Standard Project Fiche

1. Basic Information

1.1 **CRIS Number (Year 2): BG 2005/017-586.01.01**

1.2 ***Title: Implementation of the EU Directive 2003/54/EC on internal market in electricity, Geographic Information System (GIS) of the Bulgarian electricity transmission system with implemented EU standard ETRF 89 and European Geostationary Navigation Overlay System (EGNOS).***

1.3 ***Sector:*** Energy

1.4 ***Location*:** Bulgaria

1.5 ***Duration:*** multi-annual 2004-2005
- o phase 1 –12 months project activities
- o phase 2 - 12 months project activities

2. Objectives

2.1 *Overall Objective(s):*

Achievement of required level of implementation of the requirements of the EU energy acquis Directives 2003/54/EC, transposed in the Bulgarian legislation and with regard to which there is a commitment for transposition and implementation before the accession date**.**

2.2 *Project purpose*

Implementation of EU standard ETRF 89 and European Geostationary Navigation Overlay System (EGNOS), in implementation of the requirements of the Directive 2003/54/EC concerning common rules for the internal market in electricity and (repealing Directive 96/92/EC) concerning common rules for the transit of electricity through transmission grids.

2.3 *Accession Partnership (AP) and NPAA priority (and implementing measures envisaged by the Action Plan for AP priorities related to strengthening administrative and judicial capacity)*

Implementation of the energy acquis and application of the same standards as those which apply within the Union.
Pro-active and coordinated policy to reduce the energy intensity at all stages of the energy cycle.
In order to complete its preparations for membership Bulgaria's efforts should now focus on the full and timely adoption of implementing legislation in this field, in particular regarding the internal energy market (electricity and Gas) and on strengthening the administrative capacity

2.4 *Contribution to National Development Plan (and/or Structural Funds Development Plan/SDP)*
Not applicable

2.5 Cross Border Impact
Not applicable

3. Description

3.1 *Background and justification:*

An urgent and up-to date issue, having in mind the overall energy policy, is the achievement of compliance with the requirements of the EU standard ETRF 891, in implementation of the requirements of the Directive 2003/54/EC concerning common rules for the internal market in electricity and repealing Directive 96/92/EC. Nowadays Natsionalna Elektricheska Kompania EAD is the sole owner of a license for electricity transmission in the Republic of Bulgaria, which obliges the company to operate, maintain, repair and develop the electric networks and the auxiliary networks and facilities and to transfer electric power from the generating electric power plants to the electricity distribution companies and to the consumers connected at the high voltage networks, as well as to provide trans-border transit of electricity for other countries. Consumers of NEK EAD are all electricity distribution companies in the country and the consumers connected at the high voltage networks. In respect of the new Energy Act NEK will be separated in two parts – Transmission Company (the Transmission System Operator is part of it) and Public Supplier. The obligations of the Transmission Company defined by the Energy Act are attaining the European Norms of the Energy Efficiency and development and support of the concurrent regional energy market.

The high voltage networks are spread all over the country with total length 15000 km. They are maintained and operated by a branch of NEK – High Voltage Networks Enterprise, which carries out its function through 13 transmission regions. Each region maintains about 1000 km overhead lines.

NEK has developed in several directions, taking into account the development of Bulgaria in direction of harmonization of the legislative norms with the EU ones. The main directions of NEK's development are as follows:

- improvement of the activities and perfect consumers' services;
- implementation and upgrading of the information systems introduced for the main activities of the company. They are the technologic information and control system SCADA and the management information system SAP/R3.

In the last years NEK upgrades its business information system implementing the well-known SAP/R3.

Means for spatial viewing of the location of the sites and the equipment are missed for the both information systems. The relations between GIS and the PM (plant maintenance) module of SAP/R3 is necessary to indicate the exact geographic places of the equipment subject of the repairs – planned and emergent, The relations between GIS and SCADA give exact information "what" and "where" happens to stop of the electricity transmission to the experts responsible for the control and maintenance of the transmission network

[1] ETRF'89 means European terrestrial frame used in Europe since 1989 as European standard. ETRF'89 is a part of WGS84 (World Geodetic System) as a standard geodetic referenced system

The GIS are the information systems which are at least developed and implemented not only in the energy sector but in all infrastructure sectors.

The overhead power lines designs (part "Geodesy") are developed in "System 70" (specific Bulgarian system), which was used before 1989 mainly for military needs. This system is incompatible with ETRF'89 and EGNOS. The achievement of compliance is necessary and urgent action since nowadays there is no GIS of Bulgarian high voltage networks and there is:

1. Limited and insufficient and unreliable information about the size and the location of the transmission company sites (substations and electric power lines), about the type and the ownership of the terrains through which the high voltage lines pass and about their right-to-way zones.
2. Insufficient meteorological and ecological data along the routes and the resulting impact on the transmission networks.
3. An urgent need for provision of exact information for the physical characteristics of the high voltage power lines .
4. Insufficient available information for repair planning.
5. Need for support to NEK EAD experts in their operational and maintenance activities.
6. Need for establishment of the Geographical Information System (GIS) for the transmission company as an element of the infrastructure for the development of the liberalized electrical power market.
7. GIS of High voltage networks, developed in ETRF'89 and EGNO system will become a part of the National cadastre.

The implementation of the Bulgarian high voltage networks GIS will provide to NEK information about the geographic location and the technical condition of the facilities and equipment of the transmission networks, the relief features and the different infrastructure systems, analysis and planning of the development and the maintenance of the machinery and equipment, owned by NEK. It will be an instrument for exact definition of the problem points in the high voltage networks and fast and exact navigation to the place of the problem. GIS will be used by the experts involved in the construction, repair and maintenance of the equipment. GIS will support NEK in its activities connected with the increase of the high voltage network availability and in respect with the development and participation in the regional concurrent energy market.

The development of the full functionality of the GIS software will be carried out within 2004 programme – developing of the data base, input and control of the data that have been measured.. Within 2004 programme the basic GIS software and hardware for the head office of the HVN Enterprise and for 6 ETR will be supplied and the corresponding training will be provided. All the deliveries of GIS software and hardware will be finished in the third quarter 2007 . The main part of the geodetic measurements about 11000 km will be carried out in the programme of Year 2005.

In the future the Geographical Information System of the High Voltage Networks will provide interface with the specialized Software System for the Electricity Market Operator.

3.2 *Sectoral Rationale*

Not applicable

3.3 *Results:*

3.3.1 Geodetic measurements

- About 11000 km - equipment and facilities owned by NEK – High voltage networks Enterprise measured.
- All measured data processed.
- The data for the land and the properties concerned by NEK's facilities processed .
- The specialized maps and longitudinal profiles of the measured parts prepared.

3.3.2 Software development – the tasks, mentioned below, will be accomplished in the programme Year 2004

- Established and commissioned multifunctional corporate geographical information system for the Bulgarian high voltage networks, harmonized with ETRF '89 and compatible with EGNOS and GALILEO (which will be in commercial operation from 2008). The geographical information system will contain:
  - Three-dimensional digital model of the lay under the power lines and their facilities and at the substations, the disposition of the wires and the distances between the wires and the terrain relief, as well as three-dimensional digital model of sites from other infrastructure systems. This part of the software will be implemented when the data base with all attributes of the equipment necessary for the digital model is available. The data base development will be finished within the range of 2004 programme.
  - Database with geodetic, climatic, ecological, technical and operational data for the network facilities, graphics and digital snap-shot material for the facilities and the relief for almost full length of the transmission overhead lines;
  - Information reports about:
    a. The size and the ownership of territories bordering or laying under the network facilities; the restrictions for usage of the said territories; data about the owners and the legal relations between the transmission company and the owners;
    b. Technical information reports on quantities and qualities at the facilities;
    c. Operational statistical and graphical information reports and analyses, maintenance protocols – faults, repairs etc.;
    d. Data output - coordinates, status of the facility, optimal way for access to the facility etc., towards global positioning system (GPS). The compatibility with GALILEO) system will be ensured
  - Interfaces for information and data exchange with other information systems;
  - System for customers authorized access (including the usage of Internet) and data protection degrees;
  - Means for automatic drawing of the power lines longitudinal profiles, where all crossings in the safeguard zone of the relevant power line are mentioned.

3.3.3 Delivery

- Software
- Hardware

After the execution of Phase 2 NEK will have 100% implemented GIS of the transmission networks including data and trained staff.

3.4 *Activities:*

Activities Year 1:

- Terms of references, tendering, contracting (two service contracts – one TA for the GIS and one for geodesic measurements activities)
- Development of GIS application software for NEK - "High Voltage Networks" Enterprise ;
- Delivery of base software and technical equipment for the information system;
- Testing of the system;
- Local implementation of the information system
- Training of personnel of the divisions of NEK - "High Voltage Networks" Enterprise and the personnel at its headquarters.
- Geodetic measurements in appointed divisions of NEK - "High Voltage Networks" Enterprise.

Activities Year 2:

Two investment components are envisaged to be implemented during the second project year:

- One Service contract (technical assistance supporting investment) – Geodetic measurements in certain divisions of the NEK EAD, "High Voltage Networks" Enterprise:
  - collecting and processing of the geodetic data for the equipment which is part of the electricity transmission networks.

  This information will support the tasks of the TSO , noted in Chapter 4, art.9 items b, d, f of the Directive on the TSO's duties.

- One Supply contract:

  - Delivery of the last part of the base software;
  - Delivery of the last part of the technical equipment for the information system

3.5 *Linked activities:*

- SCADA of the National Dispatching Center of NEK EAD (the both systems – SCADA and GIS support the TSO with on line information about the status and the failures of the equipment – HVLines and substation), financed by funds of loans from the World Bank and from EBRD. It is developed by the Swiss company Landis&Gyr, but now it is maintained by Siemens using the information and communication achievements. The integration of the both products will increase considerably the information and efficiency of the dispatching control.
- Management Information System (MIS) of NEK EAD – the development and implementation is financed by loans from the World Bank and from EBRD. NEK is introducing successfully SAP/R3.
- Geodetic measurements of the HV lines and substations situated on the territory of Blagoevgrad, Burgas and Ruse regions (total 2500 km) – financed by NEK. The collected data will be used for the purposes of this Phare project.
  Structure of the technical and operational data base with preliminary defined references – financed by NEK The project performs some of basic functions of GIS of HVN ENTERPRISE and is ready to be used in EPR. There is a possibility to be developed further and to cover the whole enterprise with the addition of new key functions and opportunities, which were partly specified in 2004 programme and in 2005 programme.

- Feasibility study for development and implementation of GIS for the High-Voltage networks of Republic of Bulgaria – financed by NEK This study includes estimation of the needs and recommendation for the development of GIS, applying the European geodetic system.
- Project of the National Cadastre Agency for preparation a digital ortophotomap of the whole territory of Republic of Bulgaria, financed by a loan from the World Bank. This project has not started yet. After receiving results of this PHARE project NEK will exchange data with the National Cadastre Agency.

Project under National Phare programme:

- BG9411-02-01 – Organizational and technical measures for monitoring and control of electric energy losses in the electricity transmission and distribution systems - Methodology for analysis and study of electricity losses developed; system for continuous control of losses on different voltage levels developed; Software for control and monitoring of losses delivered.
- BG 0106-03 – Improvement of the joint operation of Bulgarian and Greek power systems
- BG 0007.01.01 - Development of telecommunication infrastructure of Bulgarian and Romanian electricity companies for improvement of data exchanges between their dispatching Centers and UCTE.

The means – OPGW and telecommunication equipment, delivered and installed under the projects BG 0007.01.01 and BG 0106-03, will serve for transmission of mass information blocks with geodetic data.

3.6 *Lessons learned:*

Two years ago NEK started the procedure for development of a GIS for the high voltage network. Currently NEK has the results of the geodetic measurements of the HV lines (450 km) and the substations on the territory of Blagoevgrad, which were carried out in the period 2002 - 2003. Now ia measuring of the geodetic data of the HV lines and substations for the regions of Ruse (850 km) and Burgas (1200 km) is going on. Most of the results were submitted to NEK by the end of 2004. A project for development of the technical and operational data base of the facilities and equipment owned by NEK was carried out.

The nationally funded projects “Geodetic measurements of the HV lines and substations”, “Structure of the technical and operational data base” and “Feasibility study for development and implementation of GIS for the high voltage networks of the Republic of Bulgaria” increased the professional skills of NEK experts, showed GIS advantages for three transmission regions and showed the necessity of development of complete corporate GIS. The collected by these projects experience was used for the preparation of the PF for 2005 and the TOR for 2004.

4. Institutional Framework

The institution – recipient is the Ministry of Energy and Energy Resource (MEER).

The beneficiary institution of the project is Natsionalna Elektricheska Kompania EAD.

The overall coordination and implementation of the project will be carried out by MEER. Project Implementation Units (PIUs) of NEK EAD, High Voltage Networks Enterprise will be responsible for the project implementation and for providing the technical expertise needed.

The PIUs are responsible towards MEER and CFCU at the Ministry of Finance for the operational management of the project. A Steering committee, consisting of a Chairman (MEER), a Secretary (MEER), members – experts from NEK EAD, High Voltage Networks Enterprise, MEER and an observer of the EC Delegation, will be set up. After the completion of the Project NEK EAD will become an owner of the assets. The Ownership of the GIS is a public one. NEK EAD is managed by a Board of directors, appointed by the Minister of Energy and Energy Resources.
The Executive director of the Company is responsible for developing the company's strategy and policy. The branches and the Enterprise Units are run by managers, responsible for operating and managing.

5. Detailed Budget

	Phare	**Support**				
Year 2004/ Phase 1	Investment Support	Institution Building	**Total Phare (=I+IB)**	**National Co-financing***	**IFI***	**TOTAL**
Contract-Technical assistance GIS		0.8	0.8			0.8
Contract-Technical assistance GM		0.1	0.1			0.1
Contract - Supply of equipment	0.6		0.6	0.2	-	0.8
Total year 1	**0.6**	**0.9**	**1.5**	**0.2**	**-**	**1.7**

* 25 % for the investment components and will be provided from the State budget through "National Fund" Directorate.

	Phare/Pre-Accession Instrument support	**Co-financing**			**Total Cost**
€M		**National Public Funds (*)**	**Other Sources *(**)***	**Total Co-financing of Project**	
Year 2005 – Phase 2 Investment support jointly co funded					
Contract - Supply of equipment	0,300	0,100		0,100	0,400
Contract – Geodetic measurements	2,175	0,725		0,725	2,900
Investment support – sub-total	**2.475**	**0.825**		**0.825**	**3.300**

Year 2005 – Phase 2 – Institution building support					
	N/A	N/A	*N/A*	N/A	N/A
IB Support	**0.00**	**0.00**		**0.00**	**0.00**

Total project 2005	***2,475***	***0,825***		***0,825***	***3,300***

(*) contributions form National, Regional, Local, Municipal authorities, FIs loans to public entities, funds from public enterprises.
(**) private funds, FIs loans to private entities
25 % for the investment components – supply of equipment and geodetic measurements, will be provided from the State budget through "National Fund" Directorate.

The Phare contribution for investment costs will be no more than 75% of eligible public expenditure, the balance having to be covered by the national co-financing. The national co-financing will be provided by the National Fund Directorate at the Ministry of Finance. All operational and running costs and the maintenance of the equipment will be provided by the final beneficiaries.

6. Implementation Arrangements

6.1 *Implementing Agency*

The Central Finance and Contracting Unit (CFCU) at the Ministry of Finance
102 "Rakovski" St.;
tel.: +359298592772
fax: +359298592773
CFCU will manages the programme and will be responsible for administrative and financial management of the projects, which cover the tendering, contracting, accounting, payments and reporting as well as submission of documents to be endorsed by the Commission.

The National Aid Coordinator is the Minister of Finance.

6.2 Twinning – N/A

6.3 Non-standard aspects

The PRAG will be strictly followed.

6.4 *Contracts*

Year 1 (2004)

- Two Service contracts with total budget 900 000 EURO Phare assistance
- One Supply contract with total budget 800 000 EURO – 600 000 EURO Phare assistance and 200 000 EURO national co-financing

Year 2 (2005)

- One Service contract for Geodetic measurements with total budget 2.9 MEuro) – 2.175 MEuro Phare assistance and 0.725 MEuro national co-financing
- One Supply contract with total budget 0.400 MEuro – 0.3 MEuro Phare assistance and 0.100 MEuro national co-financing

7. Implementation Schedule

For Year 1

7.1 *Start of tendering/call for proposals*

October 2005

7.2 *Start of project activity*

May 2006

7.3 *Project completion*

April 2007

For Year 2

7.4 *Start of tendering/call for proposals*
March 2006

7.5 *Start of project activity*
October 2006

7.6 *Project completion*
September 2007

8. Equal Opportunity

The equal opportunities for the participation of men and women to this project will be ensured during the implementation.

9. Environment

The project will have no hazardous environmental impact.

10. Rates of return

- *Economic rate of return*

The economical effects of implementation of GIS are as follows:

- reduction or complete elimination of clearances-related outages. Reducing clearances-related outages brings considerable economical effect to the transmission grid owner – every outage on the line involves various costs for the utility ranging from huge compensations to the industrial consumers to the costs associated with locating the clearance issue and bringing the line back to service. Expert expectation of 50% decrease of the repair planning time.
- Insurance premiums reductions – As a direct result of improved reliability of the transmission grid, there is a base for insurance premiums reductions
- Increase of capacity to transit and export electricity

- *Financial rate of return*

The financial rate can be assessed after the project implementation.

- *Feasibility studies which have been completed*

Pilot project – GIS for a small part of High Voltage Network.

Feasibility study for development and implementation of GIS for the High-Voltage networks of Republic of Bulgaria – August 2004.

11. Investment criteria

11.1 Catalytic effect:

Phare's support will catalyse the implementation of the project, which would otherwise be delayed with 8 - 10 years.

11.2 Co-financing:

The co-financing will be at least 25 % of the investment components and will be provided from the State budget through "National Fund" Directorate.

11.3 Additionality:

Phare grants will not displace other financiers especially from the private sector or IFIs.

On condition the data collected through this project cannot be commercialized. According to the Cadastre and property register Act the Ministry of Energy and Energy Resources is obliged to elaborate and to provide out of charge to all concerned state bodies a specialized geodetic map of the Bulgarian power system.

11.4 Project readiness and size:

Project is ready for contracting. Project specifications and tender requirements have been completed. A Tender procedure for elaboration of an independent Feasibility study for development and implementation of GIS was launched by NEK EAD on 30 March 2004. In August 2004 the Feasibility study was completed and was sent to the European Commission.

The feasibility study confirmed the necessity of GIS development. The study recommended alternatives of the software development, methods of the geodetic measurements and the proper software and hardware. Cost estimation of the different geodetic measurement methods was done.

11.5 Sustainability:

The investments will be sustainable in the long term, i.e. beyond the date of accession. They will comply with EU norms and standards and be in line with EU sector policy Acquis. NEK EAD and its assignee will pay for future maintenance and operating costs.

11.6 Compliance with state aids provisions

Investments respect the state aids provisions.

11.7 Contribution to NDP and/or Structural Funds Development Plan/SPD

N.A.

12. Conditionality and sequencing

The starting of the project is conditioned to the approval of the independent needs assessment.

Sequencing:

The projects for geodetic measurements and the software development concern the establishment of GIS.

In year 1 the development and implementation of GIS in a part of the transmission grid will start. At the end of Year 1 a preliminary design and the technical specifications for the necessary hardware and GIS software will be prepared. The required GIS application software will be developed. The delivered base GIS software will be customized. The results of geodetic measurements of a part of the transmission grid will be ready too.

In Year 2 the main part (last one) of the geodetic measurements of about 11000 km overhead lines and implementation of GIS in the other regions will be carried out and the whole project will be completed.

ANNEXES TO PROJECT FICHE

1. Logical framework matrix in standard format
2. Detailed implementation chart for year 1 and year 2
3. Contracting and disbursement schedule by quarter for full duration of programme (including disbursement period) for year 1 and year2
4. Needs Assessment and technical specification
5. Administrative capacity
6. List of relevant lows and regulations
7. List of relevant strategic plans

Annex 1

Phare log frame[2]

LOGFRAME PLANNING MATRIX FOR Project:	Programme name and number **National PHARE 2005**	
Implementation of the EU Directive 2003/54/EC	Contracting period (year 2) expires 30.11.2007	End of execution of contracts (Year 2) expires 30.11.2008
	Total budget: 3.3 MEURO	Phare budget: 2.475 M EURO

Overall objective	**Objectively verifiable indicators**	**Sources of Verification**	
Achievement of required level of implementation of the requirements of the EU energy acquis, Directives 2003/54/EC transposed in the Bulgarian legislation and with regard to which there is a commitment for transposition and implementation before the accession date.	• Developed legislative framework in compliance with the EU Energy acquis • Directives 2003/54/EC and 90/547/EEC fulfilled at required level. • Developed competitive electricity market	• Regular EC Progress Report • Accession Partnership • Energy balances • National institute on Statistics – Section Energy • NEK statistics	
Project purpose	**Objectively verifiable indicators**	**Sources of Verification**	**Assumptions**
Implementation of EU standard ETRF 89 and European Geostationary Navigation Overlay System (EGNOS), in implementation of the requirements of the Directive 2003/54/EC concerning common rules for the internal market in electricity and (repealing Directive 96/92/EC) concerning common rules for the transit of electricity through transmission grids.	• GIS of the high voltage networks implemented • 3D data for the lay under the overhead high voltage lines and their facilities and at the substations, the disposition of the wires and the distances between the wires and the terrain lay, as well as three-	• Ministry of Energy and Energy Resources, "European Integration and International Projects" Directorate • Phare monitoring reports • Report by the project steering committee	• Effective cooperation and involvement of the institutions in the energy sector • Maintained and used project database • Relevant information campaign

[2] The Project Results and the Project Activities are modified taking into account the Feasibility study made by an Independent Consultant at the end of August 2004.

	dimensional digital model of sites from other infrastructure systems;	• Reports by the National Electric Company on the activities, which are carried out.	implemented
Results	**Objectively verifiable indicators**	**Sources of Verification**	**Assumptions**
Year 1: 1 GIS developed and implemented in the transmission regions and the head office of HVN Enterprise; 1.1 GIS preliminary design; 1.2 Programming and adaptation of the software and interfaces to other information systems of NEK 1.3 Local implementation of the information system 1.4 Training	1.1 GIS algorithm developed 1.2 Development of the software for base functions of GIS 1.3 Delivery of GIS hardware and base GIS software	Reports by steering committee on implementation of GIS	Completed training of the personnel of NEK, responsible for the maintenance and the development of the high voltage networks
2 Geodetic measurements started;	2. Geodetic measurements of one transmission regions	Reports by steering committee on implementation of GIS	
Year 2:			
1. Geodetic measurements in 9 transmission regions	1. Geodetic measurements for the whole transmission networks available by 3rd quarter 2007.	Reports by steering committee	
2. Multifunctional corporate geographical information system for the Bulgarian high voltage grid harmonized with ETRF '89 and compatible with EGNOS and GALILEO established and commissioned.	2.1 Database with all technical and operational data for the equipment in 9 transmission regions (1 from the Year 1 and 9 form Year 2) elaborated by 3rd quarter 2007. 2.2 Updated technical and geodetic	Report by NEK EAD	

	information for the all facilities of the high voltage networks in 9 transmission regions available by 3rd quarter 2007. 2.3 On-line data exchange between the information systems of NEK. 2.4 Different levels of customer authorized access to GIS. 2.5 Drawings of the power lines longitudinal profiles available by 3rd quarter 2007. - Preserved availability of the high voltage networks in the range of 0,9995-0,9999 by increased load 15-20% to year 2007 - Decreased transmission losses by 2,0% - The repair planning time decreased of about 50% - GIS of the High Voltage Network opened for usage by the state bodies and all energy market participants by the end of 2007. .	1. Releases of information system reports, resulting from the information system 2. Report by NEK EAD 3. Report by NEK EAD 4. Agreements for utilization of the GIS usage	
Activities	**Means**		**Assumptions**
Year 1: 1. Lot 1 – TA for Geodetic measurements in certain divisions of the NEK EAD, "High Voltage Networks" Enterprise. 2. Lot 2 – TA for designing the model of the GIS, developing of the application software for adjusting the base software for the needs of the GIS; implementation	• Technical assistance contract/s		• Effective co-operation with other institutions – state bodies and all participants in the electric market

of GIS and training; connection the GIS to the other information systems of NEK EAD. 3. Delivery of the first part of the base software. Delivery of first part of the technical equipment for the information system. **Year 2:** 1. Technical assistance for Geodetic measurements in certain divisions of the NEK EAD, "High Voltage Networks" Enterprise; a. collecting of geodetic data for the equipment which is part of the electricity transmission networks in appointed divisions b. creating of specialized maps and registers in compliance with the legislation of Bulgaria c. creating of input GIS files 2. Delivery of the last part of the base software; Delivery of the last part of the technical equipment for the information system	• Supply contract 1. Technical assistance contract 2. Supply contract		
			Preconditions • High quality of the independent Feasibility Study

ANNEX 2

DETAILED IMPLEMENTATION CHART

Phase 1/ Year 1

COMPONENTS	2005												2006												2007											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Activity 1 – Technical assistance																																				
- Tendering										**x**	**x**	**x**	**x**	**x**	**x**	**x**																					
-Project activities																	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**								
Activity 2 – Supply of equipment																																				
- Tendering										x	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**																			
- Supply																			**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**										

DETAILED IMPLEMENTATION CHART

Phase 2/ Year 2

COMPONENTS	2006												2007												2008											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Activity 1 – Geodetic measurements																																				
- Tendering			**x**	**x**	**x**	**x**	**x**	**x**	**x**																											
-Project activities:										x	x	x	x	x	x	x	x	x	x	x	**x**	**x**														
Activity 2 – Supply of equipment																																				
- Tendering													**x**	x	**x**	**x**	**x**	**x**																		
- Supply																			**x**	**x**	**x**															

Annex 3

CUMULATIVE QUARTERLY CONTRACTING SCHEDULE in MEuro/€

Projects Sub-Projects	Expected Contractual Commitments (Quarters)												Budget Allocation
Implementation of GIS of High Voltage Network of Bulgaria.	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Year 1	**2005**				**2006**				**2007**				
Technical assistance contract	0	0	0	0	0.9	0.9	0.9	0.9	0.9	0,9			**0.9**
Supply contract	0	0	0	0	0,6	0,6	0,6	0,6	0,6	0.6			**0.6**
Total (Phare funds)	**0**	**0**	**0**	**0**	**1.5**	**1.5**	**1.5**	**1.5**	**1.5**	**1,5**			**1.5**
Year 2													
Geodetic measurements	0	0	0	0	0	0	0	2,900	2,900	2,900	2,900	2,900	**2.900**
Supply of equipment contract	0	0	0	0	0	0	0	0	0,400	0,400	0,400	0,400	**0.400**
Total (Phare funds) Year 2	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2,900**	**3.300**	**3.300**	**3.300**	**3.300**	**3.300**

CUMULATIVE QUARTERLY DISBURSEMENT SCHEDULE in MEuro/€

Projects Sub-Projects	Expected Contractual Commitments (Quarters)												Budget Allocation (Phare Funds)
Implementation of GIS of High Voltage Network of Bulgaria.	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
	2005				**2006**				**2007**				
Year 1													
Technical assistance contract	0	0	0	0	0.6	0.6	0.6	0.9	0.9	0,9			**0.9**
Supply contract	0	0	0	0	0,6	0,6	0,6	0,6	0,6	0,6			**0.6**
Total (Phare funds) Year 1	**0**	**0**	**0**	**0**	**1.2**	**1.2**	**1.2**	**1.5**	**1.5**	**1,5**			**1.5**
Year 2	0	0	0	0	0	0	0	0					
Geodetic measurements									1.740	1.740	2.610	2.900	**2.900**
Supply of equipment contract	0	0	0	0	0	0	0	0	0.240	0.400	0.400	0.400	**0.400**
Total (Phare funds) Year 2	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1.98**	**2.140**	**3.010**	**3.300**	**3.300**

ANNEX 4

NEEDS ASSESSMENT (figures and devices are only indicatives)

Specification of the works and the supply of the software and the hardware components which are elements of the geography information system of the Bulgarian high voltage network

1. Geodesic measurement – the prices of the geodetic measurements are specified as average price on the base of offers of Bulgarian geodetic companies participated in the tenders announced by NEK. The prices of satellite snap shots of the routes and the terrains for additional information about the vegetation and facilities near the overhead lines and substations owned by NEK are added to the geodesic measurement prices..
2. The price of the consultancy contract for the project organisation and implementation(tender procedures for contracting the works and the supply; terms of reference elaboration (TOR)) is defined on the base of the prices of contracts with European consultants.
3. The prices of the design of GIS, components/software- base software and hardware/, and organization of works, programming application software, implementation and transformation of coordinates and pictures from the Bulgarian geodesic system 1970 to ETRF' 89 are defined on the base of such services in Bulgaria

Service contract

Activities	Types	Quantities	Prices	Total
Geodesic measurements	Terrestrial measurement /Survey/,ortophoto, laser scanner and data processing	12000 km 500 dka		2 940 000 Э 40 000 Э
Elaboration of:	Design of GIS, components/software- base software and prepared templates for customising and hardware/, and organization of works		100 000 Э	100 000 Э
	GIS preliminary design carrying out – programming, adaptation and interfaces with other information systems		600 000 Э	600 000 Э
Implementation	Training		50 000 Э	50 000 Э
	Implementation of the system - locally		100 000 Э	100 000 Э

SUBTOTAL **3 830 000 Euro**

Service contracts – in compliance with the Feasibility Study				
Activities	Types	Quantities	Prices	Total
Geodesic measurements	Terrestrial measurement /Survey/,ortophoto, laser scanner and data processing	12000 km 500 dka		2 940 000 Э 40 000 Э
Elaboration of:	Design of GIS, components/software- base software and prepared templates for customising and hardware/, and organization of works		100 000 Э	100 000 Э

	GIS preliminary design carrying out – programming, adaptation and interfaces with other information systems		600 000 Э	600 000 Э
Implementation	Training		50 000 Э	50 000 Э
	Implementation of the system - locally		100 000 Э	100 000 Э

SUBTOTAL **3 830 000 Euro**

Activities	Types	Quantities	Prices Э	Total Э	Year1	Year 2
Geodesic measurement	Terrestrial measurement /Survey/,ortophoto, laser scanner and data processing	12 000 km and 500 dka	245 Э 80 Э	2 940 000 40 000	50 000	2930 000
Elaboration of:	Design of GIS, components/software- base software and prepared templates for customising and hardware/, and organization of works			100 000 Э	100 000 Э	
	GIS preliminary design carrying out – programming, adaptation and interfaces with other information systems			600 000 Э	600 000 Э	
Implementation	Training			50 000 Э	50 000 Э	
	Implementation of the system - locally			100 000 Э	100 000 Э	
Subtotals					900 000	2 930 000

TOTAL 3 830 000 EURO

Supply contract

The price of the main server including OS and DBMS is defined for starting configuration for 58 customers in the headquarter and in the 13 transmission regions. The main server will be situated at the headquarter.

Work stations (total 36 pcs. – for each transmission region - 2 pcs.) with better features than the common PC for graphical data processing.

Colour A0 scanner for precise scanning of updated maps.

Large scale A0 laser printer – for new designs connected with the geography of the facilities.

Colour A3 laser printers – one pc. for each transmission region.

Communication equipment - one **router** for each transmission region and the headquarter.

The prices of the computer equipment are compared with the prices on the Bulgarian market

Data purchase from outside sources – the sources and the prices are according the Bulgarian market.

Application software for technical tasks solution –Line design; Definition of the wires sagging and tensions in multi spam systems; Structural analysis of power systems – the prices are defined on the base of catalogues and leaflets.

Deliveries:				
System resource :	Main server including OS and DBMS GIS BASE software products	1	160 000 Э	160 000 Э 284 743 Э
	Local servers for 13 power transmission regions	13	5 000 Э	65 000 Э
	Work stations	36	3 000 Э	108 000 Э
	Colour A0 scanner for precise scanning of maps with 1:25 000 scale	1	20 000 Э	20 000 Э
	Large scale A0 laser printer	1	15 000 Э	15 000 Э
	Colour A3 laser printers	13	5 000 Э	65 000 Э
	Communication equipment /Routers/	14		105 000 Э
	GPS (or equivalent)– for navigation of the emergency maintenance squad cars of the high-voltage network enterprise and movement control	30	300 Э	9 000 Э
Data purchase from outside sources	Data for agricultural, forestry and settlement lands through which the high voltage power lines pass			20 000 Э
	Coordinates of the Bulgarian ETRF'89 points			300 Э
Application software for technical tasks solution –Line design; Definition of the wires sagging and tensions in multi spam systems; Structural analysis of power systems			23 400 Э	56 160 Э for 8 licenses (with rabat)

SUBTOTAL **908 203 Э**

Deliveries-new list in compliance with the FS :				
System resource :	Main server including OS and DBMS GIS BASE software products	1	160 000 Э	160 000 Э 364 000 Э
	Local servers for 13 power transmission regions	13	5 000 Э	65 000 Э
	Work stations	39	2 500 Э	97 500 Э
	Colour A0 scanner for precise scanning of maps with 1:25 000 scale	1	20 000 Э	20 000 Э
	Large scale A0 laser printer	1	15 000 Э	12 000 Э
	Colour A3 laser printers	13	4 500 Э	58 500 Э

	Large scale plasma monitors	2	5 500 Э	11 000 Э
	Communication equipment /Routers/	14	6 500 Э	92 000 Э
	Precise double-frequency GPS (GALILEO) receiver		30 000 Э	30 000 Э
	GPS (GALILEO)– for navigation of the emergency maintenance squad cars of the high-voltage network enterprise and movement control	39	300 Э	11 700 Э
Data purchase from outside sources	Data for agricultural, forestry and settlement lands through which the high voltage power lines pass			20 000 Э
	Coordinates of the Bulgarian ETRF'89 points		300 Э	300 Э
	Maps of the Bulgarian territory; delivery scanning, geo reference, vectorizing of infrastructure sites and relief elements with benchmarks			107 000 Э
Application software for technical tasks solution –Line design; Definition of the wires sagging and tensions in multi spam systems; Structural analysis of power systems			23 400 Э	56 160 Э for 8 licenses (with rabat)

SUBTOTAL **1 105 160 Э**

Deliveries for 2 years

	total	Year1	Year2
Main servers including OS and DBMS	160 000 Э	160 000 Э	-
GIS BASE software products	364 000 Э	216 000 Э	148 000 Э
Local servers for 13 power transmission regions	65 000 Э	35 000 Э	30 000 Э
Work stations	97 500 Э	60 000 Э	37 500 Э
Colour A0 scanner for precise scanning of maps with 1:25 000 scale	20 000 Э	-	20 000 Э
Large scale A0 laser printer	12 000 Э	12 000 Э	-
Colour A3 laser printers	58 500 Э	9 000	49 500
Large scale plasma monitors	11 000 Э	5 500 Э	5 500 Э
Communication equipment /Routers/	92 000 Э	52 000	40 000
Precise double-frequency	30 000 Э	30 000 Э	-

GPS (GALILEO) receiver			
GPS (GALILEO) – for navigation of the emergency maintenance squad cars of the high-voltage network enterprise and movement control	11 700 Э	6 000 Э	5 700 Э
Coordinates of the points under ETRF89	300 Э	300 Э	-
Applied software for the solution of technical tasks Design of electrical lines, structural analysis, etc	56 160 Э for 8 licenses (with rabat)	56 160 Э	-
	Total all	Total year 1	Total year 2
	978 160	641 960	336 200

ANNEX 5

ADMINISTRATIVE CAPACITY

The "International Projects and Aid Programmes" Department (IPAP Department), "European Integration and International Projects" Directorate, MEER will be the division within MEER acting as a PIU for the present project jointly with the "International Cooperation" expert from the State Energy Regulatory Commission. The IPAP Department will cooperate with the "European Integration" Department, within the "European Integration and International Projects" Directorate, MEER, Energy Efficiency Agency and State energy Regulatory Commission experts, in the process of project implementation.

The IPAP Department, within MEER is responsible for the management of the projects financed under PHARE programme incl. the overall programme cycle: identification, preparation, coordination of the implementation and evaluation of the projects, according to the Admistrative structure of MEER. The IPAP Department main functions are:

- Planning, coordination and administrative management of the activities, regarding the utilization of the Preaccession Funds: National PHARE Programme, PHARE CBC, ISPA financial instrument;
- Preparation of projects under the EC programmes SAVE and ALTENER;
- Operational planning, coordination and management of other energy programmes and projects, under international aid and external investments;
- planning, coordination and financial and administrative management of conventional energy projects, financed under Kozloduy Decommissioning Support Fund; etc

The IPAP Department has the relevant capacity for execution of its responsibilities and its staff is highly experienced in the field of Phare programme cycle From the beginning of Phare programme for Bulgaria, the IPAP Department (Phare PMU till 1999) have managed a number of Phare programmes with more than 70 projects with a total budget more than 60 MEURO.

The IPAP Department consists of Head of Department, 2 state experts, 1 senior expert and 2 junior experts.

An effective system for management, implementation and monitoring of Phare projects has been established at MEER. For each project a Steering Committee and Working groups are established, consisting of Project Administrator and relevant experts from MEER and from the project beneficiary institutions. The responsibilities of the Steering Committee , the Working groups and the project administrator are specified in the approved by the Minister of energy and energy resouces "Statut, responsibilities and tasks of the Steering Committees, Working groups and Admistrators for management of energy projects financed under Phare programme and under other international organisations and programmes".

From the beginning of Phare programme for Bulgaria, the IPAP Department, (Phare Conventional Energy PMU till 1999) has managed about 27 projects, relative to the adoption and implementation of the conventional energy acquis, amounting to some 27.04 MEURO. 11 of these conventional energy acquis related PHARE projects were committed after 1999. The later are listed below:

- National PHARE Programme; Project number: BG 0201.10 - Technical Assistance in Liberalizing the Natural Gas Market and pre-privatization preparation of Unbundled Bulgargaz Parts;
- SARA Programme; Project number: BG9805-01-01-04/01 - Power sector privatization studies – Grid code, Power purchase agreements, Tariff and pricing policy, Secondary legislation;
- SARA Programme; Project number: BG9805-01-01-04/02 - Power sector privatization studies – Regulatory Costing for Price Approval;
- National PHARE Programme; Project number: BG9601-03-02 - Preparation of the legislation for creation of Energy Service Company (ESCO);

- National PHARE Programme; Project number: BG0003.04 - Institutional building of SERC;
- National PHARE Programme; Project number: BG0009.02 - Institutional building of CUAEPP;
- National PHARE Programme; Project number: BG9601-02-02 - Technical assistance to the NEK EAD;
- National PHARE Programme; Project number: BG9404 – Construction of flue gas desulphurisation plants at units 7 and 8 in TPP "Maritsa East 2"
- National PHARE Programme; Project number: BG9508-01-01 - Harmonization with the EU norms and standards;
- National PHARE Programme; Project number: BG9508-01-03 - Technical assistance for the establishment of Energy Regulatory Authority;
- National PHARE Programme; Project number: BG9508-01-06 - Technical Assistance for the development of strategy and harmonization of the legislation in the distrcict heating sector with the EU ones.
- National PHARE Programme; Project number: BG 9508-01-08 - Technical assistance for the development of a tariff policy and energy saving campaign;
- National PHARE Programme; Project number: BG 9508-01-09 - Technical Assistance for the development of an energy strategy

At the same, several acquis related projects were implemented under bilateral programmes, or were funded by another donors. They are listed below:

- 2003 – World Bank - "Harmonization of the Bulgarian legislation with the acquis communautaire in the energy sector"
- Year 2002 - Cooperation with Canada – under SEETEC project – "Technical assistance for elaboration of a concept for electricity market liberalization strategy";
- 2000/2001 - MATRA programme of the Dutch government; Project number: 21561 A BG; implemented by a Consultant – volunteer – "Evaluation of the compliance of Bulgarian energy legislation with the respective EU legislation in the context of the accession process";
- 2000/2001 - MATRA programme of the Dutch government; Project number: 21548 A BG; implemented by a Consultant – volunteer – "Development of a regulatory framework for the transition of the "single buyer" model to the model of regulated third party access to the electricity and gas market in conformity with acquis communautaire"

ANNEX 6

LIST OF RELEVANT ACTS AND REGULATIONS

EU acts:

- Directive 2003/54/EC concerning common rules for the internal market in electricity and repealing **Directive 96/92/EC** concerning common rules for the internal market in electricity;
- **Council Directive 90/377/EEC** concerning a Community procedure to improve the transparency of gas and electricity prices charged to industrial end-users;
- Regulation (EC) No 1228/2003 of 26 June 2003 on conditions for access to the network for cross-border exchanges in electricity;

National acts;

- **Energy Act (**adopted by the National Assembly on 26 November 2003) and the sub law acts for its application which will be adopted:
  - ordinance concerning licenses;
  - ordinance concerning price formation and regulation;
  - rules concerning conditions for regulated third party access to the networks;
  - rules for trade with electricity and natural gas; technical rules (Grid code) for the networks;
  - ordinance concerning tradable green certificates.
- **Energy Efficiency Law** (adopted by the National Assembly on 05 March 2004) and the sub law acts for its application which will be adopted:
  - Ordinance transposing Council Directive 92/42/EEC of 21 May 1992 on efficiency requirements for new hot-water boilers fired with liquid or gaseous fuels;

Ordinance transposing Directive 2000/55/EC of the European Parliament and of the Council of 18 September 2000 on energy efficiency requirements for ballasts for fluorescent lighting;

- Cadastre and property register act

In force from January 1, 2001.

ANNEX 7

LIST OF RELEVANT STRATGEIC PLANS

1. Energy Strategy (adopted by the Council of Ministers on 22 May 2002, decision N 279, and by the National Assembly on the 27 July 2002);
2. National Plan for Economic Development 2000 – 2006 (adopted by the Council of Ministers on 5 June 2003)
3. Multiannual Programming Document 2004 – 2006
4. National Programme for the Adoption of the Acquis (NPAA)
5. Accession Partnership
6. Roadmap for EU accession for Bulgaria