METHOD TO PROVIDE MAINTENANCE AND SERVICE FOR A POWER NETWORK

A method, system database and web site for providing maintenance and service supervision to an electrical power generation, transmission and distribution network. A first company provides maintenance and service for a power network including a Physical Grid (1), owned by a Utility, by means of a contractual agreement with at least one second company. The contract is a franchise type agreement that includes operating procedures and standards for maintenance and service of the power network, access to a Work Pool, and access to the first company’s technical information and know-how necessary for the franchise to carry out the maintenance. Access may be carried out by means of web-server or web site technology or a web site.

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Method to provide maintenance and service for a power network

TECHNICAL FIELD.
The present invention relates to maintenance and service for an electrical power generation, transmission and distribution network. In particular the present invention discloses a method, a system and a web site for contracting out maintenance and service work to one or more operating companies by means of a franchise agreement between a first maintenance providing company, the franchisor, and one or more maintenance and service companies, the franchisees.

BACKGROUND ART.
Electrical power generation, transmission and distribution relies on a number of distribution networks to transmit power to a series of end users. A distribution network typically includes medium voltage, low voltage and feeder sections with a diversity of switching equipment, substations, transformers, breakers, fuses, measuring and other electrical equipment situated in a diversity of locations, buildings and yards. This includes distribution equipment to more or less specialised equipment for industrial and commercial consumers, factories etc., as well as ordinary household consumers. Maintenance and service criteria are categorisable not only by type of consumer, large or small for example. Factors of location such as rural, urban or city and criticality of supply for a hospital versus a warehouse contribute to a diverse range of
requirements for maintenance and service. Maintenance and service of such transmission and distribution networks demands a broad diversity of know how, organisation, planning, financing, spare parts, access to new equipment and technically skilled labour.

By tradition, and under conditions of a regulated market with state or community owned monopolies, a utility company is a company that operates and usually owns generating and/or distribution equipment. The utility company carries out maintenance planned on a basis of the utilities own business plan and carried out using with a mixture of in-house labour and outside sub-contractors to perform the work. In practice assets are owned and maintenance staff employed or allocated on a basis of what is necessary to meet a high maintenance requirement if and when so required.

However under de-regulation market conditions have led to a requirement for maintenance and service of transmission and distribution equipment to be carried out under a more flexible cost regime consistent with ensuring an acceptable level of quality and security of power supply.

US 5,960,411 discloses various computer program means for registering new customer information under a first access to a web site, and identifying the customer on subsequent visits to the web site to transact business. US 6,029,141 disclose methods and software means for registering companies that wish to participate in an associate referral scheme via a web site. However US 6,029,141 is directed to a method for commission selling to the general public and discloses method carried out by one or more self-selected associate companies.
SUMMARY OF THE INVENTION

It is an object of the invention to provide a method for a first company to provide maintenance and service for a transmission and distribution network to the owner of the network by providing a contract means between a third party company and the network owner which is specified according to an agreement between a first company and the third company.

It is also an object of the invention to provide maintenance and service for a transmission and distribution network in more cost effective way, by for example, assigning resources to a task as needed on a per task basis.

It is another object of the invention to optimise the technical and economic know-how of a first maintenance providing company and make it available to other maintenance and service providing companies on an contractual and cost effective basis.

It is another object of the invention to provide a database that may be used to contain technical information and economic information to carry out maintenance of a power system.

It is also an object of the invention to provide maintenance and service for a transmission and distribution network to the owner of the network, by means of a third party qualified with respect to operating procedures and standards agreed by the network owner.
These and other objects are realised by a method according to claim 1, a system according to claim 16, a database according to claim 20 and a web site according to claim 27. The invention may be described as a method to provide maintenance and service for a power network so as to use the installed assets of at least a part of the network in a more cost effective way. This is achieved by issuing specified maintenance and service tasks in the form of Work Orders to maintenance companies operating under a franchise agreement to a first company, wherein said first company has an overall contractual responsibility to a network owner, hereafter referred to as a Utility, for network maintenance. When a Work Order is issued to a franchisee, the Work Order becomes a contract between the franchisee and the network owner.

The overall contractual responsibility is defined in a so-called frame contract between the first company and the network owner. In a preferred embodiment of the invention, the frame contract is a performance based contract in which overall performance is periodically measured. Performance is preferably based more on quality parameters such as delivery time, availability (uptime), or capacity than on traditional cost-based pricing. By means of the performance based contract embodiment maintenance and service performance over a base may be financially rewarded and performance below the base may, as a further option, be financially penalised.

A database means is used to make technical information owned by the first company available to the franchisees companies. The database also contains access means to suppliers of power network equipment. The database is configured such that independent maintenance and service
providing companies may access the database under the terms of a franchise agreement in a timely and effective fashion. A web site is provided in one embodiment of the invention as a means for accepting and storing work orders, communicating work orders to franchisees, issuing work orders, giving franchisees specified access to information in the above databases and collecting information about the progress of work orders.

The main advantage of the invention is that an electrical power transmission and distribution system may be maintained in a more cost effective way. Valuable company assets such as technical competence and know-how, as well as more traditional assets such as spare parts and tools, are allocated in a rational way. The assets are divided such that the franchise giving company retains and maintains the broad know-how and deep technical competence. A franchise taking company, which effectively concentrates a limited technical competence, and certain specialised operating skills such as specialised local knowledge of the network, gains access to those assets in a way economically regulated by means of the franchise agreement.

Another advantage of the invention is that training and education provided by the first company develops know how on an as-needed basis in different operating regions of the power network.

The advantage of a performance based preferred embodiment of the invention is that maintenance and service performance as provided may be measured according to a predetermined measure and performance above base financially rewarded. The financial benefit to the
Utility of reduced maintenance cost for electricity delivered is also shared with the first company. Optionally and depending on the performance based values a financial benefit may also be distributed by the first company to the franchise companies. In this way the benefits of a more cost effective way to carry out maintenance and service according to a preferred embodiment of the invention are shared, rewarding superior performance and motivating continued improvement.

A further advantage of the invention is that an automated issue and job tracking for work orders provides a source of information to automatically calculate and optimise requirements for the local performance of maintenance, and also generate progress reports and data for wages, expenses and invoicing. This data may be further processed by the first company to provide an up-to-date information source for equipment quality and reliability purposes.

Another economic advantage of the invention is that the number of physical asset pools, including pools such as of spare parts and new equipment, tools and vehicles etc is rationalised, thus tying up less capital in installed and other physical inventory. This results in an overall reduced cost of financing so that maintenance may be provided in a more flexible and cost effective way.

Another advantage is that the method according to the invention may be adopted for a part or whole of any power network in more or less any part of the world. The invention may be operated over large distances or even between locations crossing national boundaries.
BRIEF DESCRIPTION OF THE DRAWINGS
The present invention will be described in more detail in connection with the enclosed schematic drawings.

5 Figure 1 shows a simplified diagram of a plurality of contractual relationships comprised in a method and system according to an embodiment of the invention for providing maintenance and service for a power network.

10 Figure 2 shows a plurality of information flows in a simplified diagram of a method and system according to an embodiment of the invention.

Figure 3 shows a plurality of cash flows in simplified diagram of a method and system according to an embodiment of the invention.

Figure 4 is a flow diagram for handling Work Orders according to an embodiment of the invention.

20 Figure 5 is a schematic graph of a plurality of annual maintenance costs according to a performance based embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS
Figure 1 shows contractual relationships between a Utility 2 owning a network, and a first Company A, indicated by the number 3. Company A has an overall contract to provide maintenance and service to the Utility. This is shown by the solid line 1.1 between Company A and the Utility. Company A further has a contract with one or more local maintenance and service companies, hereafter called franchisee companies, as
shown by dashed lines 1.2 between Company A and each of one or more franchisee companies such as L1, L2. When a franchisee company accepts a Work Order, the Work Order is a contract between the franchisee and the Utility, shown by the outline lines 1.3 between the Utility and each franchisee.

Figure 2 shows a part of a network, a Physical Grid 1 and an owner of the network Grid in the form of a Utility 2. The overall maintenance provider 3, Company A, which is also a franchisor, is shown and a plurality of franchisee companies are represented as L1, L2. Company A is shown to comprise at least one database 6. A plurality of information flows are shown. A Work Pool 7 is shown, which contains information about Work Orders. A Work Order information flow 2.2 is shown which may include information about the job itself as well as prices and delivery times. Technical Information and Data 2.3 is specifically a flow of signals and technical information to or from network equipment and Company A, the Work Pool, and the Utility. The Technical Information and Data 2.2 includes data such as measurement values, notifications, error signals or alarms. Technical Support is an information flow which is shown as available to franchisee companies L1, L2 from Company A indicated as a solid black line 2.4. An information flow called Decision Support 2.1 is shown between Company A and the Utility.

Signals 2.3 from the Physical grid 1 are received by the Utility, or by Company A and by a Work Pool 7. Utility 1 sends a Work Order to Work Pool 7 in response to a planned maintenance requirement for the Physical Grid 1. Alternatively Company A may send Work Orders to the Work Pool.
The franchisees, the local companies L1, L2 undertake under the terms of the franchise agreement to comply with all operating procedures and standards as laid down in documentation by Company A

-a qualification procedure to demonstrate that the franchisee complies with operating procedures and standards as laid down by Company A

-pay to Company A franchise fees as defined in the franchise agreement.

The franchise agreement that L1, L2 concludes with the franchisee includes a right of access to

-Company A’s know-how,

-Company A’s pool of spare parts and new parts at given prices

-the Work Pool containing Work Orders

-a limited right to use specified trademarks owned by Company A

-a limited right to advertise that the franchisee has been qualified by Company A

-training and education organised by Company A

Franchisee companies for local maintenance and service, companies L1, L2 and others, carry out work defined in one or more Work Orders collected from the Work Pool 7.

In the preferred embodiment of the invention for planned operations the method and system works as follows. A Work Order is sent by the Utility, or optionally Company A, to the franchise Work Pool 7. This may be for example, to re-activate the oil in all transformers in a given switchyard. One of the local maintenance companies with a franchise agreement, L1 or L2 etc, which is qualified to accept that type of job, accepts the Work Order which is
then issued as such by the Work Pool. When the Work Order is issued it becomes a contract between the franchisee company and the Utility. Allocation of the Work Orders is primarily determined in a local franchise agreement and may be based on a factor such as geographical location, type of work, price of job, size of job or a combination of factors.

Figure 4 shows a flow diagram for the Work Order. A Work Order is substantially either planned or for unplanned work. Unplanned work includes incidents, power outages, equipment failures, power shortages etc. A planned activity is provided by structured maintenance planning and prioritisation. Either a planned or unplanned event leads to generation of a Work Order, which is categorised at least by Scope of Work, which includes the type of tasks involved, a schedule for delivery times and prices, and type of Work Order.

Each Work Order is placed in the Work Pool and a notification is sent to each franchisee describing that the Work Order has been announced and stating a deadline or a time-out for response.

The Work Order may be assigned in one of several ways.
-First come, first served, in which the first franchisee that answers is allocated the Work Order, or
-Work Order bidding, in which a franchisee bids for a Work Order for a price and/or to a delivery schedule.
-Time Out, in which a obligatory assignment takes place when no response is received from selected franchisees before the deadline for responses. In this case the Work Order is allocated to a franchisee by the Work Pool.
-Pre-selection of franchisee based on the type of Work Order, qualifications of the franchisee, capacity of the franchisee or other criteria.

5 In the case of Work order bidding, it will usually be the case that one franchisee can carry out a specific Work Order faster or cheaper than another due circumstances such as to location and distances to site, available capacity to provide maintenance under the time scale of the Work Order, possession of particular tools or specialised skills.

After the franchisee has been selected the scope, price or cost and schedule for delivery may be decided in a further negotiation.

The franchisee that is allocated the Work order, L1 or L2 etc., carries out the work according to the standards laid down in the franchise agreement and the operating procedures and technical standards covered by the agreement. The franchisee reports progress of the Work Order in a timely way according to the contents and schedule of the Work Order.

25 In the preferred embodiment the frame contract is a performance based contract for which overall performance is periodically measured. Performance based values or measures may be specified for one or more parts of the overall maintenance requirement. The frame contract between Company A and the Utility specifies how performance shall be measured, and Work Orders shall be priced.
Pricing of Work Orders
Pricing of Work Orders is carried out according to predefined principles in the frame contract. Typically but not exclusively pricing will be based on one of four alternatives, with combinations of pricing alternative possible in the case of jobs containing many operations or complex operations. The four alternatives in the frame contract are

- on a time and material basis
- fixed price for a standard operation
- subscription fee for a continuous service by a franchisee regulated by a franchise agreement in which performance is specified
- franchisee bids for a Work Order in which such criteria as lowest price, fastest delivery time are used to allocate the Work order.

Performance Base
Generally performance is preferably based more on quality parameters such as
- delivery time,
- availability (uptime) of an equipment or a service,
- capacity,
- inventory value of installed equipment base
- remaining lifetime of installed equipment
- asset value of components, for example, spare parts.

Quality parameters include for example costs or values related to availability. For example remaining lifetime of installed equipment is a quality measure. If no maintenance was performed, maintenance costs would go down but so would remaining useable lifetime for installed equipment. Thus maintaining a specified remaining lifetime for asset pools while still reducing
maintenance costs is a useful performance and quality measure. As an another example there is holding or sharing a certain inventory value for spare parts to a minimum and still providing spare parts according to specified response time, delivery time, to meet a guaranteed availability (uptime) for an equipment or service.

Figure 5 shows schematically in a graph an example of performance based values or measures that may be included in a frame contract. Figure 5 shows maintenance cost on the y-axis and time in years along the x-axis. An Agreed Base maintenance cost related to achieving a specified standard inventory value of installed equipment in the Power Grid (as well as spare parts, new equipment or both) is shown which is lower than the Previous maintenance costs before the start of the contract period.

Performance is evaluated over a period by the Utility, based on total maintenance costs or, in this example, inventory costs in proportion to total electricity delivered over the same period. An Actual maintenance cost is shown which delivers better performance, that is reduced inventory cost for the same functional availability, shown as Additional performance. This saving is then distributed by the Utility to Company A. When Company A alone has taken a risk, in planning and specifying spares held by Company A, for example, the saving is kept by Company A. In a case or a part of the maintenance requirement where the franchisee companies have participated in a risk, then a distribution of rewards or penalties may be included in franchise terms.
In other areas, such as when Company A takes more responsibility for some decisions without consulting the Utility on every detail, for, key decisions only, such as when also supplying Decision Support, then rewards and penalties may be distributed only to Company A.

By means of the performance based contract embodiment maintenance and service performance over a base may be financially rewarded and performance below the base may, as a further option, be financially penalised.

Figure 3 shows cash flows between Company A, franchisee companies and the Utility in respect of franchise fees and of performance related rewards or penalties. The frame contract between Company A and the Utility stipulates the basis for determining performance. This is generally a measure of the total electricity provided by the network in relation to the gross cost of maintenance and service. The Utility reviews performance periodically as stipulated in the frame contract and calculates a performance reward or penalty for the period. The Utility then applies that financial reward or penalty to Company A.

In an additional aspect of the invention a frame contract and a franchise agreement may include terms for the further distribution of rewards or penalties to be distributed among the franchisee company as well, according to percentage of total maintenance turnover for the Utility carried out by each franchisee. Terms may include upper limits for rewards and/or penalty amounts or percentages. For example if maintenance costs for the Utility have been reduced by 10%, then the Utility
returns a part of that figure to Company A which in turn distributes part among the franchisee companies.

Also shown in Figure 3 is a franchise fee paid by each franchisee to Company A for the right to hold a franchise. The franchise fee is typically based on a percentage of annual turnover.

Distribution of the majority of Work Orders from the Work Pool, or from the Company or the Utility where necessary, is best carried out using conventional web server or web site means. The construction of web sites based on Hypertext Markup Language (HTML) and developments and extensions of it, combined with Transport Control Protocol/Internet Protocol (TCP/IP) communications, is a well known science and technology. There is a vast amount of web site creation, managing, security and other software and technical expertise available, and so technical details or program extracts for exactly how a log-in is received and validated and so on will not be described here in any detail.

A Web site accessible through the Internet, or through a private data network where necessary, may be set up with appropriate security measures to allow the quick and automated collection, storage, sending and receipt of Work Orders.

In principle the web site provides a series of functions according to the invention as follows. The first company, Company A provides and maintains the web site. Company A, the Utility 2 and all franchisee companies holding a valid franchise may log-on to the web site and be validated for access according to their status and identity. The web site comprises computer program means
to identify and validate log-ons of persons or computers
pre-identified as employed by or belonging to the first
company, the Utility and any franchisee company. Log-ons
are recorded according to both corporate identity and
personal identity. Work Orders are sent by the Utility or
by Company A to the web site where they are received and
stored in the Work Pool 7 using data storage means such
as a data server. Franchisee companies log-on to the
site, navigate to information about and access for the
Work Pool. At the Work Pool access, a franchisee company
may accept a Work Order according to a pricing method or
instead be allocated a Work Order under the Time Out
condition as previously described.

When a franchisee examines a Work Order posted in a Work
Pool on the web site the process is made quick and simple
by communicating electronically. A suitable format such
as a web page based on software means such as Java (Trade
Mark) type scripting or frames may be used to provide a
automated basis for a franchisee to log in, and thus be
identified, and then navigate to a Work Order access page
or frame and:
-examine a Work Order in the Work Pool
-register an acceptance or
-submit a bid or
-request further information or
-request a discussion, etc..

On acceptance of the Work order the Work Order details
may be downloaded to the Franchisee for job execution or
optionally not downloaded and the details accessed
instead at the web site. Franchisee companies may after
logging-on also access one or more databases such as a
database (6) containing Company A’s technical know-how
and information about the power network as described above. Access to information by a franchisee company via the web site may be restricted according to the Work Order the franchisee company has in progress, qualification status of the franchisee company and/or other factors.

The communication of Work Orders via a web site means is also arranged to include software code or computer programs that monitor and automatically log the process of sending, receiving, and in due course, fulfilling a Work Order. Progress of Work Orders is available in the form of technical or management reports for use by the first company, the franchisor, as well as for example in summary form by the Utility. Such Work Order data may be used to facilitate invoicing or provide automated invoicing by the franchisee company to the Utility on completion of a Work Order. Access to Work Order progress reports and other information and displays accessible via the web site may be configured for Company A and/or the Utility company.

A minority of Work Orders of a pre-determined type, concerned for example with equipment failures, outages or alarms, may alternatively be communicated using private networks and or highly secure communication means such as a Local Area Network (LAN), Wide Area network (WAN) or a leased telephone line not normally accessible from the Internet. Such Work Orders for outages may also be generated automatically by the Work Pool.

Company A, the franchisor, collects the relevant technical information about the power network necessary for maintenance reasons. This may include information
that it owns and has measured, calculated, modelled or otherwise derived, and stores that information in one or more databases, shown schematically in Figure 1 as database 6. The databases are accessible in a suitably structured way to the franchisee companies. Typically a database contains operating procedures and technical standards for maintenance together with some or all of information such as:

- an inventory listing of individual equipment in the power network,
- technical specification information for equipment in the power network,
- lists of spare parts and new parts for equipment in the power network,
- details of tools, specialised vehicles etc and service equipment available for maintenance tasks
- software means for testing, configuration, calibration and other maintenance functions in the power network. In the preferred embodiment of the invention the database is arranged by the franchisor to be accessible at least in part via a web server or web site means by a franchisee. Thus the franchise can simply and economically access the necessary information by logging on to the server or web site using a predetermined identification means.

Where necessary the access to technical or financial information in the database is restricted. It may for example be restricted according to a type of Work Order that the franchisee is known to have in progress. Access may also or alternatively or in combination be arranged according to the type of job the franchisee is registered as being qualified to carry out according to the qualification process conducted by Company A.
In a further embodiment of the invention, the database additionally contains access to decision modelling and decision making information and related software means. This is provided on the basis of the franchisors commercially developed design and investment know-how to enable a franchisee company to make better decisions about, for example, repairing or replacing equipment in the power network. Such decisions may also include decisions about expansion of the power network, that is, changing the Physical Grid to provide more power supply in some way. Such investment decisions require deep and sophisticated technical and financial knowledge. The technical knowledge may include knowledge and experience necessary to derive appropriate specifications, including physical dimensions, load capacity, cooling requirements etc for a new equipment in order to meet a particular electrical power requirement. The financial investment decision involved may also be complex. The decision modelling aspect of the invention may be used by Company A to provide Decision Support to the Utility, as indicated in Figure 2. Company A may also by this database means give a typically relatively small and specialised franchisee maintenance company economic access and use of a know-how asset which is typically only developed by and available to a much larger company.

In another embodiment of the invention an unplanned maintenance operation, for example a result of an equipment failure or a power outage, may also be included in the franchise agreement. When failures occur, alarms can be sent directly to the Work Pool which automatically generates a Work Order. Alternatively, and/or depending on the type of alarm, the alarm signal may be sent to
Company A or even the Utility, either of which may instead generate the Work Order.

It is to be understood that the term franchise is used to describe a type of agreement that is well known in many industries including consumer products, food and technical services. The word franchise is also used in this description to describe a legally binding agreement based on a written contract and includes any legally binding form of contractual relationship. Any contractual relationship between parties such as those described in this description for maintenance and service purposes such as those described lies within the scope of the claims included in this description.
CLAIMS

1. A method to provide maintenance and service for a power network including a Physical Grid (1), which method is carried out by a first company (3) to provide a Utility (2) with said maintenance and service, characterised by:
   - concluding a first contract means for maintenance and service with said Utility,
   - setting up a Work Pool (7),
   - offering and concluding a second contract means such as a franchise agreement with at least one maintenance and service providing company (L1, L2) hereafter called a franchisee company,
   - providing the franchisee company with access to the Work Pool,
   - allocating a Work Order to the franchisee company from the Work Pool which Work Order is a contract between the franchisee and said Utility.

2. A method according to claim 1, characterised in that alternative methods for pricing of a Work Order are defined in said first contract means.

3. A method according to claim 1, characterised by the further step of sending a Work Order to the Work Pool from said Utility or said first company.

4. A method according to claim 3, characterised in that the allocation of a Work Order from the Work Pool is based on principles defined in the frame contract such as:
   - First come, first served,
   - Work Order bidding,
   - Time Out, in which a obligatory assignment takes place,
   - Pre-selection of franchisee based on the type of Work Order and qualifications of the franchisee.
5. A method according to claim 4, characterised by the further step by the franchisee company of receiving the allocated Work Order.

6. A method according to claim 5, characterised by the franchisee company receiving the allocated Work Order from a web server or web site.

7. A method according to claim 1, characterised in that one or more means for determining a basis for performance of the maintenance and service provided to said Utility are defined in said first contract means.

8. A method according to claim 7, characterised in that the basis for performance comprises one or more of delivery time, availability (uptime) of an equipment or a service, capacity, inventory value of installed equipment base, remaining lifetime of installed equipment, operational cost reduction.

9. A method according to claim 8, characterised in that availability (uptime) performance may be described by values derived from a guaranteed availability such as inventory value level, or percentage of remaining lifetime of installed base, or inventory value of spares available in a response certain time.

10. A method according to claim 1, characterised by the step of configuring for a franchisee company an access means to a database (5) containing said technical information and know-how.

11. A method according to claim 10, characterised by the step of making available to a franchisee company such
technical information, economic information and know-how owned by said first company, the franchisor, as is necessary for the franchisee company to carry out the allocated Work Order.

12. A method according to claim 10, \textit{characterised} by the step of making available to a franchisee company communication access to suppliers of equipment or services.

13. A method according to claim 12, \textit{characterised} by the step of configuring links to a web site designated by Company A comprising links, information and predetermined commercial relationships for purchasing equipment and services.

14. A method according to claim 1, \textit{characterised} by the further steps of recording the status and progress of each Work Order, including storing information such as receipt of a Work Order at the Work Pool, receipt of the Work Order by a franchisee company, identity of the franchisee company and receipt of notice of completion for the Work Order.

15. A method according to claim 14, \textit{characterised} by the further steps of -processing database information on Work Orders, -relating said information to electricity supply patterns and usage patterns,

16. A system for providing maintenance and service for a power network including a Physical Grid (1), comprising
at least one database (6), and a web site, characterized in that the system comprises:
receiving means for receiving a Work Order in the form of a data communication signal,
5 storing means for storing the Work Order in a Work Pool as a digital file,
accessing means for a second and franchisee company to access the Work Pool by means of data communication,
issuing means for issuing the Work Order included in the form of a data communication signal to the franchisee company.

17. A system according to claim 16, characterized in that at least one database (6) contains technical information and know-how owned by a first maintenance providing company, configurable for access by the franchisee company.

18. A system according to claim 16, characterized in that a web site is provided and configured to receive data communication signals, store digital copies of the signals, access the copies and thus provide said receiving, storing and accessing means.

19. A system according to claim 16, characterized in that the web site is configured to provide said issuing means including an interactive contact with a franchisee company to receive, process and answer a bid in the form of a data communication signal.

20. A database (6) containing technical information and know-how means for maintenance and service of a power network, characterized in that said database comprises -a set of operating procedures and technical standards for said maintenance and service for said power network, -technical information about equipment comprising said power network
-economic and financial information about equipment comprising said power network.

21. A database according to claim 20 **characterised** in that the technical information about the power network comprise one or more of a:
- inventory listing of equipment in the power network,
- technical specification information for equipment in the power network,
- spare parts and new parts for equipment in the power network,
- details of tools and service equipment available for maintenance tasks,
- software means for testing, configuration, calibration and other maintenance functions in the power network.

22. A database according to claim 21, **characterised** by including a diagnosis modelling computer program producing forecasts for acute, short term and long term fault conditions.

23. A database according to claim 20, **characterised** by including a modelling or decision modelling computer program means to optimise a technical and economic decision concerning whether to repair or replace an equipment of said power network.

24. A database according to claim 20, **characterised** by that it is arranged accessible at least in part via a web server or web site means to a franchisee using computer software and a predetermined log-on identification means.

25. A database according to claim 20, **characterised** by that it is arranged accessible at least in part via a
private communication network means to a franchisee using standard computer software and a predetermined log-on identification means.

26. A database according to claim 20, characterised by that it is arranged with communication access to suppliers of power network equipment.

27. A web site comprising means for providing maintenance and service for a power network, characterised in that said web site comprises computer program means for executing the actions of:

- logging in and validating a data communication signal including a log-in by a Utility (2), a first company (3) providing maintenance and service to said Utility, or by a franchisee company (L1, L2), said franchisee company having a valid franchise agreement issued by said first company,
- receiving Work Orders from said Utility,
- receiving Work Orders from said first company,
- storing received Work Orders in a Work Pool in a data storage means,
- allowing the validly logged-on franchisee company access to a Work Order in the Work Pool,
- allocating the Work Order to the franchisee company dependent on the Work Order, franchise terms and job allocation terms.

28. A web site according to claim 27, characterised by computer program means for allowing the validly logged-on franchisee company access to a database (6) containing technical information and know-how owned by the franchisor for use by the franchisee company to carry out the maintenance defined in a Work Order registered as currently accepted by the franchisee company.
29. A web site according to claim 27, characterised by further program means to register notification from a franchisee company of the completion or partial completion of a Work Order.

30. A web site according to claim 27, characterised by further computer program means to record and store for reporting and displaying of job tracking information such as receipt of a Work Order, storage of the Work Order in the Work Pool, acceptance of the Work Order by a franchisee company and completion or other progress of the Work Order.

31. A method to provide maintenance and service for a power network including a Physical Grid (1), which method is carried out by a first company (3) to provide a Utility (2) with said maintenance and service, comprising contract means between said first company and at least one second company, characterised in that by said contract means comprises as terms and conditions: the first company offers for a consideration said second company a right of access to bid for a Work Order which is a contract for a specified job with said Utility company, the Work Order may be priced in one or more and predefined alternative ways, the Work Order comprises performance based values or measures, on completion said Utility is invoiced by said second company.

32. A method according to claim 31, characterised in that the terms and conditions further comprise performance based values and or measures such as:
- delivery time,
- availability (uptime) of an equipment or a service,
- capacity to carry out maintenance work,
- inventory value of installed equipment base
- remaining lifetime of installed equipment base
- inventory value of spare parts and components.

33. A method according to claim 31, characterised in that the terms and conditions further comprise access by said second company to:
- technical information and know-how owned by said first company,
- a pool of spare parts and new parts at given prices owned by said first company,
- a Work Pool containing Work Orders,
- a limited right to use specified trademarks owned by said first company,
- a limited right to advertise that said second company has been qualified by said first company,
- training and education organised by said first company,

provided that said second company:
- carries out each Work Order received in accordance with a set of operating procedures and standards incorporated in said contract means,
- complies with a qualification procedure to demonstrate that said second company complies with operating procedures and standards as laid down by said first company.

34. A data communication signal including a data part comprising digitally encoded information identifying a Work Order for provision of a technical operation required for maintenance and/or service work to an
electrical power grid, which said data communication signal when received at a suitably arranged a web site enables said Work Order information to be stored by memory storage means and accessed electronically and processed electronically by means of data communication signals sent by suitably authorised parties to a contract for providing maintenance and service to an electrical power grid.
Fig. 5
## INTERNATIONAL SEARCH REPORT

**PCT/IB 01/01003**

### A. CLASSIFICATION OF SUBJECT MATTER

**IPC7:** G06F 17/60

According to International Patent Classification (IPC) or to both national classification and IPC.

### B. FIELDS SEARCHED

**IPC7:** G06F

Minimum documentation searched (classification system followed by classification symbols)

**SE, DK, FI, NO classes as above**

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

### WPI DATA, EPO-INTERNAL

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>WO 0106426 A1 (AMERICAN MANAGEMENT SYSTEMS, INCORPORATED), 25 January 2001 (25.01.01), the whole document</td>
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Further documents are listed in the continuation of Box C. See patent family annex.

**Date of the actual completion of the international search:**

17 October 2001

**Date of mailing of the international search report:**

19-10-2001

Name and mailing address of the ISA/Swedish Patent Office:

Box 5055, S-102 42 STOCKHOLM

Authorized officer:

Jesper Bergstrand/OGU

Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (July 1998)
INTERNATIONAL SEARCH REPORT

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 1 – 34 because they relate to subject matter not required to be searched by this Authority, namely:
   
   see extra sheet

2. ☐ Claims Nos.: because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant’s protest.

☐ No protest accompanied the payment of additional search fees.
A method of doing business.
According to Rule 39 no search is required since the subject matter of the claimed invention concerns a method of doing business.
Despite this fact a search has been performed and thus a search report has been established.
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