

Today, many electric distribution system planners in the industry utilize computer programs, usually based on ad hoc techniques, such as load flow programs, radial or loop load flow programs, short-circuit and fault-current calculation programs, voltage drop calculation programs, and total system impedance calculation programs, as well as other tools such as load forecasting, voltage regulation, regulator setting, capacitor planning, reliability, and optimal siting and sizing algorithms. The acceptability criteria, representing the company's policies, obligations to the consumers, and additional constraints, in general, the use of the aforementioned tools and their bearing on the system design is based purely on the discretion of the planner and overall company operating policy. The distribution system loads, in turn, determine the size and location (siting) of the substations as well as the route and capacity of the associated subtransmission lines. Nevertheless, there is no substitute for engineering judgment based on adequate planning at every stage of the development of power systems, regardless of how calculations are made. As the diagram shows, the planning procedure consists of four major activities: load forecasting, distribution system configuration design, substation expansion, and substation site selection. The distribution transformer loads are then combined to determine the demands on the primary distribution system. The primary distribution system loads are then assigned to substations that step down from subtransmission voltage. Of course, the computers do perform calculations more expeditiously than other methods and free the distribution engineer from detailed work. Configuration design starts at the customer level.