



# Calculating the Cost of Transferring one Cubic Meter of NG by Traditional and ABC Methods 6<sup>th</sup> Gas Transmission Operation District

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**Abstract:** Costing system is based on new systems' activity for services and products' costs, which provides better and more accurate information requested from managers and it helps users to make correct and proper decisions. This study is applied and scientific which is done in area 6 of gas transmission operations, and it explains the importance of costing system on the basis of the area activity through analysis of its costing method and identification of strengths and weaknesses, and then ABC system steps have been identified. As the research subject represents, researchers had been looking for determination of Costing system importance based on the activities in area 6 of Iran Gas Transmission Operations and studied its fiscal year (2015), financial statements, financial information and finally they identified the activity as the foundation of ABC system and selected cost stimulus for each activity after determination of the system dominated on organization, its accounting operations flows, major activity centers and logic combination of those activities. Also, researches' results showed that using activity based costing divided major activities in area 6 of gas transmission operations to 13 decibels and to two main processes which are pipelines operations and stations operations and the results showed that the most portion is related to pipelines operations.

**Keywords:** costing, activity, cost, area 6

## INTRODUCTION

Iran, with approximately 17 percent natural gas resources, as the world's second largest gas resource can use this gift truly and plays an appropriate role in the worldwide markets. Undoubtedly, studies about gas industry can be very effective on its technical and scientific development. One of the important and essential subjects seems to be studied is transmitted gas cost to the industry and one of the most important issues is natural gas pricing in economy and society because proper usage and maintenance of Hydrocarbons resources as the future generation right, makes more sensitive the gas pricing at a huge level, and the benefits derived from natural gas pricing will play very important role on gas benefits and national economic benefits in present and future time.

In addition to the competitive conditions, costing techniques based on activity for products or services cost calculation will provide good returns (Khosin, 2006). Scientifically, activity based costing systems identify good relations between costs and essential activities to provide products and services which they make economic added value for company. Therefore, price calculation requires costs allocating to different types of the company products which is called costing process. In other words, costing means identifying and tracking production costs and calculating the costs for products on the basis of related costs. So, if activities are controlled very well, costs will be decreased and consequently the products will have more competitive capability in market.

In strategic plan of Iran Gas Transmission Company, the user transmission is determined as the strategic purpose of the company which indeed its strategic issue is gas transmission price. Therefore, scientifically

ABC system identifies the cause and effect relations between pricing and necessary activities for gas transmission operations which include economic values for gas transmission area 6. This system comes from the belief that services consume activities and activities use resources. In this method, costs are allocated for activities and then these costs are allocated for activities on the basis of using each service of the activities. Also, this system helps managers to make proper decisions about product design or service type, pricing, marketing and determining product combination and it makes continuous operations development possible. A more realistic view of costs due to the system implementation lets managers to have their decision making approaches based on more accurate information which can improve the decisions' quality and nature (Rahnamaye Roudposhti, 2006).

In fact, a system design and implementation with strategic capabilities need 3\_5 years and huge resources which is like resources allocation and it is considered as the other strategic activities in organizations (Arab Maziar Yazdi & Naseri, 1999).

According to various legal requirements affected by government budget regulations and others, which are the main barriers for processing and implementing different management strategies from other non-profit institutes, no similar policies to non-profit institutes and lack of need for certain strategies codification have led to changes in the collection to non-profit institutes with private ownership and one of the important and main theories explained in all researches related to effective factors on accounting systems have been faded out. It means that the role of management strategy factor could be ignored due to no certain strategies for business. In this way, those resources are used for certain activity should be identified to determine activity cost. This method, indeed, is a transmitting and changing process of data to certain output by using special mechanisms on the basis of existing regulations. In other words, activity is considered as a physical or mental process and based on legal duties and approved programs of executive systems to make services for people at a certain time, and costs provided from credit costs could lead to produce certain unit of services or goods and mostly could be measured or quantified. In this way, total cost of activities in a process should be calculated due to determined input price for a process (service or product), and overhead costs should be allocated to them which these costs are separated by activities and with different absorption rate. This method (activity based costing) is a cost accounting method and it is a strong management tool to increase efficiency, effectiveness and organizational productivity.

In this regard, many systems have been given for services and products costing, costs decrease, continuous improvement, performance assessment and finally value increase. Traditional costing systems supported financial reports costs by using several stimulus and gave fake information. One of new methods, activity based costing system which would be studied in this research, includes more remarkable merits than traditional costing method based on volume. This type of costing (activity based) could be considered as the improved method of two-step cost allocation which is the base for new industrial costing systems, product cost calculation and product sale pricing. Correct price calculation for product, production process improvement, redundant activities elimination, cost stimulus recognition, administrative activity recognition, added value, non-value activities elimination, operations planning, determination of economic commercial approach, and correct assessment of performance need information that provide activity based costing much better than traditional accounting management systems (Khosin, 2007). In gas industry, because overhead costs include the main portion of total costs of products, due to strong reliance of this industry on technology and investment and also considering that Iran Gas Transmission Company uses the traditional method for overhead costs allocation, it seems that activity based costing method can provide better products costing, useful and accurate information for management assessment and effectiveness.

## **Methodology**

The research method is analytical-descriptive. Iran Gas Transmission Company has been studied as a case for the research and gas transmission operations in area 6 were selected as the sample. Basic information of documents in the area and a part of financial reports and information from gas transmission staff have been used to collect data. This study calculated total price of one square meter gas transmission in fiscal year, 2015.

## **Results**

As it is observed in Table 1, the results between these two methods of costing, traditional and activity based, are different. Such a difference is due to changes on the basis of overhead costs allocation for products.

In Table 2, overhead rate of gas transmission price has been compared with both traditional and activity based costing methods. One reason for the difference in overhead rate between both methods is that traditional method considers some costs as period costs.

Table 1; Comparisons of gas transmission cost in TC and ABC (Rial)

Product	Unit	TC	ABC
Gas Transmission services	square meter	255	280

As the above table shows, there is significant difference between traditional costing method and activity based costing method for total cost. In order to study differences, total cost factors have been compared for both methods.

Table 2; Comparison of cost per unit of product in TC and ABC (Rial)

Factors	TC	ABC	Differences
direct wage	80/381/554/217	70/981/080/764	9/400/473/453
Overhead	2/797/931/648/584	3/084/002/684/820	-286/071/036/236
total	2/878/313/202/801	3/154/983/765/584	-276/670/562/783

Many studies (about gas transmission) use method of transmission calculation for 1 inch per kilometers to compare transmission lines network efficiency. Therefore, the following formula can be used for cost calculation on the basis of 1-inch kilometer to compare several companies in terms of cost. The above method advantage is network length difference elimination and determination of a more accurate criteria for making comparisons.

$$\text{Transmission cost for one-inch kilometer} = \frac{\text{Cost}}{1 \times \text{Inch Kilometer}}$$

Table 3; Comparisons of gas transmission cost in TC and ABC methods based on inch kilometer

Description	TC	ABC
Gas Transmission price( Rial)	2/878/313/202/801	3/154983/765/584
inch kilometer length	78464.782	78464.782
Gas transmission price based on inch kilometer( Rial)	36/682/867	40/208/915

The reasons for cost factors in TC and ABC methods

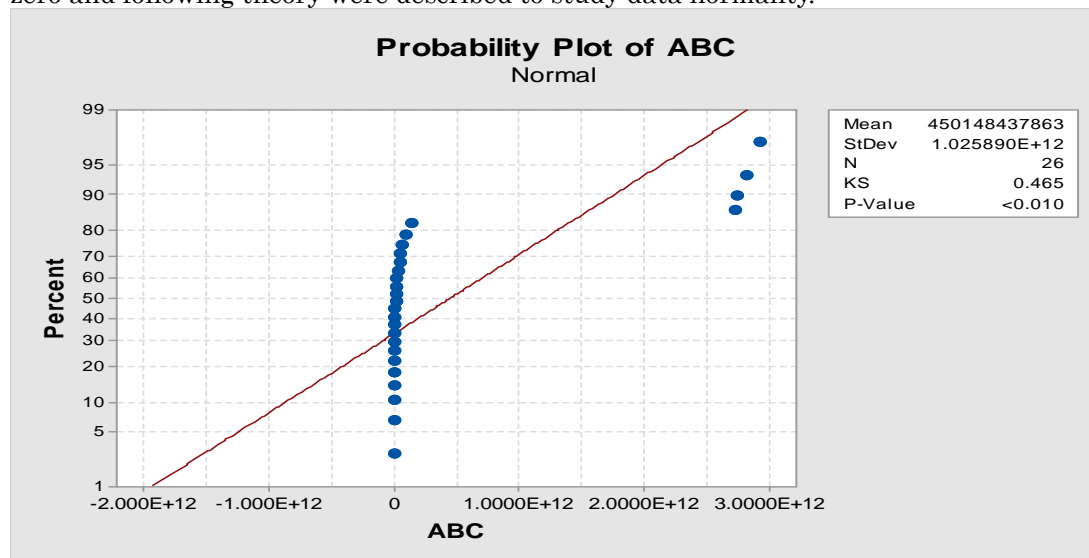
In order to calculate gas transmission price in Iran Gas Transmission Company (area 6), total cost of gas transmission was calculated and then gas transmission price was allocated.

Table 4. The cost of activity centers in area 6 for gas transmission operations.

activity	Amount ( Rial)	% Of total	Integration percent
Maintenance Facility	89,019,764,771	2.8%	2.8%
Repair and maintenance of pipelines	2,735,797,686,318	806.7%	89.5%
Coordination and monitoring of gas transit	5,926,355,656	0.2%	89.7%
Protection	45,413,291,445	1.4%	91.2%
Estate	12,099,442,504	0.4%	91.5%
Safety and Fire	9,116,535,956	0.3%	91.8%
Administrative Affairs	140,906,005,973	4.5%	96.3%

Of the product	6,814,509,830	0.2%	96.5%
Checkup	3,938,921,604	0.1%	96.6%
Transportation	50,525,171,287	1.6%	98.2%
Communications and technology information.	10,281,093,902	0.3%	98.6%
Technical Services	17,393,503,959	0.6%	99.1%
Public Service	27,751,482,379	0.9%	100.0%
Total	3,154,983,765,584	100%	100%

In order to study research theories, first data normality was examined with Kolmogorov-Smirnov test. Theory zero and following theory were described to study data normality.



Because Kolmogorov-Smirnov test result ( $p$  value=0/01) was less than alpha error level ( $= 0/05$ ), so theory zero was not approved and it showed that there was no normal distribution among data. Therefore, no parametric test (kruskal-wallis) was used to study the significant statistical difference between ABC and traditional costing methods. Theory zero was rejected, due to  $p < 0/1$ , and it showed the significant statistical difference between ABC and traditional costing methods.

ABC	TC	P value	a
280	255	0/069	0/1

## Discussion

Major disadvantages for traditional method are:

- No correct allocation for price of main process in gas transmission
- No correct identification of direct wage

In traditional costing method, total cost of wages for operational sections would be collected and shared as the price and no attention have been taken for cause and effect relations in processes and direct wage. According to some studies, those staff who have roles directly in operations, were different from those who worked for single tasks (with close role to operational units); therefore, different sharing must be allocated from direct wage. It was not regarded in TC method, and it made product price unreal.

According to the mentioned cases and TC method disadvantages to calculate total price for gas transmission company, area 6, first costs tracking structure for total price was corrected on the basis of ABC theories, then eight steps of ABC method were used to share overhead costs, which it improved product costing and

consequently provided accurate and relevant information for managers' decision making.

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