

Study on Dynamic Wireless Power Transfer System on Expressways from the Viewpoint of Economic Feasibility

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Dynamic Wireless Power Transfer (DWPT) has been studied all over the world, but due to its black box nature, the details of economic feasibility studies have not been clarified. In this paper, the economic feasibility of implementing DWPT on highways was examined and detailed, and guidelines for lowering the cost were verified. The results showed the possibility of introducing the system at a cost of about 300 million yen per kilometer.



(a) During coil installation (b) After burial

Fig. 1 Buried experiment and actual vehicle experiment at Tokyo University of Science, Noda Campus

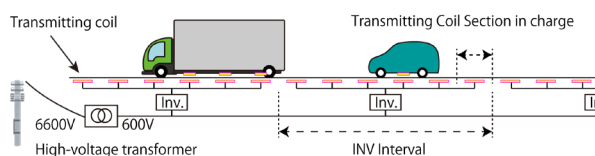


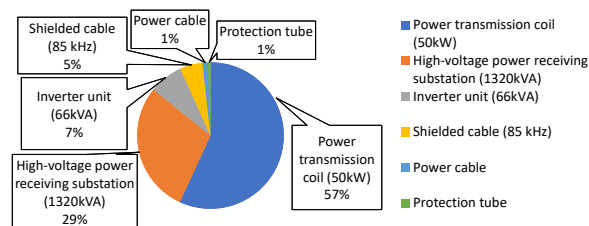
Fig. 2 Overall view of DWPT system on highways

Table 1 Cost (installation + maintenance) for the first 15 years after installation

w/ all: with all components, w/o F: ferrite-less,

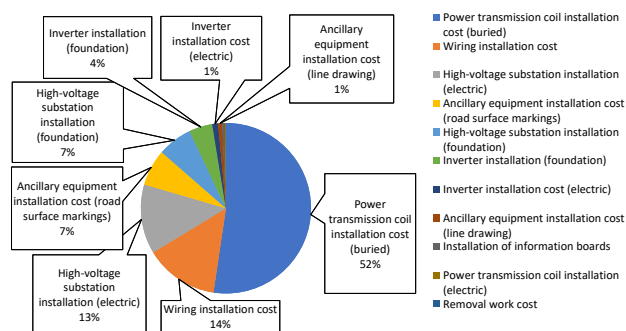
w/o Cas.: Caseless, w/o Cap.: Capacitorless

	INV interval [m]	Component Installation cost	Component Installation cost [100 million yen/km]	15-year total (Maintenance cost1) [100 million yen/km]	15-year total (Maintenance cost2) [100 million yen/km]
A-1 (C-2)	50	w/o F	3.34	4.20	3.64
A-2	30	w/o F	4.04	5.48	4.54
A-3	10	w/o F	7.56	11.86	9.04
A-4	4	w/o F	15.47	26.21	19.17
C-1	50	w/ all	3.59	4.45	3.89
C-3	50	w/o F&Cas.	3.09	3.95	3.39
C-4	50	w/o F&Cap.	2.84	3.70	3.14



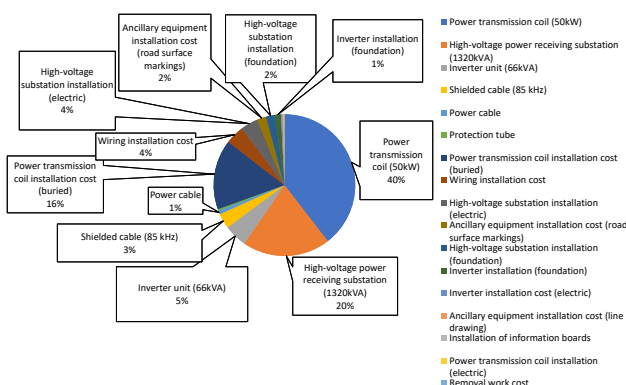
(Model A-1)

Fig. 3 DWPT electrical machine fee, INV interval 50m, laying rate 50%



(Model A-1)

Fig. 4 DWPT cost of work, INV interval 50m, laying rate 50%



(Model A-1)

Fig. 5 DWPT total, INV interval 50m, laying rate 50%