

HEAT PUMPS IN SWITZERLAND—A SUCCESS STORY

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ABSTRACT

The Swiss heat pump market has experienced in the last decade a continuous growth. On average, the sales increased by 15 %. Heat pumps play an important role especially in the new building market, where the heat pump shares about 20 %, oil-fired systems 50 %, gas-fired systems 22 %, and other heating systems 8 %. With respect to the Swiss climate, it is necessary to have reliable heating systems installed in buildings. Due to the fact that heating systems and in particular heat pumps cannot be sold in the same way as consumer-products, the Swiss Heat Pump Association (FWS) was founded 10 years ago with the goal to promote the residential heat pump in Switzerland. Furthermore, FWS coordinates governmental organizations, research and development partners, manufacturers, HVAC-consulting firms, contractors, and energy-suppliers amongst each other. Within this concept, quality assurance and operational reliability have been set as a precondition for an active market development. In addition, a successful marketing is a key component for convincing investors in heat pumps.

Key Words: *Networking and marketing of heat pump technology in Switzerland.*

1 INTRODUCTION— THE SWISS HEAT PUMP MARKET

The success of the Swiss heat pump market and the ongoing activities are discussed in this section. In summary it can be claimed that only the cooperation among the government, research and development institutes, manufacturers, HVAC-consulting firms, contractors and energy-suppliers has led to the experienced success, whereby the Swiss Heat Pump Association played an active role.

The sales figures show an increase of 15 % over the last 10 years. These heat pumps are mainly utilized for space heating whereby residential houses, school buildings, and commercial buildings, as well as small industrial sites, are considered. For that purpose, different heat sources are utilized. The heat sources are represented by 60 % air-to-water, 36 % brine-to-water, and 4% water-to-water. The development of sales is shown in Fig. 1. The evolution can be divided in two different periods, one from 1980 to 1993, and another one from 1993 to 2004. The year 1993 was the foundation year of the Swiss Heat Pump Association (FWS). In addition, legislation was past in the early 90s to protect the environment. In the same period, the Swiss executive committee decided to implement the Kyoto-Protocol. A part from all of this, it was an opportune decision to institute the FWS. It was the task of FWS to coordinate the different partners and to create together more environmental-friendly heating solutions. On one hand, the Swiss government aims to reduce pollution and in turn to protect the citizens whereas, on the other hand the industry is primarily interested in a growing market.

number of installations

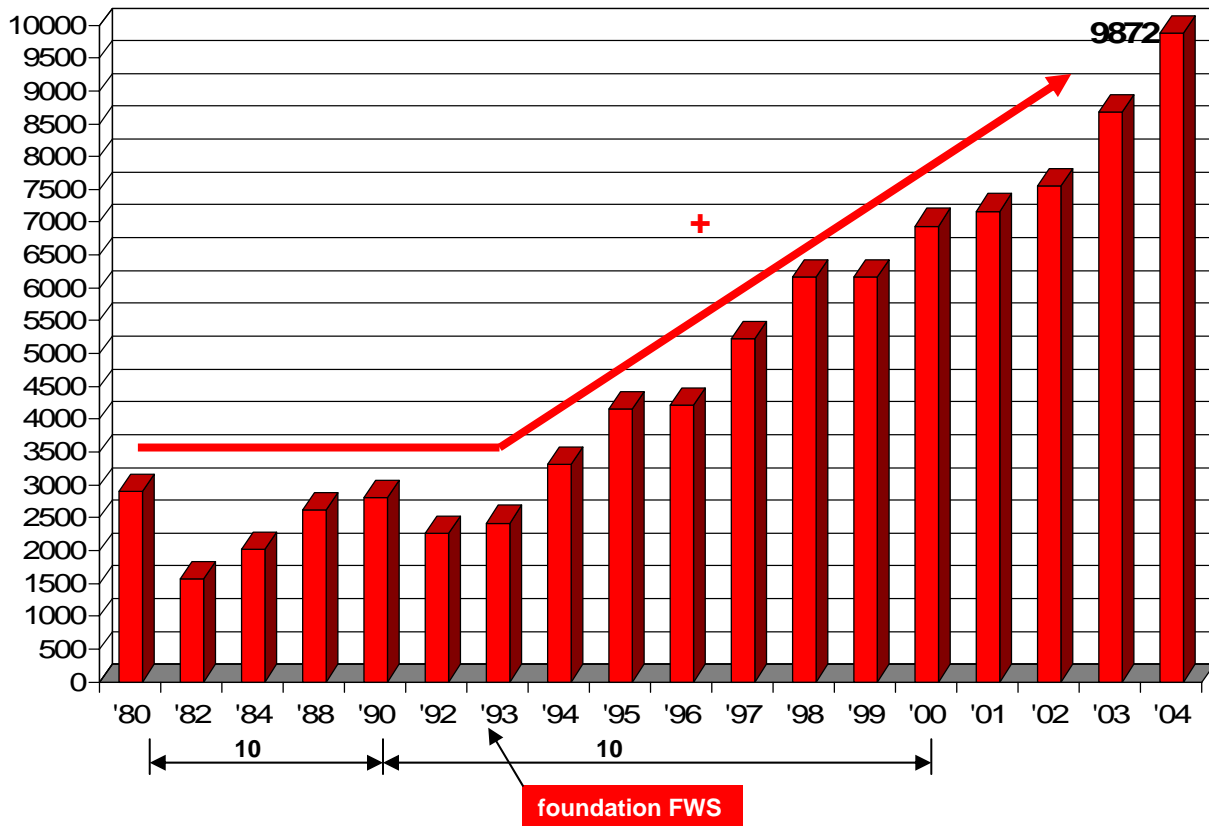


Fig. 1. Sales figures of heat pumps in Switzerland from 1980 to 2004

The sales figures then compared to other countries are relatively small and therefore relative growth rates are used in the following sections. In that context, the scale for the German heat pump market would go up to 100'000 units and for the US-market up to 1'000'000 units. In the coming sections, only space heating systems excluding domestic hot water generation are considered to showcase the different market mechanisms.

Today's heat pumps have proven themselves in the market and can be considered as a state-of-the-art apparatus, which easily can withstand the competition of traditional heating systems. It can be seen from Fig. 2 that most of the existing buildings are heated by oil-furnaces still. The second place is represented by gas-furnaces and the third by heat pumps. The other 8 % correspond to bio-mass systems and district heating networks. Furthermore, the difficult topology of Switzerland restricted the establishment of a country-wide gas-network. In fact, Switzerland is always at the end of a gas network in the east, west, north, or south. About 60 % of the Swiss topology is alpine and thus it has been difficult and inefficient to establish a gas network.

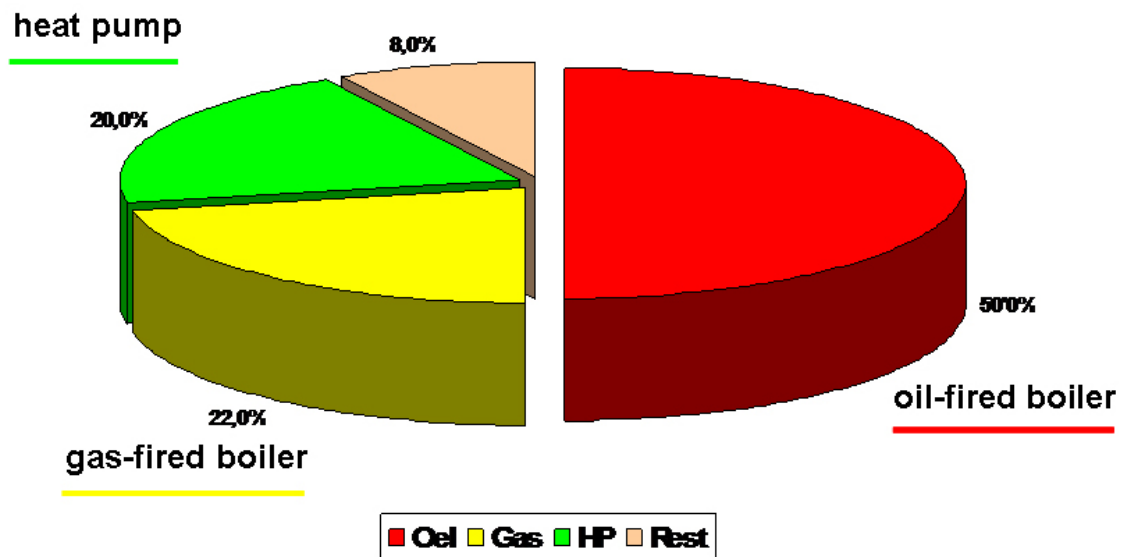


Fig. 2. Distribution of oil-fired, gas-fired boilers, and heat pumps

The heat pump can be identified as the unquestioned leader in the new residential house market whereby the sales figures have climbed from 20 to 60 % over the last 10 years. This means that nowadays in 3 out of 5 new houses a heat pump is installed as can be seen from Fig. 3.

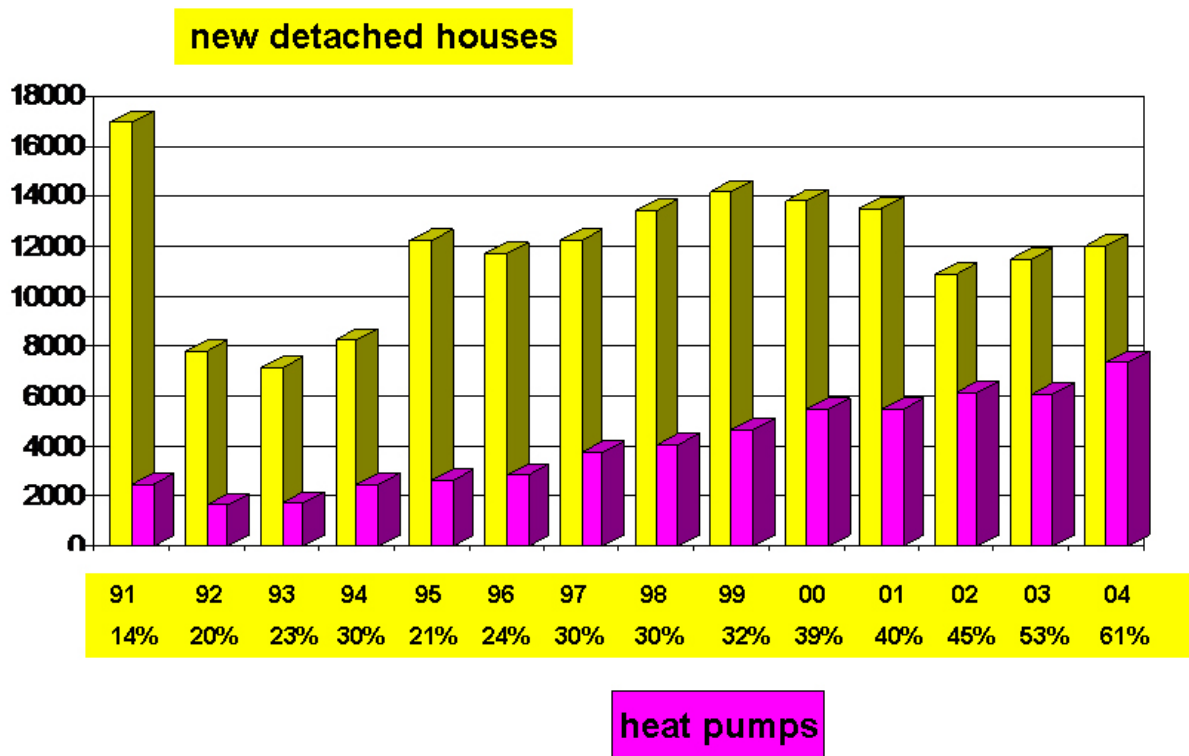


Fig. 3. Share of heat pumps in new detached houses.

2 BASIC DATA ON SWITZERLAND

Switzerland has a population of 7.4 million. Furthermore, 1.3 million buildings are used for residential, administration, education, transport, and industry. In fact, 700'000 of these buildings belong to the category of residential houses, whereby a significant portion of these houses has been built in elevated areas. About 12'000 new residential houses are built annually. With respect to the Swiss-economy, it can be noted that especially the financial and insurance services are internationally well-known. In addition, the pharmaceutical industry (Novartis, Roche etc.), the watch industry (Swatch, Omega etc.), food labels (Nestlé etc.) and tourism contribute to the Swiss-economy.

With respect to the climate, it is important to understand that the temperatures in the winter period fall for several weeks below 0 °C. In some areas, the temperatures can drop as low as minus 25 °C. In the colder seasons, a large part of the country is covered by snow. The annual mean temperature is around 4 °C. Based on these facts, it is necessary to have reliable heating systems. The sink temperature of new low-temperature heating systems ranges from 35 to 50 °C whereas existing heating systems operate between 70 to 90 °C. All of these facts call for high requirements for any heating systems. However, a long-term study initiated by the Swiss-administration and by the industry discovered that heat pumps are highly reliable. The study showed that the heat pump has reached a high technical level. The reliability, the safety, the high thermal efficiency, and the low maintenance costs demonstrate the positive sides of heat pumps. Nevertheless, scientists in the academic field and engineers in the industry are striving continuously to further improve the heat pump.

3 MARKETING CONCEPT FOR HEAT PUMPS

Heat Pumps are not like products, which are offered in a supermarket. Furthermore, heat pumps are not purchased on a daily basis instead they are only acquired every 20 to 30 years. They are also not a luxury object, which is parked in front of the house and thus, engineers have also to deal with marketing in order to successfully sell heat pumps and generate profits. However, marketing is for many engineers a rather unfamiliar discipline. This section is concerned with the marketing of heat pumps and introduces economic concepts.

Demographic studies found that the consumer attitude can be categorized into groups. For example, a tourist, traveling to Las Vegas, drives most likely a different car than a camper who spends his vacations on a nearby lake. Another example claims that a manager, at home in the financial world, furnishes his house in a different style than an elementary school teacher.

In addition, the consumer behavior was studied in a similar way with respect to different products. The results revealed that three groups can be identified: 1) high interest products, 2) low interest products, and 3) no interest products. Moreover, each of these groups is associated with individual marketing considerations. Therefore, the products of these three groups generate different interests among consumers. In order to address these different interests, it is important to apply specific marketing concepts to each group.

Let's talk for a moment about cars. This subject is a popular topic, which is discussed in many daily situations. Common questions of such discussions are for example: How much horse power has your car? How does a car navigation system work? What interior options have you chosen? These and other questions could be raised. Topics like cars, watches, traveling can be grouped as high interest products. Furthermore, these are products, which receive special attention with respect to marketing, publishing, and presentation. On the other hand, where can furniture be grouped to? How intensively is furniture discussed among people? How often during a drink does the topic of conversation turn to the designer of a couch? It can be concluded that people show a particular interest in furniture, but it is never the number one topic when people get together. Hence, furniture is categorized as a "low interest product." A disap-

pointing fact for engineers is that the technical installations in a house such as the air-conditioning system or the heating system are almost never discussed. Thus, these types of products can be identified as “no interest products.” Nevertheless, the systematic categorizing of product interests says nothing about the product’s value and necessity. These interests groups are only a measure for marketing and sales people to better introduce products on the market and to establish supporting sales infrastructure.

The discourse above outlined that many products such as beverages are promoted and sold in a different way compared to heat pumps. In addition, products like beverages or chocolate associate emotions and appetite. In fact, it is the moment that counts. With respect to heat pumps, basic conditions such as the price of the primary energy can considerably impact the market. For example, countries with low oil- and gas-prices consider less environmentally-friendly heating solutions. Another important aspect is the building design whereby a city building with heavy walls has other requirements on the heating system than a blockhouse with light walls on the Canadian countryside. Furthermore, it makes a difference if the particular object is a new building or a retrofit building. With respect to the price of heat pumps, a considerable price drop occurred over the last two decades in the Swiss market. According to Fig. 4, it can be seen that the heat pump prices dropped by 50 % over the last 24 years. As a result, the heat pump has become more competitive against conventional heating systems such as oil- and gas-fired boilers.

Investment goods like the heat pump require much more sales processes compared to products like a simple chocolate bar. The sales procedure consists of several stages, which have different impact factors. In that sense, architects and engineers play a very important role. Nevertheless, also the power-supply company has to be considered in this process. For example, a privileged heat pump tariff can give the heat pump an advantage with respect to the operational costs among its competitors. However, it is a win-win situation since in turn the power-provider can sell energy for the next 20 to 30 years. On the other side, also the Swiss administration has been involved since the executive committee signed the Kyoto-Protocol in 1990. In consequence, this decision required legislation to reduce pollution and the impact on the environment. Recently, a law to reduce CO₂-emissions has been passed in the parliament. Furthermore, this particular law will tax the combustion of fossil fuels in the near future. In addition, the Swiss administration and in particular the Swiss Federal Office of Energy significantly contributed funds to intensive research and development on promising energy solutions. Also, the administration invested into quality assurance and the training of specialists. In the case of the heat pump manufacturers, they have to operate a reliable and responsive customer service in order to maintain and repair heat pumps. This guarantees a reliable and satisfying heat pump operation. Now, how can the investments of the different players on the market be profitably implemented? The answer is in a business plan. Based on these questions, the importance of a coordination center became obvious. It was clear that this coordination office has to combine competence in the technical field as well as in marketing.

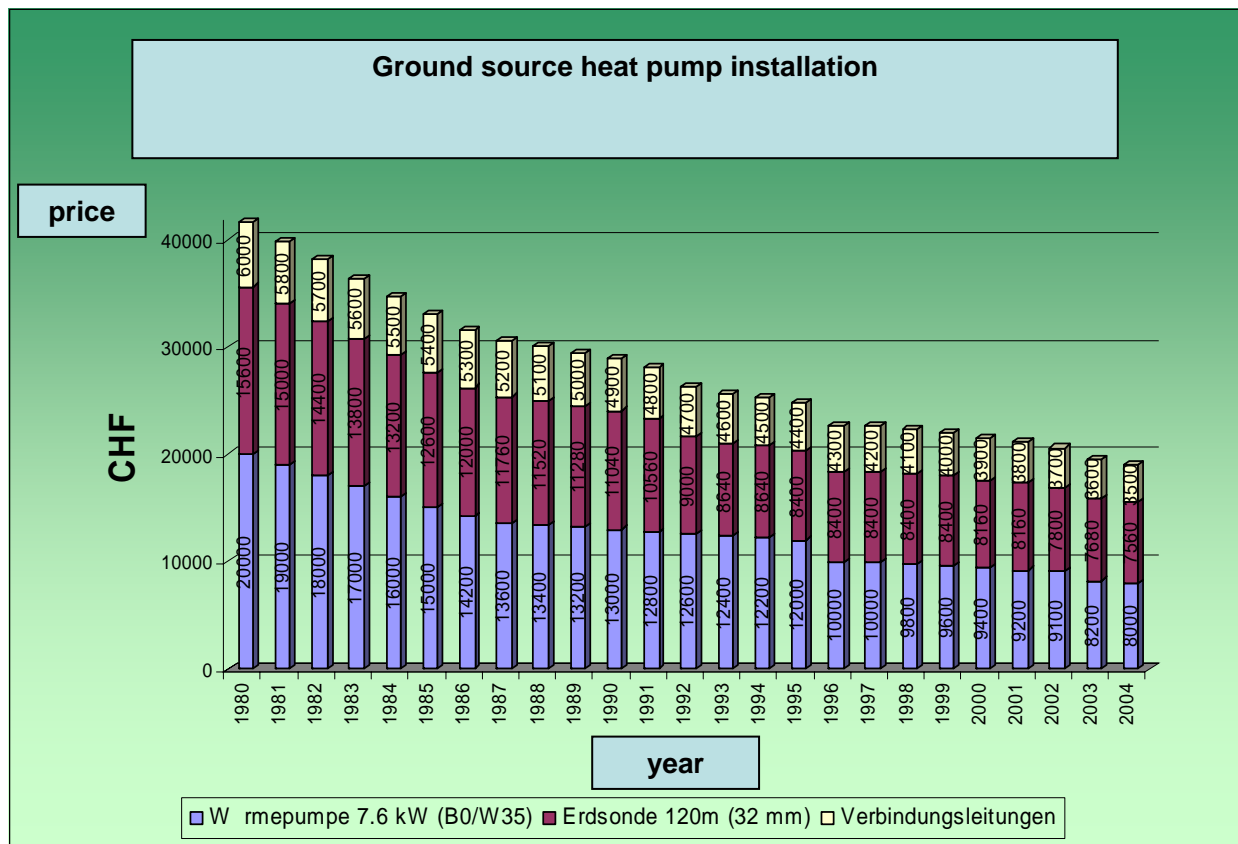


Fig. 4. Price development of brine-water heat pumps.

4 THE SWISS HEAT PUMP ASSOCIATION (FWS)

The Swiss Heat Pump Association was founded in 1993 with the goal to promote the heat pumps in Switzerland and to establish an international network with other institutions. The foundation of FWS was supported by top governmental leaders and interested partners in industry. The FWS has created a platform for engineers, contractors, manufacturers, energy-suppliers, and governmental organizations. Thanks to the involvement in the Institute for Renewable Energies the Swiss Heat Pump Association could also contribute to debates on energy-relevant subjects with the parliament. This involvement is considered amongst all members as very important. Soon after the foundation, market-driving measures were implemented. As a result, an almost immediate growth of the heat pump market was observed.

The Swiss Heat Pump Association is lead by a board of directors and an executive committee. In addition, five different departments were established:

- Marketing
- Education
- Quality Control
- Standards
- International Relations, Politics

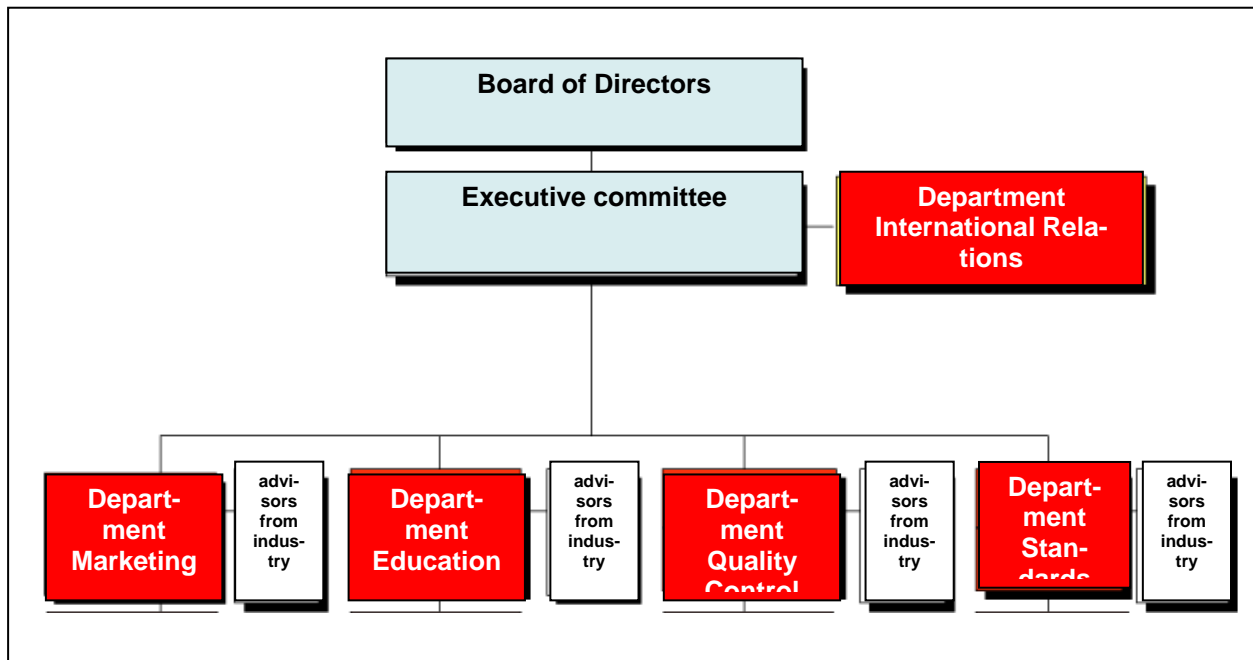


Fig. 5. Organization chart of the Swiss Heat Pump Association

The departments shown above are lead by experts on part-time bases. With respect to the marketing concept, a strategy is applied where no single object is subsidized. In contrast, a so-called Push-Pull strategy has been put into practice. What is understood by this? First of all, the marketing concept suggests supplying experts such as architects, engineers, contractors, and manufacturers with first hand knowledge. Secondly, house owners are informed in different ways about heat pumps and encouraged to install one. Furthermore, 60 % of the marketing budget is used to inform the experts and 40 % to inform the house owners. (see Fig. 6). In addition, the members of the Swiss Heat Pump Association receive support for promotional purposes. In this context, open-door events have been very popular where experts explained heat pump systems one-by-one using real live systems. At the same time, other heat pump owners shared their experiences among the spectators. A happy heat pump owner is always a very good reference. In fact, this kind of open-door event could reach up to 350 prospective buyers. In addition to such events, advertisements were also placed. The Heat Pump Newsletter (HP News) is regularly published in expert magazines. It informs about trends, experiences, and regulations. Nevertheless, public presentations and exhibitions are also a successful method to reach people. Finally, an internet platform contains lots of information for experts and perspective heat pump buyers. For example, local heat pump contractors and manufacturers can be identified using a database. These tools attract contractors and consultants to become a member of the Swiss Heat Pump Association.

The *Department of Education* is responsible for keeping all members up-to-date with new information. For that purpose, seminars for engineering, marketing, and sales are offered for the members where they can acquire the necessary knowledge to enhance their business. Separate courses are held for drilling companies, which are usually offered at the beginning of the year.

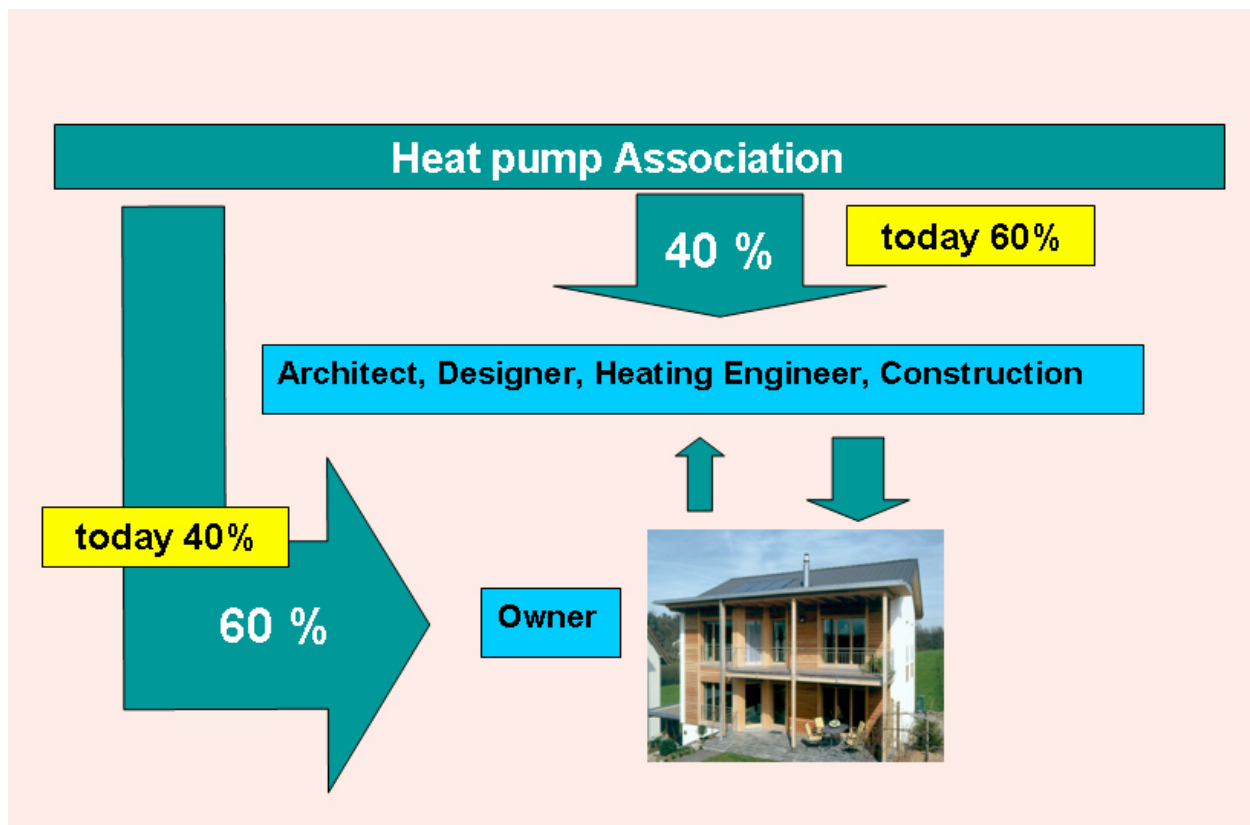


Fig. 6. Push/Pull-Strategy

The quality control is a fundamental part of the entire initiative. In fact, all marketing efforts are worthless when the quality of the products is inadequate. Therefore, the national heat pump test center conducts performance and noise measurements on new products. A seal of quality was introduced to award to heat pumps, which pass the tests. The label guarantees that the heat pump fulfills the technical standards and that the manufacturer operates an adequate service.

The Swiss Federal Office of Energy initiated a long-term field study on heat pumps. In fact, 221 heat pumps have been monitored and analyzed over a period of more than 9 years. It was the purpose of this study to gain more knowledge on the long-term performance and on the reliability of residential heat pump installations. Furthermore, it was found that 95 % of the heat pump owners are satisfied. Another interesting result of this study was that the availability of heat has been 99.5 %. These results show that heat pumps, which are engineered, manufactured, and operated with care by the Swiss industry, belong to the most reliable systems existing today.

5 SUMMARY

The Swiss Heat Pumps Association is a highly efficient organization, which brings partners together and puts suitable market arrangements in place. The fact that the Swiss government continuously supported the activities of the Swiss Heat Pump Association and has passed constructive laws, was the most important factor of success. In addition, the energy-suppliers brilliantly enhanced the initiative by offering long-term partnerships to the heat pump community. It was also crucial to invest the marketing resources for preparing the market for heat pumps rather than focusing on individual projects. Therefore, all involved partners such as the manufactures, the engineers, and the contractors benefited together. Finally, it was essential to establish reliable quality control tools to guarantee the desired standards. All these factors

together led to nearly 100 % of satisfied heat pump owners. This for us is the best reference for future heat pump customers.

REFERENCES

Homepage from Heat Pump Association Switzerland, German www.fws.ch

Homepage from Heat Pump Association Switzerland, French www.pac.ch

FAWA-Feldanalyse von Wärmepumpen Anlagen, Bundesamt für Energie