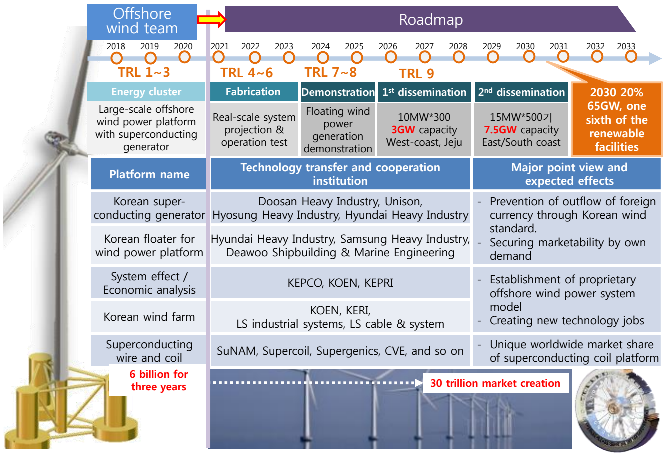

Fig. 9. Research roadmap for large scale floating offshore wind power system with a superconducting wind generator

Therefore, the designed PESs can evaluate the performance of the HTS generator. The fixed-type was better suited for evaluating the torque and force of the HTS field coils for large-scale HTS generators in terms of accuracy and safety of the system than the swing-type PES. The conceptual design structure of the fixed-type PES for 10 MW HTS generator is shown in Fig, 8. The design and FEM analysis results of the PESs are believed to be effective for the development of large-scale HTS wind power generators and the PES will be fabricated and tested in the near future.

IV. Vision and Future Plan

The primary target of this project is to design the final 10MW class HTS wind generator and to test 3 HTS magnet poles of generator with very strong torque as same as that between rotor and stator. After completing these target, real feasibility fabrication of HTS wind generator will be occurred after passing the evaluation of next step. In case of floater, the real fabrication projects are already started and a few new big programs regarding to offshore floating system are also on planning stage.

At next step, the industry related with generator or magnet has to participate the real fabrication project. Now, all participating institutes are universities. In order to move to the real fabrication level, universities only is not making a sense. And also, the fabrication only is not enough, so the full load test has to be carried out with proper rotating speed pattern.

According to the development level of large scale HTS wind generator, there needs at least 3 years to fabricate real scale 10MW HTS wind generator. After that, the field test is also obviously required more than 2 years. Consequently, after 7 or 8 years, the commercially available HTS wind generator could be ready considering only the technical point of view. However, the industrialization means that both sides not only technically but also economically have to meet the proper requirements. Technically the HTS magnet should withstand with extremely strong torque on operation, but the economical remained worry is the price of HTS wire. Considering the width of HTS wire is 12mm, totally more than 100km length of wire is required to fabricate 10MW class wind generator. Due to the recent price of HTS wire, the benefit; light weight and small volume, of HTS wind generator is not enough value to overcome the demerit of fabrication cost. The price of HTS wind generator is not needed to be the same or cheaper price of conventional wind generator since the ultimate advantages of superconductivity. However several times more expensive than that of the conventional is still unsolved and crucial problem against commercialization.

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