

Project Completion

Project 17/2008 - Development of an Automatic Switching-Off System for Idling Engine to achieve Enhanced Fuel Economy and Improved Environment

Purpose

This paper invites Members to:

- (a) consider endorsing the completion of a research-cum-technology demonstration project ECF 17/2008 on "Development of an Automatic Switching-Off System for Idling Engine to achieve Enhanced Fuel Economy and Improved Environment" (the **2008 Project**); and
- (b) consider suitable arrangements for handling the revenue expected to be generated from the above project.

Background

2. The **2008 Project** initiated by the Hong Kong Productivity Council (HKPC) aims to develop an automatic switching-off system for idling engine, and to integrate this system with an identified suitable air-conditioning system to achieve fuel saving and emission reduction. HKPC originally sought funding support at \$3,982,200 from the ECF for the project in November 2008. In its application, HKPC mentioned that upon completion of system development and field testing, it planned to disseminate the technology so developed to the trade and public, including inviting interested parties to commercialize the technology to marketable product through licensing arrangements. HKPC also indicated that no direct revenue would be generated from the project; however, income might be generated after the completion of the project and successful commercialization of the project deliverables.

3. The ECF Research Project Vetting Subcommittee (RPVSC), after reviewing the application in February and May 2009, recommended funding support at **\$3,008,150**¹ to the ECF Committee for consideration. The application was approved by the ECF Committee in July 2009 at the recommended amount of \$3,008,150. Subsequently, the Woo Wheelock Green Fund² (WWGF) undertook to share ECF's funding support for this project on an equal basis. The project commenced in October 2009. The original completion date of 4 January 2011 was twice extended with RPVSC's approval to December 2011. A summary of the project details is at Appendix 1.

Project Completion

4. According to the procedures of the ECF Environmental Research, Technology Demonstration and Conference funding scheme, for projects receiving a grant over HK\$2 million, the recipient organization is required to present the project findings to the ECF Committee upon project completion for assessment of the success or effectiveness of the project by comparing the project results against its original objectives and targets as set out in the project proposal.

5. HKPC completed the project work for the **2008 Project** in December 2011, and submitted a completion report and a final report (copy at Appendices 2 & 3 respectively) to the Secretariat. EPD's expert team, after examining the completion report and related documents, opined that the proposed deliverables under the original project proposal had been achieved. An independent evaluation (Appendix 4) arranged by the Secretariat rated the project as "very good". The Principal Investigator (PI) of the project was invited to present the project results at the RPVSC meeting on 10 January 2013 for preliminary assessment. RPVSC considered that the project was satisfactorily completed and **recommended the completion of this project to the ECF Committee for**

¹ HKPC's proposed budget for patent fee (at \$100,000) was not supported, whereas the requested budget for Research Staff (at \$1,642,200) was trimmed by RPVSC to \$768,150.

² The Woo Wheelock Green Fund is administered by the Wheelock and Company Limited. Research projects which receive ECF's funding support may also be considered for grants from WWGF. The RPVSC Secretariat will refer those research projects approved by RPVSC or ECF Committee to WWGF for consideration. For projects accepted by WWGF, ECF and WWGF would normally share the grant to the applicant on a matching basis.

endorsement.

Expected Revenue from the Project

HKPC's commercialization plan

6. At a press briefing held in December 2011 on the technology developed under the present project (named "Automatic Engine Idle-stop and Supplementary Air Conditioning System" (ISAC)), HKPC announced its plan to commercialize the technology through licensing to auto parts manufacturers for sale and production. HKPC plans to proceed with the commercialization upon the completion of another ECF-funded project, viz., Project 26/2010 for "Development of an Electric Air Conditioning System Tailored for Commercial Vehicles with Dedicated Operational Needs" (the **2010 Project**).

7. For Members' information, the **2010 Project** was approved by RPVSC in September 2010 at the requested funding of \$499,800. The project commenced in January 2011. The original completion date of June 2011 was subsequently extended thrice; the project is now scheduled for completion by end February 2013. While the air conditioning system developed under the **2008 Project** is designed to maintain operation for 15 to 30 minutes to meet the needs of most vehicle users, the **2010 Project** seeks to make use of the automatic idle-stop control system developed under the **2008 Project** together with a newly developed electric air conditioner with operating algorithm to provide longer air conditioning duration of up to two hours to serve the needs of commercial vehicles (e.g. taxis waiting for passengers). In the project proposal for the **2010 Project**, HKPC also mentioned that upon completion of system development, interested automobile manufacturers would be approached for product commercialization by means of licensing arrangements, and that income might be generated after the completion of the project and successful commercialization of the project deliverables. At this stage, HKPC has already obtained a short term and a long term patent registration for ISAC in Hong Kong and the Mainland respectively.

Possible contradictions to ECF funding principles

8. The patent registration and planned commercialization of the developed technology by means of licensing arrangements are expected to generate revenue for HKPC. In the event the revenue so generated would exceed HKPC's cost of developing the technology and associated activities (e.g. cost of the commercialization process), profit would arise which would amount to a breach of the ECF requirement that ECF-funded projects must be of a non-profit-making nature. The licensing arrangements would also preclude the free use of the technology by the industries and the public in general, and may likely invite criticisms that the project has benefited mainly HKPC and its licensed manufacturers, instead of the local community as a whole as required in paragraph 2.6 in the Guide to Application for the Environmental Research, Technology Demonstration and Conference funding scheme. In fact, the RPSV Secretariat did receive an enquiry in March 2012 about possible profit-making by HKPC through its commercialization plan for ISAC, and hence any arrangements which will reap a profit for HKPC is expected to attract more enquiries and criticisms.

9. However, since the ECF Committee had not imposed any conditions on HKPC's commercialization plan at the time when the application was approved in 2009, HKPC could now argue that their planned commercialization, and hence the possible revenue/profit to be generated, were not objected to by the ECF Committee. Nevertheless, according to paragraph 4.3.6 in the Guide to Application, income derived from an ECF-funded project after the project period, including sales of output, should be returned to ECF and/or the WWGF for offsetting part or whole of the project's cost (i.e. the plough back principle). In the circumstances, **whether HKPC should be allowed to make a profit from its commercialization plan, and whether and how the ECF should apply the plough back principle, are issues which should be addressed by ECF Committee before project completion could be endorsed.**

10. When HKPC's project completion was presented to RPSV for preliminary assessment on 10 January 2013, RPSV noted the situation above. However, considering the wider implications that any proposed measures might

have on the handling of other ECF-funded projects with a commercial or "profit" angle, RPVSC suggested that the matter be referred to the ECF Committee for consideration.

HKPC's response

11. The Secretariat has recently obtained further information from HKPC concerning the possible profit that might be generated from the planned commercialization of ISAC, and reminded HKPC about the "plough back" arrangements under the ECF. In his reply, HKPC's PI for the project advises that:

- HKPC plans to proceed with the commercialization plan after the completion of the 2010 Project, but maintains that it does not intend to make a profit from the projects. HKPC would impose a charge on licensee(s) for the transfer of technology for purposes of **recovering its cost for the technology development and commercialization processes**, and ensuring that the licensee(s) would be committed to further develop the technology into product, which would enable more users to use the developed product. In this respect, HKPC explains that if the licensee(s) does not need to have any financial commitment (i.e. licence fee) in the upfront, they may not have sufficient incentive to manufacture and promote the product to be developed from the technology. HKPC supplements that in considering the grant of licence, apart from the licence fee, it would also evaluate the capability of interested organizations in turning the developed prototype into reproducible products, their manufacturing ability, network in the field, marketing and sales proposal, and capability in after-sales services.
- As regards the **licence fee arrangements**, HKPC would allow bidders to propose payment arrangements in their bidding proposal. Based on HKPC's experience in commercializing previous R&D results, the fee arrangement may take the form of a combination of lump sum

up-front payment plus royalties.

- On the **possible amount of revenue** to be derived from the commercialization of the technology, HKPC advises that this would be highly dependent on the licensee's capability, marketing strategy, sales pipeline, affordability of the market, etc., such that it is unable to estimate the amount of revenue at this stage, particularly that the product would be the first-of-its-kind in the market.
- Before the commercialization process is completed, HKPC would act as the **technology and system provider** for installation of ISAC in vehicles **in the interim**. However, HKPC maintains that this would not be of a profit-making nature, as the fee to be received in this respect would only be able to cover its staff resources incurred, plus the direct expenses for the fabrication and installation of the developed system into vehicles.

12. Finally, the PI expresses that HKPC has devoted significant resources to facilitate the technology commercialization process. If all income generated from the project has to be ploughed back to the ECF, it would significantly dampen the interest of any R&D institute to devote further resources for such purposes, and in turn affect adversely the successful commercialization of the technology for use by more users. Nevertheless, the PI considers that **if the income to be generated from the commercialization plan would be greater than the additional cost incurred by HKPC** for the project, he believes that HKPC would be pleased **to plough back the surplus income to ECF**. According to the PI, the grants by ECF for the 2008 and 2010 Projects are not sufficient to cover its cost. For instance, the cost for applying for patents and taking forward the commercialization exercise has involved significant amounts, which have not been accounted for. Overall, the PI estimates that the total amount of additional cost that it has incurred for the development of the technology would not be less than \$1.5 million.

Observations

13. On the subject of whether HKPC should be allowed to derive income from the commercialization of the developed technology and to keep the income for itself, Members may wish to consider striking a balance between, on the one hand, upholding the ECF funding principles that funded projects must be of a **non-profit-making nature** and that the **benefits arising from a project must accrue to the local community as a whole**, and on the other hand, the efforts devoted by HKPC in developing and promoting the technology, and generally the need for incentives for non-profit making organizations to carry out research for the benefits of the trade. Since the **2010 Project** was intended to supplement the **2008 Project** to provide a longer duration of air-conditioning for commercial vehicles, it would be appropriate to consider the planned commercialization for both projects at the same time. In this regard, Members may wish to note the following:

- (a) Neither RPVSC nor ECF Committee had raised any objection against HKPC's proposed commercialization of the technology to be developed under both the **2008 and 2010 Projects** when HKPC's applications were initially submitted to RPVSC / ECF Committee for consideration.
- (b) As long as HKPC only recovers its own cost incurred for developing and commercializing the technology under the two ECF-funded projects, ECF's non-profit-making principle will not be breached.
- (c) Under ECF's plough back principle, income derived from the commercialization of technology could be returned to ECF and / or WWGF for offsetting part or whole of the project's cost. In the present case, the ECF has in total granted about \$3.51 million for the **2008 and 2010 Projects**, whereas HKPC estimates that it has incurred not less than \$1.5 million for developing ISAC under the **2008 Project** alone. However, neither the Guide to Application nor the Conditions for the Use and Allocation of Fund issued to

HKPC for the grants, clearly spells out whether, under circumstances such as in the present case, ECF's plough back has a priority over HKPC's claim to recover its cost incurred for the development and commercialization of the technology.

- (d) In the event the ECF pursues to plough back the two projects' income for offsetting the projects' costs, it will result in a similar situation for the public, i.e. the public still will not be able to use the technology free of charge, which is not consistent with the ECF's objective that the benefits to be derived from a project must accrue to the community as a whole. Hence, it may not be desirable in the present case for ECF to apply the plough back principle.
- (e) As HKPC's proposed licensing arrangements are meant to recover its own cost incurred for the development and commercialization of the technology, and to ensure that the prospective licensee(s) would put in real efforts to develop and promote marketable products, once these objectives are achieved, there would not be grounds for HKPC to derive further income (which would then be "profits") from the commercialization process.
- (f) Paragraph 3.2.2.16 in the Guide to Application (which provides guidance to applicant organizations in drawing up their applications) advises that in case recurrent income is derived from a proposed project, the applicant organization is required to state, in its application (part 16), **how such income would be used to further the project's aims**. Although the Guide has not further spelt out details on how the applicant's proposal in this respect should be handled, the intention of the Guide has been clear, viz., **any income to be generated from a project for an undefined period after project completion should be used to further promote the aims of the project**. In HKPC's applications for the 2008 and 2010 Project, HKPC has put down the remark of "N/A" against the relevant entries in this respect.

14. This is the first case in which the ECF Committee encounters such circumstances. The way that the income to be generated under HKPC's **2008 Project** and the **2010 Project** (which will soon be completed) is handled would have implications on the handling of other applications for other ECF-funded projects (particularly research and technology demonstration projects) where there are potential product commercialization and revenue generation angles. Members are invited to consider suitable arrangements for handling the revenue expected to be generated from the two projects, including possible conditions to be imposed on HKPC. As a basis to facilitate deliberations, the Secretariat has drawn up possible arrangements at Appendix 5 for Members' reference and consideration.

Suggested Amendments to the Guide to Application

15. As mentioned in paragraph 13(f) above, although paragraph 3.2.2.16 in the Guide to Application has not set out in detail how the applicant organization's proposal on the use of recurrent income generated from a project should be handled, the Guide's intention in this respect has been clear, viz., **any income to be generated from a project (for an undefined period) after project completion should be used to further promote the aims of the project.** The requirement in this respect will help ensure that revenue generated from a project after project completion would not be taken as income and/or profits for the recipient organization, and hence help maintain the ECF funding principle that all projects funded by ECF should be non-profit-making in nature. It remains to be seen, however, as to how this should reconcile with the **plough back principle** for project income to be used for off-setting the whole or part of the project's cost.

16. To set out the funding intention in this respect more clearly, subject to Members' consideration, the Secretariat would review and propose suitable amendments to the relevant provisions in the Guide and other related documents in relation to project income mentioned above, and further seek Members' agreement separately.

Advice Sought

17. Members are invited to:
- (a) assess the success and effectiveness of the **2008 Project** by comparing the project results against its original objectives and targets as set out in the project proposal and consider whether the project completion should be endorsed (paragraph 5 above); and
 - (b) consider suitable arrangements for handling the revenue expected to be generated from the **2008 Project and 2010 Project**, including suitable conditions to be imposed on HKPC (paragraphs 6 to 14 above); and
 - (c) consider the proposal for amending relevant provisions in the Guide to Application to set out more clearly the ECF funding principle in respect of the use of income generated from ECF-funded projects after project completion (paragraphs 15 & 16 above).
18. Since the **2008 Project** is funded by ECF and WWGF on an equal share basis, subject to Members' views on the suitable arrangements to be taken on the income to be generated from the two projects (paragraph 17(b) above), the Secretariat will further seek WWGF's agreement to the ECF Committee's decision before informing HKPC of the outcome.

**Secretariat, ECF Research Projects Vetting Subcommittee
January 2013**