GE SOLUTION

APPROVISIONNEMENT EN EAU TRADITIONNEL

PROJET D'APPROVISIONNEMENT EN EAU POTABLE & ÉLECTRICITÉ

AMÉLIORER LA SANTÉ ET L'ÉCONOMIE... COMMENCE PAR L'ACCÈS À L'EAU POTABLE

Pénurie d’eau

- **La pénurie d’eau est tout simplement, le manque de suffisamment d’eau (quantité) ou le manque d’accès à l’eau potable (qualité)**
- Elle touche actuellement environ 2,8 milliards de personnes dans le monde.

STATISTIQUES DE LA CRISE DE L'EAU

- 783 millions de personnes dans le monde entier n'ont pas accès à l'eau propre et sûre.
- 319 millions de personnes en Afrique subsaharienne n'ont pas accès à des sources améliorées d'eau potable fiable.
- L'Afrique subsaharienne est parmi les régions présentant les plus importants besoins en eau potable et en investissement dans les zones rurales.
- Deux tiers, soit environ 102 millions de personnes sur 159 millions utilisant encore l'eau de surface vivent en Afrique subsaharienne.
- 443 millions de jours de clase sont perdus chaque année en raison de maladies liées à l'eau contaminée.
- 695 millions millions de personnes sur 2,4 milliards qui vivent sans installations sanitaires améliorées résident en Afrique subsaharienne.
- La moitié des lits d'hôpitaux dans le monde sont occupés par des personnes souffrant d'une maladie liée à l'eau contaminée.
- L'exposition à la consommation d'eau non potable et à des conditions d'assainissement et d'hygiène inadéquates est une des principales causes du choléra et une variété de maladies infectieuses et tropicales en Afrique.
- Les filles de moins de 15 ans sont deux fois plus susceptibles que les garçons d'aller puiser de l'eau pour les besoins quotidiens de leur famille.
- Les femmes et les filles assurent la collecte d'eau dans sept sur dix ménages dans 45 pays en voie de développement.
- le fardeau de la corvée d'eau incombe surtout aux femmes et aux filles qui assurent 72% de cette tâche, ce qui exige d'elles une énergie et un temps précieux.

DANS LE DÉSERT

- La pénurie d'eau est tout à fait **normale**
- La solution est **difficile et coûteuse**

EN DRC

- La pénurie d'eau **ne doit pas se vivre**
- La solution doit être **simple et moins coûteuse**

Les maladies d’origine hydrique

Les bactéries et vers minuscules vivent naturellement dans l’eau. Les bactéries sont des micro-organismes, qui sont, pour la plupart, inoffensives ou bénéfiques pour l'organisme. Mais certaines d'entres elles peuvent provoquer des maladies dévastatrices chez les humains. Et puisqu’elles sont invisibles, elles sont inévitables. Chaque verre d’eau souillée est un tueur potentiel. La plupart de ces maladies d’origine hydrique n'existent pas dans les pays développés grâce à des systèmes sophistiqués qui ont pour but de filtrer et chlorer l’eau afin d’éliminer touts organismes porteurs de maladies. Toutefois, la fièvre typhoïde, le choléra et bien d'autres maladies sont encore répandues dans les pays en voie de développement.

L’eau et les jeunes enfants

Les nourrissons et les jeunes enfants sont particulièrement vulnérables aux maladies puisque leur système immunitaire est confronté pour la première fois à toute situation.

Les effets

- 1 décès d'enfants de moins de 5 ans sur 4 dans le monde est dû à une maladie liée à l’eau contaminée.
- Dans le monde, 80 % des maladies est lié à la consommation d'eau non potable et à des conditions d'assainissement et d'hygiène inadéquates.

Les effets

- Dans des régions telles que l’Afrique subsaharienne, le temps perdu à collecter de l’eau et la souffrance de maladies d’origine hydrique limitent le véritable potientiel des populations, ***en particulier des femmes et des filles.***

Les effets

- Plus de la moitié des africains n‘ont pas accès à une eau propre, sûre et potable (ONU).
- En Afrique, une femme marche une distance quotidienne moyenne de 6 kilomètres pour environ 8 heures de temps à collecter de l’eau.

Les effets

- Les femmes peuvent dépenser environ 85 % de leur énergie quotienne à collecter de l’eau.
- En Afrique, les femmes portent entre 18 et 25 kilogrammes d'eau sur la tête ou au dos en un seul voyage.




RIEN QU'EN AFRIQUE SUBSAHARIENNE, LES FEMMES PASSENT 40 MILLIARDS D'HEURES PAR AN À L'APPROVISIONNEMENT EN EAU DES MÉNAGES.

SANS EAU POTABLE

Vous ne pouvez pas rester en bonne santé.

Vous ne pouvez pas continuer votre éducation.

Vous ne pouvez pas continuer à travailler.

L’ ACCÈS À L’EAU POTABLE PERMET …

L’ÉDUCATION

- Lorsque les élèves sont libérés de collecter de l’eau, ils pourrront continuer leur éducation.

LA SANTÉ

- Une eau potable et salubre est essentielle pour une vie saine.

LA PAUVRETÉ

- L’accès à l’eau potable peut briser le cycle de la pauvreté.

L'UNESCO DIT QUE…

L'EAU POTABLE EST INDIPENSABLE!

Il existe sur la Terre une quantité d'eau suffisante pour répondre aux besoins de tous. Toutefois, l'eau est inéquitablement répartie, certains pays profitant de ressources abondantes alors que d'autres doivent conjuguer avec une situation de stress ou de rareté hydrique constituant un obstacle important à leur développement. Si la tendance actuelle se maintient, les deux tiers de la population mondiale pourraient faire face au stress hydrique d'ici 2025. La crise de l'eau menace donc de contrecarrer les efforts déployés jusqu'ici pour lutter contre la pauvreté et favoriser le développement durable au niveau social, économique et environnemental.

Outre la rareté résultant de conditions naturelles ou géographiques, de nombreux pays font face à un enjeu de rareté économique de l'eau : bien que les ressources soient relativement importantes, les infrastructures sont insuffisantes pour permettre à la population d'y avoir accès. Globalement, la crise de l'eau concerne 748 millions de personnes, qui encore aujourd'hui sont privées d'accès à l'eau potable. De plus, 2,5 milliards de personnes vivent sans accès à des installations sanitaires adéquates, ce qui constitue un risque additionnel pesant sur leur santé et leur développement, en plus d'altérer considérablement la qualité de l'eau et de l'environnement. L'eau contaminée est ainsi à l'origine de nombreuses maladies pouvant s'avérer mortelles. Chaque année, l'accès inadéquat à l'eau potable, à l'assainissement et à l'hygiène tue 3,5 millions de personnes. Particulièrement vulnérables, les enfants sont les premières victimes de ce fléau :chaque minute, un enfant meurt d'une maladie liée à l'eau contaminée.

Les femmes sont elles aussi concernées de façon disproportionnée par le manque d'accès à l'eau. Traditionnellement responsables de la collecte de l'eau, elles doivent souvent parcourir de longues distances pour se rendre à la source. Les femmes et les filles consacrent ainsi jusqu'à 6 heures par jour à cette corvée, qui les empêche de s'investir dans des activités productives ou éducatives. Leur indépendance financière s'en trouve donc limitée, ce qui contribue à renforcer l'inégalité homme-femme souvent profondément ancrée dans les mœurs et la culture. En raison de leurs besoins hygiéniques spécifiques, le manque d'accès à l'assainissement nuit quant à lui à la dignité des femmes, en plus de mettre à mal leur santé et leur sécurité.

Organisation
des Nations Unies
pour l'éducation,
la science et la culture

La crise de l'eau se répercute aussi sur la sécurité alimentaire des populations. Le manque d'accès à l'eau limite la productivité des cultures, ce qui nuit immanquablement à la santé nutritionnelle des familles dépendantes de l'agriculture de subsistance. Leurs revenus et leur mode de vie s'en trouvent menacés, limitant leurs chances d'échapper à la pauvreté.

Le manque d'accès à l'eau constitue donc une contrainte importante au développement humain et socio-économique. L'accès universel à l'eau potable et à l'assainissement permettrait de réduire radicalement la présence des maladies diarrhéiques et, de ce fait, de réaliser annuellement des économies de 11,6 milliards de dollars en frais de santé. En tenant compte du gain de productivité estimé (5,6 milliards de journées de travail additionnelles par an), les économies annuelles totales qui seraient générées dans le monde en développement s'élèvent à 263 milliards de dollars.

Pour des millions de personnes, améliorer l'accès à l'eau potable et à l'assainissement permet d'élargir l'horizon des possibles. Il s'agit donc d'une condition inéluctable à l'éradication de la pauvreté et au développement durable des communautés.


ALORS… LE MANQUE D’EAU POTABLE EST
UN PROBLÈME NON SEULEMENT SOCIAL,
MAIS AUSSI ÉCONOMIQUE.

GE SOLUTION contribuera à assurer un approvisionnement en eau potable et salubre aux enfants dans le besoin.

LES OFFRES DE

GE SOLUTION

PROPOSAL FOR A SHORT SOLUTION FOR RURAL AREAS IN DRC

It should be made clear that this preliminary report and the attached budget for providing safe drinking water to rural areas of Equator Guinea are based on the information and data obtained from public sources and may not represent the actual conditions prevailing at the site. Immediately after the review and acceptance of them a technical team will be dispatched to the site to study actual field conditions and collect the necessary data from the relevant authorities.

By reviewing the available information, the following issues are considered in evaluating the report;

- Providing water from surface water sources is not possible due to the high risk of contamination,
- Underground water should be used for avoiding the risk,
- However, water from shallow wells still have the risk of contamination,
- Therefore, deep wells are the only solution for the clean and safe water,
- However, manually operated pumps can not be used for pumping out the water below a certain depth. Therefore, electrically powered pumps are the only solution.
- Unfortunately, almost none of the villages under consideration is connected to national power network,
- As the quickest and less costly solution, solar cell panels are thought to be used for energizing the pumps which are to be installed in to the wells to be drilled for each village,
- Additionally, three more alternative approaches were studied for other, more comprehensive but more costly, multipurpose solutions,

- Difference of those three alternatives from the first, main alternative is the method of providing the energy for the pumps. In all of them, energy is thought to be provided from the main power network of the Country by constructing new, additional transmission lines and transformers,
- There will be an elevated water tank at each village. Water coming from the pump will be stored at those elevated tanks. Water will flow by gravity to the taps to be installed just below the elevated tanks. No distribution network to the houses is within the scope of this Project.
- Locations of some of the settlement areas could not be found on the territorial maps although their names are mentioned in the documents provided by the Client. The cost of providing water to those settlements is also included in the total cost proposed.
- Details of the alternative solutions are given below.

PROJECT ALTERNATIVES

- **SOLAR POWERED ALTERNATIVE**
- Deep wells, water depots and one water distrubiton point in every village
- Solar panels for well and pumps will be supplied for the energy needed

- Deep wells and power Transmission lines for well and pump will be supplied in central villages
- Water will be distrubuted by pipelines to the neighbour villages
- Water depot and one water distrubiton point in every village

- Deep wells and power transmission lines for well and pump will be supplied in every village
- Water depot and one water distrubiton point in every village

- Deep wells and power transmission lines for well, pump and all dwellings will be supplied in every village
- Water depot and one water distrubiton point in every village

ALTERNATIVE 1
SOLAR POWERED SOLUTION

SCOPE :

- One well drilled at each village, min. 30, max 100 m. deep.
- Supply and installation of the special deep well pump,
- Supply and installation of 4 (four) sun power panels, (installed on the platform made for the water tank),
- Supply and installation of the instrumentation system to control the proper operation of the system,
- Supply and installation of modular water tanks made of GRP material (installed on a elevated, steel platform)
- Supply and installation of the necessary piping and fixtures
- Water will be distributed in the village by tap
- **CONSTRUCTION PERIOD :** 14 months after mobilization

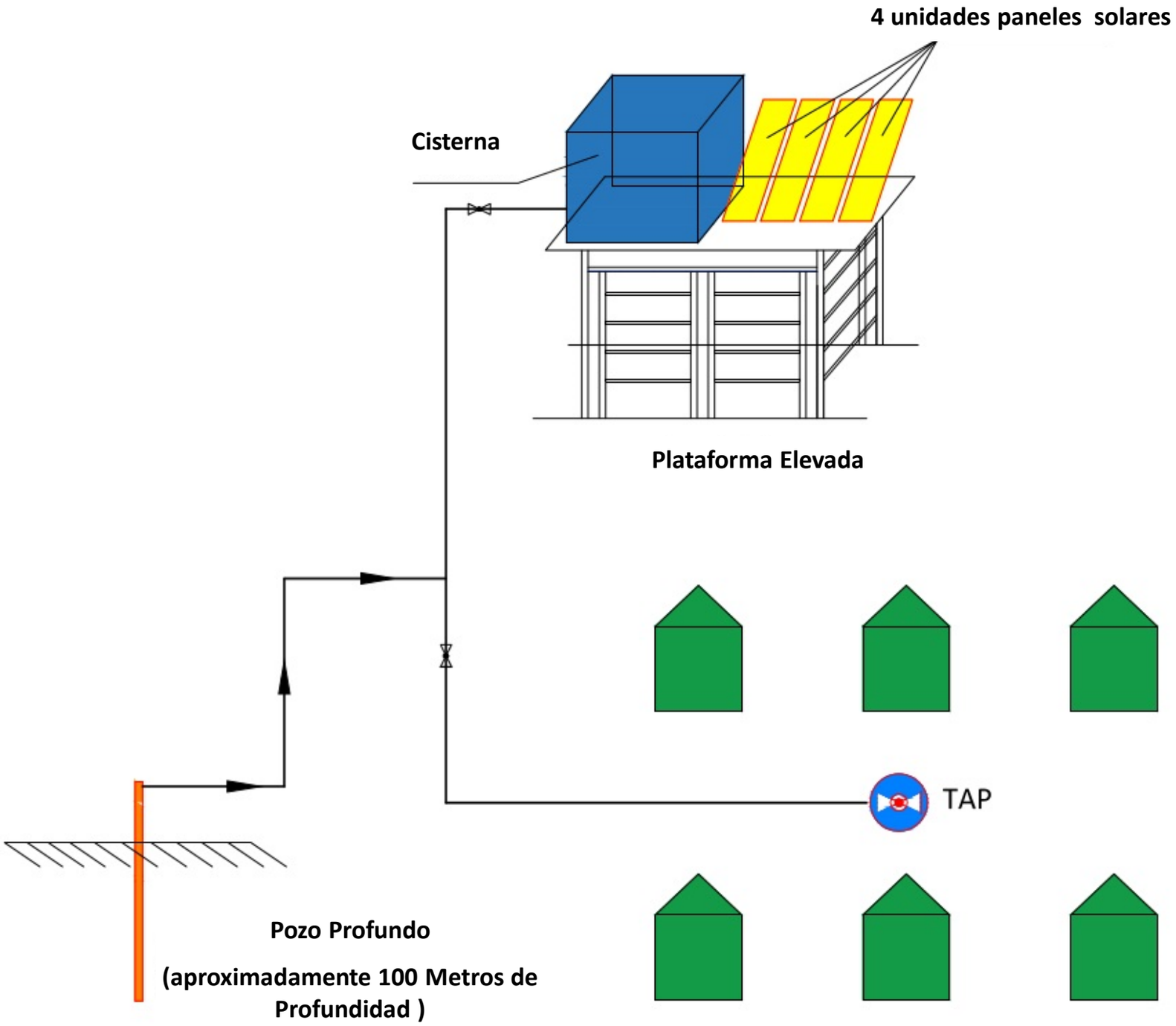
General Flow Chart For ALTERNATIVE 1

A) Main Production Site

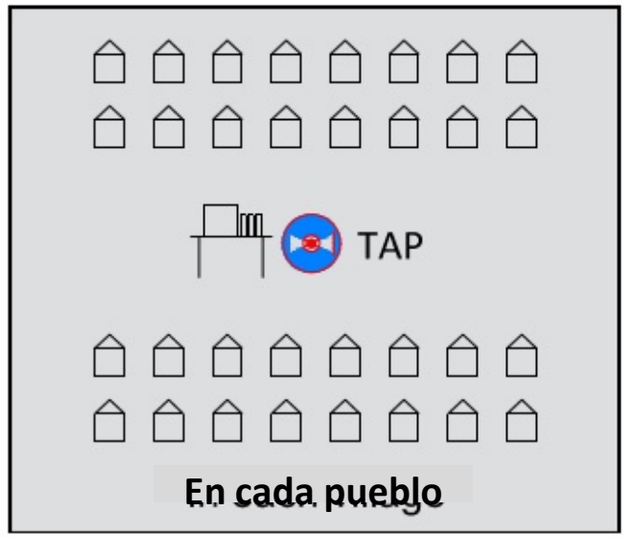
B) Consumption Site

Water Resource (Underground Water) → Water Well → Water Pump → Storage / Solar Panels → Distribution

Proyecto N1



Plan Principal



ALTERNATIVE 2

DRILLING WELLS AT SOME CERTAIN LOCATIONS AND PROVIDING WATER TO OTHER LOCATIONS BY PIPELINES

SCOPE :

- Drilling one well at a central location to serve approximately 8 – 10 villages, min. 30, max 100 m. deep.
- Supply and installation of the special deep well pump,
- Supply and installation of the water tank at the central location to serve as a reservoir before the water transmission network.
- Supply and installation of the main pump to pump the water into the water transmission network
- Construction of the water app. 420 km of main lines made of HDPE100 pipes buried underground between the central location and each other village. (including all the pipes, air valves, discharge valves, all kinds of construction works etc.)
- Construction of the necessary power transmission lines from the nearest substation and installation of the necessary transformers to run the pumps at each central location.
- Supply and installation of all the instrumentation system to control the proper operation of the system,
- Supply and installation of modular water tanks at every village area, made of GRP material. Supply and installation of the necessary piping and fixtures for those tanks.
- **CONSTRUCTION PERIOD :** 14 months after mobilization

General Flow Chart For Alternative 2

A) Main Production Site (Central Village)

B) Consumption Site (Central and Neighbour Villlages)

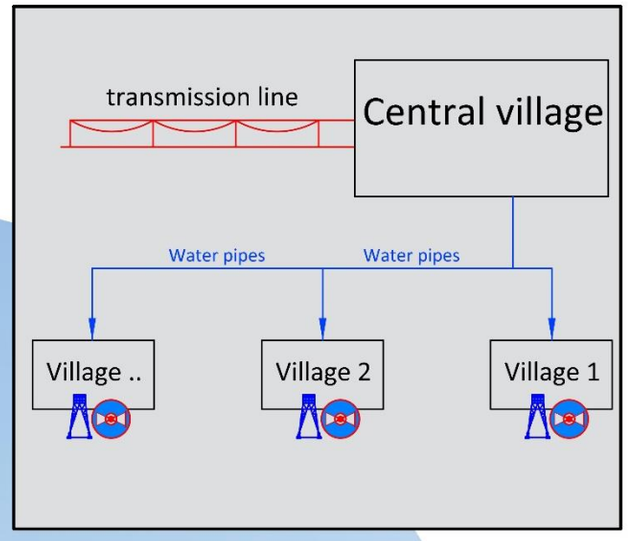
Water Resource (Underground Water) → Water Well and Deep Water Pump → Water Storage and Distrubution Water Pump → Distrubution to the neighbour villages by pipes → Storage → Distribution

Power Transmission Line

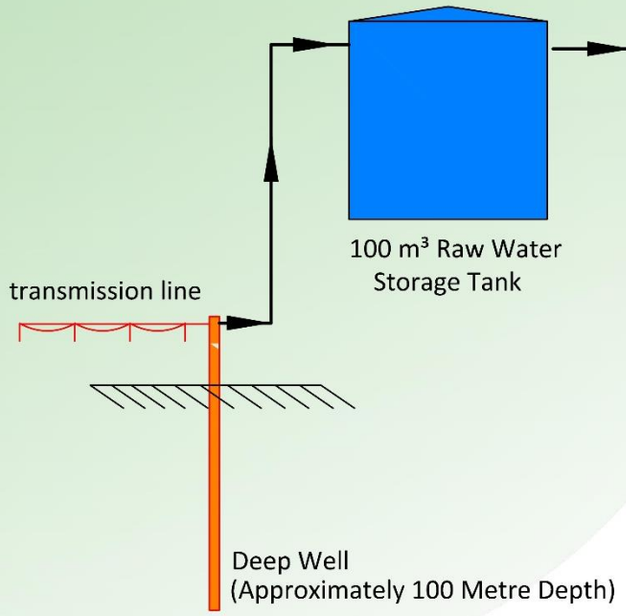
DEMOCRATIC REPUBLIC OF THE CONGO
National capital
District capital
City, town
Major airport
International boundary
District boundary
Main road
Secondary road
Railroad
0 100 200 300 km
0 100 200 mi
CAMEROON
CENTRAL AFRICAN REPUBLIC
SOUTH SUDAN
UGANDA
RWANDA
BURUNDI
UNITED REPUBLIC OF TANZANIA
ZAMBIA
MALAWI
ANGOLA
Cabinda (ANGOLA)
ATLANTIC OCEAN
Bangui
Juba
Kampala
Kigali
Bujumbura
Brazzaville
Kinshasa
Libreville
Luanda
Bangassou
Zongo
Gbadolite
Libenge
Gemena
Businga
Bondo
Uele
Ubangi
Aketi
Buta
Isiro
Watsa
Faradje
Kibali
Mungbere
Gulu
Ituri
Bunia
Lake Albert
Lake Kyoga
Jinja
Lisala
Bumba
Mongala
Imese
Impfondo
Ouesso
Oubangui
Congo
Lopori
Basoko
Aruwimi
Banalia
Bafwasende
Lulonga
Basankusu
Yangambi
Kisangani
Beni
Butembo
Kasese
Bolomba
Ekoli
Liranga
Mbandaka
Boende
Ubundu
Peneluta
Lake Edward
Lake Victoria
Tshuapa
Lomami
Lualaba
Lubutu
Lomela
Ikela
Luilaka
Punia
Goma
Inongo
Lake Kivu
Ulindi
Bolobo
Kutu
Lac Mai-Ndombe
Bukavu
Butare
Kindu
Bandundu
Lukenie
Kole
Lodja
Kilembwe
Uvira
Kasai
Kibombo
Makobola
Ilebo
Sankuru
Bena
Kwilu
Kenge
Bulungu
Mweka
Lusambo
Mamba
Kasongo
Kigoma
Pointe-Noire
Kikwit
Lubao
Kongolo
Tabora
Boma
Matadi
Mbanza-Ngungu
Kananga
Mbuji-Mayi
Kabalo
Lukuga
Kalemie
Tshikapa
Kabinda
Mpala
Lake Tanganyika
Rukwa
N'zeto
Kwango
Kahemba
Mwene-Ditu
Manono
Moba
Kabamba
Sumbawanga
Luvua
Pweto
Moliro
Kapanga
Kamina
Mbeya
Lulua
Katanga Plateau
Lake Mweru
Saurimo
Dilolo
Kolwezi
Kasenga
Likasi
Lake Bangweulu
Zambeze
Lubumbashi
Luena
Solwezi
Kipushi
Lobito
Sakania
Ndola
MITUMBA
MOUNTAINS
10°
15°
20°
25°
30°
5°
0°
© Nations Online Project

Project N2

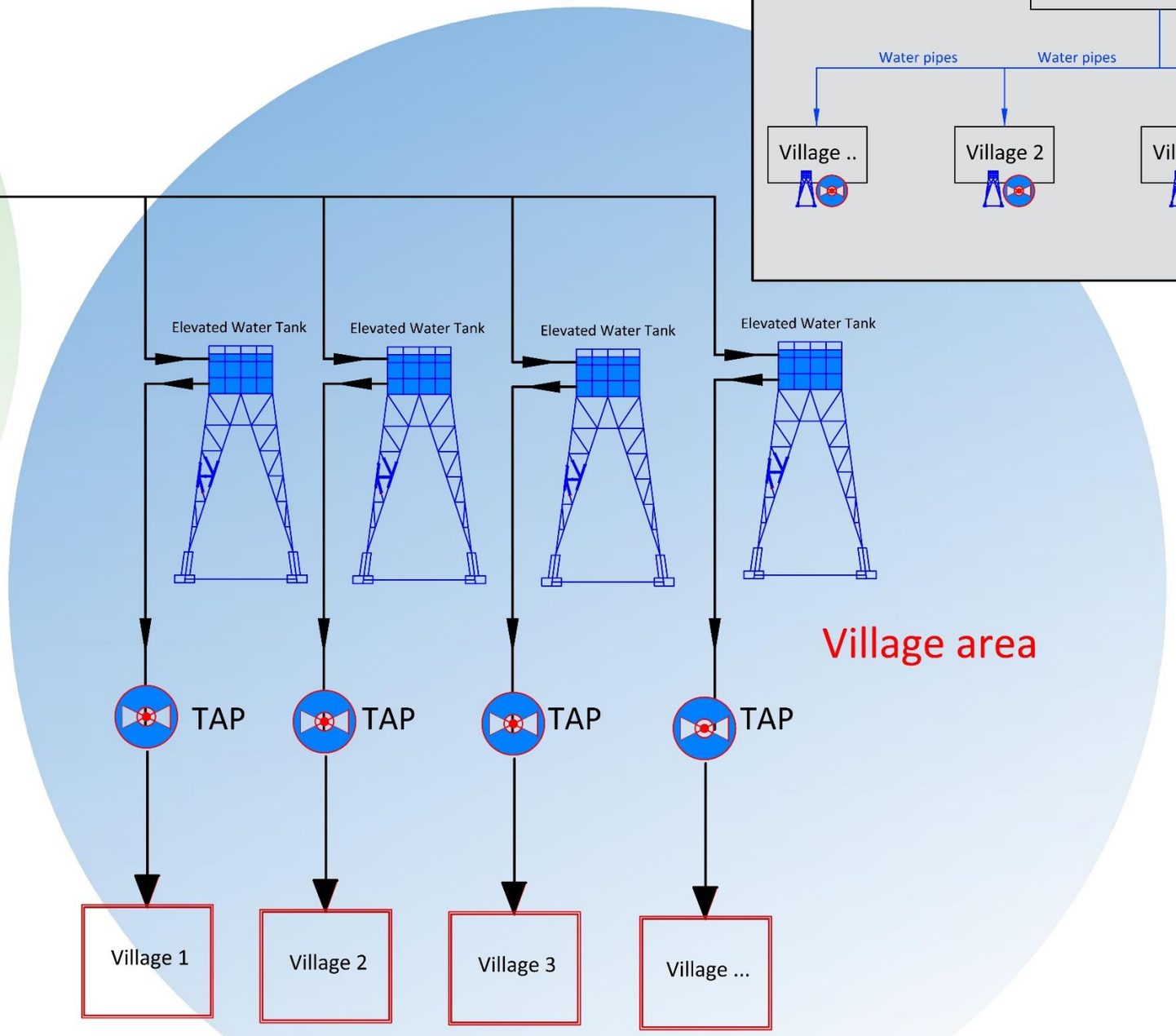
Principle scheme



Well area



Village area



ALTERNATIVE 3
WELLS AT EACH VILLAGE POWERED BY NATIONAL NETWORK.

SCOPE :

- Drilling one well at each location, min. 30, max 100 m. deep.
- Supply and installation of the special deep well pump,
- Construction of the necessary transmission lines from the nearest substation and necessary transformers to run the pumps at each village area. (Capacity just enough to power the water pumps.)
- Supply and installation of the instrumentation system to control the proper operation of the system,
- Supply and installation of modular water tanks made of GRP material (installed on a elevated, steel platform.)
- Supply and installation of the necessary piping and fixtures.
- **CONSTRUCTION PERIOD :** 14 months after mobilization

General Flow Chart For Alternative 3

A) Main Production Site

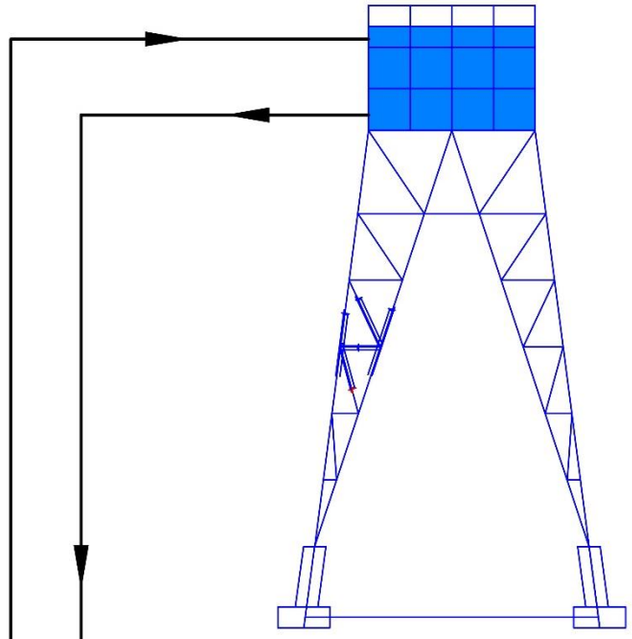
B) Consumption Site

Water Resource (Underground Water) → Water Well → Storage → Distribution

Power Transmission Line

Project N3

Elevated Water Tank

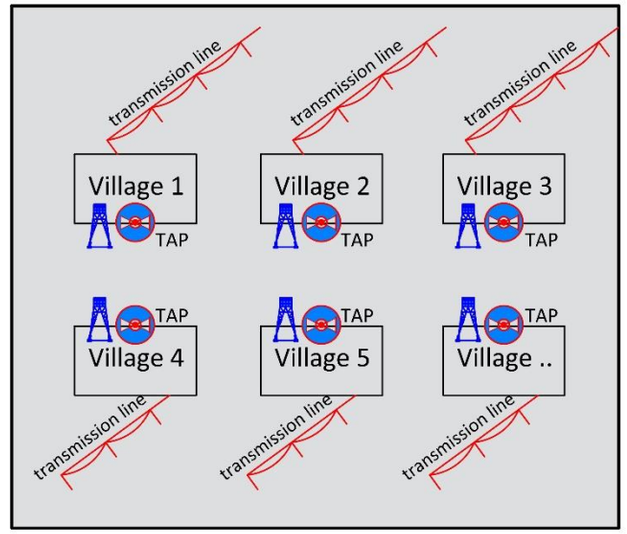


transmission line

Deep Well
(Approximately 100 Metre Depth)

TAP

Principle scheme



ALTERNATIVE 4

ENERGISING THE WELLS AND BUILDINGS AT EACH VILLAGE FROM THE NATIONAL NETWORK

SCOPE :

- Drilling one well at each location, min. 30, max 100 m. deep.
- Supply and installation of the special deep well pump,
- Construction of the necessary transmission lines from the nearest substation and installation of the necessary transformers to run the pumps at each village area.
- Construction of the necessary power distribution network within the villages and providing electricity to the buildings.
- Supply and installation of the instrumentation system to control the proper operation of the system,
- Supply and installation of modular water tanks made of GRP material (installed on a elevated, steel platform.)
- Supply and installation of the necessary piping and fixtures
- **CONSTRUCTION PERIOD :** 14 months after mobilization

General Flow Chart For Alternative 4

A) Main Production Site

B) Consumption Site

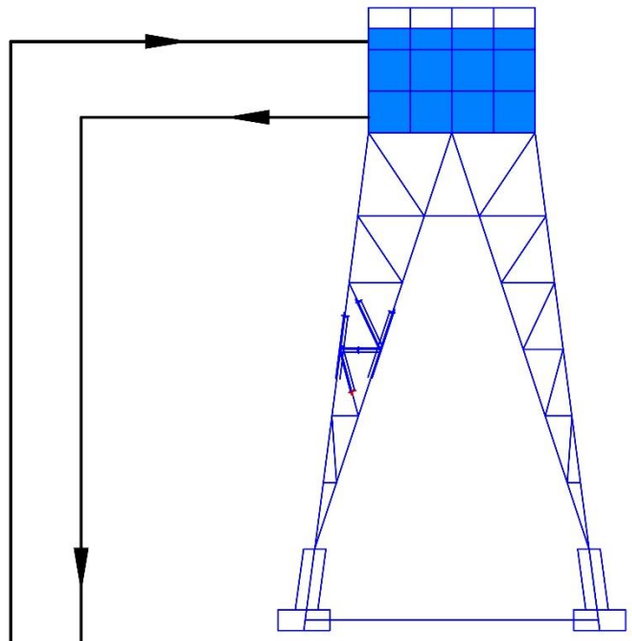
Water Resource (Underground Water) → Water Well → Water Pump → Storage → Distribution of Water by tap and electricity for every wells & houses

Power Transmission Line

Power Distrubution Lines to the buildings

Project N4

Elevated Water Tank



TAP

transmission line

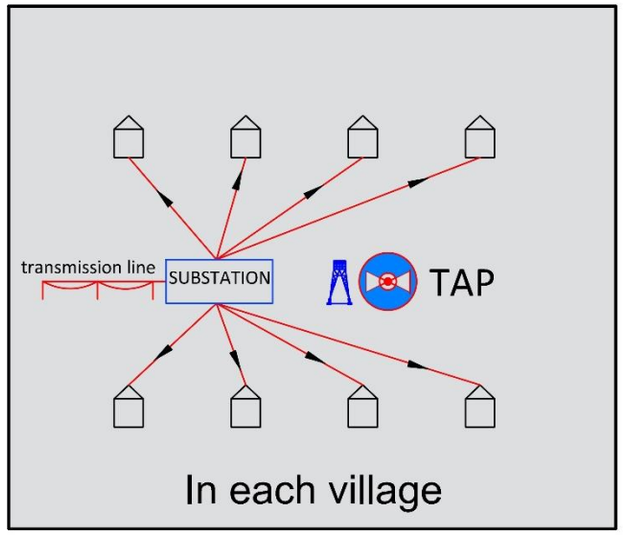
transmission line

transmission line

transmission line

Deep Well
(Approximately 100 Metre Depth)

Principle scheme



Construction Works

Well Drilling

Earth Works

Pipe Work

Elevated Water Tank

Distribution Points / Taps

Electrical Works

SOLAR PANELS

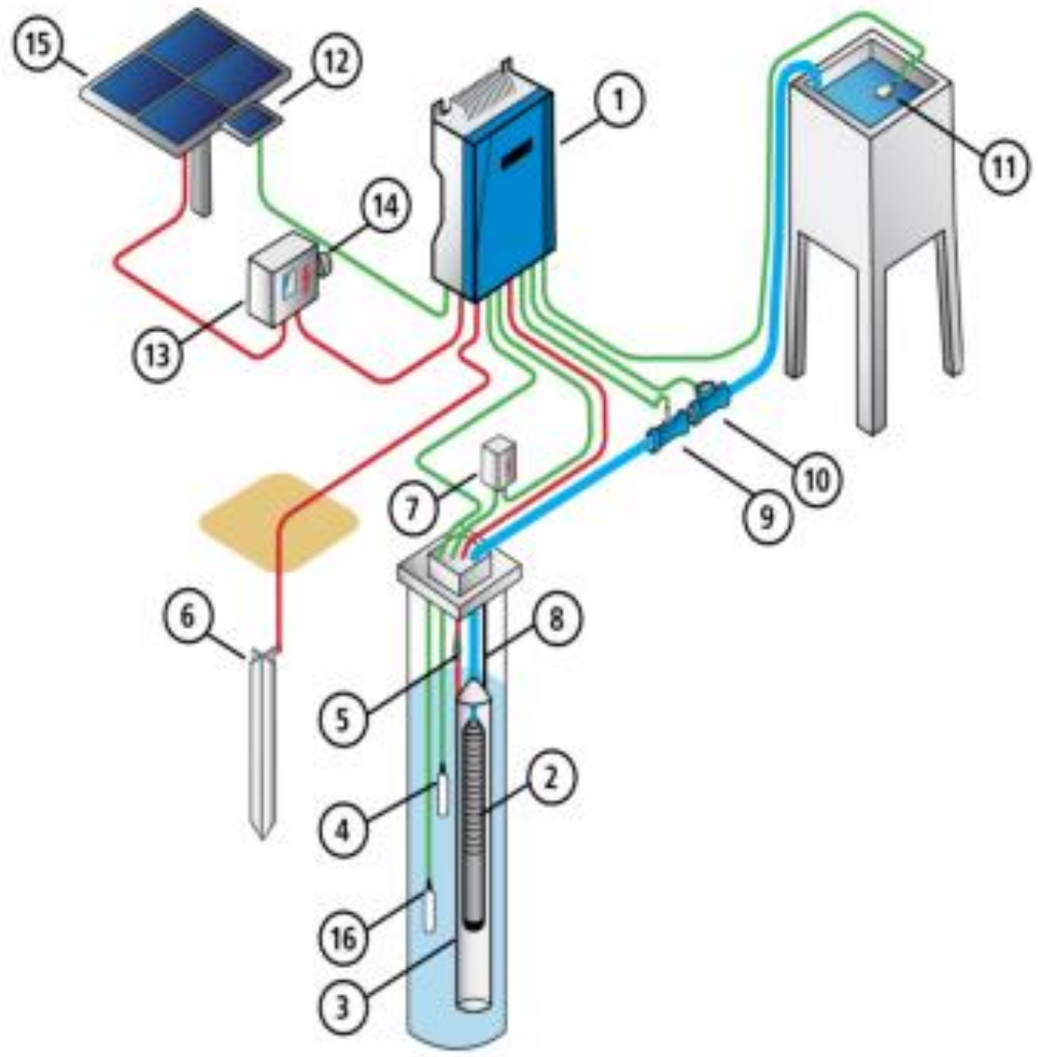
TRANSMISSION LINES

ELECTRICITY WILL BE SUPPLIED EITHER BY SOLAR PANELS OR TRANSMISSION LINES REGARDING TO THE ALTERNATIVE PROJECTS

Solar pumping project

(Fully Automatic Control System for alternative project 1)

System Layout

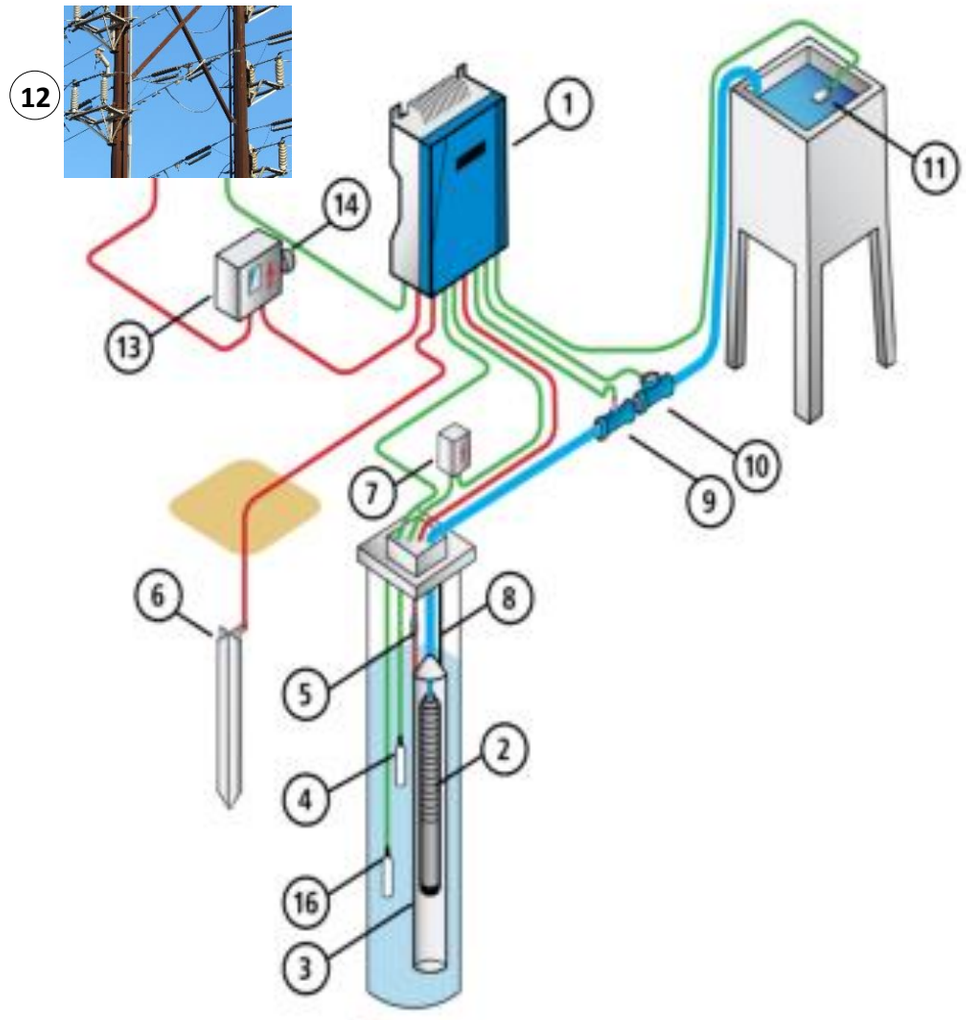


1: PS2 Controller	11: Float Switch
2: Submersible Pump	12: Sun Switch
3: Stilling Tube	13: PV Disconnect
4: Well Probe	14: Lightning Surge Protector
5: Cable Splice Kit	15: PV Generator
6: Grounding Rod	
7: Surge Protector*	
8: Safety Rope	
9: Water Meter	
10: Pressure Sensor	

*It is recommended to install a Surge Protector at each controller sensor input.

Transmission Line Pumping System (Fully Automatic Control System for Alternative Project 2-3-4)

System Layout



1: PS2 Controller	**11:** Float Switch
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5: Cable Splice Kit	
6: Grounding Rod	*It is recommended to install a Surge Protector at each controller sensor input.
7: Surge Protector*	
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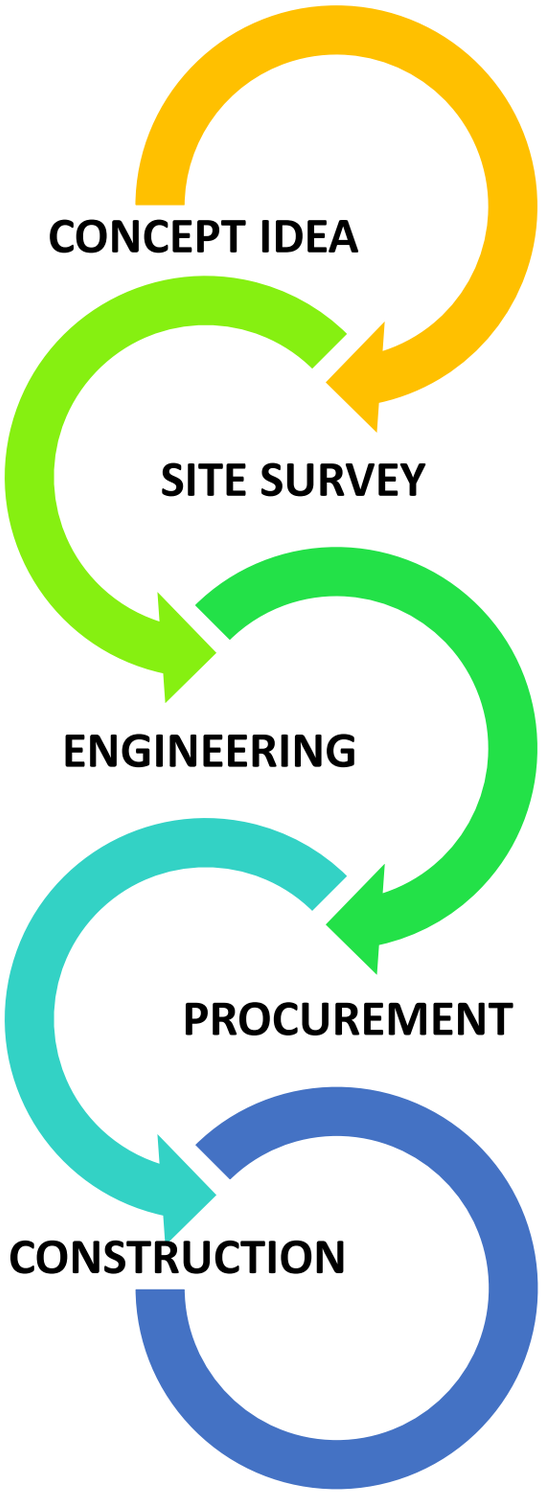
9: Water Meter	
10: Pressure Sensor	

Project Type



CATALOGS

LORENTZ Solar Water Pumping

For BERNT LORENTZ GmbH & Co KG

Who we are

- Focused on the solar market for over 15 years

- Established 1993 in Germany
  - Registered with the German Chamber of Commerce

- Optimized company, highest quality at competitive prices
  - Headquarters, engineering and key component sourcing in Hamburg, Germany
  - Manufacturing across the world in our own factories under German management
  - 200+ staff
  - ISO 9001 certified, MET (UL)

History

1993

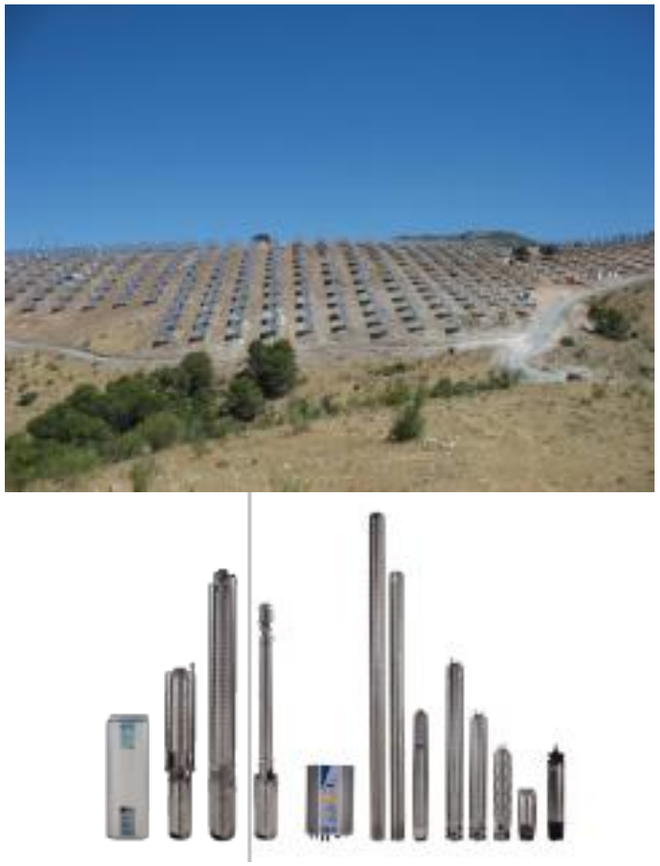
Formed

1995

First Solar Pump

2000

Brushless DC motor



2007-2016

Market leaders

Today

Design and manufacture

Support our partner network

Specialize in high growth markets

- Drinking Water
- Irrigation
- Responsible Leisure
- Solar Capture

Today

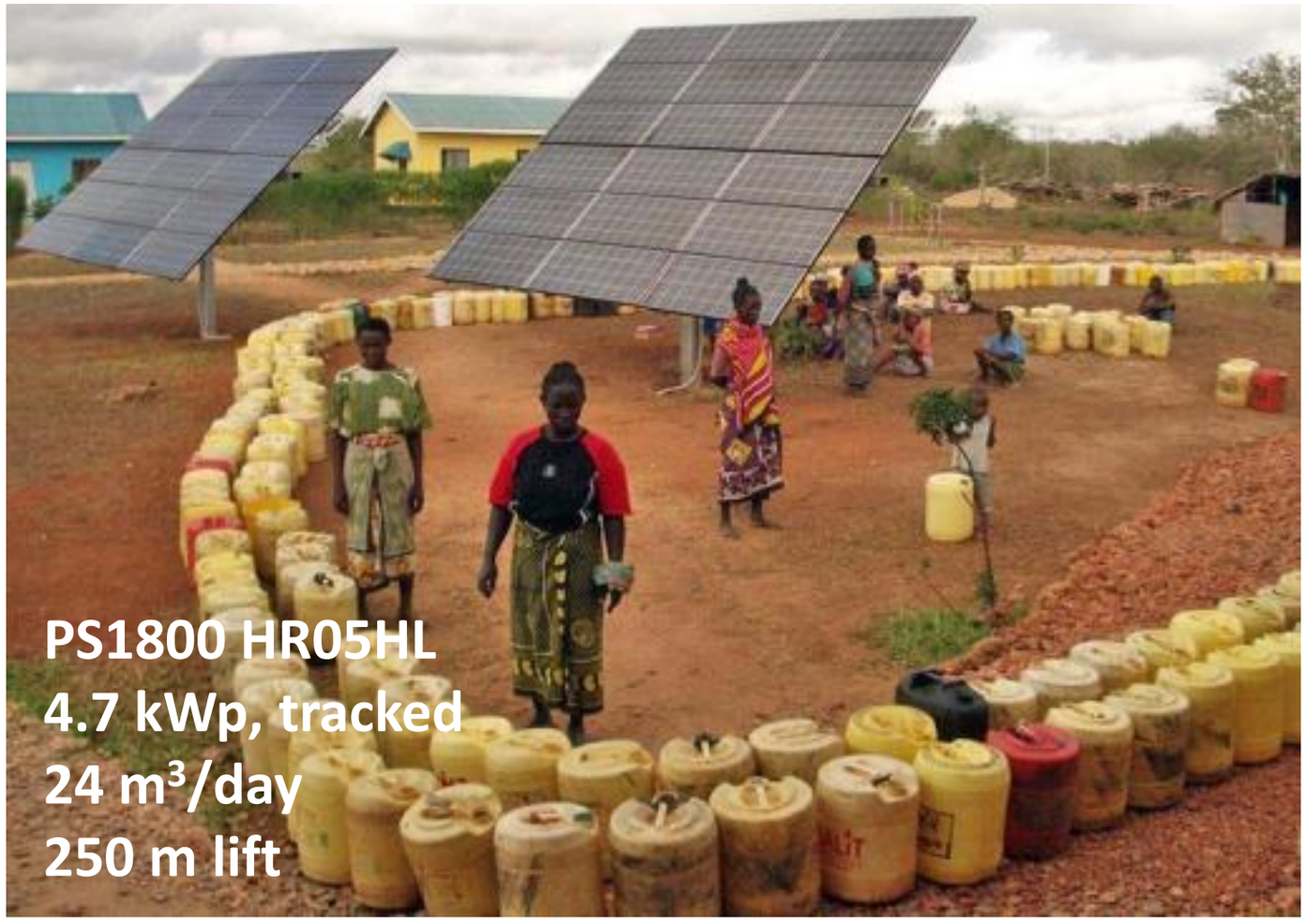
- Largest range of solar pumps in the industry
- Very successful in both the drinking water and irrigation markets
- Market leading new technology
- Continuous portfolio growth to meet partner and customer needs
- Best partner support package

PumpScanner

partnerADVANTAGE

partnerNET

Drinking Water - People



- Reliability and long life are critical
- Extended test process
- High lift and high volumes
- Pumps designed and manufactured for optimum performance and efficiency in local water conditions

- Water projects in >200 countries

Drinking Water - Livestock

- High pump efficiency and high reliability ,coupled with reducing PV costs means very low cost of ownership


Cattle farming, USA

- Mature, proven technology
- Long life
  - Pump end life typically 7 years
  - Motor life typical 9 years
- Typical breakeven is 0.5 to 3 years against diesel pumping
- More predictable than wind power plus lower service costs and no access issues

Irrigation

- Pump efficiency and improved capture makes even high volume flood irrigation feasible
- Projects are pushing towards 1,000,000 gallons per day

- Solar applications well matched to drip irrigation
- Growing application due to efficient water use
- Great diesel replacement

Responsible Leisure

- Swimming pool pumps power by solar engery are a natural fit
  - Cash saving
  - Break even < 5 years
  - Environmental benefits

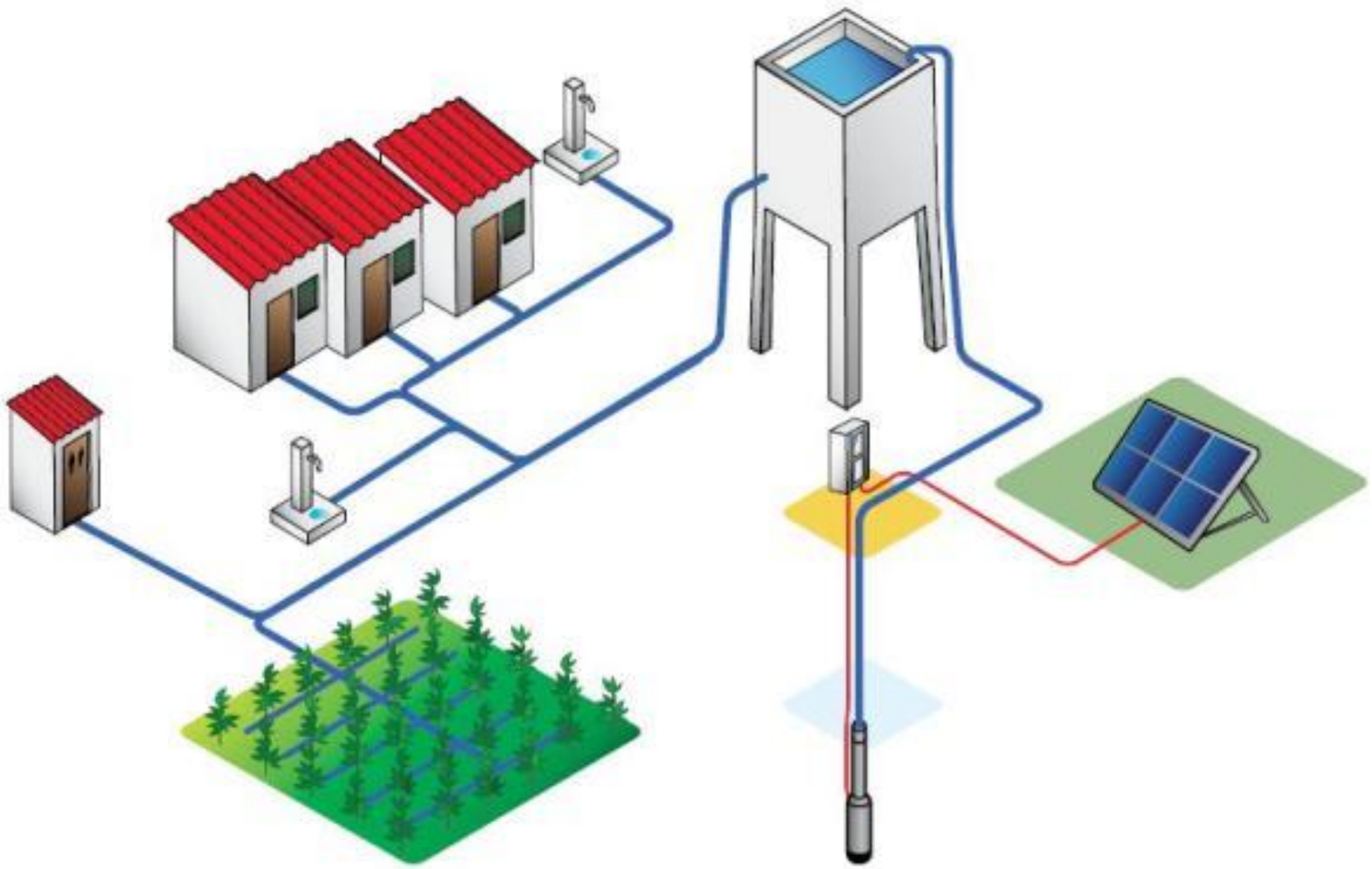
- Existing AC pumps = largest home power consumer besides air-con
- UL certified products available

Solar Capture

- Off grid solutions
- Remote power
- Extended pumping time
- Up to 40% additional yield

- On grid solutions
- Maximum yield per sqm
- Feed in tariffs
- Long life
- Maintenance free
- Preserves agricultural land

Concept



- Key components
  - Pump
  - Solar Generator
  - Controller
  - Water storage
  - Water distribution
- Principles
  - Store water, not electricity
  - Design water solutions, not always replicate the existing

PS Submersibe Solar Pump Systems
PS150-PS4000

- Flow rate up to 70 m^3/h
- Lift up to 350 m
- Centrifugal and helical rotor pump ends

PSk2 Submersible Solar Pump Systems
PS9k2, PS15k2, PS21K2, PS25K2, PS40K2

- Flow rate up to 241 m^3/h
- Lift up to 200 m

PS Surface Solar Pump Systems
PS150-PS1800

- Flow rates up to 36 m^3/h
- PS150 Boost pump designed for high pressure applications
- PS600 and PS1800 designed for low head, high flow applications
  - Swimming pool circulation and filtering
  - Water transfer

PSk2 Surface Solar Pump Systems

- Designed for high head surface applications (irrigation, drinking water and industrial processes)
- Diesel pump replacement
- Flow rates up to 300m³/h
- Dynamic head to 90m
- All the features of the PSk2 submersible pump controller

Innovation

PS DataModule

PumpScanner

- Records voltages, speed, head, flow for up to 10 years internally
- Data accessed from Android App via Bluetooth
- Pump can be controlled (speed, on / off)

Innovation

PS DataModule

PS Controller

PS Communicator

PumpScanner

- Remote data transmission and monitoring service
- Additional standalone, self powered communication terminal
- Collection of data at a central point

For access anywhere

Systems in action – Irrigation

Location

- Rajasthan, Shri Ganganagar

Solar Pump System

- 1x LORENTZ PS4000 C-SJ17-4
- Total Dynamic Head (TDH): 20 m
- Cable Length: 25 m
- Water Reservoir: Tank
- Water Source: watercourse

Solar Generator

- 14x 230 Wp, crystalline
- 3.2 kWp

Installation

- March 2012

Systems in action - Irrigation

Location

- Morocco

Solar Pump System

- 2x LORENTZ PS15k
- 1xLORENTZ PSk21k
- Complete solar powered drip irrigation system for 35 Hectares of Orange Trees. 1 pump brings water from a borehole lifting 92m to a reservoir. 2 pump system distribute water from the reservoir to drip irrigation for the Orange Trees. Over 2000m3 per day

Solar Generator

- 288x 240 Wp, crystalline
- 67 kWp

Installation

- February 2013

Our products are simply better

- Highest efficiency pump range in the industry
- Intelligent design
  - No electronics in the well
  - Water filled & lubricated motors
  - Only corrosion free materials are used
  - 7 x thicker stainless steel walls (PS range) than our competition
  - All pumps are speed adjustable
- Modular solution for optimum sizing, best application fit and reduced spares inventory
- Data ready

We have the best service and support

- Over 1000 approved partners have chosen LORENTZ
- Professional partner management and excellent partners
- Excellent pre sales support and training
- The right tools and support to help our partners – partnerNET / COMPASS
- Global distribution – to share learning
- After sales support with 24 hour response time
- Significant investments in sales and market support for our partners

Partner focused = customer focused

partnerADVANTAGE

our professional partner program which provides a framework for doing business and protects our partners investments

partnerNET

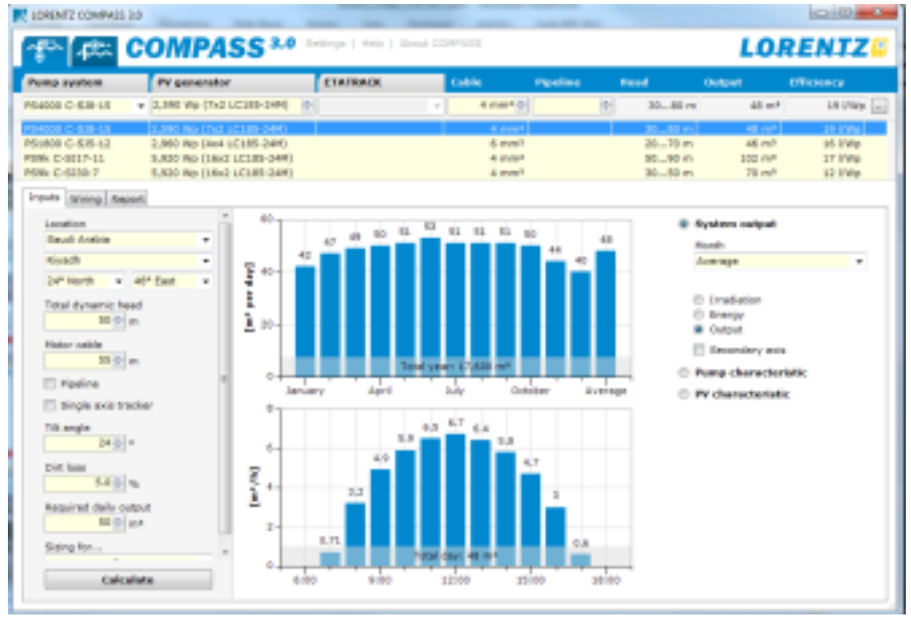
our advanced extranet service for sales, marketing, technical information, news, advice and partner services, including sales leads

partnerACADEMY

our partner training and certification program

COMPASS - The ultimate sales, sizing and specify tool

- PC based tool to simply specify systems in real time
- Accurate and realistic sizing
  - Over 250,000 Cities
  - 1° grid irradiation database NASA
  - Temperature and precipitation database
- Powerful sales tool
- Fit the right solution first time!!



Why Lorentz makes sense

- **Focus**
  Very specific, solar capture and pumping market
- **Global reach**
  experience and access to global markets
- **Family values**
  trust, honesty and in control of our own direction
- **Professional partners**Rahimafrooz / LORENTZ relationship is very strong
- **Partner support**
  excellent technical support, information, training and tools
- **Engineering excellence**
  German engineering coupled to best value,
  highest quality in-house manufacturing

Sun. Water. Life.

LAST TECHNOLOGY in the World

GRP (Composite)
MODULAR WATER DEPOTS

Meksis
Mekanik Sistemler

WHAT IS GRP?

GRP is composed of strands of glass. Each individual glass fibre is very fine with a small diameter, and they are woven to form a flexible fabric. The fabric is normally placed in a mould, for instance a mould for a canoe and polyester resin is added, followed by a catalyst (to speed up the reaction). The process is repeated so that there are many layers of fibre glass and resin and allowed to dry/cure. The resulting material is strong and light. Glass Reinforced Plastic can be sanded for a smooth finish and painted.

FROM NOW ON YOUR DEPOTS ARE MORE

Clean And Hygienic, Light And Esthetic,

WITH HIGH DURABILITY AND ECONOMIC

THE USAGE AREAS OF GRP DEPOTS

- Drinking Water Tanks
- Rain Water And Well Water, Sea Water Tanks
- Reverze-Osmosis Water (Conductivity Is Very Low And High Water) Tanks
- Fire Water Tanks, Swimming Pools, Balance Tanks,
- Distillation And Process Tanks,
- Brown (Septic), Gray (Household Waste Water) Tanks
- Industrial Process Chillers, Coolers, Water Tanks, Hot Water And Chemical Storage Tanks
- Agricultural Irrigation Areas.

Now, the importance given to the environment and living conditions around the world increases every day, people are working more sensitive and responsive on this issue. The development of green home products and the use of polluting products, used in the production and consumption of goods and energy use the most simple example of this approach.

GRP is an environmentally friendly product completely modular water tanks, why?

A long lifetime is a product design life of GRP tanks are given in 40 years. • In transportation transfers because they are lightweight and are low compared to the energy of metal warehouse spent on installation. • Both pressure deteriorate in water panels produced at high temperatures in both the water and the material exchanges do not do, therefore the water in the tank will always remain clean and hygienic. • the amount of waste materials during the manufacture of GRP tanks are close to zero. • the cleaning and maintenance have not been GRP tanks in algae and microbes occur is very rare in both easy and, therefore, to be used for cleaning chemical waste is minimized . • Make sure the tank panels are very durable and can be used many times in different repositories.

Environmental Product

MODULAR ALTERNATIVES

1 From 1 m3 capacity to 10.000 m3 capacity

ASTOR®

Dağıtım ve Güç Transformatörleri

Distribution & Power Transformers

ASTOR®

DAĞITIM TRANSFORMATÖRLERİ

DISTRIBUTION TRANSFORMERS

Transtek markası altında 25 kVA - 5000 kVA arasındaki güçlerde üst gerilim 36 kV ve alt gerilim 400 V ve benzeri gerilimlerde dağıtım transformatörleri üretmekteyiz.

Üretilen her transformatörümüzü kendi bünyemizde IEC 60076 (TS 267) standartlarında belirtilen rutin testleri uygulayarak sevk eder müşteri isteklerine göre yurtdışında Cesi / İtalya ve IPH / Berlin uluslar arası akretide test laboratuvarlarında yaptığımız kısa devre dayanım testi hariç tip testlerini ve özel testleri bünyemizde gerçekleştirebiliyoruz.

We are manufacturing distribution transformers with rated capacity ranging between 25 kVA - 5000 kVA and having 36 kV as upper limit and 400 V and the like as lower limit.
We apply routine inspections and tests on each of our transformers manufactured in accordance with IEC 60076 (TS 267) within our facilities before dispatching to customers. Upon customer's request, we are able to perform typical tests and special tests with our own available means except for the mechanical endurance test against short-circuit which can be done in the overseas test laboratories of the international accredited institutions viz. Cesi/Italy and IPH / Berlin, Germany.

ASTOR®

GÜÇ TRANSFORMATÖRLERİ

POWER TRANSFORMERS

5000kVA - 63000 kVA arasındaki güçlerde güç trafosu üretimini gerçekleştirmekteyiz.

Güç transformatörlerinde deneyimli mühendis kadromuzla müşteri isteklerine en hızlı şekilde cevap vermekteyiz.

We are manufacturing power transformers with rated capacity ranging between 5000 kVA - 63000 kVA.

We are responding to customers' demands without a moment's delay with our engineering staff well experienced on power transformers.

ASTOR®

GÜÇ ve DAĞITIM TRANSFORMATÖRLERİ

POWER & DISTRIBUTION TRANSFORMERS

SARGILAR / WINDINGS

Dağıtım transformatörlerinin sargılarında iletken malzemesi olarak emaye veya kağıt izoleli yuvarlak ve yassı elektrolitik bakır veya alüminyum iletken kullanılır.

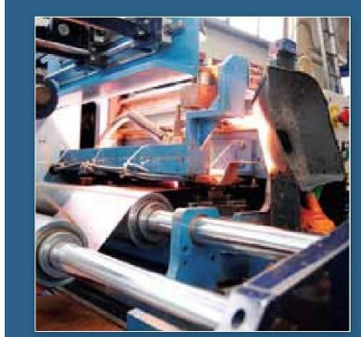
Kullanılan yalıtım malzemesi yüksek ısı ve gerilim sargılarında özel sarım uygulaması ile bobin giriş,çıkış kat yalıtımlarının arttırılması suretiyle gerilim darbelerinin düzgün dağılımı sağlanıp sarımların zorlanması önlenmiştir.

Güç Transformatörlerinin sargıları tasarım şartlarına bağlı olarak devrik ve kat sargı şeklinde yapılmaktadır. Kat sargılarda imalatı kolaylaştırmak ve sarımların temas yüzeylerindeki boşlukları gidermek amacıyla dikey ve yatay yönde pres sistemli bobin makineleri kullanılmıştır.

Round or flat electrolytic copper or aluminum conductors with resin or paper insulations are used in the distribution transformers windings as conduction material.

Homogeneous distribution of voltage impulses is obtained by means of applying special winding process to the windings exposed to high temperatures and voltages, and increasing the layer thickness of the insulation at the coil inlet and outlet. Thus abnormal stresses on the windings are prevented.

According to the design specifications, the winding configuration could be folded winding or layer winding in power transformers. In order to facilitate the production of the layer windings and eliminate the gaps on the contact surfaces of windings, horizontally and vertically operating winding (and insulation) machines having press-like system are used.



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POWER & DISTRIBUTION TRANSFORMERS

NÜVE / CORE

Çekirdek Tipi olup, kristalleri yönlendirilmiş 0.30, 0.27 ve 0.23 mm kalınlığında M5, M4, M3, MOH ve ZDHK silisyum alaşımlı saclardan imal edilmektedir. Manyetik devrenin geçiş bölgesinde 45 derece eğik kesimli saclar CNC Kontrollü kesme makinesinde kesilerek istiflenmekte ve dizilerek manyetik devre oluşturulmaktadır. Manyetik devre kesimi ve dizimi, step-lab denilen ve demir kayıplarını minimum düzeye indiren bir metot ile yapılmaktadır.Çapraz ve boyuna step-lab uygulamaları ile nüve dizilmektedir.

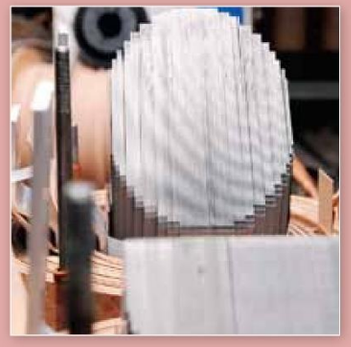
Bacak ve boyunduruk kesitlerimiz eşit olup çok kademeli ve teorik olarak yuvarlak kesitlidir.

Çekirdek sacları U profili ve boyunduruk izole borular içerisinden geçen çelik saplamalar ile sıkıştırılmak suretiyle görüntülü seviyeleri en aza indirilmiştir.

It is of laminated core type and manufactured from silicon alloy sheet steels like M5, M4, M3, MOH and ZDHK with directed crystalline orientation (grain-oriented) and having thicknesses of 0.30 mm, 0.27 mm and 0.23 mm. The sheet steel cut to a mitered form of 45 degrees angle at the section where the magnetic flux passes are slitted into intended shape and stacked with CNC slitting machine and packed to form a magnetic circuit. Cutting and packing operations for magnetic circuit are handled with a method known as step-lap which reduces iron losses to a minimum. The core is packed by applying step-lap method both crosswise and lengthwise.

The cross sections of leg and connecting cap piece are the same and multistepped and theoretically it is assumed to be round cross section.

Core laminations, U-core and connecting cap piece are so compacted by way of steel studs passing through insulated bushings that the external sight of the them are kept minimum.



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GÜÇ ve DAĞITIM TRANSFORMATÖRLERİ

POWER & DISTRIBUTION TRANSFORMERS

KAZAN / TANK

Yağlı tip transformatörlerde soğutma ve yalıtım maddesinin muhafazası için kullanılan kazanlarımız soğutma yüzeylerine bağlı olarak 3150 kVA'a kadar olan transformatörler için dalga duvarlı, daha büyük güçlerdeki transformatörlerde radyatörlü olarak imal edilmektedirler. Kazan imalatında CNC kontrollü plazma makinesi kullanılmaktadır. Montajı ve kaynak işleri bitmiş olan kazanlar, IEC standartlarına göre basınç altında sızdırmazlık testine tabi tutulur. Dalga duvarlı kazanların vakuma dayanımı 0,65 bar, radyatörlü kazanların ise 1 bar olacak şekilde tasarlanır. Müşteri talebine göre imalatı tamamlanan kazanlar kumlama işlemine tabi tutulur. Kazan kapağı sargı uçlarının dışarı çıkarılması amacı ile tasarlanmıştır. Kapak üzerinde izolatörler, faz işaretlemesi, aktif kısmın kaldırılması amacıyla kaldırma kulakları, termometre cebi, topraklama burcu ve ek donanımlar bulunmaktadır.

Özel istekler doğrultusunda kazanları sıcak daldırma galvaniz yöntemi ile kaplamak mümkündür. Müşterilerden gelen talepler doğrultusunda IEC standartlarına uygun olarak sacdan bir koruma kutusu bushingleri kapatacak şekilde kapağın üstüne monte edilebilir.

Our tanks used to store and keep the cooling and insulation substance in oil type transformers, depending on their available cooling surfaces, are manufactured with corrugated walls for the transformers up to 3150 kVA rated power and equipped with radiator for those graeter than 3150 kVA rated power. CNC plasma shape cutting machine is used in tank production. After finishing the welding works and assembly of tank, it is tested for leakage under pressure in accordance with IEC standards. Tanks with corrugated walls are designed to withstand 0.65 bar vacuum pressure and tanks with radiators are designed to withstand 1 bar vacuum pressure. The finished tanks manufactured in accordance with the customers' specifications are sandblasted afterwards. Cover of the tank is designed in such a way that the winding terminals can go out. There are insulators, phase markings, lifting lugs for taking out the active part, thermometer pocket, grounding bushing and suplementary components on the cover of tank.

There is a possibility of coating the tanks with hot-dip galvanizing, when it is particularly requested to do so. Moreover, again upon request, there is another possibility of providing a safeguard made of sheet steel and assembled on the cover in order to cover and protect bushings pursuant to IEC standards.

ASTOR®

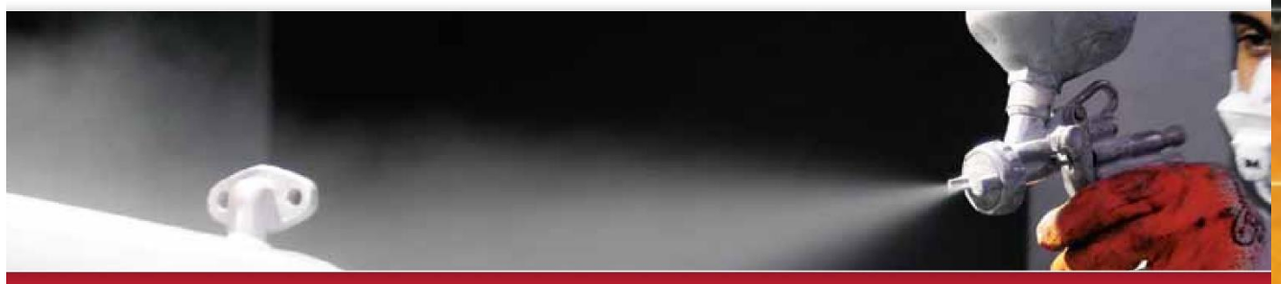
GÜÇ ve DAĞITIM TRANSFORMATÖRLERİ

POWER & DISTRIBUTION TRANSFORMERS

BOYAMA / PAINTING

Standart trafolarımız RAL7033 diye adlandırılan gri renkte olup müşteri isteklerine göre değişik renklerde de üretilebilmektedir. Akıtma ve püskürtme yöntemi ile boyanan trafolarımız otomatik bant sistemimizde astarlanıp 2 kat boya işleminden geçirilerek toplam film kalınlığı 105 mikrondan az olmayan boyaya sahip olurlar.

In our ongoing standard transformer production, a gray colour known as RAL7033 is used as standard, but we can also manufacture with different colours on customers' request. Our transformers which are painted by way of spilling and spraying methods are primed once and then painted twice on the automated assembly line. Eventually the paint thickness reaches to an extent not less than 105 microns.



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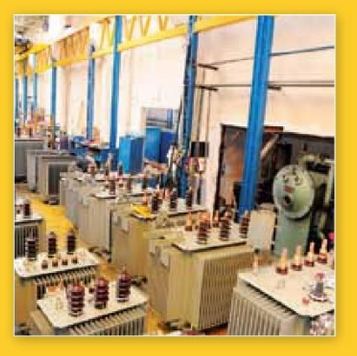
GÜÇ ve DAĞITIM TRANSFORMATÖRLERİ

POWER & DISTRIBUTION TRANSFORMERS

KURUTMA ve YAĞ DOLDURMA / DRYING AND OIL FILLING

Aktif kısım montajı bitirilen transformatörler 120 derece sıcaklıkta kurutma fırınlarında kurutulduktan sonra tanka yerleştirilir ve vakum odasında yağ doldurulur. Vakum odasında transformatörün kazanının içinde kalmış olan hava emilir ve izolasyon yağının aktif kısmına tam olarak nüfus etmesi sağlanır. Doldurulan yağ yalıtım ve soğutmayı sağlar. Kurutma işlemi gerilim ve güce bağlı olarak oluşturulan bir program çerçevesinde gerçekleştirilir.

After drying the transformers whose assembly of active part is completed, in the drying furnaces at 120 degrees Celcius are put into tanks and filled with oil in the vacuum chamber. The air entrapped in the transformer tank is removed by the suction effect in the vacuum chamber and this helps penetrate the insulating oil into the active part thoroughly. The oil filled serves as insulation and coolant. Drying process is accomplished according to a predefined program depending upon the rated voltage and power of the transformer.



BUCHHOLZ ROLESİ

Transformatör kazanı ile Yağ genleşme deposunun arasında, borularla bağlanmıştır. Transformatörün içindeki elektriksel ekipmanlarda oluşabilecek bir arızada, transformatörün içindeki elektriksel ekipmanlarda oluşabilecek bir arızada, transformatörü korumak amacıyla kullanılmaktadır. Arıza anında yalıtım malzemelerinde gaz açığa çıktığında Rölenin içinden geçerken haznede birikerek şamandırayı aşağı iterek ya da ani arızalarda yağ hızla doğru giderken klepeyi harekete geçirerek kontakların çalışmasına sebep olur. Rölede Açma ve Alarm için iki adet bağımsız kontak vardır. Bunlar; 5 A,250 VAC veya 0.2 A, 250 VDC'dir.

BUCHHOLZ RELAY

It is fitted in the connection pipe between the transformer tank and conserbator tank in order to monitor and protect transformers and other oil filled electrical equipment from faults arising internally, such as inter turn short circuits in coils and windings and against oil loss. Depending on the type of fault which occurs and the switching device which is actuated by the relay, the relay trips an alarm signal or causes the transformer to switch are istself off. Two micro switches are rated at 5 A, 250 VAC or 0.2 A, 250 VDC

ALKOLLÜ TERMOMETRE

Alkollü termometre sadece transformatör yağının sıcaklığını gözlemlemek amacıyla kullanılır ve kontaksızdır.

ALCOHOL THERMOMETER

Alcohol thermometer is used in order to only display oil temperature. It is without contact.

NEM ALICI

Yağ genleşme deposuna bağlantı olarak, yağ hacmi değiştiğinde , içinden geçen havada bulunan nemi yakalayarak , yağa nem geçmesini önler. Nem alıcının büyüklüğü yağ ve hava miktarına bağlı olarak kullanılır.

THE DEHYDRATING BREATHER

It is a uni-directional breather, where air circulation is controlled by the liquid seal located in the breather.The size of dehydrating breather is determined by the quantity of oil in the transformer.

HERMETİK KORUMA ROLESİ

Hermetik dizaynlarda tercih edilir. Röle gaz tahliyesini, yağ sıcaklığını ve kazandaki iç basıncı göstermektedir. 500 kVA'dan daha büyük transformatörlerde kullanılır. Rölede gaz tahliyesi, kazan basıncı ve yağ sıcaklığı için her birine ait ikişer kontak bulunmaktadır.

HERMETIC PROTECTING RELAY (DGPT2)

Preferabrable for hermetic design. This relay is monitored the discharge of gases, the temperature and the pressure in the tank. It is used for bigger than 500kVA power of the transformer. It has got two contacts for each one the discharge gases, the tank pressure and the temperature.

AKSESUARLAR
ACCESSORIES

BASINÇ GİDERME VALFİ

Hermetik dizaynlarda tercih edilir. Ani basınç yükselmesi durumunda Transformatör kazanını korur. Kapak üzerine montaj yapılır. Kazan, valfin ayarlandığı iç basınca maruz kalırsa, valf açılır ve yağ tahliyesi sayesinde basıncı kompanze ederek kazanın yırtılmasını önler. Sonra, otomatik olarak tekrar kapanır. İstenildiğinde kontaklı kullanılabilir.

PRESSURE RELIEF VALFE

Preferable for hermetic design. This valve protects the transformer tank from sudden overpressure surge. It is fitted to the transformer cover and adjusted in such a way that it opens briefly in the event of overpressure and cheats a compensation between the pressure inside the tank and outdie air pressure than automatic recloses.

KONTAKLI YAĞ SICAKLIĞI TERMOMETRESİ

Transformatördeki yağın ulaştığı Maksimum sıcaklığı gösteren Maksimum gösterge bulunmaktadır ve alt kısmında bir buton ile resetlenebilir. Yağ sıcaklığı 120°C'ye kadar okunabilir. İki adet ayarlanabilir. Kontak vardır. Micro switce'lerin elektriksel değeri 5 A 250 VAC veya 0.2 A,250 VDC.

THE OIL THERMOMETERS WITH CONTACTS

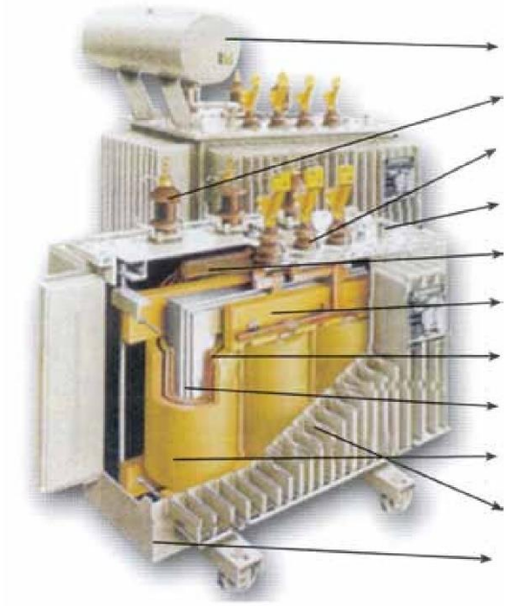
It has amaximum indicator in order to display maximum oil temperature, which can be returned to starting position by means of reset buton located on the underside of the housing it has smooth scale up to 120°C two micro switches rated at 5 A, 250 VAC or 0.2 A, 250 VDC.

MAGNETİK YAĞ SEVİYE GÖSTERGESİ

Yağ genleşme deposundaki yağın seviyesini gözlemlemek amacıyla kullanılır. Transformatör yağının değişimi magnetik olarak bağlantısı olan bir şamandıra ile yağ seviyesi göstergede gösterilir. Magnetik yağ seviye göstergesi ayrı Genleşme deposunun çapına bağlıdır. İstendiği durumda kontaklı seviye göstergeleri de kullanılır.

MAGNETIC OIL LEVEL INDICATOR

The magnetic oil indicator is used in order to display the level of the transformer oil in conservator tank. The transformation of the oil movement to displat itself is effected by two permanent magnets which are matched to ona another. This oil level indicator depends on the diameter of conservator tank. If reguired, the level indicator with contacts can be used.



- Yağ genleşme deposu • Oil Conservator
- Y.G. Buşing • H.V. Bushing
- A.G. Buşing • L.V. Bushing
- Termometre cebi • Thermometer slot
- Boşta kademe değiştirici • No load tap changer
- Nüve sıkıştırma Klempleri • Clamps
- A.G. Bobin • L.V. Coil
- Nüve • Core
- Y.G. Bobini • H.V. Coil
- Dalga Duvar • Corrugated Wall
- Transformatör Kazan • Transformer Tank

TECHİZAT

- Güç plakası
- Boşta veya Yük altında kademe değiştirici
- Yağ doldurma vanası
- Yağ boşaltma ve örnek alma vanası
- Yağ seviye göstergesi
- Yağ tasfiye vanası
- Kazan ve kapak üzerinde iki adet topraklama
- Termometre cebi
- Hava kurutucusu
- Ark boynuzları

EQUIPMENT

- Power plate
- No load/ on load tap changers
- Oil filling valve
- Oil darining and sampling valve
- Oil level indicator
- Oil filtering valve
- Eartging terminals
- Thermometer pockets
- Air dryer
- Arcing horns

SİPARİŞ ÜZERİNE TAKILAN TECHİZAT

- İki eksen yönünde ayarlanabilen tekerlekler
- Basınç emniyet valfı
- Bucholz rölesi (çift kapama kontaklı)
- Kadranlı termometre (çift kapama kontaklı)
- Yağ seviye göstergesi
- Davlumbaz
- Kablo kutusu
- Plug-in izolatör
- Sargı sıcaklık termometresi
- Hermetik koruyucu cihaz (hermetik transformatör için)
- Termistör

OPTIONAL EQUIPMENT

- 4 orientable rollers
- Pressure safety valve
- Buchholz relay (Double contacts)
- Thermometer (Double contacts)
- Oil level indicator (Double contacts)
- HV and LV terminal boxes
- Cable box
- Plug-in bushing
- Winding thermometer
- Hermetic protection device (for hermetic transformers)
- PT100 Thermometer

TRANSFORMATÖRDE AKSESUARLAR / ACCESSORIES ON THE TRANSFORMER

Koruma ve Gösterge Cihazları Protection and Monitoring Devices	AD. PCS.	Standart Açıklaması Standards Explanation	kVA																					
			25	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500
Ag Buşingleri Lv Bushings	4	DIN 42530	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Yg Buşingleri Ve Eklatörleri Hv Bushings And Arching Horns	3	DIN42531	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Plug-In Buşing Plug-In Bushings	3		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Boşta Kademe Değiştirici Off Load Tap Changer	1																					
Yg- 5 Pozisyonlu Hv- 5 Positions			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Yg- 3-11 Pozisyonlu Hv- 3-11 Positions			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Yük Altında Kademe Değiştirici On Load Tap Changer	1		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Buchholz Rölesi Buchholz Relay	1	Hermetik Hariç Except Hermetic	x	x	x	x	x	x	x	x	x	x	x	x	+	+	+	+	+	+	+	+
Termometre Cebi Thermometer Pocket	1		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Alkollü Termometre Alcoholl Thermometer	1		+	+	+	+	+	+	+	+	+	+	+	+	x	x	x	x	x	x	x	x
Kontaklı, Yağ Sıcak Termometresi Oil Thermometer With Contacts	1		x	x	x	x	x	x	x	x	x	x	x	x	+	+	+	+	+	+	+	+
Basınç Giderme Valfi Pressure Relief Valve	1	Hermetik Dizayn Hermetik Design	+	+	+	+	+	+	+	+	+	+	+	+	+	x	x	x	x	x	x	x
Hermetik Koruma Rölesi (DGPT2) Hermetic Protect Relay (DGPT2)	1	Hermetik Dizayn Hermetik Design	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yağ Seviye Göstergesi-Kontaksız Oil Level Indicator-No Contact	1		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Yağ Seviye Göstergesi-Kontaklı Oil Level Indicator-With Conta	1		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Nem Alıcı Dehydrating Breather	1	Hermetik Hariç Except Hermetic	x	x	x	x	x	x	x	x	x	x	x	+	+	+	+	+	+	+	+	+
Yağ Boşaltma Vanası Oil Drain Valve	1	DIN 42551 - A22	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-	-	-
Yağ Boşaltma Vanası Oil Drain Valve	1	DIN 42551 - A31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+	-	-
Yağ Boşaltma Vanası Oil Drain Valve	1	DIN 42551 - A40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
Tekerlekler Reversable Wheels	4		x	x	x	x	x	x	x	x	x	x	+	+	+	+	+	+	+	+	+	+
Kaldırma Kulakları Lifting Lugs	2		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Yağ Doldurma Ağzı Oil Filling Nippel	1		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Topraklama Terminalleri Earthing Terminals	2		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
İşaret Plakası Rating Plate	1		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Radyatörlü Kazan Tank With Radiators	1		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Dalga Duvarlı Kazan Corrugated Tank	1		+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Terminal Kutusu Terminal Box			x	x	x	x	x	x	x	x	x	x	x	x	+	+	+	+	+	+	+	+
Ag-Yg Kablo Kutuları Lv-Hv Cable Boxes			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Galvaniz-Sıcak Daldırma Hot-Dip Galvanizing			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Standart Dizayn Standard Design	(+)	İsteğe Bağlı Fiyatlandırarak On request against surcharge	(x)	Uygulanamaz Not available	(-)

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