

Demand, supply, and price outlook for low-sulfur diesel fuel



In this article the author has discussed the implications of the Clean Air Act Amendments of 1990 (CAAA90) on the demand - supply dynamics and price of low sulfur diesel, which was to become the mandatory fuel for on-highway vehicles. This Act (CAAA90) was in response to the emission norms which were to become more stringent from 1994 onwards. There could have been two options - to design new diesel engines, which will comply to the emission norms with existing fuels or to make the fuel quality specifications more stringent so that existing diesel engines could comply with the emission norms.

Either of the two options requires increased capital expenditure, of course in different sectors of economy. The CAAA90 eases the life of diesel manufacturers and makes life of refiners tough by putting stringent quality norms on the on-highway diesel. The Act requires that maximum sulfur content in the on-highway diesel fuel from October 1, 1993 onwards to be 0.05% well below the current level (average ~ 0.3%). The author has briefly discussed the current and projected demand pattern of different kinds of Distilled Fuel Oil.

The distilled fuel oil is of two kinds - diesel fuel and heating oil. Of the total distillate fuel oil consumption, approximately 46% is on-highway diesel fuel. In 1991, total distillate fuel production was ~ 3.0 million barrels per day and 15% of this (~0.45 million barrels per day) already meets the 0.05% sulfur content norm. Demand of the on-highway fuel has grown at 4.1% per annum in 1980s and was expected to grow at the rate of 1.3% per annum in the long term.

This is because, the truck transportation is very closely linked to the growth in economic activities and has a positive correlation. Proportion of the diesel fuel in total distillate has grown from ~38% in 1984 to ~46% in 1991. Diesel represented 54% of the total energy consumption of trucks in 1989 and this proportion is also expected to grow to ~63% by 2010. This growth is due to the fact that fuel efficiency of diesel engine shows slower gains as compared to that of gasoline engine.

The fuel efficiency of the diesel engines is expected to improve by ~11% in the time period from 1990 to 2010. Now let us discuss the supply side of the distillate. The quality norms for the heating oil and on-highway diesel were very similar till 1993. Therefore, majority of the refiners were producing a distillate that served the dual purpose of being used as on-highway fuel as well as heating oil. Even if they had distillate streams of low sulfur content and high sulfur content; they mixed the two to get a distillate that was acceptable for both applications.

This saved the cost that would be needed to maintain separate inventory for low and high sulfur distillate and also on separate transportation and marketing. But to comply with the CAAA90 they need to maintain separate inventory for the two kinds of distillates. For this they need to install additional facilities. Besides, the current production of the low sulfur diesel in 1991 was approximately one third of what is required to comply with the CAAA90 norms. Therefore, the refiners needed to produce more of low sulfur diesel to meet the demand of on-highway diesel post enforcement of CAAA90.

For this capital expenditure will be required to install fresh fuel distillation facilities capable of producing low sulfur diesel. Low sulfur diesel can as well be produced in existing catalytic hydrotreating units; but these units will be required to be operated with better catalysts and under severe conditions of temperature, pressure, space velocity and hydrogen to oil ratio. This increased severity of the catalytic hydrotreating unit will increase the operating cost of production of low sulfur fuel.

Installation of new catalytic hydrotreating units will require fresh capital expenditure. Refiners may resort to blending low sulfur distillates like kerosene for on-highway diesel fuel. This will also add to the cost. Besides, low sulfur distillate may as well be imported. Some refiners may find that the producing low sulfur diesel fuel is not economic for them and thus they may choose to produce only other kinds of distillates, while others may choose to go for low sulfur diesel.

Thus the heating oil and on-highway diesel markets will be separated from each - other. It has been estimated in different studies that additional cost of production of low - sulfur diesel is 1.2 to 7.0 cents per gallon. The fixed cost component is estimated to be 2 to 3 cents and the variable cost component to be ~ 1 cent. Thus the low sulfur diesel will command a premium of approximately 4 cents per gallon over the heating oil. The author has also discussed the seasonality of the diesel prices.

Even though demand of diesel is maximum in summer, its prices are maximum in winter, when demand of the heating oil is maximum. This is simply because of the similarity of the two products so far. However, with the quality standards of the two fuels getting widely separated; the prices of the <https://assignbuster.com/demand-supply-and-price-outlook-for-low-sulfur-diesel-fuel/>

two products are expected to get de linked from each - other. It can be summarized that the CAAA90 will lead to separation of the low sulfur and high sulfur distillate fuel and will result in premium pricing of the low sulfur diesel over the high sulfur distillate (heating oil).