

ABSTRAK

Jumlah base transceiver station (BTS) semakin meningkat dari tahun ketahun berbanding lurus dengan tingkat permintaan konsumen yang harus dilayani oleh pengguna jasa telekomunikasi. Kota Semarang adalah kota ATLAS sebagai kota terbesar ke-5 di Indonesia. Hal tersebut menyebabkan tingkat kebutuhan penggunaan telepon seluler yang sangat tinggi. Saat ini tercatat 185 tower berdiri di kota Semarang yang digunakan 4 operator seluler GSM untuk dapat menjangkau permintaan konsumen. Banyaknya BTS mengakibatkan kota menjadi hutan tower yang menjulang tinggi yang tentunya merusak keindahan kota. Hal ini terjadi karena operator-operator jaringan masih mendirikan tower-towernya masing-masing. Selain itu pemerintah telah mengeluarkan peraturan untuk menata menara telekomunikasi diantaranya adalah Peraturan Bersama Menteri Dalam Negeri, Menteri Pekerjaan Umum, Menteri Kominfo dan Kepala BKPM tentang Pedoman Pembangunan dan Penggunaan Bersama Menara Telekomunikasi dan Peraturan Pemerintah Kota Semarang telah menerbitkan Peraturan Walikota No 8 Tahun 2007 tentang tata cara penyelenggaraan penataan menara telekomunikasi bersama di kota semarang. Oleh karena itu, dengan penggunaan BTS secara bersama-sama akan memberikan penghematan biaya operasional yang harus dikeluarkan operator seluler, dan dapat menjaga nilai estetika kota Semarang..

Tujuan yang ingin dicapai dalam penelitian ini adalah untuk mengevaluasi titik-titik BTS existing saat ini untuk dapat memperoleh titik-titik optimum lokasi BTS bersama di kota semarang yang dapat mencover seluruh permintaan pelanggan seluler di Kota Semarang. Penelitian ini akan menggunakan metode set covering problem (SCP). Metode ini bertujuan untuk menentukan jumlah minimal fasilitas dan menentukan lokasi agar setiap permintaan dapat dipenuhi oleh minimal satu fasilitas. Metode ini menggunakan algoritma integer biner, dimana hasil yang didapatkan berupa bilangan biner (0 atau 1).

Terdapat 279 titik yang menjadi titik-titik pusat permintaan pelanggan operator seluler yang ada dikota Semarang yang dilayani oleh 185 BTS saat ini. Dengan menggunakan model set covering problem ditemukan jumlah optimal yang dapat digunakan sebagai BTS Bersama yakni sebanyak 62 BTS. Penurunan jumlah tersebut bersamaan dengan penghematan biaya operasional sebesar Rp 462.627.600.000 dari biaya awal sebesar Rp 695.822.000.000 menjadi Rp 233.194.400.000, atau turun sebanyak 66,49%.

Kata kunci : *BTS Bersama, Set Covering Problem, Penentuan Lokasi*

ABSTRACT

The number of *base transceiver stations* (BTS) is increasing directly from year to year which is proportional to the consumer demand level that must be served by the telecommunication users. Semarang is the ATLAS city which is the 5th largest city in Indonesia. It causes the need of cell phone usage level so high. Currently, there are 185 tower stands in Semarang city which uses four GSM mobile operators to be able to reach the consumers demand. The number of BTS makes city like forest of tower and certainly bother the beauty of city. It is because of the network operators are still erect their own tower each other. In fact, to see the type of cell phone towers appearance, one of them is the BTS type *field gren-4-legged super heavy duty*. This tower type is 32 to 72 meters high and this tower can accommodate five mobile operators. In addition, government has issued a regulation to manage the telecommunication towers. It included the Regulation of Interior Minister, Minister of Public Work, Minister of Communication and Information Technology and Head of BKPM on Guidelines for Development and Use of Telecommunication Tower in the No. 18 of 2009, No. 07 / PRT / M / 2009, No. 19 / PER / M.KOMINFO / 3/2009 and No. 3 / P / 2009. This Regulation confirms the obligation of several mobile network operators employing tower collectively. In addition of above rules, the Mayor of Semarang City has issued No. 8 of 2007 Regulation which is the procedure for the structure organization telecommunication towers collectively in Semarang city. Therefore, the usage of BTS collectively will provide operational cost savings to be incurred mobile operators and can maintain the aesthetic value of Semarang city. So, it seems need an investigation of how to select the optimal location to build the stations which can be used together but still *covered* all area of customers demand.

The aim of this study is to evaluate the *existing* BTS points at this time in order to obtain an optimum locations of BTS in Semarang city which can *cover* entire cellular customers demand. This study will use the method *set covering problem* (SCP). This method aims to determine the minimum number of facilities and determine the location. So that each demand can be met at least one facility. This method uses algorithms *integer binary*, where the results obtained in the form of a binary number (0 or 1). The SCP method is used, because it is able to cover the facility required more than two regions. Facilities referred in this study is BTS, with SCP method the amount of BTS can be determined based on distance and number of requests in Semarang city. So that researcher can provide recommendation to determine the policy of BTS establishment in Semarang City.

There are 279 points that became the points of customer demand for existing cellular operator in Semarang city which served by BTS 185 at this time. By use of *model set covering problem* found the optimal amount which could be used as BTS collectively, namely 62 BTS. The decline its number makes savings cost amount 462.627.600.000 Rupiah which is from the beginning cost 695.822.000.000 Rupiah to 233.194.400.000 Rupiah or down as much as 66.49%.

Keywords: BTS *Collectively*, *Set Covering Problem*, Determining of Location