables to the model didn't lead to consistent results.

Additionally, appliances such Oven, Microwave or Kettle, which are typically included in those studies, are not included in our CDA due the survey lack of information for these appliances.

Regarding the Lighting, the corresponding dummy variables presented in the table IX are quantitative variables indicating the household's number of bulbs, since the concept of dummy variable doesn't have any sense in these cases due all the households have lights[10].

Continuing with the iteration description, once was established the groups of appliances aimed to disaggregate, was performed a set of iterations with the primary model converging in accurate results. The obtained results for this primary model are presented in the results chapter, as well as compared with the secondary model obtained results. Although these results belongs to a primary model, they were enough representative to implement in the DR analysis.

Proceeding to the bottom, different explanatory variables setups were tested for each appliance as a combinations formed by dataset variables interacting with the corresponding dummy variable, as it was defined in the secondary model. The followed criteria was the author's engineering background as well as the search for statistical improvements that might be caused by creating more variance among the sample. Their variance might be enhanced softening certain explanatory variables to the different use behaviours, of such appliance, among the households' sample; through either intensity of use variables or certain households' characteristics, i.e. amount of residents.

The obtained results were compared and then a final explanatory variables setup was settled for each model. The setting criteria consist on a balance between the model complexity and the results accuracy and acceptance. The most representative results are presented in CDA results chapter. Further, in the Appendix III are presented the rest of the results in table format with the obtained coefficients values for each model.

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[10] See next chapter: *CDA Explanatory variables setup*

CDA Explanatory Variables Setup

There were some particularities to consider regarding the explanatory variables setup, out of the presented equations. This is the case of lighting variables, which didn't use the typical equation variables setup. Initially is was used the number of bulbs, differentiated over different types of bulbs, in order to represent the lighting consumption. The explanatory variable used for this purpose was a combination of the different bulbs variables following this equation:

$$V = V_{Bulb} + 0.25\ x\ V_{SavingLamp} + 0.75\ x\ V_{Halogen} + 0.8\ x\ V_{Fluorescent} \qquad (5)$$

The coefficients of each variable were chosen according the energy efficiency of each type of bulb, due they typically share different power consumption levels [11].

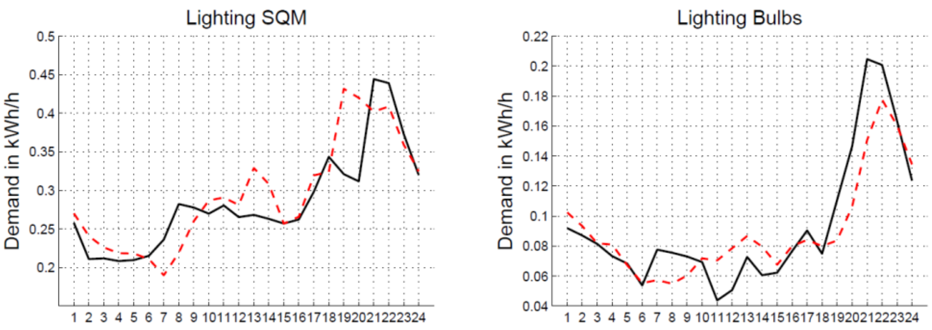

Figure VII - Lighting Demand profiles obtained by SQM variables and Bulbs combination variables from CDA Primary model within Winter WD (Black) and Winter WE (Red)

Additionally, the SQM variable was also used to explain the lighting demand instead of bulb's variables. The feasibility of this option remains in the district heating households' particularity[11]. Further, the SQM variable was finally used to explain the lighting demand instead of the bulbs variables. This decision was implemented due two major facts. Firstly, because the obtained results with the SQM were considered more accurate than the previous one. The other fact was that the lack of information in the lighting variable didn't provide enough confidence.

Following is presented a table with some of the variable interactions applied as explanatory variables in the secondary model.

Table X - Explanatory variables interactions applied in the Secondary Model setup

Interactions Applied in the Secondary Model setup	
Quantitative Variable	Appliances dummy variable
Number of Residents	Cold Appliance; Electric Stove; Lighting
Frequency of Use	Dishwasher; Washing Machine; Tumble Dryer; Drying Cabinet; Sauna
SQM	Lighting
Number of Appliances	TVs; Computers; Consumer Electronics; Cold Appliances
Appliances age	Cold Appliances

[11] See *District Heating Households Final Dataset* chapter

Should be mentioned, and especially regarding the meaning of results, that certain explanatory variable interactions presented in the secondary model setups might lead to confusing results in terms of output units. Although seems an appropriate approach when is trying to disaggregate load pattern, the meaning of the obtained load level might be more inaccurate than the obtained with the primary model when are used for DR analysis aiming at explaining a sample of households.

Following is presented the final sets of explanatory variables equation setups implemented in the CDA and presented in the CDA results chapter, both for the primary model and secondary model. Further, in the Appendix V is also presented other significant setups and its results.

Table XI - Primary Model Version 1 Explanatory Variables Setup

Primary Model - Version 1	
Appliances Groups	Explanatory Variables
Cold Appliances	'Refrigerator'
	'Refrigerator&Freezer'
	'Freezer'
	'ChestFreezer'
Electric Stove	'electricstove'
Washing Machines	'washingMachine'
Drying Machines	'tumbleDryer'
	'dryingcabinet'
Dishwasher	'Dishwasher'
Sauna	'sauna'
Lighting	'SQM'
Television	'CRTtv'
	'LCDtv'
Computer	'ComputerCRT'
	'ComputerLCD'
	'ComputerPortable'

Table XII - Secondary Model Version 1 Explanatory Variables Setup

Secondary Model - Version 1	
Appliances Groups	Explanatory Variables
Cold Appliances	'Refrigerator'+'RefriAge10'
	'Refrigerator&Freezer'+'RefriFreezAge10'
	'Freezer'+'FreezerAge10'
	'ChestFreezer'+'ChestFreezerAge10'
Electric Stove	'electricstove'*'TotalResidents'
Washing Machines	'washingMachine'*'washingMachineMonth'
Drying Machines	'tumbleDryer'*'tumbleDryerMonth'
	'dryingcabinet'*'dryingcabinetMonth'
Dishwasher	'Dishwasher'*'Dishwasherweek'
Sauna	'sauna'*'saunaweek'
Lighting	'SQM'
Television	'numCRTtv'
	'numLCDtv'
Computer	'numComputerCRT'
	'numComputerLCD'
	'numComputerPortable'

CDA Meaning of Results

The meaning of the results is an important issue to discuss in this study, especially regarding the aimed outcome and its impact for the future studies. As it was commented in the CDA introduction and literature review chapters, there are different approaches applied in the CDA studies and each approach aimed for a different outcome and results. The CDA model setup has an important significance in this theme, since the model differentiation and the explanatory variables setups define the units and means of the obtained results and consequently the representativeness of these results for future studies

In many of the performed CDA studies reviewed in the literature, the aimed outcome was to obtain useful information regarding the households' consumptions for deciding energy policies or for studying the consumptions evolution over the years. In these studies, the metered data was mainly monthly or daily meters since their aims was to find out the appliances total consumption rather than its behaviour, thus their explanatory variables setup was compound by multiples interactions among variables and long equations since they aimed to figure out the impact of as much as possible different factors in the appliances consumption.

Consequently, the obtained results in those studies were not aimed to represent any appliance profile or similar results, just quantitative results regarding the amount of power or energy consumed. These obtained results, in most of those studies, were defined as Unit Energy Coefficient or UEC [23]. The UECs for the various end-uses are functions of appropriate exogenous variables, such as end-use features, dwelling characteristics, household characteristics and household income.

In the performed CDA study, the aimed meaning of the results is different than the previous CDA studies done. The followed approach was to disaggregate the appliances consumptions in daily profile models, not in UEC; and this outcome's difference affects completely to the CDA setup both in metered data structure and equations setup. Therefore, the obtained CDA outcome presents appliances daily profiles for the different models.

Regarding this obtained load profiles, it is stated as the meaning of this results the following definition:

An appliance's daily load profile represents its hourly average demand, within the corresponding model, over the sample's households that owned this appliance, and without considering the differences of this appliance's specifications among these owners. Thus, the results are expressed in the same units to the AMR data, in kWh/h.

However, in the secondary model, certain load profiles might referenced to a frequency of use information or to other features, which had been reported by the sample. In these case the results were expressed in (*kWh/h)/feature-unit*, i.e. [(*kWh/h)/resident]* whether is used the number of residents variable in the explanatory variable setup.

Consequently, the obtained results are strongly related to the sample features or characteristics, which is one of the CDA method features, and represents the sample's behaviours with a high grade of confidence. In contrast, these results might not be extrapolated to regional or national levels with enough confidence if the analysed sample is not enough significant among the aimed level.

CDA Results

The most representative versions and results are presented in the appendices[12] by its explanatory variables setup, the coefficients INMODEL[13] table and the obtained coefficients table for the different models. In the following pages is presented the results obtained from the CDA Primary model and CDA Secondary model setups previously presented[14]. The presented results are obtained for Winter WD and WE. The results are presented as appliances load profiles figures, INMODEL variables table (containing p-values information) and the obtained coefficients values.

The obtained negative values is an issue implicit in this CDA approach. In contrast of other CDA approaches, in this case there is not physical sense for this results, since the appliances don't produce electricity, so the obtained negative values are explained by the statistical method characteristics and multicollinearity problem. Once obtained the results and before using for the DR analysis, the negative values are considered as 0 values. In the conclusions chapter this theme is discussed deeply.

CDA Primary Model Results

INMODEL Primary Model Version 1																								
Winter WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	0	0	0	0	1	1	1	1	1	0	0	1	1	0	0	0	1	1	0	1	0	0	0
'Refrigerator&Freezer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	0	1	1
'Freezer'	0	1	1	1	1	0	1	1	1	0	0	0	0	0	1	0	0	0	1	1	0	0	1	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	0	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1
'tumbleDryer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'dryingcabinet'	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	0	0	1	1	0	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1
'LCDtv'	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1	1	1	1	1	0	0	0
'ComputerCRT'	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	1	1	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1

Table XIII - CDA Primary Model Version 1 obtained results. INMODEL table for average Winter WD

INMODEL Primary Model Version 1																								
Winter WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	0	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0
'Refrigerator&Freezer'	1	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	1
'Freezer'	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0
'ChestFreezer'	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	0	0	1	1
'tumbleDryer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	1
'Dishwasher'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	1
'LCDtv'	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	0	0	1	1	0	0
'ComputerCRT'	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	1	1	1
'ComputerLCD'	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	0	0	1	0	0	0	1	0	1	0	1	0	1	1	1	1	1	1	1

Table XIV - CDA Primary Model Version 1 obtained results. INMODEL table for average Winter WE

CDA Obtained Estimated Coefficients in KWh/h																								
Winter WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0561	0,0000	0,0000	0,0000	0,0000	-0,0371	-0,0766	-0,0769	-0,0765	-0,0880	0,0000	0,0000	-0,0445	-0,0671	0,0000	0,0000	0,0000	-0,0582	-0,1324	0,0000	-0,1411	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	-0,0656	0,0000	0,0000	0,0000	0,0000	-0,0545	-0,0679	-0,0602	-0,0922	-0,1310	-0,0312	-0,0233	-0,0599	-0,0904	0,0000	0,0000	-0,0424	-0,0806	-0,0851	0,0000	-0,1191	0,0000	-0,0834	-0,0483
'Freezer'	0,0000	0,0165	0,0158	0,0237	0,0314	0,0000	0,0376	0,0456	0,0370	0,0000	0,0000	0,0000	0,0000	0,0000	0,0211	0,0000	0,0000	0,0000	0,0592	0,0434	0,0000	0,0000	-0,0562	-0,0387
'ChestFreezer'	0,0000	0,0349	0,0449	0,0575	0,0649	0,0348	0,0487	0,0606	0,0696	0,0594	0,0602	0,0513	0,0501	0,0500	0,0373	0,0000	0,0000	-0,0320	-0,0447	-0,0927	-0,0973	-0,0915	-0,1129	-0,0850
'electricstove'	0,1479	0,0000	0,0000	0,0000	0,0000	0,1256	0,1337	0,0621	0,0000	0,0000	0,0000	0,0000	0,0417	0,0320	0,0000	0,0583	0,0940	0,1194	0,1243	0,1854	0,2206	0,2115	0,2188	0,1986
'washingMachine'	0,0687	0,0000	0,0000	0,0000	0,0000	0,0475	0,0833	0,0977	0,0957	0,0811	0,0455	0,0287	0,0290	0,0404	0,0514	0,0690	0,0930	0,0852	0,0750	0,0000	0,0000	0,0524	0,1102	0,1073
'tumbleDryer'	0,0755	0,0000	0,0000	0,0000	0,0000	0,1418	0,1735	0,2122	0,1479	0,1173	0,1109	0,1249	0,1013	0,1065	0,0949	0,1496	0,1515	0,2293	0,3699	0,4308	0,2862	0,1299	0,0000	0,0422
'dryingcabinet'	-0,0760	-0,0750	-0,0639	-0,0492	-0,0658	-0,0917	-0,1089	-0,1203	-0,0547	0,0000	0,0000	0,0000	-0,0502	-0,0450	-0,0695	-0,0945	-0,1253	-0,0788	0,0000	0,0000	0,1042	0,1154	0,0000	-0,0978
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0679	0,0678	0,0660	0,0964	0,1208	0,1328	0,1488	0,1344	0,1074	0,1074	0,1337	0,1586	0,1757	0,1978	0,1618	0,1592	0,0976	0,0529	0,0000
'sauna'	-0,2024	0,0000	0,0000	0,0000	0,0000	-0,1650	-0,2188	-0,2192	-0,1993	-0,1887	-0,1794	-0,1850	-0,1887	-0,1762	-0,1571	-0,1619	-0,1690	-0,1306	-0,0387	0,0585	0,0000	-0,1278	-0,2483	-0,2567
'SQM'	0,2796	0,2448	0,2422	0,2358	0,2413	0,2242	0,2802	0,3497	0,3406	0,3169	0,3116	0,2987	0,3113	0,2993	0,3017	0,3456	0,3976	0,4259	0,4286	0,4816	0,5876	0,5553	0,4575	0,3638
'CRTtv'	-0,0862	-0,0867	-0,0852	-0,0740	-0,0666	-0,0354	-0,0156	-0,0249	-0,0204	-0,0448	-0,0456	-0,0417	-0,0415	-0,0405	-0,0411	-0,0745	-0,0679	-0,0417	0,0000	0,1048	0,1180	0,0000	-0,0746	-0,0680
'LCDtv'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0232	0,0000	0,0000	0,0000	0,0000	0,0306	0,0438	0,0000	0,0361	0,0303	0,0743	0,0510	0,0728	0,0000	0,0000	0,0000
'ComputerCRT'	0,1048	0,0804	0,0724	0,0586	0,0557	0,0424	0,0296	0,0206	0,0404	0,0000	0,0000	0,0000	0,0000	0,0220	0,0245	0,0352	0,0566	0,1112	0,0577	0,0000	0,0729	0,0602	0,0993	0,1083
'ComputerLCD'	0,0596	0,0801	0,0666	0,0572	0,0619	0,0401	0,0455	0,0206	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0465	0,0539	0,1347	0,1725	0,2589	0,2562	0,1502	0,0534	0,0641
'ComputerPortable'	0.0492	0.0297	0.0236	0.0206	0.0240	0.0000	0.0000	0.0000	0.0000	-0.0253	0.0000	0.0000	0.0000	0.0000	0.0000	0.0508	0.0725	0.1108	0.1884	0.2585	0.2126	0.1724	0.1397	0.0828

Table XV - CDA Primary Model Version 1 obtained results. CDA Estimated Coefficient in kWh/h tables for an average Winter WD

[12] See Appendix V: CDA Results

[13] See *CDA Implementation* chapter

[14] See *CDA Explanatory Variables setup* chapter

CDA Obtained Estimated Coefficients in KWh/h																								
Winter WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0517	0,0000	0,0000	0,0000	0,0000	0,0000	-0,1046	0,0000	-0,0640	-0,1029	-0,1119	-0,0714	-0,1001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0688	0,0000
'Refrigerator&Freezer'	-0,0709	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0971	0,0000	-0,0815	-0,1503	-0,1402	-0,1205	-0,1137	-0,0350	-0,0545	0,0000	-0,0642	0,0000	0,0000	0,0000	0,0000	0,0000	-0,1024	-0,0414
'Freezer'	0,0000	0,0000	0,0000	0,0000	0,0240	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0687	0,0466	0,0761	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'ChestFreezer'	-0,0282	0,0237	0,0454	0,0515	0,0703	0,0373	0,0000	0,0379	0,0357	0,0505	0,0437	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0886	-0,0796	-0,0612	-0,0719	-0,0719
'electricstove'	0,1602	0,0000	0,0000	0,0000	0,0000	0,1145	0,1026	0,0950	0,1127	0,0872	0,0897	0,1303	0,1320	0,1217	0,0922	0,0000	0,0935	0,1248	0,1486	0,2214	0,2344	0,2307	0,2268	0,1975
'washingMachine'	0,0868	0,0000	0,0000	0,0000	0,0000	0,0423	0,0610	0,0881	0,1138	0,1076	0,0664	0,0650	0,0000	0,0000	0,0721	0,0979	0,1561	0,1630	0,1017	0,0000	0,0000	0,0000	0,0722	0,1096
'tumbleDryer'	0,0496	0,0000	0,0000	0,0000	0,0000	0,0809	0,1013	0,1576	0,2515	0,3030	0,2596	0,2515	0,1967	0,2069	0,1979	0,1563	0,1496	0,2541	0,5077	0,3513	0,2275	0,1359	0,0000	0,0000
'dryingcabinet'	-0,1023	-0,0891	-0,0721	-0,0596	-0,0553	-0,0714	-0,0805	-0,0974	-0,0732	-0,0757	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,2047	0,1519	0,2451	0,1733	0,0000	-0,1029
'Dishwasher'	0,0285	0,0000	0,0000	0,0000	0,0000	0,0628	0,0770	0,0784	0,1056	0,1433	0,1843	0,1832	0,1830	0,1708	0,1865	0,1829	0,2065	0,2279	0,2063	0,2582	0,1882	0,1053	0,0850	0,0000
'sauna'	-0,2337	0,0000	0,0000	0,0000	0,0000	-0,1829	-0,2034	-0,1981	-0,2220	-0,2356	-0,2092	-0,2053	-0,2007	-0,1836	-0,1667	-0,1250	-0,1121	0,0000	0,1039	0,1010	0,0000	-0,1278	-0,2029	-0,2661
'SQM'	0,2939	0,2867	0,2636	0,2548	0,2444	0,2226	0,2108	0,2348	0,2869	0,3395	0,3518	0,3709	0,4051	0,3714	0,3129	0,3341	0,4000	0,4077	0,5011	0,5610	0,5557	0,5237	0,4440	0,3827
'CRTtv'	-0,0807	-0,0935	-0,0955	-0,0786	-0,0711	-0,0533	-0,0546	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0653	0,0000	0,0000	0,1223	0,1009	0,0000	-0,0808	-0,0716
'LCDtv'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0456	0,0653	0,0721	0,0479	0,0000	0,0509	0,0490	0,0518	0,0713	0,0529	0,0726	0,0000	0,0000	0,0642	0,0413	0,0000	0,0000
'ComputerCRT'	0,1112	0,1061	0,0874	0,0766	0,0680	0,0517	0,0609	0,0294	0,0495	0,0000	0,0000	0,0000	0,0000	0,0424	0,0408	0,1029	0,1551	0,1780	0,1380	0,0000	0,0000	0,0666	0,1085	0,1359
'ComputerLCD'	0,0614	0,0895	0,0783	0,0595	0,0422	0,0000	0,0000	0,0000	0,0000	0,0000	0,0718	0,0894	0,0762	0,0598	0,0497	0,0750	0,0706	0,0802	0,0894	0,2243	0,1843	0,0973	0,0527	0,0617
'ComputerPortable'	0,0657	0,0485	0,0300	0,0300	0,0291	0,0000	0,0000	-0,0210	0,0000	0,0000	0,0000	0,0296	0,0000	0,0369	0,0000	0,0438	0,0000	0,0826	0,2272	0,2303	0,1967	0,1797	0,1559	0,0945

Table XVI - CDA Primary Model Version 1 obtained results. CDA Estimated Coefficient in kWh/h tables for an average Winter WE

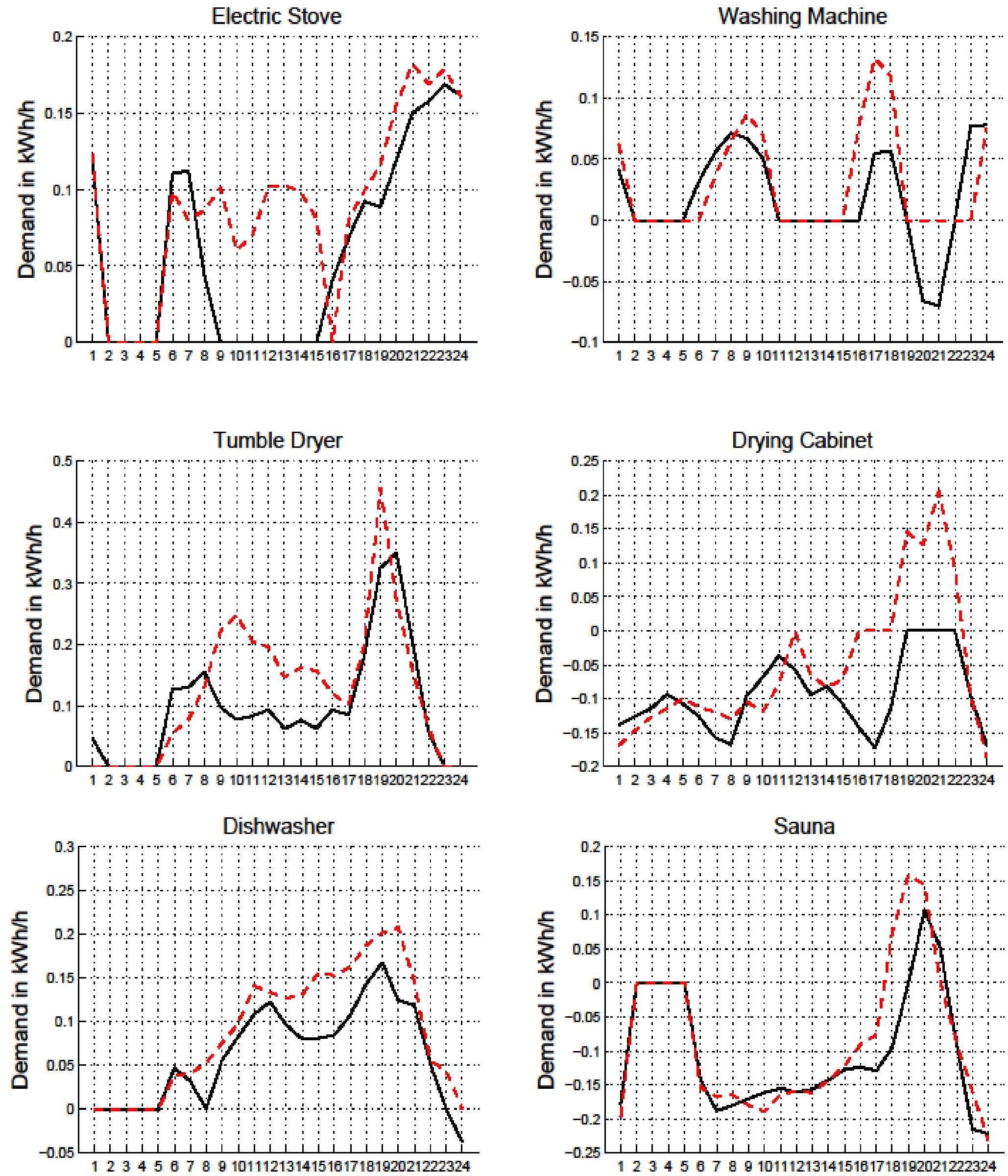

Figure VIII - CDA Primary Model Version 1 obtained results. Most representative appliances Daily Load Profiles of for an average Winter WD (Black) and Winter WE (Red).

CDA Secondary Model Results

INMODEL Secondary Model Version 1																								
Winter WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	0	0	1	1	1	1	1	0	1
'Refrigerator&Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0
'Freezer'	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	0	0	1	1	0	1	1	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	0	1	1	1	1	1	0	0	0	1	1	1	0	0	0	1	1	0	0
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	0	0	0	1	1	1	0	1	1	1	1	0	1	1
'dryingcabinet'	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	0	1	1	1	1	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1
'LCDtv'	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0
'ComputerCRT'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	0	0	1	1	0	0	0	1	1	1	0	0	1	1	0	0	0	1	1	1	1	1	1

Table XVII - CDA Secondary Model Version 1 obtained results. INMODEL table for average Winter WD

INMODEL Secondary Model Version 1																								
Winter WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	1
'Refrigerator&Freezer'	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0
'Freezer'	1	1	0	1	1	0	1	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	1
'ChestFreezer'	1	0	0	1	1	0	0	1	1	1	1	0	0	0	0	1	0	0	0	1	0	0	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	1	0
'tumbleDryer'	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1
'dryingcabinet'	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	1	1	1	1	1
'Dishwasher'	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	1	0	0	1	1	1	1	1
'LCDtv'	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	1
'ComputerCRT'	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	1	0	1	1	1	0	0	0	0	1	0	1	1	1	1	0	1	1	1

Table XVIII - CDA Secondary Model Version 1 obtained results. INMODEL table for average Winter WE

CDA Obtained Estimated Coefficients in KWh/h																								
Winter WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0506	-0,0518	-0,0454	-0,0419	-0,0410	-0,0476	-0,0859	-0,0726	-0,0337	0,0000	0,0000	0,0000	0,0000	-0,0266	-0,0160	0,0000	0,0000	-0,0500	-0,1073	-0,1035	-0,0571	-0,0274	0,0000	-0,0416
'Refrigerator&Freezer'	-0,0194	-0,0244	-0,0211	-0,0199	-0,0232	-0,0352	-0,0584	-0,0506	-0,0461	-0,0410	-0,0139	-0,0143	0,0000	-0,0249	0,0000	0,0000	0,0000	-0,0567	-0,0608	-0,0767	-0,0472	0,0000	0,0000	0,0000
'Freezer'	0,0314	0,0286	0,0247	0,0297	0,0287	0,0244	0,0344	0,0245	0,0186	-0,0132	0,0000	-0,0199	-0,0177	0,0000	0,0000	0,0184	0,0000	0,0000	0,0618	0,0495	0,0000	0,0343	0,0209	0,0516
'ChestFreezer'	0,0000	0,0126	0,0153	0,0251	0,0284	0,0164	0,0198	0,0201	0,0262	0,0179	0,0244	0,0000	0,0000	0,0141	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0265	-0,0433	-0,0389	-0,0518	-0,0352
'electricstove'	0,0935	0,0000	0,0000	0,0000	0,0000	0,0647	0,0906	0,1126	0,0531	0,0321	0,0290	0,0584	0,0628	0,0637	0,0777	0,1307	0,1793	0,1894	0,2029	0,2424	0,2063	0,1976	0,1761	0,1351
'washingMachine'	-0,0189	0,0000	0,0000	0,0000	0,0000	0,0000	0,0245	0,0311	0,0345	0,0152	0,0162	0,0000	0,0000	0,0000	0,0157	0,0322	0,0201	0,0000	0,0000	0,0000	-0,0291	-0,0174	0,0000	0,0000
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0260	0,0323	0,0436	0,0407	0,0232	0,0000	0,0000	0,0000	0,0326	0,0258	0,0536	0,0000	0,0956	0,2064	0,2420	0,1386	0,0000	-0,0523	-0,0548
'dryingcabinet'	-0,0565	-0,0549	-0,0637	-0,0546	-0,0616	-0,0874	-0,1125	-0,0929	0,0000	0,0000	-0,0434	-0,0513	-0,0438	0,0000	-0,0405	-0,0647	-0,0801	-0,0796	0,0000	0,2006	0,4061	0,3954	0,1229	-0,0399
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0240	0,0355	0,0522	0,0579	0,0815	0,0878	0,0834	0,0894	0,0745	0,0694	0,0670	0,1053	0,1113	0,0756	0,0984	0,1602	0,1051	0,0399	0,0000
'sauna'	-0,0402	0,0000	0,0000	0,0000	0,0000	-0,0403	-0,0498	-0,0545	-0,0485	-0,0529	-0,0509	-0,0529	-0,0436	-0,0450	-0,0343	-0,0123	0,0269	0,0410	0,0996	0,2028	0,1730	0,0559	-0,0183	-0,0417
'SQM'	0,2808	0,2512	0,2505	0,2431	0,2504	0,2322	0,2555	0,2987	0,3188	0,3095	0,3263	0,3182	0,3147	0,2901	0,2864	0,2982	0,3533	0,3760	0,3841	0,3322	0,4668	0,4719	0,4145	0,3464
'CRTtv'	-0,0686	-0,0446	-0,0449	-0,0452	-0,0422	-0,0313	0,0000	0,0000	0,0000	0,0000	-0,0259	-0,0202	-0,0301	-0,0268	-0,0291	-0,0424	-0,0515	-0,0257	0,0000	0,0886	0,0524	-0,0410	-0,0918	-0,0790
'LCDtv'	0,0000	0,0199	0,0167	0,0000	0,0000	0,0132	0,0218	0,0156	0,0362	0,0315	0,0223	0,0149	0,0123	0,0272	0,0331	0,0309	0,0345	0,0313	0,0438	0,0307	0,0000	-0,0241	-0,0187	0,0000
'ComputerCRT'	0,0766	0,0575	0,0519	0,0408	0,0380	0,0432	0,0357	0,0395	0,0617	0,0277	0,0213	0,0281	0,0476	0,0429	0,0457	0,0482	0,0697	0,1030	0,0000	0,0000	0,0453	0,0470	0,0826	0,0796
'ComputerLCD'	0,1060	0,1111	0,1049	0,0976	0,0931	0,0837	0,0820	0,0638	0,0522	0,0590	0,0573	0,0611	0,0621	0,0555	0,0561	0,0580	0,0591	0,0816	0,1031	0,1315	0,1212	0,0933	0,0865	0,1080
'ComputerPortable'	0,0237	0,0000	0,0000	0,0126	0,0157	0,0000	0,0000	0,0000	-0,0175	-0,0223	-0,0159	0,0000	0,0000	-0,0181	-0,0177	0,0000	0,0000	0,0000	0,0267	0,0533	0,0509	0,0752	0,0598	0,0339

Table XIX - CDA Secondary Model Version 1 obtained results. CDA Estimated Coefficient in kWh/h tables for an average Winter WD

CDA Obtained Estimated Coefficients in KWh/h																								
Winter WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0337	-0,0387	-0,0283	-0,0324	-0,0317	-0,0425	-0,0802	-0,0690	-0,0603	-0,0543	-0,0630	-0,0346	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0836	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0543
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0288	-0,0507	-0,0580	-0,0605	-0,0670	-0,0622	-0,0565	0,0000	0,0000	0,0000	0,0000	-0,0335	-0,0532	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Freezer'	0,0257	0,0207	0,0000	0,0194	0,0201	0,0000	0,0212	0,0000	0,0000	0,0284	0,0246	0,0000	0,0000	0,0000	0,0000	0,0000	0,0389	0,0670	0,0000	0,0000	0,0000	0,0000	0,0000	0,0591
'ChestFreezer'	-0,0213	0,0000	0,0000	0,0148	0,0233	0,0000	0,0000	0,0173	0,0225	0,0403	0,0333	0,0000	0,0000	0,0000	0,0000	-0,0334	0,0000	0,0000	0,0000	-0,0498	0,0000	0,0000	-0,0356	-0,0351
'electricstove'	0,0860	0,0000	0,0000	0,0000	0,0000	0,0638	0,0508	0,0509	0,0736	0,0689	0,1133	0,1703	0,1274	0,1364	0,1121	0,1147	0,1494	0,1737	0,1560	0,2116	0,2119	0,1935	0,1890	0,1322
'washingMachine'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0146	0,0335	0,0340	0,0441	0,0297	0,0000	0,0325	0,0274	0,0270	0,0309	0,0540	0,0462	0,0459	0,0000	0,0000	0,0000	-0,0345	0,0000
'tumbleDryer'	-0,0334	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0365	0,0993	0,1261	0,1332	0,1265	0,0691	0,1196	0,1197	0,0928	0,0664	0,1342	0,2148	0,1835	0,0741	0,0000	0,0000	-0,0510
'dryingcabinet'	-0,0727	-0,0656	-0,0657	-0,0512	-0,0504	-0,0691	-0,0726	-0,0742	-0,0588	-0,0525	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1033	0,0000	0,1904	0,3312	0,2767	0,0654	-0,0651
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0157	0,0333	0,0794	0,1006	0,1059	0,1207	0,0992	0,0859	0,0846	0,0878	0,0818	0,0772	0,0641	0,1462	0,1496	0,1006	0,0690	0,0000
'sauna'	-0,0377	0,0000	0,0000	0,0000	0,0000	-0,0477	-0,0527	-0,0476	-0,0423	-0,0468	-0,0520	-0,0555	-0,0528	-0,0332	0,0000	0,0000	0,0272	0,0973	0,1558	0,1620	0,1290	0,0547	0,0000	-0,0410
'SQM'	0,3020	0,2910	0,2740	0,2594	0,2549	0,2363	0,2094	0,2301	0,2698	0,3024	0,3083	0,3194	0,3604	0,3396	0,2930	0,3228	0,3777	0,3628	0,4934	0,4708	0,4520	0,4419	0,4038	0,3669
'CRTtv'	-0,0651	-0,0559	-0,0531	-0,0469	-0,0436	-0,0374	-0,0294	-0,0152	-0,0250	0,0000	0,0000	0,0000	0,0000	-0,0266	0,0000	0,0000	-0,0497	0,0000	0,0000	0,0881	0,0556	-0,0359	-0,0878	-0,0867
'LCDtv'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0155	0,0395	0,0522	0,0698	0,0475	0,0312	0,0445	0,0203	0,0400	0,0480	0,0534	0,0551	0,0000	0,0000	0,0368	0,0000	-0,0213	-0,0210
'ComputerCRT'	0,0872	0,0835	0,0684	0,0594	0,0541	0,0531	0,0664	0,0495	0,0744	0,0000	0,0394	0,0443	0,0434	0,0623	0,0631	0,1183	0,1667	0,1815	0,1210	0,0000	0,0000	0,0547	0,0930	0,1047
'ComputerLCD'	0,1409	0,1510	0,1481	0,1237	0,1053	0,0957	0,0881	0,0799	0,0653	0,0737	0,0830	0,0792	0,0857	0,0780	0,0761	0,0855	0,0734	0,0743	0,0874	0,1334	0,1172	0,0974	0,0969	0,1395
'ComputerPortable'	0,0366	0,0316	0,0216	0,0221	0,0209	0,0133	0,0000	-0,0238	-0,0326	-0,0204	0,0000	0,0000	0,0000	0,0000	-0,0273	0,0000	-0,0415	-0,0396	0,0498	0,0484	0,0000	0,0547	0,0625	0,0544

Table XX - CDA Secondary Model Version 1 obtained results. CDA Estimated Coefficient in kWh/h tables for an average Winter WE

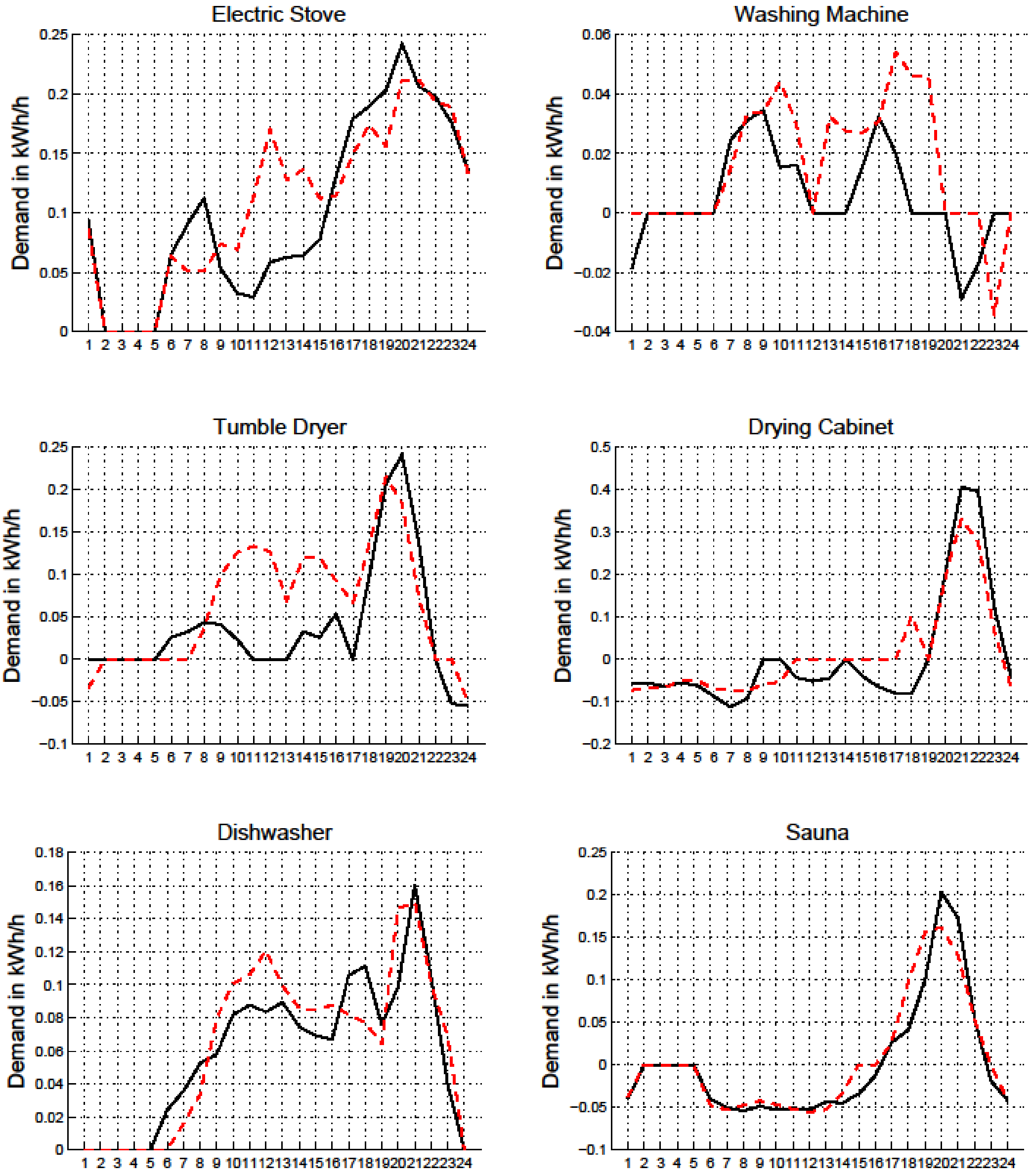

Figure IX - CDA Secondary Model Version 1 obtained results. Most representative appliances Daily Load Profiles of for an average Winter WD (Black) and Winter WE (Red).

Part II - Demand Response

Introduction

The second part of the research, analyses the Demand Response (DR) potential of the previously disaggregated loads. In the following chapters, the set of appliances included in the study will be analysed individually and subsequently divided in two categories, critical and non-critical loads, according to their DR shifting potential. The appliances individual analysis consist on a brief description of their specifications regarding their energy use as well as power demand curves and daily curves, these last obtained by previous CDA performed. In addition, their shifting potential analysis and impacts are discussed. In the results chapter it is presented the Demand Response Potential of the non-critical loads.

Demand Response [31] is defined as:

Changes in electric usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time, or to incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized.

Its implementation in the households by lowering the electricity use in the peak hours and smoothening the daily demand pattern, creates benefits to the electrical companies and consequently to the households by reducing the electricity costs. Since the unbalance between the generation and the consumption has been an issue in the energy markets over the years producing problems to all the players, the implementation of Demand Response controls has been rising as a potential solution over the last years.

Theoretical Background

Many studies has been conducted during the last year regarding the DR potential in the residential sector, presenting potential approaches and obtaining good results [32] [33]. One of this studies was the Smart-A project [34], supported by the European Commission under the "Intelligent Energy – Europe´s Programme', aimed at identifying and evaluating the potential synergies that arise form coordinating energy demand of domestic appliances with local sustainable energy generation but also with the requirements of regional load management in electricity networks. The study of domestic appliances synergy potential was performed by Stamminger [35], becoming a relevant source, both in individual appliances description and appliances DR potential. Similarly, the project includes a DR consumer acceptance study [36], where it was analysed the willingness of the residents to the DR programmes, especially regarding to shift on time certain appliances. More specifically, other task study included in the project regarding domestic washing machines and dishwashers was considered of significant relevance [37].

The Swedish metering campaign [28], presented before, can also be englobed in this DR literature since its valuable and accurate outcomes, regarding appliances load profiles. Although any DR potential is analysed in it, its results has huge potential to be implement in a DR analysis due their accurate appliances daily load profile obtained. Further, some of these results were used in the individual appliances analysis.

Similarly, the REMODECE study [38], in which were monitored residential loads to decrease energy use and carbon emissions, is a very complete study with a wide range of profitable results for the conducted study, especially the end-uses load profiles [39].

DR Analysis

Table XXI presents a set of appliances formed by the common household appliances included in the DR literature reviewed, including some variations due certain appliances specific relevance within the performed CDA.

Table XXI - DR study included appliances

Appliances included in the DR study			
RF	Refrigerator	WM	Washing Machine
FR	Freezer	DY	Tumble Dryer
ST	Electric Stove	DYC	Drying Cabinet
DW	Dishwasher	SA	Sauna
LH	Indoor Lighting	HE	Heating System

Sauna was included due its significant relevance among the Finnish households in terms of use and energy consumption, compared with other European households.

The differentiation between the Tumble Dryer and Drying Cabinet appliances is other of the particularities, since the obtained CDA results showed a differentiate pattern of use between them. This differentiation was possible owing to the nature of the data.

As it was mentioned in previous chapters[15], Air coolers or Air Conditioner appliances are not included in our study since their insignificant penetration rate among the Finnish households. Neither the engine car heating due the reason commented in that previous chapter. Further, Electric Oven and other relevant kitchen equipment are not included in the study since the lack of referring information in the available data.

The TV and PC end-uses, as well as any consumer electronics, are not included in this DR analysis since their particularities in terms of DR and their low significance in household demand profiles, in many studies are considered as only stand-by loads or miscellaneous loads. However, their impact in a household community level should not be discounted since common behaviours among the households might lead to unexpected demand peaks [40]. In addition, the number of consumer electronics in household experimented an exponential rise last years, becoming one of the main targets for the energy efficiency policies [41].

In the following sub-sections, the set of appliances is individually described.

[15] CDA Iteration process chapter

Cold Appliances

Cold appliances group includes all types of refrigerators and freezers. In terms of DR can be treated as equal, since its DR potential remains only in the user acceptance for a smart appliance. These appliances load shifting consist in an automatic process of modifying its operational cycle, more specifically its power factor, which is done by the smart appliance itself and is constrained due thermic conditions. Although in the Refrigerator case there is a more usual interaction with the consumer, this follows a periodical trend that can be easily registered and assimilated by the smart-appliance.

Refrigerators usually consist of a thermally insulated storage with a cooling system responsible of maintaining the desired temperature inside the compartment, usually 4°C. Due such specifications it has a power using factor of 33.3%, since the cooling system, to maintain the inside temperature, needs to work only 1/3 of the time the appliance is connected to the grid. The actual power demand varies according to the refrigerator features and sizes in a range of 50 to 300W. An illustration of this power demand and its relation with the inside temperature is showed in figure X [35], in which is considered an average power demand of 138,2W.

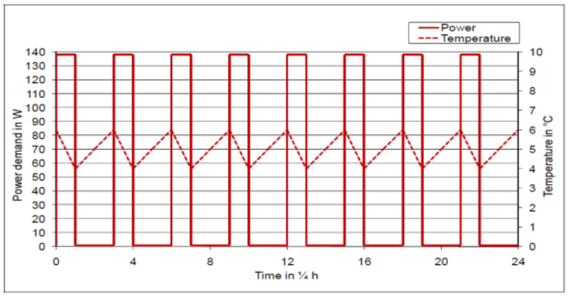

Figure X - General pattern of a power demand curve of a refrigerator in ¼ hour steps. Source: University of Bonn

Further, the interaction with the household generates an increase in the refrigerator power demand. Almost 25% of the total energy consumption of refrigerators is triggered by the consumer behaviour of opening the door and exchanging goods to be cooled.

From the performed CDA, were not obtained enough confident results for Refrigerator and Refrigerator-Freezer appliances, which is one of the CDA method weaknesses[16]. Following are presented the daily profile for such appliances, obtained from the Sweden metering campaign [28].

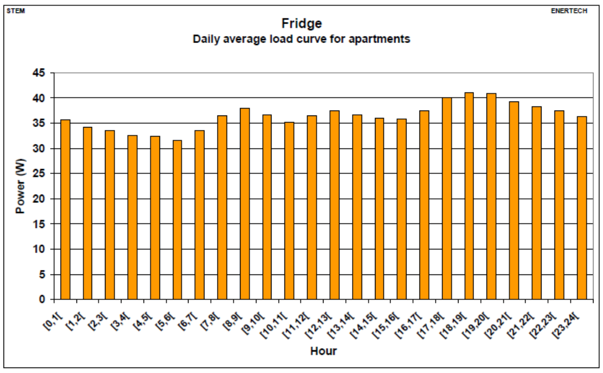

Figure XI - Refrigerator daily average load curve for apartments. Source: Zimmermann 2009

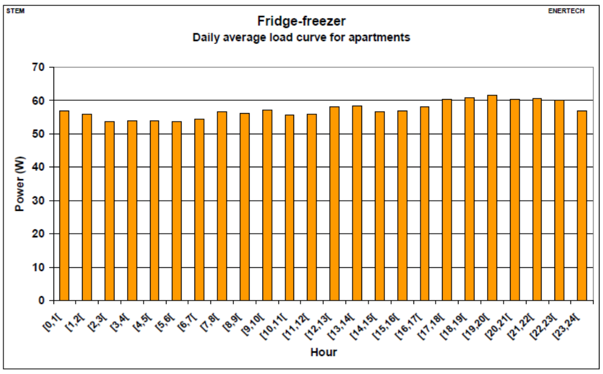

Figure XII - Refrigerator-Freezer daily average load curve for apartments. Source: Zimmermann 2009

[16] See *CDA Introduction* chapter.

Freezers [35] usually consist of a box type insulated compartment with a front-door standing alone or in combination with a refrigerator. On the other hand, Chest-freezers have a lid on the top and is standing alone.

The actual power demand of freezers varies according to their size in a range of 50 to 200W. Assuming a power-using factor of 33,3% due to the switching of the compressor and an average power demand of 105,5 W, the figure XIII illustrates its power demand relation with the inside temperature [35].

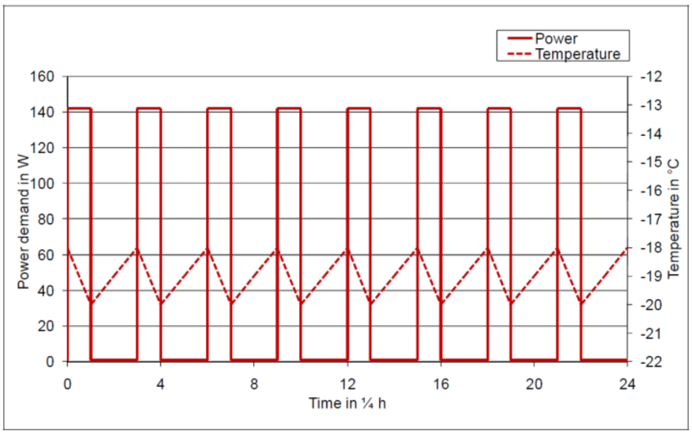

Figure XIII - General pattern of a power demand curve of a freezer in ¼ hour steps. Source: University of Bonn

From the performed CDA, were not obtained enough confident results for Freezer and Chest Freezer appliances. Following are presented the daily profile for such appliances, obtained from the Sweden metering campaign [28].

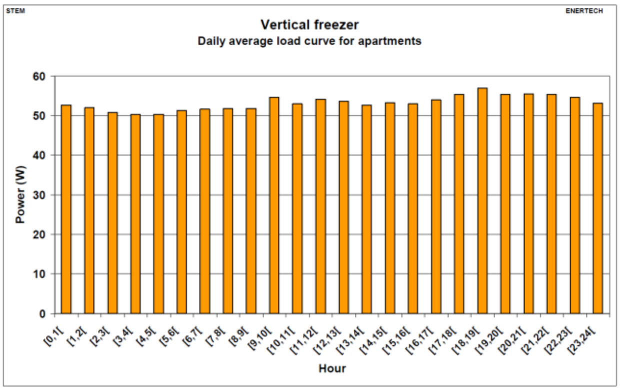

Figure XV - Freezer daily average load curve for apartments. Source: Zimmermann 2009

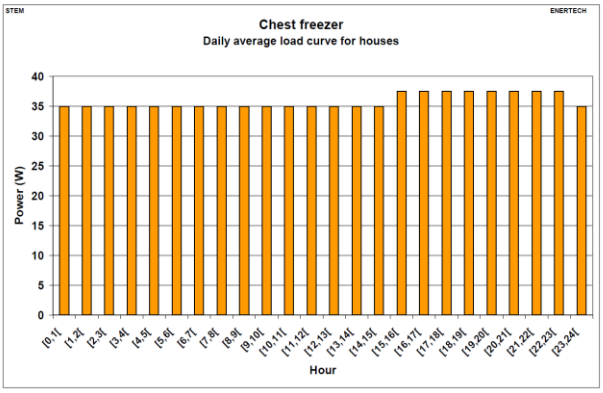

Figure XIV - Chest Freezer daily average load curve for houses. Source: Zimmermann 2009

Electric Stove

The Electric Stove appliance is a stove that converts electricity into heat to cook. It is typically compound by four iron hotplates heated by resistive heating coils. Over the years, the electric stoves evolved to glass-ceramic cooktops and induction cooking.

Electric Stove power consumption level depends on two factors, the user cooking-behaviours and the appliance specification. Appliance specifications are defined by its number of plates, their maximum power and their energy efficiency. Common electric stove working at full conditions might consume 8kW [42]; even this is not a realistic situation. Regarding the cooker behaviour, it defines, together with the type and quantity of meal cooked, the appliance power intensity and used time. So, in comparison with other appliances, which operation modes are standardised, the amount of energy consumed by this appliance may vary substantially not only among the households, but also the same household's appliance itself over the time.

Despite its high penetration rate among the sample, the load profiles obtained from the CDA showed accurate and confident results. The following Figures XVI and XVII show the load profiles obtained by a primary model and by a secondary model, where the *TotalResd* variable was included and the obtained load pattern seems more confidence.

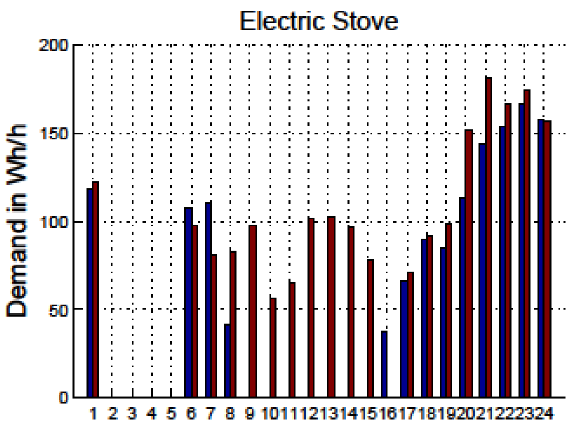

Figure XVI - Electric Stove load profile obtained from CDA Primary model. WD/WE - Blue/Red

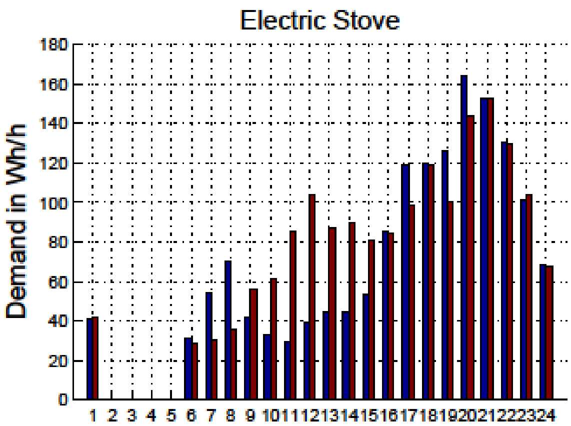

Figure XVII - Electric Stove load profile obtained from CDA Secondary Model, with the TotalResd interaction. WD/WE - Blue/Red

The DR potential of such appliance is a tricky question since implies strong changes in the residents behaviours and lunch habits. Considering an hourly-price scenario, it is difficult to implement a DR in such appliance since households are not willing to postpone their meals time longer than half-hour in an optimistic scenario [35].

Dishwasher

Dishwasher [35] is a mechanical device used for cleaning dishes and cook utilities by spraying hot water on it. The hot water temperature depends of the programme selected by the consumer, the mainly cleaning temperatures are 50/55°C, 60/65°C or 70/75°C, even lower temperatures are used for delicate items. The cleaning programs duration ranges between about 30 minutes and up to 3 hours depending on the programme and temperature chosen. Electrical energy is used mainly for heating up water to the programme temperature by a resistant heating system of between 1800W and 2500W rated power, and is additionally used for driving the circulation pump motor and the rotating spray arms. This relation between the programme temperature and the energy consumed give to the consumer a big role in energy savings, since the consumer can use it efficiently just selecting the correct programme according the cleaning needs.

Performed CDA provides confident results of Dishwasher load profiles. Figure XVIII shows the Dishwasher load profile obtained from the CDA primary model representing an average Winter WD (blue) and WE (red). The figure shows that is used on average over the whole day with more intensity in late mornings and late afternoons.

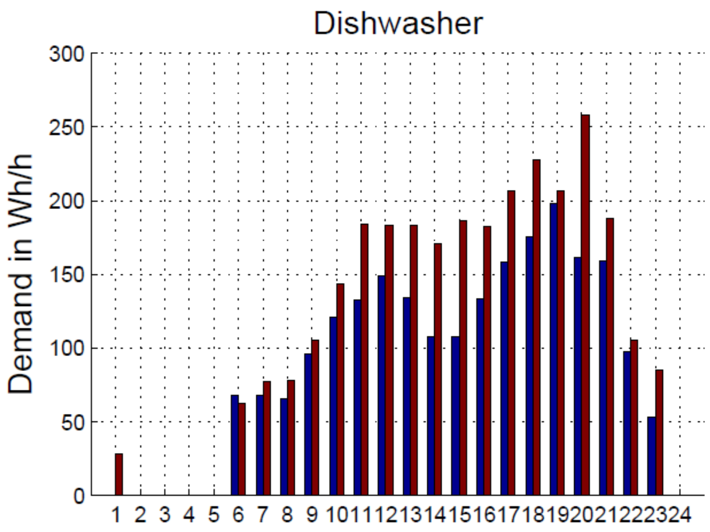

Figure XVIII - Dishwasher load profile obtained from CDA Primary model within the Winter period. WD/WE - Blue/Red

Regarding its DR potential, Dishwasher shifting potential is understood as the consumer willingness to postpone the program initialization in the time. Due the usual long duration of its programs, the dishwasher can be shifted for long periods in time. According DR studies [36] [43], the dishwasher program initialization might be postponed for a long time, inclusive overnights. In addition, a smart dishwasher might increase the shifting potential by an automatic starter; leaving the load of the content as the only user interaction needed.

Washing Machine

Washing Machine [35], in Europe, consist of a tub and a drum rotating around a horizontal axis and is used to wash laundry. The laundry, which is loaded through a front glass door, is then partially immersed into the water in the tub and the cleaning process consists in certain steps, in which the laundry is washed and subsequently rinsed, both mainly by the drum rotation, which varies in terms of duration and speed depending the phase. The washing water temperatures are mainly 30, 40, 60 or 90 °C depending on the selected program. The washing programs duration ranges between about 15 and up to 2 hours depending on the programme and temperature chosen.

Electrical energy is used mainly for heating up water to the programme temperature by a resistant heating system of between 1800W and 2500W rated power and for driving the drum motor especially at the final rinse, when the drum is rotated at high speed to extract the water from the load in order to dry it as much as possible. Regarding the hot water consumption, only about 1/4 to 1/3 of the water is being heated up, while the rest is used as cold water for rinsing.

Despite its high penetration rate, confident Washing Machine load profiles are obtained from the performed CDA. Figure XIX shows the Washing Machine load profile obtained from the CDA primary model representing an average Winter WD (blue) and WE (red). The figure shows 3 periods of use, within early morning, an afternoon peak and night use.

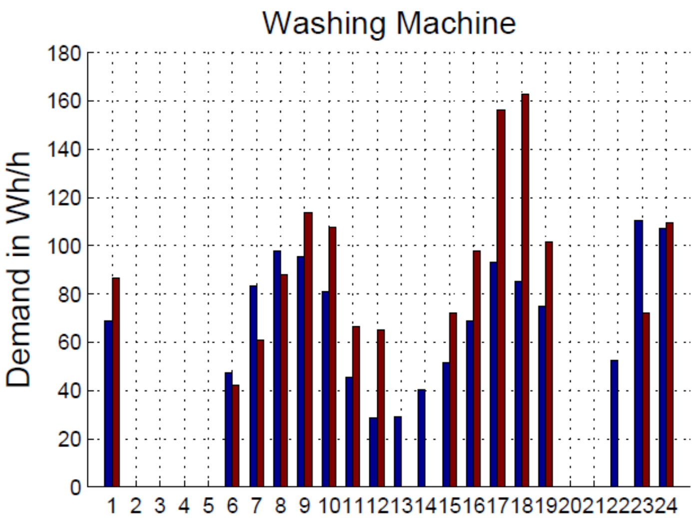

Figure XIX - Washing Machine load profile obtained from CDA Primary model within the Winter period. WD/WE - Blue/Red

Washing machine shifting potential is understood as the consumer willingness to postpone the program initialization in the time. According consulted studies, Washing Machine use might be postponed as a maximum of 3 hours in time [35] [36]. However, some households are willing to use it overnight whether this not implies disturbing noise or leaving the wet clothing for long time. Further, the Washing Machine DR potential is typically linked to the Tumble Dryer or Drying Cabinet DR potential. Therefore, in the cases that are being subsequently used, their shifting and DR potentials should be analysed as a whole.

Tumble Dryer

Tumble Dryer is used to dry the wet laundry after wash it and consist of a large drum rotating around a horizontal axis. A heated air, usually generated by an electrical heating system, circulates through the rotating drum and through the wet laundry taking up its humidity and drying it. The humid air is vented to the ambient and any water is used in the drying process. Electrical energy is used mainly for evaporating the water from the laundry and additionally for rotating the drum. Normal heating power for the heating devices are at 2000-2500W.

Performed CDA provides confident results for Tumble Dryer load profiles. Figure XX shows the Tumble Dryer load profile obtained from the CDA primary model representing an average Winter WD (blue) and WE (red). The figure shows that is used over the day with more intensity in late afternoons and during the WE mornings.

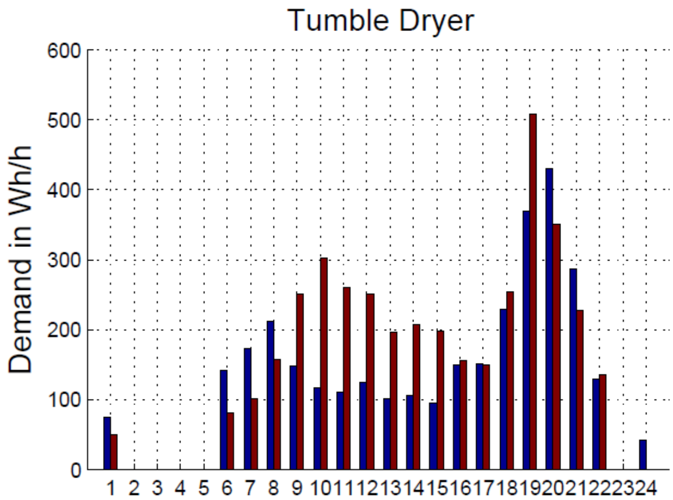

Figure XX - Tumble Dryer load profile obtained from CDA Primary model within the Winter period. WD/WE - Blue/Red

The shifting potential of the Tumble Dryer is understood as the consumer willingness to postpone the program initialization in the time. According consulted studies, Tumble Dryer use might be postponed as a maximum of 2 hours in time, which is a long time from the user's point of view, since postponing certain time such appliance means keeping the clothing wet [35] [36]. It is important to notice the use time relation between the Washing Machine and Tumble Dryer appliances, especially when in the Demand Response case, since the shifting potential of those appliances are, in most cases, sequentially related. Postponing in time the Washing Machine use, means postponing in time the Tumble Dryer initialization, at least, the same period. Further, as the exception of Washer Dryer owners, a consumer intervention is needed between the finalization of the washing machine and the initialization of the Tumble Dryer.

Drying Cabinet

Drying cabinet is an electrical machine designed to dry the wet laundry after wash it, as well as other items that are unsuitable for a traditional clothes dryer. Such items may include delicate clothing, as well as items such boots and coats. It is typically compound by an isolated storage with a heating system responsible of drying the inside items by raising the inside temperature and dry the wet of the items, sometimes with the help of a dehumidifier. There is not dynamics or mechanical parts as in the other drying machines, thus all the consumed electricity is used by the heating system.

The performed CDA provided confident results for Drying Cabinet load profiles. Figure XXI shows the Drying cabinet load profile obtained from the CDA primary model representing an average Winter WD (blue) and WE (red). The presented load profile shows a clear period of use at late afternoon and night time, being more intensive in WE than in WD.

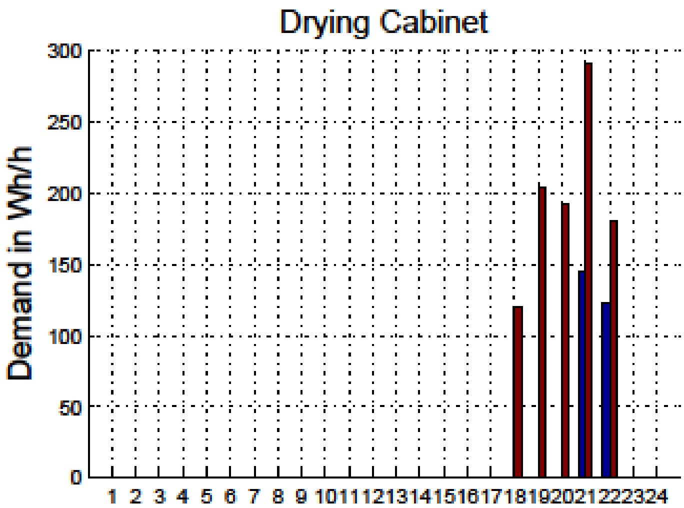

Figure XXI - Drying Cabinet load profile obtained from CDA Primary model within the Winter period. WD/WE - Blue/Red

The shifting potential of the Drying Cabinet is understood as the consumer willingness to postpone the program initialization in the time. Similarly to the Tumble Dryer, its use might be postponed as a maximum of 2 hours in time, which is a long time from the user's point of view, since postponing certain time such appliances means keeping the clothing wet. It is important to notice the use time relation between the Washing Machine and Drying Cabinet, especially in DR case, since the shifting potential of these appliances are, in most cases, sequentially related. Postponing in time the Washing Machine use means postponing in time the Drying Cabinet initialization, at least, the same period. However, Drying Cabinets present an interesting potential in DR, compared with the Tumble Dryer, since an smart appliance might be able to modify the operation cycle aiming at reducing its power peak by extending its operation time, with more flexibility than the Tumble Dryer, and smoothening its load profile, without disturbing household behaviours or affecting the clothing drying process.

Sauna

The Sauna is commonly used among the Finnish households, 2 of each 3 apartments owns a sauna. The sauna included in our study is the so-called Electric-sauna, which is compound by an electric heater meant to heat up the Sauna facility to, afterwards, steam it up by throwing water onto the electric heater stones. Sauna's indoor temperature usually rises to a range between 70°C and 90°C, which depends of the electric heater selected power and the amount of steam produced. The main power demand is consumed during the pre-heat phase, where the consumer is not still using the sauna, and the electric heater is heating the top stones to the selected level. Common sauna heaters size in range of 3 kW to 8 kW.

Performed CDA provides confident results of Sauna load profiles. Figure XXII shows the Sauna load profile obtained from the CDA primary model representing an average Winter WD (blue) and WE (red). The figure shows a clear period of use at late afternoon times in both WD and WE, earlier and more intense in this last.

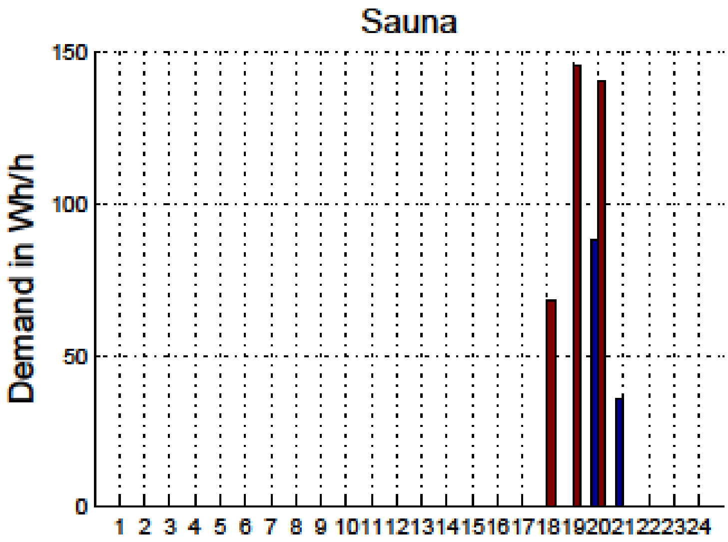

Figure XXII - Sauna load profile obtained from CDA Primary model within the Winter period. WD/WE - Blue/Red

The shifting potential of the Sauna is understood as the consumer willingness to postpone the Sauna use in time. Considering that Sauna has become a routine among the Finnish households, its shifting potential is really tied to the residents' daily routines. However, due to Sauna's power demand characteristics, which demands an intense power consumption in the beginning to heat it up, with an appropriate price incentive can be considered that households might be willing to postpone Sauna's use for 1 hour at max.

Studying Critical vs Non Critical Loads.

Following the DR approach, household's appliances can be classified into Critical and Non-critical loads according their time-shifting potential. Appliance's shifting potential depends on two factors, the appliance technical specification and the appliance interaction with the household. But in order to analyse these factors, firstly it has to be established the appliances smartness level and householders willingness to the DR program, which are used as base.

The appliances smartness level considered in this study corresponds to an initial phase of DR implementation. Analysing the DR current situation of Finnish households, whose appliances' sets cannot be considered as smart appliances, is settled as the most smartness specification a basic timer, which allows the user to define the appliance initialization time. Therefore, appliances demand curve might be shifted in time only by the consumer action or decision, not independently and neither modified, i.e. smart thermal storage during large programs or operation cycles modifications in cold appliances.

Regarding the consumers' willingness to the DR program, a conservative approach is used considering the DR major case studied in Europe, the Smart-A project [35] [36]. Considering an initial phase of DR implementation, consumers' willingness to the DR is positive as far as not implies significance changes in their daily routines and habits.

Once established the basis, the appliances specifications and their interaction with the household were analysed in order to classify them in critical or non-critical levels in terms of DR shifting potential. Two different approaches identified from the reviewed literature are following presented.

The first approach [44] is based on the user-appliance interaction needs, classifying into different categories according the level of appliance's dependence from the user activities. The different categories are presented in table XXII.

Table XXII - Appliances categorization based on user interaction level

Level	Operation Mode	Appliances
1	Independent of household occupancy	Refrigerators; Freezers
2	Dependent on occupancy but not on specific activities	Lighting, Heating System[17]
3	Dependent on occupancy and activities	Dishwasher, Washing Machine, Dryers, Electric Stove
4	Base load: Too small to model individually	Consumer Electronics

The second approach [33] classifies the appliances according to technical specifications related with load cycle characteristics and to the shifting time impact on the user. Appliances are divided in three categories according the level of potential automatic shifting. The *automatic* level includes those appliances with a thermal storage that consumes cyclically. This cycles, within

[17] Finnish Case: Primary heating systems are working full-time during Winter. Additional heating loads depend on resident behaviors

constrains, might be controlled automatically without disturbing users. The second category is considered a *semi-automatic* shifting potential, although their cycles can be shifted automatically, requires the user interaction, i.e. washing machine can be programmed, but must be initially load it. Finally, the *manual* category includes those appliances that are used on demand then load shifting implies a change in household's habits or behaviours.

Table XXIII shows the study appliances included in these categories.

Table XXIII - Appliances categorization based on technical specification and shifting time impact on the user.

Categories	Shifting Potential	Appliances
Automatic	Cycles can be shifted automatically using thermal storage features	Refrigerators, Freezers, Space Heating
Semi-automatic	Cycles can be shifted but user interaction is needed	Dishwasher, Dryers, Washing Machine
Manual	Used on demand. Shifting implies changes in user's schedule	Stove, Lighting, Sauna

This second approach is considered to be more accurate than the first in terms of appliances categorization and definition of the interaction between consumer and end-use. Therefore, it is selected as the used approach in the critical and non-critical loads classification.

Non-Critical Loads Shifting Potential

Following the sated DR approach, the Non-critical loads final set is compound by the appliances located into the *semi-automatic* category, as is defined in the selected approach[18], and the Sauna due its relevance among the Finnish households.

The selected sample possesses a major relevance within household total demand in terms of DR potential, since their operations demand high consumption provoking undesired power peaks in the more energy-active hours. Although the consumption share of some of these appliances might not have a big impact in the total household daily or monthly consumption (i.e. compared with cold appliances), their power consumption and shifting potential situate these appliances as the main targets in order to reduce and control the daily power peaks.

The non-critical loads set is compound by Dishwasher, Washing Machine, Tumble Dryer, Drying Cabinet and Sauna. The shifting potential analysis of these appliance is based in existing studies data and is composed by many aspects, being the most important features: The potential shifting-time regarding the consumers' behaviours and the automation level of this shifting. The presented DR approach[19] analyses the shifting potential as a time-postponed of the appliance initialization, without modifications in their operational cycles.

Table XXIV - Non-Critical Loads Potential Shifting Times

Non-Critical Loads	Potential Shifting Time [hours]	
	Approach 1	Approach 2
Dishwasher	5	Non-constrain
Washing Machine	3	Semi-constrained
Tumble Dryer	2	Semi-constrained
Drying Cabinet	2	Semi-constrained
Sauna	1	Constrained

The DR potential shifting time is presented in table XXIV with the two different approaches or scenarios that will be showed in the results. (1) The conservative scenario was settled analysing different sources [35] [36] [37] [43] and weighting the presented shifting times in a conservative approach. (2) In the second scenario the shifting potential is analyse in an optimistic approach, thus the non-critical loads are subdivided into those which are willing to be postponed without constrains (as long as not exceed from 24h), and those that presented a willing limitation in the maximum time, according the literature reviewed.

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[18] See *Table XXIII* in the previous chapter.

[19] See in the previous chapter Studying Critical vs Non Critical Loads the settled levels of appliances smartness and households' willingness to DR program.

In the second scenario, the *Semi-constrained* category formed by clothing appliances includes the Washing Machine due to the fact that even it is contemplated in some studies as non-constrained, the consumers object about the willingness to postpone it to night time for security reasons, disturbing noises or laundry resting wet for long time. The inclusion of the Tumble Dryer and the Drying Cabinet refers basically to their link with the Washing Machine.

Once it is established the non-critical loads and the DR scenarios, is proceeded to present a wide portfolio of results, in which are considered the different approaches, points of view and potential outcomes. Notice that, this study is not aiming to present a definitive results, but rather to present different potential scenarios in an illustrative way that offers to the receiver a valuable picture of the DR potential from a specific sample.

Furthermore, the presented code[20] was designed to implement, in a fast and effective mode, a DR potential study to different sample of households, without significant modifications in the code.

[20] See Appendices III and IV - Matlab code

DR Results

The results of the DR Potential study are following presented for both scenarios using the appliances load profiles obtained in the CDA. The aim of this results is to present in a visual and clear way the DR of the selected non-critical loads. They are grouped as a set to present the DR impact of each of these appliances within the total DR and over the profile hours. Their DR is presented for the different models accounted in the CDA.

DR First Scenario Results

In this first scenario, the non-critical loads are displayed in aggregated bars, representing the hourly amount of energy that could be postponed in time, according to the settled DR features and the appliances load profiles obtained from the CDA. The DR potential is presented in sets of 6 graphics representing various CDA models. Each set presents the hourly DR disaggregated by appliances and subsequently the DR potential for different shifting periods, from 1 to 5 hours.

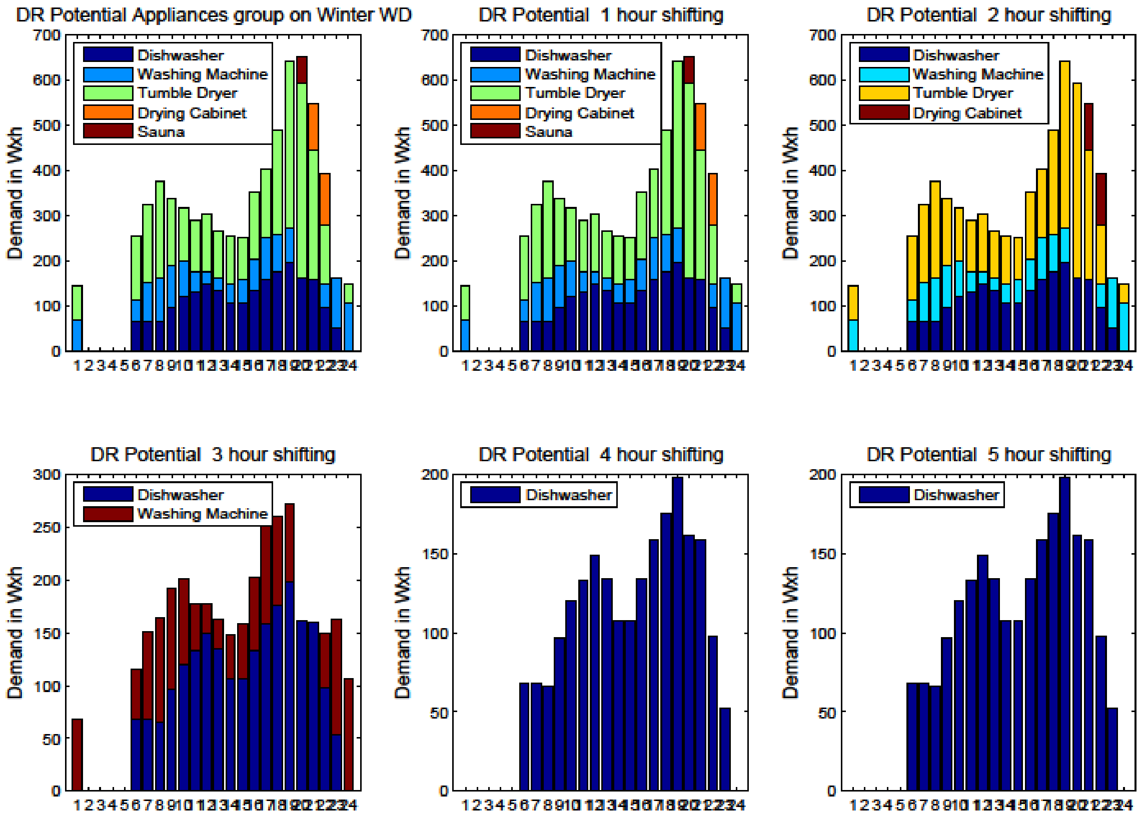

Figure XXIII - DR First Scenario Results - DR Potential for different shifting periods within Winter WD using Primary Model Load Profiles

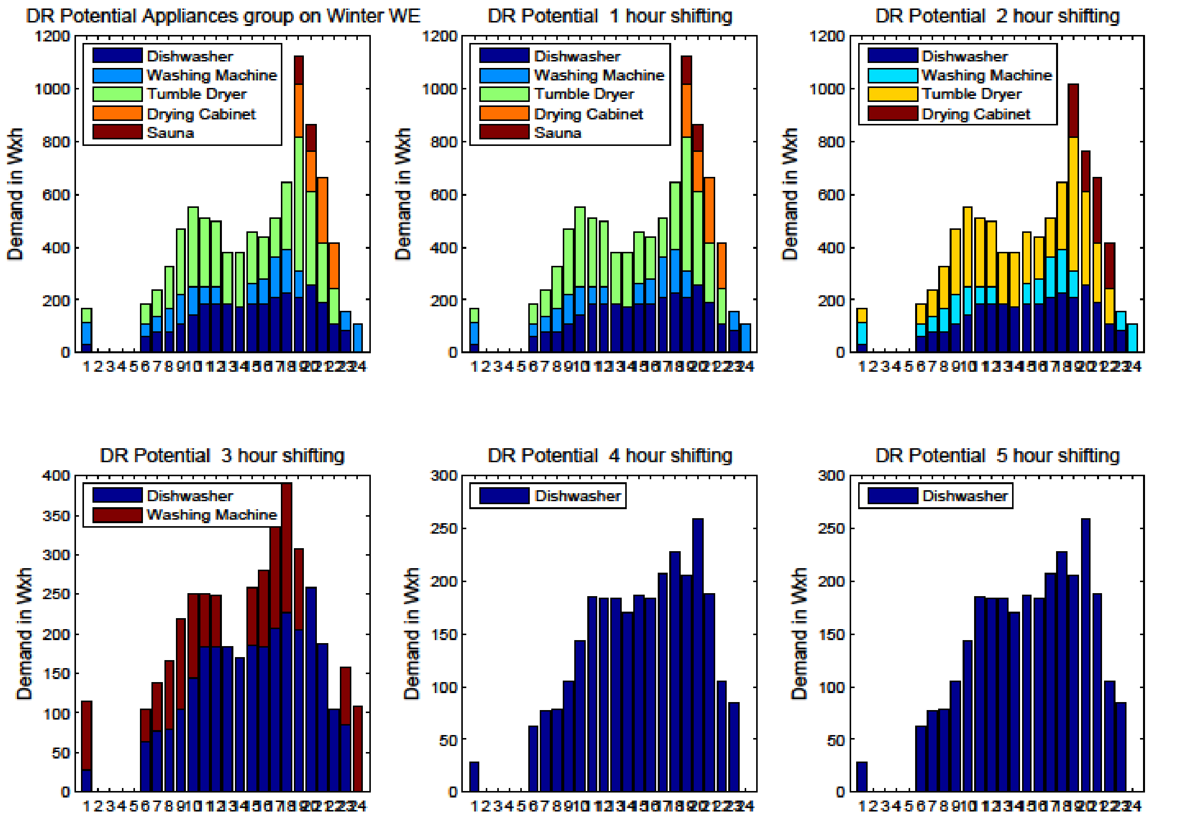

Figure XXIV - DR First Scenario Results - DR Potential for different shifting periods within Winter WE using Primary Model Load Profiles

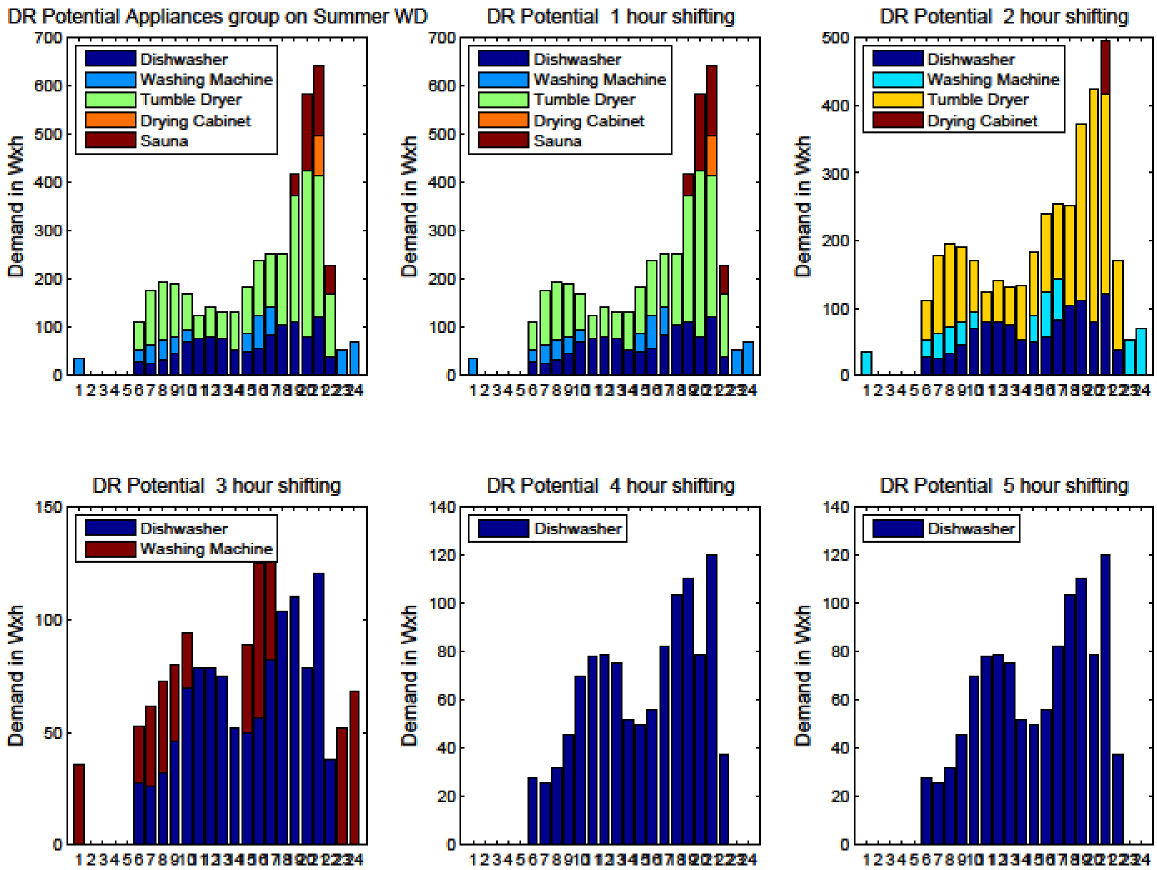

Figure XXV - DR First Scenario Results - DR Potential for different shifting periods within Summer WD using Primary Model Load Profiles

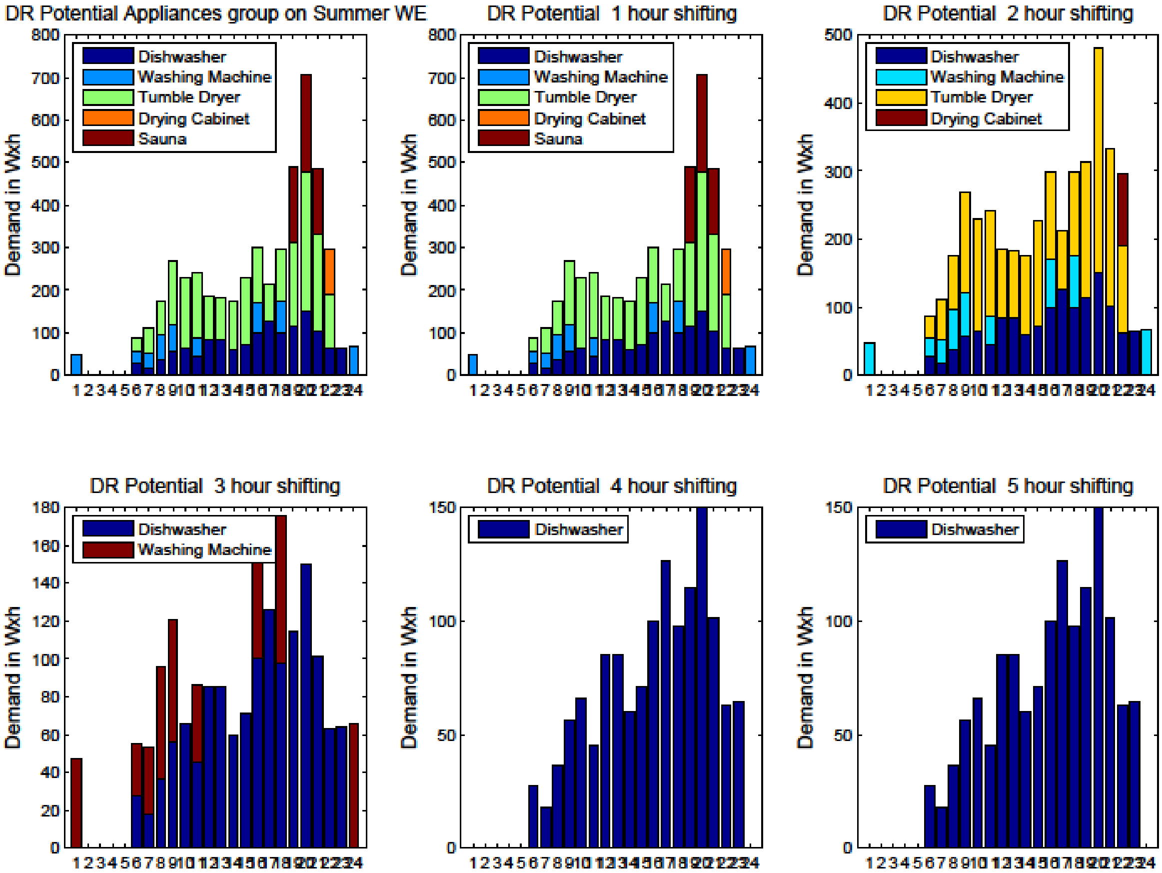

Figure XXVI - DR First Scenario Results - DR Potential for different shifting periods within Summer WE using Primary Model Load Profiles.

DR Second scenario Results

The following figures show the DR potential of the non-critical loads classified according the second scenario statements. The aim of this approach is not only the consideration of an optimistic approach in the shifting potentials, but also to categorize the DR of the non-critical loads in levels of potential according the consumer willingness and the shifting impact to them. In this scenario, the importance of the appliance smartness level and the user needed interaction can be observed better, as well as their impact in the DR potential.

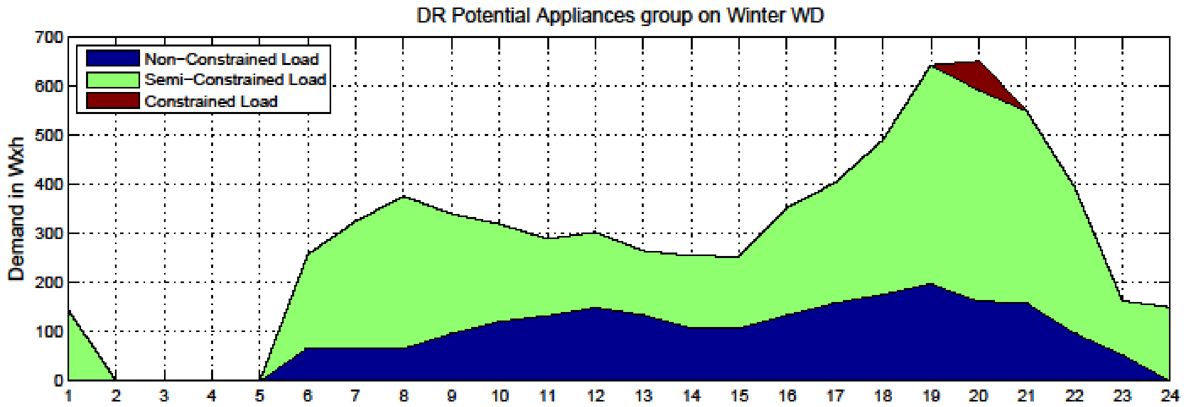

Figure XXVII - DR Second Scenario Results - Daily profile DR Potential within Winter WD grouped by constrains level.

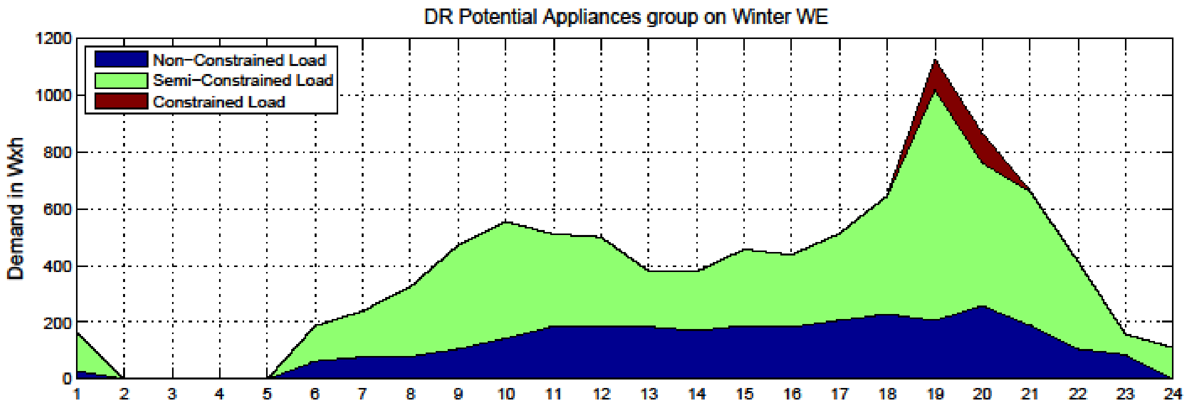

Figure XXVIII - DR Second Scenario Results - Daily profile DR Potential within Winter WE grouped by constrains level.

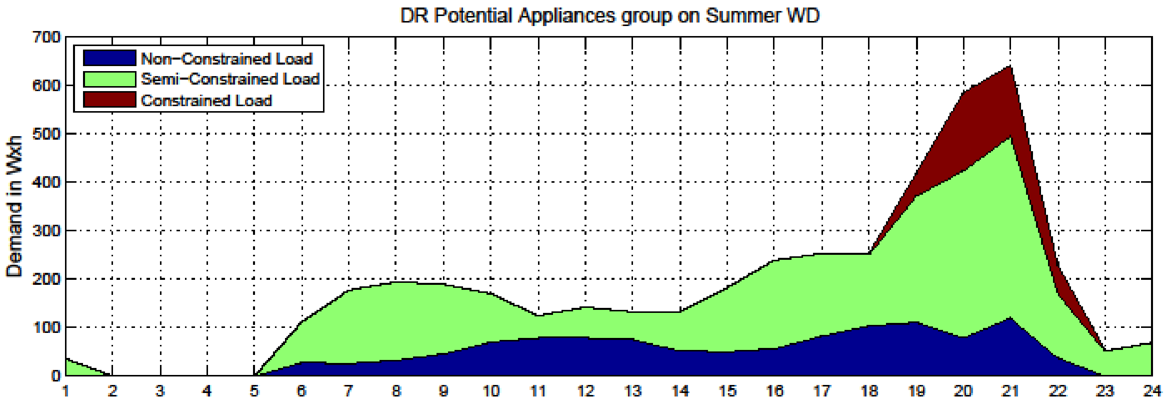

Figure XXIX - DR Second Scenario Results - Daily profile DR Potential within Summer WD grouped by constrains level.

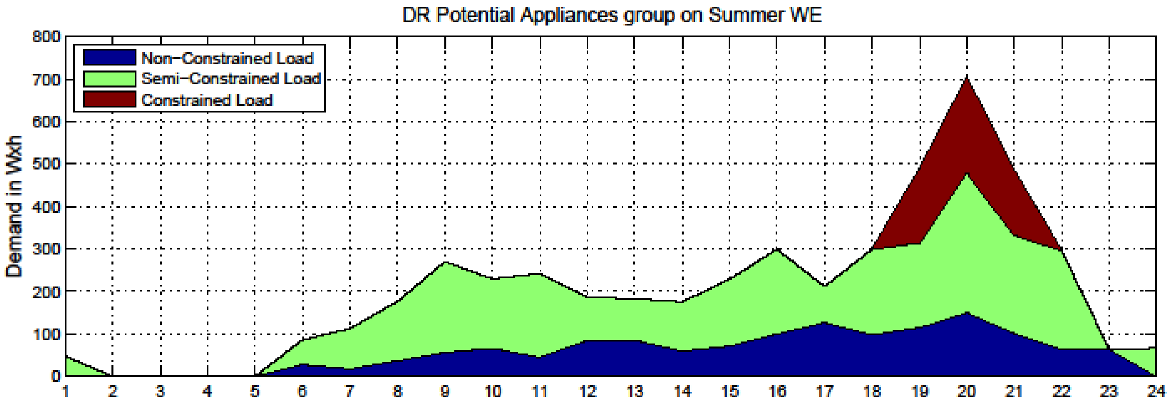

Figure XXX - DR Second Scenario Results - Daily profile DR Potential within Summer WE grouped by constrains level.

Conclusions and further Steps

Author’s conclusions are presented within four different sections. In the first part the main findings and conclusions are presented. The second section is focused in the performed CDA analysis, the positive results obtained are commented, the faced major problems are stated and the potential improvements for future performances are presented. In the third section, the results obtained from the DR potential analysis are commented, as well as the distinct approaches that are considered valuables in DR Potential analysis. The last section brings together some thoughts regarding potential improvements in this research and also comments the faced problems, especially in the database.

Summarizing the whole project and considering the initial goals, the work done has produced a valuable outcome. Numerous references of relevant significance in CDA and DR fields have been consulted and gathered in the references appendix as a valuable source for related studies. The disaggregation of significant loads has been obtained through the CDA and the results were presented both graphically and numerically. The disaggregated loads were classified into critical and non-critical loads, the shifting potential of the non-critical loads was studied and the DR potential of these loads was presented in a visual and valuable way.

Regarding the CDA performance, the obtained results were not from the accuracy initially expected and it was not possible to obtain confident results for all the appliances that were initially aimed at. As it was commented, some of these appliances were not able to implement in the CDA due its lack of data in the survey or to their low confidence in its obtained results. Other appliances, which were included in the CDA, didn’t lead to confident results considering the initial expectations, these are basically the cold appliances. As has been mentioned in several studies, this appliances has been historically a problem in the CDA approaches, due their high penetration rates and their characteristic demand curve, in which the residents’ behaviour plays a minor role and is almost acting as a constant load in an hourly profile data.

Regarding the appliances included in the DR study, such Dishwasher, Washing Machine, Tumble Dryer and Sauna, their load profiles were obtained showing confident results over the different models implemented. The load patterns obtained for such appliances were trustful and represented the behaviours of the sample’s households. But as in other CDA studies, the obtained load levels in some cases are not really confident whether are compared with the results of direct metering studies. Thus, the appliances load patterns are remarked as the strong point of these results in terms of significance.

An explanation for the inaccuracy of the obtained results might be the controversy in the CDA explanatory variables setup over the different approaches. The CDA models presented in various studies, with large and developed explanatory variables setups aiming to include as many as possible variables, leaded to really accurate results for these studies. However, these models are an inefficient approach to apply when aiming for daily load profiles disaggregation. In this case, the meaning of the results and the output units are the valuable assets. Therefore, a simple model made implemented to a good quality data could be the most efficient way to perform CDA and obtain worthy and accurate appliances’ load profiles.

Regarding the DR performed analysis, the two presented approaches provide visual, clear and valuable results, although the amount of appliances categories was limited from the CDA results. However, the presented methodology can be implemented in future studies with better quality data base obtaining more suitable results.

Regarding the settled appliances smartness level and consumer willingness to DR program, it was not aimed to analyse these constrains, but to present a valuable outcome that can be flexible to these conditions, as was considered in the presented methodology. Furthermore, the lack of this type of data in DR information within the database didn't allow to perform more precise analysis in terms of representativeness on the sample

Further, the relation between the clothes washing and clothes drying machines should be analysed and presented correctly in order to predict their real DR potential. One possibility is to disaggregate, as a different loads, the washing machine use, without subsequently drying process, than the whole process compound by the clothes washing and drying as a unique load. Then, the shifting potential of these loads might be estimated better regarding the consumer willingness and needed interaction.

Regarding the potential improvements, it is important to remark the potential existing in the AMR data that might be exploited to obtain useful information that would be used in the CDA implementation to improve the results. A pre-analysis of the AMR data aiming to obtain TOU exclusive information would be a potential approach. Similarly, Aigner [17] concludes on the potential and importance of ToU information for the zero coefficients restrictions. Therefore, TOU information might be obtained for certain appliances, those which needs direct interaction with the user and it is confidently known that their use implies a significant power and energy consumption. AMR data study oriented in this approach could lead to results which allows to assume with a high confidence level -for certain households and certain times- that certain appliance is not used. These results not only would be useful to smooth certain appliances load profiles and to obtain more accurate results, but also to detect unexpected or unknown appliance's use in night times, and even more important, to reduce the amount of negative values in the CDA obtained coefficients.

Similarly, to analyse the households AMR data might be helpful to disaggregate the standby consumption from certain households -those who have certain demand profiles that provided confident results- and subsequently to predict or model the standby consumption for the rest of the sample, supported by their survey data. One way to perform this analysis could be to study the demand profile during the night times over those households which apparently not present activity levels, and together with their survey data, aim to predict their standby consumption. Develop a simple regression with the number of appliance variables to estimate the standby consumption would be really powerful for future CDA studies. Further, might help in the reduction of negative values.

On the other hand, the major problems were faced in the survey data. The survey questionnaires plays an important role in the CDA data acquisition, and this fact amplifies the need for developing further the questionnaires otherwise results in a lack of data and a poor quality database. In this study case, the survey database was already procured so the author had not any influence in the survey questionnaires. Thus, a reformulation of these questionnaire the author belief that would produce a better quality database and leads us to an improvement in the CDA results.

Many studies had focus in the survey features and analysed the most productive ways to present these questionnaires to the costumers in order to obtain a quality database. One of the main problems faced in CDA surveys is the definition of the lighting variables. In order to disaggregate the household lighting consumption, both indoor and outdoor lighting, different variables has been used over the performed studies. The number of bulbs owned by the households, which in some studies were divided in energy saving lamps, common bulbs, halogen bulbs or fluorescent bulbs, is one of the problematic questions since in many cases is reported lack of information or invalid answers in a significant amount of questionnaires. Therefore, some studies have been used the number of rooms or an interaction with the number of residents to describe the lighting consumption.

As a conclusion, the author believes that a well-planned and accurate-designed survey leads to a good quality database that would be profitable by different study approaches. Furthermore, the implementation of CDA to a sample with not well-prepared surveys will lead to unsuccessful results, especially regarding the confidence of the disaggregated load profiles. Combinations with engineering methods and direct metering load profiles should be considered.

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Appendix I: Household Questionnaire

HOUSEHOLD

BACKGROUND INFORMATION

1 How many persons are living in your household ?

0-7 age	_______	51-65 age	_______
8-15 age	_______	66-75 age	_______
16-30 age	_______	76 age or older	_______
31-50 age	_______		

2 What kind of home are you living in?

☐ apartment house
☐ semi-detached house or row house ,which is ☐ Stone or brick made house
☐ one-family detached house ☐ Wooden houde

The energy class of the house if you know it ? __________

3 Do you use your home most of yhe time
☐ Yes ☐ Yes, except summer months ☐ mainly Mon-Fri

4 When your house/apartment has been built ?
☐ 2000 or later ☐ 1990 –1999 ☐ 1980 –1989 ☐ 1970 –1979
☐ 1960 –1969 ☐ 1950 –1999 ☐ 1950 or earlier

5 With the help of the following statements we want to find are the heated areas in one building or do you have more buildings and what kind of heating system there is ? Cross the statements that are correct.

☐ living spaces are in one building
☐ living spaces are in two or more seperate building
☐ There is a warm garage in the house or its wing
☐ There is a cold garage in the house or its wing
☐ There is a sauna in the house
☐ There is a warm garage and/or stogare in the courtyard building
☐ There is a cold garage and/or stogare in the courtyard building
☐ There is a sauna in the courtyard building

6 The windows are ☐ double glazed ☐ triple glazed ☐ other, what ____________________

7 How many rooms there is in the main building of your home ?_____ (not include bathroon, WC,portc, etc.)

The number of the floors in your apartment ? ☐ one ☐ one and a half ☐ two ☐ three

8 The warmed area of your home (over 15 ℃)
☐ under 20 m² ☐ 20-40 m² ☐ 41-60 m² ☐ 61-80 m² ☐ 81-100 m²
☐ 101-120 m² ☐ 120-150 m² ☐ 151-200 m² ☐ over 200 m²

9 The warmed area of your home (5 - 15 ℃)
☐ under 20 m² ☐ 20-40 m² ☐ 41-60 m² ☐ 61-80 m² ☐ 81-100 m²
☐ 101-120 m² ☐ 120-150 m² ☐ 151-200 m² ☐ over 200 m²

10 The total square meter area of the courtyard and side buildings according to the stated heating levels, in case of electric heating
heated square meter area (over 15 ℃) circa ________ m²
semi heater square meter area (5 – 15 ℃) circa ________ m²

11 How many hours, on average, are people present in your home ?

a) weekdays	b) weekends
☐ 0-2 h	☐ 0-2 h
☐ 2-4 h	☐ 2-4 h
☐ 4-6 h	☐ 4-6 h
☐ 6-8 h	☐ 6-8 h
☐ 8-12 h	☐ 8-12 h
☐ 12-16 h	☐ 12-16 h

HEATING AND VENTILATION SYSTEMS

12 What is the primary heating system of your house?

- [ ] District heating
- [ ] Direct electric heating
- [ ] Electric storage heating
- [ ] Oil heating
- [ ] Wood heating with water circulation
- [ ] Other wood heating
- [ ] Ground source heat pump ,which power rating is ________ kW
- [ ] Other heating system, what? ____________________

13 Do you have also other supportive heating system besides the previous?

- [ ] Wood heating (e.g. storing fire place) → How many times do you use it per week ? ________ times
- [ ] Solar power
- [ ] Air source heat pump , with a power rating of________ kW
- [ ] Air/water heat pump ________
- [ ] Other heating system, what? ____________________

14 Yearly use of fire wood in heating

If you can estimate you fire wood consumption in cubic meters of pile of wood, mark it down.
if you know the measure as (throw in) cubic meters, chance it to the pile of wood by dividing 1.6

Wood consumption is around ______ cubic meters of pile of wood

15 Underfloor heating

How many square meters of the underfloor heating have you implemented with electric cables? ________ m^2

16 Do you have an automation system or other heating control, like Ouman's controller ?

17 Do you have indoor cooling system ? If yes, what?

- [ ] Air source heat pump
- [ ] Indoor air cooler, air conditioner
- [ ] Other, what? ____________________

18 Ventilation of your house

- [ ] Natural ventilation without range hood
- [ ] Natural ventilation with range hood
- [ ] Mechanical exhaust ventilation
- [ ] Mechanical exhaust ventilation with exhaust heat pump
- [ ] Mechanical supply and exhaust ventilation
- [ ] Mechanical supply and exhaust ventilation with heat recovery
- [ ] Other, what

EQUIPMENT

19 Mark in the questionnaire the equipments that are in use at your household, how many and age of them.

- [ ] Refrigerator or other cool storage…………………….. ______ units which over 10 years age ______ units
- [ ] Refrigerator + freezer box………………………….. ______ units which over 10 years age ______ units
- [ ] Freezer………………………………………………… ______ units which over 10 years age ______ units
- [ ] Chest freezer ______ units which over 10 years age ______ units
- [ ] Dishwasher, with drying cycle [ ] Yes [ ] No ______ units uses in a week ______ times

Is your dishwasher connected to? [ ] Cold water [ ] hot water [ ] I don't know

- [ ] Washing machine………………………………… using times in a month ______ times
- [ ] Washer-dryer…………………………………….. using times in a month ______ times
- [ ] Tumble drier or equivalent ……………………………… using times in a month ______ times
- [ ] Drying cabinet…………………………………………. using times in a month ______ times
- [ ] Electric sauna stove…………………………………… using times in a week ______ times
- [ ] Electric sauna stove (open and use stove) ………… using times in a week ______ times
- [ ] Electric stove…………………………………………… using times in a week ______ times
- [ ] A computer with cathode-ray tube display ………… ______ units
- [ ] A computer with LCD display……………………….. ______ units
- [ ] A portable computer…………………………………… ______ units
- [ ] Cathode-ray tube television…………………………… ______ units
- [ ] LCD television…………………………………………… ______ units
- [ ] Home theatre system ______ units
- [ ] Other consumer electronics (DVD, Xbox, stereot, etc.) ______ units
- [ ] engine-block heater → In how many car ? ______ units Time per usage? ______ hour
- [ ] car's cabin heater → In how many car ? ______ units Time per usage? ______ hour

20 Lighting

Lighting (indoor lighting)		Lighting (outdoor lighting) If it affects your power consumption	
The number of bulbs	_____ units	The number of the bulbs	_____ units
The number of energy saving lamps	_____ units	The number of energy saving lamps	_____ units
The number of halogen lamp	_____ units	The number of halogen lamp	_____ units
The number of fluorescent lamp	_____ units	The number of fluorescent lamp	_____ units
Others	_____ units	Others	_____ units

Is lighting that is usually on when people are home, made by ? Mark one option

☐ incandescent bulbs ☐ energy saving bulbs ☐ fluorecent lamps ☐ energy saving lamps and fluorecent lamps
☐ incandescent bulbs and energy saving lamps ☐ energy saving and fluorecent lamps

ELECTRICITY COMSUMPTION HABITS

21 What is the indoor temperature of your house? ________ ºC ☐ I don't know
Have you thought about the possibility to lower your indoor temperarure? ☐ Yes ☐ No

22 Electronic devices have standby consumption, when they are not fully turn-off. Typical this kind of household machines are for example stereos, VCR, TV and computers.
How many of these machines do you have in your household ? ________ unit
How many of these do you switch off the standby state on daily basis ? ________ unit

23 Do you follow the size of your energy bill? ☐ Yes ☐ No

24 Would you like to follow your energy consumption through
☐ Internet-service (the hourly consuption of the previous day)
☐ From panel in your energy meter
☐ The bill is sufficient

25 Would you be willing to effect energy efficiency?
Changing driving/travelling habits ☐ Yes ☐ No Decreasing water usage ☐ Yes ☐ No
Changing bying habits ☐ Yes ☐ No Recycling ☐ Yes ☐ No
Decreasing other energy usage (devices) in your home ☐ Yes ☐ No

26 Would you be willing to take pricing that changes in periods, even hourly ?
☐ Yes ☐ No

27 Would you be willing to let a power company connect on and off your heating several times (for instance) during the day if that gave you a lower energy bill ? ☐ Yes ☐ No

28 Have you do any energy savings? If yes, what sort of ? For instance change main heating system (from that.to that) or change windows (some or all) or add insulation to frame work of the house.

____

____

____

29 Open feedback

____

____

____

30 Would you be willing to take part in a research of the effects of the feedback to the energy consumption level?
The research will be made by VTT and Adato Energy Oy. ☐ Yes ☐ NO

Thank you for your answers!

Appendix II: Finnish Households Statistics

Finnish Households Principal Appliances Penetration Rates	
Dishwasher	64,52 %
Washing machine	90,65 %
Tumble dryer/airing cabinet	17,91 %
Freezer	96,00 %
Microwave oven	92,10 %
Colour TV	91,00 %
Personal computer	81,97 %
Sauna in apartment	61,63 %

Source: Statistics Finland

Appendix III: Study Implementation MATLAB Code

Program Initialization

```
clear all
load('Database.mat');

M=KWh_Prim_District; % AMR data District Heating Households
A=HDD; % HDD data
B=workday; % WD/WE differentiation
Time=time; % Time matrix - Contains hours index
app={
'Refrigerator',0,0;
'Refrigerator & Freezer',0,0;
'Freezer',0,0;
'Chest Freezer',0,0;
'Electric Stove',1,0;
'Washing Machine',3,1;
'Tumble Dryer',2,1;
'Drying Cabinet',2,1;
'Dishwasher',5,1;
'Sauna',1,0;
'Lighting SQM',0,0;
'TV CRT',0,0;
'TV LCD',0,0;
'PC CRT',0,0;
'PC LCD',0,0;
'PC Portable',0,0;
'Other',0,0
}; % DR Potential in hours for appliances and approaches
```

Choosing Explanatory Variables

```
exp=input('What group of Explanatory variables?');
switch exp
    case 1
        Q=EV_M2_V1;
        appNight=[5 6 7 9 10]; % Coefficients with night restrictions
        meanAPP=[11]; % Coefficients to be we weighted
        meanAPP2=[5 6 7 8 9 10]; %Coefficients to be weighted according dummies
    case 2
        Q=EV_M1_V1;
        appNight=[5 6 7 9 10]; % Coefficients with night restrictions
        meanAPP=[11]; % Coefficients to be we weighted
        meanAPP2=[0]; %Coefficients to be weighted according dummies
     case 3
        Q=EV_M1_V3;
        appNight=[5 6 7 9 10]; % Coefficients with night restrictions
        meanAPP=[11]; % Coefficients to be we weighted
        meanAPP2=[0]; %Coefficients to be weighted according dummies
    otherwise
        break
end
```

Choosing Study Months

```
time=input('What group of Months? 1-Winter Dec-Feb 2- Oct-Mar 3-Summer Jul-Aug 4- Mar-Jun');
switch time
    case 1 %Winter December-February
        hour(1,1)=Time(6,3);
        day(1,1)=Time(6,1);
        hour(1,2)=Time(8,4);
        day(1,2)=Time(8,2);
        numit=1;
        head='Winter';
    case 2 %Montly October to March
        numit=5;
        for i=1:1:numit
            hour(i,1)=Time(4+i,3);
            day(i,1)=Time(4+i,1);
            hour(i,2)=Time(4+i,4);
            day(i,2)=Time(4+i,2);
        end
    case 3 %Summer July-August
        hour(1,1)=Time(1,3);
        day(1,1)=Time(1,1);
        hour(1,2)=Time(2,4);
        day(1,2)=Time(2,2);
        numit=1;
        head='Summer';
     case 4 %Montly March to June
        numit=4;
        for i=1:1:numit
            hour(i,1)=Time(9+i,3);
            day(i,1)=Time(9+i,1);
            hour(i,2)=Time(9+i,4);
            day(i,2)=Time(9+i,2);
        end
    otherwise
        break
end
```

CDA Iterations

```
it=1;
while it<=numit
    %%Initializing

    t=hour(it,1):1:hour(it,2);
    days=day(it,1):1:day(it,2);

    num_HH=size(M,1); %Total Amount of HouseHolders
    num_days=size(t,2)/24; %Total Amount of days
    num_WD=sum(B(days,1),1);
    num_WE=num_days-num_WD;
    num_data_WD=num_HH*num_WD;
    num_data_WE=num_HH*num_WE;
    num_ExplaVar=size(Q,2);
    Y_WD=zeros(num_data_WD,24); %kWh hourly consumption for each daily hour
```

```
Y_WE=zeros(num_data_WE,24); %kWh hourly consumption for each daily hour
X_WD=zeros(num_data_WD,num_ExplaVar); %Explanatory Variables [dayly values]
X_WE=zeros(num_data_WE,num_ExplaVar); %Explanatory Variables [dayly values]

i=1; %ID Householder
j=1:1:24; % Y column index = 24h/day
k=t(1):1:t(24); %Initialazing first 24 hours vector (Day1)
l=1:1:num_ExplaVar; % X column index = number of Explanatory variables

%%Creating Y,X matrices
d=1;
d_we=1;
d_wd=1;
while i<=num_HH
    while d<=num_days
        if B(days(d))==1 %WEEKDAYS
            X_WD(d_wd+((i-1)*num_WD),l)=Q(i,l); %X matrix creation
            if daily_variance==1 %Implementation daily variances as HDD!!!
                X_WD(d_wd+((i-1)*num_WD),19)=X_WD(d_wd+((i-1)*num_WD),19)*A((t(1)-1)/24+d,1);
            else
            end
            Y_WD(d_wd+((i-1)*num_WD),j)=M(i,k); %Y matrix creation
            d_wd=d_wd+1; %Next Weekday
        else %WEEKENDS
            X_WE(d_we+((i-1)*num_WE),l)=Q(i,l); %X matrix creation
            if daily_variance==1 %Implementation daily variances as HDD!!!
                X_WE(d_we+((i-1)*num_WE),19)=X_WE(d_we+((i-1)*num_WE),19)*A((t(1)-1)/24+d,1);
            else
            end
            Y_WE(d_we+((i-1)*num_WE),j)=M(i,k); %Y matrix creation
            d_we=d_we+1; %Nex Weekendday
        end
        k=k+24; %Nexts 24h
        d=d+1;  %Next Index Day
    end
    %Next Householder
    k=t(1):1:t(24);
    d=1;
    d_wd=1;
    d_we=1;
    i=i+1;
end
%%Creating different hours X matrices
for h=1:23
    X_WD(:,:,h+1)=X_WD(:,:,h);
    X_WE(:,:,h+1)=X_WE(:,:,h);
end
%%Restrict Appliances Night-Time
for j=appNight
    for h=2:5
        X_WD(:,j,h)=X_WD(:,j,h).*0;
        X_WE(:,j,h)=X_WE(:,j,h).*0;
    end
end
%%Removing 0-values from Y Matrices
Y_WD(find(Y_WD==0))=nan;
Y_WE(find(Y_WE==0))=nan;
```

```
    for h = 1:24
        [E_WD(h,:,it),SE_WD(h,:,it),PVAL_WD(h,:,it),INMODEL_WD(h,:,it),STATS_WD(h,:,it)]=
stepwisefit(X_WD(:,:,h),Y_WD(:,h));
        [E_WE(h,:,it),SE_WE(h,:,it),PVAL_WE(h,:,it),INMODEL_WE(h,:,it),STATS_WE(h,:,it)]=
stepwisefit(X_WE(:,:,h),Y_WE(:,h));
    end
    aux_WD=[STATS_WD.intercept];
    aux_WE=[STATS_WD.intercept];
    h=1:1:24;
    E0_WD(it,h)=aux_WD(1,h+24*(it-1)); % Constant Consumption WD
    E0_WE(it,h)=aux_WE(1,h+24*(it-1)); % Constant Consumption WE
    clear aux_WD
    clear aux_WE
    for h = 1:24
        kWhAPP_WD(h,:,it) = E_WD(h,:,it).*INMODEL_WD(h,:,it); %ONLY Coefficients IN model
        kWhAPP_WE(h,:,it) = E_WE(h,:,it).*INMODEL_WE(h,:,it); %ONLY Coefficients IN model
    end
    dum_WD = mean(X_WD); % ExplaVar Values WD
    dum_WE = mean(X_WE); % ExplaVar Values WE
    for i=1:1:size(X_WD,2)
        aux_dum_WD=X_WD(:,i,:);
        dum2_WD(1,i)=mean(aux_dum_WD(aux_dum_WD>0));
        aux_dum_WE=X_WE(:,i,:);
        dum2_WE(1,i)=mean(aux_dum_WE(aux_dum_WE>0));
    end
    for h=1:24
        for nAPP=1:1:length(meanAPP)
            kWhAPP_WD(h,meanAPP(nAPP),it) =
dum_WD(1,meanAPP(nAPP)).*kWhAPP_WD(h,meanAPP(nAPP),it);
            kWhAPP_WE(h,meanAPP(nAPP),it) =
dum_WE(1,meanAPP(nAPP)).*kWhAPP_WE(h,meanAPP(nAPP),it);
        end
    end
    if (meanAPP2(1)~=0)
        for h=1:24
            for nAPP=1:1:length(meanAPP2)
                kWhAPP_WD(h,meanAPP2(nAPP),it) =
dum2_WD(1,meanAPP2(nAPP)).*kWhAPP_WD(h,meanAPP2(nAPP),it);
                kWhAPP_WE(h,meanAPP2(nAPP),it) =
dum2_WE(1,meanAPP2(nAPP)).*kWhAPP_WE(h,meanAPP2(nAPP),it);
            end
        end
    else
    end
    dum_WD=0;
    dum_WE=0;
    it=it+1;
end
```

Plotting CDA Results

```
screen_size = get(0, 'ScreenSize');
colorWD='kkkkkkkkkkkkkkkkk';
colorWE='rrrrrrrrrrrrrrrr';
x=1:1:24;
it=1;

% Auxiliar variables for the 2x2 subplots
aux=floor(num_ExplaVar/4);
aux2=num_ExplaVar-aux*4;

for j=1:1:aux+1
    figure
    hold on
    grid on
    if j==aux+1;
        if aux2==0
            for it=1:1:numit
                plot(E0_WD(it,:),'-','Color','r','Linewidth',1.5);
                plot(E0_WE(it,:),'--','Color','r','Linewidth',1.5);
            end
            set(gca,'xtick',x);
            ylabel('Demand in kWh/h','FontSize',15);
            title(['Unexplained Consumption'],'FontSize',15);
        else
            for i=1:1:aux2
            subplot(2,2,i)
            hold on
            grid on
            for it=1:1:numit
                plot(kWhAPP_WD(:,i+aux*4,it),'-','Color',colorWD(it),'Linewidth',1.5);
                plot(kWhAPP_WE(:,i+aux*4,it),'--','Color',colorWE(it),'Linewidth',1.5);
            end
            set(gca,'xtick',x);
            title([app(i+aux*4,1)],'FontSize',15);
            ylabel('Demand in kWh/h','FontSize',15);
            end
            subplot(2,2,aux2+1)
            hold on
            grid on
            plot(E0_WD(1,:),'-','Color','r','Linewidth',1.5);
            plot(E0_WE(1,:),'--','Color','r','Linewidth',1.5);
            set(gca,'xtick',x);
            ylabel('Demand in kWh/h','FontSize',15);
            title(['Unexplained Consumption'],'FontSize',15);
        end
    else
        for i=1:1:4
            subplot(2,2,i)
            hold on
            grid on
            for it=1:1:numit
                plot(kWhAPP_WD(:,i+(j-1)*4,it),'-','Color',colorWD(it),'Linewidth',1.5);
                plot(kWhAPP_WE(:,i+(j-1)*4,it),'--','Color',colorWE(it),'Linewidth',1.5);
            end
            set(gca,'xtick',x);
```

```
            ylabel('Demand in kWh/h','FontSize',15);
            title([app(i+(j-1)*4,1)],'FontSize',15);
        end
    end
    f1 = figure(j);
    set(f1, 'Position', [0 0 screen_size(3) screen_size(4) ] );
    set(gcf,'PaperOrientation','landscape');
    set(gcf,'PaperUnits','normalized');
    set(gcf,'PaperPosition', [0 0 1 1]);
    print -dpdf
    pause(4)
end
```

Choosing the DR Analysis Approach

```
DR=input('Appliances to include in DR Analysis: ')
switch DR
    case 1 %approach one
        DRapp=[6 7 8 9 10];
        timespans=[1 2 3 4 5]; %%Timespans to present (5of6plots)
        scenario=1;
    case 2 %approach two
        DRapp=[1 2 3 4 6 7 8 9 10];
        scenario=2;
end
```

DR Initialization

```
%%Removing negative values

kWhAPP_WD(find(kWhAPP_WD<0))=0;
kWhAPP_WE(find(kWhAPP_WE<0))=0;

%%Changing units to Wh/h

kWhAPP_WD(:,:,:)=kWhAPP_WD(:,:,:).*1000;
kWhAPP_WE(:,:,:)=kWhAPP_WE(:,:,:).*1000;

%%Sorting appliances by Shifting time

for i=1:1:length(DRapp)
    DRaux(i,1)=cell2mat(app(DRapp(i),2));
end

% Sorting 'descend' or 'ascend'
[DRaux(:,2),DRaux(:,3)]=sort(DRaux(:,1),'descend');

for i=1:1:length(DRapp)
    DRtime(i,1)=DRapp(DRaux(i,3)); % Row1 = DR apps ref sorted
    DRtime(i,2)=DRaux(i,2); % Row2 = DR shifting potential sorted
end

%%Creating the DR Matrices

DR_kWhAPP_WD=kWhAPP_WD(:,DRtime(:,1));
DR_kWhAPP_WE=kWhAPP_WE(:,DRtime(:,1));
```

Plotting First Scenario Results

```
if scenario==1
    %%Plotting Results WD

    figure
    hold on
    grid on
    x=1:1:24;

    subplot(2,3,1)
    bar(DR_kWhAPP_WD,'stacked');
    ylabel('Demand in Wxh','FontSize',12);
    title(['DR Potential Appliances group on ',head,' Weekdays'],'FontSize',12);
    set(gca,'xtick',x);
    legend(app(DRapp,1),'Location','NorthWest');

    for i=1:1:length(timespans)
        subplot(2,3,i+1)
        bar(DR_kWhAPP_WD(:,find(DRtime(:,2)>=timespans(i))),'stacked');
        ylabel('Demand in Wxh','FontSize',12);
        title(['DR Potential  ',num2str(timespans(i)),' hour shifting',],'FontSize',12);
        set(gca,'xtick',x);
        legend(app(DRapp,1),'Location','NorthWest');
    end
    f1 = figure(aux4+aux+2);
    set(f1, 'Position', [0 0 screen_size(3) screen_size(4) ] );
    set(gcf,'PaperOrientation','landscape');
    set(gcf,'PaperUnits','normalized');
    set(gcf,'PaperPosition', [0 0 1 1]);
    print -dpdf
    pause(4)

    %%Ploting Results WE

    figure
    hold on
    grid on
    x=1:1:24;

    subplot(2,3,1)
    bar(DR_kWhAPP_WE,'stacked');
    ylabel('Demand in Wxh','FontSize',12);
    title(['DR Potential Appliances group on ',head,' Weekends'],'FontSize',12);
    set(gca,'xtick',x);
    legend(app(DRapp,1),'Location','NorthWest');

    for i=1:1:length(timespans)
        subplot(2,3,i+1)
        bar(DR_kWhAPP_WE(:,find(DRtime(:,2)>=timespans(i))),'stacked');
        ylabel('Demand in Wxh','FontSize',12);
        title(['DR Potential  ',num2str(timespans(i)),' hour shifting',],'FontSize',12);
        set(gca,'xtick',x);
        legend(app(DRapp,1),'Location','NorthWest');
    end
```

```
    f1 = figure(aux4+aux+3);
    set(f1, 'Position', [0 0 screen_size(3) screen_size(4) ] );
    set(gcf,'PaperOrientation','landscape');
    set(gcf,'PaperUnits','normalized');
    set(gcf,'PaperPosition', [0 0 1 1]);
    print -dpdf
```

Plotting Results Second Scenario

```
elseif scenario==2

    DR_CONS=zeros(2,24);
    DR_SEMC=zeros(2,24);
    DR_NONC=zeros(2,24);

    for i=1:1:length(DRapp)
        auxDR=cell2mat(app(DRtime(i,1),3));
        switch auxDR
            case 1  % Non-constrained loads
                DR_NONC(1,:)=DR_NONC(1,:)+kWhAPP_WD(:,DRtime(i,1))';
                DR_NONC(2,:)=DR_NONC(2,:)+kWhAPP_WE(:,DRtime(i,1))';
            case 0.5 % Semi-constrained loads
                DR_SEMC(1,:)=DR_SEMC(1,:)+kWhAPP_WD(:,DRtime(i,1))';
                DR_SEMC(2,:)=DR_SEMC(2,:)+kWhAPP_WE(:,DRtime(i,1))';
            case 0  % Constrained loads
                DR_CONS(1,:)=DR_CONS(1,:)+kWhAPP_WD(:,DRtime(i,1))';
                DR_CONS(2,:)=DR_CONS(2,:)+kWhAPP_WE(:,DRtime(i,1))';
        end
    end

    figure
    hold on
    grid on
    x=1:1:24;

    %WD Graphic
    subplot(2,1,1)
    Z_WD=cat(1,DR_NONC(1,:),DR_SEMC(1,:),DR_CONS(1,:));
    area(Z_WD');
    grid on
    ylabel('Demand in Wxh','FontSize',12);
    title(['DR Potential Appliances group on ',head,' WD'],'FontSize',12);
    set(gca,'xtick',x);
    legend('Non-Constrained Load','Semi-Constrained Load','Constrained
Load','Location','NorthWest');

    %WE Graphic
    subplot(2,1,2)
    Z_WE=cat(1,DR_NONC(2,:),DR_SEMC(2,:),DR_CONS(2,:));
    area(Z_WE');
    grid on
    ylabel('Demand in Wxh','FontSize',12);
    title(['DR Potential Appliances group on ',head,' WE'],'FontSize',12);
    set(gca,'xtick',x);
    legend('Non-Constrained Load','Semi-Constrained Load','Constrained
Load','Location','NorthWest');
```

```
    f1 = figure(aux+2);
    set(f1, 'Position', [0 0 screen_size(3) screen_size(4) ] );
    set(gcf,'PaperOrientation','landscape');
    set(gcf,'PaperUnits','normalized');
    set(gcf,'PaperPosition', [0 0 1 1]);
    print -dpdf

else
    display('No scenario selected')

end
```

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Appendix IV: Creating Explanatory Variable sets MATLAB Code

Program Initialization

```
clear all
load('Data_Dummy.mat')

% District Heating household 93 varialbes set
Q=Dummy_HH_Prim_District;
Q10=Dummy_10_Prim_District_v1; % Only Dummies

num_HH=size(Q,1); %number of HouseHolders
num_exp_var=16; %Number of explanatory variables
D=zeros(num_HH,num_exp_var); % Pre-allocating Explanatory variables Matrix

i=1:1:num_HH;
j=1;
```

Cold Appliances

```
D(i,j)=(Q10(i,44)); % #1 Xonlyref
j=j+1;
D(i,j)=(Q10(i,45)); % #2 Xref&frz
j=j+1;
D(i,j)=(Q10(i,46)); % #3 Xfrz
j=j+1;
D(i,j)=(Q10(i,47)); % #4 Xchest
j=j+1;
```

Electric Stove

```
D(i,j)=Q(i,68); % #5 XelecStove
j=j+1;
```

Washing Machine

```
D(i,j)=Q10(i,56); % #6 Xwashmach
j=j+1;
```

Drying Machines

```
D(i,j)=Q10(i,60); % #7 Xtumbledry
j=j+1;
D(i,j)=Q10(i,62); % #8 XdryerCab
j=j+1;
```

Dishwasher

```
D(i,j)=Q10(i,52); % #9 Xdishwash
j=j+1;
```

Sauna

```
D(i,j)=Q10(i,64); % #10 Xsauna
j=j+1;
```

Lighting

```
D(i,j)=Q(i,9); % 11 SQM Lighting
j=j+1;
```

TV

```
D(i,j)=Q10(i,73); % #14 Xtv_crt
j=j+1;
D(i,j)=Q10(i,74); % #15 Xtv_LCD
j=j+1;
```

PC

```
D(i,j)=Q10(i,70); % #16 Xpc_crt
j=j+1;
D(i,j)=Q10(i,71); % #17 Xpc_LCD
j=j+1;
D(i,j)=Q10(i,72); % #17 Xpc_portable
j=j+1;
```

Creating Output Matrix

```
EV_M1_V1=D; % Explanatory Variables Primary Model Version 1
```

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Appendix V: CDA Results

In the following pages are presented the CDA numerical results of Primary and Secondary Model versions. Each version results are presented for the different seasons and WD/WE models by the obtained coefficients and INMODEL tables.

Primary Model - Version 1	
Appliances Groups	Explanatory Variables
Cold Appliances	'Refrigerator'
	'Refrigerator&Freezer'
	'Freezer'
	'ChestFreezer'
Electric Stove	'electricstove'
Washing Machines	'washingMachine'
Drying Machines	'tumbleDryer'
	'dryingcabinet'
Dishwasher	'Dishwasher'
Sauna	'sauna'
Lighting	'SQM'
Television	'CRTtv'
	'LCDtv'
Computer	'ComputerCRT'
	'ComputerLCD'
	'ComputerPortable'

Secondary Model - Version 1	
Appliances Groups	Explanatory Variables
Cold Appliances	'Refrigerator'+'RefriAge10'
	'Refrigerator&Freezer'+'RefriFreezAge10'
	'Freezer'+'FreezerAge10'
	'ChestFreezer'+'ChestFreezerAge10'
Electric Stove	'electricstove'*'TotalResidents'
Washing Machines	'washingMachine'*'washingMachineMonth'
Drying Machines	'tumbleDryer'*'tumbleDryerMonth'
	'dryingcabinet'*'dryingcabinetMonth'
Dishwasher	'Dishwasher'*'Dishwasherweek'
Sauna	'sauna'*'saunaweek'
Lighting	'SQM'
Television	'numCRTtv'
	'numLCDtv'
Computer	'numComputerCRT'
	'numComputerLCD'
	'numComputerPortable'

Primary Model - Version 2	
Appliances Groups	Explanatory Variables
Cold Appliances	'Refrigerator'
	'Refrigerator&Freezer'
	'Freezer'
	'ChestFreezer'
Electric Stove	'electricstove'
Washing Machines	'washingMachine'
Drying Machines	'tumbleDryer'
	'dryingcabinet'
Dishwasher	'Dishwasher'
Sauna	'sauna'
Lighting	'Bulbs*'
Television	'CRTtv'
	'LCDtv'
Computer	'ComputerCRT'
	'ComputerLCD'
	'ComputerPortable'

Secondary Model - Version 2	
Appliances Groups	Explanatory Variables
Cold Appliances	'Refrigerator'+'RefriAge10'
	'Refrigerator&Freezer'+'RefriFreezAge10'
	'Freezer'+'FreezerAge10'
	'ChestFreezer'+'ChestFreezerAge10'
Electric Stove	'electricstove'*'TotalResidents'
Washing Machines	'washingMachine'*[1+'washingMachineMonth'/(30*24)]
Drying Machines	'tumbleDryer'*[1+'tumbleDryerMonth'/(30*24)]
	'dryingcabinet'*[1+'dryingcabinetMonth'/(30*24)]
Dishwasher	'Dishwasher'*'Dishwasherweek'/(7*24)
Sauna	'sauna'*'saunaweek'/(7*24)
Lighting	'SQM'
Television	'numCRTtv'
	'numLCDtv'
Computer	'numComputerCRT'
	'numComputerLCD'
	'numComputerPortable'

The Month-Season relation is presented in the following table, where is showed the months data included in each season model.

Seasons Model - Months Relation	
Season	Months Included
Autumn	September 2008 - November 2008
Winter	December 2008 - February 2009
Spring	April 2009 - May 2009
Summer	July 2008 - August 2008

Results from Primary Model Version 1 Autumn

INMODEL Primary Model Version 1																								
Autumn WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	1	0	1	0	0	1	0	0
'Refrigerator&Freezer'	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	1	1	1
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	1	0	0	0	1	0	1	1
'tumbleDryer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'dryingcabinet'	1	0	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	0	1	1	1	1	0	1
'Dishwasher'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	0	0	1	1	1	0	0	0	0	0	0	1	1	0	1	1	1	1	1	0
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerCRT'	1	1	1	1	1	1	0	0	1	0	0	1	1	1	1	1	1	1	0	0	0	0	1	1
'ComputerLCD'	1	1	1	1	0	0	1	0	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0	1
'ComputerPortable'	1	1	0	0	0	0	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	1	1	1

INMODEL Primary Model Version 1																								
Autumn WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
'Refrigerator&Freezer'	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	1
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	0	1	1	0	0
'ChestFreezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	1	0	1	1	1	1	1	0	0	0	0	0	1	1	0	0	0	1	1	1	0	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0
'LCDtv'	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0	1	1	1	1	1
'ComputerCRT'	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0	0	1	1	1
'ComputerLCD'	1	1	1	1	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	0	0	1	1	1	1	0	0	1	1	0	0	1	0	0	1	1	1	1	1	1

CDA Obtained Estimated Coefficients in KWh/h																								
Autumn WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0445	-0,0316	-0,0318	-0,0321	0,0000	0,0000	-0,0627	-0,0483	-0,0676	-0,0674	-0,0325	-0,0263	-0,0411	-0,0436	0,0000	0,0506	0,0446	0,0000	-0,0790	0,0000	0,0000	-0,0872	0,0000	0,0000
'Refrigerator&Freezer'	-0,0479	-0,0169	-0,0173	-0,0206	0,0000	0,0000	-0,0591	-0,0562	-0,0741	-0,0854	-0,0529	-0,0520	-0,0621	-0,0713	-0,0261	0,0000	0,0000	-0,0537	-0,1268	0,0000	0,0000	-0,0959	-0,0997	-0,0455
'Freezer'	0,0253	0,0527	0,0529	0,0552	0,0535	0,0346	0,0517	0,0558	0,0599	0,0414	0,0440	0,0239	0,0254	0,0447	0,0647	0,0355	0,0408	0,0381	0,0924	0,0901	0,0730	0,0465	0,0000	0,0000
'ChestFreezer'	0,0000	0,0396	0,0470	0,0520	0,0472	0,0241	0,0500	0,0493	0,0519	0,0546	0,0534	0,0459	0,0481	0,0598	0,0613	0,0421	0,0260	0,0000	0,0000	-0,0466	-0,0415	-0,0699	-0,1000	-0,0586
'electricstove'	0,1205	0,0000	0,0000	0,0000	0,0000	0,0859	0,0793	0,0251	0,0000	0,0000	0,0000	0,0000	0,0222	0,0000	0,0000	0,0291	0,0547	0,0785	0,0698	0,0911	0,0952	0,1217	0,1821	0,1616
'washingMachine'	0,0407	0,0000	0,0000	0,0000	0,0000	0,0274	0,0598	0,0607	0,0346	0,0268	0,0000	0,0000	0,0000	0,0000	0,0000	0,0377	0,0534	0,0000	0,0000	0,0000	-0,0622	0,0000	0,0718	0,0858
'tumbleDryer'	0,0491	0,0000	0,0000	0,0000	0,0000	0,0786	0,1364	0,1748	0,1558	0,0908	0,0779	0,0897	0,0691	0,0856	0,0951	0,1307	0,1577	0,2716	0,4068	0,4250	0,3222	0,1368	0,0000	0,0270
'dryingcabinet'	-0,0217	0,0000	0,0000	0,0000	0,0000	-0,0477	-0,0725	-0,0508	0,0280	0,0692	0,0000	0,0000	0,0000	-0,0247	-0,0468	-0,0699	-0,0748	0,0000	0,0814	0,0800	0,1837	0,1719	0,0000	-0,0430
'Dishwasher'	0,0192	0,0000	0,0000	0,0000	0,0000	0,0453	0,0365	0,0296	0,0661	0,0952	0,1024	0,1045	0,0953	0,0841	0,0683	0,0694	0,1001	0,1370	0,1454	0,0873	0,0815	0,0656	0,0541	0,0000
'sauna'	-0,1475	0,0000	0,0000	0,0000	0,0000	-0,1133	-0,1249	-0,1136	-0,1169	-0,1089	-0,0938	-0,0985	-0,1118	-0,0921	-0,0850	-0,0786	-0,0765	-0,0501	0,0410	0,1357	0,1088	-0,0506	-0,1870	-0,1937
'SQM'	0,1763	0,1677	0,1687	0,1649	0,1731	0,1743	0,2163	0,2536	0,2297	0,2033	0,2223	0,2096	0,1985	0,1918	0,1942	0,2427	0,3308	0,3185	0,3238	0,4437	0,5604	0,4895	0,3506	0,2365
'CRTtv'	-0,0277	-0,0237	-0,0234	-0,0175	0,0000	0,0000	0,0219	0,0207	0,0190	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0256	-0,0303	0,0000	0,0693	0,1049	0,1322	0,0509	0,0288	0,0000
'LCDtv'	0,0363	0,0404	0,0345	0,0330	0,0488	0,0388	0,0420	0,0406	0,0628	0,0369	0,0422	0,0279	0,0237	0,0292	0,0484	0,0322	0,0412	0,0288	0,0915	0,0530	0,0945	0,0953	0,1151	0,0567
'ComputerCRT'	0,0659	0,0447	0,0399	0,0349	0,0297	0,0251	0,0000	0,0000	0,0193	0,0000	0,0000	0,0205	0,0478	0,0202	0,0294	0,0305	0,0352	0,0615	0,0000	0,0000	0,0000	0,0000	0,0294	0,0599
'ComputerLCD'	0,0172	0,0247	0,0146	0,0126	0,0000	0,0000	0,0128	0,0000	-0,0145	-0,0178	-0,0197	0,0000	0,0000	0,0000	0,0000	0,0183	0,0356	0,0909	0,1323	0,1937	0,2037	0,1265	0,0000	0,0183
'ComputerPortable'	0,0277	0,0117	0,0000	0,0000	0,0000	0,0000	-0,0123	-0,0144	-0,0310	-0,0408	-0,0281	-0,0187	0,0000	-0,0143	0,0000	0,0323	0,0000	0,0442	0,1080	0,2059	0,1785	0,1468	0,0648	0,0393

CDA Obtained Estimated Coefficients in KWh/h																								
Autumn WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0,0000	0,0000	0,0000	-0,0229	0,0000	-0,0485	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0681	0,0535	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0597	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0803	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0530	0,0000	-0,0499	-0,0286
'Freezer'	0,0259	0,0393	0,0416	0,0545	0,0540	0,0391	0,0307	0,0338	0,0493	0,0654	0,0634	0,0480	0,0384	0,0000	0,0321	0,0000	0,0522	0,0866	0,0657	0,0000	0,0555	0,0621	0,0000	0,0000
'ChestFreezer'	-0,0196	0,0271	0,0454	0,0517	0,0508	0,0210	0,0282	0,0237	0,0312	0,0411	0,0479	0,0362	0,0452	0,0355	0,0000	0,0000	0,0000	0,0000	-0,0948	-0,1327	-0,0533	0,0000	-0,0984	-0,0745
'electricstove'	0,1141	0,0000	0,0000	0,0000	0,0000	0,0768	0,0505	0,0350	0,0342	0,0000	0,0000	0,0000	0,0556	0,0786	0,0639	0,0000	0,0000	0,0000	0,0933	0,1238	0,1627	0,1479	0,1832	0,1592
'washingMachine'	0,0502	0,0000	0,0000	0,0000	0,0000	0,0000	0,0253	0,0521	0,0403	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0950	0,0908	0,1541	0,1306	0,0000	0,0000	0,0000	0,0000	0,0705
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0596	0,0919	0,1709	0,3058	0,3084	0,2584	0,2089	0,2397	0,2709	0,2338	0,2091	0,1139	0,2263	0,5026	0,3897	0,2544	0,1743	0,0000	0,0000
'dryingcabinet'	-0,0655	-0,0508	-0,0412	0,0000	-0,0305	-0,0490	-0,0594	-0,0670	-0,0551	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0921	-0,1163	0,0000	0,0000	0,0000	0,1203	0,2796	0,1621	0,0000	-0,0538
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0619	0,0420	0,0535	0,0857	0,1020	0,1033	0,1229	0,1253	0,1196	0,1146	0,1025	0,1356	0,1131	0,0000	0,1126	0,1038	0,0000	0,0882	0,0000
'sauna'	-0,1434	0,0000	0,0000	0,0000	0,0000	-0,1164	-0,1107	-0,1070	-0,1050	-0,1072	-0,1015	-0,1144	-0,0992	-0,0836	-0,1071	-0,0626	0,0000	0,1118	0,2267	0,2142	0,0804	0,0000	-0,1416	-0,1893
'SQM'	0,2330	0,1992	0,1703	0,1614	0,1680	0,1719	0,1821	0,1827	0,1943	0,2468	0,2851	0,2889	0,2617	0,2841	0,2550	0,2961	0,3429	0,3450	0,5121	0,6029	0,4920	0,4735	0,4098	0,2975
'CRTtv'	-0,0190	-0,0187	-0,0159	0,0000	0,0000	0,0000	0,0000	0,0277	0,0241	0,0000	0,0000	0,0000	0,0000	0,0000	0,0645	0,0000	0,0000	0,0000	0,2068	0,2139	0,0877	0,0000	0,0000	0,0000
'LCDtv'	0,0378	0,0435	0,0427	0,0472	0,0497	0,0361	0,0265	0,0373	0,0337	0,0000	0,0000	0,0000	0,0000	0,0000	0,0664	0,0413	0,0657	0,0000	0,1575	0,1620	0,0932	0,0432	0,0802	0,0531
'ComputerCRT'	0,0629	0,0447	0,0335	0,0329	0,0302	0,0217	0,0246	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0485	0,1026	0,0884	0,1156	0,1542	0,0000	0,0000	0,0407	0,0813	0,0836
'ComputerLCD'	0,0409	0,0365	0,0217	0,0157	0,0000	-0,0329	0,0000	0,0000	0,0000	0,0000	0,0739	0,0980	0,0826	0,0660	0,0498	0,0494	0,0523	0,0757	0,1065	0,1769	0,1334	0,1104	0,0313	0,0355
'ComputerPortable'	0,0449	0,0239	0,0132	0,0000	0,0000	-0,0164	-0,0366	-0,0496	-0,0317	0,0000	0,0000	0,0241	0,0361	0,0000	0,0000	0,0451	0,0000	0,0000	0,1640	0,2353	0,1776	0,1316	0,1019	0,0698

Results from Primary Model Version 1 Winter

INMODEL Primary Model Version 1																								
Winter WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	0	0	0	0	1	1	1	1	1	0	0	1	1	0	0	0	1	1	0	1	0	0	0
'Refrigerator&Freezer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	0	1	1
'Freezer'	0	1	1	1	1	0	1	1	1	0	0	0	0	0	1	0	0	0	1	1	0	0	1	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	0	0	0	0	1	1	0	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1
'tumbleDryer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'dryingcabinet'	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	0	0	1	1	0	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1
'LCDtv'	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	1	1	1	1	1	0	0	0
'ComputerCRT'	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	1	1	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1

INMODEL Primary Model Version 1																								
Winter WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	0	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0
'Refrigerator&Freezer'	1	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	1
'Freezer'	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0
'ChestFreezer'	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	0	0	1	1
'tumbleDryer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	1
'Dishwasher'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	1
'LCDtv'	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	0	0	1	1	0	0
'ComputerCRT'	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	1	1	1
'ComputerLCD'	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	0	0	1	0	0	0	1	0	1	0	1	0	1	1	1	1	1	1	1

CDA Obtained Estimated Coefficients in KWh/h																								
Winter WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0561	0,0000	0,0000	0,0000	0,0000	-0,0371	-0,0766	-0,0769	-0,0765	-0,0880	0,0000	0,0000	-0,0445	-0,0671	0,0000	0,0000	0,0000	-0,0582	-0,1324	0,0000	-0,1411	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	-0,0656	0,0000	0,0000	0,0000	0,0000	-0,0545	-0,0679	-0,0602	-0,0922	-0,1310	-0,0312	-0,0233	-0,0599	-0,0904	0,0000	0,0000	-0,0424	-0,0806	-0,0851	0,0000	-0,1191	0,0000	-0,0834	-0,0483
'Freezer'	0,0000	0,0165	0,0158	0,0237	0,0314	0,0000	0,0376	0,0456	0,0370	0,0000	0,0000	0,0000	0,0000	0,0000	0,0211	0,0000	0,0000	0,0000	0,0592	0,0434	0,0000	0,0000	-0,0562	-0,0387
'ChestFreezer'	0,0000	0,0349	0,0449	0,0575	0,0649	0,0348	0,0487	0,0606	0,0696	0,0594	0,0602	0,0513	0,0501	0,0500	0,0373	0,0000	0,0000	-0,0320	-0,0447	-0,0927	-0,0973	-0,0915	-0,1129	-0,0850
'electricstove'	0,1479	0,0000	0,0000	0,0000	0,0000	0,1256	0,1337	0,0621	0,0000	0,0000	0,0000	0,0000	0,0417	0,0320	0,0000	0,0583	0,0940	0,1194	0,1243	0,1854	0,2206	0,2115	0,2188	0,1986
'washingMachine'	0,0687	0,0000	0,0000	0,0000	0,0000	0,0475	0,0833	0,0977	0,0957	0,0811	0,0455	0,0287	0,0290	0,0404	0,0514	0,0690	0,0930	0,0852	0,0750	0,0000	0,0000	0,0524	0,1102	0,1073
'tumbleDryer'	0,0755	0,0000	0,0000	0,0000	0,0000	0,1418	0,1735	0,2122	0,1479	0,1173	0,1109	0,1249	0,1013	0,1065	0,0949	0,1496	0,1515	0,2293	0,3699	0,4308	0,2862	0,1299	0,0000	0,0422
'dryingcabinet'	-0,0760	-0,0750	-0,0639	-0,0492	-0,0658	-0,0917	-0,1089	-0,1203	-0,0547	0,0000	0,0000	0,0000	-0,0502	-0,0450	-0,0695	-0,0945	-0,1253	-0,0788	0,0000	0,0000	0,1042	0,1154	0,0000	-0,0978
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0679	0,0678	0,0660	0,0964	0,1208	0,1328	0,1488	0,1344	0,1074	0,1074	0,1337	0,1586	0,1757	0,1978	0,1618	0,1592	0,0976	0,0529	0,0000
'sauna'	-0,2024	0,0000	0,0000	0,0000	0,0000	-0,1650	-0,2188	-0,2192	-0,1993	-0,1887	-0,1794	-0,1850	-0,1887	-0,1762	-0,1571	-0,1619	-0,1690	-0,1306	-0,0387	0,0585	0,0000	-0,1278	-0,2483	-0,2567
'SQM'	0,2796	0,2448	0,2422	0,2358	0,2413	0,2242	0,2802	0,3497	0,3406	0,3169	0,3116	0,2987	0,3113	0,2993	0,3017	0,3456	0,3976	0,4259	0,4286	0,4816	0,5876	0,5553	0,4575	0,3638
'CRTtv'	-0,0862	-0,0867	-0,0852	-0,0740	-0,0666	-0,0354	-0,0156	-0,0249	-0,0204	-0,0448	-0,0456	-0,0417	-0,0415	-0,0405	-0,0411	-0,0745	-0,0679	-0,0417	0,0000	0,1048	0,1180	0,0000	-0,0746	-0,0680
'LCDtv'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0232	0,0000	0,0000	0,0000	0,0000	0,0306	0,0438	0,0000	0,0361	0,0303	0,0743	0,0510	0,0728	0,0000	0,0000	0,0000
'ComputerCRT'	0,1048	0,0804	0,0724	0,0586	0,0557	0,0424	0,0296	0,0206	0,0404	0,0000	0,0000	0,0000	0,0000	0,0220	0,0245	0,0352	0,0566	0,1112	0,0577	0,0000	0,0729	0,0602	0,0993	0,1083
'ComputerLCD'	0,0596	0,0801	0,0666	0,0572	0,0619	0,0401	0,0455	0,0206	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0465	0,0539	0,1347	0,1725	0,2589	0,2562	0,1502	0,0534	0,0641
'ComputerPortable'	0,0492	0,0297	0,0236	0,0206	0,0240	0,0000	0,0000	0,0000	0,0000	-0,0253	0,0000	0,0000	0,0000	0,0000	0,0000	0,0508	0,0725	0,1108	0,1884	0,2585	0,2126	0,1724	0,1397	0,0828

CDA Obtained Estimated Coefficients in KWh/h																								
Winter WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0517	0,0000	0,0000	0,0000	0,0000	0,0000	-0,1046	0,0000	-0,0640	-0,1029	-0,1119	-0,0714	-0,1001	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0688	0,0000
'Refrigerator&Freezer'	-0,0709	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0971	0,0000	-0,0815	-0,1503	-0,1402	-0,1205	-0,1137	-0,0350	-0,0545	0,0000	-0,0642	0,0000	0,0000	0,0000	0,0000	0,0000	-0,1024	-0,0414
'Freezer'	0,0000	0,0000	0,0000	0,0000	0,0240	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0687	0,0466	0,0761	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'ChestFreezer'	-0,0282	0,0237	0,0454	0,0515	0,0703	0,0373	0,0000	0,0379	0,0357	0,0505	0,0437	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0886	-0,0796	-0,0612	-0,0719	-0,0719
'electricstove'	0,1602	0,0000	0,0000	0,0000	0,0000	0,1145	0,1026	0,0950	0,1127	0,0872	0,0897	0,1303	0,1320	0,1217	0,0922	0,0000	0,0935	0,1248	0,1486	0,2214	0,2344	0,2307	0,2268	0,1975
'washingMachine'	0,0868	0,0000	0,0000	0,0000	0,0000	0,0423	0,0610	0,0881	0,1138	0,1076	0,0664	0,0650	0,0000	0,0000	0,0721	0,0979	0,1561	0,1630	0,1017	0,0000	0,0000	0,0000	0,0722	0,1096
'tumbleDryer'	0,0496	0,0000	0,0000	0,0000	0,0000	0,0809	0,1013	0,1576	0,2515	0,3030	0,2596	0,2515	0,1967	0,2069	0,1979	0,1563	0,1496	0,2541	0,5077	0,3513	0,2275	0,1359	0,0000	0,0000
'dryingcabinet'	-0,1023	-0,0891	-0,0721	-0,0596	-0,0553	-0,0714	-0,0805	-0,0974	-0,0732	-0,0757	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,2047	0,1519	0,2451	0,1733	0,0000	-0,1029
'Dishwasher'	0,0285	0,0000	0,0000	0,0000	0,0000	0,0628	0,0770	0,0784	0,1056	0,1433	0,1843	0,1832	0,1830	0,1708	0,1865	0,1829	0,2065	0,2279	0,2063	0,2582	0,1882	0,1053	0,0850	0,0000
'sauna'	-0,2337	0,0000	0,0000	0,0000	0,0000	-0,1829	-0,2034	-0,1981	-0,2220	-0,2356	-0,2092	-0,2053	-0,2007	-0,1836	-0,1667	-0,1250	-0,1121	0,0000	0,1039	0,1010	0,0000	-0,1278	-0,2029	-0,2661
'SQM'	0,2939	0,2867	0,2636	0,2548	0,2444	0,2226	0,2108	0,2348	0,2869	0,3395	0,3518	0,3709	0,4051	0,3714	0,3129	0,3341	0,4000	0,4077	0,5011	0,5610	0,5557	0,5237	0,4440	0,3827
'CRTtv'	-0,0807	-0,0935	-0,0955	-0,0786	-0,0711	-0,0533	-0,0546	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0653	0,0000	0,0000	0,1223	0,1009	0,0000	-0,0808	-0,0716
'LCDtv'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0456	0,0653	0,0721	0,0479	0,0000	0,0509	0,0490	0,0518	0,0713	0,0529	0,0726	0,0000	0,0000	0,0642	0,0413	0,0000	0,0000
'ComputerCRT'	0,1112	0,1061	0,0874	0,0766	0,0680	0,0517	0,0609	0,0294	0,0495	0,0000	0,0000	0,0000	0,0000	0,0424	0,0408	0,1029	0,1551	0,1780	0,1380	0,0000	0,0000	0,0666	0,1085	0,1359
'ComputerLCD'	0,0614	0,0895	0,0783	0,0595	0,0422	0,0000	0,0000	0,0000	0,0000	0,0000	0,0718	0,0894	0,0762	0,0598	0,0497	0,0750	0,0706	0,0802	0,0894	0,2243	0,1843	0,0973	0,0527	0,0617
'ComputerPortable'	0,0657	0,0485	0,0300	0,0300	0,0291	0,0000	0,0000	-0,0210	0,0000	0,0000	0,0000	0,0296	0,0000	0,0369	0,0000	0,0438	0,0000	0,0826	0,2272	0,2303	0,1967	0,1797	0,1559	0,0945

Results from Primary Model Version 1 Spring

INMODEL Primary Model Version 1																								
Spring WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
'Refrigerator&Freezer'	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	0	1	0	0	0	1	0
'ChestFreezer'	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	1	1	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	1	1
'tumbleDryer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	0	0	0	0	0	1	1	1	0	0	0	0	1	1	1	1	1	0	0	1	1	1	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	1	0	1	1	1	1	0	0
'LCDtv'	1	1	1	1	1	0	1	1	1	1	1	0	0	1	0	0	1	1	1	0	1	1	1	1
'ComputerCRT'	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	0	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	0	0	0	0	0	1	1	0	0	0	1	1	1	1	1	1	1	1	1

INMODEL Primary Model Version 1																								
Spring WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
'Refrigerator&Freezer'	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
'Freezer'	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0
'ChestFreezer'	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	1	0	0	0	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	0	0	1	1	0	0	0	0	0	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0	1	0	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
'dryingcabinet'	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	0	1	1	0	1	1	0	0	0	1	1	0	1	1	1	1	0	0	0	0	1	1	0	0
'LCDtv'	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1
'ComputerCRT'	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	1
'ComputerLCD'	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1

CDA Obtained Estimated Coefficients in KWh/h																								
Spring WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0339	-0,0543	-0,0432	-0,0350	-0,0287	-0,0733	-0,0814	-0,0865	-0,0821	-0,0574	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,1355	0,0000	0,0000	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0564	-0,0523	-0,0711	-0,0726	-0,0656	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0801	0,0000	0,0000	0,0000	-0,0498	0,0000
'Freezer'	0,0223	0,0413	0,0433	0,0493	0,0490	0,0331	0,0651	0,0563	0,0473	0,0220	0,0342	0,0000	0,0000	0,0000	0,0256	0,0266	0,0304	0,0000	0,0752	0,0000	0,0000	0,0000	-0,0278	0,0000
'ChestFreezer'	-0,0216	0,0181	0,0320	0,0400	0,0442	0,0329	0,0507	0,0288	0,0299	0,0320	0,0513	0,0000	0,0000	0,0306	0,0284	0,0000	0,0000	-0,0459	-0,0593	-0,1139	-0,1208	-0,1108	-0,1061	-0,0856
'electricstove'	0,0974	0,0000	0,0000	0,0000	0,0000	0,0567	0,0573	0,0259	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0355	0,0575	0,0863	0,1321	0,1326	0,0852	0,1556	0,1384
'washingMachine'	0,0291	0,0000	0,0000	0,0000	0,0000	0,0237	0,0281	0,0351	0,0384	0,0291	0,0252	0,0316	0,0000	0,0319	0,0480	0,0550	0,0653	0,0735	0,0000	0,0000	0,0000	0,0000	0,0475	0,0604
'tumbleDryer'	0,0218	0,0000	0,0000	0,0000	0,0000	0,0748	0,0945	0,1225	0,0789	0,0826	0,0662	0,0893	0,0706	0,0689	0,0722	0,1069	0,0935	0,1640	0,2573	0,3533	0,2643	0,0871	0,0000	0,0000
'dryingcabinet'	-0,0458	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0495	-0,0414	0,0275	0,0000	0,0000	0,0000	0,0000	-0,0295	-0,0521	-0,0815	-0,0908	-0,0621	0,0000	0,0000	0,1223	0,1594	0,0633	-0,0489
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0477	0,0447	0,0604	0,0732	0,0734	0,0785	0,0837	0,0823	0,0604	0,0514	0,0774	0,0898	0,1140	0,1288	0,1330	0,1203	0,0705	0,0000	-0,0309
'sauna'	-0,1216	0,0000	0,0000	0,0000	0,0000	-0,1071	-0,1096	-0,1198	-0,1004	-0,0877	-0,0703	-0,0880	-0,0856	-0,0750	-0,0621	-0,0760	-0,0616	-0,0621	0,0365	0,1233	0,1157	0,0000	-0,1390	-0,1544
'SQM'	0,2124	0,1763	0,1536	0,1519	0,1547	0,1381	0,1650	0,2065	0,1894	0,1835	0,1883	0,2024	0,2015	0,1873	0,2049	0,2151	0,2551	0,2110	0,2253	0,3140	0,4286	0,4313	0,4016	0,3250
'CRTtv'	-0,0266	-0,0346	-0,0201	-0,0180	-0,0215	-0,0215	0,0000	0,0000	0,0257	0,0208	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0340	0,0000	0,0518	0,0710	0,1221	0,0514	0,0000	0,0000
'LCDtv'	0,0291	0,0202	0,0216	0,0187	0,0167	0,0000	0,0260	0,0215	0,0278	0,0286	0,0228	0,0000	0,0000	0,0147	0,0000	0,0000	0,0296	0,0301	0,1004	0,0000	0,0820	0,0839	0,0672	0,0354
'ComputerCRT'	0,0680	0,0468	0,0306	0,0247	0,0260	0,0194	0,0176	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0241	0,0000	0,0258	0,0402	0,0695	0,0458	0,0000	0,0000	0,0000	0,0949	0,0791
'ComputerLCD'	0,0574	0,0621	0,0493	0,0358	0,0323	0,0141	0,0216	0,0000	-0,0184	0,0000	-0,0166	0,0000	0,0000	0,0227	0,0208	0,0388	0,0484	0,0827	0,1150	0,1885	0,2011	0,1480	0,0694	0,0575
'ComputerPortable'	0,0510	0,0290	0,0171	0,0176	0,0202	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0211	-0,0135	0,0000	0,0000	0,0000	0,0235	0,0286	0,0439	0,1068	0,1993	0,2176	0,1287	0,1179	0,0806

CDA Obtained Estimated Coefficients in KWh/h																								
Spring WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0255	-0,0484	-0,0415	-0,0403	-0,0379	-0,0791	-0,1013	-0,0867	0,0000	-0,0990	0,0000	0,0000	-0,0297	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0576	-0,0656	-0,0710	0,0000	-0,0743	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Freezer'	0,0000	0,0276	0,0341	0,0382	0,0391	0,0297	0,0498	0,0343	0,0263	0,0347	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0560	0,0544	0,0633	0,0000	0,0000	0,0000	0,0000	0,0000
'ChestFreezer'	-0,0285	0,0224	0,0340	0,0360	0,0357	0,0205	0,0309	0,0000	0,0000	0,0000	0,0000	-0,0353	0,0000	0,0000	0,0000	-0,0435	0,0000	0,0000	0,0000	-0,1007	-0,1613	-0,1162	-0,0891	-0,0703
'electricstove'	0,1069	0,0000	0,0000	0,0000	0,0000	0,0631	0,0434	0,0316	0,0363	0,0000	0,0000	0,0573	0,0705	0,0000	0,0000	0,0000	0,0000	0,0000	0,0915	0,1449	0,1611	0,1504	0,1612	0,1376
'washingMachine'	0,0628	0,0000	0,0000	0,0000	0,0000	0,0268	0,0299	0,0412	0,0546	0,0000	0,0404	0,0543	0,0508	0,0420	0,0743	0,0837	0,0975	0,1179	0,0000	0,0000	0,0000	0,0737	0,0000	0,0567
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0587	0,0522	0,1252	0,1782	0,1894	0,1602	0,1211	0,0843	0,1079	0,1366	0,0972	0,0789	0,1336	0,2889	0,2791	0,1850	0,0000	0,0000	0,0000
'dryingcabinet'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0390	-0,0457	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0727	-0,0742	0,0000	0,0000	0,0000	0,0000	0,0000	0,1375	0,0000	0,0000
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0329	0,0342	0,0593	0,0836	0,1016	0,0959	0,0972	0,0662	0,0714	0,0746	0,0870	0,0853	0,1104	0,1477	0,1477	0,0858	0,0000	0,0523	0,0000
'sauna'	-0,1343	0,0000	0,0000	0,0000	0,0000	-0,1184	-0,1196	-0,1311	-0,1196	-0,1024	-0,0956	-0,0931	-0,1064	-0,0846	-0,0655	-0,0488	0,0000	0,0598	0,1868	0,2051	0,0966	0,0000	-0,1018	-0,1526
'SQM'	0,2007	0,1847	0,1650	0,1607	0,1729	0,1463	0,1477	0,1743	0,1664	0,2066	0,2289	0,2685	0,2536	0,2265	0,1907	0,2127	0,2127	0,2256	0,3025	0,4207	0,4718	0,4451	0,3713	0,2773
'CRTtv'	0,0000	-0,0244	-0,0170	0,0000	-0,0167	-0,0254	0,0000	0,0000	0,0000	0,0353	0,0251	0,0000	0,0715	0,0540	0,0771	0,0481	0,0000	0,0000	0,0000	0,0000	0,1143	0,1009	0,0000	0,0000
'LCDtv'	0,0474	0,0322	0,0269	0,0328	0,0160	0,0000	0,0171	0,0188	0,0288	0,0415	0,0000	0,0000	0,0633	0,0448	0,0915	0,0916	0,0802	0,0000	0,0945	0,0000	0,1199	0,1203	0,0728	0,0513
'ComputerCRT'	0,0559	0,0493	0,0286	0,0183	0,0000	0,0185	0,0198	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0400	0,0785	0,1188	0,1070	0,0000	0,0000	0,0000	0,0642	0,0590
'ComputerLCD'	0,0720	0,0752	0,0520	0,0406	0,0216	0,0000	0,0000	0,0000	0,0000	0,0515	0,0602	0,0667	0,0893	0,0812	0,0695	0,0499	0,0538	0,0555	0,1269	0,1741	0,1891	0,1423	0,0580	0,0702
'ComputerPortable'	0,0399	0,0251	0,0173	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0255	0,0289	0,0419	0,0373	0,0000	0,0000	0,0000	0,0000	0,0590	0,1659	0,2247	0,1924	0,1297	0,1052	0,0521

Results from Primary Model Version 1 Summer

INNMODEL Primary Model Version 1

Summer WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
'Refrigerator&Freezer'	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1
'Freezer'	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	1	1	0	1	1	0
'ChestFreezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	1
'electricstove'	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	0	0	0	0	1	1	1	0	0	0	0	0	1	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	0	0	1	0	0	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	0	1	1	0	0	0	1	1	1	0	1	0	0	1	1	0	0	0	0	1	1	1	1	0
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
'ComputerCRT'	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	1	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	0	1	0	0	1	1	0	0	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	0	1	0	0	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1	1	1	1

INNMODEL Primary Model Version 1

Summer WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0	0	1	1	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
'Refrigerator&Freezer'	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0
'Freezer'	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0
'ChestFreezer'	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	1	0	0	0	1	1	0	0	0	1	1	1	0	0	1	0	0	0	0	1	1	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	0	1	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	1	1	1	0	0	0
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	1	0	0	0
'ComputerCRT'	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
'ComputerLCD'	1	1	1	1	1	0	0	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1
'ComputerPortable'	1	1	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

CDA Obtained Estimated Coefficients in KWh/h

Summer WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0,0000	-0,0189	-0,0195	-0,0187	-0,0291	-0,0168	-0,0550	-0,0476	-0,0702	-0,0677	-0,0738	-0,0483	-0,0506	-0,0538	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	-0,0250	-0,0233	-0,0555	-0,0731	-0,0886	-0,0886	-0,0831	-0,0700	-0,0724	-0,0832	-0,0213	-0,0529	-0,0324	-0,0507	0,0000	0,0000	0,0000	0,0000	-0,0825	-0,0240
'Freezer'	0,0000	0,0165	0,0182	0,0241	0,0206	0,0121	0,0377	0,0346	0,0317	0,0279	0,0368	0,0163	0,0000	0,0000	0,0000	0,0000	0,0381	0,0000	0,0835	0,0620	0,0000	0,0478	-0,0356	0,0000
'ChestFreezer'	-0,0289	0,0128	0,0194	0,0225	0,0230	0,0143	0,0368	0,0301	0,0495	0,0395	0,0565	0,0293	0,0165	0,0381	0,0383	0,0266	0,0211	0,0000	0,0000	0,0000	-0,0603	0,0000	-0,0899	-0,0446
'electricstove'	0,0688	0,0000	0,0000	0,0000	0,0000	0,0427	0,0155	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0488	0,0000	0,0571	0,1235	0,1060	0,1781	0,1373
'washingMachine'	0,0359	0,0000	0,0000	0,0000	0,0000	0,0251	0,0360	0,0404	0,0339	0,0239	0,0000	0,0000	0,0000	0,0000	0,0388	0,0686	0,0600	0,0000	0,0000	0,0000	0,0000	0,0000	0,0518	0,0684
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0583	0,1156	0,1219	0,1095	0,0764	0,0462	0,0636	0,0571	0,0814	0,0936	0,1145	0,1108	0,1481	0,2617	0,3457	0,2960	0,1332	0,0000	0,0000
'dryingcabinet'	-0,0651	-0,0500	-0,0393	-0,0260	-0,0194	-0,0425	-0,0803	-0,0599	0,0000	0,0000	0,0000	0,0000	-0,0498	-0,0441	-0,0558	-0,0803	-0,0914	-0,0669	0,0000	0,0000	0,0799	0,0000	0,0000	-0,0465
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0276	0,0257	0,0320	0,0457	0,0700	0,0784	0,0785	0,0750	0,0519	0,0497	0,0561	0,0823	0,1036	0,1105	0,0788	0,1202	0,0375	0,0000	-0,0452
'sauna'	-0,0964	0,0000	0,0000	0,0000	0,0000	-0,0647	-0,0642	-0,0637	-0,0666	-0,0650	-0,0656	-0,0659	-0,0643	-0,0562	-0,0657	-0,0487	-0,0474	-0,0251	0,0450	0,1592	0,1453	0,0564	-0,1190	-0,1388
'SQM'	0,1944	0,1629	0,1602	0,1414	0,1413	0,1363	0,1558	0,1830	0,1878	0,2140	0,2320	0,2660	0,2653	0,2346	0,2200	0,2191	0,2770	0,2424	0,2452	0,2752	0,3837	0,3964	0,3530	0,2543
'CRTtv'	0,0000	-0,0150	-0,0114	0,0000	0,0000	0,0000	0,0185	0,0124	0,0245	0,0000	0,0243	0,0000	0,0000	0,0256	0,0345	0,0000	0,0000	0,0000	0,0000	0,0899	0,0952	0,0625	0,0300	0,0000
'LCDtv'	0,0380	0,0282	0,0273	0,0305	0,0277	0,0289	0,0467	0,0450	0,0541	0,0310	0,0508	0,0195	0,0175	0,0332	0,0562	0,0401	0,0510	0,0262	0,0000	0,0588	0,0537	0,0569	0,0693	0,0336
'ComputerCRT'	0,0426	0,0216	0,0184	0,0131	0,0092	0,0000	0,0000	0,0000	0,0000	-0,0160	-0,0183	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0438	0,0000	-0,0446	0,0000	0,0384	0,0298
'ComputerLCD'	0,0436	0,0483	0,0349	0,0302	0,0186	0,0132	0,0146	0,0000	-0,0266	0,0000	0,0000	0,0238	0,0181	0,0000	0,0000	0,0264	0,0430	0,1028	0,0792	0,1279	0,2058	0,1603	0,0710	0,0585
'ComputerPortable'	0,0201	0,0127	0,0000	0,0087	0,0000	0,0000	-0,0141	-0,0242	-0,0373	-0,0379	-0,0364	-0,0193	-0,0223	-0,0183	0,0000	0,0000	-0,0211	-0,0293	0,0000	0,0616	0,1174	0,0975	0,0702	0,0331

CDA Obtained Estimated Coefficients in KWh/h

Summer WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0,0000	0,0000	-0,0159	-0,0155	-0,0320	-0,0402	-0,0653	0,0000	-0,0520	0,0000	0,0000	-0,0291	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	-0,0211	-0,0521	-0,0682	-0,0403	-0,0796	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0691	0,0000	0,0000	0,0000	-0,0513	-0,0420	0,0000
'Freezer'	0,0000	0,0000	0,0231	0,0255	0,0287	0,0000	0,0234	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0556	0,0563	0,0878	0,0000	0,0000	0,0000	0,0000	0,0000
'ChestFreezer'	-0,0182	0,0000	0,0242	0,0285	0,0252	0,0000	0,0266	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0495	0,0000	0,0000	0,0000	-0,1096	-0,0455	-0,0685	-0,0651
'electricstove'	0,0944	0,0000	0,0000	0,0000	0,0000	0,0392	0,0287	0,0000	0,0000	0,0483	0,0405	0,0471	0,0531	0,0571	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1362	0,1631	0,1379
'washingMachine'	0,0473	0,0000	0,0000	0,0000	0,0000	0,0275	0,0354	0,0595	0,0647	0,0000	0,0408	0,0000	0,0000	0,0000	0,0000	0,0697	0,0000	0,0780	0,0000	0,0000	0,0000	0,0000	0,0000	0,0660
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0307	0,0592	0,0802	0,1490	0,1640	0,1562	0,1010	0,0978	0,1152	0,1571	0,1296	0,0857	0,1223	0,1991	0,3296	0,2305	0,1278	0,0000	0,0000
'dryingcabinet'	-0,0760	-0,0376	-0,0267	0,0000	0,0000	0,0000	-0,0303	-0,0462	0,0000	0,0000	0,0000	-0,0638	-0,0883	-0,0604	0,0000	0,0000	-0,1065	0,0000	0,0000	0,0000	0,0000	0,1048	-0,0855	-0,1093
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0278	0,0177	0,0365	0,0564	0,0658	0,0453	0,0849	0,0850	0,0599	0,0711	0,1001	0,1264	0,0980	0,1148	0,1499	0,1015	0,0632	0,0643	0,0000
'sauna'	-0,0961	0,0000	0,0000	0,0000	0,0000	-0,0670	-0,0744	-0,0847	-0,0942	-0,0748	-0,0851	-0,0927	-0,0924	-0,0760	-0,0574	-0,0554	0,0000	0,0000	0,1746	0,2252	0,1528	0,0000	-0,0972	-0,1293
'SQM'	0,2029	0,1762	0,1574	0,1474	0,1556	0,1386	0,1459	0,1648	0,1954	0,2124	0,2459	0,2588	0,2932	0,2753	0,2516	0,2631	0,2747	0,2465	0,2874	0,3784	0,4610	0,3904	0,2991	0,2555
'CRTtv'	0,0000	-0,0226	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0305	0,0595	0,0743	0,0656	0,0560	0,0000	0,0000	0,0000	0,0000	0,0771	0,0711	0,0982	0,0000	0,0000	0,0000
'LCDtv'	0,0311	0,0225	0,0358	0,0313	0,0247	0,0207	0,0303	0,0210	0,0265	0,0444	0,0505	0,0512	0,0344	0,0489	0,0000	0,0000	0,0477	0,0000	0,0000	0,0000	0,1288	0,0000	0,0000	0,0000
'ComputerCRT'	0,0361	0,0243	0,0000	0,0139	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0382	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'ComputerLCD'	0,0608	0,0625	0,0482	0,0325	0,0131	0,0000	0,0000	-0,0173	0,0000	0,0479	0,0727	0,1003	0,0903	0,0752	0,0550	0,0000	0,0000	0,0451	0,1023	0,1227	0,1629	0,1438	0,0741	0,0517
'ComputerPortable'	0,0359	0,0186	0,0000	0,0128	0,0000	-0,0113	-0,0231	-0,0364	-0,0450	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0956	0,1177	0,1372	0,0766	0,0763	0,0381

Results from Primary Model Version 2 Autumn

INMODEL Primary Model Version 2

Autumn WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0	1	1	1	0	0	0	1	1	1	0	0	1	1	0	1	1	0	0	0	0	0	1	0
'Refrigerator&Freezer'	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	1	1
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1
'electricstove'	1	0	0	0	0	1	1	0	0	1	1	1	0	0	1	0	1	1	1	1	0	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	1	0	0	1	1	0	1	1
'tumbleDryer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'dryingcabinet'	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1	1	0	1	1	1	1	0	1
'Dishwasher'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'Bulbs'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerCRT'	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1
'ComputerLCD'	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	0	1	0	0	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1

INMODEL Primary Model Version 2

Autumn WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0	0	0	1	0	1	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
'Refrigerator&Freezer'	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	1	1
'electricstove'	1	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	0	0	0	0	1	1	1	1
'washingMachine'	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'dryingcabinet'	1	1	1	0	0	1	1	1	0	0	0	0	0	0	1	1	0	1	1	1	1	1	0	1
'Dishwasher'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
'Bulbs'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1
'LCDtv'	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1
'ComputerCRT'	1	1	1	1	1	1	1	0	0	0	1	0	0	0	1	1	1	1	1	0	0	1	1	1
'ComputerLCD'	1	1	1	1	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	0	1	1	1	1	0	1	1	1	0	0	1	0	0	1	1	1	1	1	1

CDA Obtained Estimated Coefficients in KWh/h

Autumn WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0,0000	-0,0154	-0,0146	-0,0117	0,0000	0,0000	0,0000	-0,0335	-0,0553	-0,0565	0,0000	0,0000	-0,0311	-0,0340	0,0000	0,0583	0,0561	0,0000	0,0000	0,0000	0,0000	0,0000	0,0327	0,0000
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0470	-0,0679	-0,0810	-0,0327	-0,0389	-0,0605	-0,0698	-0,0311	0,0000	0,0000	-0,0597	-0,0714	0,0000	0,0000	0,0000	-0,0636	-0,0331
'Freezer'	0,0312	0,0583	0,0587	0,0612	0,0618	0,0449	0,0611	0,0694	0,0713	0,0514	0,0526	0,0346	0,0369	0,0550	0,0769	0,0479	0,0581	0,0569	0,0937	0,1239	0,1046	0,0664	0,0000	0,0260
'ChestFreezer'	0,0000	0,0483	0,0560	0,0610	0,0600	0,0358	0,0625	0,0689	0,0700	0,0717	0,0726	0,0659	0,0678	0,0771	0,0801	0,0619	0,0548	0,0278	0,0000	0,0000	0,0000	-0,0502	-0,0915	-0,0435
'electricstove'	0,0998	0,0000	0,0000	0,0000	0,0000	0,0704	0,0570	0,0000	0,0000	-0,0204	-0,0330	-0,0267	0,0000	0,0000	-0,0229	0,0000	0,0301	0,0563	0,0450	0,0511	0,0000	0,0613	0,1374	0,1330
'washingMachine'	0,0328	0,0000	0,0000	0,0000	0,0000	0,0228	0,0529	0,0575	0,0313	0,0264	0,0000	0,0000	0,0000	0,0000	0,0000	0,0355	0,0516	0,0000	0,0000	-0,0588	-0,0798	0,0000	0,0538	0,0714
'tumbleDryer'	0,0241	0,0000	0,0000	0,0000	0,0000	0,0604	0,1137	0,1549	0,1393	0,0776	0,0655	0,0813	0,0604	0,0763	0,0856	0,1125	0,1373	0,2478	0,3826	0,3790	0,2552	0,0642	-0,0511	0,0000
'dryingcabinet'	-0,0251	0,0000	0,0000	0,0000	0,0000	-0,0405	-0,0666	-0,0330	0,0467	0,0894	0,0457	0,0324	0,0345	0,0000	0,0000	-0,0505	-0,0432	0,0000	0,1054	0,0957	0,1955	0,1612	0,0000	-0,0492
'Dishwasher'	0,0267	0,0000	0,0000	0,0000	0,0000	0,0579	0,0500	0,0525	0,0867	0,1120	0,1185	0,1273	0,1181	0,1049	0,0881	0,0903	0,1324	0,1656	0,1698	0,1232	0,1132	0,0780	0,0592	0,0000
'sauna'	-0,1472	0,0000	0,0000	0,0000	0,0000	-0,1177	-0,1251	-0,1175	-0,1243	-0,1134	-0,0967	-0,1033	-0,1170	-0,1002	-0,0901	-0,0830	-0,0847	-0,0594	0,0324	0,1344	0,1071	-0,0509	-0,1856	-0,1937
'Bulbs'	0,1084	0,1022	0,0976	0,0922	0,0961	0,0903	0,1129	0,1120	0,0976	0,0768	0,0803	0,0780	0,0776	0,0748	0,0766	0,1068	0,1367	0,1283	0,1400	0,2330	0,3146	0,3107	0,2390	0,1548
'CRTtv'	-0,0103	-0,0101	0,0000	0,0000	0,0115	0,0247	0,0443	0,0494	0,0442	0,0331	0,0360	0,0216	0,0198	0,0202	0,0207	0,0000	0,0000	0,0568	0,1051	0,1500	0,1867	0,0952	0,0587	0,0242
'LCDtv'	0,0335	0,0347	0,0345	0,0301	0,0426	0,0420	0,0392	0,0383	0,0611	0,0426	0,0486	0,0273	0,0225	0,0283	0,0482	0,0308	0,0363	0,0402	0,0907	0,0497	0,0887	0,0869	0,1062	0,0551
'ComputerCRT'	0,0684	0,0474	0,0425	0,0413	0,0352	0,0282	0,0000	0,0000	0,0331	0,0228	0,0305	0,0325	0,0560	0,0308	0,0397	0,0431	0,0544	0,0789	0,0499	0,0000	0,0000	0,0000	0,0319	0,0596
'ComputerLCD'	0,0261	0,0309	0,0215	0,0209	0,0086	0,0000	0,0227	0,0173	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0313	0,0530	0,1107	0,1554	0,2129	0,2276	0,1468	0,0271	0,0275
'ComputerPortable'	0,0307	0,0136	0,0000	0,0100	0,0000	0,0000	-0,0100	-0,0133	-0,0270	-0,0359	-0,0225	-0,0179	-0,0104	-0,0126	0,0000	0,0341	0,0000	0,0495	0,1199	0,2057	0,1769	0,1506	0,0676	0,0404

CDA Obtained Estimated Coefficients in KWh/h

Autumn WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0,0000	0,0000	0,0000	-0,0209	0,0000	-0,0373	0,0000	0,0000	-0,0630	0,0000	0,0000	0,0000	0,0000	-0,0595	0,0000	0,0530	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0506	0,0000	0,0000	-0,0738	0,0000	0,0000	0,0000	0,0000	-0,0828	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Freezer'	0,0366	0,0461	0,0479	0,0600	0,0625	0,0468	0,0449	0,0468	0,0611	0,0768	0,0755	0,0622	0,0507	0,0000	0,0576	0,0382	0,0659	0,0987	0,1113	0,0612	0,1051	0,0739	0,0546	0,0372
'ChestFreezer'	0,0000	0,0378	0,0553	0,0612	0,0644	0,0315	0,0430	0,0393	0,0516	0,0565	0,0622	0,0526	0,0588	0,0505	0,0473	0,0000	0,0000	0,0000	0,0000	-0,0777	0,0000	0,0000	-0,0718	-0,0565
'electricstove'	0,0892	0,0000	0,0000	0,0000	0,0000	0,0608	0,0371	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0548	0,0000	-0,0564	0,0000	0,0000	0,0000	0,0000	0,1125	0,1107	0,1310	0,1230
'washingMachine'	0,0354	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0509	0,0432	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0899	0,0876	0,1507	0,1191	0,0000	0,0000	0,0000	0,0000	0,0500
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0414	0,0767	0,1572	0,2965	0,2815	0,2264	0,1793	0,2084	0,2352	0,2073	0,1825	0,0923	0,1965	0,4705	0,3351	0,1960	0,1080	0,0000	-0,0409
'dryingcabinet'	-0,0649	-0,0511	-0,0397	0,0000	0,0000	-0,0431	-0,0488	-0,0526	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0797	-0,0963	0,0000	0,1028	0,1265	0,1586	0,2963	0,1561	0,0000	-0,0650
'Dishwasher'	0,0196	0,0000	0,0000	0,0000	0,0000	0,0717	0,0608	0,0711	0,1070	0,1182	0,1147	0,1431	0,1381	0,1339	0,1223	0,1292	0,1808	0,1444	0,0677	0,1587	0,1325	0,0563	0,0867	0,0000
'sauna'	-0,1467	0,0000	0,0000	0,0000	0,0000	-0,1199	-0,1140	-0,1090	-0,1124	-0,1133	-0,1114	-0,1245	-0,1006	-0,0989	-0,0982	-0,0693	0,0000	0,0986	0,2256	0,2114	0,0797	-0,0460	-0,1425	-0,1883
'Bulbs'	0,1380	0,1223	0,1016	0,0975	0,0975	0,0862	0,0860	0,0842	0,0784	0,1230	0,1439	0,1446	0,1437	0,1366	0,1324	0,1194	0,1498	0,1665	0,2041	0,2838	0,2672	0,2723	0,2731	0,1978
'CRTtv'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0276	0,0275	0,0471	0,0438	0,0289	0,0436	0,0483	0,0458	0,0861	0,0866	0,0654	0,0000	0,0000	0,2487	0,2776	0,1350	0,0631	0,0338	0,0386
'LCDtv'	0,0304	0,0385	0,0386	0,0349	0,0378	0,0402	0,0312	0,0369	0,0322	0,0000	0,0000	0,0000	0,0000	0,0498	0,0645	0,0584	0,0394	0,0000	0,1486	0,1584	0,0868	0,0433	0,0673	0,0555
'ComputerCRT'	0,0631	0,0468	0,0364	0,0396	0,0350	0,0274	0,0297	0,0000	0,0000	0,0000	0,0315	0,0000	0,0000	0,0000	0,0580	0,1151	0,1071	0,1376	0,1808	0,0000	0,0000	0,0424	0,0772	0,0817
'ComputerLCD'	0,0461	0,0433	0,0280	0,0224	0,0000	-0,0241	0,0000	0,0000	0,0000	0,0284	0,0946	0,1121	0,0965	0,0759	0,0634	0,0680	0,0740	0,0868	0,1271	0,2043	0,1591	0,1237	0,0437	0,0487
'ComputerPortable'	0,0422	0,0255	0,0148	0,0128	0,0000	-0,0140	-0,0354	-0,0509	-0,0361	0,0000	0,0306	0,0281	0,0371	0,0000	0,0000	0,0509	0,0000	0,0000	0,1574	0,2332	0,1794	0,1329	0,1013	0,0727

Results from Primary Model Version 2 Winter

INMODEL Primary Model Version 2

Winter WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0
'Refrigerator&Freezer'	1	0	0	0	0	1	0	0	1	1	1	1	1	1	0	0	0	1	1	0	0	0	1	1
'Freezer'	0	1	1	1	1	0	1	1	1	0	0	0	0	0	1	1	0	0	1	1	0	1	1	0
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1
'tumbleDryer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'dryingcabinet'	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	1	1	0	1
'Dishwasher'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
'Bulbs'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1
'LCDtv'	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	1	0	1	1	1	0	0	0
'ComputerCRT'	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	0	0	0	0	1	0	0	1	0	1	1	1	1	1	1	1	1	1	1

INMODEL Primary Model Version 2

Winter WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
'Refrigerator&Freezer'	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	1
'Freezer'	0	0	0	1	1	0	1	1	0	1	1	0	0	0	0	1	1	1	0	0	1	0	0	0
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	0	0	1	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1
'Dishwasher'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1
'Bulbs'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	1
'LCDtv'	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	0	0	0	1	1	0	0
'ComputerCRT'	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0	0	1	1	1
'ComputerLCD'	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	0	0	1	0	0	0	1	0	1	0	1	1	1	1	1	1	1	1	1

CDA Obtained Estimated Coefficients in KWh/h

Winter WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0313	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0586	-0,0641	0,0000	0,0000	0,0000	-0,0467	0,0000	0,0000	0,0559	0,0000	-0,1066	0,0000	0,0000	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	-0,0442	0,0000	0,0000	0,0000	0,0000	-0,0315	0,0000	0,0000	-0,0864	-0,1255	-0,0492	-0,0365	-0,0305	-0,0853	0,0000	0,0000	0,0000	-0,0492	-0,0653	0,0000	0,0000	0,0000	-0,0709	-0,0325
'Freezer'	0,0000	0,0258	0,0265	0,0352	0,0441	0,0000	0,0497	0,0610	0,0554	0,0000	0,0000	0,0000	0,0000	0,0000	0,0385	0,0465	0,0000	0,0000	0,0861	0,0666	0,0000	0,0272	-0,0317	0,0000
'ChestFreezer'	0,0000	0,0496	0,0613	0,0748	0,0839	0,0477	0,0677	0,0893	0,0996	0,0781	0,0820	0,0711	0,0691	0,0713	0,0603	0,0563	0,0000	0,0000	0,0000	-0,0651	-0,0756	-0,0605	-0,0891	-0,0592
'electricstove'	0,1176	0,0000	0,0000	0,0000	0,0000	0,1062	0,1053	0,0325	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0596	0,0873	0,0846	0,1331	0,1500	0,1481	0,1648	0,1547
'washingMachine'	0,0578	0,0000	0,0000	0,0000	0,0000	0,0467	0,0769	0,0957	0,0950	0,0806	0,0500	0,0305	0,0304	0,0439	0,0485	0,0601	0,0899	0,0897	0,0638	0,0000	0,0000	0,0000	0,0876	0,0885
'tumbleDryer'	0,0375	0,0000	0,0000	0,0000	0,0000	0,1256	0,1482	0,1929	0,1335	0,0974	0,0987	0,1087	0,0778	0,0896	0,0727	0,1220	0,1148	0,2115	0,3280	0,3710	0,2108	0,0514	-0,0420	0,0000
'dryingcabinet'	-0,0802	-0,0738	-0,0585	-0,0407	-0,0541	-0,0784	-0,0969	-0,0899	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0463	-0,0664	-0,1105	0,0000	0,0000	0,0000	0,0976	0,1064	0,0000	-0,1029
'Dishwasher'	0,0232	0,0000	0,0000	0,0000	0,0000	0,0861	0,0867	0,0991	0,1342	0,1551	0,1748	0,1848	0,1511	0,1348	0,1310	0,1581	0,1894	0,2160	0,2247	0,1872	0,1794	0,1250	0,0671	0,0000
'sauna'	-0,2063	0,0000	0,0000	0,0000	0,0000	-0,1692	-0,2197	-0,2227	-0,2109	-0,2012	-0,1939	-0,1960	-0,1913	-0,1823	-0,1651	-0,1616	-0,1778	-0,1385	-0,0439	0,0519	0,0000	-0,1298	-0,2511	-0,2566
'Bulbs'	0,1650	0,1441	0,1353	0,1259	0,1236	0,0995	0,1353	0,1463	0,1422	0,1387	0,1174	0,1173	0,1345	0,1205	0,1205	0,1511	0,1877	0,1742	0,2063	0,2753	0,3498	0,3445	0,2864	0,2270
'CRTtv'	-0,0558	-0,0615	-0,0596	-0,0485	-0,0401	0,0000	0,0151	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0396	0,0000	0,0000	0,0653	0,1519	0,1734	0,0409	-0,0291	-0,0316
'LCDtv'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0158	0,0000	0,0000	0,0000	0,0000	0,0000	0,0323	0,0449	0,0000	0,0450	0,0000	0,0835	0,0438	0,0624	0,0000	0,0000	0,0000
'ComputerCRT'	0,1101	0,0871	0,0812	0,0689	0,0679	0,0533	0,0428	0,0424	0,0576	0,0000	0,0000	0,0000	0,0429	0,0419	0,0511	0,0536	0,0756	0,1379	0,0760	0,0000	0,0877	0,0701	0,1055	0,1145
'ComputerLCD'	0,0712	0,0886	0,0764	0,0679	0,0740	0,0525	0,0592	0,0393	0,0000	0,0000	0,0000	0,0183	0,0328	0,0187	0,0331	0,0627	0,0775	0,1594	0,1947	0,2775	0,2813	0,1706	0,0697	0,0791
'ComputerPortable'	0,0513	0,0323	0,0269	0,0243	0,0284	0,0000	0,0000	0,0000	0,0000	-0,0230	0,0000	0,0000	0,0173	0,0000	0,0222	0,0507	0,0814	0,1156	0,1934	0,2594	0,2195	0,1737	0,1410	0,0857

CDA Obtained Estimated Coefficients in KWh/h

Winter WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0969	-0,1001	0,0000	-0,0684	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	-0,0302	0,0000	0,0000	0,0000	0,0000	-0,0239	0,0000	0,0000	-0,0444	-0,1409	-0,1291	-0,0786	-0,1041	-0,0509	-0,0644	0,0000	-0,0687	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0447	-0,0375
'Freezer'	0,0000	0,0000	0,0000	0,0273	0,0377	0,0000	0,0254	0,0289	0,0000	0,0453	0,0465	0,0000	0,0000	0,0000	0,0000	0,0821	0,0618	0,0898	0,0000	0,0000	0,0554	0,0000	0,0000	0,0000
'ChestFreezer'	0,0000	0,0375	0,0600	0,0740	0,0903	0,0531	0,0388	0,0650	0,0605	0,0909	0,0823	0,0473	0,0461	0,0457	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0430	-0,0555	-0,0578
'electricstove'	0,1253	0,0000	0,0000	0,0000	0,0000	0,0970	0,0793	0,0768	0,0906	0,0594	0,0644	0,0979	0,1027	0,0970	0,0726	0,0000	0,0706	0,0963	0,1187	0,1738	0,1751	0,1738	0,1742	0,1526
'washingMachine'	0,0771	0,0000	0,0000	0,0000	0,0000	0,0420	0,0518	0,0847	0,1189	0,1007	0,0599	0,0629	0,0000	0,0000	0,0777	0,0961	0,1548	0,1704	0,1097	0,0000	0,0000	0,0000	0,0524	0,0953
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0648	0,0846	0,1443	0,2434	0,2840	0,2437	0,2264	0,1811	0,1943	0,1865	0,1332	0,1147	0,2455	0,4789	0,3121	0,1677	0,0656	0,0000	0,0000
'dryingcabinet'	-0,1047	-0,0853	-0,0633	-0,0517	-0,0409	-0,0557	-0,0671	-0,0715	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1455	0,2475	0,1965	0,2674	0,1704	0,0000	-0,1091
'Dishwasher'	0,0386	0,0000	0,0000	0,0000	0,0000	0,0810	0,0875	0,1045	0,1366	0,1790	0,2301	0,2155	0,2292	0,2173	0,2325	0,2248	0,2403	0,2823	0,2624	0,3070	0,2167	0,1283	0,0936	0,0000
'sauna'	-0,2332	0,0000	0,0000	0,0000	0,0000	-0,1892	-0,1998	-0,2025	-0,2279	-0,2364	-0,2128	-0,2090	-0,2060	-0,1894	-0,1754	-0,1363	-0,1255	0,0000	0,0863	0,0959	0,0000	-0,1359	-0,2055	-0,2696
'Bulbs'	0,1766	0,1673	0,1446	0,1377	0,1217	0,0954	0,0976	0,1011	0,1148	0,1359	0,1452	0,1638	0,1740	0,1563	0,1344	0,1528	0,1695	0,1617	0,1923	0,2531	0,2902	0,3130	0,2767	0,2481
'CRTtv'	-0,0519	-0,0630	-0,0665	-0,0525	-0,0439	-0,0274	-0,0348	0,0000	0,0000	0,0000	0,0000	0,0363	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1107	0,1844	0,1529	0,0679	-0,0359	-0,0327
'LCDtv'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0313	0,0458	0,0452	0,0000	0,0000	0,0000	0,0000	0,0000	0,0460	0,0614	0,0000	0,0000	0,0000	0,0575	0,0427	0,0000	0,0000
'ComputerCRT'	0,1185	0,1154	0,0989	0,0854	0,0811	0,0660	0,0704	0,0421	0,0702	0,0000	0,0000	0,0000	0,0375	0,0654	0,0570	0,1232	0,1862	0,2047	0,1664	0,0000	0,0000	0,0765	0,1159	0,1410
'ComputerLCD'	0,0736	0,1017	0,0917	0,0681	0,0550	0,0197	0,0000	0,0000	0,0000	0,0313	0,0893	0,1043	0,1025	0,0833	0,0712	0,0938	0,1008	0,1069	0,1286	0,2506	0,2031	0,1212	0,0654	0,0745
'ComputerPortable'	0,0678	0,0526	0,0347	0,0330	0,0339	0,0000	0,0000	-0,0216	0,0000	0,0000	0,0000	0,0300	0,0000	0,0373	0,0000	0,0488	0,0454	0,0853	0,2399	0,2275	0,1942	0,1837	0,1576	0,0953

Results from Primary Model Version 2 Spring

INMODEL Primary Model Version 2																								
Spring WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	0	1	0	0	0	1	0	0	0	0	1	0	1	0	1	0
'Refrigerator&Freezer'	0	0	0	0	0	1	1	1	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0	0
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	0	1	0	0	0
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	0	0	1	1	0	0	0	1	1	0	1	1	1	1	0	1	1
'washingMachine'	0	0	0	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	0	0	0	0	0	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
'dryingcabinet'	1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	1	0	0	0	1	1	0	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
'Bulbs'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	0	1	0	0	0	0	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0
'LCDtv'	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	0	1	0	1	1	1	0
'ComputerCRT'	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	1	1	0	0	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	1	0	1	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1

INMODEL Primary Model Version 2																								
Spring WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
'Refrigerator&Freezer'	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
'Freezer'	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	0	1	0	0	0
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	0	0	1	0	1	1	0	0	0	0	0	0	1	1	1	1	1
'washingMachine'	1	0	0	0	0	0	1	1	1	0	0	1	1	1	1	1	1	1	0	0	0	0	0	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0
'dryingcabinet'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1
'Bulbs'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
'LCDtv'	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1
'ComputerCRT'	1	1	1	1	1	1	1	0	1	0	1	0	0	1	1	1	1	1	1	0	0	0	1	1
'ComputerLCD'	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1

CDA Obtained Estimated Coefficients in KWh/h																								
Spring WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0316	-0,0507	-0,0405	-0,0315	-0,0243	-0,0620	-0,0688	-0,0746	0,0000	-0,0418	0,0000	0,0000	0,0000	-0,0481	0,0000	0,0000	0,0000	0,0000	-0,1194	0,0000	-0,0569	0,0000	0,0378	0,0000
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0479	-0,0426	-0,0681	0,0000	-0,0555	0,0000	0,0000	0,0000	-0,0557	0,0000	0,0000	0,0000	0,0000	-0,0705	0,0000	0,0000	0,0000	0,0000	0,0000
'Freezer'	0,0372	0,0477	0,0482	0,0550	0,0554	0,0407	0,0737	0,0694	0,0542	0,0331	0,0495	0,0000	0,0225	0,0000	0,0403	0,0491	0,0425	0,0325	0,0871	0,0000	0,0666	0,0000	0,0000	0,0000
'ChestFreezer'	0,0000	0,0290	0,0402	0,0498	0,0549	0,0421	0,0613	0,0507	0,0438	0,0458	0,0667	0,0249	0,0296	0,0438	0,0474	0,0406	0,0000	0,0000	-0,0424	-0,1030	-0,0875	-0,0993	-0,0891	-0,0748
'electricstove'	0,0741	0,0000	0,0000	0,0000	0,0000	0,0461	0,0423	0,0000	0,0000	-0,0316	-0,0295	0,0000	0,0000	0,0000	-0,0300	-0,0363	0,0000	0,0433	0,0687	0,0981	0,0857	0,0000	0,1055	0,1038
'washingMachine'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0198	0,0225	0,0356	0,0343	0,0250	0,0000	0,0292	0,0000	0,0337	0,0462	0,0516	0,0684	0,0708	0,0000	0,0000	0,0000	0,0000	0,0000	0,0450
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0593	0,0771	0,1170	0,0670	0,0664	0,0497	0,0693	0,0564	0,0574	0,0546	0,0900	0,0798	0,1606	0,2390	0,3094	0,1987	0,0000	-0,0548	-0,0386
'dryingcabinet'	-0,0482	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0436	0,0000	0,0426	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0336	-0,0593	-0,0619	0,0000	0,0000	0,0000	0,1235	0,1439	0,0000	-0,0500
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0553	0,0559	0,0890	0,0889	0,0903	0,0991	0,0943	0,0988	0,0799	0,0666	0,0927	0,1226	0,1364	0,1484	0,1473	0,1388	0,0840	0,0000	0,0000
'sauna'	-0,1211	0,0000	0,0000	0,0000	0,0000	-0,1099	-0,1126	-0,1228	-0,1025	-0,0895	-0,0700	-0,0934	-0,0930	-0,0858	-0,0664	-0,0768	-0,0683	-0,0634	0,0315	0,1180	0,1123	0,0000	-0,1356	-0,1577
'Bulbs'	0,1324	0,1016	0,0905	0,0839	0,0804	0,0647	0,0813	0,0830	0,0751	0,0886	0,0817	0,0878	0,0863	0,0731	0,0783	0,0823	0,0916	0,0754	0,0999	0,1921	0,2599	0,2902	0,2829	0,2074
'CRTtv'	0,0000	-0,0182	0,0000	0,0000	0,0000	0,0000	0,0289	0,0000	0,0475	0,0418	0,0319	0,0401	0,0259	0,0354	0,0455	0,0340	0,0000	0,0000	0,0781	0,1052	0,1633	0,0933	0,0368	0,0000
'LCDtv'	0,0309	0,0158	0,0206	0,0173	0,0174	0,0105	0,0312	0,0000	0,0262	0,0288	0,0275	0,0171	0,0000	0,0214	0,0264	0,0228	0,0302	0,0000	0,1001	0,0000	0,0767	0,0791	0,0613	0,0000
'ComputerCRT'	0,0708	0,0517	0,0335	0,0295	0,0321	0,0292	0,0231	0,0000	0,0185	0,0000	0,0000	0,0221	0,0234	0,0347	0,0265	0,0420	0,0586	0,0841	0,0577	0,0000	0,0000	0,0000	0,0929	0,0807
'ComputerLCD'	0,0653	0,0685	0,0545	0,0420	0,0396	0,0220	0,0295	0,0000	0,0000	0,0000	0,0000	0,0211	0,0000	0,0324	0,0341	0,0492	0,0663	0,0926	0,1270	0,2003	0,2189	0,1650	0,0854	0,0684
'ComputerPortable'	0,0522	0,0312	0,0190	0,0200	0,0233	0,0120	0,0000	-0,0126	0,0000	0,0000	-0,0198	0,0000	0,0000	0,0000	0,0000	0,0246	0,0334	0,0427	0,1101	0,2006	0,2190	0,1289	0,1218	0,0782

CDA Obtained Estimated Coefficients in KWh/h																								
Spring WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0,0000	0,0000	-0,0385	0,0000	-0,0324	-0,0666	-0,0904	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	0,0000	0,0420	0,0000	0,0364	0,0000	-0,0476	-0,0575	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Freezer'	0,0000	0,0328	0,0397	0,0428	0,0465	0,0408	0,0578	0,0466	0,0453	0,0471	0,0342	0,0000	0,0000	0,0000	0,0000	0,0440	0,0653	0,0636	0,0777	0,0000	0,0543	0,0000	0,0000	0,0000
'ChestFreezer'	0,0000	0,0323	0,0434	0,0441	0,0498	0,0313	0,0427	0,0348	0,0365	0,0396	0,0391	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0789	-0,1160	-0,1047	-0,0783	-0,0601
'electricstove'	0,0847	0,0000	0,0000	0,0000	0,0000	0,0497	0,0303	0,0000	0,0000	-0,0376	0,0000	0,0388	0,0540	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1193	0,1168	0,1015	0,1182	0,1071
'washingMachine'	0,0566	0,0000	0,0000	0,0000	0,0000	0,0000	0,0273	0,0396	0,0545	0,0000	0,0000	0,0545	0,0510	0,0466	0,0808	0,0760	0,0903	0,1095	0,0000	0,0000	0,0000	0,0000	0,0000	0,0450
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0410	0,0423	0,1217	0,1703	0,1798	0,1372	0,1043	0,0696	0,0947	0,1285	0,0879	0,0583	0,1057	0,2570	0,2435	0,1415	0,0000	-0,0641	0,0000
'dryingcabinet'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1159	0,1231	0,0000	0,0000
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0447	0,0470	0,0753	0,0992	0,1185	0,1113	0,1252	0,0978	0,0969	0,0903	0,1044	0,1056	0,1291	0,1718	0,1890	0,1172	0,0531	0,0652	0,0000
'sauna'	-0,1355	0,0000	0,0000	0,0000	0,0000	-0,1197	-0,1215	-0,1268	-0,1191	-0,0991	-0,0997	-0,0980	-0,1164	-0,0947	-0,0743	-0,0536	0,0000	0,0523	0,1844	0,1893	0,0884	0,0000	-0,1071	-0,1563
'Bulbs'	0,1188	0,1013	0,0972	0,0947	0,0874	0,0769	0,0751	0,0682	0,0673	0,0763	0,0955	0,1105	0,0994	0,0791	0,0618	0,0728	0,0930	0,1271	0,1261	0,1517	0,2271	0,2906	0,2418	0,1765
'CRTtv'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0599	0,0649	0,0478	0,1060	0,0869	0,1005	0,0681	0,0506	0,0000	0,0979	0,1451	0,1603	0,1336	0,0358	0,0337
'LCDtv'	0,0340	0,0315	0,0235	0,0201	0,0142	0,0142	0,0000	0,0000	0,0230	0,0423	0,0292	0,0000	0,0630	0,0474	0,0918	0,0900	0,0929	0,0000	0,1299	0,0683	0,1125	0,1003	0,0673	0,0485
'ComputerCRT'	0,0620	0,0559	0,0322	0,0270	0,0224	0,0220	0,0252	0,0000	0,0311	0,0000	0,0379	0,0000	0,0000	0,0307	0,0436	0,0561	0,0864	0,1294	0,1189	0,0000	0,0000	0,0000	0,0673	0,0620
'ComputerLCD'	0,0757	0,0828	0,0575	0,0474	0,0318	0,0000	0,0000	0,0000	0,0000	0,0597	0,0739	0,0832	0,1008	0,1029	0,0880	0,0568	0,0676	0,0631	0,1496	0,2018	0,2015	0,1511	0,0718	0,0799
'ComputerPortable'	0,0384	0,0294	0,0191	0,0147	0,0000	0,0000	0,0000	0,0000	0,0000	0,0259	0,0364	0,0433	0,0403	0,0289	0,0304	0,0000	0,0000	0,0620	0,1718	0,2348	0,1911	0,1242	0,1069	0,0534

Results from Primary Model Version 2 Summer

INMODEL Primary Model Version 2																								
Summer WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0	0	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1
'Refrigerator&Freezer'	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
'Freezer'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	0
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1
'electricstove'	1	0	0	0	0	1	0	1	0	0	0	1	0	0	0	1	0	1	0	0	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	0	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'dryingcabinet'	1	1	1	0	0	1	1	1	0	1	1	1	0	0	1	1	1	0	1	0	1	0	0	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'Bulbs'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1
'ComputerCRT'	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0	0	1	1	0	0	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	0	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	1	1	0	1	1	1	1	1

INMODEL Primary Model Version 2																								
Summer WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
'Refrigerator&Freezer'	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
'Freezer'	0	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	1	1	1	0	1	0	0	0
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	1
'electricstove'	1	0	0	0	0	1	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1
'Bulbs'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	0	0	0	0	0	1	1	0	1	1	1	1	1	1	1	0	0	0	1	1	1	1	0	0
'LCDtv'	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	1	1	0	0
'ComputerCRT'	1	1	1	1	1	1	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	1	1
'ComputerLCD'	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1

CDA Obtained Estimated Coefficients in KWh/h																								
Summer WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0,0000	0,0000	-0,0139	-0,0132	0,0000	0,0000	-0,0466	-0,0376	-0,0608	-0,0594	-0,0650	-0,0360	-0,0394	-0,0463	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0715	0,0290
'Refrigerator&Freezer'	0,0000	0,0145	0,0000	0,0000	0,0000	-0,0138	-0,0539	-0,0740	-0,0887	-0,0943	-0,0861	-0,0723	-0,0716	-0,0817	-0,0268	-0,0547	-0,0401	-0,0601	-0,0364	0,0000	0,0000	0,0000	0,0000	0,0000
'Freezer'	0,0000	0,0246	0,0266	0,0324	0,0296	0,0183	0,0465	0,0458	0,0424	0,0410	0,0509	0,0338	0,0164	0,0222	0,0213	0,0273	0,0561	0,0000	0,0809	0,0726	0,0552	0,0614	0,0000	0,0000
'ChestFreezer'	0,0000	0,0263	0,0335	0,0369	0,0373	0,0257	0,0516	0,0495	0,0670	0,0617	0,0804	0,0565	0,0413	0,0627	0,0610	0,0502	0,0465	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0699	-0,0355
'electricstove'	0,0498	0,0000	0,0000	0,0000	0,0000	0,0328	0,0000	-0,0224	0,0000	0,0000	0,0000	-0,0325	0,0000	0,0000	0,0000	-0,0299	0,0000	0,0350	0,0000	0,0000	0,0859	0,0668	0,1325	0,1112
'washingMachine'	0,0372	0,0000	0,0000	0,0000	0,0000	0,0247	0,0374	0,0443	0,0351	0,0279	0,0000	0,0000	0,0000	0,0000	0,0371	0,0657	0,0590	0,0376	0,0000	0,0000	0,0000	0,0000	0,0000	0,0606
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0500	0,1083	0,1172	0,1018	0,0729	0,0405	0,0557	0,0449	0,0715	0,0831	0,1008	0,0967	0,1411	0,2499	0,3121	0,2517	0,0822	-0,0339	-0,0265
'dryingcabinet'	-0,0508	-0,0387	-0,0262	0,0000	0,0000	-0,0294	-0,0613	-0,0324	0,0000	0,0395	0,0391	0,0297	0,0000	0,0000	-0,0312	-0,0581	-0,0625	0,0000	0,0745	0,0000	0,0988	0,0000	0,0000	-0,0461
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0393	0,0412	0,0534	0,0678	0,0973	0,1071	0,1139	0,1017	0,0739	0,0765	0,0790	0,1152	0,1288	0,1354	0,0986	0,1295	0,0630	0,0000	-0,0337
'sauna'	-0,0964	0,0000	0,0000	0,0000	0,0000	-0,0680	-0,0678	-0,0693	-0,0739	-0,0759	-0,0742	-0,0715	-0,0740	-0,0638	-0,0743	-0,0519	-0,0567	-0,0370	0,0306	0,1574	0,1410	0,0480	-0,1119	-0,1415
'Bulbs'	0,1057	0,0783	0,0747	0,0603	0,0548	0,0529	0,0550	0,0589	0,0613	0,0588	0,0682	0,0798	0,0919	0,0731	0,0815	0,0800	0,1063	0,0883	0,0943	0,1515	0,1978	0,2257	0,2400	0,1441
'CRTtv'	0,0000	0,0000	0,0000	0,0121	0,0128	0,0196	0,0363	0,0332	0,0482	0,0395	0,0526	0,0422	0,0381	0,0538	0,0601	0,0368	0,0244	0,0000	0,0319	0,1204	0,1276	0,1046	0,0597	0,0395
'LCDtv'	0,0249	0,0249	0,0225	0,0276	0,0254	0,0312	0,0467	0,0464	0,0549	0,0395	0,0500	0,0237	0,0204	0,0330	0,0554	0,0457	0,0435	0,0000	0,0000	0,0561	0,0523	0,0510	0,0617	0,0376
'ComputerCRT'	0,0527	0,0310	0,0297	0,0237	0,0224	0,0148	0,0176	0,0216	0,0191	0,0000	0,0000	0,0000	0,0216	0,0291	0,0000	0,0000	0,0000	0,0391	0,0596	0,0000	0,0000	0,0000	0,0380	0,0355
'ComputerLCD'	0,0532	0,0571	0,0442	0,0384	0,0288	0,0215	0,0248	0,0000	-0,0138	0,0000	0,0165	0,0379	0,0330	0,0220	0,0000	0,0371	0,0551	0,1197	0,0880	0,1413	0,2242	0,1776	0,0830	0,0706
'ComputerPortable'	0,0204	0,0165	0,0083	0,0119	0,0073	0,0000	-0,0112	-0,0221	-0,0325	-0,0344	-0,0321	-0,0186	-0,0169	0,0000	0,0000	0,0000	-0,0198	-0,0235	0,0000	0,0625	0,1229	0,1011	0,0732	0,0367

CDA Obtained Estimated Coefficients in KWh/h																								
Summer WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0363	-0,0589	0,0000	-0,0390	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0686	0,0545	0,0000
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0494	-0,0697	-0,0408	-0,0845	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0442	-0,0757	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Freezer'	0,0000	0,0193	0,0274	0,0310	0,0362	0,0238	0,0327	0,0230	0,0000	0,0379	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0658	0,0640	0,0997	0,0000	0,0857	0,0000	0,0000	0,0000
'ChestFreezer'	0,0000	0,0293	0,0390	0,0434	0,0410	0,0264	0,0417	0,0299	0,0272	0,0359	0,0380	0,0000	0,0292	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0481	-0,0451
'electricstove'	0,0774	0,0000	0,0000	0,0000	0,0000	0,0320	0,0203	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0396	0,0000	-0,0564	0,0000	0,0000	0,0000	0,0000	0,0000	0,0969	0,1341	0,1149
'washingMachine'	0,0541	0,0000	0,0000	0,0000	0,0000	0,0245	0,0372	0,0582	0,0678	0,0000	0,0462	0,0000	0,0000	0,0000	0,0000	0,0737	0,0000	0,0779	0,0000	0,0000	0,0000	0,0000	0,0000	0,0694
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0227	0,0555	0,0773	0,1432	0,1528	0,1447	0,0875	0,0863	0,1005	0,1312	0,1063	0,0866	0,1070	0,1822	0,3068	0,2048	0,0832	0,0000	0,0000
'dryingcabinet'	-0,0551	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1203	0,0000	0,1584	0,1169	-0,0663	-0,0875
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0388	0,0365	0,0558	0,0808	0,0910	0,0739	0,1131	0,1144	0,0934	0,0932	0,1244	0,1551	0,1269	0,1457	0,2027	0,1299	0,0796	0,0755	0,0000
'sauna'	-0,0979	0,0000	0,0000	0,0000	0,0000	-0,0703	-0,0792	-0,0866	-0,1030	-0,0741	-0,0855	-0,0977	-0,0939	-0,0845	-0,0667	-0,0556	0,0000	0,0000	0,1633	0,2101	0,1449	0,0000	-0,1008	-0,1327
'Bulbs'	0,0991	0,0732	0,0682	0,0661	0,0643	0,0499	0,0482	0,0539	0,0620	0,0770	0,0924	0,1031	0,1083	0,1082	0,1271	0,1144	0,1012	0,0956	0,1147	0,1475	0,1799	0,1794	0,1547	0,1311
'CRTtv'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0156	0,0163	0,0000	0,0420	0,0537	0,0895	0,1044	0,0954	0,0878	0,0421	0,0000	0,0000	0,0000	0,1124	0,1238	0,1365	0,1019	0,0000	0,0000
'LCDtv'	0,0170	0,0236	0,0259	0,0215	0,0151	0,0233	0,0289	0,0000	0,0370	0,0445	0,0501	0,0473	0,0317	0,0449	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1201	0,0627	0,0000	0,0000
'ComputerCRT'	0,0508	0,0365	0,0285	0,0249	0,0231	0,0184	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0363	0,0562	0,0000	0,0524	0,0000	0,0553	0,0000	0,0000	0,0000	0,0000	0,0495	0,0394
'ComputerLCD'	0,0739	0,0717	0,0591	0,0409	0,0253	0,0000	0,0000	0,0000	0,0000	0,0565	0,0883	0,1106	0,1113	0,0925	0,0682	0,0445	0,0000	0,0650	0,1127	0,1463	0,1715	0,1599	0,0886	0,0673
'ComputerPortable'	0,0388	0,0216	0,0146	0,0159	0,0102	0,0000	-0,0234	-0,0370	-0,0437	-0,0215	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0982	0,1243	0,1334	0,0820	0,0828	0,0439

Results from Secondary Model Version 1 Autumn

INMODEL Secondary Model Version 1

Autumn WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0	1	1	0	0	0	1
'Refrigerator&Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	0	1	1
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ChestFreezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	0	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	1	0
'tumbleDryer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	0	1	1	1	1	1	0
'Dishwasher'	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	0	1	0	0	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerCRT'	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
'ComputerPortable'	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0

INMODEL Secondary Model Version 1

Autumn WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1
'Refrigerator&Freezer'	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	1	0	0	1	1	1	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0	0	0	1	1	0	0	1	0
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	1	1	1	1	0
'Dishwasher'	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	1	1	1	0	1	1
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerCRT'	1	1	1	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	1	0	0	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	0	0	0	1	1	1	1	1
'ComputerPortable'	1	0	0	0	0	0	1	1	1	1	0	0	0	1	1	1	1	1	1	0	0	0	1	1

CDA Obtained Estimated Coefficients in KWh/h

Autumn WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0318	-0,0369	-0,0368	-0,0348	-0,0330	-0,0400	-0,0579	-0,0392	-0,0202	0,0000	0,0000	0,0000	0,0000	0,0000	0,0108	0,0186	0,0255	0,0000	-0,0597	-0,0700	0,0000	0,0000	0,0000	-0,0391
'Refrigerator&Freezer'	-0,0139	-0,0163	-0,0155	-0,0158	-0,0189	-0,0245	-0,0389	-0,0375	-0,0254	-0,0208	-0,0155	-0,0157	-0,0166	-0,0216	0,0000	0,0000	0,0000	-0,0299	-0,0826	-0,0662	-0,0314	0,0000	-0,0310	-0,0256
'Freezer'	0,0376	0,0402	0,0409	0,0417	0,0409	0,0396	0,0477	0,0463	0,0454	0,0234	0,0193	0,0135	0,0100	0,0205	0,0356	0,0337	0,0268	0,0330	0,0724	0,0672	0,0226	0,0413	0,0304	0,0577
'ChestFreezer'	0,0139	0,0228	0,0278	0,0309	0,0290	0,0253	0,0394	0,0363	0,0352	0,0336	0,0327	0,0259	0,0252	0,0325	0,0321	0,0310	0,0285	0,0207	0,0233	0,0000	0,0000	-0,0156	-0,0306	0,0000
'electricstove'	0,0613	0,0000	0,0000	0,0000	0,0000	0,0393	0,0554	0,0607	0,0288	0,0173	0,0167	0,0260	0,0317	0,0355	0,0475	0,1057	0,1672	0,1794	0,2028	0,2121	0,1480	0,1362	0,1119	0,0993
'washingMachine'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0168	0,0279	0,0347	0,0355	0,0216	0,0195	0,0130	0,0000	0,0114	0,0261	0,0231	0,0338	0,0000	0,0000	0,0000	0,0000	0,0000	0,0171	0,0000
'tumbleDryer'	0,0291	0,0000	0,0000	0,0000	0,0000	0,0373	0,0645	0,0874	0,0889	0,0418	0,0302	0,0304	0,0275	0,0529	0,0539	0,0641	0,0836	0,1785	0,2652	0,2907	0,1951	0,0536	0,0000	0,0000
'dryingcabinet'	-0,0161	-0,0242	-0,0160	-0,0148	-0,0236	-0,0456	-0,0673	-0,0272	0,0450	0,0318	0,0000	0,0000	0,0000	0,0000	-0,0240	-0,0582	-0,0905	0,0000	0,0668	0,2163	0,4567	0,4384	0,1753	0,0000
'Dishwasher'	-0,0170	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0154	0,0293	0,0524	0,0540	0,0626	0,0626	0,0485	0,0373	0,0353	0,0445	0,0595	0,0462	0,0659	0,1118	0,0677	0,0000	-0,0235
'sauna'	-0,0296	0,0000	0,0000	0,0000	0,0000	-0,0246	-0,0265	-0,0271	-0,0363	-0,0343	-0,0311	-0,0328	-0,0337	-0,0275	-0,0156	0,0000	0,0264	0,0373	0,1059	0,1863	0,1745	0,0624	0,0000	-0,0277
'SQM'	0,1750	0,1687	0,1688	0,1629	0,1750	0,1705	0,2017	0,2186	0,2194	0,2057	0,2207	0,2119	0,2023	0,1839	0,1758	0,1950	0,2770	0,2548	0,2566	0,2967	0,4318	0,4155	0,3247	0,2203
'CRTtv'	-0,0191	0,0000	-0,0059	0,0000	0,0000	-0,0062	0,0135	0,0145	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0280	0,0156	0,0457	0,1060	0,0848	0,0000	-0,0337	-0,0239
'LCDtv'	0,0450	0,0499	0,0387	0,0351	0,0361	0,0354	0,0506	0,0488	0,0564	0,0474	0,0512	0,0416	0,0332	0,0352	0,0503	0,0862	0,0481	0,0456	0,0661	0,0252	0,0345	0,0346	0,0506	0,0479
'ComputerCRT'	0,0563	0,0358	0,0362	0,0313	0,0287	0,0295	0,0000	0,0000	0,0405	0,0332	0,0448	0,0443	0,0627	0,0394	0,0460	0,0584	0,0494	0,0609	0,0000	-0,0626	-0,0409	0,0000	0,0287	0,0437
'ComputerLCD'	0,0360	0,0374	0,0303	0,0270	0,0226	0,0195	0,0214	0,0094	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0201	0,0388	0,0583	0,0546	0,0418	0,0285	0,0337
'ComputerPortable'	0,0091	0,0000	0,0068	0,0097	0,0078	0,0000	-0,0181	-0,0218	-0,0369	-0,0334	-0,0213	-0,0267	-0,0200	-0,0271	-0,0148	0,0343	-0,0490	-0,0317	-0,0398	0,0000	0,0000	0,0361	0,0000	0,0000

CDA Obtained Estimated Coefficients in KWh/h

Autumn WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0217	-0,0246	-0,0340	-0,0298	-0,0337	-0,0351	-0,0490	-0,0427	-0,0469	-0,0387	-0,0225	0,0000	0,0000	0,0000	0,0000	0,0329	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0361
'Refrigerator&Freezer'	0,0000	0,0000	-0,0130	0,0000	-0,0168	-0,0264	-0,0303	-0,0351	-0,0443	-0,0279	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0363	0,0000	0,0000	0,0000
'Freezer'	0,0391	0,0364	0,0370	0,0405	0,0411	0,0382	0,0404	0,0377	0,0413	0,0488	0,0424	0,0000	0,0000	0,0000	0,0248	0,0000	0,0263	0,0490	0,0000	0,0000	0,0460	0,0445	0,0484	0,0650
'ChestFreezer'	0,0000	0,0178	0,0295	0,0302	0,0309	0,0224	0,0274	0,0268	0,0388	0,0400	0,0375	0,0000	0,0234	0,0000	0,0242	0,0000	0,0000	0,0000	-0,0511	-0,0593	0,0000	0,0000	-0,0264	0,0000
'electricstove'	0,0646	0,0000	0,0000	0,0000	0,0000	0,0196	0,0183	0,0357	0,0599	0,0760	0,0931	0,0883	0,1088	0,1367	0,1180	0,0948	0,1258	0,1581	0,2183	0,2197	0,2049	0,1645	0,1177	0,1019
'washingMachine'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0163	0,0370	0,0534	0,0536	0,0258	0,0386	0,0417	0,0339	0,0401	0,0539	0,0537	0,0366	0,0673	0,0000	0,0000	0,0000	0,0000	0,0000
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0338	0,0534	0,0979	0,2063	0,2103	0,1825	0,1312	0,1521	0,1609	0,1276	0,1031	0,0946	0,1614	0,2936	0,2300	0,0959	0,0591	0,0000	0,0000
'dryingcabinet'	0,0000	0,0000	0,0000	0,0000	-0,0241	-0,0358	-0,0366	-0,0471	-0,0590	0,0000	0,0420	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1926	0,2870	0,3067	0,1521	0,0000
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0234	0,0482	0,0658	0,0804	0,0717	0,0691	0,0443	0,0508	0,0000	0,0476	0,0000	0,0990	0,1169	0,0503	0,0265	-0,0192
'sauna'	-0,0201	0,0000	0,0000	0,0000	0,0000	-0,0215	-0,0313	-0,0314	-0,0251	-0,0186	-0,0213	-0,0156	0,0000	0,0000	0,0000	0,0000	0,0687	0,0981	0,1854	0,2148	0,1487	0,0707	0,0268	0,0000
'SQM'	0,2170	0,1982	0,1674	0,1652	0,1683	0,1768	0,1803	0,1746	0,1585	0,1948	0,2217	0,2605	0,2133	0,2177	0,1969	0,2570	0,3398	0,2908	0,4142	0,4744	0,3786	0,3883	0,3767	0,2739
'CRTtv'	-0,0235	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0198	0,0000	0,0000	0,0296	0,0244	0,0000	-0,0282	0,0000	0,0904	0,1119	0,0528	0,0000	-0,0521	-0,0362
'LCDtv'	0,0388	0,0505	0,0459	0,0420	0,0382	0,0341	0,0414	0,0503	0,0512	0,0308	0,0265	0,0000	0,0152	0,0473	0,0517	0,0475	0,0424	0,0349	0,0704	0,0479	0,0435	0,0375	0,0261	0,0317
'ComputerCRT'	0,0474	0,0332	0,0263	0,0295	0,0286	0,0332	0,0360	0,0262	0,0415	0,0000	0,0408	0,0000	0,0397	0,0000	0,0745	0,1133	0,0953	0,1281	0,1299	0,0000	0,0000	0,0000	0,0765	0,0611
'ComputerLCD'	0,0434	0,0463	0,0369	0,0357	0,0265	0,0179	0,0154	0,0110	0,0000	0,0000	0,0287	0,0390	0,0355	0,0295	0,0220	0,0000	0,0000	0,0000	0,0000	0,0483	0,0367	0,0410	0,0377	0,0466
'ComputerPortable'	0,0117	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0192	-0,0355	-0,0429	-0,0275	0,0000	0,0000	0,0000	-0,0475	-0,0357	-0,0263	-0,0487	-0,0578	-0,0642	0,0000	0,0000	0,0000	0,0268	0,0193

Results from Secondary Model Version 1 Winter

INMODEL Secondary Model Version 1																								
Winter WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	0	0	1	1	1	1	1	0	1
'Refrigerator&Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0
'Freezer'	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	0	0	1	1	0	1	1	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	0	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	0	1	1	1	1	1	0	0	0	1	1	1	0	0	0	1	1	0	0
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	0	0	0	1	1	1	0	1	1	1	1	0	1	1
'dryingcabinet'	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	0	1	1	1	1	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1
'LCDtv'	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0
'ComputerCRT'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	0	0	1	1	0	0	0	1	1	1	0	0	1	1	0	0	0	1	1	1	1	1	1

INMODEL Secondary Model Version 1																								
Winter WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	1
'Refrigerator&Freezer'	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0
'Freezer'	1	1	0	1	1	0	1	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0	1
'ChestFreezer'	1	0	0	1	1	0	0	1	1	1	1	0	0	0	0	1	0	0	0	1	0	0	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	1	0
'tumbleDryer'	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1
'dryingcabinet'	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	1	1	1	1	1
'Dishwasher'	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	1	0	0	1	1	1	1	1
'LCDtv'	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	1
'ComputerCRT'	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	1	0	1	1	1	0	0	0	0	1	0	1	1	1	1	0	1	1	1

CDA Obtained Estimated Coefficients in KWh/h																								
Winter WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0506	-0,0518	-0,0454	-0,0419	-0,0410	-0,0476	-0,0859	-0,0726	-0,0337	0,0000	0,0000	0,0000	0,0000	-0,0266	-0,0160	0,0000	0,0000	-0,0500	-0,1073	-0,1035	-0,0571	-0,0274	0,0000	-0,0416
'Refrigerator&Freezer'	-0,0194	-0,0244	-0,0211	-0,0199	-0,0232	-0,0352	-0,0584	-0,0506	-0,0461	-0,0410	-0,0139	-0,0143	0,0000	-0,0249	0,0000	0,0000	0,0000	-0,0567	-0,0608	-0,0767	-0,0472	0,0000	0,0000	0,0000
'Freezer'	0,0314	0,0286	0,0247	0,0297	0,0287	0,0244	0,0344	0,0245	0,0186	-0,0132	0,0000	-0,0199	-0,0177	0,0000	0,0000	0,0184	0,0000	0,0000	0,0618	0,0495	0,0000	0,0343	0,0209	0,0516
'ChestFreezer'	0,0000	0,0126	0,0153	0,0251	0,0284	0,0164	0,0198	0,0201	0,0262	0,0179	0,0244	0,0000	0,0000	0,0141	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0265	-0,0433	-0,0389	-0,0518	-0,0352
'electricstove'	0,0935	0,0000	0,0000	0,0000	0,0000	0,0647	0,0906	0,1126	0,0531	0,0321	0,0290	0,0584	0,0628	0,0637	0,0777	0,1307	0,1793	0,1894	0,2029	0,2424	0,2063	0,1976	0,1761	0,1351
'washingMachine'	-0,0189	0,0000	0,0000	0,0000	0,0000	0,0000	0,0245	0,0311	0,0345	0,0152	0,0162	0,0000	0,0000	0,0000	0,0157	0,0322	0,0201	0,0000	0,0000	0,0000	-0,0291	-0,0174	0,0000	0,0000
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0260	0,0323	0,0436	0,0407	0,0232	0,0000	0,0000	0,0000	0,0326	0,0258	0,0536	0,0000	0,0956	0,2064	0,2420	0,1386	0,0000	-0,0523	-0,0548
'dryingcabinet'	-0,0565	-0,0549	-0,0637	-0,0546	-0,0616	-0,0874	-0,1125	-0,0929	0,0000	0,0000	-0,0434	-0,0513	-0,0438	0,0000	-0,0405	-0,0647	-0,0801	-0,0796	0,0000	0,2006	0,4061	0,3954	0,1229	-0,0399
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0240	0,0355	0,0522	0,0579	0,0815	0,0878	0,0834	0,0894	0,0745	0,0694	0,0670	0,1053	0,1113	0,0756	0,0984	0,1602	0,1051	0,0399	0,0000
'sauna'	-0,0402	0,0000	0,0000	0,0000	0,0000	-0,0403	-0,0498	-0,0545	-0,0485	-0,0529	-0,0509	-0,0529	-0,0436	-0,0450	-0,0343	-0,0123	0,0269	0,0410	0,0996	0,2028	0,1730	0,0559	-0,0183	-0,0417
'SQM'	0,2808	0,2512	0,2505	0,2431	0,2504	0,2322	0,2555	0,2987	0,3188	0,3095	0,3263	0,3182	0,3147	0,2901	0,2864	0,2982	0,3533	0,3760	0,3841	0,3322	0,4668	0,4719	0,4145	0,3464
'CRTtv'	-0,0686	-0,0446	-0,0449	-0,0452	-0,0422	-0,0313	0,0000	0,0000	0,0000	0,0000	-0,0259	-0,0202	-0,0301	-0,0268	-0,0291	-0,0424	-0,0515	-0,0257	0,0000	0,0886	0,0524	-0,0410	-0,0918	-0,0790
'LCDtv'	0,0000	0,0199	0,0167	0,0000	0,0000	0,0132	0,0218	0,0156	0,0362	0,0315	0,0223	0,0149	0,0123	0,0272	0,0331	0,0309	0,0345	0,0313	0,0438	0,0307	0,0000	-0,0241	-0,0187	0,0000
'ComputerCRT'	0,0766	0,0575	0,0519	0,0408	0,0380	0,0432	0,0357	0,0395	0,0617	0,0277	0,0213	0,0281	0,0476	0,0429	0,0457	0,0482	0,0697	0,1030	0,0000	0,0000	0,0453	0,0470	0,0826	0,0796
'ComputerLCD'	0,1060	0,1111	0,1049	0,0976	0,0931	0,0837	0,0820	0,0638	0,0522	0,0590	0,0573	0,0611	0,0621	0,0555	0,0561	0,0580	0,0591	0,0816	0,1031	0,1315	0,1212	0,0933	0,0865	0,1080
'ComputerPortable'	0,0237	0,0000	0,0000	0,0126	0,0157	0,0000	0,0000	0,0000	-0,0175	-0,0223	-0,0159	0,0000	0,0000	-0,0181	-0,0177	0,0000	0,0000	0,0000	0,0267	0,0533	0,0509	0,0752	0,0598	0,0339

CDA Obtained Estimated Coefficients in KWh/h																								
Winter WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0337	-0,0387	-0,0283	-0,0324	-0,0317	-0,0425	-0,0802	-0,0690	-0,0603	-0,0543	-0,0630	-0,0346	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0836	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0543
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0288	-0,0507	-0,0580	-0,0605	-0,0670	-0,0622	-0,0565	0,0000	0,0000	0,0000	0,0000	-0,0335	-0,0532	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Freezer'	0,0257	0,0207	0,0000	0,0194	0,0201	0,0000	0,0212	0,0000	0,0000	0,0284	0,0246	0,0000	0,0000	0,0000	0,0000	0,0000	0,0389	0,0670	0,0000	0,0000	0,0000	0,0000	0,0000	0,0591
'ChestFreezer'	-0,0213	0,0000	0,0000	0,0148	0,0233	0,0000	0,0000	0,0173	0,0225	0,0403	0,0333	0,0000	0,0000	0,0000	0,0000	-0,0334	0,0000	0,0000	0,0000	-0,0498	0,0000	0,0000	-0,0356	-0,0351
'electricstove'	0,0860	0,0000	0,0000	0,0000	0,0000	0,0638	0,0508	0,0509	0,0736	0,0689	0,1133	0,1703	0,1274	0,1364	0,1121	0,1147	0,1494	0,1737	0,1560	0,2116	0,2119	0,1935	0,1890	0,1322
'washingMachine'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0146	0,0335	0,0340	0,0441	0,0297	0,0000	0,0325	0,0274	0,0270	0,0309	0,0540	0,0462	0,0459	0,0000	0,0000	0,0000	-0,0345	0,0000
'tumbleDryer'	-0,0334	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0365	0,0993	0,1261	0,1332	0,1265	0,0691	0,1196	0,1197	0,0928	0,0664	0,1342	0,2148	0,1835	0,0741	0,0000	0,0000	-0,0510
'dryingcabinet'	-0,0727	-0,0656	-0,0657	-0,0512	-0,0504	-0,0691	-0,0726	-0,0742	-0,0588	-0,0525	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1033	0,0000	0,1904	0,3312	0,2767	0,0654	-0,0651
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0157	0,0333	0,0794	0,1006	0,1059	0,1207	0,0992	0,0859	0,0846	0,0878	0,0818	0,0772	0,0641	0,1462	0,1496	0,1006	0,0690	0,0000
'sauna'	-0,0377	0,0000	0,0000	0,0000	0,0000	-0,0477	-0,0527	-0,0476	-0,0423	-0,0468	-0,0520	-0,0555	-0,0528	-0,0332	0,0000	0,0000	0,0272	0,0973	0,1558	0,1620	0,1290	0,0547	0,0000	-0,0410
'SQM'	0,3020	0,2910	0,2740	0,2594	0,2549	0,2363	0,2094	0,2301	0,2698	0,3024	0,3083	0,3194	0,3604	0,3396	0,2930	0,3228	0,3777	0,3628	0,4934	0,4708	0,4520	0,4419	0,4038	0,3669
'CRTtv'	-0,0651	-0,0559	-0,0531	-0,0469	-0,0436	-0,0374	-0,0294	-0,0152	-0,0250	0,0000	0,0000	0,0000	0,0000	-0,0266	0,0000	0,0000	-0,0497	0,0000	0,0000	0,0881	0,0556	-0,0359	-0,0878	-0,0867
'LCDtv'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0155	0,0395	0,0522	0,0698	0,0475	0,0312	0,0445	0,0203	0,0400	0,0480	0,0534	0,0551	0,0000	0,0000	0,0368	0,0000	-0,0213	-0,0210
'ComputerCRT'	0,0872	0,0835	0,0684	0,0594	0,0541	0,0531	0,0664	0,0495	0,0744	0,0000	0,0394	0,0443	0,0434	0,0623	0,0631	0,1183	0,1667	0,1815	0,1210	0,0000	0,0000	0,0547	0,0930	0,1047
'ComputerLCD'	0,1409	0,1510	0,1481	0,1237	0,1053	0,0957	0,0881	0,0799	0,0653	0,0737	0,0830	0,0792	0,0857	0,0780	0,0761	0,0855	0,0734	0,0743	0,0874	0,1334	0,1172	0,0974	0,0969	0,1395
'ComputerPortable'	0,0366	0,0316	0,0216	0,0221	0,0209	0,0133	0,0000	-0,0238	-0,0326	-0,0204	0,0000	0,0000	0,0000	0,0000	-0,0273	0,0000	-0,0415	-0,0396	0,0498	0,0484	0,0000	0,0547	0,0625	0,0544

Results from Secondary Model Version 1 Spring

INMODEL Secondary Model Version 1																								
Spring WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	1	1	1	1	0	1	1
'Refrigerator&Freezer'	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	1	1	0	0	1	1	1	0	0	0	1	0	0	0
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	0	0	0	1	1	1	0	1	1	1	1	0	1	1
'dryingcabinet'	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	1	1
'Dishwasher'	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	0	1	1	1	0	0	0	0	0	1	0	1	0	0	1	0	1	1	1	0	1	1
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'ComputerCRT'	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	0	0	0	1	0	1	0	0	0	0	1	1	1	1	1	1
'ComputerPortable'	1	0	0	0	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1

INMODEL Secondary Model Version 1																								
Spring WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0	1	0	0	0	0	1	1
'Refrigerator&Freezer'	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0	1	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	0	1	1	1	1	0
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	1	1
'dryingcabinet'	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
'Dishwasher'	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'ComputerCRT'	1	1	0	0	0	1	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1
'ComputerPortable'	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	1	0	1	1	0

CDA Obtained Estimated Coefficients in KWh/h																								
Spring WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0389	-0,0440	-0,0398	-0,0360	-0,0342	-0,0482	-0,0605	-0,0508	-0,0313	0,0000	-0,0141	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0189	-0,0256	-0,0801	-0,0758	-0,0476	0,0000	-0,0189	-0,0517
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0226	-0,0285	-0,0336	-0,0232	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0323	-0,0391	0,0000	0,0000	0,0000	0,0000
'Freezer'	0,0421	0,0448	0,0436	0,0466	0,0449	0,0426	0,0547	0,0471	0,0431	0,0231	0,0336	0,0120	0,0138	0,0135	0,0263	0,0358	0,0391	0,0420	0,0708	0,0459	0,0318	0,0431	0,0476	0,0689
'ChestFreezer'	0,0000	0,0219	0,0273	0,0334	0,0350	0,0375	0,0451	0,0301	0,0255	0,0275	0,0409	0,0152	0,0112	0,0232	0,0206	0,0261	0,0229	0,0000	0,0000	-0,0309	-0,0392	-0,0316	-0,0259	-0,0196
'electricstove'	0,0873	0,0000	0,0000	0,0000	0,0000	0,0354	0,0615	0,0643	0,0449	0,0397	0,0439	0,0471	0,0435	0,0458	0,0614	0,0837	0,1381	0,1340	0,1482	0,1768	0,1302	0,1349	0,1652	0,1362
'washingMachine'	-0,0157	0,0000	0,0000	0,0000	0,0000	0,0116	0,0128	0,0168	0,0281	0,0163	0,0199	0,0106	0,0000	0,0000	0,0259	0,0298	0,0271	0,0000	0,0000	0,0000	-0,0341	0,0000	0,0000	0,0000
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0306	0,0432	0,0491	0,0379	0,0369	0,0000	0,0000	0,0000	0,0188	0,0267	0,0532	0,0000	0,0471	0,1017	0,1694	0,1196	0,0000	-0,0382	-0,0461
'dryingcabinet'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0386	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0269	-0,0504	-0,0778	0,0000	0,0000	0,0000	0,2096	0,4235	0,3090	0,0619
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0269	0,0333	0,0386	0,0448	0,0512	0,0542	0,0439	0,0239	0,0406	0,0507	0,1025	0,0556	0,0948	0,1512	0,0938	0,0265	0,0000
'sauna'	-0,0239	0,0000	0,0000	0,0000	0,0000	-0,0268	-0,0236	-0,0277	-0,0278	-0,0209	-0,0276	-0,0297	-0,0303	-0,0249	-0,0217	0,0000	0,0423	0,0357	0,1148	0,2112	0,2344	0,0917	0,0000	-0,0196
'SQM'	0,1948	0,1786	0,1520	0,1551	0,1568	0,1351	0,1519	0,1806	0,1729	0,1794	0,1739	0,1820	0,1839	0,1700	0,1799	0,1736	0,2150	0,1528	0,1832	0,1957	0,3295	0,3328	0,3209	0,2684
'CRTtv'	-0,0276	-0,0141	0,0000	-0,0067	-0,0108	-0,0094	0,0000	0,0000	0,0000	0,0000	0,0000	0,0115	0,0000	0,0102	0,0000	0,0000	-0,0333	0,0000	0,0300	0,1131	0,0879	0,0000	-0,0526	-0,0424
'LCDtv'	0,0252	0,0311	0,0300	0,0221	0,0178	0,0196	0,0300	0,0266	0,0168	0,0273	0,0296	0,0285	0,0116	0,0272	0,0246	0,0340	0,0352	0,0402	0,0758	0,0655	0,0549	0,0369	0,0000	0,0000
'ComputerCRT'	0,0452	0,0273	0,0147	0,0000	0,0140	0,0200	0,0179	0,0000	0,0237	0,0173	0,0256	0,0258	0,0351	0,0326	0,0229	0,0359	0,0404	0,0688	0,0000	-0,0576	0,0000	0,0000	0,0814	0,0573
'ComputerLCD'	0,0415	0,0447	0,0396	0,0342	0,0355	0,0287	0,0245	0,0076	0,0000	0,0000	0,0000	0,0088	0,0000	0,0093	0,0000	0,0000	0,0000	0,0000	0,0337	0,0583	0,0656	0,0441	0,0366	0,0402
'ComputerPortable'	0,0105	0,0000	0,0000	0,0000	0,0087	0,0000	-0,0099	-0,0190	-0,0130	-0,0230	-0,0270	-0,0235	0,0000	-0,0177	-0,0200	-0,0260	-0,0406	-0,0235	-0,0280	0,0000	0,0629	0,0560	0,0671	0,0410

CDA Obtained Estimated Coefficients in KWh/h																								
Spring WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0368	-0,0418	-0,0394	-0,0363	-0,0356	-0,0484	-0,0669	-0,0589	-0,0483	-0,0488	-0,0312	0,0000	0,0000	0,0000	-0,0279	0,0000	0,0000	-0,0498	0,0000	0,0000	0,0000	0,0000	-0,0237	-0,0407
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0193	-0,0320	-0,0375	-0,0388	-0,0262	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'Freezer'	0,0330	0,0328	0,0347	0,0373	0,0376	0,0375	0,0471	0,0416	0,0395	0,0308	0,0196	0,0000	0,0000	0,0000	0,0312	0,0280	0,0352	0,0855	0,0681	0,0000	0,0000	0,0000	0,0445	0,0577
'ChestFreezer'	0,0000	0,0214	0,0267	0,0274	0,0271	0,0260	0,0312	0,0271	0,0289	0,0276	0,0247	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0446	0,0000	-0,0434	-0,0650	-0,0553	-0,0277	0,0000
'electricstove'	0,0884	0,0000	0,0000	0,0000	0,0000	0,0353	0,0255	0,0396	0,0556	0,0658	0,1061	0,1055	0,1074	0,0752	0,0762	0,1003	0,0913	0,0857	0,1655	0,1855	0,2044	0,2171	0,1620	0,1283
'washingMachine'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0175	0,0355	0,0466	0,0337	0,0258	0,0283	0,0209	0,0345	0,0428	0,0353	0,0368	0,0579	0,0560	0,0000	0,0000	0,0000	0,0000	0,0000
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0298	0,0201	0,0700	0,1044	0,1100	0,0912	0,0519	0,0374	0,0661	0,0499	0,0410	0,0564	0,0000	0,0865	0,0880	0,0819	0,0000	-0,0541	-0,0312
'dryingcabinet'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0294	-0,0356	-0,0376	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1095	0,3264	0,1328	0,0831
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0361	0,0534	0,0515	0,0585	0,0466	0,0547	0,0535	0,0566	0,0562	0,0645	0,0513	0,1011	0,0818	0,0550	0,0636	0,0000
'sauna'	-0,0279	0,0000	0,0000	0,0000	0,0000	-0,0307	-0,0316	-0,0378	-0,0341	-0,0227	-0,0209	-0,0261	-0,0260	-0,0209	0,0000	0,0000	0,0547	0,0710	0,1686	0,2083	0,1794	0,0658	0,0000	-0,0205
'SQM'	0,1838	0,1837	0,1663	0,1626	0,1659	0,1361	0,1380	0,1521	0,1227	0,1639	0,1772	0,2149	0,2100	0,1964	0,1547	0,1652	0,1794	0,1824	0,2519	0,3101	0,3474	0,3272	0,3050	0,2382
'CRTtv'	-0,0190	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0174	0,0219	0,0281	0,0420	0,0215	0,0211	0,0000	0,0000	0,0000	0,0000	0,0724	0,0866	0,0304	-0,0602	-0,0333
'LCDtv'	0,0373	0,0394	0,0300	0,0272	0,0223	0,0221	0,0192	0,0294	0,0362	0,0300	0,0267	0,0377	0,0428	0,0408	0,0588	0,0640	0,0745	0,0344	0,0808	0,0528	0,1034	0,0570	0,0000	0,0270
'ComputerCRT'	0,0344	0,0292	0,0000	0,0000	0,0000	0,0172	0,0248	0,0213	0,0488	0,0273	0,0406	0,0000	0,0000	0,0000	0,0323	0,0562	0,0764	0,1242	0,0833	0,0000	0,0000	0,0000	0,0584	0,0368
'ComputerLCD'	0,0573	0,0635	0,0521	0,0423	0,0309	0,0266	0,0213	0,0105	0,0000	0,0191	0,0167	0,0197	0,0295	0,0257	0,0229	0,0000	0,0000	0,0000	0,0000	0,0435	0,0508	0,0350	0,0218	0,0465
'ComputerPortable'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0191	-0,0272	-0,0414	-0,0652	0,0000	0,0000	0,0405	0,0000	0,0311	0,0347	0,0000

Results from Secondary Model Version 1 Summer

INMODEL Secondary Model Version 1																								
Summer WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	0	1	1	1	0	0	0	1	1	1	1	1	1	0	1	1	0	0	0
'Refrigerator&Freezer'	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	0
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	0	1	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	1	0	0	0	1	1	1	0	1	1	0	0	1	0
'tumbleDryer'	0	0	0	0	0	0	1	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
'dryingcabinet'	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	0	0	0	1	1	0	1	0	1	1	1	0	0	1	1	1	0	0	1	1	1	0	0	0
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
'ComputerCRT'	1	1	1	0	0	0	0	1	1	0	0	0	1	1	0	1	0	1	1	1	1	0	0	0
'ComputerLCD'	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1
'ComputerPortable'	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0

INMODEL Secondary Model Version 1																								
Summer WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
'Refrigerator&Freezer'	1	1	0	0	0	0	1	1	1	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0
'Freezer'	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	0	0	0	0	0	1	1
'ChestFreezer'	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	0	0
'tumbleDryer'	0	0	0	0	0	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	0	1	1
'dryingcabinet'	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	1	1	0	0	1	0	1
'Dishwasher'	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	0	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	1	1	1
'ComputerCRT'	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0
'ComputerLCD'	1	1	1	1	1	1	0	0	1	0	0	1	1	0	0	0	1	0	0	0	0	1	1	1
'ComputerPortable'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	1	0	0

CDA Obtained Estimated Coefficients in KWh/h																								
Summer WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0156	-0,0172	-0,0168	-0,0122	-0,0073	0,0000	-0,0276	-0,0154	-0,0127	0,0000	0,0000	0,0000	0,0192	0,0158	0,0104	0,0262	0,0197	0,0379	0,0000	-0,0690	-0,0390	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0242	-0,0314	-0,0272	-0,0217	-0,0178	-0,0225	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0235	-0,0633	-0,0529	-0,0270	-0,0306	0,0000
'Freezer'	0,0200	0,0220	0,0222	0,0224	0,0213	0,0186	0,0353	0,0390	0,0283	0,0151	0,0110	0,0000	0,0000	0,0000	0,0000	0,0165	0,0261	0,0179	0,0522	0,0527	0,0000	0,0000	0,0164	0,0316
'ChestFreezer'	0,0000	0,0122	0,0164	0,0189	0,0179	0,0142	0,0329	0,0334	0,0375	0,0235	0,0350	0,0146	0,0109	0,0227	0,0223	0,0196	0,0243	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0242	-0,0116
'electricstove'	0,0709	0,0000	0,0000	0,0000	0,0000	0,0432	0,0304	0,0258	0,0140	0,0267	0,0232	0,0453	0,0489	0,0497	0,0540	0,0564	0,1065	0,1039	0,0733	0,1418	0,1578	0,1364	0,1298	0,1116
'washingMachine'	-0,0212	0,0000	0,0000	0,0000	0,0000	0,0071	0,0140	0,0303	0,0285	0,0236	0,0174	0,0000	0,0000	0,0000	0,0148	0,0162	0,0337	0,0000	0,0352	0,0402	0,0000	0,0000	0,0254	0,0000
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0414	0,0360	0,0377	0,0000	0,0000	0,0000	0,0000	0,0351	0,0232	0,0291	0,0296	0,0761	0,1296	0,1888	0,1861	0,0515	-0,0430	-0,0258
'dryingcabinet'	0,0000	-0,0325	-0,0293	-0,0227	-0,0271	-0,0441	-0,0634	-0,0370	0,0000	-0,0271	-0,0278	-0,0277	-0,0536	-0,0480	-0,0582	-0,0723	-0,0938	-0,0675	0,0000	0,0000	0,1760	0,1748	0,2243	0,0383
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0149	0,0121	0,0099	0,0216	0,0408	0,0525	0,0728	0,0621	0,0452	0,0427	0,0343	0,0484	0,0758	0,0771	0,0332	0,0896	0,0718	0,0000	-0,0173
'sauna'	-0,0281	0,0000	0,0000	0,0000	0,0000	-0,0245	-0,0211	-0,0256	-0,0312	-0,0242	-0,0279	-0,0317	-0,0301	-0,0197	-0,0217	-0,0210	0,0000	0,0000	0,0507	0,1322	0,1584	0,0782	-0,0123	-0,0347
'SQM'	0,1736	0,1597	0,1586	0,1422	0,1436	0,1304	0,1489	0,1735	0,1825	0,2084	0,2276	0,2609	0,2534	0,2143	0,2046	0,1885	0,2454	0,2136	0,1921	0,1797	0,2848	0,3346	0,2913	0,2085
'CRTtv'	0,0000	0,0000	0,0000	0,0074	0,0051	0,0000	0,0136	0,0000	0,0099	0,0113	0,0168	0,0000	0,0000	0,0169	0,0218	0,0404	0,0000	0,0000	0,0315	0,1067	0,0823	0,0000	0,0000	0,0000
'LCDtv'	0,0384	0,0351	0,0331	0,0335	0,0291	0,0317	0,0506	0,0460	0,0511	0,0452	0,0525	0,0264	0,0302	0,0336	0,0544	0,1054	0,0616	0,0554	0,0612	0,0681	0,0448	0,0000	0,0353	0,0376
'ComputerCRT'	0,0350	0,0119	0,0109	0,0000	0,0000	0,0000	0,0000	0,0174	0,0231	0,0000	0,0000	0,0000	0,0178	0,0211	0,0000	0,0307	0,0000	0,0256	0,0544	-0,0467	-0,0645	0,0000	0,0000	0,0000
'ComputerLCD'	0,0348	0,0418	0,0268	0,0160	0,0112	0,0050	0,0000	-0,0087	-0,0137	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0133	0,0000	0,0356	0,0491	0,0293	0,0178	0,0392
'ComputerPortable'	0,0000	0,0000	-0,0060	-0,0064	-0,0075	-0,0113	-0,0338	-0,0334	-0,0359	-0,0346	-0,0293	-0,0223	-0,0292	-0,0294	-0,0300	0,0135	-0,0598	-0,0629	-0,0685	-0,0726	-0,0427	0,0000	0,0000	0,0000

CDA Obtained Estimated Coefficients in KWh/h																								
Summer WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0,0000	0,0000	-0,0128	-0,0110	-0,0108	0,0000	-0,0221	-0,0147	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0552	0,0000	0,0000	0,0000	0,0000	0,0000	0,0412	0,0000	0,0000
'Refrigerator&Freezer'	0,0142	0,0130	0,0000	0,0000	0,0000	0,0000	-0,0216	-0,0285	-0,0207	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0340	-0,0296	-0,0466	-0,0531	0,0000	-0,0568	0,0000	0,0000	0,0000
'Freezer'	0,0148	0,0133	0,0197	0,0227	0,0230	0,0183	0,0251	0,0252	0,0202	0,0183	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0256	0,0458	0,0000	0,0000	0,0000	0,0000	0,0205	0,0201
'ChestFreezer'	0,0000	0,0000	0,0123	0,0198	0,0154	0,0115	0,0187	0,0165	0,0256	0,0228	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0226	-0,0300
'electricstove'	0,0925	0,0000	0,0000	0,0000	0,0000	0,0340	0,0343	0,0225	0,0348	0,0809	0,1018	0,0873	0,0856	0,0835	0,0763	0,0626	0,0861	0,1037	0,1440	0,1938	0,1710	0,1774	0,1447	0,1190
'washingMachine'	-0,0193	0,0000	0,0000	0,0000	0,0000	0,0000	0,0133	0,0369	0,0509	0,0223	0,0000	0,0221	0,0248	0,0245	0,0215	0,0462	0,0377	0,0350	0,0753	0,0000	0,0554	0,0303	0,0000	0,0000
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0174	0,0256	0,0908	0,0952	0,1009	0,0426	0,0000	0,0456	0,0558	0,0000	0,0610	0,0646	0,1359	0,1952	0,0971	0,0000	-0,0458	-0,0450
'dryingcabinet'	-0,0470	-0,0405	-0,0300	-0,0172	-0,0235	-0,0295	-0,0450	-0,0412	-0,0384	0,0000	0,0000	-0,0457	-0,0706	0,0000	0,0000	0,0000	-0,1137	-0,1078	0,0000	0,0000	0,1723	0,2050	0,0000	-0,0666
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0223	0,0405	0,0420	0,0728	0,0829	0,0704	0,0690	0,0658	0,0404	0,0581	0,0000	0,0638	0,0859	0,0563	0,0319	0,0000
'sauna'	-0,0299	0,0000	0,0000	0,0000	0,0000	-0,0249	-0,0332	-0,0358	-0,0355	-0,0302	-0,0375	-0,0416	-0,0256	-0,0280	-0,0251	0,0000	0,0000	0,0000	0,0668	0,1291	0,1186	0,0511	0,0000	-0,0299
'SQM'	0,1840	0,1807	0,1553	0,1551	0,1591	0,1421	0,1435	0,1561	0,1741	0,1688	0,2024	0,2063	0,2500	0,2248	0,2135	0,2348	0,2344	0,1974	0,2036	0,2701	0,3058	0,2984	0,2516	0,2117
'CRTtv'	0,0000	0,0000	0,0102	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0306	0,0668	0,0634	0,0508	0,0395	0,0000	0,0000	0,0000	0,0420	0,0804	0,1121	0,0806	0,0483	0,0000	0,0000
'LCDtv'	0,0392	0,0374	0,0369	0,0294	0,0223	0,0273	0,0354	0,0348	0,0469	0,0567	0,0659	0,0537	0,0459	0,0496	0,0000	0,0494	0,0538	0,0481	0,0000	0,0000	0,0845	0,0541	0,0223	0,0280
'ComputerCRT'	0,0198	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0437	0,0000	0,0554	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0617	0,0000	0,0000
'ComputerLCD'	0,0492	0,0556	0,0463	0,0227	0,0166	0,0083	0,0000	0,0000	-0,0141	0,0000	0,0000	0,0177	0,0170	0,0000	0,0000	0,0000	-0,0230	0,0000	0,0000	0,0000	0,0000	0,0242	0,0225	0,0421
'ComputerPortable'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0078	-0,0209	-0,0290	-0,0470	-0,0476	-0,0458	-0,0380	-0,0401	-0,0516	0,0000	-0,0385	-0,0623	-0,0581	0,0000	0,0000	-0,0611	-0,0410	0,0000	0,0000

Results from Secondary Model Version 2 Autumn

INMODEL Secondary Model Version 2

Autumn WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0	1	1	0	0	0	1
'Refrigerator&Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1
'ChestFreezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	1	1	0	1	1
'tumbleDryer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	0	1	1	1	1	0	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	0	1	0	0	0	1	1	0	0	0	1	1	0	0	0	1	0	1	1	1	1	1	1
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1
'ComputerCRT'	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	0	0	1	0	1	0	0

INMODEL Secondary Model Version 2

Autumn WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	1	0	1
'Refrigerator&Freezer'	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	1
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0	1	0	0	1	1	1	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	1	0	1	0	0	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	1	0	0	1	1	1	1	0	0	0	0	0	1	1	0	0	0	1	1	1	0	0
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1
'LCDtv'	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1
'ComputerCRT'	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	1	1	1	1	1
'ComputerPortable'	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1

CDA Obtained Estimated Coefficients in KWh/h

Autumn WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0344	-0,0368	-0,0367	-0,0347	-0,0328	-0,0404	-0,0565	-0,0376	-0,0210	0,0000	0,0000	0,0000	0,0000	0,0000	0,0124	0,0226	0,0322	0,0000	-0,0450	-0,0592	0,0000	0,0000	0,0000	-0,0419
'Refrigerator&Freezer'	-0,0235	-0,0161	-0,0153	-0,0156	-0,0185	-0,0301	-0,0435	-0,0425	-0,0281	-0,0220	-0,0167	-0,0165	-0,0220	-0,0250	0,0000	0,0000	0,0000	-0,0403	-0,0855	-0,0794	-0,0575	-0,0240	-0,0454	-0,0398
'Freezer'	0,0335	0,0408	0,0414	0,0422	0,0416	0,0355	0,0419	0,0405	0,0401	0,0205	0,0170	0,0117	0,0000	0,0189	0,0338	0,0322	0,0228	0,0257	0,0572	0,0608	0,0000	0,0234	0,0162	0,0482
'ChestFreezer'	0,0085	0,0225	0,0282	0,0313	0,0297	0,0188	0,0331	0,0312	0,0275	0,0280	0,0268	0,0210	0,0181	0,0259	0,0247	0,0246	0,0175	0,0000	0,0000	0,0000	0,0000	-0,0292	-0,0474	-0,0157
'electricstove'	0,0531	0,0000	0,0000	0,0000	0,0000	0,0425	0,0644	0,0826	0,0518	0,0418	0,0402	0,0503	0,0505	0,0556	0,0719	0,1333	0,2027	0,2062	0,2303	0,2758	0,2393	0,1873	0,1288	0,0905
'washingMachine'	0,0294	0,0000	0,0000	0,0000	0,0000	0,0223	0,0523	0,0474	0,0242	0,0000	0,0000	0,0000	0,0000	-0,0217	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0824	-0,0860	0,0000	0,0516	0,0638
'tumbleDryer'	0,0309	0,0000	0,0000	0,0000	0,0000	0,0625	0,1139	0,1526	0,1440	0,0791	0,0649	0,0802	0,0615	0,0768	0,0837	0,0900	0,1400	0,2551	0,3915	0,4097	0,3233	0,1387	0,0000	0,0000
'dryingcabinet'	-0,0207	-0,0177	0,0000	0,0000	0,0000	-0,0448	-0,0690	-0,0507	0,0317	0,0680	0,0000	0,0000	0,0000	-0,0254	-0,0469	-0,0831	-0,0701	0,0000	0,1108	0,1102	0,2274	0,2013	0,0000	-0,0305
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0349	0,0229	0,0182	0,0603	0,0885	0,0924	0,1014	0,0956	0,0858	0,0651	0,0439	0,0940	0,1333	0,1493	0,1150	0,1082	0,0658	0,0446	-0,0227
'sauna'	-0,1237	0,0000	0,0000	0,0000	0,0000	-0,1008	-0,1133	-0,1118	-0,1135	-0,1041	-0,0925	-0,0992	-0,1104	-0,0916	-0,0855	-0,0766	-0,0717	-0,0495	0,0420	0,1442	0,1133	-0,0343	-0,1471	-0,1614
'SQM'	0,1639	0,1670	0,1669	0,1612	0,1722	0,1570	0,1933	0,2205	0,2153	0,1911	0,2096	0,2012	0,1915	0,1778	0,1743	0,2009	0,2665	0,2392	0,2294	0,3108	0,4680	0,4313	0,3214	0,2110
'CRTtv'	-0,0187	0,0000	-0,0057	0,0000	0,0000	0,0000	0,0131	0,0123	0,0000	0,0000	0,0000	-0,0103	-0,0097	0,0000	0,0000	0,0000	-0,0272	0,0000	0,0282	0,0862	0,0680	-0,0166	-0,0356	-0,0221
'LCDtv'	0,0418	0,0464	0,0383	0,0347	0,0354	0,0295	0,0367	0,0337	0,0409	0,0349	0,0380	0,0228	0,0166	0,0231	0,0347	0,0748	0,0299	0,0000	0,0284	0,0000	0,0355	0,0324	0,0490	0,0463
'ComputerCRT'	0,0602	0,0367	0,0366	0,0317	0,0294	0,0221	0,0000	0,0000	0,0215	0,0150	0,0251	0,0246	0,0474	0,0206	0,0303	0,0448	0,0300	0,0344	0,0000	-0,0919	-0,0711	0,0000	0,0264	0,0542
'ComputerLCD'	0,0271	0,0378	0,0301	0,0268	0,0224	0,0120	0,0131	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0130	0,0309	0,0536	0,0502	0,0346	0,0153	0,0225
'ComputerPortable'	0,0071	0,0067	0,0072	0,0102	0,0085	0,0000	-0,0096	-0,0116	-0,0316	-0,0331	-0,0192	-0,0239	-0,0192	-0,0238	0,0000	0,0466	-0,0301	0,0000	0,0000	0,0339	0,0000	0,0335	0,0000	0,0000

CDA Obtained Estimated Coefficients in KWh/h

Autumn WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0188	-0,0239	-0,0336	-0,0298	-0,0334	-0,0361	-0,0494	-0,0402	-0,0439	-0,0368	0,0000	0,0000	0,0000	0,0000	0,0000	0,0315	0,0000	0,0000	0,0000	0,0000	0,0000	0,0287	0,0000	-0,0409
'Refrigerator&Freezer'	0,0000	0,0000	-0,0134	0,0000	-0,0164	-0,0332	-0,0352	-0,0368	-0,0457	-0,0325	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0439	-0,0497	0,0000	0,0000	-0,0233
'Freezer'	0,0359	0,0358	0,0364	0,0405	0,0418	0,0353	0,0383	0,0325	0,0358	0,0429	0,0317	0,0000	0,0000	0,0000	0,0204	0,0000	0,0000	0,0410	0,0000	0,0000	0,0413	0,0296	0,0420	0,0538
'ChestFreezer'	0,0000	0,0167	0,0286	0,0302	0,0317	0,0158	0,0220	0,0194	0,0249	0,0289	0,0284	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0622	-0,0623	0,0000	0,0000	-0,0411	-0,0236
'electricstove'	0,0681	0,0000	0,0000	0,0000	0,0000	0,0164	0,0234	0,0477	0,0853	0,1205	0,1396	0,1388	0,1619	0,1892	0,1635	0,1302	0,1502	0,1897	0,2673	0,2942	0,2855	0,2075	0,1414	0,1007
'washingMachine'	0,0306	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0457	0,0357	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0762	0,0887	0,1327	0,1097	0,0000	-0,0804	0,0000	0,0000	0,0367
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0437	0,0743	0,1541	0,2933	0,2866	0,2468	0,1996	0,2241	0,2449	0,2266	0,1982	0,1161	0,2058	0,5017	0,3795	0,2364	0,1666	0,0000	0,0000
'dryingcabinet'	-0,0574	-0,0465	-0,0389	0,0000	0,0000	-0,0510	-0,0567	-0,0620	-0,0547	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0798	-0,1111	0,0000	0,0000	0,0000	0,1814	0,3209	0,1749	0,0000	0,0000
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0448	0,0333	0,0426	0,0765	0,0890	0,0965	0,1265	0,1247	0,1059	0,1104	0,1086	0,1378	0,1079	0,0752	0,1316	0,1163	0,0000	0,0746	0,0000
'sauna'	-0,1208	0,0000	0,0000	0,0000	0,0000	-0,0979	-0,1021	-0,1042	-0,1048	-0,1134	-0,1091	-0,1246	-0,1024	-0,0836	-0,0977	-0,0656	0,0000	0,1058	0,2376	0,2234	0,1054	0,0000	-0,1023	-0,1563
'SQM'	0,2163	0,2041	0,1723	0,1652	0,1657	0,1623	0,1749	0,1704	0,1552	0,1930	0,2353	0,2511	0,2140	0,2178	0,2032	0,2520	0,3062	0,2759	0,4140	0,4623	0,3736	0,4123	0,3753	0,2569
'CRTtv'	-0,0231	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0362	0,0000	0,0651	0,0957	0,0369	-0,0262	-0,0557	-0,0322
'LCDtv'	0,0436	0,0508	0,0461	0,0420	0,0378	0,0272	0,0321	0,0328	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0191	0,0000	0,0000	0,0000	0,0420	0,0411	0,0236	0,0273	0,0328
'ComputerCRT'	0,0485	0,0313	0,0247	0,0295	0,0291	0,0285	0,0279	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0461	0,0790	0,0813	0,1025	0,0930	0,0000	0,0000	0,0000	0,0702	0,0719
'ComputerLCD'	0,0343	0,0466	0,0372	0,0357	0,0262	0,0100	0,0086	0,0000	0,0000	0,0000	0,0196	0,0291	0,0269	0,0225	0,0000	0,0000	0,0000	0,0000	0,0000	0,0415	0,0321	0,0369	0,0272	0,0326
'ComputerPortable'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0162	-0,0269	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0194	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0240	0,0243	0,0181

Results from Secondary Model Version 2 Winter

INMODEL Secondary Model Version 2

Winter WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	0	0	1	1	1	1	0	1	1
'Refrigerator&Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	0	1	1
'Freezer'	1	1	1	1	1	1	1	0	0	1	1	1	1	0	0	1	0	0	1	1	0	0	0	1
'ChestFreezer'	1	1	1	1	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	1	0	0	0	1	1	1	1	0	1	0	0	1	1
'tumbleDryer'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'LCDtv'	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0
'ComputerCRT'	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	0	1	0	1	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	0	0	0	1	1	1	1	0	1	0	1	0	1	1	1	1	1	1	1

INMODEL Secondary Model Version 2

Winter WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	1
'Refrigerator&Freezer'	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	1	1	0	0	1	0	0	1
'Freezer'	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1
'ChestFreezer'	1	0	0	1	1	0	0	0	0	1	0	0	0	0	1	1	0	0	0	1	0	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	0	1
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	1	0	1	1	1
'LCDtv'	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	1
'ComputerCRT'	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'ComputerPortable'	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

CDA Obtained Estimated Coefficients in KWh/h

Winter WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0486	-0,0512	-0,0448	-0,0410	-0,0400	-0,0442	-0,0845	-0,0622	-0,0315	0,0000	0,0000	0,0000	-0,0160	-0,0306	-0,0160	0,0000	0,0000	-0,0503	-0,0975	-0,0892	-0,0605	0,0000	-0,0231	-0,0536
'Refrigerator&Freezer'	-0,0303	-0,0243	-0,0209	-0,0196	-0,0230	-0,0395	-0,0679	-0,0588	-0,0558	-0,0471	-0,0221	-0,0211	-0,0260	-0,0342	0,0000	0,0000	-0,0262	-0,0702	-0,0670	-0,0944	-0,0747	0,0000	-0,0421	-0,0340
'Freezer'	0,0225	0,0293	0,0258	0,0304	0,0294	0,0188	0,0261	0,0000	0,0000	-0,0232	-0,0163	-0,0231	-0,0181	0,0000	0,0000	0,0172	0,0000	0,0000	0,0542	0,0364	0,0000	0,0000	0,0000	0,0434
'ChestFreezer'	-0,0118	0,0112	0,0145	0,0251	0,0283	0,0121	0,0138	0,0000	0,0141	0,0000	0,0169	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0544	-0,0621	-0,0612	-0,0619	-0,0381
'electricstove'	0,0762	0,0000	0,0000	0,0000	0,0000	0,0619	0,1062	0,1381	0,0834	0,0638	0,0587	0,0782	0,0869	0,0874	0,1056	0,1694	0,2318	0,2328	0,2426	0,3197	0,2924	0,2538	0,1956	0,1314
'washingMachine'	0,0401	0,0000	0,0000	0,0000	0,0000	0,0314	0,0680	0,0822	0,0807	0,0647	0,0349	0,0000	0,0000	0,0000	0,0372	0,0336	0,0532	0,0487	0,0000	-0,0641	0,0000	0,0000	0,0684	0,0643
'tumbleDryer'	0,0539	0,0000	0,0000	0,0000	0,0000	0,1217	0,1395	0,1759	0,1226	0,0992	0,0995	0,1088	0,0806	0,0914	0,0842	0,1280	0,1254	0,2073	0,3580	0,3938	0,2623	0,1164	0,0000	0,0000
'dryingcabinet'	-0,0928	-0,0863	-0,0770	-0,0608	-0,0766	-0,1008	-0,1199	-0,1421	-0,0712	-0,0489	0,0000	-0,0465	-0,0698	-0,0616	-0,0819	-0,1092	-0,1335	-0,0788	0,0000	0,0000	0,1228	0,1169	0,0000	-0,1035
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0490	0,0467	0,0460	0,0837	0,1075	0,1244	0,1430	0,1188	0,1022	0,0979	0,1120	0,1434	0,1663	0,2006	0,1720	0,1644	0,0947	0,0299	-0,0283
'sauna'	-0,1657	0,0000	0,0000	0,0000	0,0000	-0,1357	-0,1953	-0,2118	-0,1949	-0,1805	-0,1727	-0,1788	-0,1751	-0,1608	-0,1484	-0,1494	-0,1524	-0,1117	0,0000	0,0864	0,0000	-0,0904	-0,2012	-0,2061
'SQM'	0,2692	0,2535	0,2508	0,2436	0,2519	0,2161	0,2408	0,2997	0,3116	0,3047	0,3020	0,2878	0,2932	0,2825	0,2752	0,2867	0,3268	0,3464	0,3440	0,3475	0,4824	0,4923	0,4066	0,3363
'CRTtv'	-0,0684	-0,0446	-0,0447	-0,0436	-0,0404	-0,0355	0,0000	0,0000	0,0000	-0,0192	-0,0321	-0,0277	-0,0333	-0,0368	-0,0404	-0,0504	-0,0571	-0,0383	-0,0286	0,0730	0,0368	-0,0574	-0,0937	-0,0770
'LCDtv'	0,0000	0,0139	0,0108	0,0000	0,0000	0,0000	0,0000	0,0000	0,0178	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0180	0,0000	0,0000	0,0000	0,0000	-0,0264	-0,0203	0,0000
'ComputerCRT'	0,0830	0,0572	0,0520	0,0401	0,0368	0,0352	0,0222	0,0238	0,0421	0,0000	0,0000	0,0000	0,0283	0,0219	0,0265	0,0258	0,0423	0,0741	0,0000	-0,0753	0,0000	0,0312	0,0851	0,0902
'ComputerLCD'	0,0950	0,1121	0,1056	0,0977	0,0932	0,0741	0,0691	0,0517	0,0406	0,0488	0,0466	0,0474	0,0510	0,0477	0,0480	0,0473	0,0405	0,0669	0,0886	0,1216	0,1089	0,0838	0,0715	0,0936
'ComputerPortable'	0,0180	0,0121	0,0113	0,0147	0,0182	0,0000	0,0000	0,0000	-0,0133	-0,0168	-0,0162	-0,0149	0,0000	-0,0123	0,0000	0,0225	0,0000	0,0184	0,0595	0,0932	0,0640	0,0691	0,0516	0,0283

CDA Obtained Estimated Coefficients in KWh/h

Winter WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0442	-0,0375	-0,0268	-0,0314	-0,0308	-0,0441	-0,0810	-0,0712	-0,0626	-0,0457	-0,0542	-0,0408	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0793	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0694
'Refrigerator&Freezer'	-0,0293	0,0000	0,0000	0,0000	0,0000	-0,0353	-0,0579	-0,0627	-0,0672	-0,0766	-0,0684	-0,0680	0,0000	0,0000	0,0000	0,0000	-0,0365	-0,0542	0,0000	0,0000	-0,0359	0,0000	0,0000	-0,0393
'Freezer'	0,0181	0,0214	0,0000	0,0198	0,0205	0,0000	0,0166	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0295	0,0539	0,0000	0,0000	0,0000	0,0000	0,0000	0,0504
'ChestFreezer'	-0,0255	0,0000	0,0000	0,0144	0,0229	0,0000	0,0000	0,0000	0,0000	0,0252	0,0000	0,0000	0,0000	0,0000	-0,0325	-0,0414	0,0000	0,0000	0,0000	-0,0622	0,0000	-0,0271	-0,0430	-0,0395
'electricstove'	0,0792	0,0000	0,0000	0,0000	0,0000	0,0528	0,0533	0,0681	0,1096	0,1186	0,1617	0,2043	0,1706	0,1770	0,1586	0,1689	0,2005	0,2321	0,2028	0,2829	0,3030	0,2487	0,2056	0,1261
'washingMachine'	0,0637	0,0000	0,0000	0,0000	0,0000	0,0298	0,0422	0,0798	0,1001	0,0810	0,0000	0,0000	0,0000	0,0000	0,0000	0,0844	0,1289	0,1434	0,0000	0,0000	0,0000	0,0000	0,0000	0,0641
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0569	0,0726	0,1343	0,2308	0,2671	0,2266	0,2171	0,1712	0,1931	0,1834	0,1553	0,1359	0,2343	0,4810	0,3130	0,2145	0,1143	0,0000	0,0000
'dryingcabinet'	-0,1192	-0,1063	-0,0932	-0,0769	-0,0715	-0,0895	-0,0972	-0,1091	-0,0854	-0,0918	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,1077	0,1912	0,1735	0,2810	0,1721	0,0000	-0,1153
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0387	0,0460	0,0611	0,0927	0,1160	0,1692	0,1650	0,1508	0,1584	0,1890	0,1908	0,1905	0,2269	0,2151	0,2475	0,1777	0,0899	0,0687	0,0000
'sauna'	-0,1826	0,0000	0,0000	0,0000	0,0000	-0,1537	-0,1702	-0,1762	-0,1963	-0,2072	-0,1865	-0,1789	-0,1686	-0,1541	-0,1343	-0,1160	-0,0874	0,0000	0,1437	0,1397	0,0000	-0,0822	-0,1440	-0,2109
'SQM'	0,2864	0,2953	0,2769	0,2621	0,2571	0,2148	0,1916	0,2179	0,2616	0,2937	0,2995	0,2968	0,3428	0,3268	0,2836	0,3015	0,3396	0,3202	0,4371	0,4416	0,4356	0,4523	0,3981	0,3460
'CRTtv'	-0,0618	-0,0539	-0,0511	-0,0453	-0,0420	-0,0373	-0,0334	-0,0243	-0,0393	0,0000	0,0000	0,0000	0,0000	-0,0321	-0,0252	-0,0396	-0,0657	-0,0359	0,0000	0,0787	0,0000	-0,0430	-0,0947	-0,0853
'LCDtv'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0377	0,0216	0,0000	0,0226	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0234	-0,0257
'ComputerCRT'	0,0938	0,0813	0,0668	0,0580	0,0528	0,0504	0,0602	0,0347	0,0484	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0822	0,1356	0,1482	0,0815	0,0000	0,0000	0,0000	0,0888	0,1131
'ComputerLCD'	0,1273	0,1513	0,1482	0,1239	0,1054	0,0831	0,0762	0,0701	0,0554	0,0637	0,0738	0,0707	0,0763	0,0662	0,0640	0,0692	0,0608	0,0576	0,0749	0,1289	0,1024	0,0887	0,0876	0,1231
'ComputerPortable'	0,0324	0,0348	0,0246	0,0245	0,0232	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0656	0,0653	0,0327	0,0497	0,0587	0,0502

Results from Secondary Model Version 2 Spring

INMODEL Secondary Model Version 2																								
Spring WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0	1
'Refrigerator&Freezer'	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
'Freezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	1	1	1	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	0	0	0	0	0	0	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1	1	1	0	0	1	1	1	0
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	1
'LCDtv'	1	1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1
'ComputerCRT'	1	1	1	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1	0	1	0	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
'ComputerPortable'	0	0	0	0	1	0	0	1	0	1	1	1	0	1	0	1	1	0	0	1	1	1	1	1

INMODEL Secondary Model Version 2																								
Spring WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	0	1	0	0	0	0	0	1
'Refrigerator&Freezer'	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
'Freezer'	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	0	0	1	1
'ChestFreezer'	0	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	0	1	1	1	1	0
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
'dryingcabinet'	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	1	1	0	0
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	1	0	0	0	0	1	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1	0	1	1
'LCDtv'	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	1	0	1	1	1	1
'ComputerCRT'	1	1	0	0	0	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	1	0	1	1
'ComputerLCD'	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	0	1
'ComputerPortable'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	0	0

CDA Obtained Estimated Coefficients in KWh/h																								
Spring WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0362	-0,0440	-0,0398	-0,0360	-0,0342	-0,0485	-0,0600	-0,0501	-0,0334	0,0000	-0,0150	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0203	-0,0689	0,0000	0,0000	0,0000	0,0000	-0,0471
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0264	-0,0330	-0,0387	-0,0254	-0,0129	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0367	0,0000	0,0000	0,0000	0,0000	0,0000
'Freezer'	0,0405	0,0448	0,0436	0,0466	0,0449	0,0398	0,0512	0,0417	0,0399	0,0177	0,0324	0,0115	0,0100	0,0131	0,0230	0,0334	0,0250	0,0396	0,0651	0,0000	0,0000	0,0310	0,0308	0,0651
'ChestFreezer'	0,0000	0,0219	0,0273	0,0334	0,0350	0,0327	0,0383	0,0244	0,0184	0,0215	0,0377	0,0139	0,0000	0,0220	0,0137	0,0179	0,0000	0,0000	0,0000	-0,0622	-0,0604	-0,0453	-0,0369	-0,0211
'electricstove'	0,0809	0,0000	0,0000	0,0000	0,0000	0,0378	0,0614	0,0810	0,0633	0,0566	0,0626	0,0673	0,0552	0,0607	0,0747	0,1113	0,1722	0,1721	0,1851	0,2443	0,2170	0,1994	0,1904	0,1422
'washingMachine'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0196	0,0229	0,0259	0,0000	0,0000	0,0000	0,0000	0,0000	0,0361	0,0296	0,0378	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0599	0,0794	0,1078	0,0677	0,0769	0,0523	0,0753	0,0593	0,0611	0,0630	0,0914	0,0790	0,1443	0,2449	0,3106	0,2434	0,0712	0,0000	0,0000
'dryingcabinet'	-0,0399	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0500	-0,0417	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0534	-0,0791	-0,0877	-0,0519	0,0000	0,0000	0,1491	0,1823	0,0738	0,0000
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0346	0,0345	0,0513	0,0679	0,0735	0,0741	0,0755	0,0727	0,0609	0,0476	0,0715	0,0858	0,1156	0,1254	0,1254	0,1202	0,0576	0,0000	-0,0460
'sauna'	-0,1029	0,0000	0,0000	0,0000	0,0000	-0,0930	-0,0997	-0,1165	-0,0965	-0,0835	-0,0677	-0,0858	-0,0883	-0,0769	-0,0666	-0,0776	-0,0620	-0,0538	0,0510	0,1397	0,1362	0,0000	-0,1063	-0,1224
'SQM'	0,1922	0,1786	0,1520	0,1551	0,1568	0,1241	0,1425	0,1755	0,1646	0,1668	0,1650	0,1742	0,1721	0,1638	0,1759	0,1742	0,2021	0,1428	0,1610	0,2031	0,3367	0,3561	0,3439	0,2774
'CRTtv'	-0,0288	-0,0141	0,0000	-0,0067	-0,0108	-0,0108	0,0000	-0,0092	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0324	0,0000	0,0000	0,0990	0,0691	0,0000	-0,0548	-0,0398
'LCDtv'	0,0289	0,0311	0,0300	0,0221	0,0178	0,0120	0,0166	0,0114	0,0000	0,0154	0,0187	0,0128	0,0000	0,0151	0,0000	0,0187	0,0203	0,0204	0,0453	0,0354	0,0432	0,0472	0,0214	0,0147
'ComputerCRT'	0,0489	0,0273	0,0147	0,0000	0,0140	0,0150	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0213	0,0212	0,0000	0,0000	0,0262	0,0446	0,0000	-0,0774	0,0000	0,0000	0,0809	0,0676
'ComputerLCD'	0,0349	0,0447	0,0396	0,0342	0,0355	0,0219	0,0176	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0228	0,0549	0,0603	0,0424	0,0292	0,0332
'ComputerPortable'	0,0000	0,0000	0,0000	0,0000	0,0087	0,0000	0,0000	-0,0142	0,0000	-0,0203	-0,0274	-0,0247	0,0000	-0,0181	0,0000	-0,0145	-0,0247	0,0000	0,0000	0,0586	0,0959	0,0549	0,0478	0,0297

CDA Obtained Estimated Coefficients in KWh/h																								
Spring WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	-0,0360	-0,0418	-0,0394	-0,0363	-0,0356	-0,0497	-0,0682	-0,0583	-0,0479	-0,0469	-0,0195	0,0000	0,0000	0,0000	-0,0264	0,0000	0,0000	-0,0464	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0382
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0246	-0,0373	-0,0412	-0,0404	-0,0307	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0369	0,0000	0,0000	0,0000
'Freezer'	0,0304	0,0328	0,0347	0,0373	0,0376	0,0361	0,0454	0,0371	0,0347	0,0279	0,0000	0,0000	0,0000	0,0000	0,0286	0,0241	0,0309	0,0752	0,0670	0,0000	0,0000	0,0000	0,0311	0,0551
'ChestFreezer'	0,0000	0,0214	0,0267	0,0274	0,0271	0,0235	0,0270	0,0206	0,0232	0,0231	0,0000	-0,0197	0,0000	0,0000	0,0000	0,0000	0,0000	0,0386	0,0000	-0,0534	-0,0753	-0,0581	-0,0313	0,0000
'electricstove'	0,0865	0,0000	0,0000	0,0000	0,0000	0,0355	0,0322	0,0526	0,0867	0,1094	0,1435	0,1399	0,1347	0,1119	0,1179	0,1347	0,1362	0,1434	0,2261	0,2512	0,2623	0,2736	0,1991	0,1342
'washingMachine'	0,0341	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0314	0,0423	0,0000	0,0000	0,0000	0,0000	0,0000	0,0540	0,0542	0,0747	0,0917	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0421	0,0375	0,1084	0,1574	0,1854	0,1425	0,0967	0,0713	0,0982	0,1281	0,0877	0,0650	0,1160	0,2700	0,2514	0,1558	0,0000	0,0000	0,0000
'dryingcabinet'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0413	-0,0464	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0576	0,0000	0,0000	0,0946	0,0000	0,0000	0,1144	0,1647	0,0000	0,0000
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0176	0,0252	0,0439	0,0661	0,0983	0,0979	0,0908	0,0675	0,0719	0,0762	0,0792	0,0870	0,1072	0,1640	0,1396	0,0725	0,0000	0,0461	-0,0345
'sauna'	-0,1115	0,0000	0,0000	0,0000	0,0000	-0,1024	-0,1078	-0,1249	-0,1177	-0,1058	-0,1020	-0,0883	-0,0992	-0,0851	-0,0642	-0,0467	0,0000	0,0632	0,1889	0,2158	0,1144	0,0000	-0,0838	-0,1173
'SQM'	0,1764	0,1837	0,1663	0,1626	0,1659	0,1310	0,1322	0,1464	0,1182	0,1619	0,1795	0,2090	0,2026	0,1938	0,1621	0,1586	0,1731	0,1559	0,2363	0,2962	0,3474	0,3661	0,3157	0,2473
'CRTtv'	-0,0201	0,0000	0,0000	0,0000	0,0000	-0,0105	0,0000	0,0000	0,0000	0,0000	0,0150	0,0266	0,0392	0,0181	0,0000	0,0000	0,0000	0,0000	0,0000	0,0462	0,0793	0,0000	-0,0600	-0,0357
'LCDtv'	0,0348	0,0394	0,0300	0,0272	0,0223	0,0133	0,0132	0,0177	0,0213	0,0000	0,0000	0,0255	0,0338	0,0226	0,0272	0,0497	0,0627	0,0000	0,0690	0,0000	0,0811	0,0592	0,0256	0,0293
'ComputerCRT'	0,0390	0,0292	0,0000	0,0000	0,0000	0,0176	0,0202	0,0000	0,0261	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0350	0,0572	0,0933	0,0000	0,0000	-0,0632	0,0000	0,0461	0,0454
'ComputerLCD'	0,0506	0,0635	0,0521	0,0423	0,0309	0,0195	0,0143	0,0000	0,0000	0,0000	0,0000	0,0159	0,0239	0,0228	0,0172	0,0000	0,0000	0,0000	0,0000	0,0443	0,0462	0,0318	0,0000	0,0409
'ComputerPortable'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0323	-0,0481	0,0000	0,0000	0,0949	0,0519	0,0309	0,0000	0,0000

Results from Secondary Model Version 2 Summer

INMODEL Secondary Model Version 2																								
Summer WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0	1	1	1	1	1	1	1	1	0	0	0	1	0	1	1	1	1	0	1	1	0	0	0
'Refrigerator&Freezer'	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	1	1	1	1	0
'Freezer'	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	0	0	0	1
'ChestFreezer'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	0	1	0
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	0	0	0	0	0	1	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	1	1	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1	0
'Dishwasher'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	0	1	0	1	1	0	1	0	0	0	1	0	0	1	1	1	0	0	1	1	1	0	1	0
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1
'ComputerCRT'	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1
'ComputerLCD'	1	1	1	1	1	0	0	1	1	1	1	0	0	1	1	0	0	1	0	1	1	1	0	1
'ComputerPortable'	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1

INMODEL Secondary Model Version 2																								
Summer WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0
'Refrigerator&Freezer'	0	1	0	0	0	1	1	1	1	1	0	0	0	0	0	1	0	1	0	0	1	0	0	0
'Freezer'	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	0	0	0	0	1
'ChestFreezer'	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
'electricstove'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'washingMachine'	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
'tumbleDryer'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
'dryingcabinet'	1	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	1	0	1	0	1	1	1	1
'Dishwasher'	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'sauna'	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1
'SQM'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
'CRTtv'	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	0	0	1	1	1	1	0	0	0
'LCDtv'	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	1	0	1	1
'ComputerCRT'	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0
'ComputerLCD'	1	1	1	1	1	0	0	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1
'ComputerPortable'	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0

CDA Obtained Estimated Coefficients in KWh/h																								
Summer WD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0,0000	-0,0166	-0,0166	-0,0120	-0,0071	-0,0105	-0,0246	-0,0122	-0,0110	0,0000	0,0000	0,0000	0,0191	0,0000	0,0116	0,0270	0,0221	0,0401	0,0000	-0,0556	-0,0327	0,0000	0,0000	0,0000
'Refrigerator&Freezer'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0116	-0,0239	-0,0295	-0,0242	-0,0214	-0,0184	-0,0226	0,0000	-0,0201	0,0000	0,0000	0,0000	0,0000	-0,0239	-0,0585	-0,0556	-0,0335	-0,0408	0,0000
'Freezer'	0,0000	0,0221	0,0227	0,0228	0,0219	0,0188	0,0316	0,0351	0,0260	0,0149	0,0106	0,0000	0,0000	0,0000	0,0000	0,0150	0,0218	0,0177	0,0529	0,0491	0,0000	0,0000	0,0000	0,0305
'ChestFreezer'	-0,0152	0,0110	0,0159	0,0190	0,0183	0,0148	0,0298	0,0300	0,0358	0,0239	0,0349	0,0144	0,0100	0,0235	0,0220	0,0179	0,0191	0,0000	0,0000	0,0000	-0,0293	0,0000	-0,0320	0,0000
'electricstove'	0,0580	0,0000	0,0000	0,0000	0,0000	0,0457	0,0342	0,0364	0,0309	0,0523	0,0492	0,0640	0,0631	0,0639	0,0739	0,0690	0,1353	0,1253	0,1222	0,1888	0,2173	0,1765	0,1579	0,1071
'washingMachine'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0154	0,0279	0,0307	0,0272	0,0000	0,0000	0,0000	0,0000	0,0000	0,0246	0,0396	0,0372	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0385
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0495	0,1072	0,1157	0,1017	0,0669	0,0350	0,0551	0,0485	0,0684	0,0800	0,0755	0,0980	0,1388	0,2450	0,3119	0,2888	0,1455	0,0000	0,0000
'dryingcabinet'	-0,0614	-0,0492	-0,0372	-0,0208	-0,0157	-0,0378	-0,0713	-0,0521	0,0000	0,0000	0,0000	0,0000	-0,0487	-0,0427	-0,0508	-0,0911	-0,0805	-0,0493	0,0615	0,0000	0,1104	0,0700	0,0543	0,0000
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0230	0,0230	0,0290	0,0415	0,0651	0,0706	0,0753	0,0681	0,0465	0,0493	0,0329	0,0773	0,0984	0,1097	0,0850	0,1361	0,0594	0,0000	-0,0662
'sauna'	-0,0816	0,0000	0,0000	0,0000	0,0000	-0,0603	-0,0621	-0,0638	-0,0646	-0,0652	-0,0680	-0,0702	-0,0646	-0,0577	-0,0678	-0,0475	-0,0498	-0,0260	0,0333	0,1571	0,1475	0,0559	-0,0922	-0,1115
'SQM'	0,1763	0,1604	0,1588	0,1419	0,1421	0,1194	0,1433	0,1702	0,1824	0,1977	0,2165	0,2464	0,2456	0,2113	0,1974	0,1926	0,2323	0,2034	0,1886	0,1824	0,2890	0,3465	0,3104	0,2129
'CRTtv'	0,0000	0,0070	0,0000	0,0078	0,0056	0,0000	0,0110	0,0000	0,0000	0,0000	0,0133	0,0000	0,0000	0,0149	0,0173	0,0397	0,0000	0,0000	0,0248	0,0986	0,0597	0,0000	-0,0168	0,0000
'LCDtv'	0,0362	0,0367	0,0300	0,0328	0,0283	0,0236	0,0368	0,0324	0,0345	0,0303	0,0426	0,0158	0,0190	0,0222	0,0412	0,0918	0,0441	0,0375	0,0350	0,0435	0,0000	0,0000	0,0311	0,0468
'ComputerCRT'	0,0400	0,0000	0,0110	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0757	-0,0988	-0,0448	0,0000	0,0200
'ComputerLCD'	0,0322	0,0422	0,0273	0,0160	0,0110	0,0000	0,0000	-0,0127	-0,0178	-0,0103	-0,0102	0,0000	0,0000	-0,0084	-0,0103	0,0000	0,0000	0,0125	0,0000	0,0349	0,0497	0,0281	0,0000	0,0331
'ComputerPortable'	0,0000	0,0000	0,0000	-0,0053	-0,0064	-0,0104	-0,0260	-0,0277	-0,0325	-0,0322	-0,0288	-0,0218	-0,0280	-0,0262	-0,0244	0,0206	-0,0455	-0,0518	-0,0472	-0,0359	0,0000	0,0000	0,0000	-0,0142

CDA Obtained Estimated Coefficients in KWh/h																								
Summer WE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
'Refrigerator'	0,0000	0,0000	-0,0128	-0,0109	-0,0108	-0,0124	-0,0221	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0533	0,0000	0,0000	0,0000	0,0000	0,0000	0,0445	0,0272	0,0000
'Refrigerator&Freezer'	0,0000	0,0128	0,0000	0,0000	0,0000	-0,0153	-0,0217	-0,0209	-0,0206	-0,0174	0,0000	0,0000	0,0000	0,0000	0,0000	0,0324	0,0000	-0,0417	0,0000	0,0000	-0,0543	0,0000	0,0000	0,0000
'Freezer'	0,0120	0,0140	0,0206	0,0232	0,0237	0,0196	0,0231	0,0170	0,0158	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0328	0,0482	0,0369	0,0000	0,0000	0,0000	0,0000	0,0195
'ChestFreezer'	0,0000	0,0000	0,0133	0,0204	0,0162	0,0126	0,0180	0,0120	0,0217	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0465	0,0000	-0,0331	-0,0291
'electricstove'	0,0775	0,0000	0,0000	0,0000	0,0000	0,0291	0,0332	0,0354	0,0627	0,1016	0,1125	0,1205	0,1297	0,1187	0,1067	0,1025	0,1135	0,1407	0,1830	0,2207	0,2436	0,2395	0,1619	0,1155
'washingMachine'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0298	0,0470	0,0493	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0414
'tumbleDryer'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0204	0,0495	0,0680	0,1371	0,1486	0,1370	0,0863	0,0813	0,1028	0,1456	0,1213	0,0776	0,1071	0,1862	0,2992	0,2237	0,1186	0,0000	0,0000
'dryingcabinet'	-0,0711	-0,0369	0,0000	0,0000	0,0000	0,0000	-0,0286	-0,0446	0,0000	0,0000	0,0000	0,0000	-0,0683	0,0000	0,0000	0,0000	-0,0891	0,0000	0,1192	0,0000	0,1360	0,1184	-0,0714	-0,1015
'Dishwasher'	0,0000	0,0000	0,0000	0,0000	0,0000	0,0199	0,0000	0,0276	0,0440	0,0654	0,0512	0,0809	0,0871	0,0655	0,0662	0,0963	0,1187	0,1087	0,1223	0,1616	0,1146	0,0624	0,0539	-0,0438
'sauna'	-0,0757	0,0000	0,0000	0,0000	0,0000	-0,0569	-0,0687	-0,0837	-0,0942	-0,0782	-0,0876	-0,0982	-0,0982	-0,0777	-0,0680	-0,0497	0,0000	0,0000	0,1598	0,2076	0,1304	0,0000	-0,0828	-0,1038
'SQM'	0,1761	0,1809	0,1517	0,1533	0,1566	0,1267	0,1389	0,1492	0,1683	0,1722	0,1990	0,1970	0,2432	0,2317	0,2118	0,2206	0,2217	0,1761	0,1848	0,2628	0,3289	0,3092	0,2425	0,2173
'CRTtv'	0,0000	0,0000	0,0108	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0315	0,0603	0,0600	0,0453	0,0374	0,0000	0,0000	0,0000	0,0282	0,0799	0,1104	0,0741	0,0000	0,0000	0,0000
'LCDtv'	0,0359	0,0368	0,0365	0,0290	0,0218	0,0228	0,0281	0,0251	0,0298	0,0381	0,0507	0,0381	0,0303	0,0350	0,0000	0,0000	0,0367	0,0000	0,0000	0,0000	0,0448	0,0000	0,0195	0,0262
'ComputerCRT'	0,0235	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0387	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0735	-0,0929	-0,0732	0,0000	0,0000
'ComputerLCD'	0,0453	0,0554	0,0460	0,0225	0,0163	0,0000	0,0000	-0,0137	-0,0187	0,0000	0,0000	0,0150	0,0000	0,0000	0,0000	0,0000	-0,0225	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0376
'ComputerPortable'	0,0000	0,0000	0,0000	0,0000	0,0000	-0,0110	-0,0191	-0,0265	-0,0360	-0,0406	-0,0403	-0,0327	-0,0343	-0,0473	0,0000	0,0000	-0,0468	-0,0298	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000