SOFTWARE
&
IT SOLUTIONS

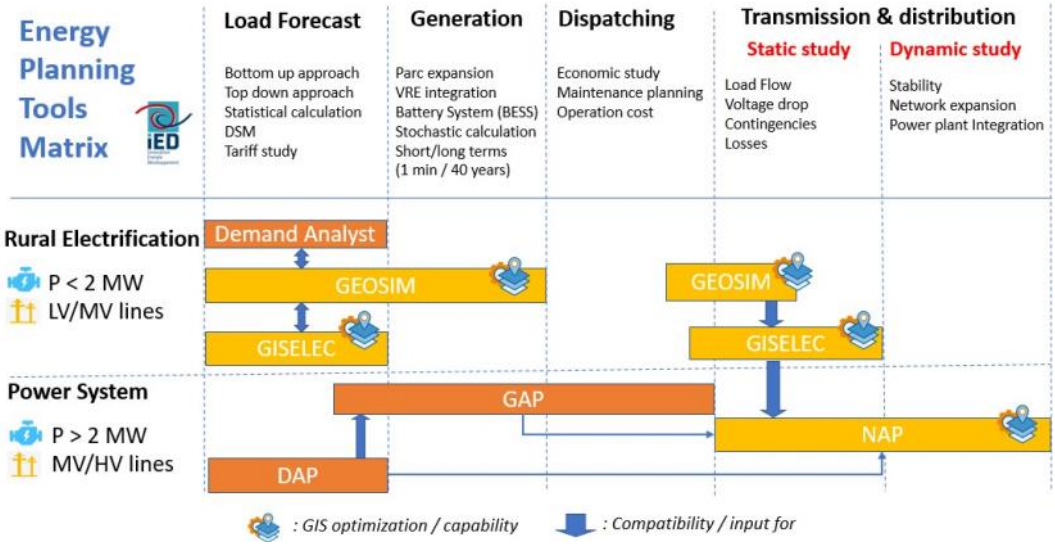
Electrical Sector and Renewable Energies

IED digital solutions training programs

WHO ARE WE?

As an independent consulting and engineering firm, IED has been involved in the provision of sustainable and strategic energy services since its creation in 1988 . From power systems planning to feasibility studies and operational management, IED offers a wide range of IT solutions to support your needs in the field of electrification, network planning and renewable energy project development.

Specialized tools for institutions, companies, local authorities and consulting firms involved in the energy sector.



GIS AT THE SERVICE OF PLANNING ACCESS TO ENERGY

Geographic information systems (GIS) have the capacity to store and use alphanumeric data as well as geographic data offering new opportunities for the decentralized rural planning sector, energy production and demand assessment.

IED combines its knowledge of the energy sector with its solid expertise in the design of information systems, the development of alphanumeric and cartographic databases and spatial analysis through several GIS software (ArcGis, Manifold, QGIS...).

The data collection (alphanumeric and cartographic) and its consolidation (geographic, topographical, demographic, socio-economic data, etc.) is one of the main capabilities and qualities of IED experts who are used to operating in contexts where data access is often difficult.

- **Overlay of multisectoral data**
  Visualization of different layers of data to take into account a large number of factors influencing the final decision: socio-economic infrastructure, road networks, rivers, protected areas, ...)
- **Publication of decision support maps**
  Production of detailed decision-making maps for decision-makers (wind farm identification, energy constraints, social and environmental impact ...)
- **Dissemination, communication and consensus of data**
  Communication on geographical data, in electronic, paper or on the Internet. They promote a better understanding of the issues and therefore an easier consensus on energy projects.

WEB DATA COLLECT, SHARING AND DISSEMINATION

GIMSYS©

Internet platform stored on the cloud, sharing and disseminating information based on GIS technology. GIMSYS © offers:

- Map access to information and the possibility of decentralized updating of geo-referenced data without software
- Universal or protected access to information through a simple, user-friendly and cartographic interface.
- Update real-time georeferenced data from mobile devices

PLANNING

Rural electrification and energy sector

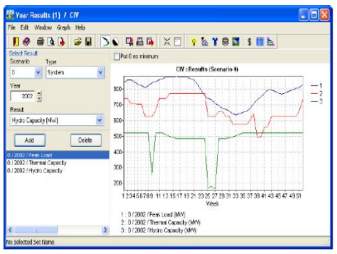
GEOSIM©

Geospatial rural electrification planning software exploiting the power of Geographic Information Systems (GIS)

- Spatial analysis and Identification of Development Poles,
- Load forecast
- Identification of least-cost electrification options (grid extension, decentralized solar, hydro, biomass or hybrid diesel / wind and solar projects as well as distributed solutions)

GAP©

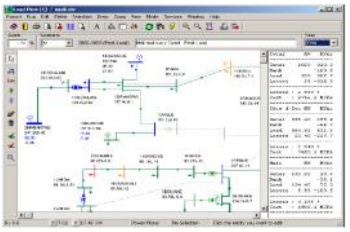
GAP is a software for analysis and planning of generation systems including hydroelectric and thermal powerplants and wind farms, solar parks and energy storage. At the heart of the GAP lies a stochastic model of production simulation, calculating the technical and economic results of various generation park expansion scenarios.



NAP©

NAP is a complete software for the analysis and planning of electrical networks. A single graphical interface groups together several calculation modules:

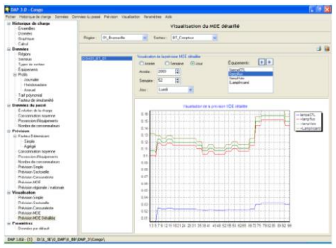
- Instantaneous Load Flow (ILF)
- Load Flow with constraints (CPF)
- Optimized Load Flow (OPF)
- Short-circuit (SCC)
- Incident Simulation (OUTSIM)



DAP©

DAP is a software designed both to forecast the demand and the peak load, and to prepare actions of Demand Side Management (DSM).
DAP has four applications:

- Simple trend forecast,
- Sector trend forecast ,
- Customer trend forecast,
- DSM forecast



TECHNICAL STUDIES

Electrical and mechanical calculation

DEMAND ANALYST©

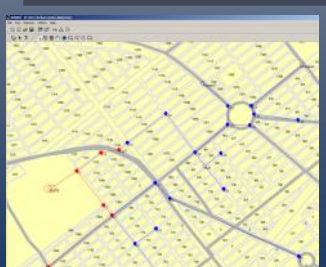
Software for forecasting electricity demand in rural areas. The tool is based on a "bottom-up" model fed in advance by surveys conducted at the household level and village infrastructures in order to model the evolution of consumption / peak.

GISELEC©

Electrical and mechanical calculation software based on Geographical Information Systems (GIS) technology to calculate and design distribution networks to build. GISELEC© optimally designs both LV and MV networks with the help of catalogues of equipment adapted to each project environment and restores the quantity of materials required for tenders (supports, armaments, drivers, etc.).

REBAN©

REBAN provides traditional functions of low voltage network calculation software. From the description of the network and its loads (which can be individualized or distributed linearly), REBAN renders power transits and their margins, voltage drops and their gravity, and finally power losses.



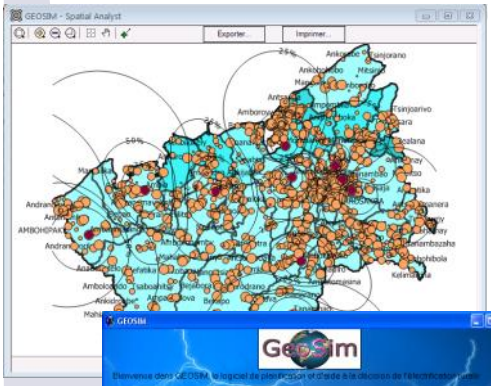
GeoSim

Planning Rural Electrification

Strengthened by a rich heritage based on rural electrification planning experiences and developed in several countries, GEOSIM is now used by numbers of organisations, consultant companies and public institutions in Asia and Africa. With a fully documented set of 4 main modules, GEOSIM has become the most innovative and powerful GIS based planning tool software exploiting all the power of the GIS capability.

- ♦ GEOSIM provides an easy-to-use graphical user interface that simplifies the management and publishing of rural electrification planning results.
- ♦ The customisation of every aspect of rural electrification scenarios and the rapid integration of specific parameters and hypothesis is today accessible to all.
- ♦ A wide range of renewable options is studied for rural electrification planning allowing a maximal flexibility to users for designing effective plans taking into account ground realities.

The Geographical Information Systems power to serve the rural electrification planning



GEOSIM© is divided into four interdependent modules :

- SPATIAL ANALYST©: Through the concepts of **Development Poles and hinterlands** (or attraction areas), GEOSIM Spatial Analyst® identifies and analyses settlements with **high potential for social and economic development** which should be electrified first, so as to **maximise impact** of rural electrification.
- DEMAND ANALYST©: The module aims at modelling and forecasting the demand for electricity at the village level, in a context of countries in which macro data is not always reliable.
- NETWORK OPTIONS©: The module finds the **best decentralised options** (micro-hydro, biomass, solar, interconnected, diesel genset, wind…) to supply electricity to previously identified Development Poles and their surrounding settlements, using one of the following methods: Selected projects are those with the lowest actualized cost of electricity or technologies are ranked by preference.
- DISTRIBUTED ENERGY©: Distributed Energy strategies aim at **improving access to modern forms of energy** (electricity but also mechanical power for productive uses) in areas where accessibility, lack of available financing and other socio-economic constraints render electrification through grid extension or isolated mini-grids impossible in the near future.

Each module provides cartographic and analytic outputs improving project understanding and issues evaluation.

Tool recommended by ASEAN, and deployed already in various countries such as: *Laos, Cambodia, Ethiopia, Burkina Faso, Ivory Coast, Cameroon, Mali, Niger, Benin, Madagascar, Tanzania, Congo, Gambia, Guinea Bissau, Namibia, Peru...*

Minimal Configuration :

- ♦ GIS software Manifold© (included) compatible QGIS, ArcGis, AUTOCAD…
- ♦ Windows 7, 10, 11
- ♦ Plateform .NET 4.6

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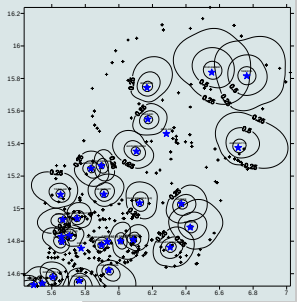
GEOSIM SPATIAL ANALYST©

Spatial Analysis and land planning

GEOSIM Spatial Analyst® is a module dedicated to the analysis of local dynamics within the studied area, prior to the socioeconomic optimisation phase of electrification solutions.

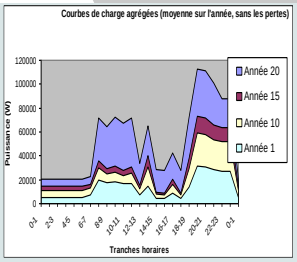


Through the concepts of development poles and hinterlands (or attraction areas), GEOSIM Spatial Analyst® identifies and analyses settlements with potential for social and economic development and that should be electrified first, so as to improve impact of rural electrification.

Additionally, **GEOSIM Spatial Analyst®** enables to identify localities with low access to socioeconomic services, and requiring therefore some specific attention.

GEOSIM DEMAND ANALYST©

Load forecast model



GEOSIM Demand Analyst® forecasts load demand at the planning horizon. The module will be based on a detailed analysis of demand for each end-user established in previous socio-economic surveys:

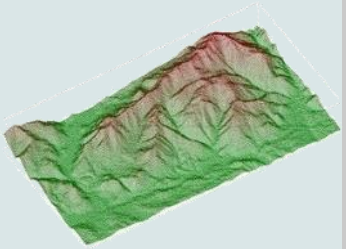
- **Domestic demand**, according to a categorization established after the treatment of household surveys
- The needs of the **administration and public services**: administration, social services (health centers, schools), and public lighting in every village will be counted and their power requirements and energy quantized.
- The potential consumption of the **economic sector** evaluated (i) by economic census targeting activities likely to use electricity and (ii) estimation of their power needs, energy and type of use through the current application and scope of each activity. This component will concern mainly agriculture, agro-industry, trade, crafts and small industry sectors.

GEOSIM NETWORK OPTIONS©

Grid supply option optimisation module

GEOSIM Network Options® identifies the most appropriate and least cost electrification solution for localities of the study area at the planning horizon, on the basis of a cost-benefits optimisation. Considered options, in clusters (group of localities) or in isolated mode, are :

- **Connection to the national grid,**
- Supply from **small hydro power plants** (with or without back-up),
- Supply from **biomass power plants** (with or without back-up),
- Supply from **solar power plants** (with energy storage)
- Supply from **diesel gensets** with or without **Solar or wind hybridization**.



GEOSIM Network Options® also offers the possibility of net-metering for renewable energy based projects , enabling both (i) to purchase lack of energy from the grid or (ii) to inject excess of energy into the grid.

GEOSIM® integrates a **Terrain calculation engine** which will consider geographic features such as obstacles (lakes, rivers…) or favourable terrain (roads, trail) when identifying the best suitable and lest cost path to build distribution lines.

GEOSIM DISTRIBUTED ENERGY©

Module for distributed energy programs

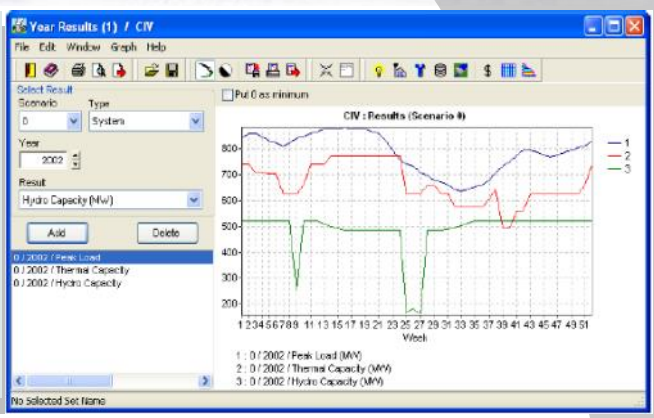
Access to basic energy services is a necessity for settlements located far from development poles and not electrified at the planning horizon.

Based on **GEOSIM Spatial Analyst®** and **GEOSIM Network Options®** results, **GEOSIM Distributed Energy®** identifies localities and settlements that should benefit from projects oriented towards access to basic energy services from alternatives sources (photovoltaic systems, multifunctional platforms, etc...). This modules provides systems sizing and related required investments for targeted areas.

GAP
Generation Analysis and Planning

At the time of the complexification of interconnected transmission networks, the diversification of supply energy resources and the introduction of new intermittent renewable energies (wind and solar), it has become fundamental to better analyse and control energy production in order to guarantee an acceptable stability and quality of service level.

GAP software is offering powerful and advanced functionalities, taking into account actual issues on the following technical and economic aspects .
A user-friendly graphical interface and a powerful scenario manager allow the user to easily analyse several generation configurations and to determine the optimum system expansion plan.



Analyze and plan energy generation at territory scale

Stochastic simulation of the production

The core of the GAP is a stochastic Generation Simulation programme designed for computing the yearly production cost and system reliability of a power generation system. This calculation module is called PROSIM. The method is stochastic because it conceptualizes the random aspect of the energy demand and considers the reliability of the units park. It uses direct calculations based on probability distributions to produce the expected values of the main variables of interest: the energy produced by each unit, the operating cost, reliability of the generation system, and marginal production costs. Individual loading probabilities for each unit can also be obtained. The uncertainty on hydro generation capabilities (natural water inflows) and on the fuel costs is modelled by repeated runs of PROSIM and sensitivity analysis using study scenarios.

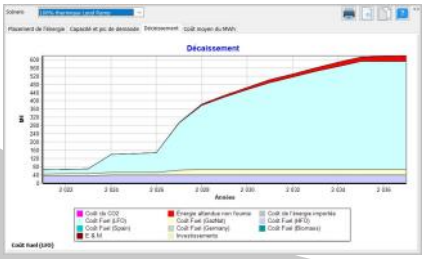
Results

GAP main results are twofold: Economic results (investment and operating costs) and Technical results (Loss-of-Load probability, Expected Unsupplied Energy, Produced Energy; etc.). Both types of results can be achieved at system level or for each generating unit individually; for each year of the study period, and for the overall period. They are presented in the form of columns of values which are selected by the user. Corresponding reports can be previewed and printed. In addition, weekly data resulting from PROSIM calculations may be customized and displayed graphically, edited in various reports.

Technical, economic and financial optimization

- Load Forecasting
- Generation from thermal and hydroelectric powerplants, solar and wind parks, storage site, import and export of energy ...

- Diagnosis and analysis of the electrical generation system
- Study of the integration of energy importation / exportation and energy purchases from IPPs
- Establishment of a technical comparative analysis of generation scenario
- Facilitate the integration of renewable energies, a solution to compensate intermittencies
- Reduce load shedding, a fast and reliable solution to cope with the accidental shutdown of a power plant
- Contribute to security of supply, a solution to maintain supply / demand balance during the dry season
- Analysis of the impact and cost of failures on the national system
- Evaluation of risk scenarios and planning of maintenance and mitigation measures
- Reduce the electricity bill for consumers, a solution to optimize energy generation
- Establishment of an economic comparative analysis of generation scenario
- Development of a summary evaluation of the environmental impact costs (CO2 emission, energy mix, renewable share ...)
- Marginal cost studies and assistance for tariff study



Minimal Configuration :

- Windows 7, 10, 11
- Server version : Yes
- Language : FR/GB/ES

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DATA AND SCENARIO MANAGEMENT

In GAP software, 5 groups of input data are proposed:

- Planned and existing generation units: thermal, hydro and solar power plants, wind farms and storage units,
- Maintenance schedules of thermal units,
- Energy resource data (Hydro, solar and wind resources),
- Fuels hypothesis,
- Load forecast profiles,

For each group, the user will specify several alternative cases during the time of the study. A specific combination of these alternatives represents/is a Scenario. Generation expansion planning involves several alternative projections or cases for each data group leads to a particular Scenario.

GAP offers a powerful generation scenario manager which allows users to easily create, maintain, compare and organise data hypothesis and results of various expansion scenarios. Generation scenarios combine energy resources variants and generation park hypothesis in order to identify the best solution.

Generation and Interconnections data

Generation data define the power generation capabilities of thermal, hydro, solar, wind and pumping storage units. Typical data for these units are installation and decommissioning years, investment and operating costs, generation capacity, reliability, fuel consumption, etc… Interconnections can be set as well in order to take into account energy imports and exports.

Fuel data

For each type of fuel used in the model, the calorific value and the evolution of the cost over time are defined. This evolution is displayed in a graphical way allowing an immediate plausibility check.

Maintenance data

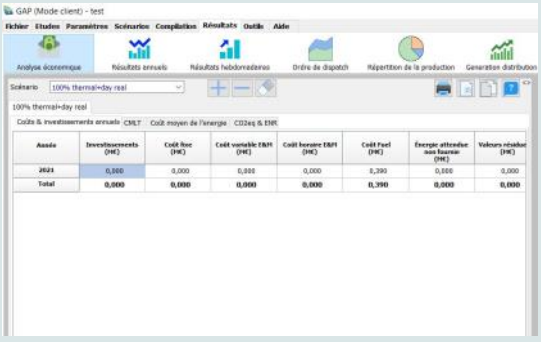
In the maintenance data section, the user determines, for each generation unit, the weeks when it will be unavailable due to planned maintenance. Several cases (alternatives) may be defined for each generating unit.

Hydro data

For each hydro unit, for each week of the study period, the generating capacity, the 'must run' fraction of it, and the generated energy will be defined. Several cases may be defined to reflect various water inflow or hydro operation assumptions. Hydro data may be automatically shown in a graphic way which allows visual plausibility check.

Wind farms

For wind farms will be given the wind characteristics of the farm and the description of the types of turbines used.



Solar power plants

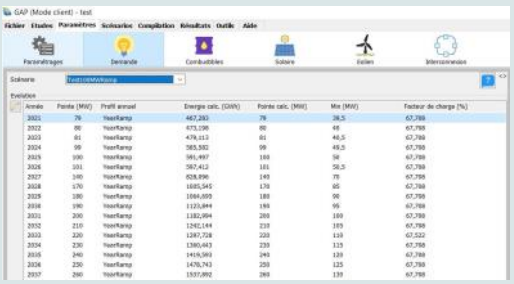
For solar power plants will be given the solar resource and the description of the photovoltaic equipment used.

Storage units

Power systems can include also storage units (PSU, batteries…) which can be analysed and planned

Load Data

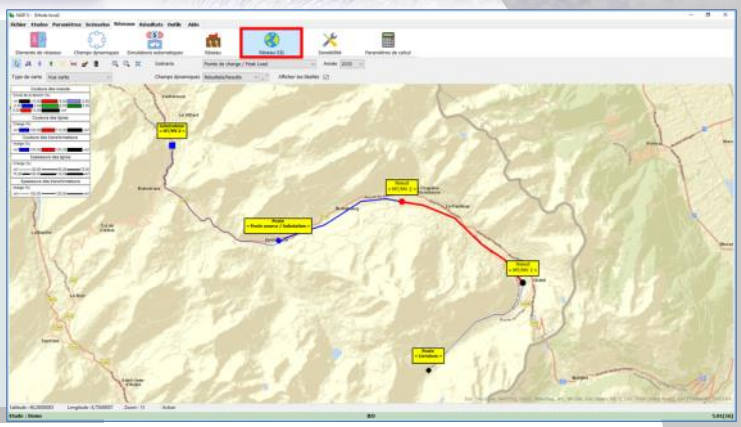
The system load evolution is described in a very compact form. It uses a yearly peak value, a yearly load shape of weekly peaks, and weekly load shapes of daily peaks. Several alternatives can be defined in various cases to be included in different expansion scenarios. Load data evolution and profiles are automatically displayed in a graphic way which allows visual check.



NAP
Network Analysis and Planning

NAP is a comprehensive software package for planning and analysis of electric power networks. A single graphical user interface allows to access several calculation models:

- Initial Load Flow (ILF)
- Constrained Power Flow (CPF)
- Optimum Power Flow (OPF)
- Short Circuit (SCC)
- Contingency Analysis (OUTSIM)



Analysing and planning electricity transmission within a territory

A state-of-the-art software

NAP is the result of more than 30 years of Systems Europe experience in load flow models, new research on mathematical and physical systems and modern Object Oriented Programming techniques. Our primary objectives were always to develop a software that is:

- easy to use: using a friendly user interface, modern compliant with Windows standards.
- Planning oriented, i.e. several scenarios can be defined, commissioning and decommissioning years are taken into account, as well as load growth.
- Based on reliable, flexible and powerful algorithms.

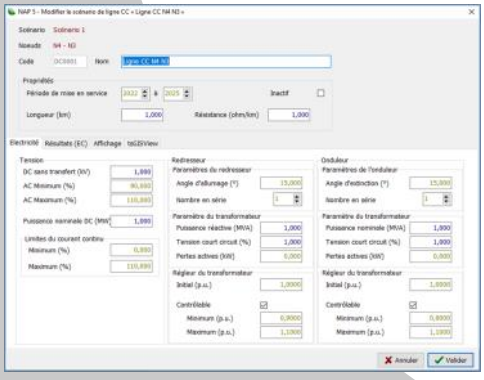
Graphical Network Display

Networks can be displayed in both a one-line diagram schematic representation and GIS view. The user may edit data and results to display on this network drawing. Moreover, any data or result may determine the colour and thickness of the network elements. Several windows can also be simultaneously opened, allowing to analyse at a glance different network alternatives. Standard drawing functions, such as zoom facilities, are of course available.

Interactivity

Network elements, i.e. nodes, lines, DC lines and transformers are created by simply drawing them on the network display. Click and drag is also available in order to move them.

By simply clicking on any network element, the user can edit any of its data and visualise its results. All data are in physical units (MW, km, ...), forget prerequisite per unit conversion.



Scenario manager

Scenarios are organised into a hierarchical structure based on inheritance. It means that, if a particular data is not defined in a scenario, its value equals the value defined in its parent scenario. This parent value can inherit from its own parent, and so on. This method is the best for defining variants and avoiding data redundancy. As for planning, scenarios can differ in technical data or investments strategies.

Minimal Configuration :

- ♦ Windows 7, 10, 11
- ♦ Server version : Yes
- ♦ Language : FR/GB

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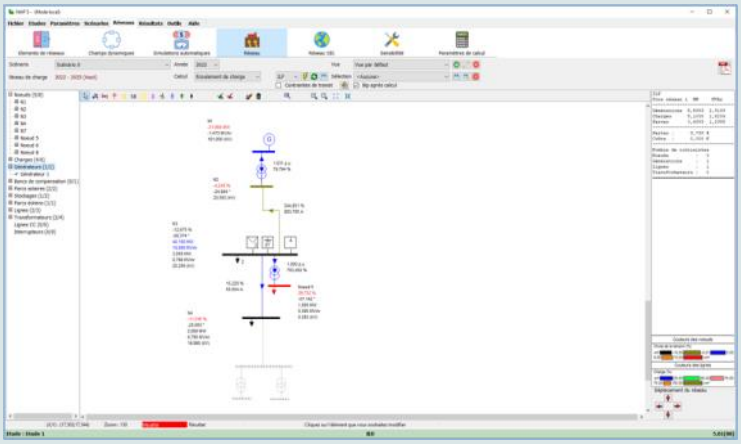
Network Calculation Models



Load Flow

The optimal load flow has to solve the problem of minimizing cost in which the variables are restricted by:

- Equality constraints: the power flow equations.
- Inequality constraints: operating limits on controllable variables.

Calculation is divided into 3 steps: ILF, CPF and OPF.

ILF - Initial Load Flow

This first step consists of solving a standard power flow problem ignoring the inequality constraints, using the Newton-Raphson mathematical technique.

CPF - Constrained Power Flow

As the ILF solution may be unfeasible, this second stage consists of moving the ILF solution into the feasible subspace, satisfying all voltage, generation, transit and tap transformer constraints. If no feasible solution is found, the unsatisfied constraints are highlighted.

OPF - Optimum Power Flow

This third step consists of finding the power flow solution, which minimises the generators operating cost while not violating the inequality constraints.

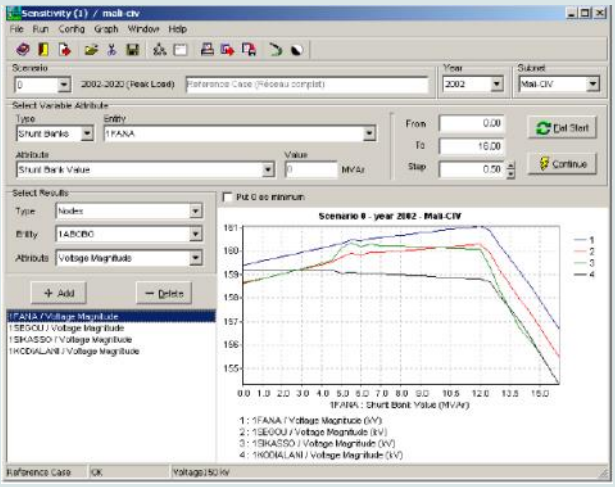
Due to this powerful approach, the OPF also calculates the marginal costs of real and reactive demand at each node. This information is a powerful help when designing new systems or upgrading existing ones.

SCC - Short Circuit

The objective of the Short Circuit simulation is to estimate the status of the generation and transmission system a few voltage cycles after the occurrence of a fault. Transient or sub-transient responses can be analysed. The program simulates symmetrical faults (3 phases to ground) and non-symmetrical faults (1 phase to ground, 2 phases to ground, or phase to phase). The OPF solution is used as the pre-fault status of the system.

OUTSIM – Contingency Analysis

OUTSIM is a N-1 incident simulator, i.e. it simulates lines, transformers and generators outages one by one. Starting from the OPF solution, a full AC power flow simulation is performed in order to predict the impact of outages on branch loading, voltages limits and generation capacity.



Sensitivity analysis

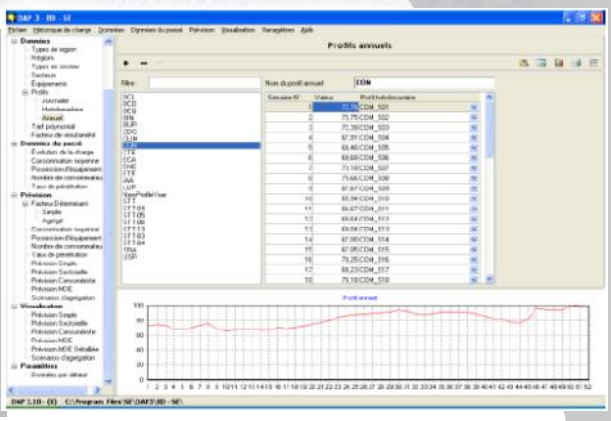
This module analyses the evolution of any result as a function of any data varying within the user-defined limits.

DAP
Demand Analysis and Planning, DSM

DAP is a software tool designed to forecast demand - and load and to draw up Demand Side Management actions.

DAP includes four applications:

- ♦ Simple trend forecast,
- ♦ Sector trend forecast,
- ♦ Customer trend forecast,
- ♦ DSM forecast



Forecasting the demand for a better anticipation of energy needs

A state-of-the-art software

DAP is based on more than 30 years of experience in demand forecasting and DSM project impact assessment. Up to now, there is apparently no equivalent on the market. In order to have maximum flexibility, DAP uses a user-defined list of sectors and regions, and a library of determining factors that can be forecasted independently.
In addition, sectors can be identified by codes and be grouped in Types of sectors for clear classification in breakdowns.

Guidelines

Depending on which application is used, forecasting windows will concern determining factors, number of customers, average customer consumption, ownership factors, etc. Linear and exponential forecasts are suggested, and the past increase rate is automatically computed.
For determined forecasts (i.e. linked to a determining factor forecast), the elasticity between the variable to be forecasted and the factor is automatically computed and proposed to make the forecast. After forecasting the demand and assigning load profiles, DAP provides also the related peak load forecast.

Library of profiles

Profiles are values that change with time: days, weeks, years. They represent either load profiles or usage profiles of the equipment. As they are expressed in percentages, they can easily be compared and applied to other regions or sectors. The time resolution is 15 minutes, i.e. 96 values/day.

Minimal Configuration :

- ♦ Windows 7, 10, 11
- ♦ Server version : Yes
- ♦ Language : FR/GB

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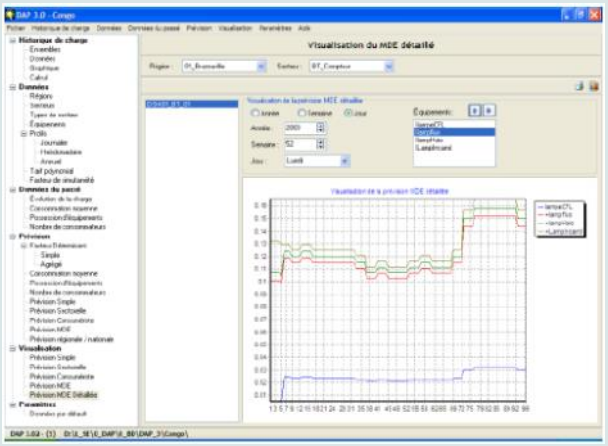
Forecast your load and simulate your DSM projects

Library of equipment

For the DSM forecast, equipment are defined with their nominal power. Usage profiles can be associated with the equipment for each sector-region pair. Simultaneity factors are also associated in order to represent the natural (statistical) smoothening of the resulting load curve.



Library of tariffs

Tariffs are represented by polynomials based on the energy consumed (active, capacitive and inductive) and on the peak load. This allows assessing the financial impact of DSM for a utility.

Why 4 methods for demand forecasting?

Depending on the available data and on the time you have, various levels of details can be adopted. DAP allow you to forecast from the simplest level to the most detailed level which represents all equipment: the DSM forecast level.

For each sector of each region, one of the following methods, at least, has to be applied: a further aggregation into a national forecast will be suggested.

1. Simple Trend Forecast

The simplest forecast of the demand or the peak load is the one based on its past values. In a few clicks it will give you a reasonable or an approximate estimate.

2. Sector Trend Forecast

A first improvement consists in assigning the future evolution of the demand or the peak load to a "determining" factor: for example the population, the Gross regional product (or the added value), the industrial production, the rate of occupied surface area (m^2), etc. The determining factor should then represent the trend of the sector, in terms of power consumption.

3. Customer Trend Forecast

In this approach, the demand is on the one hand defined by a number of customers and on the other hand by the average customer consumption: each of these variables can be forecasted separately, possibly by linking it to a determining factor which is selected to represent the customer's trends.

4. DSM forecast

The DSM forecast is a process in 4 steps:

1) The forecast of the number of customers
2) The definition of the equipment in each sector, with the selection of one's usage profile and simultaneity factors to be associated.
3) The forecast of the ownership of equipments in each sector.
4) The computation of the DSM forecast itself

As a result, the user can view his DSM forecast with the share of each equipment. By comparing two DSM forecasts, i.e. a "natural demand" forecast and a "Demand Side Managed forecast", the user can identify the impact of the DSM project on the peak load, on the consumption and on the utility revenues.

National forecasts

After working with the 4 methods, the forecaster will have various forecasts for a given sector in a given region.

He can then assign to each "sector-region" his best forecast (any type) so that a sum can be computed at the regional level or at the national level. The latter can to take into account losses, due, for example, to the network.

Design and optimisation of distribution networks

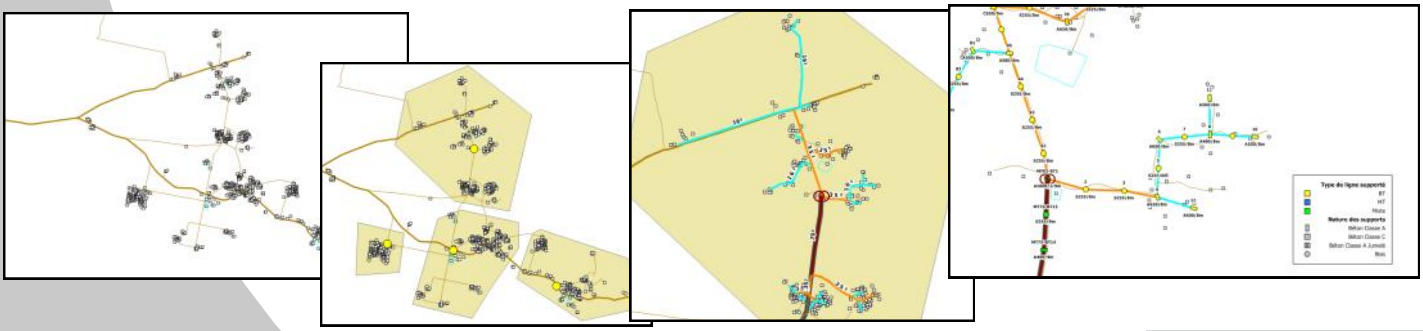
In the actual environment where companies and institutions in charge of electrification are looking to cut costs, it has become essential to identify low cost solutions in terms of technology but also to optimize the design of power lines for distribution energy especially in rural and remote areas where electrification remains a loss making activity. It is therefore necessary to first optimize the medium and low voltage networks starting from feasibility studies, avoiding additional costs due to oversizing of equipment to be installed. GISELEC© is a **user-friendly software accessible to all**, built on the **Geographic Information Systems** (GIS) technology which has the objective of streamlining the design of electrical lines by:

- Helping to **optimize sizing and location of transformers** within villages by mapping and forecasting load points previously identified during the village mapping steps
- **Optimization of cable cross sections for medium and low voltage lines** according to load forecast criteria in rural electrification projects (network expansion or decentralized networks projects)
- Supporting electrical engineers for technical decisions during electrical and mechanical network studies...

Optimize distribution networks sizing so as to reduce Infrastructures investment thanks to Geographic Information Systems

GISELEC© software main features :

- **Analysis of energy demand** (consumption and peak energy demand) for a specific village in short, medium and long terms according to the load forecast module previously customized, in order to estimate the number and capacity of each planned transformers.
- **Placement of transformers optimisation** near the energy loads centroid so as to reduce energy losses and voltage drops.
- **Calculation of energy losses and voltage drops** and identification of critical cables cross section for planned networks.
- **Optimisation of cable cross sections** based on the power supplied by the network and according to the list of cables available in the study area.
- **Poles localization**, mechanical calculation, editing **bill of quantities** and detail design study.
- Edition of **reports and network sizing maps**, bills of quantity required for the project and associated costs



Minimal Configuration :

- GIS software Manifold© compatible MAPINFO, ESRI, AUTOCAD...
- Windows 7, 10, 11
- Compatible with Geosim NAP and Demand Analyst©

Tool deployed already in various countries such as:
Benin, Senegal, Burkina Faso, Cameroon, Togo...

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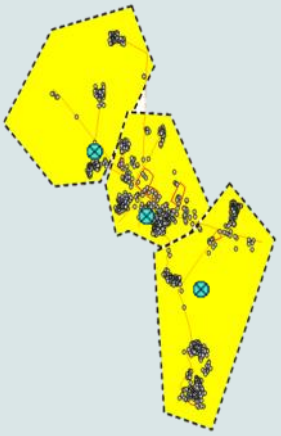
GISELEC TRANSFO

Module for transformers localization



Because optimizing a network means finding the most suitable place for transformers setting-up, which will supply energy to a locality and its whereabouts so as to reduce losses according to the energy loads distribution. This module will particularly help users to:

- **Localize the best place to install transformer** according to energy loads distribution (households, socio and economic activities…) within the targeted area.
- **estimate transformers capacity** thanks to the powerful load forecasting model integrated to GISELEC© et visualize transformer coverage area.

GISELEC DISTRIB

Module for sizing low voltage lines (LV)

Reducing distribution costs by optimizing network design and least cost grid sizing. From a village cartography geo-referencing energy loads within the study area and a proposed network design, GISELEC DISTRIB will analyse the LV grid in order to :

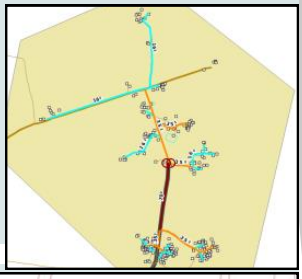
- Optimize cable cross sections of the low voltage lines and identify **critical sections** along the network
- Evaluate **voltage drops** in various locations along the network, provide estimates of electric **losses** and validate electric network feasibility
- Propose a **least cost solution** for developing the LV network
- Map the new sized network

GISELEC CONNECT

Module for sizing medium voltage lines (MV)

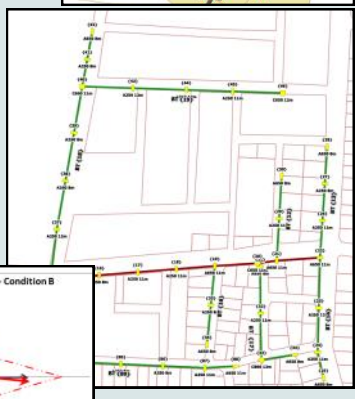
Similar to LV lines study, GISELEC CONNECT analyse MV network connecting transformers identified in the GISELEC DISTRIB module or villages within a specific area in order to optimize the MV grid network. The module will therefore:

- Optimize cable cross sections of the medium voltage lines and identify **critical sections** along the network
- Evaluate **voltage drops** in various locations along the network, provide estimates of electric **losses** and validate electric network feasibility
- Propose a network **least cost solution** for developing the MV network
- Map the new sized network.



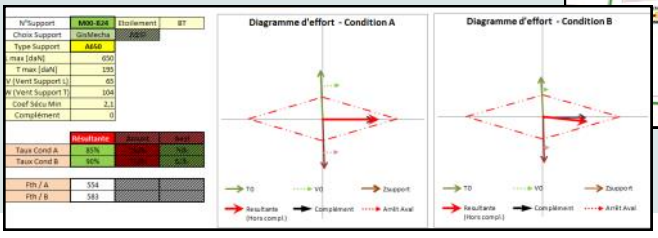
GISELEC MECA

Module for network mechanical calculation



GISELEC MECA allows, from a planned distribution network, to place and size automatically poles available within an equipment catalogue defined for the project, based on mechanical forces involved all along the network. Finally, this module help to :

- Compare various technical solutions (equipment, span length, railing height..)
- Determine bill of quantities for the preparation of call for proposal (supports, cross arms, cables…)
- Edit network design...



GISELEC BILECO

Network economic calculation module

GISELEC BILECO makes it possible to determine the overall construction cost of an electrification project based on a detailed quantity report of all construction-related equipment but also by taking into account the cost of the necessary labour.

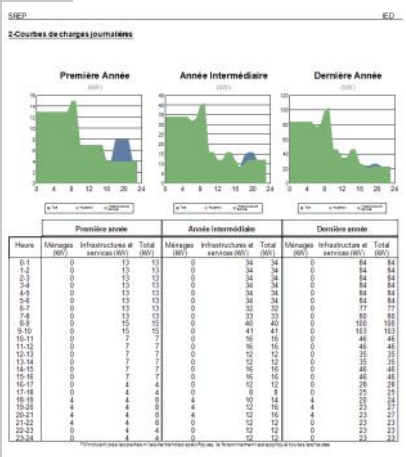
Modelling and planning the energy demand

Demand Analyst

Demand Analyst® is a powerful tool for rural electrification help decision making dedicated for planners and engineers. The software is designed to estimate the energy demand growth for one specific village or a cluster of village with a study area until the planning horizon. At the opposite of traditional "top-down" approach model, Demand Analyst® use an accurate demand analysis for each end user (Households classes, public infrastructures and services, businesses, shops, etc.), which are previously identified through socio economic field surveys.

- Demand Analyst© offers a user friendly interface which simplifies the management and edition of load forecasting results.
- The scenario customization can be easily done by a non-specialist and growth hypothesis can be quickly addressed and tested.

Forecasting the project energy demand in order to optimize the grid network sizing and investment required



Demand Analyst© offers various functionalities :

- **Study area customization** : Demand Analyst© can equally study one specific village or a cluster of villages within a study area with different energy patterns and population ranges.
- **Planning horizon**: The planning horizon can be easily adapted to local or national customs
- **Regional parameters** : Various parameters can be set according to its geographic area.
- **Specific demands** : Some productive uses or agro-industries requiring large amount of energy located outside even villages can modify the energy pattern. Those demands can then be characterized and take into account for planning studies.
- **Study scenarios**: More than three type of energy service scenario can be simultaneously studied and compared.
- **Detailed energy output** : Annual consumption, energy peak, client number (low and medium voltage) and daily load curves.

Tool already deployed in various countries such as: *Laos, Cambodia, Burkina Faso, Cameroon, Benin Madagascar, Tanzania...*

Minimal configuration :

- Windows 7, 10, 11
- Platform .NET 4.6
- GEOSIM© compatible

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TARIFFS CATALOGUE

SOFTWARE AND APPLICATIONS

Software application tariffs valid for 2024

	Software	Price**
PLANNING	**GEOSIM©***	**9 400 €**
	GAP© ***	**6 500 €**
	NAP© ***	**3 800 €**
	DAP© ***	**4 500 €**
STUDIES	**GISELEC©***	**5 900 €**
	DEMAND ANALYST©	**950 €**
WEB	**GIMSYS©**	**On demand**

**Giselec© and Geosim© software are delivered with a GIS software and enclose both a Demand Analyst module.*

*** Tariffs include 3 months guarantee (bug fixing only)*

**** Demo version available*

Subject to the terms and conditions of quantity purchases, some discounts can be applied to purchases of multiple quantities of products (excluding the following software Demand Analyst and GIMSYS)

Discount from the second licence of the same software

Discount for the purchase of the MASTER-AP suite (GAP, NAP and DAP)

Discount for the entire order in case of purchase of several software

Please contact us for a quote for Server licences and Educational licences.

Contract for annual maintenance and support, per software, giving access to up-grades and technical support :

Software	Silver Service	Premium Service Y3
GEOSIM, NAP, GAP, DAP, GISELEC	460€ -1130€/yr	960€-2370€ /3 yrs

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OUR REFERENCES

Many institutions in the world trust our IT solutions and use our software. Few key references….

150 clients

15 years of support

22 countries

4 continents

Institutions and national agencies

- Rural Electrification Development Agency (ADER, Madagascar)
- Electrification Development Funds (FDE, Burkina Faso)
- Benin Rural Electrification and Demand Side Management Agency (ABERME, Benin)
- Rural Energy Agency (REA, Tanzania)
- Ministry of Water and Energy (MINEE, Cameroon)
- Ministry of Industry, Mines and Energy (MIME, Cambodia)
- Rural Electrification Funds (REF, Cambodia)
- Ministry of Energy and Mines (MEM, Lao PDR)

Utilities

- SONABEL (Burkina Faso)
- TANESCO (Tanzania)
- EEPCO (Ethiopia)
- SBEE (Benin)
- CI-ENERGIES (Côte d'Ivoire)
- ENEMALTA (Malte)
- JOIRAMA (Madagascar)
- SENELEC (Senegal)
- VRA (Ghana)

Private companies

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