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Gas Rate Fundamentals

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Excerpt

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GAS RATE FUNDAMENTALS

Fourth Edition
1987

American Gas Association Rate Committee
1515 Wilson Boulevard, Arlington, VA 22209

associated expenses of this lateral should be assigned directly to the industrial class.

REARRANGING COSTS INTO FUNCTIONAL GROUPS

Although the system of accounts generally follows functional groups, a cost allocation study will require rearranging many costs into functional groups that are more descriptive of their origin. Such groups combine costs incurred for a similar purpose. A relatively small number of groups – 20 to 30 – is often adequate (see Table 7-4). Thus, each functional group can be treated as a unit in the assignment to the cost components.

ALLOCATION FACTORS

With all of the costs assigned to the major cost components, the next step is to determine suitable allocation factors. These are used to apportion the major cost components to classes of service. For gas utility operations, the three basic allocators are capacity, commodity, and customer, as explained earlier in this chapter. The allocation of the commodity and customer components poses no real problem because the quantities are the sum of the class totals. Capacity cost allocations, however, are more difficult because of the difference in demands of the various groups and their relation to the system demand and capacity. Nevertheless, three capacity cost allocation methods have received considerable attention: coincident demand, noncoincident demand, and average and excess demand, as described below.

Coincident Demand (CP)

The CP method, also called peak responsibility, allocates capacity-related costs based on the demands of the various classes of service at the time of the system peak. The rationale for the CP method is that the utility's costs associated with its maximum load should be divided among the customers causing that peak. The magnitude of those customers' demands at other times of the day, month or year or the length of those demands is not a consideration. Under this method, the "allocator" for capacity costs is the ratio of the demand of the various classes of service at the time of the system peak to the total demand at that time. An example is shown in Table 7-5.

Thus, the residential and industrial classes would each bear 40 percent of the capacity costs, commercial customers would bear 20 percent, and the interruptible class would not be allocated any of the capacity costs. The CP method has the following characteristics:

TABLE 7-4
Cost of Service Study
Functional Service Levels

Item	Demand	Classification with Allocation Methods			
		Commodity	Customer	Specific	Revenue
Production & Gas Supply					
1. Gas Supply	CP	Mcf or Therms			
2. Storage	CP	Seasonal Mcf or Th			
3. Liquefied Nat Gas	CP	Seasonal Mcf or Th			
4. Propane	CP	Seasonal Mcf or Th			
Transmission					
5. Compressor Stations	CP	Mcf or Th		Spec Assign	
6. Mains	CP	Mcf or Th		Spec Assign	
7. Regulatory Stations	CP	Mcf or Th	Spec Assign		
Distribution					
8. Compressor Stations	NCP				
9. Mains	NCP		No. of Cust.	Spec Assign	
10. M&R Stations	NCP		No. of Cust.	Spec Assign	
11. Services	NCP		No. of Cust.		
12. Meter & Install			Wgt. Cust		
13. House Reg & Install			Wgt. Cust		
14. Imd M&R Stations				Spec Assign	
15. Cust. Install				Spec Assign	
Other					
16. Customer Accts			Wgt. Cust		
17. Sales Expense			Wgt. Cust		
Revenue					
18. Revenue from Sales					Revenue
19. Revenue Taxes					Revenue

TABLE 7–5
Cost Allocation by Coincident Demand

Class of Service	Demand at Time of System Peak (Mcf/Day)	Ratio to System Peak
Residential	4,000	0.40
Commercial	2,000	0.20
Industrial	4,000	0.40
Interruptible	–	0.00
Total (System Peak)	10,000	1.00

- It may produce radically different results if the time of the system peak shifts.
- It requires a determination of class demands at the time of the system or sub-system peaks.
- It may require a load study.
- It allocates no capacity costs to off-peak or curtailed customers, as illustrated by the interruptible class in Table 7–5. The CP allocation may be appropriate if off-peak operations result from control by the customer or the utility, as in the case of interruptible service, or if off-peak use stems from natural characteristics as, for example, air conditioning.

Noncoincident Demand (NCP)

This method, also called class demand, is based on the maximum demands of the individual classes of service regardless of when those demands occur. Under the NCP method, the effects of diversity are apportioned in equal proportions to each class. Thus, the allocator for capacity costs is the ratio of each of the class maximum demands to the sum of all the class maximum demands irrespective of time of occurrence. An illustration is shown in Table 7–6.

Each class pays part of the total capacity costs. Under the NCP method, this includes the interruptible class, which bore no capacity costs under the peak responsibility method. The NCP method has the following characteristics:

- It assumes that the cost of joint facilities to serve the various classes should be allocated in proportion to the facilities necessary to serve each class as though it were served alone.
- It is not affected by shifts in the time of maximum class demands.

- It allocates costs to all groups of customers whether or not they create any demand at the time of the system peak. For this reason, the NCP method is inappropriate for incremental cost studies.
- It leads some analysts to contend that interruptible customers are charged for "too much" capacity because the capacity used by them is that "released" by others. Whether an interruptible customer should receive less than its proportional share of capacity costs or even no capacity costs depends on the *philosophy* of the cost analyst.

Average and Excess Demand Method (A&E)

Under the A&E method, also called "used and unused capacity," capacity costs are allocated by a two-part formula.[1] It recognizes both the average use of capacity and responsibility for the capacity required to meet the maximum system load. Used capacity costs are calculated by multiplying total capacity costs by the system load factor. These costs are allocated to the various classes in proportion to their respective use (Mcf sold). System load factor is the ratio, expressed as a percent, of used capacity (Mcf sold) to total capacity. The remainder of the capacity costs represent the costs associated with the unused portion of capacity (i.e., that portion above *average* requirements). These costs

TABLE 7-6
Cost Allocation by Non-Coincident Demand

Class of Service	Maximum Class Demand (Mcf/Day)	Ratio to Sum of Class Demands
Residential	4,500	0.375
Commercial	2,700	0.225
Industrial	4,000	0.333
Interruptible	800	0.067
Total (Non-Coincident)	12,000	1.000

[1] "Used capacity" is the minimum capacity needed to deliver the total gas used. Hence, it is numerically equal to the average deliveries. "Unused capacity" is the difference between average (used) capacity and peak capacity. Used, unused, or peak capacity may be expressed in terms of hours, days, year, or any other period. Peak capacity is usually expressed in terms of the peak hour or day.

are allocated to the various classes in the ratio that the individual group demands, in *excess* of used demands, bear to the summation of such excess demands. A simplified example is shown in Table 7–7.

Use of the A & E method has the following effects:

- Shifts in the time of the system peak do not greatly affect the cost allocations.
- The allocation of unused capacity is similar to the non coincident demand method except that it is applied only to the excess of class demands above the average.
- The load factor of the various classes is recognized.

Two additional cost-allocation approaches deserve discussion: the Seaboard and United methods. While generally referred to as allocation methods, they are really cost classification methods. These two approaches have been used in FERC proceedings involving pipeline cost allocation studies. Recent FERC decisions, however, have moved towards a modified fixed-variable approach, which will be discussed later. Some analysts argue that such cost allocation methods are actually pricing mechanisms.

The Seaboard method assigns 50 percent of the fixed (demand) costs to the commodity classification and the other 50 percent to the demand classification. These costs are allocated to the various classes by the appropriate demand and commodity-allocation factors. The Seaboard method shifts capacity-related costs from classes with lower load factors (e.g., seasonal heating requirements) to classes with a more uniform or stable year-round (i.e., higher) load factor.

The United method (sometimes called the "Modified Seaboard" method) assigns 75 percent of the fixed costs to the commodity classification and the rest to the demand classification. Again, capacity-related costs are shifted from low to high load factor customers. Cost causation is not the rationale.

In recent FERC proceedings, the modified fixed-variable approach has been used. This allocation method permits all fixed costs to be classified in the demand component, except for return on equity and associated taxes. These are placed in the commodity component. Then the demand costs are allocated 50 percent on the basis of historical Average Peak Day and 50 percent on the customer's Annual Volume.

ALLOCATION OF SPECIAL COSTS

Taxes

Taxes are levied by federal, state, and local authorities. Taxes can be classified on the basis of assessment (i.e., income, revenue, property,

TABLE 7-7
Cost Allocation by Average and Excess Demand

Class of Service	Annual Use (Mcf)	System Peak (Mcf/Day)	Class Max Demand (Mcf/Day)
	(1)	(2)	(3)
Residential	365,000	N/A	3,000
Commercial	182,500	N/A	1,250
Industrial	146,000	N/A	1,100
Interruptible	219,000	N/A	3,000
Total	912,500	4,167	8,350

Class of Service	Class Max Demand (Mcf/Day)	Average Demand (Mcf/Day)	Process Demand Alloc. Basis (Mcf/Day)
	(4)	(5)	(6)
Residential	3,000	1,000	2,000
Commercial	1,250	500	750
Industrial	1,100	400	700
Interruptible	3,000	600	2,400
Total	8,350	2,500	5,850

Class of Service	Average Demand (Mcf/Day)	Excess Demand (Mcf/Day)	A & E Demand (Mcf/Day)
	(7)	(8)	(9)
Residential	1,000	570	1,570
Commercial	500	214	714
Industrial	400	199	599
Interruptible	600	684	1,284
Total	2,500	1,667	4,167

Column

1: Total annual consumption by class. This is equivalent to the commodity allocation factor.
2: Actual (estimated) peak day(s) demands of the system. The individual class values are not shown because they are not used in the calculation.
3: The sum of the individual class maximum demands (class NCP). Each class maximum demand may occur at a different time.
4: The sum of the individual class maximum demands (class NCP). Each class maximum demand may occur at a different time.
5: Calculated by dividing each element in Column 1 by 365 days.
6: Column 4 less Column 5.
7: Calculated by dividing each element in Column 1 by 365 days.
8: Calculated by multiplying the ratio of each to the total in Column 6 times the system excess demand. The system excess demand is defined as the system peak less the total system average demand. For example:

System excess demand would be

$$4{,}167 \text{ less } 2{,}500 = 1{,}667$$

Residential class excess demand would be

$$\frac{2{,}000}{5{,}850} \times 1{,}667 = 570$$

9: Sum of Column 7 and Column 8.