

# **Transaction Costs of Energy Efficiency Subsidy Programmes in the Czech Republic: Case study Operational Programme Environment**

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## **Introduction**

According to the directive 2006/32/EC on end-use energy efficiency, the Czech Republic should reach savings of 9 % of final energy consumption by 2016. Similarly, the Czech Republic is bound to increase the share of renewable energy sources (RES) at gross final energy consumption at 13 %.

In the same time, recently a large amount of financial resources has been available for energy efficiency (and RES development) projects both in public and in private sectors. The financial sources come mainly from structural and cohesion funds, as well as sale of excess CO<sub>2</sub> emission allowances. Altogether, in 2007 – 2013 up to 68 billion CZK (about 2.7 billion EUR) should be at disposal.

Public programmes related to these resources could largely contribute to the above mentioned goals undertaken by the Czech Republic. However, detailed evaluation of the programmes is necessary. When evaluating energy efficiency (or GHG emission reduction) programmes the analysis usually only compares the level of subsidy and the resulting effects (CO<sub>2</sub> savings, energy savings, etc.). In line with the transaction costs theory, it is argued that such evaluation leads to suboptimal decisions, because it only covers part of the relevant costs.

The present paper evaluates transaction costs of one of the operational programmes, funded from structural and cohesion funds, aimed at energy efficiency in public buildings – Operational Programme Environment (OPE) – Priority axis 3. The programme itself is the second largest operational programme with the total allocation in 2007 – 2013 of 4.9 billion EUR. Total allocation of the Priority axis 3, focused on Sustainable Use of Energy, reaches 792 million EUR in 2007 - 2013.

## **Methods**

Transaction costs theory is imbedded in the theory of institutional economics. The main idea is that all actors in the economy make their decisions under “bounded rationality” and therefore all transactions (and contracts) lead to some level of transaction costs. On the other hand, without transactions, there would be no transaction costs.

There is not a single definition of transaction costs; they differ according to the area of interest (Allen 1999). Definition pertinent to energy efficiency programmes could be for instance the one of Matthews (1986), who defines transaction costs as "...the costs of arranging a contract ex ante and monitoring and enforcing it ex post, as opposed to production costs."

The transaction costs in energy efficiency (subsidy) programmes arise ex ante and ex post and are borne both by the administration body and by the recipient. More detailed (even though not exhaustive) enumeration of the sources of transaction costs is presented in Table 1.

**Table 1 Transaction costs in energy efficiency programmes**

Organisation	Ex-ante	Implementation	Ex-post
<b>Public administration</b>	Design of the programme Technical assistance (experts, legal advice) Administration of the programme – validation of projects	Validation and processing of the programme	Monitoring and verification Quantification of the results (savings, GHG emissions)  Settling of legal disputes
<b>Subsidy recipient</b>	Search for information and its assessment Initial negotiations Development of application Legal fees Bank fees (credit)	Negotiation of the contract, procurement, project validation	Monitoring Payment request Lawsuits

Source: Pavel 2005, Mundaca and Neij 2006, adapted by author

Note: In some programmes other parties such as the technology suppliers incur transaction costs as well.

The research of transaction costs of the OPE (Priority axis 3) was carried out in three main stages, which were desk research, in-depth interviews and survey among successful subsidy recipients.

Firstly, main sources of transaction costs have been defined through literature review and specifically from review of the programme documents.

Secondly, in-depth interviews have been carried out. The semi-structured interviews were conducted with four successful recipients of the subsidy from the OPE programme and with one representative of the State Environmental Fund, who is the intermediate body responsibly for the whole administration of the programme. The aim of the in-depth interviews was to obtain detailed information on the administration of the projects and programme from both sides. The interviews also served as a background for the subsequent questionnaire survey.

Thirdly, questionnaire survey has been carried out among successful subsidy recipients. The aim of the survey was to get quantitative data on the time and resources spent on administration of the subsidized project. In total 318 questionnaires were sent out and 79 questionnaires returned, which means 25%

return rate. The subsidy recipients (respondents) are public organizations (municipalities) or their budgetary organizations (schools, health care centres, etc.).

### **Preliminary results – Operational programme Environment, Priority axis 3**

#### **Induced costs of recipients**

Based on the analysis of the main programme documents, in-depth interviews with subsidy recipients as well as representative of consultancy doing the subsidy administration management, the main processes and activities of the subsidy administration have been identified.

The main steps are:

- **Initial information on the programme and its requirements**  
This step includes initial gathering of information on the programme and getting to know the main requirements for subsidy (i.e. whether the applicant is eligible in the programme)
- **Decision on the project realisation and on submitting the application**  
This step is connected with presentation of the subsidy programme to the governing body and ensuring their approval. It means for example preparation of background materials for municipality council, which has to approve the concept.
- **Tender for preparation of the application**  
Some applicants use tender to select external company, which helps them with administration of the application.
- **Preparation and submittal of subsidy application**  
This step includes preparation of all documents necessary for subsidy application, upload to the Internet application and submittal of paper documents to the intermediate body (State Environmental Fund).
- **Processing of tender documents for suppliers of energy efficiency measures and organization of the tender**  
According to Czech legislation on public tender as well as according to OPE requirements subsidy recipients are obliged to organize tender on technology suppliers.
- **Realization of the project**

The time spent on realization of the project, additional to common realization of the given measure (and technology) and connected to the fact that the project was supported by a subsidy. For example this may mean the need for consultation of changes in the project or eligibility of costs.

- Preparation of support materials for and signing of the contract with State Environmental Fund (SEF)

As soon as the SEF publishes the Decision on granting the subsidy, a contract between the recipient and the SEF has to be signed. Only after the contract is signed, it is possible to submit request for payment.

- Preparation of obligatory supplements for request for payment  
The obligatory supplements are invoices (and bank statements), the list of realised works or declaratory protocol, etc.

- Preparation of Intermediate (monitoring) reports and final report from project realization

The subsidy recipient has to submit regular reports in the course of the project and after its end.

### ***Time costs of the recipient***

Respondents of the questionnaire survey estimated the time (range of hours) that they have spent carrying out activities related to the given project administration phase as defined above. The following table (Table 2) shows the summary of average, mean, minimum and maximum values that the respondents have provided.

**Table 2 Time spent in different phases of administration from the viewpoint of subsidy recipient – Operational Programme Environment, Priority axis 2**

	Average	Mean	Maximum	Minimum
Initial information on the programme and its requirements	24,7	15	70	5
Decision on the project realisation and on submitting the application	20,7	10	100	5
Tender for preparation of the application	21,3	5	100	5
Preparation and submittal of subsidy application	46,5	30	100	5
Processing of tender documents for suppliers of energy efficiency measures	48,4	50	120	10
Organization of tender for technology supplier	39,1	30	120	10
Project realization	54,1	50	120	10
Preparation of support materials for and signing of the contract with State Environmental Fund (SEF)	35,8	30	120	10
Preparation of obligatory supplements for request for payment	25,1	15	100	5
Preparation of Intermediate (monitoring) reports and final report from project realization	20,0	15	100	5
Final report and monitoring after project end	24,7	15	100	5

As we can see from the aggregated data, the most time consuming tend to be the initial phases of administration, i.e. the submittal of application, which in average took 46,5 hours, and then the preparation of tender documents and organization of the tender for technology supplier. These two phases (which anyways are closely connected) take about one quarter of the total time spent with administration of the subsidized project. The most intensive is then the realization of project, or more specifically the activities during realization, which are connected to the administration of the subsidy (54 hours on average).

On the contrary, as less time consuming according to respondents are evaluated the initial processing of information about the programme or the decision to apply for subsidy, as well as the closing stages, such as request for payment and monitoring reports.

Similar conclusions came out from the four in-depth interviews with selected subsidy recipients. The respondents agreed that the programme requirements are complicated. That is why the application process takes so long. Filling out the forms itself is rather straightforward, but more difficult according to respondents is the preparation of the necessary documents accompanying the application. In bigger towns, even getting the initial approval by the governing body may be time consuming (as detailed supporting documents need to be prepared for the city council meeting, etc.).

As to both respondents of the in-depth interview and of the questionnaire survey, the most time consuming is the organization of public tender (together with the preparation of tender documents). Connected problem is that before initiating the

public tender, subsidy recipients need to have the registration list, issued by State Environmental Fund, which in some cases takes more than a year. The public tenders, before initiated, have to be approved by the intermediate body (SEF). For schools (allowance organizations of municipalities) tenders are organized through the respective department at the municipality, which further complicates the process.

Time lags needed to get response from the intermediate body were mentioned by the respondents – e.g. in signing the contract with SEF, which is a prerequisite for request for payment. During realization of the project, the eligibility of costs (and the need to decide which costs are eligible) is the major source of transaction costs.

From the in-depth interviews it seems that effects of learning curve are not as significant, or depend on the subject of the project. Within bigger municipalities, it can be several departments that will be responsible for the project depending on the facility (education department for schools, health department for health care centres, etc.). The effects of learning curve are diminished by this, as the transfer of knowledge is lower.

The total time spent by respondents on subsidy administration averages at **354 hours** for one project. That is about 44 working days, or 2 full months of work. The mean is somewhat lower, 320 hours. If we recalculate the time intensity to financial terms (using labour costs for public sector employees as calculated by the Czech Statistical Office, which in 2010 were 267 CZK/hour, ca 10,5 EUR/hour<sup>1</sup>), the average induced costs of subsidy recipients in the survey reach 93 228 CZK for one project, which is about 3 700 EUR. The mean is 83 438 CZK.

### **External services**

Administration of the subsidy is complicated and therefore most of the respondents hire an external company to do some of the work. Table 3 presents the share of respondents that used external services for the given parts of work and also to what extent they had these services paid by the subsidy scheme.

Basically all respondents used external services for the energy audit and project documentation. This is partially given also by the legislative framework, which says that for instance energy audit can only be issued by certified energy auditor.

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<sup>1</sup> With exchange rate 25 CZK/EUR.

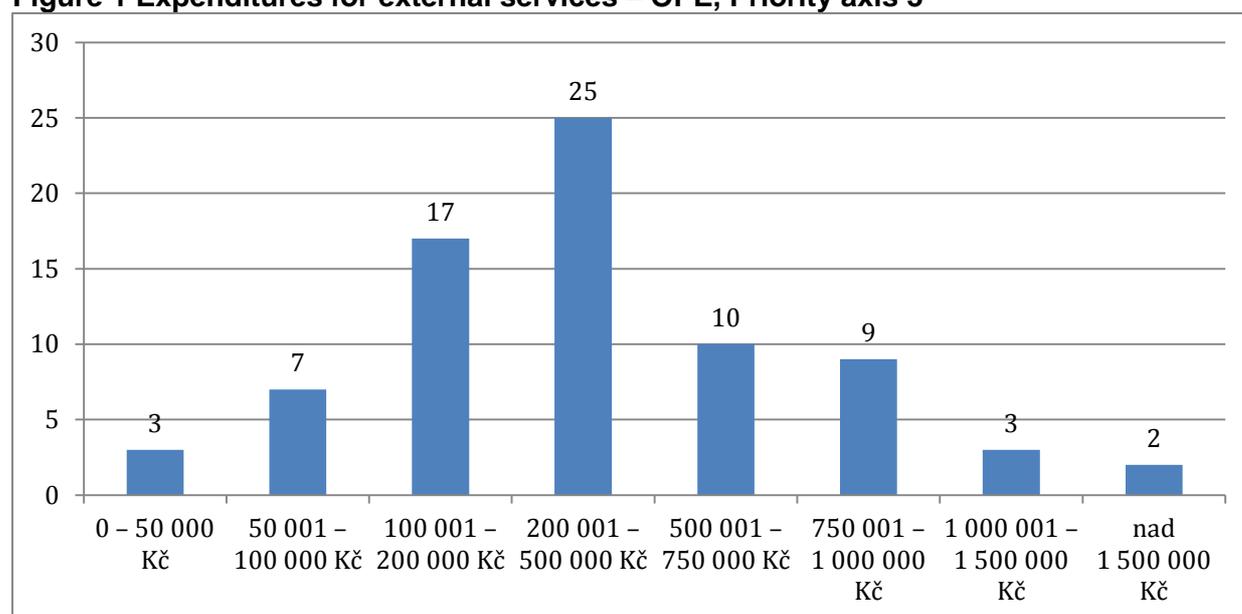
**Table 3 Use of external services by subsidy recipients in OPE, Priority axis 3**

	Externally (% respondents)	Request for payment <sup>1</sup>
Energy label, energy audit	99%	77%
Project documentation	99%	79%
Public tender for project preparation	43%	62%
Preparation and submittal of application	67%	66%
Public tender documentation for technology supplier	65%	57%
Organisation of public tender	57%	49%
Project publicity	67%	81%
Other (engineering supervision)	14%	82%

<sup>1</sup> from the ones that used external company

Two thirds of respondents used external company to help them in preparation and submittal of the application and also for preparation of public tender. Similarly more than a half of respondents (57 %) hired external company to organize the public tender. This step is a complex and complicated one and also very important from the viewpoint of subsidy, among others because wrongly realized public tender can lead to non-repayment of the approved subsidy.

Distribution of total expenditure for external services related to administration of the subsidy is presented in the following graph (Figure 1). The graph shows that most frequently the total expenditure for external services ranges between 200 000 and 500 000 CZK (ca 8 000 – 20 000 EUR) for one project. Two projects have expenditures over 1 500 000 CZK, more precisely, the total expenditure reached 5.5 million CZK and 10 million CZK respectively.

**Figure 1 Expenditures for external services – OPE, Priority axis 3**

Note: last column means over 1 500 000 CZK.

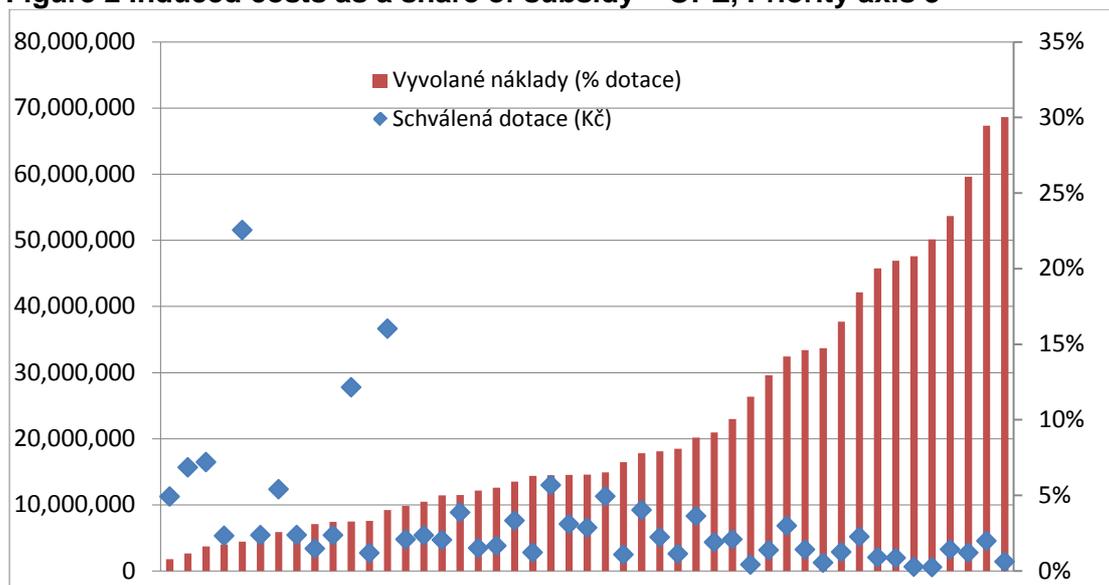
## Induced costs

Next step is to compare the total induced costs (time costs and costs for external services) with the subsidy level. The following graph (Figure 2) shows the percentage share of induced costs (as a sum of time costs and costs for external services) on the approved subsidy. For each project, the actual level of subsidy in absolute terms is presented, too. (Only respondents with one project have been included in the graph).

Based on the results of the survey, total induced costs of subsidy recipients in OPE, Priority axis 3 range between 0.2 % and 30 % of subsidy. Average share of induced costs on subsidy is 8 %; the mean is 6 %.

If we only count projects smaller than 20 000 000 CZK in project costs, which represent more than 94 % of all project in OPE, Priority axis 3, the average share of induced costs on subsidy increases to 10 % with mean of 7 % and range of 1% - 30 %.

**Figure 2 Induced costs as a share of subsidy – OPE, Priority axis 3**



Note: blue dots = approved subsidy (in CZK), red columns = induced costs as percentage of subsidy (%)

The graph indicates that there might be a correlation between the two variables – level of subsidy and the share of induced costs on the subsidy. Regression analysis of these two variables (one project per recipient, project value maximum 20 000 000 CZK, sample of 44 projects) shows that there is statistically significant indirect relation between the variables on 95 % confidence interval. It means that the higher the subsidy, the lower the transaction costs as percentage of the subsidy (i.e. lower administrative burden).

The correlation coefficient is -0.53, which means medium strong dependence between the variables. The standard error of estimate is 6.7 percentage points. Mean absolute error is 5.4 percentage points.

The results of the statistical analysis are shown in Table 4.

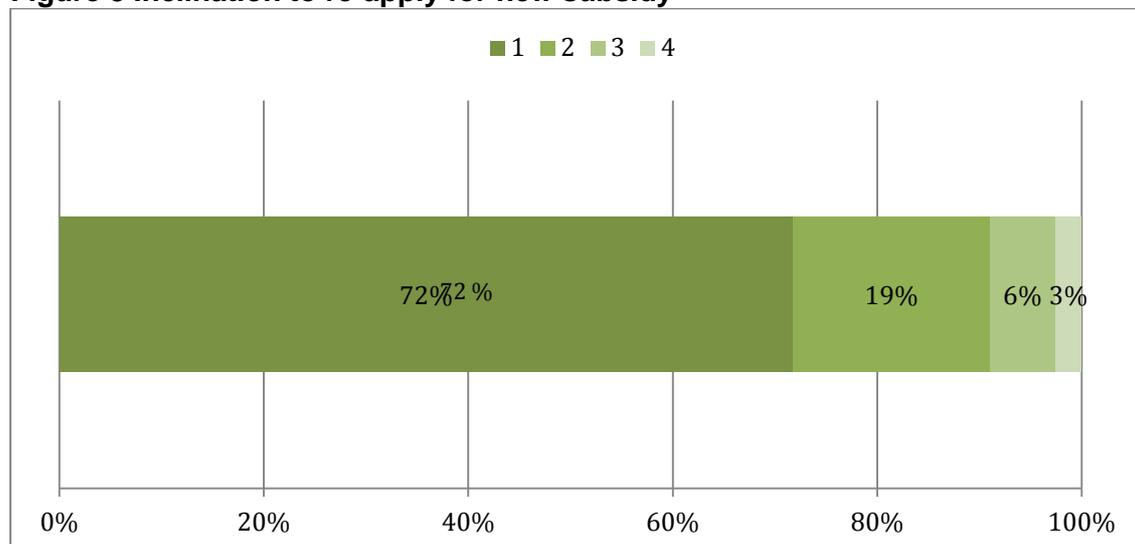
**Table 4 Regression analysis of induced costs and subsidy – OPE, Priority axis 3**

Characteristic	Value
Correlation coefficient	-0.533
R-squared	28.4 %
R-squared (adjusted for d.f.)	26.7 %
Standard error of estimate	0.0678 (6.8 p.p.)
Mean absolute error	0.0540 (5.4 p.p.)
Durbin-Watson test	1.68463 (p=0.1492)

Note: p.p. = percentage point

Respondents were further asked, whether based on their previous experience, they would re-apply for the subsidy in this scheme. They were to choose on a scale of 1 - 5, where 1 means definitely yes and 5 means definitely no. They were also encouraged to give reasons for their answers. The results of the responses are shown in Figure 3.

**Figure 3 Inclination to re-apply for new subsidy**



Note: 1 = definitely yes to apply for new subsidy, 5 = definitely no.

It is clear from the results, that almost three quarters of respondents would definitely apply again, if that was the case, only 10 % can be considered as rather undecided or inclined to not applying given their experience from the previous project. It is important to keep in mind though that the respondents were successful applicants.

Most of the respondents that would definitely apply again, said that the reason was the possibility to receive additional funding and to realize energy savings and

therefore lower the operational energy costs. Frequently mentioned reason was the need for reconstruction of the given facilities, for which there is a lack of financing. (One may then question the additionality of the programmes to some extent.) The recipients further mention that the subsidy significantly improves the economics of the projects and the “liberated” financial resources of public budgets can be used elsewhere. The respondents even highlighted the “catastrophic” underfinancing of municipalities and inner indebtedness, which prevents them from realizing larger investment activities.

Respondents also mentioned improvement of inner environment of the buildings and contribution to CO<sub>2</sub> reduction emission targets. On the other hand, the negatives of the programme as expressed by the respondents are different information from different SEF project managers, high administrative burden (as perceived by the respondents) and long terms of the intermediate body (SEF).

### **Administrative costs of the programme**

Administrative costs of the programme (costs of the administration body) can be related to the technical assistance, which makes part of every operational programme. For OPE, the technical assistance is 2.91 % of the total allocation of the programme (MoE 2007). If we related the technical assistance only to the resources, which are devoted to projects (therefore excluding the technical assistance), the share increases to 3 %.

Real administrative costs are likely to be higher than 3 % because the technical assistance only covers the costs of the administration system itself, but does not cover other costs related to the whole subsidy scheme, such as the costs of the financial body (Ministry of Finance), which administers the financial resources on national level, costs of negotiation about the programme on national and European level, and other.

## **Conclusions**

It has been shown that transaction costs in operational programmes for energy efficiency (specifically transaction costs in Operational Programme Environment) are not negligible. Induced costs of the recipients average at 8 %, the administrative costs (of the administration bodies) amount to at least 3 % of the subsidy allocation.

The total allocation of the Operational Programme Environment – Priority axis 3 Sustainable use of energy is 792 million EUR in 2007 – 2013. Given the success of the programme, it is certain that the allocation will be spent by that time.

It means that probably additional 87 million EUR will have been spent on administration of the programme – both by the administration body and the recipients of the subsidy. Importantly, further costs are likely to have been spent by the unsuccessful applicants – the rate of successful applications in the programme is 53 % only (SEF 2010).

The operational programmes represent an important “kick” for the development of energy efficiency (and RES) projects in the Czech Republic. However, careful evaluation is needed, also with respect of the new programmes, which will be launched soon, for the period 2014 – 2020.

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