Annex 1: Results Framework and Monitor

VIETNAM**: DISTRIBUTION EFFICIENCY PROJECT**

(Baseline and indicators to be agreed and finalized during appraisal)

Project Development Objective (PDO):														
PDO Level Results Indicators*	**Core**	**Unit of Measure**		**Cumulative Target Values****							**Frequency**	**Data Source/ Methodology**	**Responsibility for Data Collection**	**Description (indicator definition etc.)**
			2011 Base Line		**2013 Start**	**2014**	**2015 Midterm Review**	**2016**	**2017**	**2018 Completion**				
Indicator on Reliability														Average duration of sustained interruptions per consumer during the year, measured in units of time (minutes or hours). SAIDI = (Total duration of sustained interruptions in a year) / (Total number of consumers)
1.1 System Average Interruption Duration Index (SAIDI) in project areas, calculated as in Distribution Code (1)														
											at project appraisal, Midterm review, and Completion	Semi- annual progress reports of IAs and PCs' operation reports. ERAV Distribution Code monitoring documents.	PCs, overseen by Business Department of EVN	
NPC		minutes	5,145			5,048	4,947	4,848	4,751	4,656				
CPC			3,631			3,506	3,436	3,367	3,300	3,234				
SPC			6,958			5,990	5,871	5,753	5,638	5,525				
HCM PC			1682			884	716	581	472	384				
HNPC			299			297	296	294	293	291				
Indicator on Reliability														Average number of sustained interruptions per consumer during the year. SAIFI
1.2 System Average Interruption Frequency Index (SAIFI) in project areas calculated as in Distribution Code (1).											at project appraisal, Midterm review, and Completion	Semi- annual progress reports of IA, PC operation reports. ERAV	PCs, overseen by Business Department of EVN	

NPC		times	19.80			19.42	19.20	19.00	18.83	18.65		Distribution Code monitoring documents.		= (Total number of sustained interruptions in a year) / (Total number of consumers)
CPC			23.53			22.72	22.26	21.82	21.38	20.95				
SPC			24.30			23.40	22.90	22.50	22.00	21.60				
HCM PC			7.62			4.47	3.82	3.29	2.86	2.50				
HNPC			1.73			1.71	1.70	1.69	1.68	1.67				
Indicator on Power Quality														A short-term increase in voltage, lasting up to a few seconds or decrease in voltage lasting longer than a few seconds.
2. Voltage excursion outside +/-5% at 110kV/MV transformers, in project areas		Times/ year									at project appraisal, Midterm review, and Completion	Semi- annual progress reports of IAs and PCs' operation reports. ERAV Distribution Code monitoring documents.	PCs, overseen by Business Department of EVN	
NPC		Times/ year	60			56	52	48	44	40				
CPC			0			0	0	0	0	0				
SPC			25			12	10	7	5	4				
HCM PC			0			0	0	0	0	0				
HNPC			0 (automatic control)			0	0	0	0	0				
Indicator on Total Distribution Losses														
3. Losses in project areas											at project appraisal, Midterm review, and Completion	Semi- annual progress reports of IAs and PCs' operation reports. ERAV Distribution Code	PCs, overseen by Business Department of EVN	
NPC		%	24.38	24.38	24.38	20.48	16.59	13.99	12.69	11.39				
CPC			13.58	13.58	13.58	12.62	11.67	11.03	10.71	10.39				
SPC			10.24	10.24	10.24	9.45	8.66	8.13	7.86	7.60				

HCM PC			7.86	7.86	7.86	7.15	6.44	5.97	5.74	5.50		monitoring documents.		
HNPC			19.00	19.00	19.00	16.90	14.80	13.40	12.70	12.00				
4. Indicator consumption reduction for AMI consumers (2)														
NPC		MWh	0.0	0.0	0.0	28.0	96.0	144.9	162.7	181.6	Midterm review, and Completion	Semi- annual progress reports of IA, and PCs' operation reports and M&E reports	Participating PCs, overseen by Business Department of EVN	
HCM PC			0.0	0.0	0.0	17.3	58.0	85.9	94.9	104.3				
HNPC			0.0	0.0	0.0	11.1	37.5	56.1	62.4	69.1				
CPC			0.0	0.0	0.0	9.3	31.8	47.8	53.6	59.4				
TOTAL NPC, HCM PC, HNPC and CPC			0.0	0.0	0.0	65.7	223.3	334.7	373.6	414.3				
Avoided GHG (3)														
NPC		Tons CO2	0			18,213	62,405	94,190	105,775	118,015	Midterm review, and Completion	Semi- annual progress reports of IAs and PCs' operation reports. M&E reports by IAs	Participating PCs, overseen by Business Department of EVN	
HCM PC			0			11,262	37,726	55,835	61,698	67,818				
HNPC			0			7,212	24,406	36,446	40,528	44,890				
CPC			0			6,026	20,638	31,094	34,825	38,596				
TOTAL NPC, HCM PC , HNPC and CPC			0			42,712	145,175	217,565	242,826	269,319				

INTERMEDIATE RESULTS		

***Intermediate Result indicator for Component A*:**			**2011 Base Line**	**2012**	**2013 Start**	**2014**	**2015 Midterm Review**	**2016**	**2017**	**2018 Completion**				
Implementation progress of 110 kV lines														
NPC		% constructed			10	25	60	80	90	100				
CPC					10	25	60	80	90	100				
SPC					10	25	60	80	90	100	Annual	Semi-annual progress reports of IA, and PCs' operation reports	PCs, overseen by Business Department of EVN	
HCM PC					10	25	60	80	90	100				
HNPC			-		10	25	60	80	90	100				
Implementation progress of 110 kV substations														
NPC		% constructed			10	25	60	80	90	100				
CPC					10	25	60	80	90	100				
SPC					10	25	60	80	90	100	Annual	Semi-annual progress reports of IA, and PCs' operation reports	PCs, overseen by Business Department of EVN	
HCM PC					10	25	60	80	90	100				
HNPC			-		10	25	60	80	90	100				
Implementation progress of 35/22/0.4 kV Lines														
NPC		% constructed			10	25	60	80	90	100				
CPC					10	25	60	80	90	100				
SPC					10	25	60	80	90	100	Annual	Semi-annual progress reports of IA, and PCs' operation reports	PCs, overseen by Business Department of EVN	
HCM PC					10	25	60	80	90	100				
HNPC					10	25	60	80	90	100				
Implementation progress of 35/22/0.4 substation														

											Annual	Semi-annual progress reports of IA, and PCs' operation reports	PCs, overseen by Business Department of EVN	
NPC		% constructed			10	25	60	80	90	100				
CPC					10	25	60	80	90	100				
SPC					10	25	60	80	90	100				
HCM PC					10	25	60	80	90	100				
HNPC					10	25	60	80	90	100				
***Intermediate Result indicator for Component B*:**														
Implementation of progress of AMI System											Annual	Semi-annual progress reports of IA, and PCs' operation reports	Participating PCs, overseen by Business Department of EVN	
NPC		% installed	0				50	100						
HCM PC							50	100						
HNPC							50	100						
CPC							50	100						
Implementation progress of SCADA system														
											Annual	Semi-annual progress reports of IA, and PCs' operation reports	Participating PCs, overseen by Business Department of EVN	
NPC		%				10	40	80	100					
CPC						10	40	80	100					
SPC														
HCM PC						30	60	80	100					
HNPC														
***Intermediate Result indicator for Component C*:**														
											Annual	Semi-annual progress reports and M&E reports of	PCs and ERAV	
ERAV		Progress Demand response implementation	None											
PCs			None											

												IAs		
											Annual	Semi-annual progress reports of IA M&E reports	PCs and ERAV,	
PCs		% of TA				20	50	80	100					
ERAV						30	60	80	100					

Note:

(1) The definition and calculation methodology for SAIDI and SAIFI are specified in Vietnam Distribution Code, and exclude interruptions outside the control of PCs as listed in Distribution Code Article 13, such as caused by failure of upstream transmission system or generation shortage. SAIDI and SAIFI will be calculated considering the interruptions to PC customers connected in the project area.

$$SAIDI_j = \frac{\sum_{i=1}^{n} T_i K_i}{K}$$

$$SAIDI = \sum_{j=1}^{4} SAIDI_j$$

Ti: Duration of interruption/outage "i" (longer than 5 minutes) in the quarter J.

Ki: The number of Users and Distributor and retailer who buy the electricity from the Distributor and are impacted by interruption/outage "i" in the quarter J

n: The total number of interruption/outage longer than 5 minutes in the quarter j.

K: The total number of User, Distributor and retailer who buy the electricity from Distributor in the quarter j

$$SAIFI_j = \frac{n}{K}$$

$$SAIFI = \sum_{j=1}^{4} SAIFI_j$$

n: The total number of interruption/outage longer than 5 minutes in the quarter j.

K: The total number of User, Distributor and retailer who buy the electricity from Distributor in the quarter j

(2) Reduction of consumption compared to business as usual (without the project scenario) will be calculated as actual annual PC sales to AMI targeted customers minus business as usual consumption for that year. Business as usual scenario is determined from a baseline corresponding to actual 2011 PC sales to the customers where AMI will be implemented, plus forecasted demand growth at the time of appraisal as shown in table below.

Indicators in the results framework calculated with reductions as from 2014, as follows: 2014 0.13%, (50% of AMI implemented), 2015 0.38% (implementation of AMI completed); and 0.5% remaining years

Baseline / BAU Demand of AMI customers (2)		**2011 Base Line**	**2012**	**2013 Start**	**2014**	**2015 Midterm Review**	**2016**	**2017**	**2018 Completion**	
NPC	GWh	15,044	17,183	19,626	22,416	25,602	28,981	32,546	36,312	at project appraisal
HCM PC		9,954	11,115	12,412	13,860	15,477	17,180	18,984	20,867	
HNPC		6,184	6,976	7,869	8,876	10,013	11,214	12,470	13,812	
CPC		4,984	5,690	6,496	7,416	8,467	9,383	10,399	11,526	

(3) Avoided GHG will be calculated for PCs with AMI under conversion factor 0.65 tCO2/MWh, estimating avoided power generation equal to demand reduction. Consumption reduction calculated as described in bullet 2.