



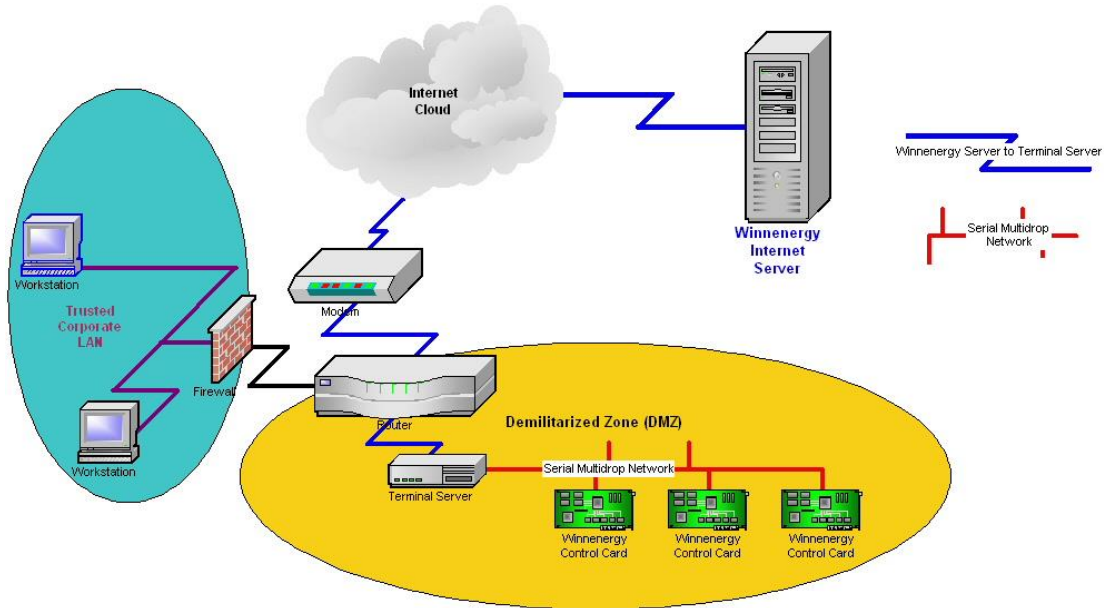
## **Remote Communication Use Existing Corporate Internet Networking Options**

The ADRES Energy Management System has a proven Internet deployable Energy Management Control System based on the use of industry standard Internet TCP/IP or UDP protocol communication and addressing and port forwarding practices. One must first understand the means communication to understand the necessity for port forwarding. The ADRES controllers are individually addressed and may be polled in sequence for data logging purposes or individually (out of sequence) controlled via operator control. Communication to the controller (s) is accomplished via an RS232 serial protocol, where the controller is requested to present data (read) or data is written (write) into the controller memory.

Each network of ADRES controllers must have a serial port such as an ADRES terminal port server or a MS Windows PC / server box to support communications between ADRES controllers and to the remote EnergyPro server. A typical installation will consist of a remotely located MS Windows server box running the EnergyPro software and multiple local ADRES terminal servers (Typically one ADRES terminal server per building).

Access to the individual building (s) with ADRES controllers and the serial communication network is gained through the use of an ADRES terminal server (Ethernet to RS232 conversion box), such that the EnergyPro software deployed on the remote Microsoft Windows 2003 / 2008 server box attaches to the terminal server via a static IP or UDP address. In turn the EnergyPro server may be accessed though the Internet/Intranet via either a remote windows terminal session or via an ActiveX enabled web browser depending on the configuration of the EnergyPro server and software configuration.

## Configuration Option 1 - Connection in front of LAN Firewall / Router



**Fig. 1 ADRES contained in Corporate Demilitarized Zone (DMZ)**

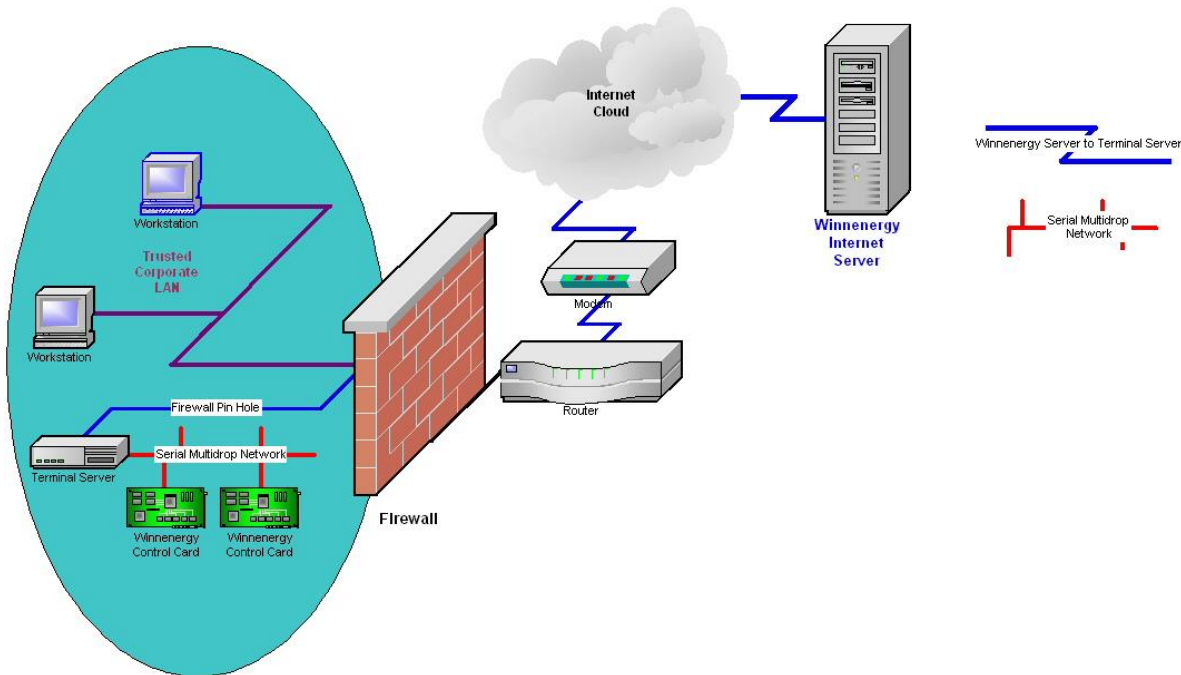
A network situated between the Internet and a trusted corporate network Local Area Network (LAN) and Wide Area Network (WAN), is often referred to as a "perimeter network" or Demilitarized Zone (DMZ). In this recommended configuration approach, the ADRES terminal server may be polled from the remote EnergyPro server on the Internet where it is made available for remote access and interrogation. The EnergyPro server connects with the ADRES terminal server via a static public IP address. This approach will require the company network policy to have a DMZ, in which corporate mail and Internet servers may reside, as well as the ADRES terminal server. Again, because of the dedicated nature of the ADRES terminal server, it would be configured to require physical access to change the configuration, i.e. the terminal server can't be hacked from the network connection.

Fig. 1 illustrates the configuration and the placement of the ADRES terminal server and associated equipment within the IT established non-secured network DMZ. In this approach a public static IP will need to be assigned to the ADRES terminal server and configured via the corporate gateway (Internet Modem) using the following format.

### ADRES contained in Corporate Demilitarized Zone (DMZ) Worksheet

Terminal Server Settings	Actual Project Settings	Typical Setting Behind Gateway
IP Address:		216.20.165.9
Subnet Mask:		255.255.255.0
Default Gateway:		216.20.165.1
DNS Server:		165.236.240.162
Domain:		Blank
Host Name:		Blank
Port:		2101

## Configuration Option 2 - Connection behind the Firewall / Router



**Fig. 2 ADRES System Internet Connection Via Pin Hole in Corporate Firewall**

Since both the terminal server and the EnergyPro software act as servers (EnergyPro Server), they should be configured with static IP's. A typical configuration utilizes a firewall pinhole in which the terminal servers are located on the clients Local Area Network (LAN) or Wide Area Network (WAN), which is connected via a router and firewall to the Internet. In computer networking, the term firewall pinhole is used to describe a port that is opened through a firewall to allow a particular application to gain controlled access to the protected network. The router is configured with port forwarding to the IP address of the terminal server, typically one terminal server per building and one port per terminal server. The port will then need to be open in the firewall to enable the routing. The remote EnergyPro server will then connect to the associated terminal server located in the building by establishing port connections through the client's firewall and router.

Fig. 2 illustrates the required network connections to link the remote EnergyPro server with the ADRES controllers and terminal server, which should be an always on connection with very low bandwidth. In this example, the firewall is configured with port forwarding which enables the remote EnergyPro server to connect with the designated static IP on the terminal server on the LAN network. The pin hole in the corporate firewall needs to be a dedicated and continuous (always on), but the serial communication nature of the connection require very low bandwidth. These always on low bandwidth characteristics of the connection provide operational parameters for securing the corporate firewall. Should this type of Internet access be deemed unavailable or undesirable, then other configurations may be used in order to conform to the IT departments security policy. In this approach a public static IP will need to be assigned to the ADRES terminal server and configured via the corporate gateway (Internet Modem) using the following format:



## ADRES System Internet Connection Via Pin Hole in Corporate Firewall Worksheet

Terminal Server Settings	Actual Project Settings	Typical Settings Behind Router
IP Address: Subnet Mask: Default Gateway:  DNS Server: Domain: Host Name:  Port:		192.168.1.121 255.255.255.0 192.168.1.1  64.105.166.250 Blank Blank  2101
Router Settings	Actual Project Settings	Typical Settings Behind Router
Router IP Address: Subnet Mask: Gateway IP Address:  Static DNS Server 1: Static DNS Server 2: Static DNS Server 3:  Local Router IP Address: Router Subnet Mask: Start Router IP Address: Router Port Forwarding:		69.3.14.218 255.255.255.248 69.3.14.217  64.105.166.250 64.105.166.122 0.0.0.0  192.168.1.1 255.255.255.128 192.168.1.100 2101 go to IP Address 192.168.1.121



### **Configuration Option 3 - Connection within the LAN/WAN**

Another approach is the complete encapsulation of the ADRES system on the trusted corporate LAN/WAN. The entire ADRES hardware and remote EnergyPro Server would all reside on the corporate network without any independent connection to the Internet, the system may still be viewed via a remote windows terminal session or via the ActiveX enable web browser on the corporate network(Intranet).

### **Configuration Option 4 - Alternative Wired and Wireless Internet Access**

Lastly the ADRES system may not use any corporate networking, in which case the ADRES system would use a myriad of wire or wireless networks and/or Internet connections in order to achieve the aforementioned goals.