



EENA Operations Document

Costs of Providing Emergency Call Answering Services

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1 Introduction

This document will detail the different types of costs incurred by a PSAP (Public Safety Answering Point) or group of PSAPs and propose a way to assess the efficiency of these costs. The goal of this document is not to specify which and how costs should be reduced¹ but to propose a framework under which the efficiency of costs can be assessed. This is partly based on the report issued by the Irish Regulatory Authority (ComReg) and its consultants in 2011 in the specific context of Ireland².

Furthermore, since 2008, Europe has entered a recession. In order to avoid rising interest rates, European countries have to comply with international banks' recommendations, by lowering their expenses and public deficit. This is generally carried out by reviewing every piece of public expense, even rather small ones. In this context of public budget restriction, it seems relevant to assess whether the cost of the PSAPs is efficient or not, as checked with other public services. However, because of the critical aspect of the PSAPs, the service cost efficiency has historically not been the main focus. While one must keep in mind that maintaining a good service level is of paramount importance, good practices can be identified. Moreover, some governments have already expressed some interest in the measurement of PSAPs' costs, as illustrated by a report published by the French "cour des comptes" which stated that "The measurement of the [emergency service] activity remains deficient because this measure is too general and inadequate to enable an analysis of the results when compared to the means by which the service is implemented."³

As with all EENA Operations documents, recommendations and requirements will be detailed.

2 Analysis of costs

The costs analysis presented in this report should allow PSAPs to understand how to compare their actual costs with efficient ones and/or benchmarks in order to identify potential areas of improvement. For each specific PSAP or group of PSAPs, a thorough analysis would be required to compute exact figures, depending on the context (volume of emergency calls, local salary costs,

¹ For example, this document does not discuss how ghost calls, which generate inefficient costs, should be reduced. See "False Emergency Calls EENA Operations Document"

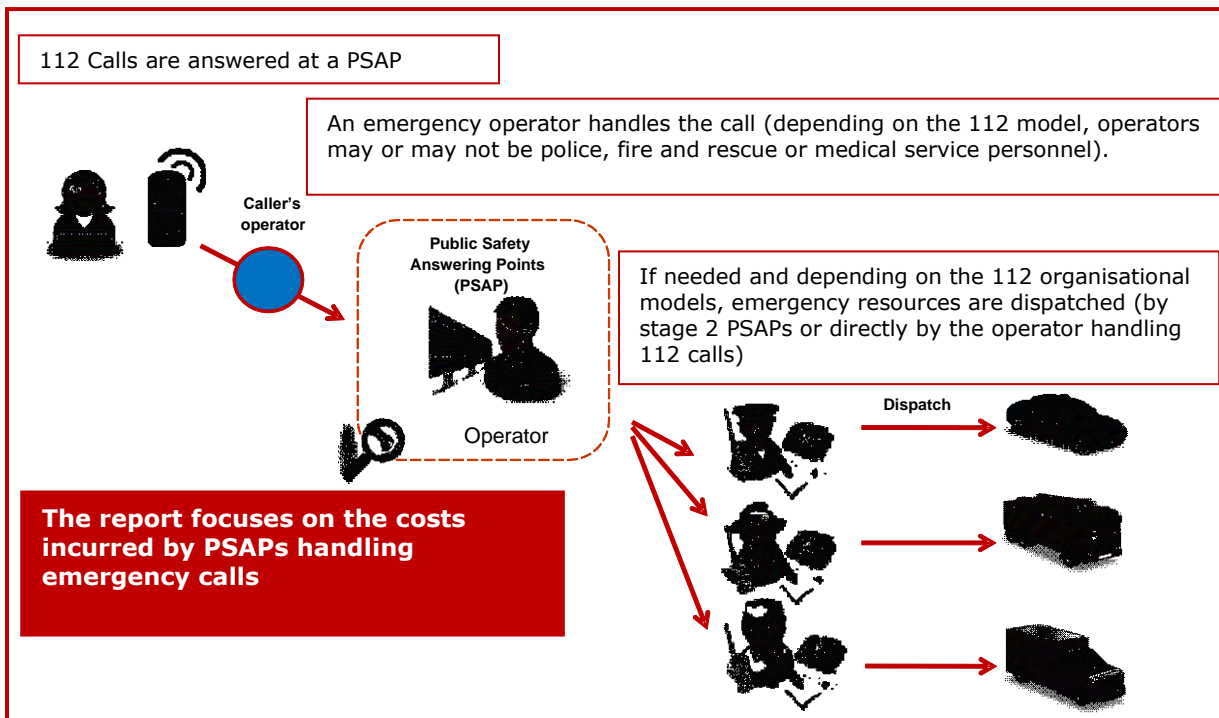
² See ComReg, Emergency Call Answering Service: Call Handling Fee Review 2012/2013 (<http://www.comreg.ie/fileupload/publications/ComReg1181.pdf>) and TERA Consultants, Recommendations for a reasonable Call Handling Fee (CHF) associated with the Emergency Call Answering Services (ECAS) (<http://www.comreg.ie/fileupload/publications/ComReg1181a.pdf>)

³ Annual report 2004 of the French « cour des comptes » published on march 2nd 2005, page 420 : « La mesure de l'activité reste défailante car trop globale et inadaptée à l'analyse des résultats par rapport aux moyens mis en oeuvre. »

requirements and obligations in term of quality of service provision, etc.), although the general breakdown proposed in this report remains valid.

While the overall emergency services organisation's architecture is complex⁴, this report will focus on the assessment of the public safety answering points' (PSAPs) costs. Figure 1 describes a high level PSAP operations flow, and the scope of this report.

Figure 1 : The scope of this report in the PSAP operations flow



In this scope, five main sources of costs have been identified:

- Operator costs: the costs of call centre operators (main category of costs);
- Management and support costs: first line managers, administrators, legal and finance teams;
- Non pay costs: accommodation, maintenance, administration, network services, etc;
- Fixed assets depreciation: equipments required to operate the PSAP and possibly some set-up costs;
- Financial costs related to the activity.

⁴ 112 Service Chain Description EENA Operations Document:
<http://www.eena.org/view/en/Committees/112operations/index/generalframework.html>



These cost categories do not necessarily match with all PSAP models existing in Europe. For instance, the scope of financial costs incurred in the context of the PSAP may depend on whether the service is operated by a private company or not. Regardless of the categories listed above, the costs defined should be reasonable; in this context, reasonable are those costs that are incurred as part of the delivery of the service being provided or those costs that are incurred because of a previous legal or regulatory obligation, such as health and safety legislation for example.

2.1 Operator costs

Operators' costs account for most of PSAP costs. This category corresponds to the wages of employees answering to emergency calls (sometimes including "coordinators" and "lead operators" with additional responsibilities), either employed directly by the entity in charge of the PSAP or by a subcontractor. The two main components of PSAP costs are the number of operators working hours required to provide the service and the operator's cost per hour. The assessment of these elements should provide a good estimate of the overall efficient operator costs.

2.1.1 Operator cost per hour

The operator cost per hour usually covers the wages of basic operators, and possibly some coordinators' and lead operators' costs. This operator cost per hour can be further split into the following cost elements:

- Basic rate (for wages)
- Bonus
- Social and insurance charges
- Churn (the ratio of employees leaving the company)
- Uplift for unavailable hours (to take into account employees' holidays, capacity building, unavailability due to illness, injuries etc)
- Resourcing (management of the resources to fit volumes of calls)
- Trainers
- Recruitment
- Overhead

A benchmark with other countries and/or local similar positions can be led on each cost element in order to provide a reasonable range for the overall efficient cost. More precisely, costs that are not specific to PSAP should be benchmarked against costs of other local call centers, while cost elements specific to PSAP have to be benchmarked against PSAP costs of other countries. Table 1 details which elements can be benchmarked locally versus those that can be benchmarked with other countries.



Table 1 : Operator cost per hour elements to benchmark locally versus those to benchmark with PSAP of other countries

Operator cost per hour element	Benchmark (local versus PSAP of other countries)
Basic rate	Local
Bonus	Local
Social and insurance charges	Local
Churn (% of staff who leave)	Local
Uplift for unavailable hours	Local
Resourcing	PSAP of other countries
Call centre coordinators	Local
Trainers	PSAP of other countries
Recruitment	Local
Overhead	Local

If some cost elements are too far from benchmarks, further analysis will have to be done in order to understand the national or domestic conditions that may prevail and optimize these costs.

2.1.2 Operators working hours

The number of operator hours necessary to provide the PSAP under a defined set of service level targets can be assessed with the help of a capacity planning model based on demand forecasts. Typical methods based on queuing theory, assuming a Poisson distribution⁵ of emergency calls, can be used to provide a good capacity planning model and to make sure that the number of operator hours paid is not inefficient.

The capacity planning process is dependent on several parameters that should be carefully chosen such as but not limited to the following:

- The number of operators is based on the service level offered. This level has to be chosen according to the PSAP provider goals (for example a 97.5% in 5 seconds service level is used in Ireland). Moreover, indicators related to the service level (like the average and worst waiting time) should be monitored;
- “not ready time” uplift, allowing operators to cater for short unscheduled breaks and any follow up work related to calls taken, has to be included;
- Additional “shrinkage”⁶ uplift required to convert a base operator into a full time equivalent employee has to be taken into account;

⁵ A Poisson distribution is a [discrete probability distribution](#) that expresses the probability of a given number of events occurring in a fixed interval of time and/or space if these events occur with a known average rate and [independently](#) of the time since the last event.

⁶ Shrinkage is the term given to additional activities and uplifts needed to convert a base operator requirement up to a full time equivalent employee level. It includes at work activities such as performance coaching, meetings and breaks, plus non work factors such as annual leave, sickness and other absence.



- A minimum staffing level per site may be applied in order to maintain a 24x7 service and to comply with local legislation (minimum number of employees per site), even though calls volumes are low during certain periods.
- The numbers of PSAP's required which will result in higher costs.

It is to be noted that, when planning resources, multiple layers of contingency can generate a level of staffing above the level required meeting service targets.

The capacity planning process requires demand forecasts. These forecasts should be as accurate as possible by taking into account the following elements:

- The forecasts process should deal with medium and long-term forecasts, as well as short-term forecasts;
- External elements like population demographic shifts or structural changes in the landscape (like the reduction of 'error calls' due to the improvement of telecom operators' infrastructure) should be taken into account;
- Specific analysis of historical data should be carried out for usual periods of high demand, like Halloween and New Year's Eve. The anticipated call volumes should be adjusted accordingly during these periods.

2.2 Management costs

Additionally to the call answering operators, a management team and a direct support team are required to operate the PSAP. Therefore, the following additional costs have to be accounted for:

- Direct labour costs corresponding to the costs of first line managers and administrators involved in the PSAP;
- Direct support costs corresponding to the costs of the legal, regulatory and finance teams involved in the PSAP.

Typical First Line Managers' responsibilities include:

- Achieving the overall service performance;
- Overseeing operators' performance and quality of work;
- Completing call monitoring and providing staff with feedback meetings ;
- Completing staff's final end of year performance appraisals;
- Playing a key role in the implementation of service escalation plans that need to be put into place;
- Preparing management reports;
- Working on staff issues if there are both performance and Human Resource type issues (such as high absence) apparent.

Most PSAP's have an Administrative function and typically administrators have to complete call monitoring functions in addition to that completed by first line managers. They also usually focus on call quality, in order to report externally on the level of quality achieved and other such



functions. With respect to the other duties performed by the administrators, systems and network administration is often completed by a central IT/IS support team.

Direct support costs consist mainly of the following costs:

- The legal team, including members of Legal and Regulatory staff;
- The finance team, including the Finance Manager, Billing & Credit control staff, etc;
- The Procurement team;
- Business Account Managers.

Direct management and support costs can be assessed by comparison to benchmarks with local similar positions. Moreover, managers and support staff interviews can be led in order to assess the management and support functions efficiency, by checking the consistency between the different roles and avoiding tasks redundancies and overlaps.

2.3 Non pay costs

Non-pay costs correspond to every costs incurred by PSAP providers that are not salaries. These costs include:

- Accommodation (for PSAP staff, as well as management and support staff);
- HR services (if payroll and HR services are outsourced to a third party);
- Travel costs, mileage payments, canteen costs (usually small);
- Premises and related costs (electricity costs, facilities management charges);
- Maintenance (if outsourced);
- Administration (for example charges for auditors) and,
- Network Services (leased line costs, interconnect costs, data centre costs etc).

Network services, premises, accommodation and maintenance costs usually represent most of these non-pay costs. Subcontracting and tendering (for network services, premises, operators, etc.) may provide "best value for money". However, an in depth analysis of these expenses should be led and compared with benchmarks of local similar services (like other call centers), in order to assess if these costs are reasonable and truly better value or not.

2.4 Fixed assets depreciation

Fixed assets are purchased to enable PSAP operations. These assets will depreciate over their life cycle and the depreciation values will have to be taken into account when computing the PSAP costs. These fixed assets include mainly:

- Hardware
- WAN ("Wide Area Network")
- Software & Testing
- The fitting out of PSAP locations (i.e. fixtures and fittings)
- The PSAP call handling platform



The fitting out of PSAP locations and the call handling platform are usually the most important fixed assets. However, benchmarks should be led for each of these elements in order to have a good estimate of the optimum investment required. When PSAP specific equipments are used, the corresponding costs should be compared to global benchmarks with PSAP of other countries... On the other hand, fitting out costs are typically better assessed when compared to similar local activities.

2.5 Financial costs

In addition to operational costs incurred by PSAP providers, financial costs related to capital investments may be taken into account, depending on the circumstances. While governments may not have profitability constraints, any private company in charge of a PSAP will have to take into account their cost of capital. Therefore, depending on the context, the cost of capital can vary greatly:

- For a private company in charge of a PSAP, the revenues expected by the company's shareholders, as well as the cost of the company's debt are usually used to compute the WACC ("Weighted Average Cost of Capital"), which is typically used as the cost of capital for new projects. Because of the peculiar aspect of PSAPs being subcontracted by the Government, and therefore with a limited risk, the service's cost of capital may be contractually agreed between the company and the Government at a lower rate than the usual WACC used for other projects.
- If PSAPs are operated by a country's Government, the cost of capital does not include any cost of equity. However, since governments use mostly debt to finance their activity, using the cost of debt as the PSAP cost of capital seems reasonable. NB: Governments may also choose not to consider financing costs in their analysis if they are only interested in checking that their costs are reasonable and efficient.

2.6 Costs of inaccuracy and unavailability of automatic caller location

Knowing the exact location of people calling the 112 emergency number is very important for emergency services. This knowledge ensures timely interventions, verification of genuine calls and, in certain cases, identification of calls concerning the same major incident⁷. Medical research even indicates that for certain pathologies the reduction in response time by one minute will improve the odds of survival by 24%⁸.

The nature of the reported incident has a direct bearing on the type of equipment and crews dispatched but this is not the only consideration. There is a direct cost associated with each crew and vehicle dispatched to an incident. Reducing or eliminating the need for equipment and crews at incidents directly reduces the cost of providing emergency services.

⁷ Caller Location in Support of Emergency Services: http://www.eena.org/ressource/static/files/2011_05_27_2.2.2.cl_v1.3.pdf

⁸ The Importance Of The Time Factor In Fire And Rescue Service Operations In Sweden: <http://www.eena.org/ressource/static/files/6.-henrik-jaldell.pdf>



The faster that the correct type of crew and equipment can get to an incident site the more efficient the use of emergency resources. For example, helicopters with expensive visual equipment may be used to locate a car that has come off the road in treed or forested areas, but it is the ground paramedic crew that are actually needed on site. Eliminating the use of the helicopter and its crew reduces the costs of the rescue.

Automatically provided high-precision, accurate location information is crucial to reducing the length of time that the PSAP call-taker needs to be engaged on a call, and the search time for dispatched crews to quickly locate the incident. Traditional wireline services (known also as fixed telephony services) have provided detailed street address information that is accessible from a database using a telephone number as a key. This enables swift dispatch to the address in question with little to no search time in many cases. Emergency calls originating from mobile devices are apt to be provided with coarse-level or no specific caller location information. This slows down the time for dispatch crews to locate the incident and directly adds to the cost of running the emergency service organization as well as raising the potential loss of life or placing the public in danger.

PSAPs may wish to quantify the cost of not having accurate caller location information with each call. This may be done by noting the distribution of mobile to fixed originated emergency calls and the average time it takes to get dispatch crews to each incident. If this information is captured over a range of environments, urban, suburban, and rural the metrics become statistically significant and the cost of less accurate location information can be quantified.

2.7 Hoax calls

Hoax calls from the public can create additional burdens on the PSAP as resources and personnel are assigned to fictitious incidents, preventing them from responding to real and more appropriate events. A PSAP should take action by engaging in public awareness and educational campaigns to highlight this problem to citizens.

For repeat offenders, numbers may be 'gray listed' to indicate to the call taker, previous hoax events but this is very much dependant on the national legislation that exists to permit such a move and is often only on foot of a decision by the National Police Force. This is not intended to block or deny service, however these calls may be assigned a lower priority than others. This should only be applicable during overload times when routing decisions must be made.

3 Conclusion

The costs incurred by a PSAP provider can be decomposed into several types of costs: operators, management, non pay, fixed assets depreciation and financial costs. These costs can then be further split and compared to benchmarks done on similar services / positions in the same country or on PSAP providers of other countries. When possible, using a local benchmark should be preferred over an international one, which does not take into account local specificities (wages,



socials charges, legal constraints, etc...). On the other hand, for aspects specific to PSAP, which cannot be compared to other local services, an international benchmark is a good alternative.



4 EENA recommendations

Stakeholders	Actions
<i>European Authorities</i>	<i>Create a database to compare similar efficient and effective call handling platform costs in particular and more generally all types of costs</i>
<i>National Government/ Regional Authorities</i>	<i>Assess and benchmark the costs incurred to provide the PSAP with similar local costs</i>
<i>Emergency services</i>	<p><i>Keep the number of call centers low, in order to lower the costs but without affecting resilience and performance.</i></p> <p><i>Subcontracting and tendering (for network services, premises, operators, etc...) may provide "best value for money" however ongoing benchmarking of the costs is required;</i></p> <p><i>Undertake routine efficiency tests on staffing levels and eliminate any unwanted costs.</i></p>

5 EENA Requirements

Requirements	
Detailed study of costs	Compulsory