- 99.99 per cent availability on private line circuits and 99.7 per cent availability on Transparent LAN Services and Internet Transit Services;
- Four-hour mean-time to repair; and
- 24/7 monitoring for immediate response and reliability.

Hydro One runs an integrated technology management centre (ITMC) and network operation centre (NOC) north of Toronto which provides service under contract to other local hydro utilities throughout the region. Hydro One Telecom has selected **Telcordia Network Engineer** to provide geospatial network management for the company's fibre-optic network.

Hydro One Networks Inc. also obtains telecom network services on a wholesale basis from **Cap Gemini Ernst & Young Canada Inc.** which won a C$1-billion, 10-year outsourcing contract from Hydro in February 2002. That contract underscores the dual threat to established telecom players posed by both hydro telcos and system integration outsourcers.

Hydro One boasts partnerships with numerous regional utility service providers – including Telecom Ottawa, Toronto Hydro Telecom, Enersource Telecom, the *FibreWired* and *Fibretech* consortia and wireless broadband provider **MIPPS**. A partnership with Telergy Inc. of Syracuse, N.Y. – now owned by **Dominion Telecom Inc**., an affiliate of U.S. energy giant **Dominion Resources Inc**. of Richmond, Va. – provides cross-border broadband links to Montreal and to Buffalo, N.Y.

Toronto Hydro Telecom

Toronto Hydro Telecom Inc., a wholly-owned subsidiary of **Toronto Hydro Corp.**, was established in 1994 as a division of the municipal utility then spun off as a separate entity in 2000. Scarborough Public Utility – now a part of Toronto Hydro following amalgamation of the five municipalities of Metro Toronto –- has been offering telecommunications services since 1992. Neighboring North York Hydro launched its municipal fibre-optic program in May 1994. The former city of North York fibre project began with a small pilot test that linked two McDonald's restaurants with 2-kms of fibre optic cable leased under a long-term lease that provides continuous revenue for the utility. North York Hydro increased revenue by leasing surplus dark fibre to numerous carriers, including **Sprint Canada Inc**., and to the North York Board of Education – now a part of the Toronto District School Board.

Toronto Hydro Telecom is a facilities-based telecom service provider that offers both dark and, more recently, lit fibre-optic and data communications services to carrier and large enterprise customers throughout the Greater Toronto Area (GTA). But the utility is pursuing a financially conservative strategy. "No capital costs are incurred by Toronto Hydro Telecom until a customer actually contracts for the service," Ian Miles, president, said at a recent briefing. "We are not pursuing a 'build it and they will come' approach that typified the failed strategies of many competitive entrants in the late 1990s. Rather, we will only build additional facilities when a contract is secured." Nor will the utility attempt to be all things to all customers. Instead, Toronto Hydro Telecom focuses on developing customer-specific network services and last-mile fibre, Mr. Miles said.

Toronto Hydro Telecom had annual revenue of C$1.5-million in 2002, according to Toronto Hydro's annual report. However, Toronto Hydro Telecom's results in fiscal 2002 did not include a full year of sales from its three largest blue-chip customers. The company's results for fiscal 2003 will get a substantial boost from revenue from major contracts with **Toronto-Dominion Bank** and **Q9 Networks Inc**., in addition to Sprint Canada.

Current revenue is derived about equally between wholesale carrier and enterprise customers, Mr. Miles said. However, the enterprise market segment is growing faster.

Toronto Hydro Telecom's network

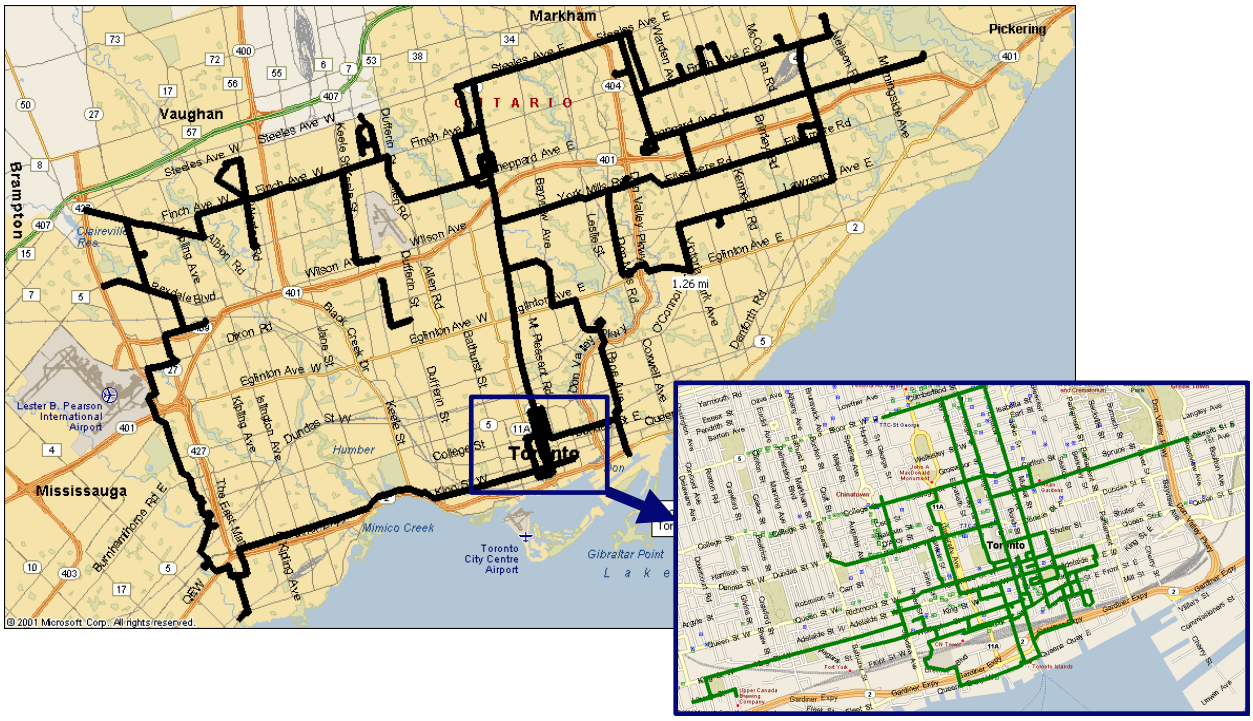
The utility owns a 450-km-long fibre-optic SONET network that currently connects more than 440 buildings in Toronto. The company's assets were valued at C$16.2-million comprised primarily of a network of fibre optic cable located in ducts, on poles and in other parts of the electricity distribution system shared with Toronto Hydro. Fibre to buildings; to demarcation point in basement; in many cases, include fibre in building risers with demarcation point in IT department, said Ewan Crawford, telecom director at Toronto Hydro Telecom.

Toronto Hydro Telecom also maintains a master network operations centre (NOC) within its 4,000-square-foot carrier class data center located in west Toronto. The NOC is staffed 24-by-seven by nine fulltime technical support employees who also do shift rotations working in the field directly with the company's customers. The company currently has 36 employees. An additional 3,500-sq.ft. in Toronto Hydro Telecom's NOC houses equipment dedicated solely to TD-Bank for its redundant data "hot" site. Toronto Hydro also runs three additional NOCs throughout the GTA which can serve as backups to the central facility.

Toronto Hydro Telecom's network coverage in the Greater Toronto Area and downtown Toronto core are shown on the maps in Figure 6 below.

FIGURE 6

Toronto Hydro Telecom's GTA Coverage, 2003



Source: Toronto Hydro Telecom, 2003

Toronto Hydro Telecom's optical transport networks run on **Lucent Technologies'** OC-48 Metropolis hubs; **Juniper Networks** Internet router switches**;** and **Foundry Networks** Ethernet switches.

The company's offerings include dark fibre services, private line, metro LAN, dedicated Internet access and data centre co-location. Toronto Hydro Telecom's service portfolio includes:

- Dedicated Internet Access
- Metropolitan LAN; Access interfaces using any one or combination of Ethernet (10 Mbps), Fast Ethernet (100 Mbps) and Gigabit Ethernet (1 Gbps)
- Private Line
- Dark Fibre
- Video Transmission Service
- Disaster Recovery and Storage Transport Service (see below) and
- Carrier Services.

Dark fibre customers have the option to install and manage their own optical equipment to transport data at whatever speed desired. Service attributes are outlined briefly in Table 5 below and include competitive prices under one, two, three or five-year contract terms.

TABLE 5

Toronto Hydro Telecom Services

	Dedicated Internet Access	Metro LAN	Private Line	Dark Fibre
Bandwidth	Scaleable Internet access speeds, custom burstable usage plans	10 Mpbs (Ethernet) to 100 Mpbs (Fast Ethernet) to 1 Gbps (Gigabit Ethernet) or faster	A variety of service speeds ranging from 44 Mbps (DS-3) to 155 Mbps (OC-3) and higher	Leverage their fibre optic cable network to its full capacity without any sharing or limitation
Reliablity	Fully redundant and multi-homed to its upstream providers	Metro LAN services are delivered over their proprietary fibre optic network	End-to-end fibre optic network	Dedicated point-to-point service
Provisioning	25-day average	SAME	SAME	SAME

Source: Toronto Hydro Telecom; IDC Canada, 2003

Toronto Hydro Telecom also promises swift service quotation response time with a two-day turn around. Upon receipt of a signed service order, Toronto Hydro Telecom guarantees timely provisioning within:

- 10 business days in on-net POP buildings; and
- 35 business days for on-net fibre buildings.

All "lit" fibre services are supported by an SLA Agreement. Reliability statistics include:

- 99.999 per cent network availability incorporating all network equipment between core switches and the network access interface (excluding local loop or POP).
- Latency - An average round trip traffic transit time of 65-milliseconds or less. The average latency is measured as the average of 15-minute samples of 64 byte ping packets across Toronto Hydro Telecom's network taken throughout the month. That objective excludes local loop, customer premises equipment, customer LAN, and interconnections to or from and connectivity within other service provider networks.
- 4-hour mean time to repair (but 2-hours is the internal benchmark target).
- 24/7/365 network monitoring and support.

Backup Power Not An Issue

Paradoxically, Toronto Hydro's telecom network is more reliable than North America's aged electricity grid, as the massive power blackout that plunged most of eastern North America into darkness on August 14, 2003 demonstrated. (See: Christopher

Boone, "U.S. Northeast Blackout Illuminates Need for Electric Grid Overhaul, Improved ISO Outage Management," *Industry Insight*, IDC#30009, August 2003.) Coincidentally, Toronto Hydro Telecom obtained a long-awaited permit from the Ontario Ministry of Environment to test its backup diesel generators just 10 days before the blackout. Those redundant facilities, which include batteries that provide between six-to-eight hours of backup powers and auxillary generators supported by a large diesel fuel farm, enabled Toronto Hydro Telecom's network to function during the blackout – a bonus for the utility's marketing thrust aimed at the growing niche of disaster recovery and redundant networks for data centres.

Data Storage Transport Services

Toronto Hydro Telecom has engineered its network to offer large scale data warehousing and storage area network (SAN) transport services to enterprise customers. Toronto Hydro offers a SAN-to-SAN extension service that provides access between two or more data centre locations, including third-party offsite locations, for disaster recovery. The utility's enterprise co-location service, used by TD-Bank, demonstrates the interest of enterprise customers in redundant network access.

Internet Back-Up

Additional redundant protection for Internet-based services is also offered through interconnection with BGP, a secure routing protocol that enables routing information to be shared so that loop-free transmission paths can be established with IP protocols. BGP peering with one or more Toronto Hydro data centers provides redundant connectivity through extension of a private area storage network to a customer's router network. Redundant and multiple site email and DNS servers may be used to also provide back-up hosting services.

Toronto Hydro Telecom also provides network operation services for both neighboring hydro utilities: **Markham Hydro** in the northern GTA and **Enersource in** Mississauga to the west. Toronto Hydro has completed extensive interconnection agreements with both neighboring hydro utilities. All three of those utility fibre networks are in turn connected to the regional FibreTech and FibreWired consortia permitting seamless service throughout southern Ontario via the fibre backbone maintained by Hydro One.

"We are telecom's best-kept secret," Mr. Miles joked with reporters and analysts at a recent briefing, referring to the emerging province-wide network.

Enersource Telecom

Enersource Telecom Inc., the telecom affiliate of Mississauga, Ont.-based **Enersource Corp**. (formerly Hydro Mississauga), offers high-speed Internet access, transparent LAN, VPN, managed network and fibre leasing services to business customers in Mississauga. Enersource Telecom's meshed fibre-optic network consists of six Points of Presence (POPs) and 350 route kilometers of high capacity fibre-optic lines within reach of 90 per cent of Mississauga-based businesses. Enersource currently has 96-and 144-strand cables throughout Mississauga's business centres.