



# TOWER AS A SERVICE

SUBSCRIPTION BASED  
TURNKEY SOLUTION

New SLIMLINE tower concept

- Choose location
- Lower costs
- Quick set-up

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# REDUCE THE COSTS

## - AND GET GREATER FLEXIBILITY WITH CIBICOM'S NEW TOWER CONCEPT

*The increased consumption of communication in society requires quick construction of towers easily and cost-effectively, and in places, fulfilling customers requirements and needs - without having to set up their own tower.*

*Cibicom can provide services that are relevant to the solution. You save in terms of time and investment and simply designate a specific location in which you want to obtain coverage.*

With Cibicom's Tower as a Service (TaaS), you can rent tower locations and obtain services on attractive conditions that can be adapted to your needs.

And you can have your own equipment installed, for example, antennas, BTS, and any links or data connections you require.

Cibicom has developed a new tower concept, which among other things reduces the time spent setting up new towers. With the Slimline Tower concept, Cibicom offers coordination of the entire process from site acquisition, building application, planning, creation of the foundation and setting up of the tower to the establishment of a transmission connection and connection to the electricity supply. We build the complete telecommunications installation from A-Z for you and provide documentation according to your requirements and wishes.

We take care of the geotechnical surveys and static calculations and ensure that all necessary approvals and agreements are in place with both the authorities and land owners.

The process has been optimized in every aspect so you can quickly put new locations into operation. Cibicom's TaaS tower solution makes it simple, provides an overview and offers reassurance when you need coverage in new geographical areas.

### FACTS ABOUT THE TOWERS:

- Developed in cooperation with Ramboll.
- Flexible and quick foundation solution: Steel pipe base foundation that is driven down into the ground – requires no excavation or removal of soil from the site (for masts with a maximum height of 42 meters).
- Modular design of towers at heights from 18 meters to 48 meters.
- Slim tower design with minimal environmental impact on the surroundings.
- Strong modular construction - a minimum of 15 m<sup>2</sup> wind load at the top 9 meters.
- Vertical sections at the top 18 meters at least to ensure easy antenna mounting without the need for additional brackets.
- Standard circular steel pipe size is used in the design to ensure shorter delivery times and where production is not dependent on a single manufacturer.



# CIBICOM TAKES FULL VALUE CHAIN RESPONSIBILITY

## END-TO-END TOWER TURNKEY SOLUTION

- including site hunting, building application, tower erection, and antenna installation in one package

### STEP 01

#### Customer:

- Points out wanted tower location
- Specifies demand for the final solution



### STEP 02

#### Cibicom:



##### Site hunting

- Site identification
- Negotiation of price with land owners
- Building permit application

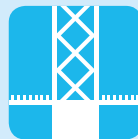
3-12 months



##### Survey / Geo-report

- Inspection of soil composition
- Foundation dimensioning
- Detailed project plan

2-3 weeks



##### Foundation

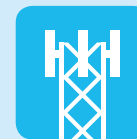
- Sourcing of steel pipes and tower modules
- Foundation construction

1 day  
(30 days if concrete)



##### Tower Erection

- Site preparation
- Tower erection
- Site re-establishment



##### Antenna Installation

- Installation of antennas on new tower

2-4 days



##### Final Connection

- Connecting of equipment in tower
- Installation of equipment shelter

+ Value-added services (power, UPS, backhaul, FLM, etc.)

### STEP 03

#### Customer:

- Receives turnkey solution based on subscription (tower rental)



# SERVICES

## CIBICOM'S FACILITIES AND PREMISES

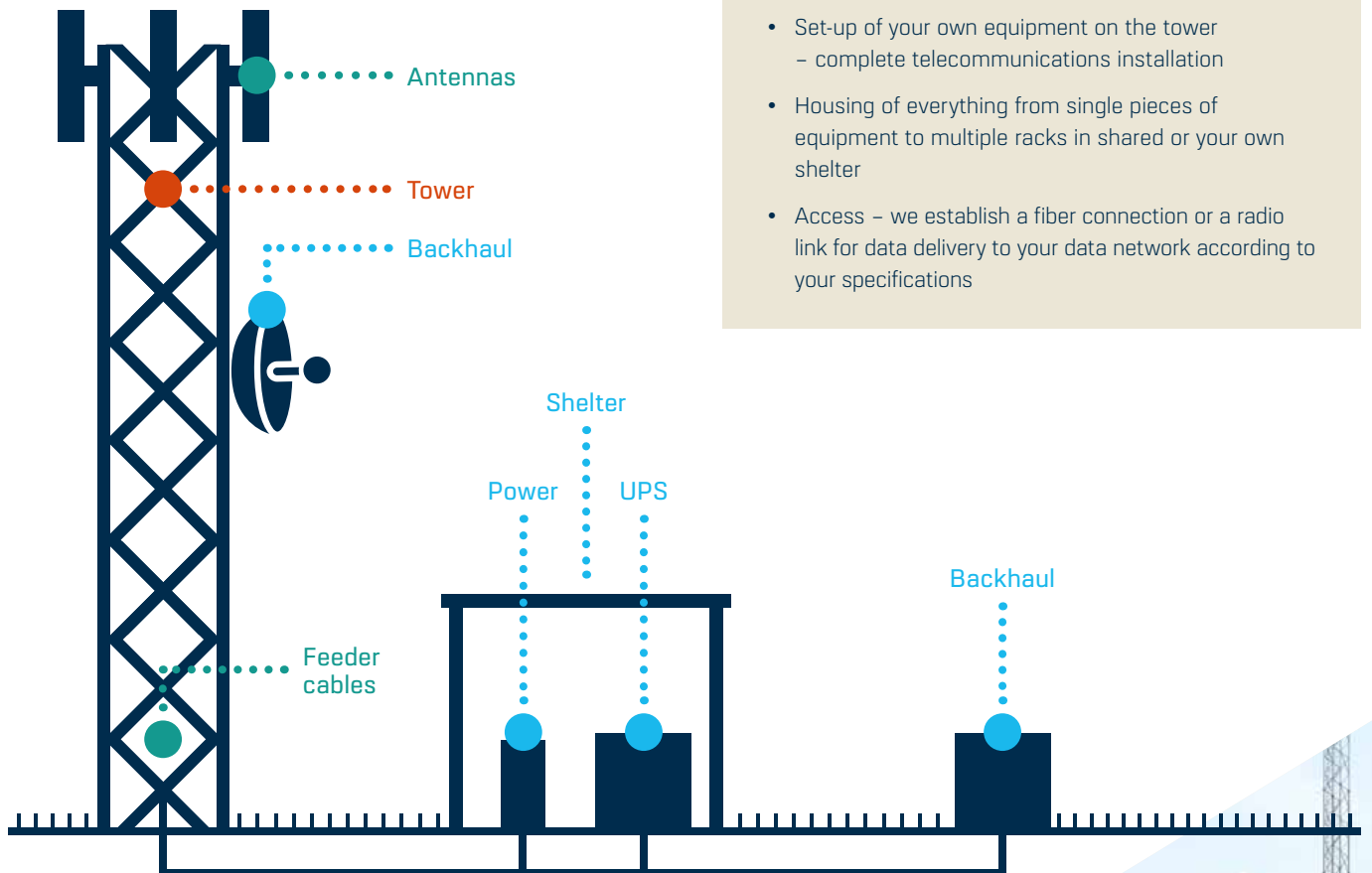
A prerequisite for optimal functioning of the communication network is the location of the equipment in a physically reliable environment.

Cibicom's systems, and those we continuously construct, meet stringent requirements relating to both buildings and installations. All of our technicians are certified, which is the customer's guarantee of high quality and safety.

The systems are administered by Cibicom's own service organization, whose solid knowledge and rapid response ensures the operational management of the system. The systems are also linked together via Cibicom's nationwide fiber network, which is optimal for both primary and secondary connections.

### OPTIONS:

- Connection to electrical supply – we take care of:
  - 230/400 V AC mains power line, connection and power meter Stands
  - 48 V DC back-up power supply
- Set-up of your own equipment on the tower
  - complete telecommunications installation
- Housing of everything from single pieces of equipment to multiple racks in shared or your own shelter
- Access – we establish a fiber connection or a radio link for data delivery to your data network according to your specifications



- = Tower
- = Options/customers own equipment
- = Customer equipment





# TECHNICAL DESIGN

## MAIN GEOMETRY:

- 4-legged
- Lattice greenfield towers series 18 meters to 48 meters
- Modular system to achieve various heights
- Straight lattice section in full heights up to 42 meters
- Section length of 6 meters
- Base width 1,31 meters for all tower heights up to 42 meters

## DESIGN STANDARDS:

- EN 1990: Eurocode 0
- EN 1991-1-4: Eurocode 1
- EN 1993-1-1: Eurocode 3
- EN 1993-1-8: Eurocode 3
- EN 1993-3-1: Eurocode 3

incl. all Danish corresponding national annexes

## DESIGN CRITERIA:

- Design wind speed: 24 m/s
- Antenna load (EPA): 15 m<sup>2</sup> on the top 9 meters
- Rotation: 2 deg. at operational wind
- Wind return period: 50 years
- Terrain category: II

## MATERIAL AND SURFACE TREATMENT:

- Execution class C2
- Tubes S355J2 ref. EN 10025-2
- Secondary steel: S235J2 ref. EN 10025-2
- Bolts: 8.8 according to ISO 4014/4017
- Hot-dip Galvanized according to ISO 1461

## FOUNDATION PRINCIPLES:

- Steel foundation pile
- Fast installation with less space requirement
- No excavation, no concrete
- No waiting time for concrete curing
- Foundation depth determine as per soil condition
- Installation method: pile-driving
- Concrete if steel pipe foundation is not possible





## DESIGN LOADS

The Slimline Tower series including the foundation are calculated for an EPA of 15 m<sup>2</sup> distributed over top 9 m, with a feeder EPA of 0,6 m<sup>2</sup>/m. In the table below, this is listed in the row called "standard load".

Since the tower series is one family, the 42 m is designed to be fully utilized for the 15m<sup>2</sup> loading. Hence, the lower heights can obtain additional loads in the top 9 m. The total load that can be taken by the lower heights is also listed in the table below – in the row "Max load".

In the table, a maximal load in top 9 m is also given for when the feeder load is reduced to 0,3 m<sup>2</sup>/m [feederless].

Height	18 m [m <sup>2</sup> ]	24 m [m <sup>2</sup> ]	30 m [m <sup>2</sup> ]	36 m [m <sup>2</sup> ]	42 m [m <sup>2</sup> ]	48 m [m <sup>2</sup> ]*
Standard load	15	15	15	15	15	15
Max load	25	22	20	18	15	15
Max load 0,3 m <sup>2</sup> /feederless	26	23	21	19	18	17

\* The 48 tower consists of the same top 18 meters as the slimline, but with an inclined base from 0 to 30 m, hence not a part of the slimline tower series.