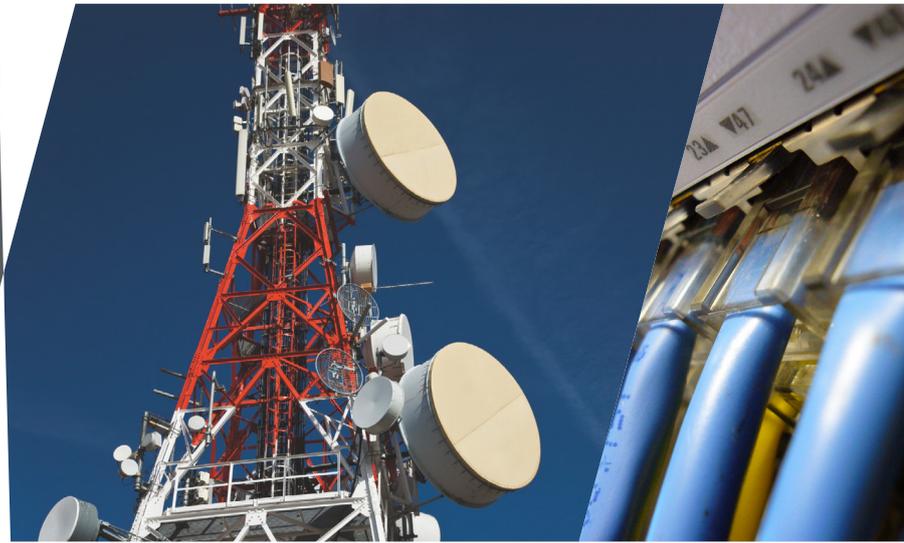


Information and Communication Technologies (ICT)

The skills and in-house expertise we have developed enables us to deliver high standard outcomes based on practical, specialised knowledge.



Cardno BEC is an established engineering consultancy providing professional services to the mining, utilities, materials handling, oil and gas, industrial and petrochemical industries.

Since 1996, we have completed projects for major clients throughout Australia, North and South America, Africa, Asia, Europe and the Pacific.

We have proven capabilities across all aspects of project management, power generation, power systems, control systems, automation, plant integrity and operations support.

Steady growth has seen us develop into a respected partner of many of the world's premier companies.

'Applied expertise' is the difference – our clients are served by a team of dedicated people with the most appropriate and relevant experience.

Cardno BEC undertakes and completes projects from feasibility through to implementation with a commitment to ongoing technical support.

Radio Link Planning

Cardno BEC can provide specialist VHF/UHF, microwave, VSAT and satellite link planning, design and implementation to various organisations including industry, government, utility, vendors and operators.

We have experience in using multiple industry software tools packages to produce detailed path profiles and link budgets including link availability and performance.

Our services can be used to design small to large backhaul networks, point to multipoint networks, single point to point links or satellite links. With our diverse experience across multiple industry sectors we are well equipped to provide the following services:

- > option studies;
- > feasibility studies;
- > business case development;
- > budget estimates;
- > technology reviews and equipment selection;
- > transmission systems dimensioning including sub E1, PDH, SDH and packet;
- > synchronisation design;
- > tender, installation, commissioning, implementation and acceptance documentation;

- > high level and detailed design documentation and drafting;
- > network management design;
- > desktop studies;
- > line of sight assessments;
- > radio field surveys;
- > site selection, site surveys and site assessments;
- > radio spectrum license applications;
- > vendor and contractor management; and
- > project management and implementation.

Radio Frequency Design

Cardno BEC can provide specialist radio frequency (RF) planning and design to various organisations including industry, government, utility, vendors and operators. Cardno BEC have experience in using multiple industry software tools.

We can provide design services for most legacy and current technologies including 2G, 3G, Wimax, Wi-Fi, PMR, APCO25, Tetra and MESH networks. Design services can include:

- > tender preparation;
- > high level design; and
- > detailed design.



We provide engineering solutions for a wide range of projects with an emphasis on innovative solutions.

Voice and Data Networks

Cardno BEC can provide specialist independent advice in relation to all voice and data systems and solutions including:

- > corporate WAN, LAN and VLAN;
- > ethernet;
- > security systems;
- > telephony systems including voice over internet protocol (VOIP);
- > CCTV;
- > MATV;
- > entertainment systems including triple and quad play;
- > public address (PA) systems;
- > early warning systems (EWS); and
- > telemetry systems.

With experience across many industry sectors including government, utilities, vendors and operators, we are well placed to provide the following services:

- > option studies;
- > market research;
- > product selection;
- > system audits;
- > feasibility studies;
- > business case development;
- > budget estimates;
- > detailed costing, design and documentation of networks;
- > structured cabling;
- > network management;
- > network provisioning;
- > contractor and vendor management;
- > site surveys and site assessments; and
- > project management and implementation.

Fibre Optic Networks

Cardno BEC can provide specialist independent advice in relation to all fibre optic systems and solutions. We can also provide detailed design and documentation for all fibre optic applications including large backbone networks to smaller building solutions. With experience across many industry sectors including government, utilities, vendors and operators, we are well placed to provide the following services:

- > option studies;
- > system audits;
- > feasibility studies;
- > business case development;
- > budget estimates;
- > detailed costing, design and documentation of fibre optic networks;
- > desktop studies;
- > active and passive infrastructure design;
- > head-end design;
- > outdoor plant design;
- > contractor and vendor management;
- > site surveys and site assessments;
- > fibre route planning, design and costing;
- > structured cabling;
- > FTTx network design and costing; and
- > project management and implementation.

Industry Groups

Our experience encompasses a complete range of industry sectors, including;

- > oil and gas;
- > mining;
- > utilities;
- > materials handling;
- > industrial; and
- > petrochemicals.

Cardno is an ASX200 professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs. Cardno is an international company, listed on the Australian Securities Exchange [ASX:CDD].