CONTRIBUTION OF THE FUND FOR SUSTAINABLE ACCESS TO THERMAL RENEWABLE ENERGY (FASERT) TO THE DINAMIZATION OF THE IMPROVED COOKSTOVES MARKET. SAN MARTIN, PERU

SUMMARY

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Contribution of the Fund for Sustainable Access to Thermal Renewable Energy (FASERT) to the dinamization of the improved cookstoves market. San Martin, Peru. Summary

The Fund for Sustainable Access to Thermal Renewable Energy (FASERT) is an initiative financed by the Energising Development (EnDev) program and implemented by the Inter-American Institute for Cooperation on Agriculture (IICA) in Peru.

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Main Acronyms and Abbreviations

Acopagro	Cooperative of cacao producers
Adisa	Naranjos District Farming Association
EMS	Energy Market Scorecard
EnDev	Energising Development Program
Fasert	Fund for Sustainable Access to Thermal Renewable Energy
Fidecop	Fund for Innovation and Development of Portable Wood-Burning Cookstoves
Foncodes	Fund for Social Development Cooperation
GIZ	German Agency for International Cooperation
ICS	Improved cookstoves
IICA	Inter-American Institute for Cooperation on Agriculture
INEI	National Institute of Statistics and Informatics
Iraepa	Institute for Advice and Studies in the Peruvian Amazon Region
Minem	Ministry of Energy and Mining
MVCS	Ministry of Housing, Construction and Sanitation
Osinergmin	Energy and Mining Regulatory Agency
RBF	Results-based Financing
Sencico	Peruvian Agency for Training in the Construction Sector
Siemac	Equipment, Maintenance and Construction Engineering Services
BEAT	Network of Basic Energy Access Technologies
TRET	Thermal Renewable Energy Technologies

Summary

This document is based on the application of the Energy Market Scorecard (EMS) methodology developed by the Energising Development (EnDev) program. The objective of the use of the EMS methodology by the Fund for Sustainable Access to Thermal Renewable Energy (FASERT) was to establish the development phases (or stages) of the market of improved cookstoves (ICS) in the San Martin region of Peru for the 2014-2018 period.

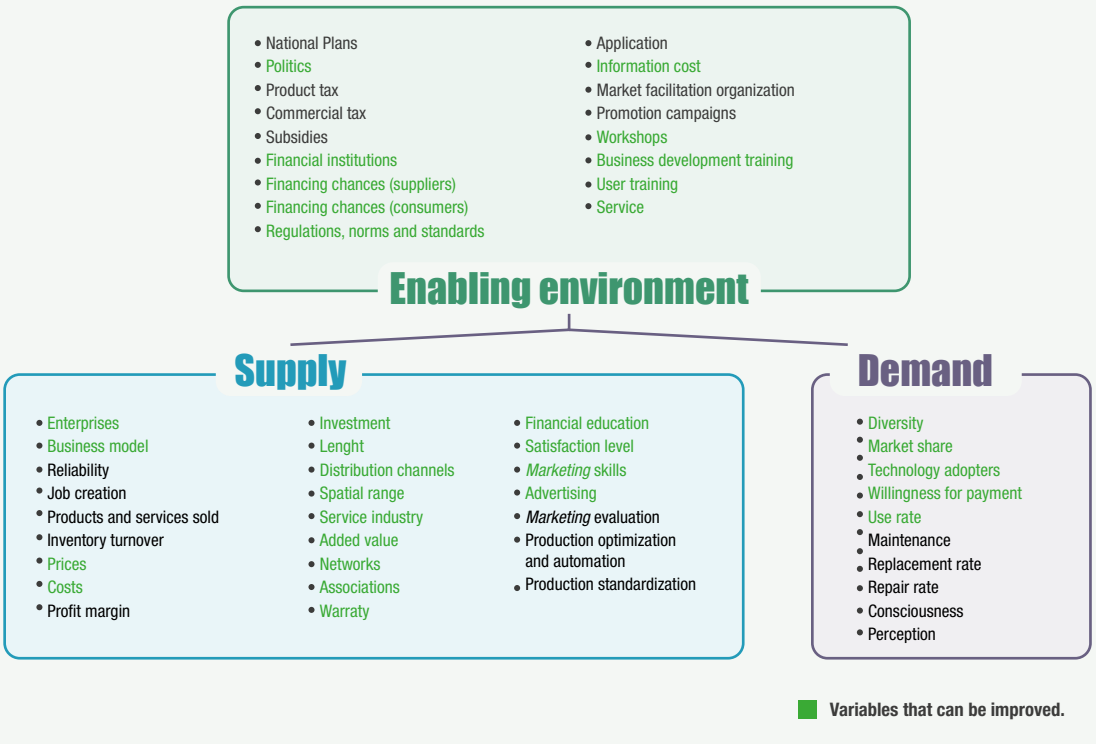
This methodology analyzes the market system of a technology over a certain period of time on the basis of three key aspects: supply, demand and enabling environment. Each aspect involves the analysis of a number of variables that feed a set of indicators. On the *supply* side, 25 variables were analyzed (8 indicators); on the *demand* side, 10 variables were analyzed (6 indicators); and in terms of the *enabling environment*, 17 variables were analyzed (5 indicators). After the analysis of these variables, a development phase is assigned and over that basis, the corresponding indicator for each key area gets then established. The EMS methodology proposes six market development phases: pre-commercial, pioneering, expansion, maturity, saturation and degeneration.

The baseline information was collected directly (primary information) through surveys and interviews with current and potential customers, enterprises, NGOs and public and financing institutions. To this end, the EnDev Surveys application was used and the data was processed by the SPSS statistical software package. At the same time, a documentary review was conducted (secondary information), complementing the analysis of the primary information.

The results show that in 2018 there was significant progress in the development of the market of improved cookstoves (ICS) in the San Martin region: 33 variables out of 52 (63%) migrated to a higher market development phase as compared to 2014. On the supply side, 18 variables out of 25 (72%) improved in terms of a development phase; on the demand side, 5 variables out of 10 (50%) migrated to a higher market development phase; and in terms of the enabling environment, 10 variables out of 17 (59%) improved as well. (see figure 1)

The promotion of a dynamic market of ICS in the San Martin region was possible through the implementation of FASERT mainly through its contribution in the supply and in the enabling environment. It is also possible to extrapolate this result at national level, as FASERT implements cross-cutting actions under the same approach in the country, although there may be small differences due to the various contexts present in each region.

Figure 1. Summary of variables that improve in each key aspect of market development.



Main results

Supply:

- Increase in the number of enterprises in the ICS market in the San Martin region.
- Sustained growth in the volume of ICS sales, both in terms of the institutional demand and the retail demand.
- Identification of the roles and expansion of the actors in the supply chain of ICS.
- Promotion of partnerships between enterprises in the supply chain of ICS.
- Reduction of logistic costs for the expansion of the ICS market coverage.
- Strengthening the management and business models of enterprises engaged in the commercialization of ICS.
- Standardization of the production of ICS.

Demand:

- Product supply diversification (promotion for the development and commercialization of new models of mobile and portable ICS).
- Expansion of the spatial coverage of the ICS market in the region.
- Increased awareness among customers regarding the use and payment of new models of ICS.

Enabling environment:

- Promotion for the sustainable use of ICS by influencing on decision makers.
- Creation of new financing mechanisms such as credit funds, results-based financing (RBF), ICS replacement and maintenance programs, etc.
- Building the capacities of the technicians from public institutions so that they will have the knowledge to support the update of the regulatory framework on ICS, as well as other initiatives.

Introduction

This document analyzes the contribution of FASERT to the market of improved cookstoves (ICS) in San Martin, Peru, in order to determine its development in the 2014-2018 period.

FASERT, is an initiative funded by EnDev and implemented in Peru by the IICA since October 2014. Its objective is to promote a dynamic value chain in the market of Thermal Renewable Energy Technologies (TRET) in the country. To this end, FASERT strengthened the technical and financial capacities of the actors involved in the value chain of TRET at the household, community (social infrastructure) and productive levels.

The fund has three components: direct promotion of the TRET market through non-refundable grants; the promotion for innovation and quality in the TRET market; and the indirect promotion of of an efficient TRET market with the aim of positioning a viable alternative for the promotion of sustainable livelihoods.

Considering that the majority of the technologies promoted by FASERT in the San Martin region and across the country are improved cookstoves, this led to assess the development of these technologies in the San Martin region, identifying within the contribution of FASERT to this process.

Thus, the application of the EMS methodology allowed the project to determine the development phase of the ICS market in the San Martin region, through the analysis of a set of variables and indicators in terms of supply, demand and enabling environment. The period analyzed goes from 2014 (prior to the implementation of FASERT) to 2018, in order to assess the contribution of the fund to the dynamics of this market from its implementation.

Based on the assessment of the ICS market, FASERT identified several lessons learned, which will be useful for the implementation of future programs, projects, initiatives, and strategies aimed at promoting a dynamic ICS market.

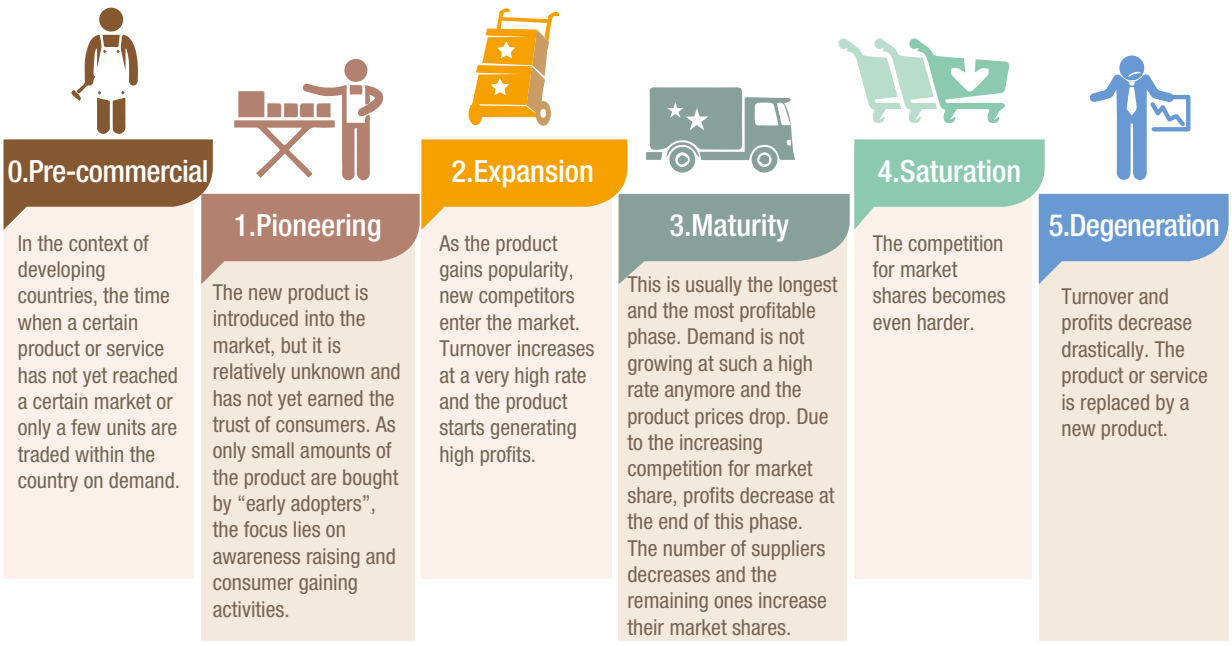
Demonstration of use of the Econofire portable improved cookstove.

1. Methodology used

1.1 Description of the Energy Market Scorecard methodology

EnDev developed the EMS methodology as a tool to investigate, measure, and subsequently be able to effectively stimulate the market development for modern energy products and services. EMS assesses the intervention of a program or project with regard to a technology over a certain period of time. Under EMS, the development of a market comprises six phases: pre-commercial, pioneering, expansion, maturity, saturation and degeneration (Figure 2). The most challenging period is the transition from the pioneering to the expansion phase.

Figure 2: Market development phases



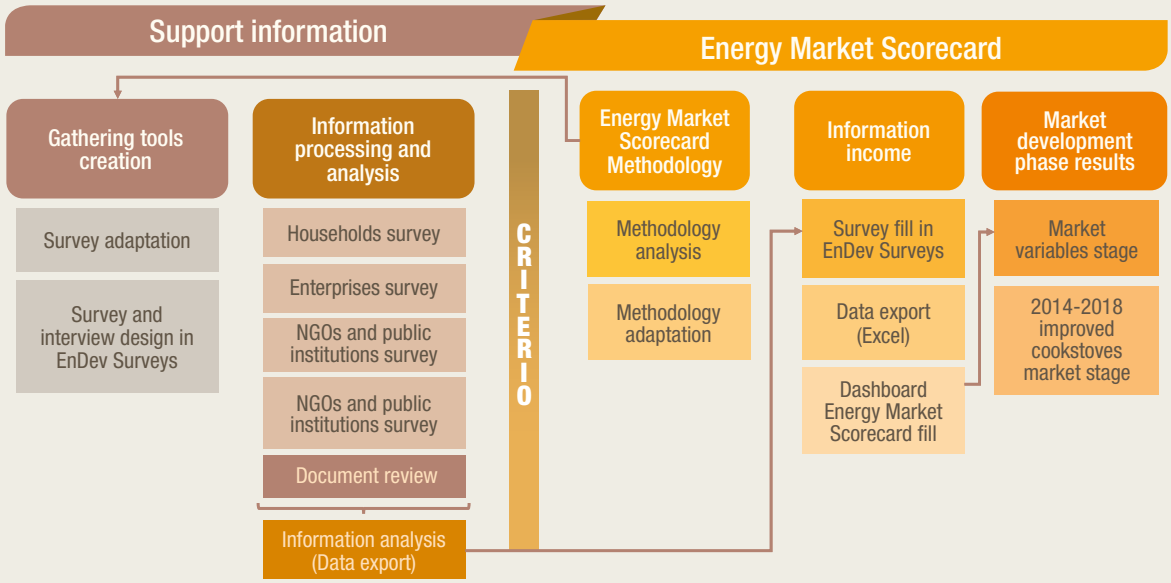
Source: EMS, EnDev program.

The development of a dynamic market involves the analysis of three key aspects: supply, demand and environment. EMS offers a scorecard with 19 market development indicators that can be tracked over time. Each indicator proposed contains one or more variables (52 in total), which are a reference point for each market development phase.

The indicators on the supply side are the following: suppliers; sales volume; prices, costs and profits; supply chain development; value chain development; business networks; warranties; and entrepreneurial skills. On the demand side, the indicators are the following: product and service diversity; market penetration; willingness to pay; systems in use; replacement and repair; and consumer awareness. Finally, the enabling environment indicators are the following: policies; access to finance; quality regulations, norms and standards; market information; and expertise development.

Based on the results, each variable is placed in one of the six market development phases. At the same time, this also indicates the market development phase for the indicators and subsequently the corresponding key aspect (i.e. supply, demand and enabling environment). The steps for the application of the EMS methodology is shown as follows (Figure 3).

Figure 3: Methodology for the application of the Energy Market Scorecard



* EnDev Surveys is a monitoring and evaluation platform for processing surveys.

Source: EMS, EnDev program.

1.2 Documentary review and adjustment of the methodology

This section describes how the proposed methodology was adapted to the Peruvian context. It also describes the instruments used for the collection of the information.

1.2.1 Documentary review

The project conducted a review of documents, statistics, market assessments, impact studies, reports and other relevant data. A total of 52 sources of information were consulted including the semi-annual reports of FASERT, development agencies, partner institutions (e.g. IICA, EnDev Peru) and government entities, as well as news from the media. The documentary review complements the primary information collected, particularly in terms of demand indicators (replacement and repair) and enabling environment indicators (quality regulations, norms and standards) of the EMS.

1.2.2 Adjustment of the methodology

a. Adjustment of EMS indicators and variables to the Peruvian context

In order to maintain the comparability between different current and future researches, EMS variables and indicators have been adapted to the Peruvian context. On the supply side, the percentage of sales from bids and retail sales was added to the *sales volume* indicator; on the demand side, the number of products facilitated through government subsidies was added to the *market penetration* indicator; as regards enabling environment, the perception about piracy and the mechanisms for its elimination were not considered in the *quality regulations, norms and standards* indicator.

b. Adjustment of pre-determined questionnaires

The technical team of EnDev Peru and FASERT reviewed the EMS methodology and adapted five questionnaires for the collection of information. The questions were written using a language that is easy to understand by the target population. In order to clarify the potential conceptual doubts of the interviewees, a glossary was prepared. For households, a survey was prepared. For companies, structured and semi-structured interviews were applied. In the case of NGOs, public institutions and financing institutions, a guide with semi-structured questions was used for the interviews with representatives.

1.3 Surveys and interviews

1.3.1 Surveys

In order to determine the size of the sample, two sampling procedures were conducted: random probabilistic proportional sampling for households with an ICS, and multi-stage sampling for households without an ICS.

a. **Households with ICS:** A random probabilistic proportional sampling was conducted. Based on this, the sample was calculated with a margin of error of 8% and a level of confidence of 95%. Based on a universe of 4251 users, a sample of 145 household surveys was established.[1]

b. **Households without ICS, but in need of one:** A multi-stage sampling[2] based on the sample of households with ICS was conducted. Based on this total, and bearing in mind the percentage of households in need of an ICS in San Martin region,[3] a sample of 47 surveys for potential households was established.

Table 1: summarizes the calculations made in order to determine the number of households for the survey

Item	Households with ICS	Households without ICS, but in need of one
Universe of users with ICS in San Martin region	4251	
Level of confidence	95%	
Margin of error	8%	
Sample of current customers for the survey	145	
Percentage of potential customers on the sample		32,1%
Sample of potential customers for the survey		47
Total of surveys		196

Own elaboration

In order to establish the geographic location of the households for the survey, the following criteria were taken into account:

- Database of users with ICS in the San Martin region[4]
- Locations with the highest concentration of households with ICS
- Population in the prioritized locations in the San Martin region[5]

Bearing in mind the size of the samples and the criteria described above, the project established the number of households for the survey in the districts of Alto Biavo, Banda de Shilcayo, Lamas, Morales, Moyobamba, Sauce, Shapaja, Soritor, Tabalosos and Tarapoto.
The families were very willing to participate, so, as Table 2 shows, the representatives of 150 households with ICS were interviewed (5 more than the planned number) as well as 63 households without ICS, but in need of one (16 more than the planned number)[6]

Table 2: Households surveyed in San Martin region

Type of household	Surveys planned	Surveys conducted
With ICS	145	150
Without ICS, but in need of one	47	63
Total	192	213

Own elaboration

1.3.2 Interviews

In order to understand the perceptions about the ICS market from the perspectives of the supply and the enabling environment in the San Martin region, the project conducted structured interviews aimed at enterprises and semi-structured interviews aimed at public institutions, NGOs, associations of producers, financing institutions and enterprises.

32 interviews (out of 37 planned by the project) were conducted: 10 structured interviews and 22 semi-structured interviews. Thus, the difference between what was planned and the reality lies on the fact that some of the actors identified could not be contacted or could not be reached in inaccessible areas when the field work was conducted. The structured and semi-structured interviews were prepared on-site using the EnDev Surveys application.

The field work was conducted from September 20 to October 10, 2018. In order to collect the information, tablets with the EnDev Surveys application were used.

1. The sample was calculated using the following web page: <http://www.berrie.dds.nl/calcss.htm>.
2. Multi-stage sampling is a tool that helps to collect data through an opinion survey. It has two stages: planning and execution. See: <http://encuestasdeopinion.blogspot.com/2008/09/qu-es-un-diseo-muestral-polietpico.html>.
3. National Household Survey 2017, INEI.
4. Database provided by the monitoring area of EnDev Peru.
5. National Household Survey, 2017.
6. This increase did not affect the representativeness of the sampling conducted.

Demonstration of use of a Selva fixed improved cookstove, after its construction.

2. Results and discussion

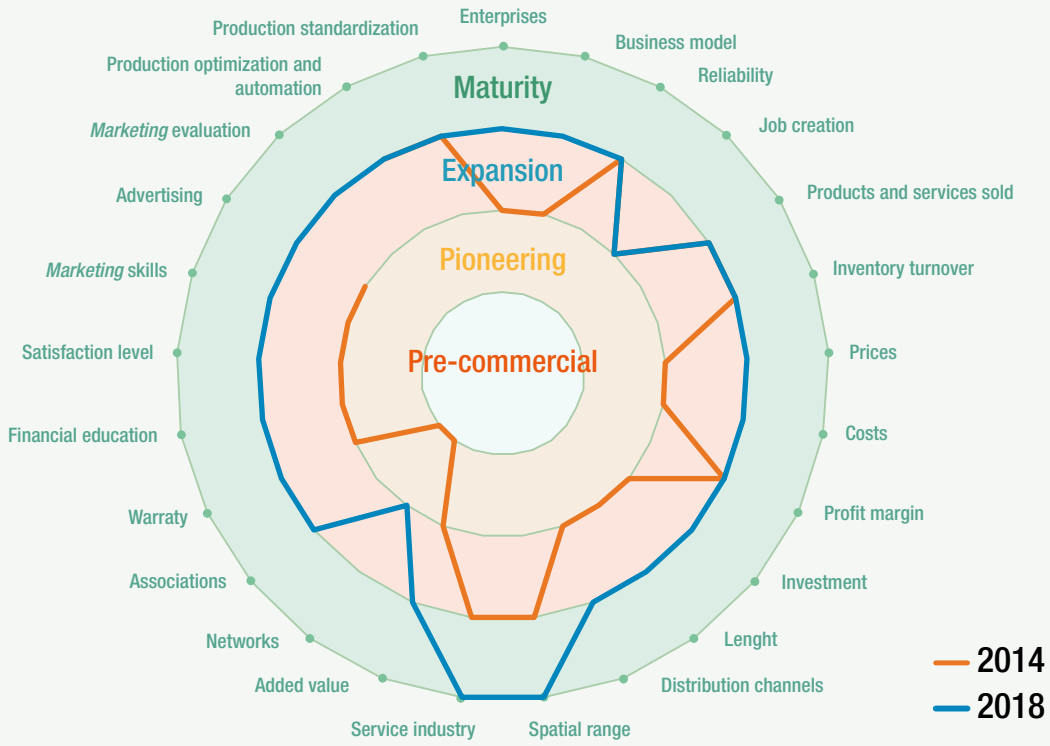
The results are based on the primary information collected (i.e. surveys and interviews with different actors of the ICS market in the San Martin region) and on the analysis of the secondary information.

2.1 Supply

On the supply side, 25 variables that correspond to 8 indicators were analyzed. Graphic 1 shows the resulting development phase of the market of ICS in the San Martin region in terms of each variable analyzed for the 2014-2018 period.

Graphic 1

Analysis of the variables on the supply side of the ICS market in the San Martin region for the 2014-2018 period



Note: In 2014, the *marketing* evaluation variable had no defined phase. Therefore, the chart shows no value for this variable.

It is observed that the *networks* and *partnerships* variables (business networks indicator) migrated from the pre-commercial development phase to pioneering and expansion, respectively. On the other hand, the following variables migrated from pioneering to expansion development phase: *businesses, business modalities* and *formality* (suppliers indicator); *prices, costs* and *investments* (prices, costs and profits indicator); *length* and *distribution channels* (supply chain development indicator); *value chain* (value chain indicator); *warranties* (warranties indicator); *financial literacy, satisfaction level, marketing skills* and *advertising* (entrepreneurial skills indicators). Finally, the *spatial reach* and *service industry* variables (supply chain development indicator) migrated from expansion to maturity development phase.

The following sections briefly analyze the variables on the supply side in order to establish the market development phase for the 2014-2018 period.

Indicator 1 on the supply side: Suppliers

Variable 1.1 Enterprises: From *pioneering* to *expansion*

In 2014, there were 13 enterprises in the market of ICS in San Martin, including manufacturers, wholesalers, retailers and points of sale. Six of these enterprises received direct support from EnDev Peru: G&S Constructores y Consultores S.A.C., Siemac, Concretera Comander Forever S.A.C., Construcciones e Inversiones Rayvi E.I.R.L., Cocinas Hot, and Enerselva. In 2018, according to the interviewees, there were 32 enterprises. All of them received support from EnDev Peru and Fasert. The enterprises participating in this market include Inkawasi Soluciones, Cocinas Mejoradas Multiusos JCS, Cocinas e Inversiones Myfranver, Siemac, Enerselva, Constructora y Consultora Firuz, Faro Corporation, Geoenergía, and Envirofit Perú..

Variable 1.2 Business modalities: From *pioneering* to *expansion*

The business model applied by the enterprises until 2014 was the traditional model: based on the government's institutional demand for ICS, the enterprises used the structure already in place, which focused mainly on businesses in the construction sector. Basically, they gathered parts and hired installers for the installation of ICS. In the case of providing for the retail demand, in order to capture customers, the enterprises also used the traditional business model (e.g. attending fairs, using local media, etc.). In 2018, according to the enterprises, apart from the traditional business model, they had also accepted an innovative model, which involved using the Internet for the commercialization of ICS (e-commerce). To this end, the enterprises developed various strategies (e.g. creation of web sites, using social networks such as Facebook and WhatsApp), especially to attend to the retail demand (fixed, mobile and portable ICS). On the other hand, the enterprises with a portfolio of different technologies applied the same business model for all of them.

Variable 1.3 Formality: From *expansion* to *expansion*

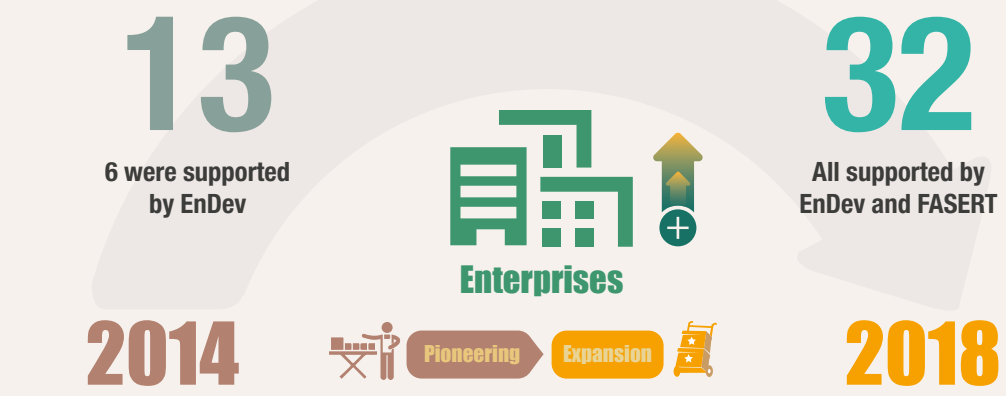
In 2014, according to data collected by EnDev Peru, the 6 enterprises commercializing ICS were formal (see the businesses variable above). In 2018, based on the interviews conducted, it is clear that all enterprises commercializing ICS are formal and this formality is reflected on their respective points of sale and sales force.

Variable 1.4 Jobs created: From *pioneering* to *pioneering*

According to the interviews with technical experts, in 2014 the enterprises were in need of personnel in order to respond to the institutional demand and the retail demand. The size of the orders determined the number of personnel required. An enterprise commercializing ICS in San Martin had an average of 2 or 3 permanent employees. If the order was big or several orders had to be attended to simultaneously, 5 to 10 additional employees were hired. In 2018, based on the interviews with entrepreneurs and people in charge of points of sale, an average of 4 people were hired as fixed personnel.

Graphic 2

Indicator 1 Summary



Indicator 2 on the supply side: Sales volume

Variable 2.1 Productos/servicios vendidos: de *expansión* a *expansión*

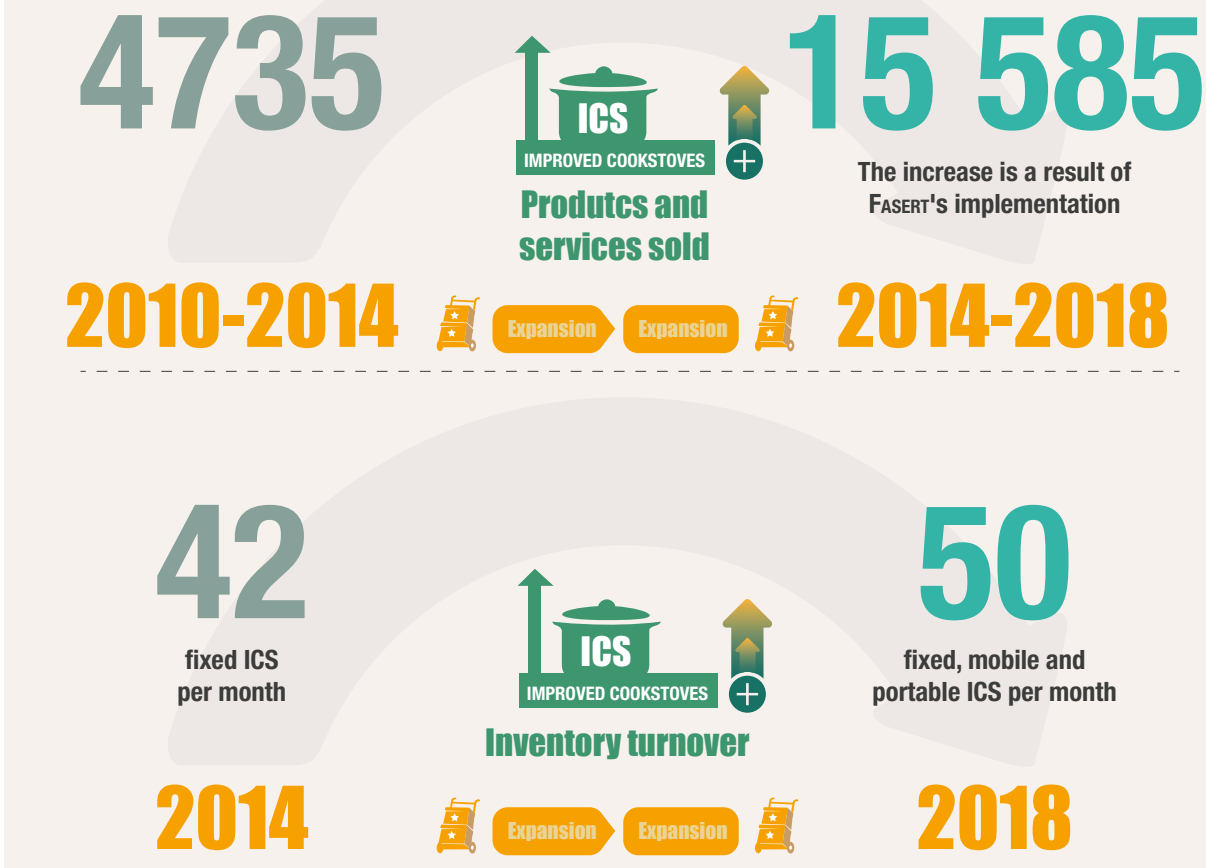
According to EnDev Peru's monitoring system, from 2010 to 2014 the enterprises promoted by the project in the San Martin region had commercialized 4735 ICS. According to this source, as of June 2018, 15 585 ICS had been sold. This increase in the 2015-2018 period was the result of the implementation of FASERT in the region, which encouraged the sales of fixed, mobile and portable ICS.[7]

Variable 2.2 Inventory turnover: From *expansion* to *expansion*

According to the interviews with enterprises, in 2014, an average of 42 fixed ICS were commercialized per month, attending primarily to the institutional demand in the San Martin region. In 2018, considering the variety of technologies, 20 fixed ICS, 15 mobile ICS and 15 portable ICS were commercialized. It means that the average turnover was 50 ICS per month.

Graphic 3

Indicator 2 Summary



7. There are three types of ICS: (i) Fixed: fixed ICS are constructed *in situ*, i.e. they are part of the house structure. (ii) Mobile: mobile ICS are similar to fixed ICS in terms of size, but they are constructed in a workshop. Upon transport of the cookstove to the household and installation of the chimney, it will be necessary to uninstall and then re-install the cookstove if a change of place is needed. (iii) Portable: portable ICS are small and can be easily moved from one place to another.

Indicator 3 on the supply side: Prices, costs and profits

Variable 3.1 Prices: From *pioneering* to *expansion*

In 2014, only the fixed ICS technology was available in the market of the San Martin region. According to entrepreneurs, the price of an ICS fluctuated from 120 to 160 Euros; the difference in the price responded to the logistic costs involved in the transport of materials and in situ construction. In 2018, apart from fixed ICS, mobile and portable ICS were commercialized; the prices were 69, 169 and 31 Euros, respectively. Due to the availability of a wider portfolio of ICS technologies, there was a diversification in the price.

Variable 3.2 Costs: From p*ioneering* to *expansion*

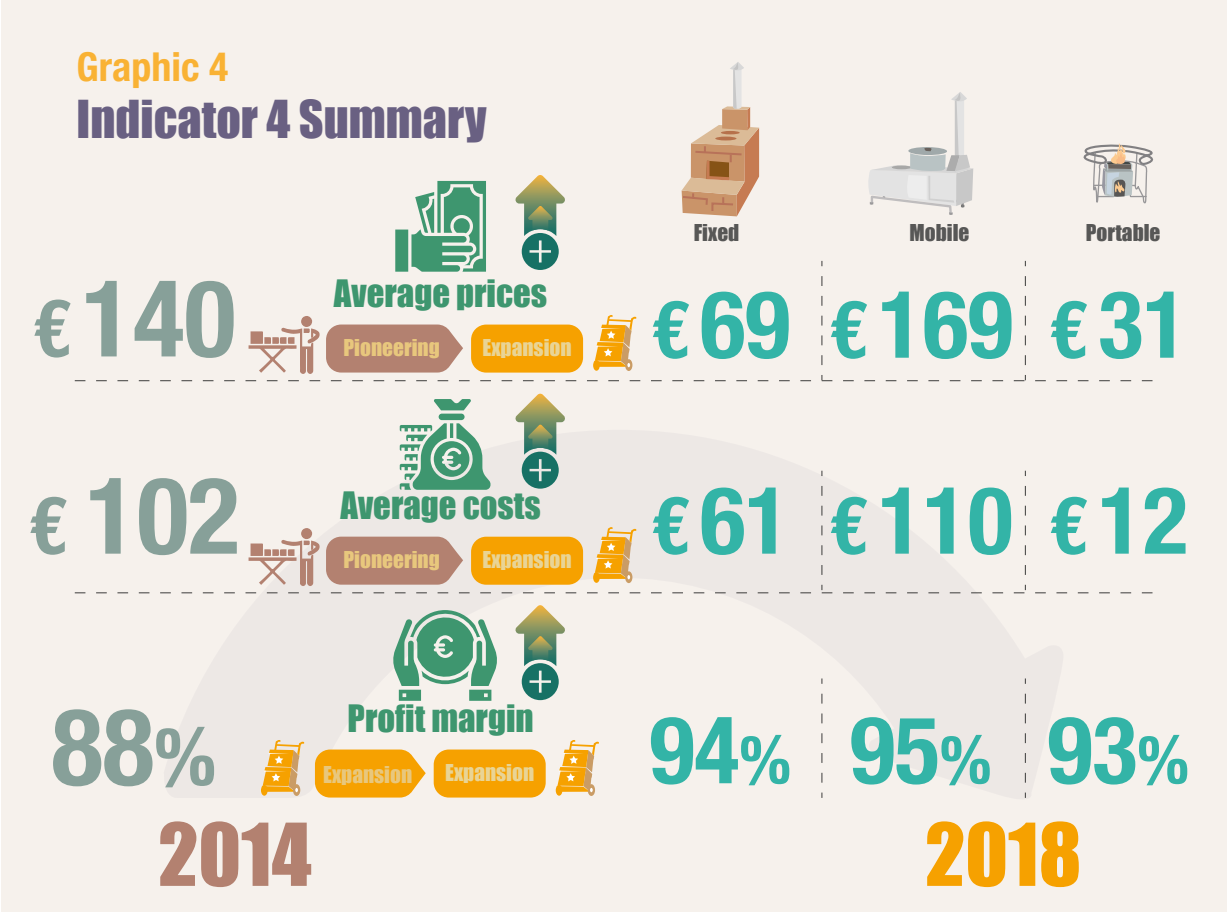
According to entrepreneurs, in 2014, a fixed ICS had an average fixed cost of 87 Euros and a variable cost of 15 Euros due to the need for gathering system parts and construction of the ICS. Therefore, the average total cost for enterprises was 102 Euros. In 2018, the fixed cost of a fixed ICS was 60 Euros; a mobile ICS 109 Euros; and a portable ICS 11 Euros. In all three cases, the variable cost was 1 Euro.

Variable 3.3 Profit margin: From e*xpansion* to *expansion*

In 2014, the enterprises had 88% of profit for each fixed ICS sold. In 2018, the enterprises had 94%, 95% and 93% of profit for the commercialization of fixed, mobile and portable ICS, respectively.

Variable 3.4 Investments: From *pioneering* to *expansion*

According to the experts who were interviewed, in 2014, the enterprises related to ICS had made no investments, but planned to do it. By 2018, due to the incentives provided by FASERT, the enterprises Faro, Firuz and ENERSELVA had invested mainly in *marketing* and management tools, followed by labor and machinery.



Indicator 4 on the supply side: Supply chain development

Variable 4.1 Length: From *pioneering* to *expansion*

In 2014, the supply chain of the ICS market in the San Martin region had three links: producers, assemblers and wholesalers. In 2018, as a result of EnDev Peru's interventions through FASERT and FIDECOP, two links were added to the supply chain: importers and retailers, being the latter divided into points of sale and sales force.

Variable 4.2 Distribution channels: From *pioneering* to *expansion*

As explained in the analysis of the *length* variable, in 2014, the supply chain of the market of ICS in the San Martin region had three links, which means that there was a weak distribution network. However, in 2018, as a result of the specialization of the actors involved in the chain, two additional links were added with clear responsibilities for businesses in each link of the chain.

Variable 4.3 Spatial reach: From *expansion* to *maturity*

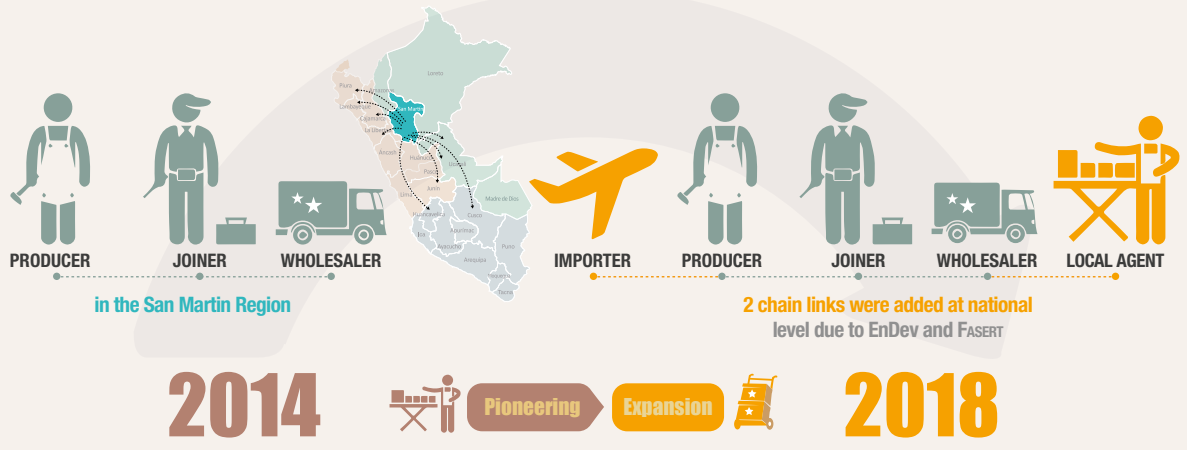
According to EnDev Peru's monitoring system, in 2014, the enterprises in the San Martin region were engaged in the commercialization of ICS in all the provinces of the region. The provinces with more coverage were Moyobamba (25%), Lamas (19%) and Rioja (12%), where social programs operated. Thus, the enterprises sold ICS to social programs. In 2018, the representatives of the enterprises interviewed said that their coverage had expanded. Faro Corporation and Firuz said that they covered other regions of the country apart from San Martin (national coverage); ENERSELVA reported regional coverage (Moyobamba and Rioja provinces); and SIEMAC -an implementing agency- reported regional coverage.

Variable 4.4 Service industry: From *expansion* to *maturity*

The experts who were interviewed said that the concept of after-sales service was introduced to the entrepreneurs in 2014 with the support of EnDev Peru. The enterprises commercializing ICS improved the information to the customer, the possibilities to have credit for the payment of ICS expanded, and warranties for the products offered were available. In 2018, the entrepreneurs who were interviewed said that they provided after-sales service, i.e. information to the customer, credit facilities or payment in installments for acquisition of ICS, and warranties. Warranty, in particular, is a service that should be highlighted. The enterprises Firuz and Faro Corporation offer warranties directly to their customers, while in the case of ENERSELVA, the point of sale is in charge of the warranty. On the other hand, metalworking businesses also offer warranties to the enterprises for the metal sheets they buy for making ICS.

Graphic 5

Indicator 4 Summary



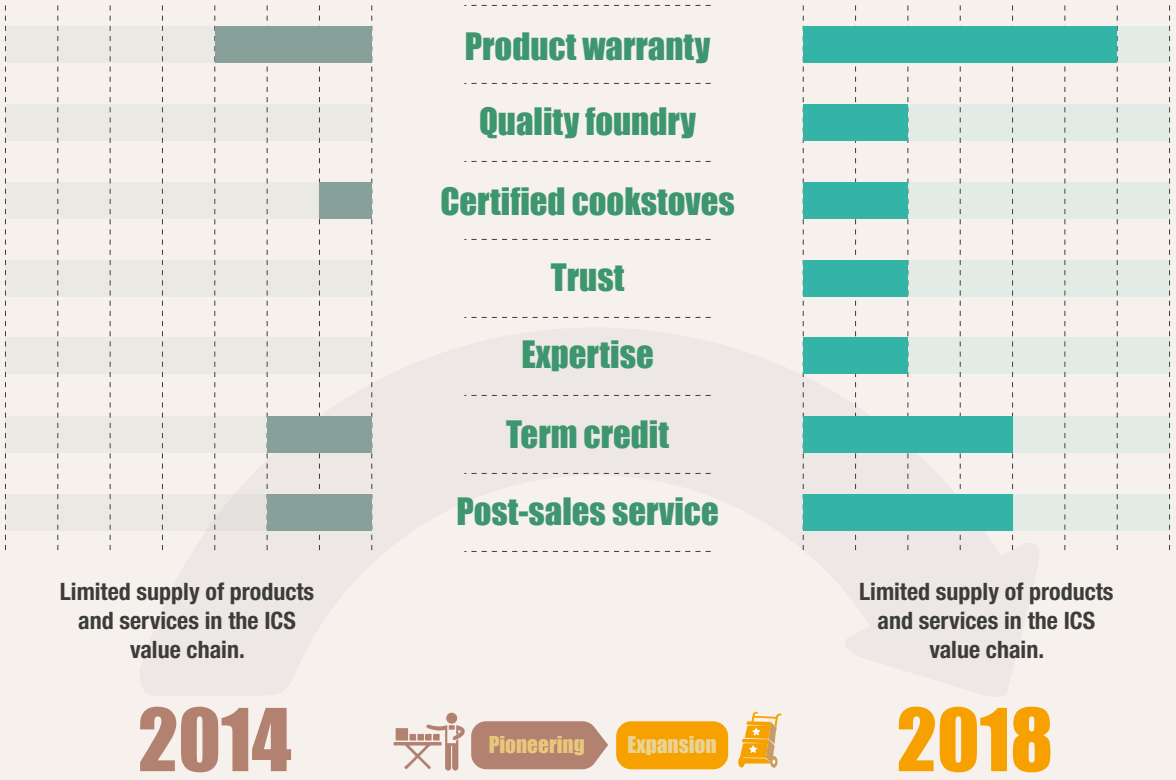
Indicator 5 on the supply side: Value chain development

Variable 5.1 Value added: From *pioneering* to *expansion*

In 2014, as stated in the previous section, the after-sales service, the information to the customer, etc. were already in place. It is worth noting that all the ICS commercialized in the San Martin market had a certification issued by SENCICO; some credits or payment in installments for acquisition of ICS were also offered. This had a positive effect on the market. Also, the documentary review found that EnDev Peru had promoted activities for strengthening the enterprises commercializing ICS. Thus, the articulation of the chain with the local demand added value. By 2018, 30% of the value added offered by the enterprises was related to the warranty, 20% credit in installments, 20% information for the customer, 20% after-sales services, etc. In the case of the commercialization of fixed ICS, the enterprises said that the warranty offered by metalworking businesses is a value added (20%), as well as the quality of the bricks (10%).

Graphic 6

Indicator 5 Summary



Indicator 6 on the supply side: Business networks

Variable 6.1 Networks: From *pre-commercial* to *pioneering*

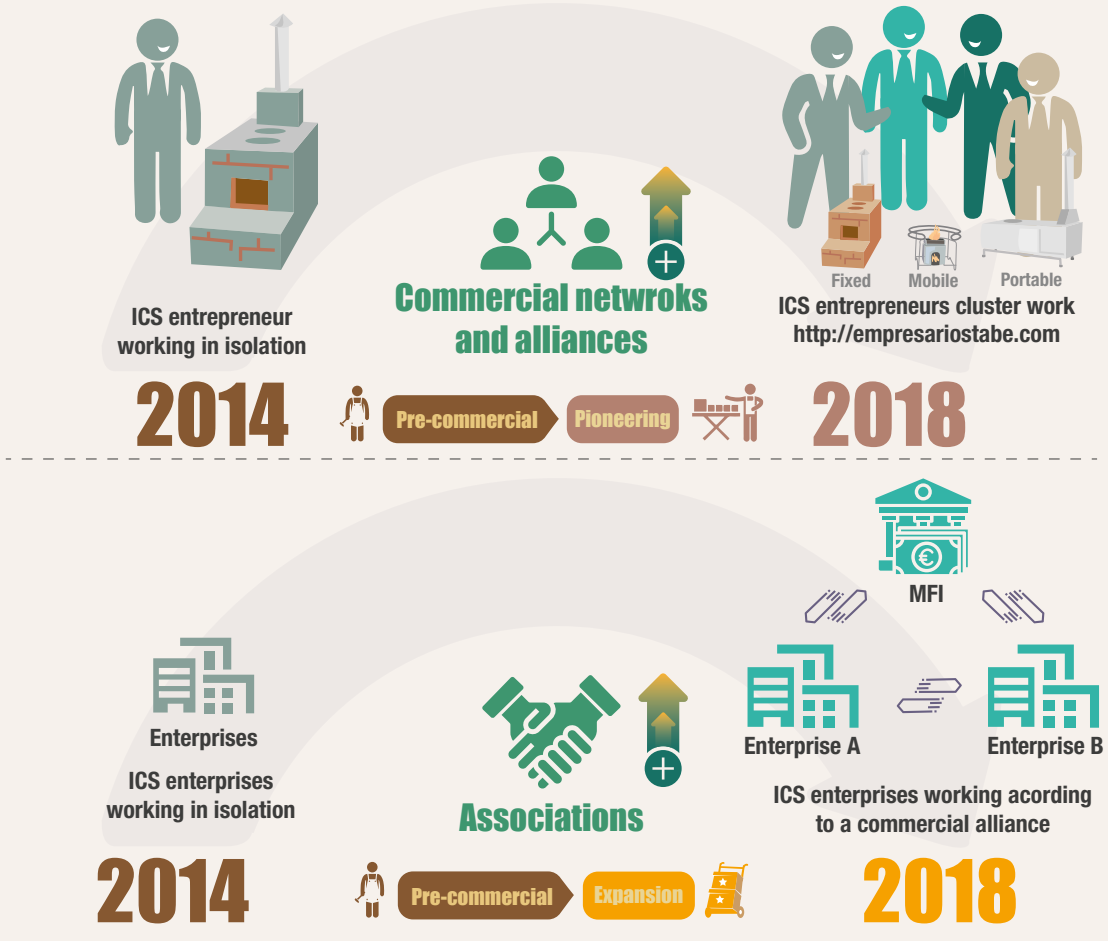
According to the experts who were interviewed, in 2014, there were no networks or partnerships between enterprises in the San Martin region. With the support of EnDev Peru and FASERT, the Network of Basic Energy Access Technologies (BEAT) was created in 2016 to promote the distribution and commercialization of ICS at national level through business partnerships between its members. The six entrepreneurs from the San Martin region who were interviewed are members of this network.

Variable 6.2 Partnerships: From *pre-commercial* to *expansion*

According to the experts who were interviewed, in 2014, there were no business partnerships in the market of ICS in the San Martin region. According to the entrepreneurs, partnerships between businesses and financing institutions started to arise in the market of ICS in the San Martin region after the implementation of FASERT. These partnerships facilitated access to credit for acquisition of ICS. In 2018, according to financing institutions, the enterprise Faro Corporation had a business partnership with IRAEPA and with the savings and credit cooperative 'Del oriente', as well as a verbal agreement with the micro-financing institution PROMUJER for the provision of technologies to its customers. On the other hand, financing institutions expressed their interest in creating new business partnerships with other enterprises commercializing ICS.

Graphic 7

indicator 6 Summary



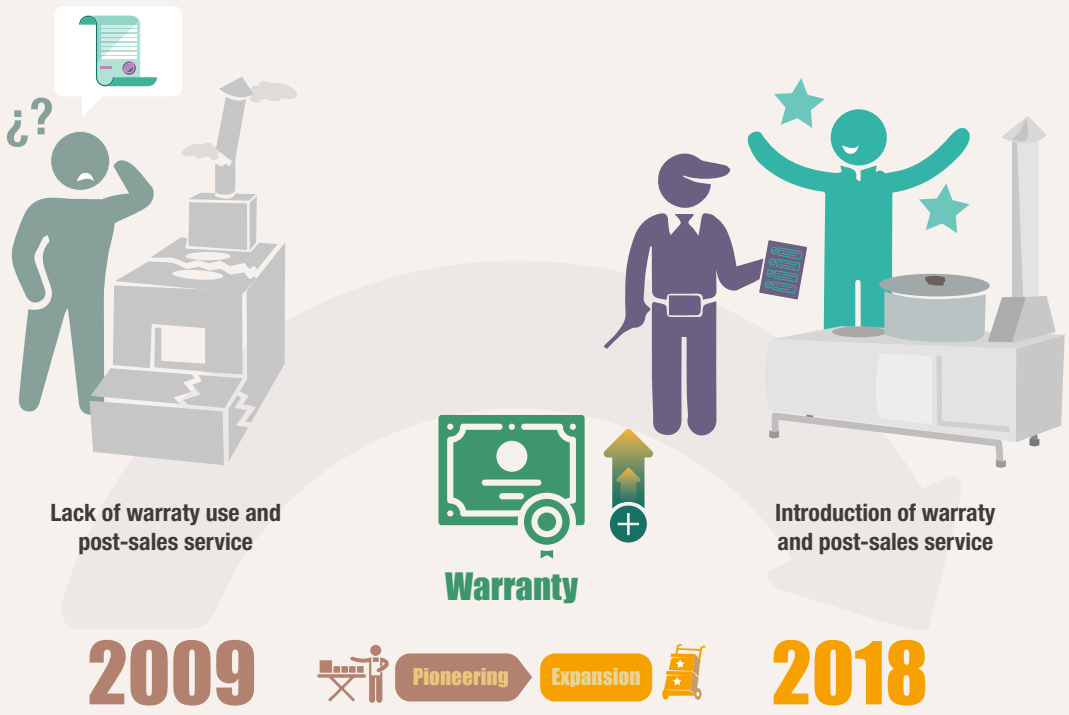
Indicator 7 on the supply side: Warranties

Variable 7.1 Warranties: From *pioneering* to *expansion*

The enterprises commercializing ICS started to offer warranties for their products in 2009. However, the use of warranties is not a usual practice in rural areas; therefore, users make little use of them. In 2018, all enterprises commercializing ICS in the San Martin region said that they offer warranties for the technologies they sell. This improvement is the result of EnDev Peru's influence through FASERT and FIDECOP, as one of the requirements for enterprises to participate in these funds was that they should provide after-sales services (warranty and commitment to follow-up on customers). It should be noted that warranties are backed by wholesale enterprises, i.e. wholesalers are in charge of making warranties effective.

Graphic 8

Indicator 7 Summary



Indicator 8 on the supply side: Entrepreneurial skills

Variable 8.1 Financial learning: From *pioneering* to *expansion*

By 2014, the EnDev Peru project had implemented activities aimed at supporting the scaling-up of the market of ICS and its support services. The activities focused on the consolidation of 15 enterprises identified at the beginning of the intervention in Apurimac, Arequipa, Cajamarca, Huancavelica and San Martin regions. In San Martin, three enterprises participated in the intervention (ENERSELVA E.I.R.L., COAM Ingenieros S.A.C., Consultores y Constructores Rayvi E.I.R.L.). These enterprises received support for the development of management tools such as business plans. Three activities were organized: a training for the development of business plans; a workshop on management skills for entrepreneurs; and a pilot for the dissemination of the model to other areas of the intervention. By 2018, as a result of the training delivered by FASERT and EnDev Peru, the capacities of the enterprises commercializing ICS in the San Martin region were strengthened. This allowed enterprises to expand their network of suppliers and their intervention areas, and increase their income. One of the results of the capacity-building actions is that enterprises now have financial and management records (business plans).

Variable 8.2 Satisfaction level: From *pioneering* to *expansion*

According to the progress report on business strengthening, in 2014, the enterprises commercializing ICS had no serious doubts about their future success, as they believed that their business was growing and was profitable. In 2018, the interest and the motivation were increasing. In the interviews, the entrepreneurs said that they wish to continue in the business, even if the incentives provided by FASERT were no longer available. Being satisfied, the entrepreneurs said that they have many future plans for the commercialization of ICS.

Variable 8.3 Marketing skills: From *pioneering* to *expansion*

In 2014, a number of enterprises commercializing ICS had marketing skills. The enterprises (e.g. Comander Forever S.A.C.) were implementing marketing plans for the commercialization of ICS since 2012 with the support of EnDev Peru. As part of this, the enterprises constructed demonstration ICS and participated in fairs such as the First Regional Fair on Aquaculture in San Martin region. In 2018, the entrepreneurs who were interviewed said that they were aware of the importance of having a marketing plan. FASERT promoted a number of marketing campaigns aimed at the enterprises that are part of the BEAT network. In this context, a Facebook fan page and a web site were created, and micro-videos publicizing the technologies were produced for dissemination on social networks. The enterprises developed various advertising strategies, e.g. a banner was placed in the stadium to capture customers among football fans.

Variable 8.4 Advertising: From *pioneering* to *expansion*

In 2014, the enterprises carried out advertising activities for the promotion of ICS with the support of EnDev Peru. For example, Comander Forever and Construcciones e Inversiones Rayvi produced radio and TV spots for the promotion of ICS in rural and urban areas. According to the interviews conducted, the enterprises were implementing marketing activities since 2015.

Variable 8.5 Marketing evaluation: From no defined phase to *expansion*

In 2014, there was no information that could help to measure how the enterprises evaluated their marketing activities. By 2018, the enterprises -especially, ICS distributors- were measuring the effectiveness of their marketing activities.

Variable 8.6 Product automation and optimization: From *expansion* to *expansion*

In 2014, according to the experts, the construction of a fixed ICS comprised the following steps: manufacturing ICS parts (mechanized bricks, chimneys, ferrocement slabs or cast iron sheets, and metal grids); gathering ICS parts; and in situ construction of ICS in compliance with SENCICO parameters. The manufacturers of fixed ICS, depending on the part they had to manufacture, had to comply with a series of minimum technical requirements which, in general, required the interaction between the automated part and the manual part (medium level). In 2018, as in 2014, there were minimum technical requirements for the construction of fixed ICS parts, and for manufacturing mobile and portable ICS. All three cases involve a process that combines the automated part with the manual part (medium level).

Variable 8.7 Standardized production: From *expansion* to *expansion*

In 2014, SENCICO was applying the regulations for evaluation and certification of ICS, which outlined that the proposing institution should prepare a technical dossier with information about the size and proportions of the cookstove (plans). Upon approval of the dossier, the manufacturer had to comply with these plans. Therefore, the standardization of the production and installation of ICS was achieved as a result. In 2018, the above mentioned criteria -outlined originally by SENCICO- were still applied, which ensures, to date, the standardization of the products commercialized.

Graphic 9

Indicator 8 Summary

Limited training supply

Financial education

Broad training offer gives more trading strength to ICS enterprises

2014

2018

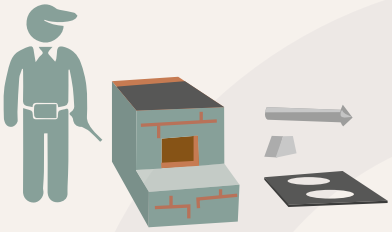
Conventional advertising activities (fairs, word of mouth).

Advertising and marketing

Conventional advertising activities + digital tools such as social networks.

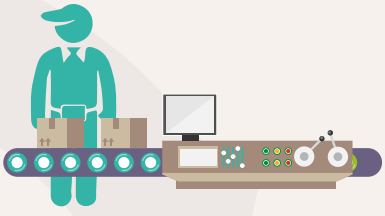
2014

2018



ICS assembly by handwork.

Estandarización de la producción



Standardization of the process for the fabrication of products.

2014

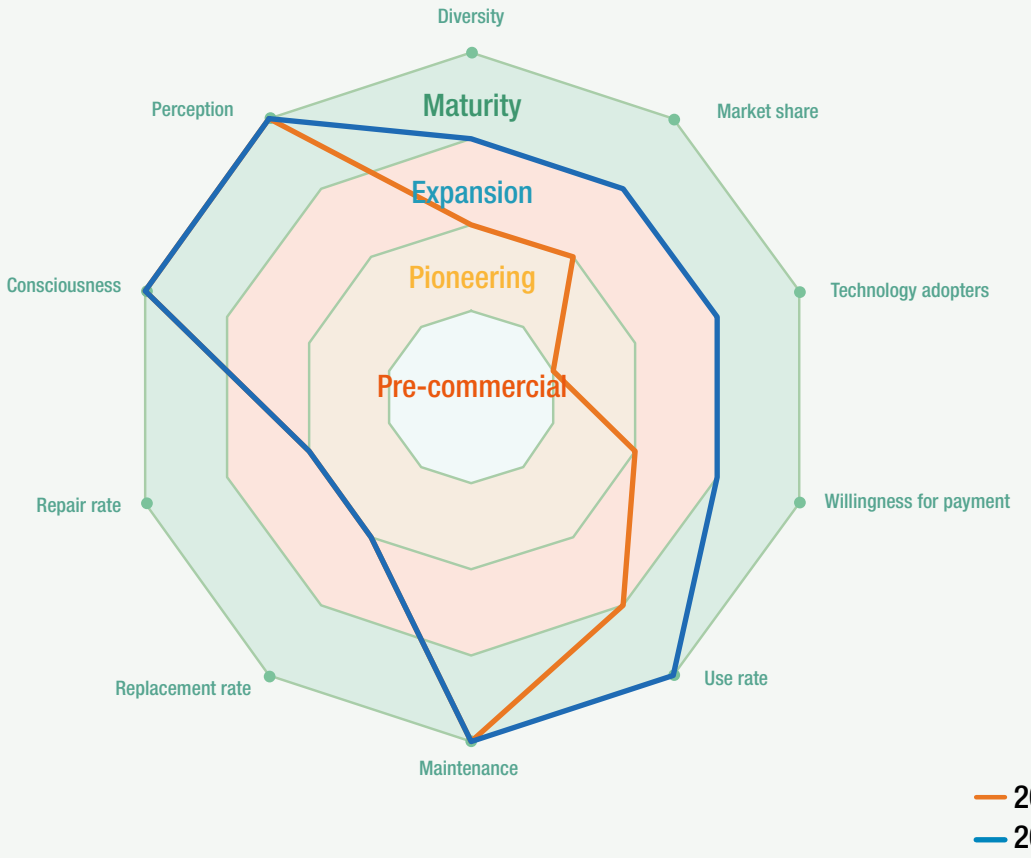
2018

2.2 Demand

On the *demand* side, the EMS methodology contemplates the analysis of 10 variables that correspond to 6 indicators. Graphic 10 shows the resulting development phase of the market of ICS in the San Martin region in terms of each variable analyzed for the 2014-2018 period.

Graphic 10

Analysis of the variables on the demand side of the ICS market in the San Martin region for the 2014-2018 period



It is observed that the *technology adopters* variable of the *market penetration* indicator migrated from pre-commercial to expansion development phase. The *diversity* (*product and service diversity* indicator), *market share* (*market penetration* indicator) and *willingness to pay* (willingness to pay indicator) variables migrated from pioneering to expansion development phase.

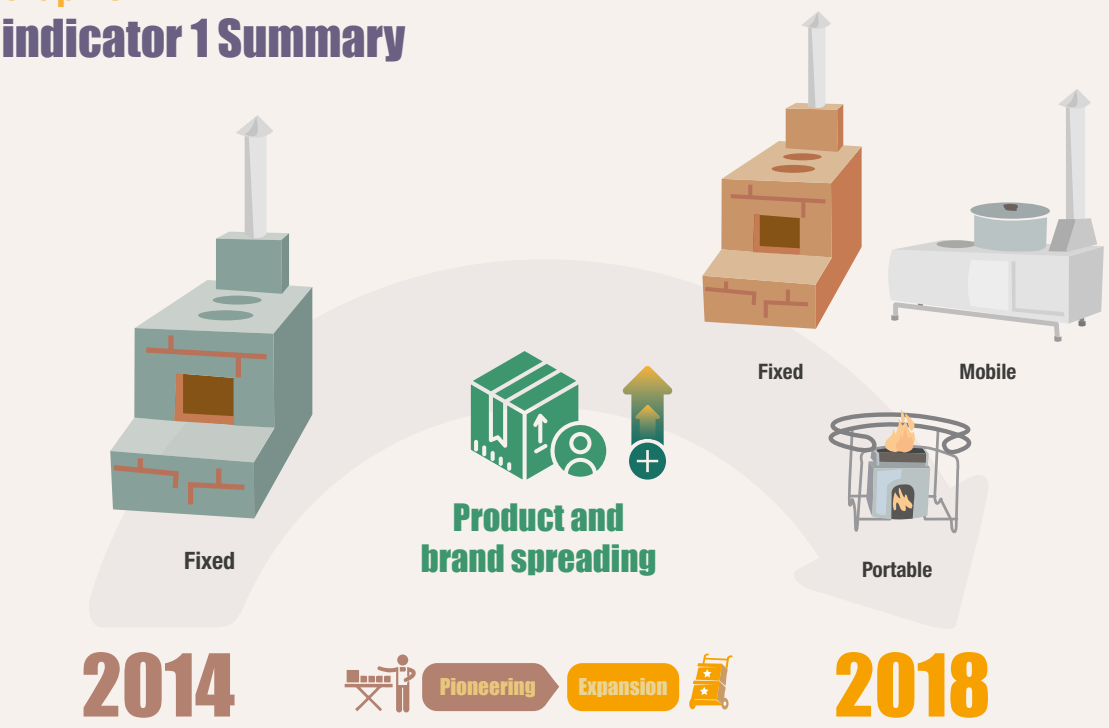
The following sections briefly analyze the variables on the demand side in order to establish the market development phase for the 2014-2018 period.

Indicator 1 on the demand side: Product and service diversity

Variable 1.1 Diversity: From *pioneering* to *expansion*

According to the laboratory of improved cookstoves of SENCICO, there were 38 certified models of ICS in the national market in 2014. In the San Martin region, four models of fixed ICS were implemented based on the specific characteristics of the Amazon region: cast-iron top-plate Inkawasi, Inkawasi Pichqa-GTZ, Inkawasi Tawa-GTZ and Selva-GIZ. The diversification was proportional to the increase in users' demand. With the support of FIDECOP and FASERT, there was an increase in the diversification of fixed, mobile and portable ICS since 2015 (see Note 7). By 2018, private companies had increased their supply of ICS with the introduction of six new models: Carhua, Ecoportátil, Ecoselva, Practifogón, Practifogón 3H and Envirofit G-3000. According to the survey conducted in 2018, 127 current and potential customers out of 213 (59%) did not know about the diversity in the supply of ICS; 35% said that they knew about the existing supply; and 6% said that there were not many options in the market.

Graphic 11
indicator 1 Summary



Indicator 2 on the demand side: Market penetration

Variable 2.1 Market share: From *pioneering* to *expansion*

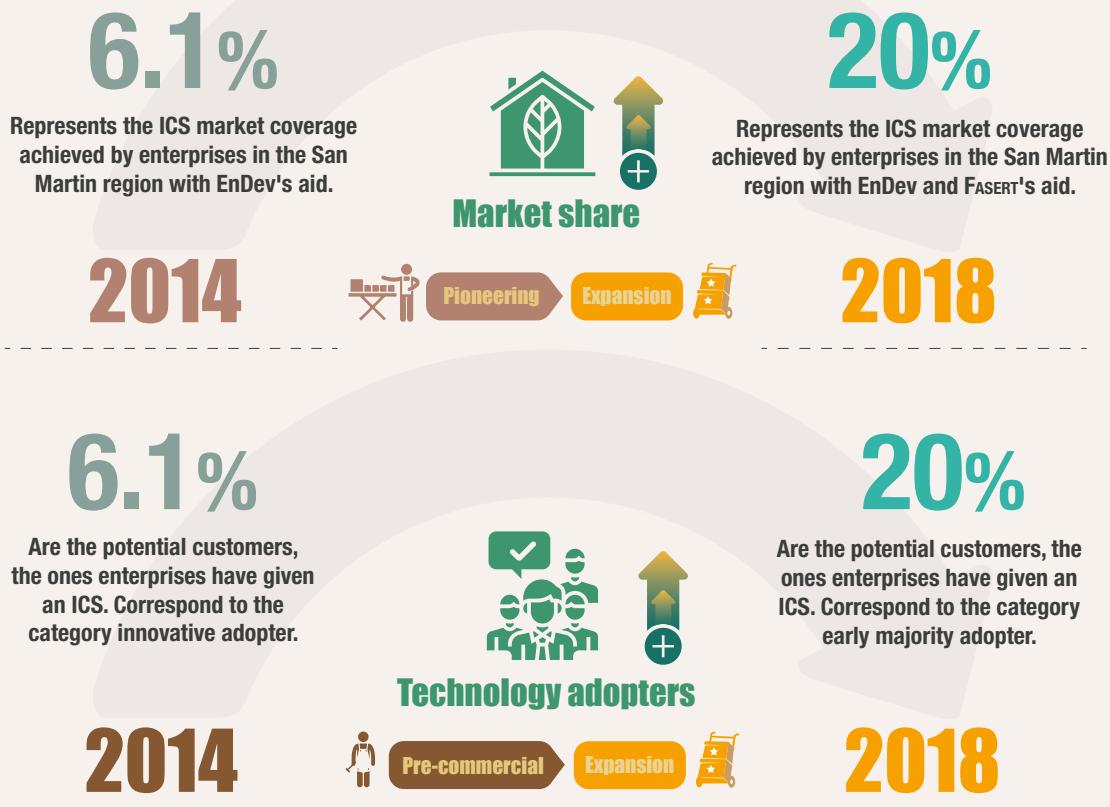
According to INEI statistics, in 2014 the San Martin region had a population of 829 500 inhabitants; if an average of five people per household is considered, the result is 165 900 households. In 2014, the percentage of 'households that use firewood for cooking' was 12.4% and the percentage of 'households that use gas and other fuel for cooking' was 34.3%. In total, 77 475 households (46.7%) were in need of a wood-burning ICS. According to EnDev Peru's monitoring system, 4735 ICS had been sold to households in the San Martin region by 2014. By applying the equation suggested by EMS to establish the market share, the result is that 6.1% of households in the San Martin region were covered in 2014. In 2018, the San Martin region had a population of 862 800; if an average of five people per household is considered, the result is 172 560 households. In 2018, the percentage of 'households that use firewood for cooking' was 8.8% and the percentage of 'households that use gas and other fuel for cooking' was 36.2%. In total, 77 652 households (45.0%) were in need of a wood-burning ICS. According to EnDev Peru's monitoring system, 15 585 ICS had been sold in San Martin region by 2018. By applying the equation suggested by EMS to establish the market share, the result is that 20.0% of households in San Martin region were covered in 2018.

Variable 2.2 Technology adopters: From *pre-commercial* to *expansion*

In 2014, based on the figures indicated under the *market penetration* variable and in accordance with EMS guidelines, the households were categorized as 'innovators' (6.1%). By 2018, the households had migrated to a higher market development phase categorized as 'early majority' (20.0%).

Graphic 12

Indicator 2 Summary



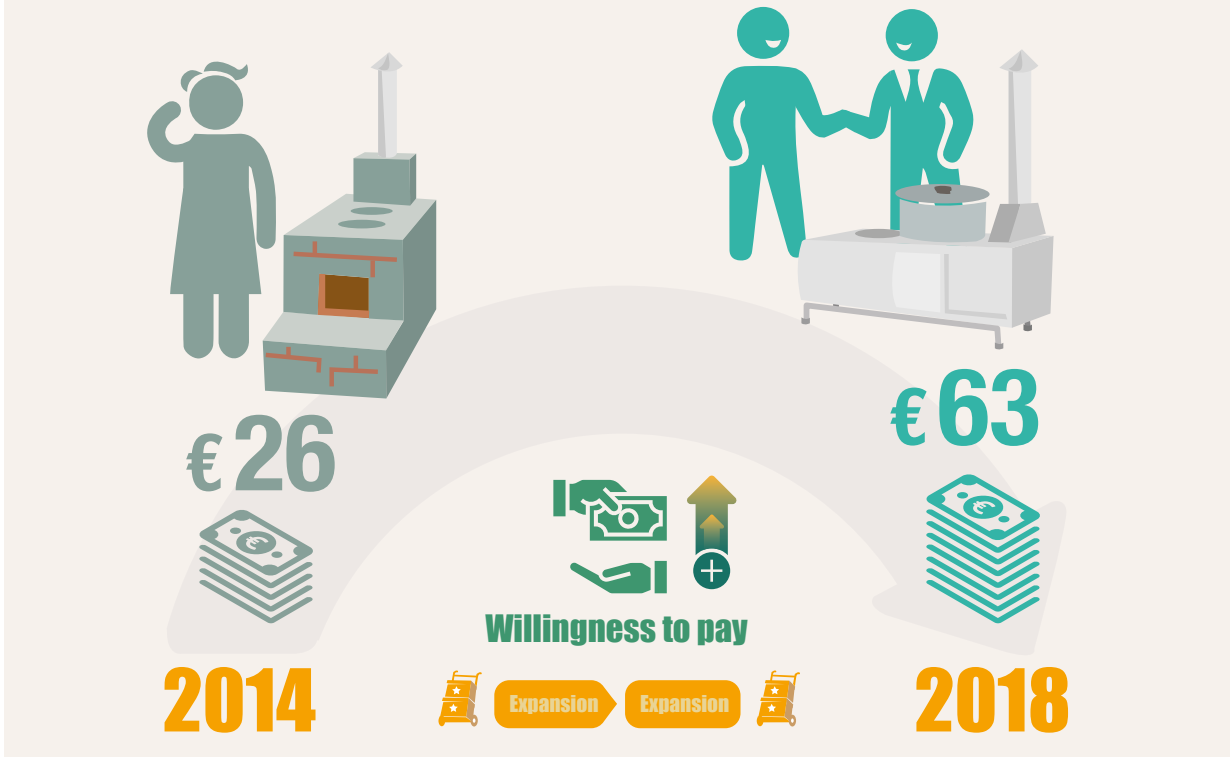
Indicator 3 on the demand side: Willingness to pay

Variable 3.1 Willingness to pay: From *pioneering* to *expansion*

According to a study conducted by Ipsos Apoyo for EnDev Peru in 2013, users were willing to pay an average of 26 Euros for a fixed ICS. Back then, mobile and portable cookstoves were not commercialized yet. In 2018, when asked how much they would be willing to pay for an ICS, 33% of the interviewees said 53 to 80 Euros; 27 Euros (29%); 80 to 107 Euros (15%); and 133 to 173 Euros (only 7%). Besides, 7% of the interviewees would not be willing to pay for this technology. Based on the average response, customers would be willing to pay 63 Euros.

Graphic 13

Indicator 3 Summary



Indicator 4 on the demand side: Systems in use

Variable 4.1 Usage rate: From *expansion* to *maturity*

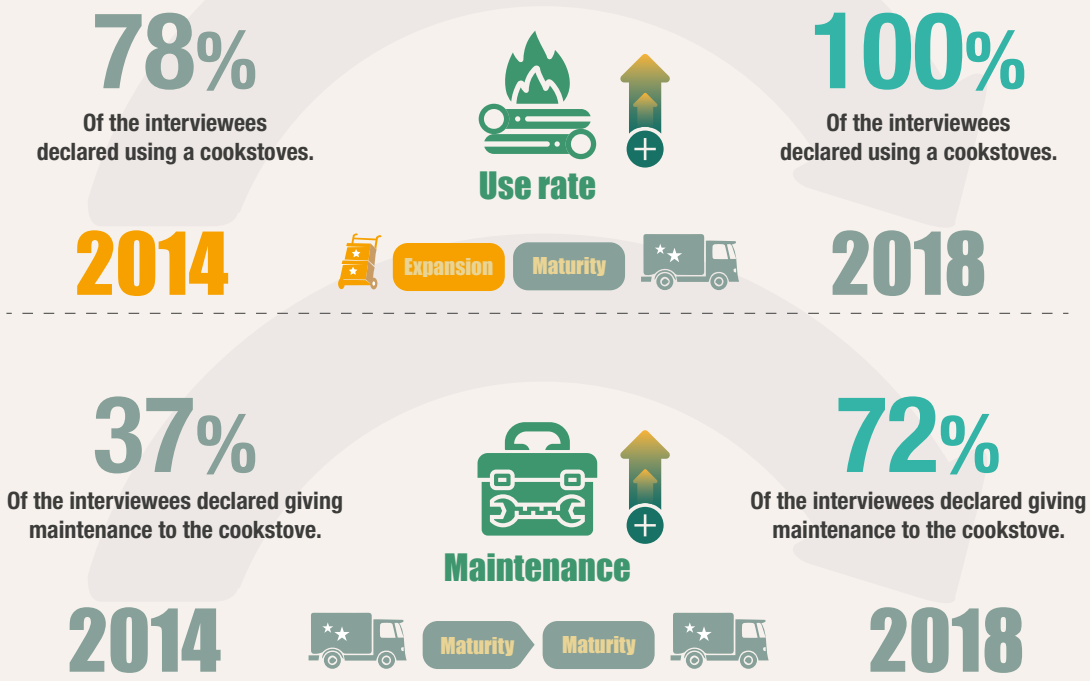
According to a study conducted by Ipsos Apoyo for EnDev Peru in 2014, from the total users interviewed in the San Martin region, 78% made use of their ICS. In 2018, according to a conducted survey, all the users (100%) made use of their ICS.

Variable 4.2 Maintenance: From *maturity* to *maturity*

According to a study conducted by Ipsos Apoyo for EnDev Peru in 2014, 37% of the interviewees did not carry out maintenance activities for their ICS, since by using ICS build of abode or bricks and handcrafted local materials, it was not considered to make any maintenance procedures. In 2018, according to a survey, 72% of users did not carry out maintenance activities for their ICS and 10% of this group instead paid for it. The explanation for this is that by having now a produced ICS, it is not necessary to conduct so many maintenance activities.

Graphic 14

Indicator 4 Summary



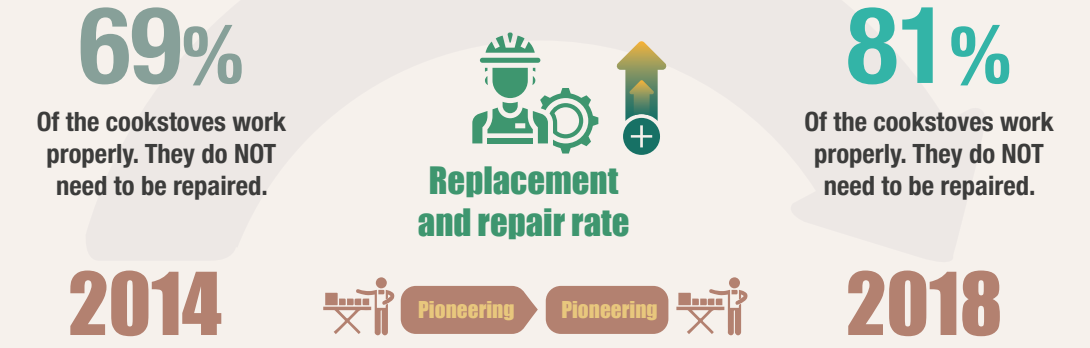
Indicator 5 on the demand side: Replacement and repair

Variable 5.1 Replacement and repair rate: From *pioneering* to *pioneering*

According to a study conducted by Ipsos Apoyo for EnDev Peru in 2014, from the total users interviewed in the San Martin region, 69% did not have the need to replace or repair their ICS. In 2018, 81% of the interviewees mentioned not having replaced or repaired their ICS. The same considerations indicated for the maintenance variable apply for this one, too.

Graphic 15

Indicator 5 Summary



Indicator 6 on the demand side: Consumer awareness and perception

Variable 6.1 Awareness: From *maturity* to *maturity*

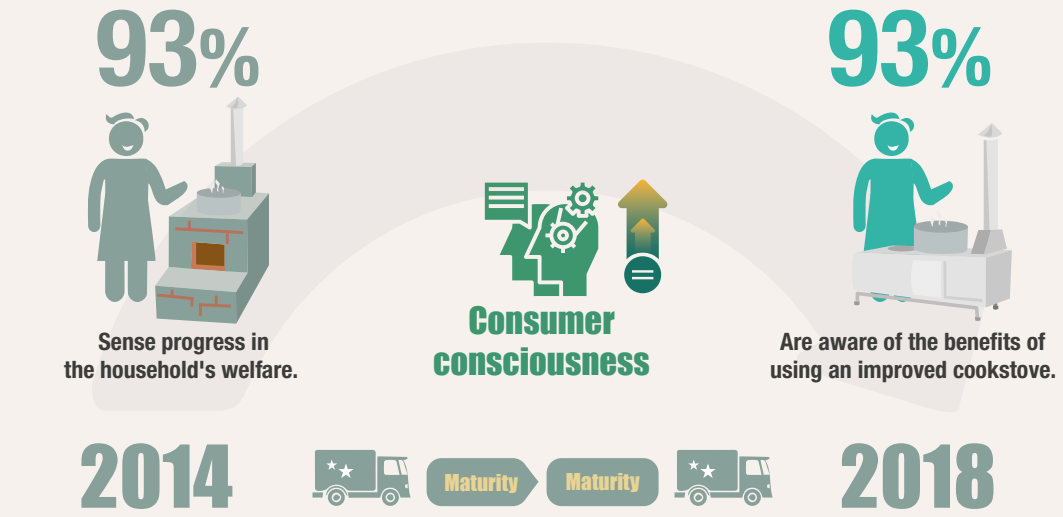
In 2014, according to the study conducted by Ipsos Apoyo for EnDev Peru, the female users said that ICS had a very positive impact on their daily life. Almost all female users (93%) perceived that there was some progress in terms of the well-being of their household as a result of the use of ICS. In 2018, potential customers were asked about the advantages and disadvantages of ICS, from which 93% confirmed to be aware of the benefits gained by using an ICS.

Variable 6.2 Perception: From *maturity* to *maturity*

In 2014, according to the study conducted by Ipsos Apoyo for EnDev Peru, 93% of the interviewees perceived that there was some progress in terms of the well-being of their household as a result of the use of ICS. In 2018, 92% of the customers said that they were very satisfied (29%) or satisfied (63%) with their ICS.

Graphic 16

Indicator 6 Summary

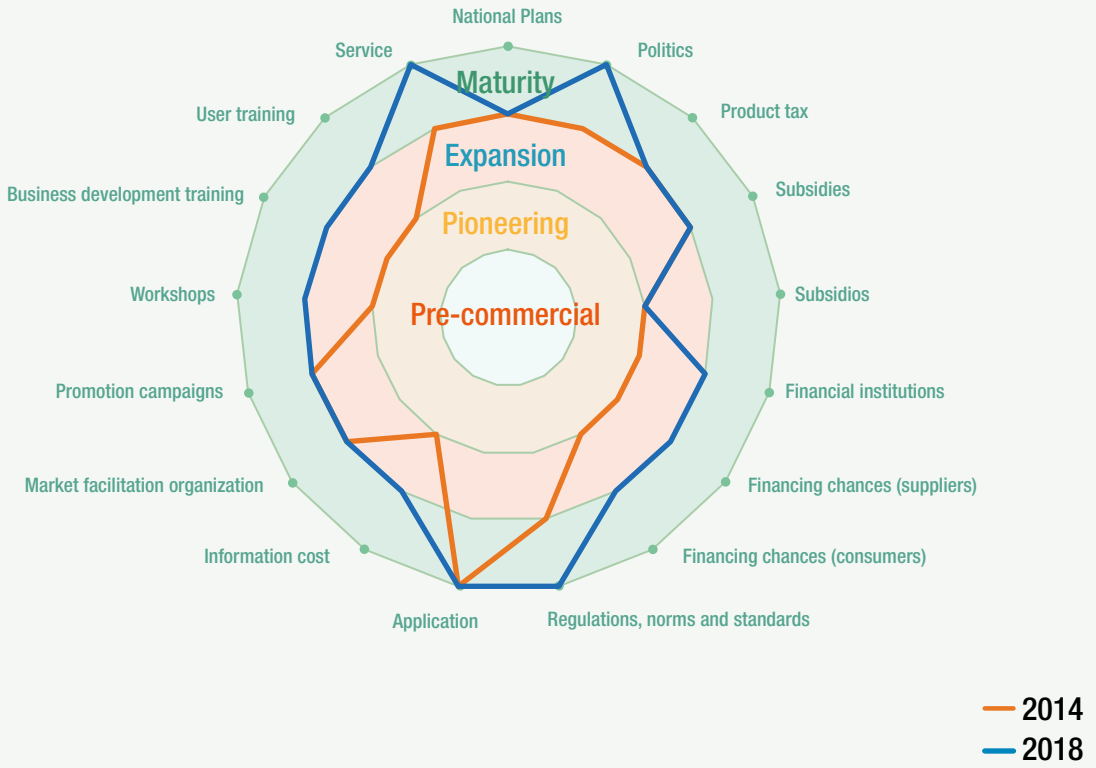


2.3. Enabling environment

As regards the enabling environment, the EMS methodology contemplates the analysis of 17 variables that correspond to 5 indicators. Graphic 17 shows the resulting development phase of the market of ICS in the San Martin region in terms of each variable analyzed for the 2014-2018 period.

Graphic 17

Analysis of the variables on enabling environment of the market of ICS in San Martin region for 2014-2018 period



It is observed that the following variables migrated from pioneering to expansion development phase: *financial institutions* and *financing options* (suppliers and consumers) (access to finance indicator); *cost of information* (market information indicator); and *courses*, BDT and *user training* (expertise development indicator). Finally, the following variables migrated from expansion to maturity development phase: *policy* (policy indicator); *regulations, norms and standards* (quality regulations, norms and standards indicator); and *service* (expertise development indicator).

The following sections briefly analyze the variables on enabling environment in order to establish the market development phase for the 2014-2018 period.

Indicator 1 of the enabling environment: Policy

Variable 1.1 National plans: From *expansion* to *expansion*

In 2013, Minem approved the Plan for Universal Energy Access 2013-2022. The overall objective of this plan is to promote economic development through energy in an efficient and environmentally sustainable manner and with equality, through the implementation of projects that promote universal access to energy, prioritizing the use of available energy sources. The plan is still in force.[8] The impact of the plan is primarily on the following areas: "food (cooking with stoves that use liquefied petroleum gas and with improved cookstoves); education (lighting and Internet); health (heating); and communication. It also intends to benefit agroindustry, the use of vehicles and micro-enterprise development."

As stated by Osinergmin, a comprehensive proposal on energy access must be developed identifying the needs of each region, the existing fuels and the mechanisms that promote such access, based on a unified fund for energy access created with this specific objective. This would allow to achieve energy access at a reasonable price, maximizing the impact of the program and promoting its sustainability in the long term.[9]

Variable 1.2 Policy: From *expansion* to *maturity*

As of 2014, a number of initiatives for the promotion of ICS at national level had been implemented. In 2009, a campaign that promoted the implementation of half a million improved cookstoves in Peru was launched through a partnership of public and private institutions, coordinated by the Technical Secretariat of the Inter-Ministry Commission for Social Affairs of the Presidency of the Council of Ministers, the Pan-American Health Organization and EnDev.[10] In 2010, Peru's National Energy Policy 2010-2040 was approved. This plan promotes an energy system that responds to the national demand for energy in a reliable, regular, continuous and efficient manner, while promoting sustainable development. In 2011, the Energy Policy of the San Martin Region 2011-2025 was approved. This plan seeks to achieve a significant reduction in the use of energy sources from hydrocarbons, as they cause a high rate of pollution and their price is not stable. In 2018, apart from these initiatives, the following programs and projects related to the implementation of ICS were promoted: Foncodes; Qali Warma (national food program for school students); Nationally Determined Contributions (NDC); and the Collective for the Promotion of Basic Energy Access.

Variable 1.3 Product taxes: From *expansion* to *expansion*

In 1998, the Peruvian government approved Law 27037 'Law for the promotion of investment in the Amazon region'. The objective of this law is to promote the sustainable and integrated development of the Amazon region, setting the conditions for public investment and encouraging private investment. In 1999, the law came into force through the approval of its regulations. In the frame of this law and its regulations, a number of tax benefits are granted to taxpayers in the Amazon region (including San Martin region) for a period of 50 years.

Variable 1.4 Business taxes: From *expansion* to *expansion*

All enterprises commercializing ICS in the San Martin region are formal and pay their taxes properly.

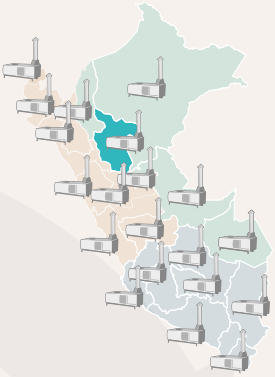
8. See: <http://www.fise.gob.pe/pags/normas/RM-203-2013-MEM-DM.pdf>.

9. See: <http://www.osinergmin.gob.pe/seccion/centro_documental/Institucional/Estudios_Economicos/Documentos_de_Trabajo/Documento_de_Trabajo_29.pdf>.

10. *Technical-Financial Report, October 2013 - April 2014. Fasert. Lima, 2014.*

Graphic 18
Indicator 1 Summary

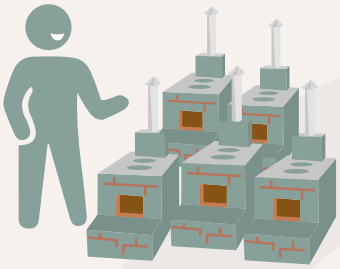
The Peruvian government launches a Plan for Universal Access to Energy.



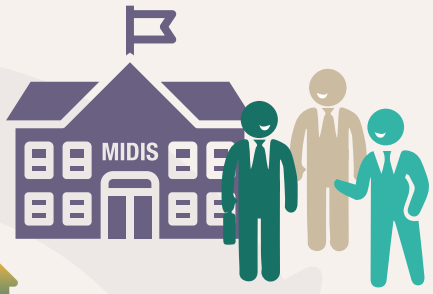
Energy access plan in current implementation.

National plans

2014 — Expansion — Expansion — **2018**



Approval of national policies for the promotion of ICS mass use.



Implementation of programs and projects that put into operation national policies.

Policy

2014 — Expansion — Maturity — **2018**

There are mechanisms for the promotion of private investments.

There are still mechanisms for the promotion of private investments.

Product taxes

2014 — Expansion — Expansion — **2018**

Indicator 2 of the enabling environment: Access to finance

Variable 2.1 Subsidies: From *pioneering* to *pioneering*

In the 2010-2014 period, 61% of the ICS implemented in the San Martin region were subsidized by the State. The main social programs that provided subsidies for ICS were: *Nina, Cocina Perú, Haku Wiñay - Noa Jayatai* (Foncodes), and the project for the implementation of 50 000 wood-burning ICS (Foncodes). During the first half of 2018, 80.5% of ICS were still subsidized by the State. As regards the remaining percentage, the majority of the enterprises received incentives from Fasert or Fidecop for the commercialization of ICS. In the interviews, the entrepreneurs said that the dynamics of the market is not affected, but rather encouraged, by the institutional demand and the retail demand.

Variable 2.2 Financial institutions: From *pioneering* to *expansion*

In 2014, two micro-financing institutions provided co-financing for ICS in the San Martin region: Acopagro and Adisa. The financial study conducted by Siemac identified 11 (regulated and non-regulated) micro-financing institutions, which could eventually provide financing mechanisms to consumers. In 2018, as a result of the implementation of projects by Fasert, the enterprises already offered financing-related products, e.g. Adisa and Asociación Valle Grande (associations of coffee producers). On the other hand, the enterprises created strategic partnerships with micro-financing institutions and other institutions in order to promote financing options for the acquisition of ICS (e.g. Siemac, Faro Corporation).

Variable 2.3 Financing options and investments by suppliers: From *pioneering* to *expansion*

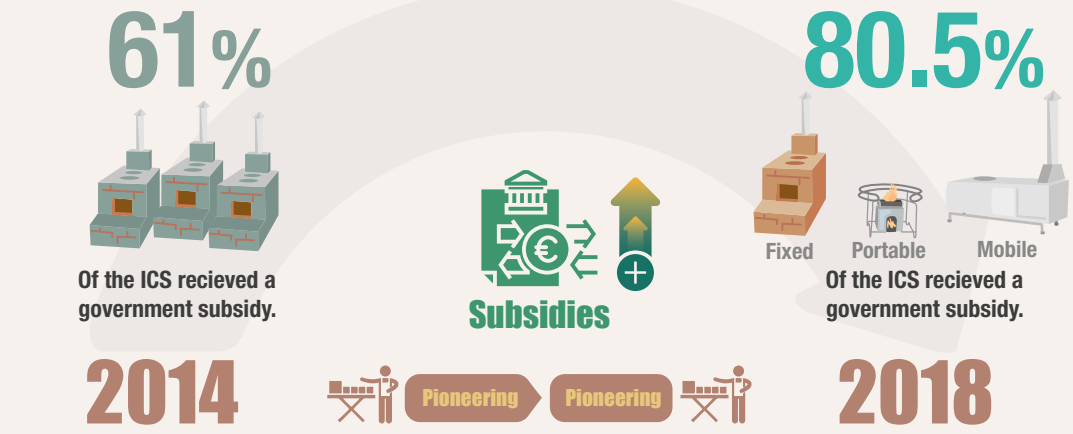
In 2012, EnDev Peru developed general financing plans for enterprises interested in the market of ICS, including Enerselva, an enterprise from the San Martin region. Also, the enterprise Comander Forever S.A.C. received 10 000 euros from GIZ through co-financing under the public-private partnership modality for the implementation of the project titled 'Expanding the market of ICS in 14 associations of coffee producers in Rioja and Moyobamba provinces for compliance with fair trade and organic certification regulations'. By 2018, the enterprises had received financing from three funds: Fasert, Fidecop and StartUp Peru (Ministry of Production). As regards financial institutions, the enterprises said that they have partnerships with Adisa, Iraepa, Cooperativa Oriente and Promujer.

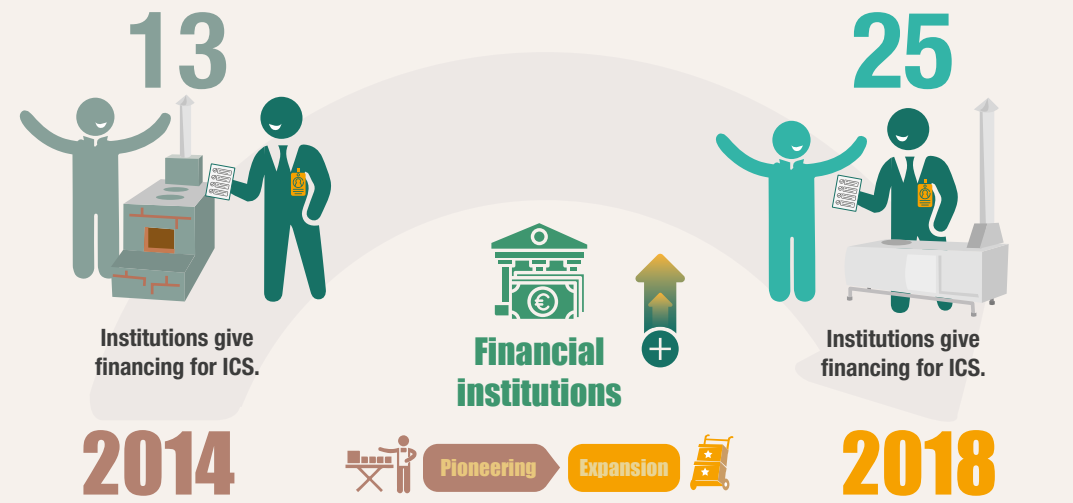
Variable 2.4 Financing options for consumers: From *pioneering* to *expansion*

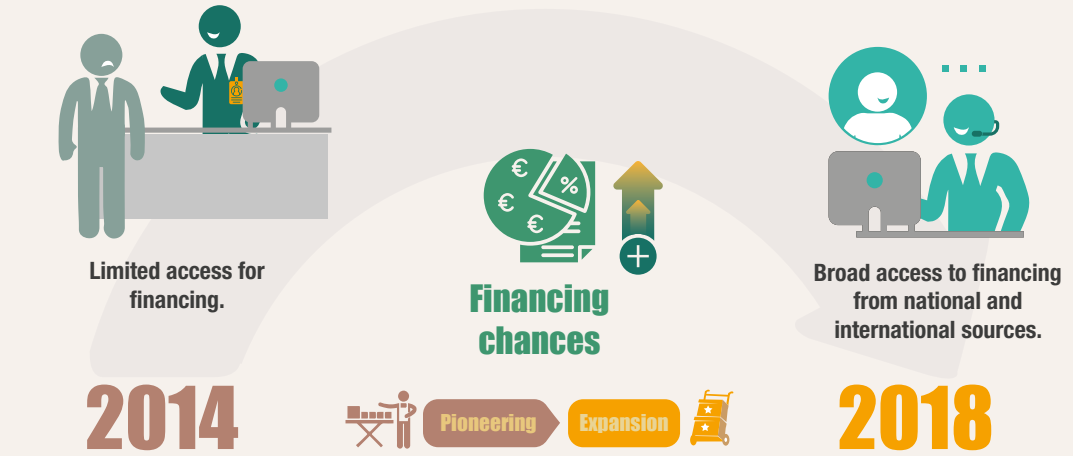
As stated under the *financial institutions* variable, in 2014, two micro-financing institutions provided co-financing for ICS in the San Martin region: Fidecop and Adisa. In 2018, three financial institutions (Promujer, Oriente, Iraepa) and two associations (Adisa, Valle Grande) were operating.

Graphic 19

Indicator 2 Summary







Indicator 3 of the enabling environment: Quality regulations, norms and standards

Variable 3.1 Regulations, norms and standards: From *expansion* to *maturity*

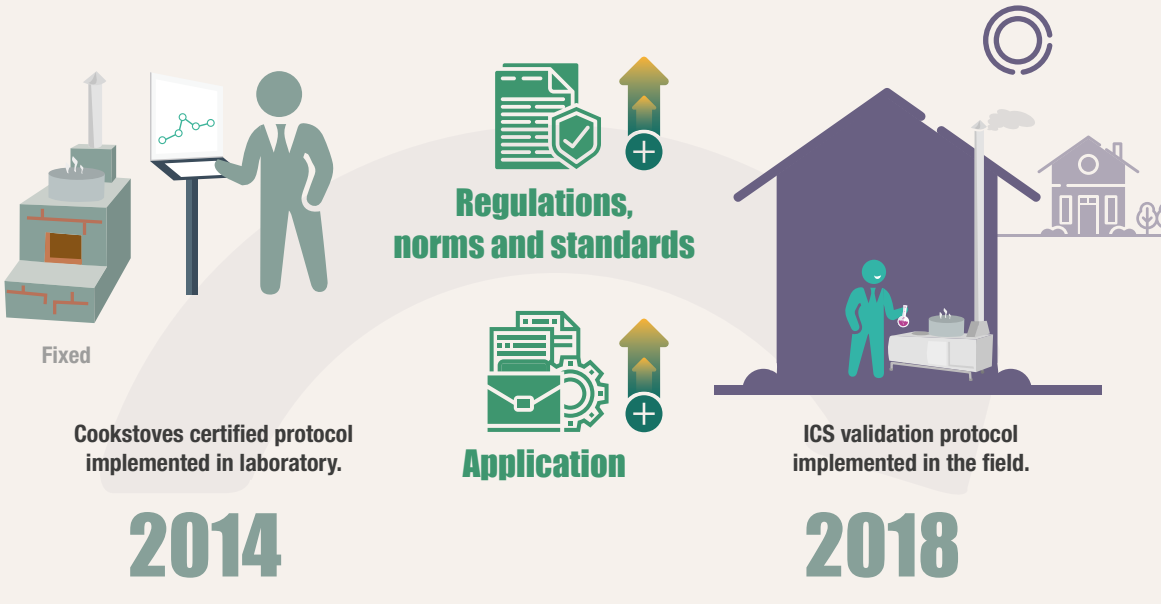
The regulations ruling ICS came into force in 2009, when Supreme Decree 015-2009-MVCS was enacted and the technical norm on ICS was approved. This norm sets the minimal technical requirements that a cookstove that uses biomass for cooking (and other uses) must meet in order to be considered an improved cookstove. In 2018, in line with international standards, Peru developed a number of protocols and norms. In this context, the technical committee for clean cookstoves and clean solutions (TC-285) was created, led by the National Quality Institute, SENCICO and public/private institutions. A number of security protocols and tests measuring the efficiency, pollution and durability of ICS were developed through this initiative. In March 2018, the MVCS released an update to the technical norm on ICS, based on the existing protocols and norms. In 2015, as part of component 2 'Innovation and quality through TRET', FASERT and SENCICO entered into an inter-institutional cooperation agreement with the following objectives: strengthen the technical capacities of the staff of SENCICO's laboratory of improved cookstoves; and work towards the creation of a normalized system for the evaluation of ICS in the field, in response to the increasing demand by national and regional institutions. The actions outlined in the frame of this agreement have concluded.

Variable 3.2 Enforcement: From *maturity* to *maturity*

The regulations for evaluation and certification of ICS came into force in 2009. On August 15 2009, through Supreme Decree 015-2009-MVCS, the Peruvian government appointed SENCICO as the entity in charge of overseeing the evaluation and certification of ICS, in order to ensure the effectiveness of the different types of ICS commercialized in the country. In this context, SENCICO issues the Certification of ICS Validation. By 2014, any natural person or legal entity building or installing an ICS in a building in any region of Peru had to comply with the technical norm on ICS. All the enterprises that receive support from Endev Peru through project implementation (FASERT and FIDECOP) comply with the relevant norm by commercializing certified ICS. In the 2015-2018 period, 13 ICS models were delivered in the San Martin region with a certification issued in that period.[12]

Graphic 20

indicator 3 Summary



11. See: <http://spij.minjus.gob.pe/graficos/Peru/2009/agosto/16/DS-015-2009-Vivienda.pdf>.

12. Database of users of ICS, San Martin, 2010-2018. EnDev. Lima, 2018.

Indicator 4 of the enabling environment: Market information

Variable 4.1 Cost of information: From *pioneering* to *expansion*

By 2014, EnDev Peru and a number of public institutions provided market information. Users received information through dissemination campaigns in mass media and printed materials that guided users on how to use ICS; also, people with influence in the region disseminated messages highlighting the benefits of ICS. On the other hand, the project tried to link the installer with the customer. In this context, EnDev Peru conducted a training program with activities that provided tools to strengthen the business models and the knowledge on ICS. By 2018, public institutions, EnDev Peru and FASERT provided information to enterprises commercializing ICS, but also the enterprises themselves developed tools that informed users about the benefits of this technology.

Variable 4.2 Market facilitation organizations: From e*xpansion* to *expansion*

In 2014, EnDev Peru was the main organization that facilitated the market of ICS in the country. In 2018, donors were still facilitating market information (and taking over the costs). The enterprises did not demand relevant information other than the identification of customers; this made it difficult for the development of the market in the San Martin region.

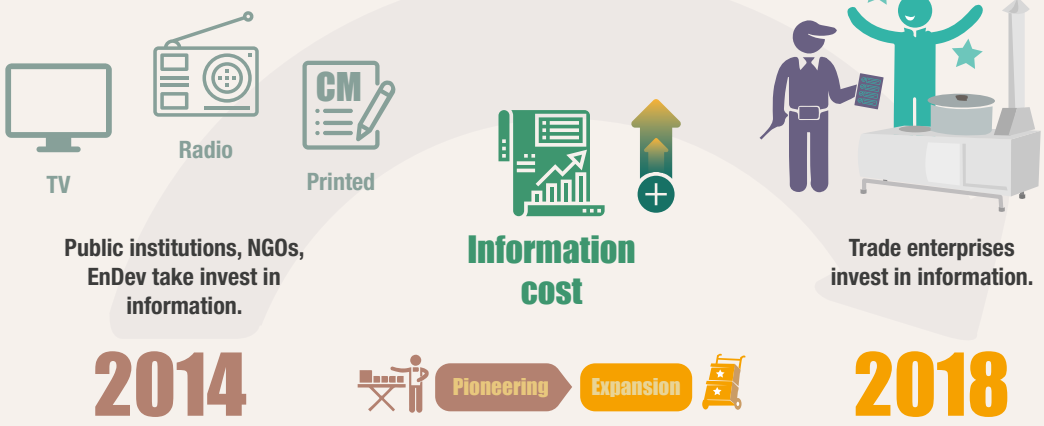
The section below reviews the information available for the different actors analyzed: customers, suppliers and others. In 2018, there was limited access to the market information in possession of NGOs in the San Martin region. On the other hand, the enterprises provide different market information, basically related to identification of potential customers, schedules of fairs, zoning, areas of agricultural production, mass sales, associations of producers, local governments, and other information. As regards the sources of financing, there is evidence that financing and micro-financing institutions support entrepreneurs, but there is no evidence about NGOs supporting them. Finally, as regards national policies, regulations and incentive mechanisms, all actors involved in the ICS sector are informed about the technical norm, the entity that oversees ICS quality, and the minimum parameters that ICS must meet.

Variable 4.3 Awareness campaigns: From e*xpansion* to *expansion*

In 2014, EnDev Peru conducted awareness campaigns together with government social programs. Also, according to the interviews conducted, Cáritas and SIEMAC played a role of assistance in the market by donating ICS to the population and organizing awareness campaigns aimed at households. Government entities in the San Martin region including the Energy and Mining Regional Agency (DREM) and the Regional Environmental Authority (ARA), as well as NGOs, had active participation in the market of ICS by organizing awareness campaigns. In 2018, the majority of current and potential customers who were interviewed said they did not know about policies implemented in the field of ICS. According to the interviews conducted, NGOs and public institutions (e.g. Cáritas, ARA), as well as micro-financing institutions, carry out awareness actions on eco-environmental issues such as demonstration activities for interest groups in rural areas. FASERT and EnDev Peru promoted the creation of the BEAT network: a network that gathers most enterprises involved in the market of ICS, and plays an active role in promoting awareness campaigns aimed at expanding the market coverage in the region.

Graphic 21

Indicator 4 Summary



Indicator 5 of the enabling environment: Expertise development

Variable 5.1 Courses: From *pioneering* to *expansion*

In 2014, as stated above, EnDev Peru implemented a training program for 12 entrepreneurs from different regions of the country, including San Martin. The program addressed issues related to the development of the business model and strengthening entrepreneurs' *marketing skills*, based on previous experience in the market of ICS. The program also provided tools for dissemination of the technology; these tools allowed suppliers to introduce themselves in their region. The details of this training program are described under the *entrepreneurial skills* indicator.[13] In 2018, Fasert organized events that addressed the massification, monitoring and sustainable market of ICS. In August 2015, a training workshop for entrepreneurial and business facilitators was organized in Lima by Fasert and EnDev-GIZ with the support of the Global Alliance for Clean Cookstoves. The representatives of the implementing agencies (Cofide, Practical Action and Aspem) attended this event.[14] Additionally, as stated under the regulations section, the objective of the agreement between Fasert and Sencico was to strengthen the technical capacities of the staff of the laboratory of improved cookstoves, and work towards the creation of a normalized system for the evaluation of ICS in the field. On the other hand, the implementing agencies have included in their workplans training actions for entrepreneurs, distributors, producers and households, in order to promote a dynamic and sustainable market of ICS. This information is analyzed in the *supply chain development and entrepreneurial skills* variables above. From the beginning of the Fasert program, the main distributors (Firuz, Faro Corporation, Enerselva, Siemac) implemented technical training and awareness actions aimed at the personnel of the points of sale, distributors and associations. Siemac was in charge of the training for Enerselva, Faro and Cocinas Hot.

Variable 5.2 Business development training: From *pioneering* to *expansion*

In 2014, Sencico conducted a short-term operational training on construction of Inkawasi improved cookstoves at households. Prior to this, in 2012, EnDev Peru provided continuous technical assistance for the formulation and implementation of business plans, including marketing plans and strategic plans. In 2018, the system for evaluation, accreditation and certification of quality in the education sector (Sineace) appointed Foncodes as the entity in charge of the certification of competencies for the role as 'expert in productive technologies at household level – Yachachiq' for a period of five years. This certification includes issues related to ICS. The appointment was validated through resolution 152-2018-Sineace/CDAH-P.

Variable 5.3 User training: From *pioneering* to *expansion*

In 2014 and in previous years, the training for users was delivered primarily by public institutions and NGOs. In 2012, EnDev Peru conducted a dissemination program informing users about the benefits of ICS and the parameters for the use and maintenance of the cookstoves. The messages were transmitted mainly through radio and TV spots. EnDev Peru also organized on-site events that provided an opportunity for suppliers to introduce themselves and show the technology to the users. According to a study conducted by EnDev Peru titled *Factors involved in the acquisition of an improved cookstove,* "[…] the training and the information for users were delivered in 2014 by NGOs and social programs; the dissemination and the training were conducted through the media, and users were informed about the importance of avoiding household air pollution, promoting a healthy environment in the household and having an ICS." In 2018, NGOs, public institutions (e.g. Caritas, ARA) and micro-financing institutions conducted awareness actions such as demonstration activities for interest groups in rural areas (see the *access to information* indicator above). The suppliers prepared training manuals for users explaining how to use and maintain ICS, as well as the characteristics of the after-sales services. The suppliers and the personnel of the points of sale are in charge of providing relevant information for the use and maintenance of ICS.

13. Final Report: 'Scaling-up ICS at business level and strengthening entrepreneurs in Cajamarca, Arequipa, Huancavelica, Apurimac and San Martin regions'. EnDev. Lima, 2012.

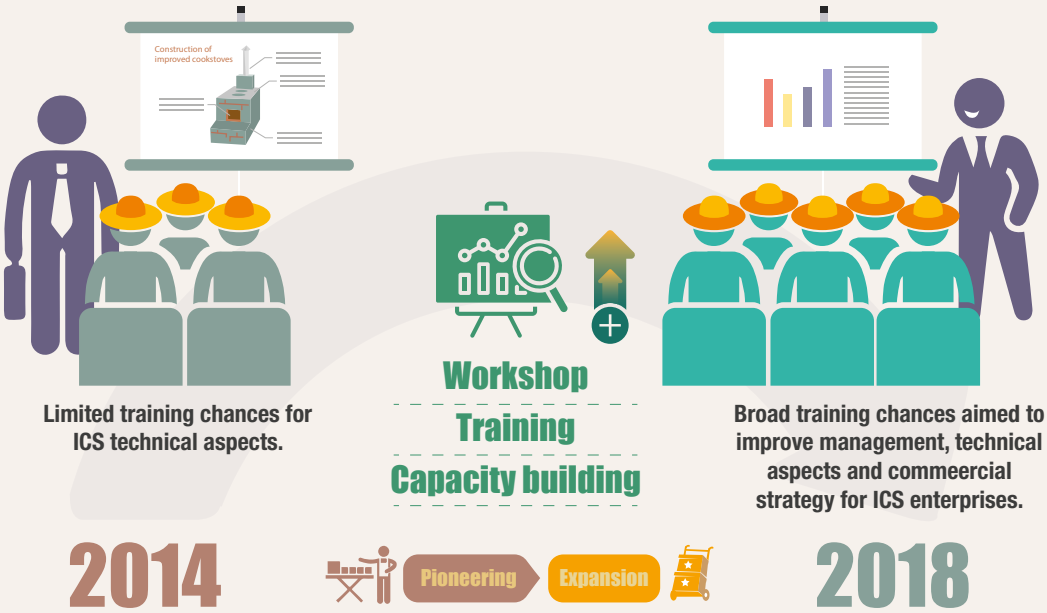
14. *Technical-Financial Report, October-December 2015. Fasert. Lima, 2016.*

Variable 5.4 Service: From *expansion* to *maturity*

In 2014 and in previous years, the suppliers were at the stage of adopting the business skills that would enable them to carry out activities related to the commercialization of cookstoves. As stated under the service industry variable, the enterprises provide after-sales services, information to the customer, credit facilities or payment in installments for the acquisition of cookstoves, and ICS parts are acquired with warranty from metalworking businesses. In 2018, according to the interviews with enterprise representatives, wholesalers offered after-sales services. The main distributors (Firuz, Faro) had undertaken the responsibility of the warranty and the replacement of ICS. ENERSELVA, on the other hand, offered after-sales service in one of its points of sale. In general, the service is delivered in the household.

Graphic 22

Indicator 5 Summary



The enterprise Enerselva commercializes improved cookstoves as well as other technologies.

3. CONCLUSIONS

This section summarizes the conclusions reached after the analysis of the key elements of the market.

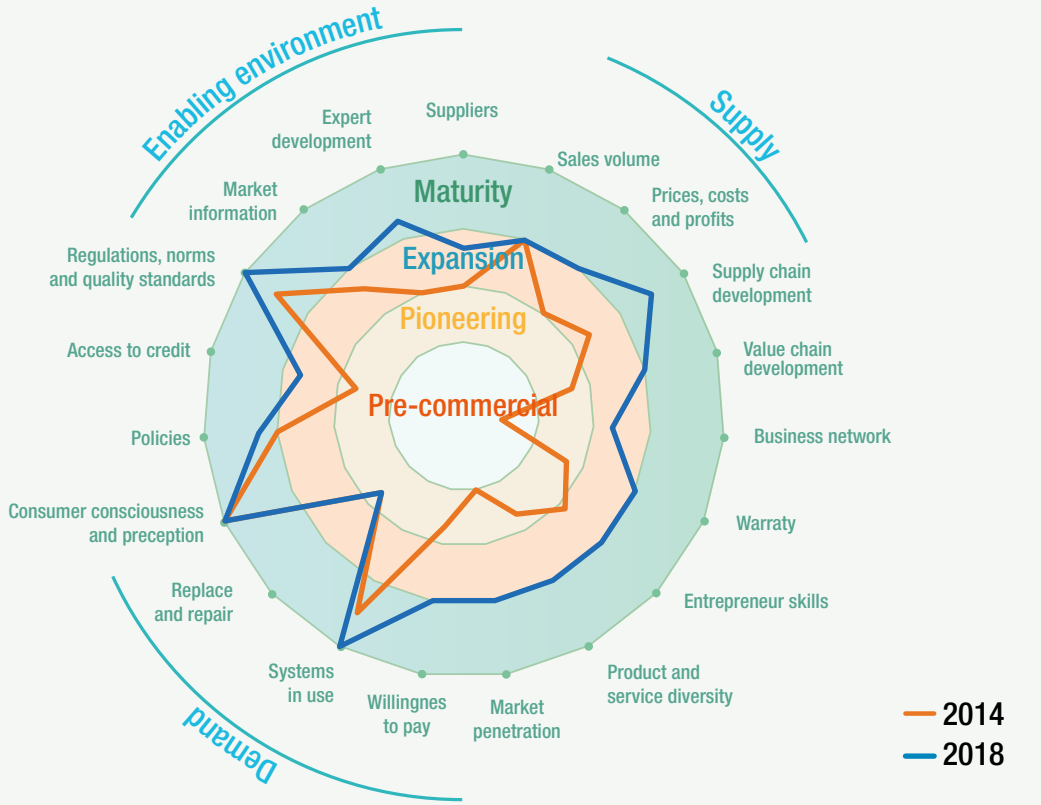
In terms of the supply, FASERT promoted the increase in the number of entrepreneurs and enterprises with innovative business models. FASERT also promoted the development of the supply chain, and encouraged enterprises to add value to their cookstoves in the course of their activities. On the other hand, more mature and motivated enterprises investing in the growth of their business and the diversification of their products are observed in the market. Also, the enterprises have achieved the optimization of their productive and logistic processes through business partnerships, and have established links with financing institutions for the expansion of the market coverage. Finally, as a result of the capacities developed, the enterprises have tools that enable them to strengthen their business and management models, and standardize the production of ICS.

In terms of the demand, FASERT supported the diversification of the supply of ICS (mobile and portable) through partnerships with other funds promoted by EnDev Peru. As a result of this diversification, there is a wide range of products that users can buy according to their purchasing power.

In terms of the enabling environment, FASERT promoted the sustainable use of wood-burning ICS through its participation in the group for the promotion of basic energy access. As regards access to financing, as a result of the creation of new mechanisms (e.g. credit funds), a number of institutions that offer credit to ICS suppliers and customers operate in the market. The enterprises developed strategic partnerships that allow products to reach a higher number of users. On the other hand, based on the experience developed in other countries, SENCICO's technicians were trained in the evaluation of ICS. This is in line with the new regulations on ICS evaluation (including durability tests) issued in 2018.

In 2018, as compared to 2014, there was a dynamic market of ICS in the San Martin region mainly as a result of the actions undertaken by FASERT in terms of the three components analyzed above (Graphic 23). It is also possible to extrapolate this result at national level, as FASERT implements cross-cutting actions under the same approach in the country, although there may be small differences due to the different context in each region of the country.

Graphic 23
Development phases of the indicators of the ICS market in the San Martin region for 2014-2018



Participation of the BEAT Network in the Expoamazónica Fair 2017, showing an institutional improved cookstove.

4. Lessons learned

The following lessons were learned from the implementation of FASERT:

a) The incentive for the creation of new enterprises that promote development helps to achieve a dynamic market of ICS.

b) FASERT's ongoing support and monitoring allowed the enterprises and business initiatives to improve their management model and the commercialization of ICS.

c) The identification of the enterprises in each link of the supply chain strengthens them and reduces the high costs of the insertion in the market of ICS.

d) The introduction of innovative business models (use of online platforms) boosts enterprises and allows them to expand the coverage of their commercialization activities.

e) The introduction of after-sales services in the value chain of the enterprises generates sustainability in the commercialization of ICS.

f) The creation of a business network facilitates the creation of business partnerships in the search for reducing costs and expanding the coverage.

g) Encouraging articulation between ICS supplier enterprises and local financing institutions allows potential customers with low purchasing power to access resources to pay for the acquisition of an ICS.

h) Promoting research and development (R&D) in enterprises that manufacture ICS allows the diversification of the supply with different prices, making it possible for customers to access the product according to their purchasing power.

i) The joint work of the civil society, the private sector, NGOs and government entities (national, regional, local) promotes the development of comprehensive initiatives and avoids duplication of efforts on issues related to ICS.

j) The technical empowerment of ICS normalization and validation institutions in the areas of efficiency, security, durability and no-pollution ensures a standardized quality product that meets the technical expectations of customers.

k) The implementation of influence actions for the visibility of ICS issues is a tool that allows decision-makers to get informed about ICS and invest in this technology at government level.

l) The development of innovative financing mechanisms, such as the revolving credit fund for producers' organizations, and the replacement and maintenance program, has expanded the access to this technology.

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