Technological Issues

Field	Technological Issues	Background	Contents of Technological Issues
Trans-mission	(T-11)Tansmission Network Planning	-	-
		Improvement of power factor is necessary	Reactive power planning
	(T-12)Efficient Supply Technologies for overcrowded areas Underground Cable, Underground Substation etc.	Optimized design for underground substations is requested	- GIL, Underground Cable Technologies - Optimized design method for underground substations
		-	-
		-	-
	(T-13)UHV Technologies	-	-
	(T-15)HVDC Technologies(overhead line & underground/marine cable)	Efficient Vietnam - China power transmission is requested	HVDC technologies fit to Vietnam - China power transmission
		PLN is going to build 500 kV HVDC link between Sumatra and Java islands in near future. It is a new technology for PLN.	- Design & selection of HVDC technology, - Preparation of HR for Operation & Maintenance - Operational experience - Impact of HVDC lines on environment, health, etc - Impact of ground return
		(Same as above)	(Same as above)
	(T-21)Protection Method	-	-
		There is a need for system-wide monitoring, control and protection to prevent major disturbance in Java Bali power system	Phasor measurement technology, configuration, software
		PEA needs to reduce the Protection cost which is interconected Small Power Producer (SPP). PEA uses the Optical Fiber Cable now.	PEA wants to use Power Line Communications (PLC).
	(T-22)Natural Disaster Prevention e.g. Lightning, Salt Damage	Salt contamination accidents occurred due to lightning activities	Analysis of salt contamination areas and insulation technologies coping with the contamination/ Methodology and establishment of thunderstorm aerial distribution map of VN
		(1)Needs for alanysis of faults by linghtning & counter measures to the faults-concentrated points (2)Needs to know the cause of facility-destroy by the earthquake	-
		-	-
		-	-
	(T-23)Fault Locator, Restoration Technologies		- Fault Locator and Fault Analisys technologies - Energy Restoration System
		-	-
	(T-24)Power Network Simulator	Java-Bali grid has developed into a large power system including HVDC link to Sumatra. PLN is considering to have a real time network simulator for testing protection and control systems, , including HVDC control system	Power system model, parameter identification & validation
		(Same as above)	(Same as above)
	(T-25)Asset Management (Efficient Utilization of Transmission System)		Efficient Utilization of transmission system using Dynamic Thermal Current Rating method
		Efficient Utilization of transmission system is necessary for coping with the high demand growth	-
	(T-26)Reliable Operation (V, Hz,Stability, Shrort Circuit Current)	Reduction of short circuit current in 220kV network in Hochiminh city is requested	-
	(T-27)Equipment Reliability		
	(T-31)Insulation Technologies	-	-
		-	-
		-	-
	(T-32)Diagnosis Technologies for Power Supply Equipment	Fialures of CT/VTs, Arresters, and Switch gears have happend. Trasnformer fire accidents also sometimes occurred. Suitable measures for them are necessary.	Diagnosis and Maintenance technologies for the reliability of substations - Failure Analysis and countermeasures for the failures of CT/VTs, Arresters, and Switchgears - Analysis of Trasformer Fire Accidents and their countermeasures
			-
		<#1> Some equipments in our power system are aging. The equipments include: generators, transformers, cables, GIS	<#1> Assessing the remaining life of power cables, transformers, and generators
		<#2> SP PowerGrid's network is a fully underground cable system. Pursuit of new technologies to prevent failures of underground cables through condition monitoring is important to enhance network performance.	<#2> New technologies for condition monitoring of transmission and distribution cables
		-	-
		Quality of the distribution equipment is poor. Reliablity is affected.	To introduce registration system for supplier
	(T-33)Material Engineering	Quality of the distribution equipment is poor. Reliablity is affected.	To introduce registration system for supplier
	(T-34)Standards / Guidelines	Standards for transmission system construction and operation are not established enough. EVN is trying to prepare them, referring to IEC standards.	
		-	-
	Candidates of R&D collaboration themes - Transmission -	Referring to the IERE website, TNBR proposed some candidates of R&D collaboration themes	- Small wireless temperature sensor - Network Reliability Assessment using current and voltage analysis V0/I0 - Distribution Post Fault Intelligent Switching - Equipment Condition Characterisation - Optical Fiber Current Sensor

Technological Issues

Field	Technological Issues	Background	Contents of Technological Issues
Distri-bution	(Di-11)Distribution Network Planning	-	-
		-	-
	(Di-12)Distributed-Generation Interconnection Guidelines	Singapore has seen the development of Distributed Generation in the manufacturing industries. The network related issues arising from Distributed Generation need to	Technical issues relating to connections, protection, fault level control, etc.
		MEA has the problems how to interconnect increased SPPs to Network. Especially, to manage between airport-demand (incl. air conditioner load) and generation-supply	Power Grid Interconnection Guidelines for Small Power Producer (SPP)
		PEA has the Power Grid Interconnection Guidelines. But the standard equipments aren't constructed in predetermined way in order to reduce the cost. PEA uses the Optical Fiber Cable. PEA wants inexpensive equipments	To confirm the Power Grid Interconnection Guidelines and to open it completely
	(Di-13)Underground Distribution & Substation Technologies	MEA knows TEPCO's undergrand substation. But it is expensive. MEA wants to construct the inexpensive substation. MEA wants to replace present substations with undergrand substations in limited area easily. The Present substations have the complexed distribution lines on the ground.	- Designing Technology for Underground equipments - To investigate economical system
		-	-
	(Di-14)20kV Distribution	-	-
	(Di-21)Distribution System Automation (recovery after brackout,etc.)	Need to asses TNB's planned DA system	To study DA system used by other utilities e.g. TEPCO, KEPCO, etc.
		-	-
		Automatic distribution system is launched in future.	-
		-	-
	(Di-23)Fault Locator	-	-
	(Di-24)Power Quality (Voltage, momentary Voltage drop, etc.)	More and more customers in major cities complain to PLN for low quality of power supply. PLN considers PQ as a next issue after supply adequacy and reliability. Regulation on PQ is also lacking. PLN staff at large are not familiar with mitigation techniques fot PQ enhancement	Best practice in policy, strategy and technique of PQ enhancement
		<#3> High tech industries are sensitive to voltage dips. These industries demand very high power quality standards. Voltage dip mitigation solutions are important in addition to network solutions to improve power quality.	<#3> Voltage dip mitigation solutions
		Complaint of many momentary drops from customer (ex.TOYOTA) . (about 10-20 times per year)	To improvement Reliability (incl. measure for momentary outage and momentary drop) in 24kV Distribution line/equipments
		PEA has the quality problems. For examples, momentary outage, momentary drop and voltage drop	To improvement quality in distribution network
	(Di-25)Network Technical Losses, Voltage Unification	Total % of technical loss of Distibution System is 4%. (Total % loss of transmission system, including distribution, is 10.8%.) It is necessary to reduce its losses.	- To optimize the ulilization of off points - Usage of capacitor banks - Parallel operation of distribution network - Loading factor
		EVN plans to unify the distribution voltage to 22kV	Rational logic for 22kV voltage unification
		Loss reduction theory and technologies are necessary, because of large technical distribution network loss. There are too many levels of distribution voltage.	
	(Di-26)Asset Utilization	Need to maximize the utilization of overhead lines, cables, busbars, transformers	- To improve current practice on system operations - To put in place contigency plans to avoid total outage
	(Di-31)Insulation Technologies	Suitable insulation coordination theories and technologies are necessary	- To understand insulation coordination theory for MV overhead system - To study insulation coordination on existing 33kv line with high outage rate - To recommend solution based on the study of enhance the line performance
		-	-
	(Di-32)Diagnosis Technologies for Power Supply Equipment	-	-
		Same as Transmission (T-32 <#1>)	Same as Transmission (T-32 <#1>)
		Same as Transmission (T-32 <#1>)	Same as Transmission (T-32 <#1>)
		Similar to T-32 <#2> (SP PowerGrid's network is a fully underground cable system. Pursuit of new technologies to prevent failures of underground cables through condition monitoring is important to enhance network performance.)	Similar to T-32 <#2> (New technologies for condition monitoring of transmission and distribution cables)
		-	-
	(Di-33)Material Engineering	-	-
	(Di-34)Standards / Guidelines	-	-
	Candidates of R&D collaboration themes - Distribution -	Referring to the IERE website, TNBR proposed some candidates of R&D collaboration themes	- Fault Analyzing System and Technology - Energy Restoration System

Technological Issues

Field	Technological Issues	Background	Contents of Technological Issues
Gene-ration	(G-11)Generation Planning	Rational generation planning, fit to very high demand growth rate, is necessary.	
		Rational generation planning, fit to very high demand growth rate, is necessary.	-
	(G-12)CDM	-	-
		-	-
	(G-13)High Efficiency Clean Coal or Natural Gas Power Generation (including combustion, efficient fuel utilization)	- to use low quality coal mined in Malaysia - to improve the combustion efficiency	- Coal Analysis - Auto Tuning Combustion
		Most coal-fired power plants in PLN use low rank coal instead of high rank coal as specified by the boiler design. There is also a need to reduce CO2 emission and to improve coal quality before burning	coal quality upgrading , low emission combustion, - improvement of combustion system - establishment of hot gas cleaning improvements for pollutant removal at elevated temperatures - coal gasification technology
		We repower the existing steam plant's to Gas fire combined plant, by re-using its Boiler in order to decrease cost. But we must realize the same efficiency with completely newly built power plants.	
		-	-
		EGAT has Coal thermal Plants. EGAT in interested in Clean Coal technology	-
	(G-15)Conversion of fuel in existing thermal Power plants	About 24% of electricity generated by PLN in 2006 was coming from burning oil, accounted for 73% of the total production cost. This caused heavy financial burden for PLN and the Government	Conversion of HSD-fired diesel power plant to Gas Engine running on gas (from coal gasification or LNG). Conversion of HSD diesel power plant to use biodiesel. Combined cycle plant running on HSD be converted to gas
		From the point of view of "Best Mix", introduction of power station whose fulel is defferent from "Natural Gas" are required. (Singapre depends too much on Natural Gas)	Conversion from Oil Power Station to "Coal + Biomass Co-firing" PowerStation' - Feasibility Study of Operation problem (How much percentage Biomass we can mix? , etc.)
		-	-
	(G-21)Optmized Plants Operation	-	-
		-	-
	(G-22)Utilization of Coal Ash, DeNox、DeSox、DeDust from Flue Gas	-	-
		- Strong needs of coal ash utilization - Vietnam manufacturers develop DeNox、DeSox equipment. - Optimized selection and operation method of electric Dedust sysytem is necessary	-
		The land of Singapore is small and there in not enough spaces for burying. That's why they have to deal with the ash by their own in Singapore.	Utilization of Coal Ash, especially for bottom Ash
		-	-
		-	-
	(G-23)Improvement of Thermal Power Efficiency Technologies e.g. Efficiency Evaluation Method, Boiler Repairs	-	-
		The existing thermal plants commissioned between 1979 to 1996 have experienced efficiency degradation	Energy audit of existing thermal power plants to find out degradation of main components. On-line monitoring of plant performance. Use of Fuel Oil Additive to improve combustion efficiencies and performance
		-	-
		If EGAT's object is the same as Task-force's object, EGAT may join TF's member. Task-force's theme is "For improvement the efficeiency of thermal power plant under operation in Taiwan".	-
	(G-24)Decrease of Fault Outage (Reliability)	Generation wholesale market of Singapore applies pool system. Outages of our power plants in the past causes 'power outpur limitation' of 'price increase of back up power', etc.	Decrease of Fault Outage of Generation
	(G-25)Increase of Availability	Needs to increase Availability (But present availability is moderate.)	

Technological Issues

Field	Technological Issues	Background	Contents of Technological Issues
Gene-ration	(G-31)Biomas / Utilization of unused energy source	-	-
		Potential capacity of wind generation in Vietnam, mainly along the coast, is about 400MW. EVN plans to conduct the wind power generation project.	Wind power generation technologies
		From the point of view of "Best Mix", introduction of power station whose fulel is defferent from "Natural Gas" are required. (Singapre depends too much on Natural Gas)	Conversion from Oil Power Station to "Coal + Biomass Co-firing" PowerStation' - Feasibility Study of Operation problem (How much percentage Biomass we can mix? , etc.)
		-	-
	(G-32)CO2 Separation, Recovery and Sequestration Technologies	-	-
	(G-33)Material Engineering	-	-
		-	-
		-	-
	(G-34)Diagnosis / Life Extension Technologies、RBI	Coping with both cost reduction and high reliability, Risk Based Inspection should be considered	- Best Maintenance Repair Practice Database - Turbine RBI including steam path audit and performance tets
		the existing steam power plants have been operating for more than 15 years and high temperature components experienced material degradation due to creep phenomenon	Remaining life assessment of hot temperature components (ID & FD fans, BFP, turbines, and auxiliary). Development of standard boiler and turbine remaining life assessment. Life extension of thermal power plants, i.e. HRSG, boilers and turbines. Remaining life assessment and life extension of gas turbines power plants
		Executive demands cost-cut. We have already worked on the life extention of "Boiler", but not yet on the "Gas Turbine". Electricity Utilities don't have information about the "hot parts" which are produced by deffrerent manufacturing companies. On the othere hands, manufacturing companies don't guarantee the operation beyond the agreed period. The balance between "reliability and cost" is very diffucult. These problem seems common among Electricity Utilities.	Life Extension Technologies of Gas turbine hot parts" -Needs to extent guaranteed period from 50,000 hours to 70,000 hours. We would hold next 6 year contracts in present condition, but after the 6 years we would like to extent it.
		To use the diagnosis technology to improvement reliablity	-
	Candidates of R&D collaboration themes - Generation -	Referring to the IERE website, TNBR proposed some candidates of R&D collaboration themes	- Coal generation : boiler, steam turbine and environmental control - Gas generation - RBI : Maintenance & Life Prediction of plant - Combustion technology enhancement - Coal analysis
	CO2 Reduction Technologies / Kyoto Protocol	-	-
Demand Side	(Demand-11)Energy Management, ESCO	-	-
		-	-
		-	-
	(Demand-13)Load Leveling Technologies e.g. Energy Storage	-	-
		-	-
	(Demand-14) Countermeasures for momentary outage (Demand Side)	Similar to Di-24 <#3> (High tech industries are sensitive to voltage dips. These industries demand very high power quality standards. Voltage dip mitigation solutions are important in addition to network solutions to improve power quality.)	Similar to Di-24 <#3> (Voltage dip mitigation solutions)
		-	-
		-	-