JCM Project Design Document Form

A. Project description

A.1. Title of the JCM project

Introduction of Amorphous High Efficiency Transformers in Southern and Central Power Grids

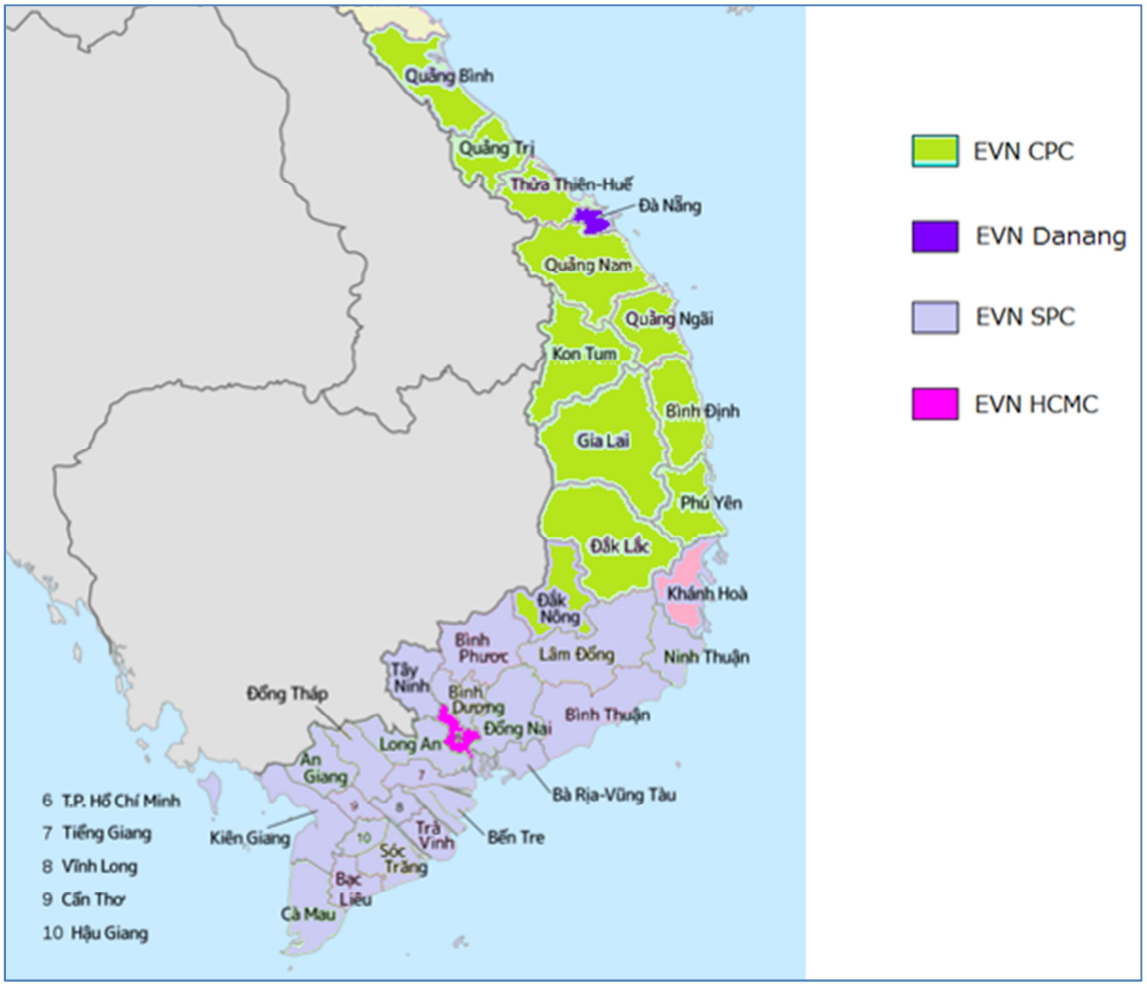
A.2. General description of project and applied technologies and/or measures

The proposed JCM project aims to reduce CO_2 emissions by utilization of energy efficient transformers in power distribution grid in Southern and Central Viet Nam.

The project involves installation of high efficient amorphous transformers. The project replaces some existing and some yet-to-be-installed conventional/more energy intensive silicon steel core transformers. Amorphous transformers installed by the project are manufactured in Vietnam based on the state of the art technology developed by Hitachi Metals of Japan. The use of amorphous alloy in the amorphous transformer's iron core leads to improvement of electrical characteristics and significantly reduces non-load losses (standby electricity) caused regardless of whether a load is present.

The proposed JCM project plans to install total of 4,841 amorphous transformers to the power distribution grid in southern and central part of Viet Nam, which is managed by following state owned enterprises:
EVN Southern Power Corporation (EVNSPC)
EVN Central Power Corporation (EVNCPC)
Da Nang Power Company Ltd. (DNPC)
Ho Chi Minh City Power Corporation (EVNHCMC)

In addition to the above four entities, the project transformers are operated and maintained by provincial/district power companies which are subsidiaries of EVNSPC, EVNHCMC, and EVNCPC. The area of the power distribution grid where project amorphous transformers are installed is shown in the following figure.



(Source of scanned image: Wikipedia)

Figure : Area of the power distribution grid covered by the project

The expected annual emission reductions that would be achieved by the proposed project are estimated to be 3,885.tCO_2/y.

A.3. Location of project, including coordinates

Country	The Socialist Republic of Viet Nam
Region/State/Province etc.:	Province/City etc. corresponding to the location of headquarters of each regional power corporations and district power companies involved: 1. An Giang Province 2. Ba Ria Vung Tau Province 3. Bac Lieu Province 4. Ben Tre Province

	5. Binh Duong Province 6. Binh Phuoc Province 7. Binh Thuan Province 8. Ca Mau Province 9. Can Tho City 10. Dong Thap 11. Hau Giang 12. Kien Giang 13. Lam Dong Province 14. Long An Province 15. Ninh Thuan Province 16. Soc Trang Province 17. Tay Ninh Province 18. Tien Giang Province 19. Tra Vinh Province 20. Vinh Long Province 21. Ho Chi Minh City 22. Binh Dinh Province 23. Dak lak Province 24. Dak Nong Province 25. Gia Lai Province 26. Kon Tum Province 27. Phu Yen Province 28. Quang Binh Province 29. Quang Nam Province 30. Quang Ngai Province 31. Quang Tri Province 32. Thua Thien Hue Province 33. Ho Chi Minh City 34. Da Nang City
City/Town/Community etc:	1. Xuyen City 2. Vung Tau City 3. Bac Lieu City 4. Chau Thanh District 5. Thu Dau Mot City 6. Dong Xoai Town 7. Phan Thiet City 8. Ca Mau City 9. Ninh Kieu District

	10. Cao Lanh City 11. Vi Thanh City 12. Tach Gia City 13. Da Lat City 14. Tan An City 15. Phan Rang-Thap Cham City 16. Soc Trang City 17. Tay Ninh Town 18. My Tho City 19. Tra Vinh City 20. Vinh Long City 21. Thu Duc District 22. Quy Nhon City 23. Buon Ma Thuat City 24. Gia Nghia Town 25. Pleiku City 26. Kon Tum City 27. Tuy Hoa City 28. Dong Hoi City 29. Tam Ky City 30. Quang Ngai City 31. Dong Ha City 32. Hue City 33. District 1 34. Hai Chau District
Latitude, longitude	1. 10°22'56.8"N 105°26'09.5"E 2. 10°20'49.7"N 107°04'34.7"E 3. 09°17'45.0"N 105°43'34.9"E 4. 10°16'13.4"N 106°21'29.5"E 5. 10°57'58.4"N 106°40'08.3"E 6. 11°31'44.0"N 106°52'17.5"E 7. 10°56'53.2"N 108°06'37.7"E 8. 09°10'46.5"N 105°08'46.3"E 9. 10°02'18.9"N 105°47'14.0"E 10. 10°27'32.4"N 105°38'26.9"E 11. 09°46'25.2"N 105°27'18.6"E 12. 10°00'13.8"N 105°04'58.7"E 13. 11°56'59.9"N 108°28'03.2"E 14. 10°32'31.7"N 106°24'42.8"E 15. 11°33'50.2"N 109°00'35.5"E 16. 09°35'47.0"N 105°58'27.9"E 17. 11°18'35.1"N 106°06'21.2"E 18. 10°21'24.5"N 106°22'21.0"E 19. 09°56'13.7"N 106°20'39.6"E 20. 10°15'30.3"N 105°57'10.6"E 21. 10°49'56.5"N 106°45'21.2"E 22. 13°46'25.3"N 109°14'20.8"E 23. 12°40'08.9"N 108°02'28.6"E 24. 11°58'23.0"N 107°39'55.3"E 25. 13°58'36.1"N 108°00'06.0"E 26. 14°20'59.1"N 108°00'03.9"E

	27. 13°05'08.9"N 109°17'54.0"E 28. 17°28'37.6"N 106°36'14.2"E 29. 15°34'25.0"N 108°28'22.2"E 30. 15°07'11.2"N 108°48'02.2"E 31. 16°49'22.3"N 107°05'58.1"E 32. 16°27'29.9"N 107°35'28.6"E 33. 10°47'01.5"N 106°42'14.7"E 34. 16°04'13.3"N 108°13'16.9"E

A.4. Name of project participants

The Socialist Republic of Viet Nam	EVN Southern Power Corporation (EVNSPC) EVN Central Power Corporation (EVNCPC) Da Nang Power Company Ltd. (DNPC) Ho Chi Minh City Power Corporation (EVN HCMC)
Japan	YUKO-KEISO Co., Ltd.

A.5. Duration

Starting date of project operation	13/05/2017
Expected operational lifetime of project	18 years

A.6. Contribution from Japan

The proposed project was partially supported by the Ministry of the Environment, Japan (MOEJ) through the financing program for JCM model projects, which provided financial support of less than half of the initial investment for the projects in order to acquire JCM credits. Further, implementation of the proposed project promotes diffusion of low carbon technology within Viet Nam.

B. Application of an approved methodology(ies)

B.1. Selection of methodology(ies)

Selected approved methodology No.	VN-AM005
Version number	Ver.01.0

B.2. Explanation of how the project meets eligibility criteria of the approved methodology

Eligibility criteria	Descriptions specified in the methodology	Project information
Criterion 1	Single-phase and/or three-phase oil-immersed transformer with amorphous metal core is installed in	All transformers installed by the project are either single-phase or three-phase oil-immersed transformer with

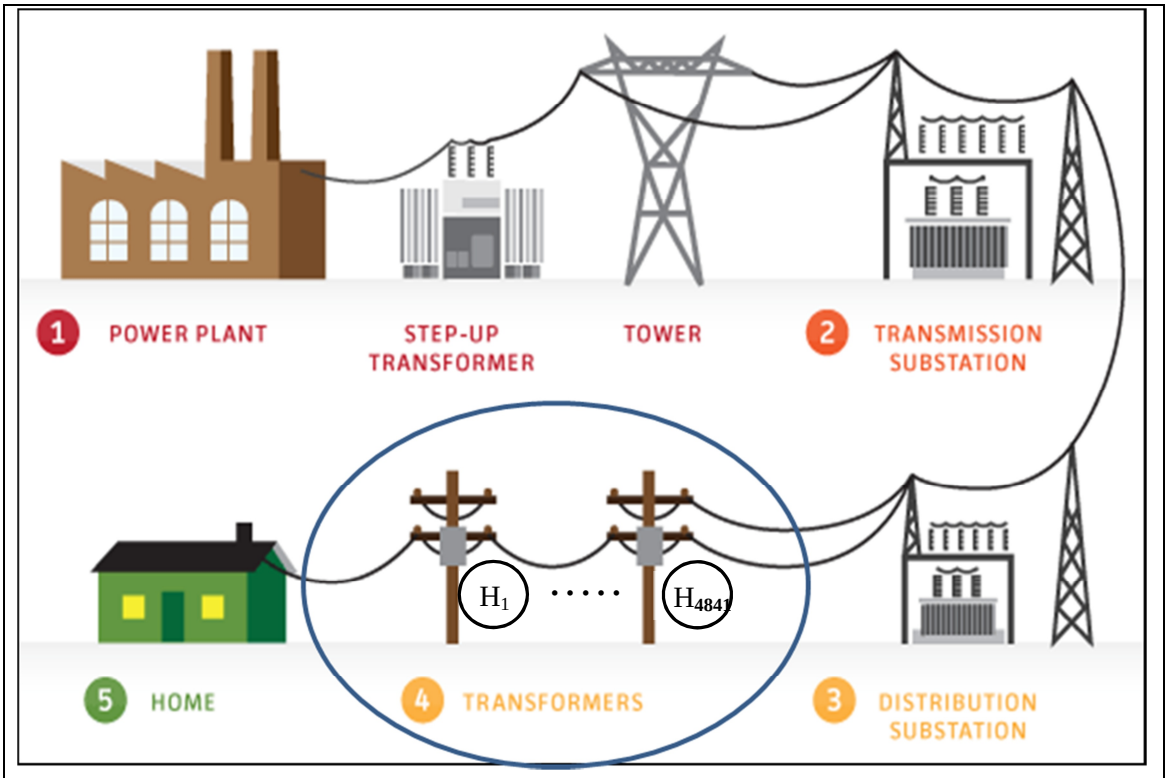
	the distribution grid.	amorphous metal core.
Criterion 2	Load losses of the project transformer determined in line with IEC 60076-1 or national/industrial standards complying with IEC 60076-1 is equal or smaller than the standard values or specification values of load loss, required by the power company of the grid where the project transformer is installed, corresponding to its capacity and number of phases.	It has been confirmed that the load loss of the project transformers are equal or smaller than the standard/specification values of load loss, required by the power company of the grid where the project transformer is installed, corresponding to its capacity and number of phases.

C. Calculation of emission reductions

C.1. All emission sources and their associated greenhouse gases relevant to the JCM project

Reference emissions	
Emission sources	GHG type
No-load losses of grid electricity by reference transformers	CO_2
Project emissions	
Emission sources	GHG type
No-load losses of grid electricity by project transformers	CO_2

C.2. Figure of all emission sources and monitoring points relevant to the JCM project



H_i : Indicating the location of the project transformer *i* (variable from 1 to 4841) whose energizing time are counted toward the monitoring parameter, $H_{i,p}$

Monitoring point:

Exact installation locations of the project amorphous transformers are identified. Any incidence of repair/replacement of the project transformers will be reported to relevant power distribution companies (i.e. EVNSPC, EVNCPC, DNPC, EVNHCMC), and the record will be kept at the distribution companies. Energizing time (i.e. hours in the monitoring period) of each project transformer will be adjusted based on the repair/replacement record if necessary.

C.3. Estimated emissions reductions in each year

Year	Estimated Reference emissions (tCO_{2e})	Estimated Project Emissions (tCO_{2e})	Estimated Emission Reductions (tCO_{2e})
2013	-	-	-
2014	-	-	-
2015	-	-	-
2016	-	-	-
2017	4,228.7	1,748.2	2,480
2018	6,624.3	2,738.6	3,885

2019	6,624.3	2,738.6	3,885
2020	6,624.3	2,738.6	3,885
Total (tCO_{2e})	24,100	9,965	14,135

D. Environmental impact assessment	
Legal requirement of environmental impact assessment for the proposed project	No

E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

The direct stakeholders of the project activity, installation and operation of amorphous transformers at power distribution grid system in Southern and Central Viet Nam, are the operators and workers of four power corporations and the provincial/district power companies subsidiaries of EVNSPC, EVNHCMC, and EVNCPC who will be involved in operation and maintenance of the project transformers. To solicit comments from stakeholders, consultation meetings were planned and identified stakeholders were invited via invitation letter. The meetings were held as follows:

	Date and Time	Venue	Invitees
Day1	02 August, 2017 9:00-11:45	EVNCPC office	EVNCPC, DNPC, and their subsidiaries power companies in districts where project transformers are installed.
Day2	03 August, 2017 14:00-16:45	EVNSPC office	EVNSPC, EVNHCMC, and their subsidiaries power companies in districts where project transformers are installed.

Satisfactory response to the comments received during the consultation meetings were provided at the time of the meetings. There is no further action required as for the consideration of comments received. Summary of comments received during the consultation meetings and their consideration are summarized in the following section E.2.

E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received
EVN CPC	Is there a penalty to the project developer if the project fails to achieve estimated emission reduction in the PDD due to technical failure of transformers?	There will be no penalty. But technical failure of transformers needs to be reported in a timely manner. *No further action required.*
EVN CPC	In case of relocation of transformers due to load upgrade, what do we need to do?	Please report to YUKO-KEISO and send evidence that relate to removal and relocation of the transformers in order to deduct hours when the transformers are off line. *No further action required.*
DNPC	If transformers under the project fail after manufacturer's warranty period, and repair is impossible, will a new transformer replace the failed one? What can we do with the failed transformers?	Before discarding the failed transformer, please obtain a letter from the manufacturer to confirm no repairing is possible and report the incident to YUKO-KEISO. Because the project receives financial support from Japanese government, any event of discarding of transformers receiving the financial support needs to be reported. *No further action required.*
	In case failed transformers are removed for repair and reinstalled after the repair, can the repaired transformers continue to be a part of the JCM project? (i.e. Is it applicable for issuance of JCM credit?)	Yes. The time between removal and reinstallation will be deducted from the energizing hours of the transformer to avoid overestimate of emission reductions. *No further action required.*
EVN HCMC	Is there any renewable energy project utilizing JCM scheme?	There is a solar PV project aiming for JCM approval. Other types of renewable energy projects also have potential as JCM projects.

		No further action required.
EVN SPC/ EVN CPC	Who will be appointed as the TPE for the project?	It has not been decided yet. Information will be shared in a timely manner with all project participants when TPE for the project is selected. *No further action required.*
EVN CPC	When will JCM credits from the project be issued?	After successful JCM registration, the project will undergo verification process before requesting credit issuance to the JC. No clear schedule is decided yet for the project. Most likely the verification for the project will be conducted after March 2018. *No further action required.*

F. References
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Reference lists to support descriptions in the PDD, if any.

Annex
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Revision history of PDD		
Version	Date	Contents revised
01.0	19/10/2017	First edition
02.0	05/12/2017	Second edition
03.0	09/02/2018	Third edition
04.0	02/03/2018	4th edition