young cities

Developing Urban Energy Efficiency

Tehrān-Karaj

Young Cities Research Briefs | 01

Energy Consumption Behavior and Attitudes towards Climate Change in Hashtgerd New Town

Results of a Qualitative Survey

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1 Introduction

Within the last decades, worldwide urbanization rates increase, while greenhouse gas emissions have steadily continued to thrive. These developments call for new concepts of climatically sustainable urban development. Since approximately 80% of worldwide greenhouse gas emissions are currently produced in cities, the consequences of climate change can only be considerably reduced by significantly and sustainably changing the way we build, the way we move and the way we live in our cities. Like many other countries in the Middle East North Africa region (MENA), Iran has reacted to the enormous urbanization pressure it faces by constructing numerous New Towns in the vicinity of its major urban centers.

The research project "Young Cities—Developing Urban Energy Efficiency in the Tehran-Karaj Region", which is funded under the program "Future Megacities" by the Federal Ministry for Education and Research (BMBF), focuses on the energy efficient development of New Towns, with emphasis on the New Town Hashtgerd. Hashtgerd New Town lies in the growth corridor to the west of the emerging mega city of Tehran. Measured by its geographical size, it is the largest of the new urban settlements (see *www.youngcities.org*).

This study was prepared in the framework of the sub-project "Awareness Raising", led by the nexus Institute for Cooperation Management and Interdisciplinary Research within the research project "Young Cities". The aims of the sub-project "Awareness Raising" are to survey the attitudes of citizens in regard to environmental issues, climate change and energy consumption patterns, in order to develop awareness-raising measures for environmental and climate change issues and to sensitize the population of the New Town Hashtgerd to climate change, sustainable energy consumption and energy-efficient building. Furthermore, the aim is to obtain insight into the needs and suggestions of Hashtgerd residents and incorporate them into the work of the project.

Therefore, an exploratory qualitative survey of citizens of the New Town Hashtgerd on energy consumption in the household and transport sector, and on information about and attitudes towards climate change was carried out. The survey was also used to find out more about the structural condition of the apartments and buildings and about needs and suggestions of the residents regarding traffic and transport and other infrastructure in Hashtgerd.

2 Methodology

In March 2009, a total of 60 residents of Hashtgerd New Town were surveyed by two Iranian interviewers, accompanied by the religious police. The interviews were semi-structured with mostly open questions and lasted 20-30 minutes on average. The interviews were carried out at the doorstep, in parks or on the road. Regarding the selection of respondents, it was ensured that an even distribution of gender and age of respondents was maintained. Of the 60 respondents, 29 were men and 31 women. The age of the respondents was between 15 and 71 years. As the interviews were conducted during the day, it is likely that housewives, pensioners, unemployed and students are slightly over-represented. The following personal data of the interviewees were recorded: age, education level, occupation, gender and place of residence, i.e. construction phase.

As the living and construction quality varies for different construction phases, residents from all three construction phases were surveyed. The proportion of the interviewed residents of phase III is rather small due to the fact that this phase was built last and does not have as many inhabitants as phases I and II.

Judging from the above information, the interviewees represent a cross-section of the middle class and lower middle class living in New Hashtgerd.

Tab. 1: Sex

Men	29
Women	31

Tab. 2: Occupation

	Total	Women	Men
Working (Employees, Self-employed, Public Service)	23	8	15
Unemployed	1	1	–
Housewives/-men	16	16	–
Retired Persons	6	–	6
In Training/Students	12	4	8
Not Specified	2	2	–

Tab. 3: Education

	Total	Women	Men
High School	18	8	10
Bachelor	9	5	4
Master	1	–	1
Other degrees	32	18	14

Tab. 4: Distribution of respondents, construction phases I–III

	Total	Women	Men
Construction Phase I	27	8	10
Construction Phase II	9	5	4
Construction Phase III	1	–	1

3 Interview Results

3.1 Attitudes towards Climate Change

During the survey, the interviewees were asked whether they felt threatened by the effects of climate change. More than half of respondents (32) answered "yes". Those that responded more specific to this question, particularly stated the more dangerous solar radiation caused by a thinner ozone layer and water shortages and droughts as a threat. However, the ozone hole is not directly connected to climate change and is caused by different gases (FCKW) than climate change (CO_2). The fact that the ozone layer is becoming thinner has been covered by the media for a much longer time than climate change. Here, two differing topics become mixed up in public perception.

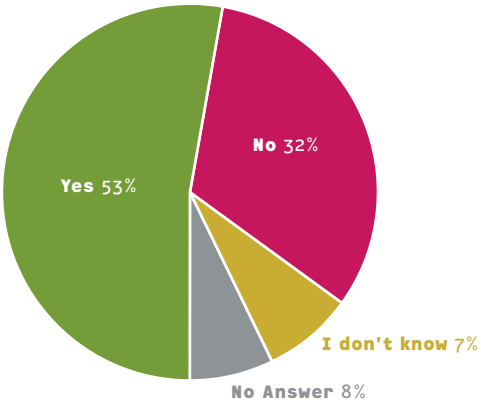

Fig. 1: Do you feel threatened by the possible consequences of climate change?

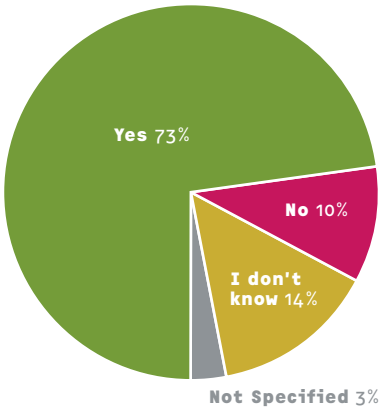

Fig. 2: Do you think that humans are at least partly responsible for climate change?

Furthermore, the residents were asked whether they believed that humans were at least partially responsible for climate change. 73% of respondents were of the opinion that this was the case, 10% felt that this was not true.

Most of the respondents consider counteraction to climate change as being mainly, or at least partially, the responsibility of the state. Although many people stated that cooperation between citizens and the state is neces-

Photo 1: Billboard requesting to keep the city clean (left)

sary, too, the state has the duty to create the necessary conditions (e.g. inform the citizens, provide infrastructure, e.g. adequate public transport infrastructure, and adopt and enforce binding laws). For example, several respondents demanded better information for the public about ways to counteract climate change, more cooperation with the people and integration into decisions in this regard. The need for binding legislation was emphasized by several respondents.

> ***"In the industrialized countries the state was always the pioneer. You cannot protect the environment only on your own initiative. The state has to provide the framework for that. It doesn't help, for example, if every household separates its garbage, but it isn't collected separately."***
>
> 71 years, male

One student pointed out the familiar problem that climate change is too abstract and not sufficiently visible to the people in order to motivate individuals to commit themselves to reduce energy consumption (see Weber 2006, WWF India 2006):

> ***"I think climate change is somehow not sufficiently specific. Iranians do not step on a piece of bread lying on the ground, as they believe it is a gift of God. They treat things that are visible with caution. But climate change is not sufficiently visible and specific."***
>
> 15 years, female

Therefore, it is important to communicate to the public how climate change and its consequences affect their daily lives and what they can do to, for example, reduce energy consumption in their daily routines. This would make the issue more tangible and understandable.

An interesting result of this question is that none of the respondents believed that nothing should be done about climate change. All respondents

thought that the government, citizens or both—and thus generally the people—had the responsibility to mitigate climate change.

3.2 Sources of Information

During the interview, the interviewees were asked about the channels through which they have received information on climate change and energy saving. It was shown that television is the main information channel for such information. Three quarters of the respondents stated television as one source of information. Half of the respondents, 29 persons, named television as the only source of information. The information sources stated second and third most were newspapers and radio. Only three people mentioned the Internet as a source of information, and this always in addition to other sources.

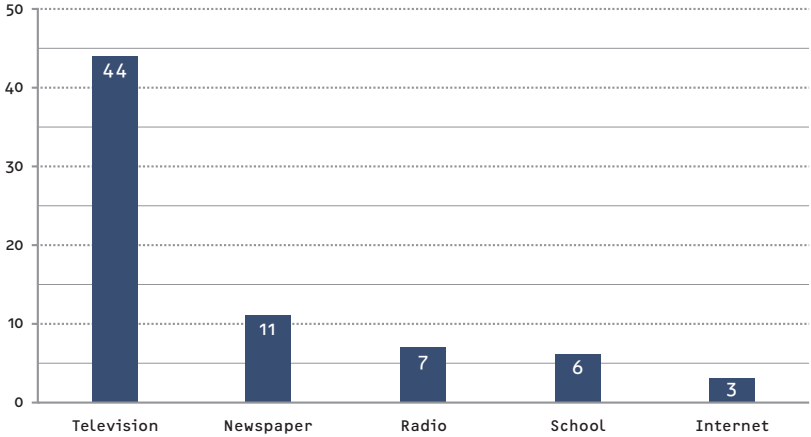

Fig. 3: If you think of different channels of information: Where did you recently get information about topics such as climate change and energy saving? (abs. frequencies)

The responses show that television is by far the most important source of information. This is also the result of a recent World Bank study (Calabrese 2008). A television is available in almost every household - as opposed to, for example, an Internet connection. Only just over half of the respondents claimed to have an Internet connection. If an Internet connection is available at home, it is used mostly by the younger generation.

In school, subjects such as climate change and energy saving are discussed more or less intensively. If environmental issues are addressed at all, then this is generally done within biology classes. Two respondents mentioned explicitly that they were taught about these topics by their children.

When asked about the specific topics that were treated in the media, respondents named the following terms in the following order of frequency: ozone hole, global warming/melting of the poles, air pollution, environmental pollution, water shortages and droughts.

However, issues such as climate change or environmental pollution are hardly discussed as an overall problem in everyday conversations within the family or with friends or colleagues. If anything, certain effects or problems that arise in connection with climate change and environmental pollution and are seen as problems in everyday life are discussed. This includes lack of water, the need for saving energy, as energy becomes more expensive, or plastic waste lying about. However, slightly less than half of the respondents (28 people) stated that they do not talk about environmental issues at all within the family or with friends or work colleagues. The reasons were, for example, that they are not very well-versed in these topics, do not want to deal with such negative issues or have enough other pressing problems.

3.3 Energy Consumption Behavior

3.3.1 Mobility

Which means of transportation does your household own?
Which means of transportation do you mainly use?

Three-fourths (44) of the interviewees own a motorized vehicle in their household. 39 respondents have a car in their household. Six people own a motorcycle (two of them next to the car), 4 own a transporter/lorry, and 16 persons—one-fourth—do not own any motorized vehicle in their household.

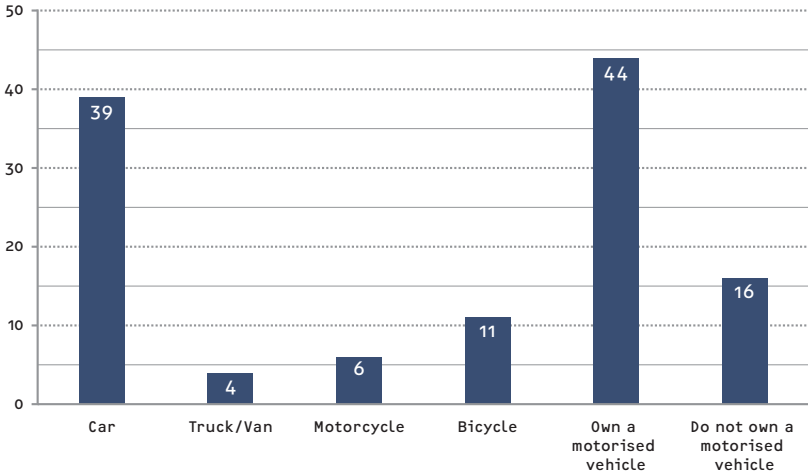

Fig. 4: Which vehicles does your household own? (abs. frequencies)

About half of respondents (31) use their private car, six people use a motorcycle (one of them in addition to the car). Of these 36 people, only 15, less than half, exclusively use their private car or motorcycle. Six use taxis in addition. All the others (16), use public transport besides their private car. 15 people exclusively use public transport (see Fig. 5). Motorcycles are used only by men. As many men as women say that they're using a private car. However, the

women rarely drive the car themselves. Instead, they often use it as a passenger, while the men use the car more regularly, e.g. for commuting to work.

The following means of public transport are used by the inhabitants of Hashtgerd: shuttle taxi (the shuttle taxis go, for example, from New Hashtgerd to Old Hashtgerd or from the main square in Hashtgerd to the metro station Golshahr outside of Hashtgerd, from there you take the metro to Tehran), shuttle bus (runs directly between Tehran and Hashtgerd), bus (within Hashtgerd, also goes to the metro station), metro and taxi.

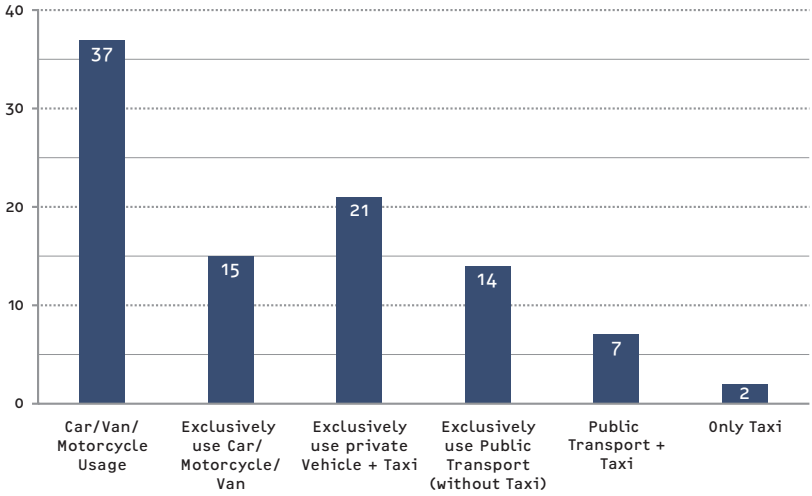

Fig. 5: Which means of transportation do you use? (abs. frequencies)

Within Hashtgerd, people either use their own vehicle, a taxi, a shuttle taxi or bus, although the bus was mentioned only by 11 persons as a means of transportation. The taxi and shuttle taxi, for short distances within New Hashtgerd or between new and old Hashtgerd, are the most commonly-used means of transport. However, several respondents also mentioned that it was not always easy to find a taxi. Therefore, if the waiting time is included, even short distances can take a very long time. In addition, taxis are quite expensive. Regarding energy efficiency, the taxi is a public mean of transportation with comparably high CO_2 emissions per passenger. Many distances within New Hashtgerd, both for everyday errands and, partly, for getting to work, are also covered by foot.

Women are especially limited in their scope, since many do not drive a car and wait for their husbands or fathers to make errands with them to Old Hashtgerd or Tehran by car. Most of the housewives said they do not leave the house very often and, therefore, don't use many means of transportation.

To reach Tehran by public transport, there are three options (in order from the cheapest to the most expensive option):

1. Shuttle-Bus (direct connection without changing)
2. Local Bus + Metro (changing once)
3. Shuttle-Taxi + Metro (changing once—fastest, but most expensive option)

The majority of the working respondents are working in Old Hashtgerd, Karaj or the surrounding area. Seven respondents work in New Hashtgerd and one in the industrial area of Hashtgerd. Those who work in Old Hashtgerd need about one hour for the round-trip. These respondents did not complain about the distance and the travel costs. Those who need to go to Tehran either for their work, their studies or other commitments complained about the waste of time, high travel costs and poor connections to the capital. Traveling to Tehran and back takes three to six hours in total.

Less than half of the respondents hold a driver's license. Of the 29 men, two-thirds (19) hold a driving license; of the 31 women, one-fourth (8) hold a driver's license. Usually, if the respondent does not possess a driver's license, someone in the family drives a car. The car or motorcycle is mostly used by the father as the working part, as he has to commute to work in a neighboring city. Commuting daily by public transport is inconvenient and time-consuming.

Some of the respondents own one or more bicycles. However, bicycles are mainly used by children and as a leisure activity, rather than as a means of transportation. Some parents think that riding the bike is too dangerous for their children.

> ***"No, I do not let my children ride the bike, the roads are too dangerous,"***
>
> 35 years, female

> ***"No, I do not let my son ride a bike, the streets are too narrow",***
>
> 34 years, female

Of the 60 respondents, 48 said that they did not ride the bike. However, half of these 48 persons said that they would like to ride the bike, but that the roads are in poor condition, partially unpaved, steep, and lacking bike paths.

Photo 2: Public means of transportation

Many women would like to ride a bike, but do not dare because of the social restrictions. One woman said that she would ride the bike sometimes at night her own road.

> ***„If I could go to university by bike, I could save time and money, but because of social restrictions it would be unusual if I would ride a bike."***
>
> 20 years, female

Distances covered by foot
Shopping within New Hashtgerd, especially, is done by foot. Also, walks to and within the popular "Golestan" park are made by foot. Many interviewees are also talking walks on the streets, especially on streets with reduced traffic. Others go to the mosque by foot. Furthermore, a walk from one phase to the other, especially to the very well-developed phase 1, in order to use its shopping facilities and parks, is very popular. Most of the respondents, who work in New Hashtgerd, walk to their workplace.

Traffic in New Hashtgerd
All respondents said that currently there are no problems in Hashtgerd with heavy traffic. However, many respondents were of the opinion that in the future, when all the apartments will be occupied (i.e. more residents) and public transport is lacking, there will be problems with traffic congestion. Only one interviewee thought that New Hashtgerd was already crowded in summer, due to pleasant weather.

Safety and security in New Hashtgerd
Nearly two-thirds of the respondents feel safe in Hashtgerd traffic. However, a good third of respondents does not feel safe on the streets of Hashtgerd, for various reasons: there were complaints that many drivers, particularly the young ones, go very fast, (supported by the fact that the roads are relatively empty).

Regarding security—feeling secure e.g. from criminal actions—especially girls, young women and young people mentioned that they did not feel safe on the streets at certain times, when the streets are empty. At those times, they only go out with company. It was also mentioned as being problematic that the city's infrastructure remains underdeveloped and, for example, the lighting of the streets was inadequate. Especially in winter, the streets are dark and full of stray dogs and cats, which is also an obstacle to going out by foot.

Suggestions for the improvement of public transport—What should be done so that public transportation will be used more frequently?
The answers of the respondents indicate that the inhabitants of New Hashtgerd would like to have a metro station in Hashtgerd. The Metro is in

better condition than the buses and is, for example, equipped with air conditioning. Secondly, it operates on a reliable schedule. Thirdly, the metro costs less in total compared to other transport options to Tehran.

Furthermore, the respondents would also like to have a bus service in all phases of construction, not only in the first construction phase. The establishment of "vans" (small mini buses) was also suggested. Because of the small number of residents in New Hashtgerd, mini buses are seen as a more appropriate mode of transportation than large buses.

It was also criticized that the buses that operate in New Hashtgerd are in poor condition. Accordingly, inconveniences such as exaggerated heat in summer and freezing in winter have to be accepted. The existing buses should, therefore, be equipped with heating and air conditioning, in order to be used more frequently. They should also operate more often. Especially in the evening and at night, between 1 and 3 o'clock, the buses go very rarely. Since it is difficult to get a taxi after 6pm, it was proposed to increase the number of taxis and to reduce their price.

> ***"I would like to use buses if I wouldn't have to drag a blanket on the bus in winter."***
>
> 26 years, female

> ***„The buses are too cold for me and my children, but I like to use the Metro,"***
>
> 35 years, female

The high fares for public transport were criticized as well. The fare for a ride to Tehran by shuttle bus, for example, is 8000 Rials per ride (about 70 Euro cents, 2009). That is, if the head of the family, who is usually the sole earner, uses public transport daily to go to Tehran to work, he has to spend more than 400,000 riyals (about 35 €) for commuting, which is about 10-20 percent of his total income (based on the average income specified by respondents).

Mothers value public transport, because they see it as a safe means of transportation for their daughters and because they do not have to worry if their daughters use public transport.

Public infrastructure and shopping facilities

Less than one third of those interviewed were satisfied with the quality of the infrastructure in New Hashtgerd, even though many commented that New Hashtgerd is still a young city and that they hope the situation will improve in the future.

Regarding transport infrastructure, the poor quality of the streets and lack of sidewalks was especially criticized. In general, the quality of construction was criticized. Many newly-built streets and sidewalks are severely damaged after only a short time, because they were not built competently or were not built with durable (i.e. weatherproof) materials.

Photo 3: Health care facilities in Hashtgerd NT

Additional recreational infrastructure was most desired. This includes swimming facilities, cinemas and, especially, more green spaces. More hospitals are also needed (see below).

Of those interviewed, 80% are able to reach shopping facilities to meet their daily needs by foot. One half require 5 minutes or less to the nearest shopping facility. The local stores, however, have only limited capacity to meet the demands of their customers. For everything that goes beyond daily requirements (e.g. clothing, shoes), the residents of New Hashtgerd must drive to Old Hashtgerd, Karaj or Tehran. The residents of Phase 2, especially, but also the residents of Phases 1 and 3, desire more small supermarkets, bakeries and fruit and vegetable stores nearby.

The high prices in New Hashtgerd pose another problem. According to those interviewed, high prices are a result of a lack of competition in New Hashtgerd. Some buy only the minimum of necessities in New Hashtgerd and drive to Old Hashtgerd, Karaj or Tehran for all other products, as they are cheaper there.

Photo 4: Shopping facilities in the different construction phases (III to I)

Overall, those interviewed desired more bakeries, butcher's shops, fruit and vegetable stores and small supermarkets nearby. Large supermarkets with wider selections, as well as more stores to meet medium-range needs (e.g. clothing stores, shoe stores and shopping centers) were also desired.

Real estate agents are located in many of the existing business units in New Hashtgerd. These offer properties in Hashtgerd, but are of little interest to the residents.

Recreation activities

In order to identify which distances were covered for recreation activities and to evaluate recreation infrastructure in New Hashtgerd, residents were asked about their recreation activities.

One half of those who have time leisure time, named recreation activities at home (e.g. reading, watching television, learning or playing computer). More than one half of those spend most of their leisure time at home. Several of those interviews responded explicitly that they stayed at home because there were no recreation facilities/options in Hashtgerd. For the same reason, some occasionally spend their leisure time in Old Hashtgerd, Tehran, Karaj or Fashand.

The "Golestan" Park, in building phase 1, was the most commonly-named recreation destination/activity after activities at home. The park is used for walking, relaxing and for sport. Families and, especially, mothers and their children frequent the park. However, many residents must drive a great distance to reach the park, as it is the only larger park in Hashtgerd. One of those interviewed said that because there are so few, the parks in Hashtgerd are too full.

Visits to relatives and friends in neighboring towns and cities, as well as visits to the library (of mosque) or to the mosque, were named also.

Overall, it became clear that there are few opportunities and facilities in Hashtgerd for spending leisure time outside of the home. Several men and one woman said that they would like to do sport, but that there were no opportunities in Hashtgerd. There is no cinema, no swimming facility,

Photo 5: The "Golestan" park in construction phase I

not enough parks and few opportunities to attend courses, for example. It is interesting to observe, that visits of family and friends were seldom named. In Iran it is common that women, especially, spend much time with their families and at home, but this does not mean that they have no social life.

Meeting family and friends plays an important part, but seems to be lacking in Hashtgerd. One reason must be that many family members live in other cities. Another reason must be that there are too few options for meetings and social gatherings in Hashtgerd.

The younger girls, especially, clearly expressed their discontent with the options in Hashtgerd. The boys of the same age viewed this as being less of a problem, maybe because they are affected less by societal constraints.

3.3.2 Housing and living

Type of housing

31 of 60 respondents live in a condominium, three in their own house, 25 live in a rented apartment and one respondent in a rented house.

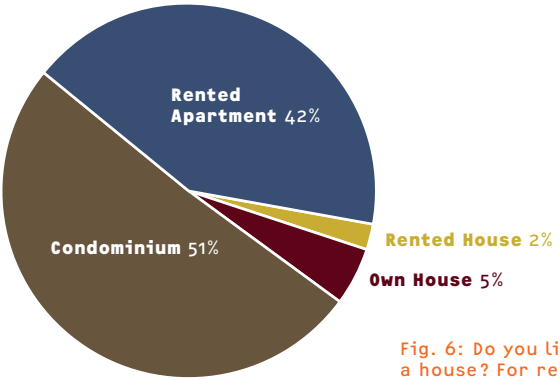

Fig. 6: Do you live in an apartment or a house? For rent or as proprietor?

Heating and cooling

Two-thirds of the respondents have a central heating system in their household that is based on oil (24) or gas (16). The other third uses local heat sources, especially oil and gas ovens, but some also individual gas heating. Three of the respondents said that in winter, when it is very cold, they turn on decentralized ovens in addition to the central supply. In winter, the supply of gas

Photo 6: Types of construction in Hashtgerd New Town

is impeded by icy conditions on the streets, which results mainly in the fact that the ovens of some interviewees cannot be adequately supplied with gas. 87% of respondents (52) have a decentralized water-powered air conditioning. The majority uses the air conditioner for one to three months out of the year. Few use them more than three months a year. Six respondents do possess a decentralized water-powered air conditioning, but have never used it. Seven of the respondents do not have air conditioning in their apartment or house. One family uses a fan. Overall, air conditioning is used seldom, because of the cooler weather in Hashtgerd in the summer, compared to other cities in Iran.

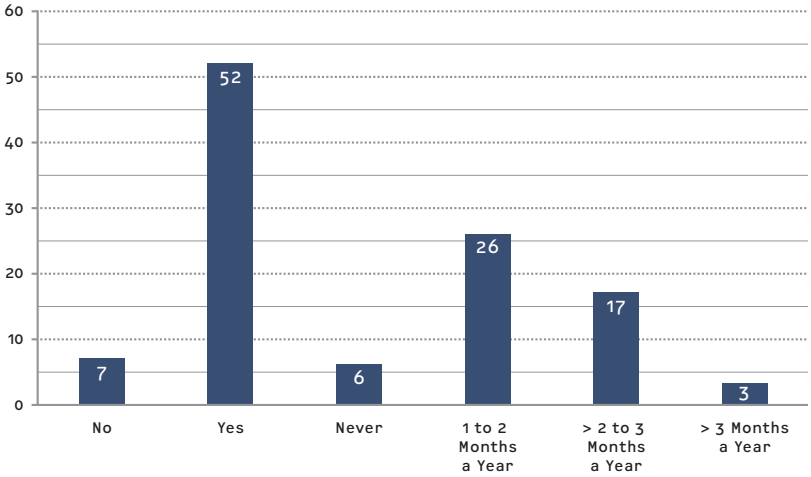

Fig. 7: Do you a have an air condition? If yes: How often do you use it? (abs. frequencies)

Saving energy

The reactions to the questions about energy saving in the household show that while energy saving certainly is an issue for the residents of Hashtgerd, it is less a matter of environmental friendly or ideological behavior, but rather of taking necessary measures to achieve a certain comfort in the apartment or house. Nearly all respondents said that, in the winter, they seal up the windows and, if they exist, the access channels of the air conditioning. A few also seal their balconies with foil. These statements show that leaky windows and poorly-sealed air-conditioning systems constitute a problem for many respondents. Especially in the cold winter, this is problematic for the residents. One woman put the problem of saving energy in badly sealed buildings like this:

> ***"Why? What good is it if I seal all the windows, cover the gap between the door and the floor with a cloth, turn the heating down, while the flat loses so much energy because of poor construction quality, for example through external walls without***

insulation? This is as disappointing as trying with a small bowl to remove the water from a boat with a hole.“

28 years, female

Some interviewees (13) said that, in winter, they only heat the rooms that are being used, turn down the heating at night or when not using the rooms. The citizens seem to be sensitized to the topic of heating, possibly encouraged by rising oil and gas prices and sometimes scarce resources in the winter.

“I have seen how my neighbors were affected from gasoline shortage last winter, and therefore I sure know that it is important to save energy.”

39 years, female

When asked about their activities to save energy, two thirds of the respondents said that they used energy-saving lamps. The power supply in Iran, especially in the late evening hours, is often scarce, which probably contributes to an increased awareness of citizens for economical consumption of power. A few said that they would, therefore, turn off devices which excessively consume power. Six respondents mentioned that their electronic appliances were energy label A.

“I recently purchased electrical equipment for the dowry of my daughter, and all were provided with energy label A. We also use energy-saving lamps.”

51 years, male

However, there were a few interviewees (4) who had never heard of energy conservation and/or do not take any energy saving measures.

When asked about the ventilation of their apartment, many respondents (12) said that they do not ventilate their apartment at all. One reason for that was stated as follows:

„It is not necessary [to ventilate]. Thanks to badly insulated external walls this is happening automatically.“

71 years, male

Besides, dust is often entering the apartment when opening the windows, so that opening the windows for a longer time is not desirable. Therefore, some ventilate their apartment by opening the apartment door.

Obstacles to saving energy

The obstacles to saving energy, in regard to heating, were already identified in the previous section. There is a big opportunity to save energy by avoiding holes and leakages and insulating the buildings.

Nevertheless, a majority (35) of the respondents feels that there are no obstacles to energy saving. Surprisingly, saving energy is very often and sometimes exclusively associated with the use of energy saving lamps. These are used by most respondents and are readily available. There are no obstacles seen in using them. As an argument against energy-saving lamps a few mentioned their short life span and low brightness.

Saving water

Since water is a scarce resource in northern Iran, it is not surprising that saving water is an issue for most of the respondents. Three quarters of respondents said that they save water in one way or another. The responses showed that washing of cars and carpets are considered to be especially water-wasting activities in Iran. Several respondents said they would wash their cars less often and only by using buckets of water instead of running water. It was also mentioned that carpets are cleaned less frequently to conserve water. In some homes or buildings the cleaning of carpets or cars is banned on the compound. Some also reduce the consumption of water when washing or showering. To what extent water is saved and what is meant by saving water is interpreted differently, though.

> ***„My mother believes that the next generation has a right to potable water, too. In order to save more water, she soaks the vegetables, cleans them and then uses this water to water the plants."***
>
> 14 years, female

> ***„Certainly, we clean our carpets only once a year and wash our car only once a month—at home!"***
>
> 26 years, female

Some responded that they are aware of the importance of water conservation, but are not able to do so. For example, they have a large family to take care of and/or that their (Iranian) lifestyle and water conservation to not fit together.

> ***„I save everywhere, but saving water is not possible. I think that saving water would not fit well with the Iranian lifestyle!"***
>
> 34 years, female

The answers of the respondents reflect the assumption that saving water is seen as being the responsibility of women. One respondent expressed this explicitly and one respondent said that everybody in her home, other than her father, saves water. Also, slightly more women responded that they saved water. This means that for promoting the saving of water, women could be the primary contact.

Photo 7: Cleaning the carpet

Energy-efficient building

Except for seven persons, all respondents had heard of energy-efficient building. When asked about energy-efficient building, most respondents associated double-glazed insulated windows and insulated exterior walls. Half of the respondents said that they had heard about energy-efficient building on TV, often through television advertising. Six of those surveyed said they had received information about Code 19 (a law on energy-efficient building) through television. Here again, television proves to be an important source of information for citizens. Two residents had heard of earthquake-resistant building.

When asked about their assessment of whether energy-efficient building in Hashtgerd was feasible and useful, the opinions differed. As in previous answers, energy-efficient building, to the interviewees, means the insulation of walls and insulated windows. Technology-oriented solutions for energy-efficient building are not mentioned and may not be well known. About one-third of respondents agreed that there are good conditions for energy-efficient building in Hashtgerd and that it would be quite feasible, especially as there are many construction activities at the moment.

> ***"It need not be complicated. All the prerequisites are there. They are building a lot and you only have to take the opportunity and build an energy-efficient house."***
>
> 35 years, male

> ***"They are showing it on TV, it is easy to realize."***
>
> 31 years, male

> ***"The city is young, and it is being built a lot, and this is the best opportunity for the government. They can pass new laws for energy-efficient building for construction companies."***
>
> 35 years, male

Photo 8: Energy-efficient building

Nearly one third thought that energy-efficient building would only be feasible under certain conditions (e.g. if new laws are for the implementation of energy-efficient building are passed or existing laws are enforced). This also means that the contractors and construction workers should be should be trained accordingly and be subjected to stricter controls. Some respondents argued that energy-efficient building was too expensive.

> ***"As long as construction companies only think of their profits and the state does not control their performance, energy-efficient building is not in question."***
>
> 62 years, female

> ***"Energy-efficient building is expensive. The residents cannot afford it, so they are not interested in it. But if the government passes a law and governmental organizations oversee the contractors and construction companies, perhaps energy-efficient building can be implemented."***
>
> 22 years, female

Another third of the respondents was not able to assess the conditions for energy-efficient building in Hashtgerd, had no opinion on this topic or had no interest in it.

Structural condition of the apartments/houses

In the survey, the residents were also asked about their assessment of the condition of their apartment or building, or rather about specific aspects that they approved or disapproved of. The positive responses from just under a third of respondents tended to be more general ("Everything is fine.").

The most-named problems in regard to the condition of housing units were too thinly-rated and often-blocked sewage pipes and poorly-insulated and leaking water pipes. Valves are frequently dripping and must often be repaired. This leads to high costs for tenants and landlords and to other problems of dampness (e.g. damp spots directly in the flat, damp or wet areas in

basements). Responses to questions regarding dampness demonstrate that dampness is a problem for half of those interviewed. With the exception of one person, all of those interviewed living in building phase 3 have problems with dampness. In contrast, only half in building phase 2 and one third in building phase 1 have problems with dampness.

Leaky windows and doors, and thin or poorly-insulated walls, were considered to be problems. Some of those interviewed responded that cracks in the walls are visible. In the winter, the flats are cold or drafty and must therefore be heated strongly. For this reason, most of those interviewed seal their windows with foil, tape, cloth or other materials themselves, in order to avoid loss of heat in the winter. The climate in Hashtgerd is continental (i.e. cold winters and very hot summers). More than half of those interviewed consider their flat to be too cold in the winter. The flats are considered comfortable in the summer, however. Few considered their flats to be too hot in the summer.

Seven of those interviewed quantitatively valued building materials and workmanship poorly altogether.

Some of those interviewed, when asked about the structural condition of their flat, also criticized the poor infrastructure facilities (e.g. lacking shopping and recreation facilities, unpaved streets) in the vicinity of the flat. This demonstrates, once again, that the shopping, recreation and transport infrastructure is an important issue for residents.

Other responses mentioned poor power lines, missing electric meters, missing gas pipes, missing exhaust hoods, stove fumes that re-enter the flat through power outlets, poorly-laid tiles, shared water meters (viewed negatively), low water pressure, lack of safety in the case of an earthquake and a poorly-designed floor plan.

4 Conclusions

The results of the study show that the issue of climate change is present in the minds of the people, but that it is linked to different environmental issues, which are related to climate change more-, and sometimes less-, directly (e.g. global warming/polar melting, ozone hole, air pollution, water shortages).

Studies show that when climate change is presented as a purely scientific issue, few people are interested (e.g. Weber 2006). When, however, climate change is presented in connection with its effects on the lives of individuals, it is no longer only an issue of luxury of the educated middle-class of developed nations (e.g. WWF India 2006).

This study also demonstrates that climate change, in its complexity, is difficult to grasp for many and is only seldom thought of in connection with daily life. Those interviewed felt poorly informed about what climate change really means and about what can be done to reduce its effects. Even energy-efficient building was a largely unknown concept. Most of those interviewed, at least, were of the opinion that humans caused climate change and must work to slow it and reduce its effects. However, it can be deduced from the responses that the responsibility for climate change is placed on the society and state, rather than on the individual.

It is important to assist citizens in recognizing how climate change is affecting their daily lives and/or how it will in the future and to offer them suitable measures for reducing these effects (e.g. make connection between daily routines and reduction of CO_2 emissions). This will make climate change easier to grasp and more understandable. Information about the potential of energy-efficient building should be promoted, especially through the Young Cities project. Although knowledge does not automatically lead to corresponding actions, there is often a connection between knowledge and environmentally-conscious views and actions (McFarland and Boxall 2003).

In order to better inform citizens, it is important to know which channels of information and communication are most used. Questions about sources for information on climate change and energy efficient demonstrate that television is the most important source of information. This was also found by a World Bank survey of Tehran residents (Calabrese 2008). Television is also used by the state as a medium for spreading information, for example, about new laws and regulations (e.g. Code 19 for energy-efficient building).

School holds an important position as a source of information about the environment, at least for the younger generation. The Internet holds a less prominent position, at least for now.

In regard to transport and infrastructure, the study shows that both the public transport system and the shopping and recreation infrastructure of New Hashtgerd require upgrading. Although public means of transport are used, many of those interviewed expressed the need for expansion and improvement of the system. Suggestions included the addition of more buses, especially small buses, improved equipment in the buses, a regular schedule, lower fares and the extension of the metro to Hashtgerd. Herein lies the potential to enable increased mobility through an improved transport system and to motivate more residents to use public transport.

The percentage of households that own a car is high (75%). However, few of these use the car exclusively (25%). The same percentage of households uses public transport exclusively. Overall, cars are used more frequently by men and a greater percentage of men have a driving license (two third of men as opposed to a quarter of women). Women use public transport more frequently. Public transport is viewed as a safe mode of transportation, especially for girls.

Bicycles are not among the main modes of transport. Mostly, they are used by children in their leisure time, but not as mode of transport. Some of those interviewed expressed that they would like to ride bicycles. However, societal constraints for women and/or poor street conditions are reasons why they do not.

According to the residents of New Hashtgerd, upgrading of shopping and recreation facilities is necessary. There is a shortage of shopping facilities for medium-term grocery and clothing needs and of recreation facilities. Due to low competition, prices for food and groceries are comparatively high in New Hashtgerd. The lack of shopping facilities motivates residents to drive to Karaj or Tehran to go shopping. This increases the use of individual transport to New Hashtgerd, Karaj or Tehran and reduces the attractiveness of New Hashtgerd as a place to reside. The responses also show that residents of Hashtgerd spend much time in the home, due in part to the lack of options for spending time outside of the home. Appropriate public and semi-public spaces for social gathering and recreation options are also lacking in New Hashtgerd. These would make the New Town more attractive to residents.

A certain degree of sensitization is noticeable in regard to the issue of conserving energy and water. This is, most likely, due to increases of price and shortages, rather than ecological views. Reasons for conservation of energy and water were not explicitly researched in the study. However, included may be the structural condition of living space. A large percentage of those interviewed criticized leaky windows, doors and walls, which make saving energy (e.g. for heating) more difficult. Energy-efficient building is only partially recognized as an option by those interviewed. It must still battle with the preconception of being very expensive.

Overall, the study shows that a certain degree of sensitization opposite issues of climate change and energy conservation exists among residents of Hashtgerd. There remains a high demand/need for information about the specific effects of climate change on daily life and about the effects of daily activities on CO_2 emissions. The existing sensitization offers a good foundation for measures for strengthening consciousness opposite the environment and climate change. The lack of consciousness about climate change can be explained by the context in which the issue is presented and whether or not the connection is made between climate change and societally-relevant issues (transport, energy supply, food supply). There are clues in this study about which issues these are in the case of Hashtgerd.

Information is also needed by the residents of Hashtgerd in regard to energy-efficient building. The daily experience with resource shortage, rising energy prices and leaky cladding (i.e. energy-inefficient building) presents a good basis of experience against which the advantages and disadvantages of energy-efficient building can be visualized.

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