International Journal of Architectural, Civil and Construction Sciences
ISSN: 2415-1734
Vol:11, No:10, 2017

# Key Issues in Transfer Stage of BOT Project: Experience from China

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***Abstract*—**The build-operate-transfer (BOT) project delivery system has provided effective routes to mobilize private sector funds, innovative technologies, management skills and operational efficiencies for public infrastructure development and have been widely used in China during the last 20 years. Many BOT projects in China will be smoothly transferred to the government soon and the transfer stage, which is considered as the last stage, must be studied carefully and handled well to achieve the overall success of BOT projects. There will be many issues faced by both the public sector and private sector in the transfer stage of BOT projects, including project post-assessment, technology and documents transfer, personal training and staff transition, etc. and sometimes additional legislation is needed for future operation and management of facilities. However, most previous studies focused on the bidding, financing, and building and operation stages instead of transfer stage. This research identifies nine key issues in the transfer stage of BOT projects through a comprehensive study on three cases in China, and the expert interview and expert discussion meetings are held to validate the key issues and give detail analysis. A proposed framework of transfer management is prepared based on the experiences derived and lessons drawn from the case studies and expert interview and discussions, which is expected to improve the transfer management of BOT projects in practice.

***Keywords*—**BOT project, key issues, transfer management transfer stage.

## I. Introduction

THE concept of BOT was introduced as a method to finance the construction of major infrastructure projects without the need for direct sovereign guarantee of loans [1]-[3], and has been widely used by the developed and developing countries for many years. The first batch of BOT projects in China were developed in the late 1980s and early 1990s, and recently, some of them entered the transfer stage as their concession periods are usually 20 to 30 years. The smooth transfer of project, which is usually the last task, is important to achieve the overall success of BOT project. Therefore, the research on the transfer management of BOT project is urgent due to the lack of relative experience in China. However, there are not many studies focusing on the transfer stage of BOT project. Zhang and Kumaraswamy [4] have identified several issues in the transfer stage of BOT project and introduced the Hong Kong experience in practice based on a case study of the Cross-Harbor Tunnel (CHT) project. Li [5] has analyzed several risk factors in the transfer stage of BOT project in China based on a case study of the Shenzhen Shajiao B Power Station. Yuan et al. [6] have identified the residual value risk as one of the important risks at the time of BOT project transfer, and a proposed definition of residual value risk has been given based on comprehensive literature review and open-ended questionnaire survey. It is obvious that current practices of transfer management have not been studied in detail and a comprehensive protocol to guide both the government and the private sector has not been proposed. Therefore, the main objective of this research is to study the key issues in the transfer stage of BOT project in China and propose a comprehensive framework for transfer management to the government.

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## II. Methodology

### *A. Research Framework*

The flow of the overall research framework is shown in Fig. 1. First, we had conducted a comprehensive literature review to identify key issues in transfer stage of BOT project. Second, we had selected three cases and spent a great amount of time to search detailed information of the issues in transfer stage from various sources and analyzed the data collected. Third, we had initially identified the key issues through case studies. Fourth, we had conduced expert interview and expert discussion meetings to validate the key issues in transfer stage identified in case studies and give detail analysis on each issue. Fifth, we had generated a proposed framework of transfer management for BOT projects based on the lessons learnt from the case studies and the expert interview and discussions. Finally, we drew the conclusions by summarizing the findings of this study.

### *B. Case Selection*

To draw best practices of transfer management, this study prepared case studies according to the following criteria: (1) the BOT project has been transferred back to the government after the concession expired; and, (2) detailed information of the project relevant to this research could be obtained through publications, including literature, newspapers, websites, etc. Three BOT projects were chosen in this study: Shenzhen Shajiao B power station [7], CHT project in Hong Kong [4] and Guangxi Laibin B power station. Various types of information concerning these three BOT projects were collected, including news and reports from multimedia, published books, reports and articles. A detailed description of these projects is summarized in Table I [8], [9].

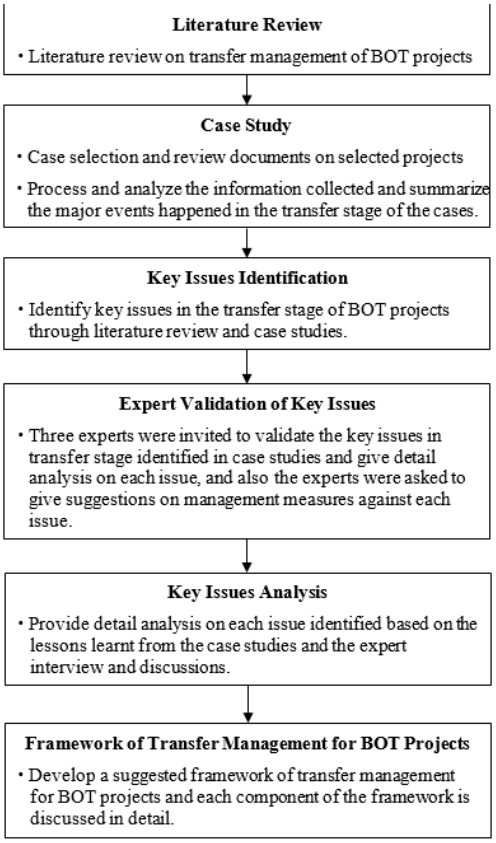


Fig. 1 Flow of the overall research framework

## III. Identification of Key Issues Based on Case Study

### A. Shenzhen Shajiao B Power Station

Shajiao B power station is a 700 MW coal-fired plant located in Guangdong province, China. The project sponsor was a joint venture of Shenzhen Special Economic Zone Power Development Co. (SPDC) and Hopewell Power (China) Ltd. (HPC). HPC was responsible for financing all construction costs, while SPDC was the interface with government and provincial agencies. Revenue was structured in both local and foreign currency. Guangzhou International Trust and Investment Company provided guarantees on the power purchase agreement and coal supply agreement [10]. In 1999, the Shajiao B project was successfully transferred back to the government and operated well by the new operator, Shenzhen Energy Group (SEG). However, several issues were still identified in the transfer stage of the project, as shown in Table II.

### B. Cross-Harbor Tunnel

CHT project is a vehicular harbor crossing in Hong Kong, which was delivered through a 30-year build–operate–transfer contract and opened for traffic on August 1972. The CHT was passed to the Hong Kong government in August 1999 upon termination of the franchise. The CHT was financially very successful and the concessionaire obtained huge profits over the concession period. The project paid all its debts off within five years of operation, whereas it was predicted that the debt would be paid off between the 10$^{th}$ and 19$^{th}$ year of the concession. The government began to prepare for the transfer of the CHT in late 1997 [4]. The transfer of the CHT was smooth without major disagreements in September 1999. The tunnel was stopped for a few minutes to allow the changeover of management between the outgoing and incoming operators. This was also needed for the termination of the toll collection account of the outgoing franchisee and the activation of a computer system to collect tolls by the new operator. Several key issues could be identified through analysis of the major events in the transfer stage of CHT, as shown in Table II.

TABLE I
Detailed Description of the Three BOT Projects

| Project | Shenzhen Shajiao B Power Station | Cross-Harbor Tunnel | Guangxi Laibin B Power Station |
|---|---|---|---|
| Location | Guangdong province | Hong Kong | Guangxi province |
| Sector | Energy | Transportation | Energy |
| Investment | 540 million US Dollars | 320 million Hong Kong Dollars | 650 million US Dollars |
| Investor | Hopewell Holdings Co. | The Cross-Harbor (Holdings) Limited | Consortium of GEC Alsthom and EDF |
| Operator (before transfer) | Hopewell Holdings Co. | The Cross-Harbor (Holdings) Limited | EDF (Synergie) |
| Operator (after transfer) | Shenzhen Energy Group (SEG) | Serco Group (HK) Limited | Guangxi Investment Group CO., LTD |
| Concession period | 10 years | 30 years | 18 years |
| Status of transfer | Transferred back to the government in 1998 | Transferred back to the government in 1999 | Transferred back to the government in 2015 |
| Post transfer | Owned and operated by the state-owned company which is nominated by the government | Owned by the government and operated under an O&M outsourcing arrangement | Owned and operated by the state-owned company which is nominated by the government |

### C. Guangxi Laibin B Power Station

The Laibin B power station in Guangxi province is the first state-approved BOT power project in China. It is the second-phase project for the Laibin power plant, with a capacity of 2×350 MW coal-fired units with an estimated cost of 600 million US Dollars. The prospect of joining the first consortium to test the new BOT framework was incentive enough for many developers to submit tenders and Electricite de France (EDF) and the GEC Alsthom consortium, which

tendered under the name of the consortium, finally won the concession with a very aggressive tender and the backing of France's export-credit agency, Coface [11]. After the construction period, GEC Alsthom sold its 40% share to EDF, and EDF became the sole owner of the project. The project is operated by Synergie under an O&M contract, which is an 85% subsidiary of the EDF Group. The preparation work for the transfer of the Laibin B project started in 2013, about two years before the transfer in Sep. 2015. In September 2013, the Guangxi Special Equipment Supervision and Inspection Institute (GSESII) conducted an overall inspection of the project, and in 2014, the performance test of the project was conducted under the inspection of the government which is defined in the contract to keep the project in good operating order after the transfer. In July, 2015, the Guangxi Investment Group Co., Ltd. (GXIG) and the EDF have achieved the agreement on the project transfer. The GXIG is the new operator of the project as the representative of the local government after the concession period expired in September, 2015. Several key issues could be identified through analysis of the major events in the transfer stage of the Laibin B project, as shown in Table II.

TABLE II
KEY ISSUES IDENTIFIED IN THE TRANSFER STAGE OF THE BOT PROJECT BASED ON CASE STUDIES

| No. | Major events in the transfer stage | Key issues identified |
|---|---|---|
| | Shenzhen Shajiao B Power Station | |
| 1 | Because of the dispute over whether the local government had fulfilled the obligation of power purchase as promised, the project concession period was extended for one year. | • Dispute over the government and concessionaire's fulfillment of the obligations as promised<br>• Concession period extension |
| 2 | Before the concession period expired, the concessionaire only focused on power generation without proper technical improvement and equipment replacement, which caused the facilities to sustain extensive wear. | • Opportunistic behavior of the concessionaire of overusing the facilities |
| 3 | The personnel training for post-transfer operation started more than five years before the concession period expired. | • Personnel training |
| 4 | The government nominated a new project company to take over the project after the concession period expired, and the new project company is owned by SEG and the Guangdong province government. | • Post-transfer management mode |
| | The Hong Kong CHT project | |
| 5 | The tunnel was stopped for a few minutes to allow the changeover of management between the outgoing and incoming operators. | • Stability and continuity of public services provided by the project during the transfer stage |
| 6 | The Hong Kong government implemented legislation for future management of the CHT. | • Post-transfer management |
| 7 | The Hong Kong government prepared tendering documents for a management, operation, maintenance contract for the post-transfer running of the CHT. | • Post-transfer management |
| 8 | The government kept following up on the outstanding maintenance works with the concessionaire. | • Opportunistic behavior of the concessionaire of overusing the facilities |
| 9 | Smooth transition of the staff of the concessionaire | • Staff placement |
| | Guangxi Laibin B Power Station | |
| 10 | EDF hired the Guangxi Special Equipment Supervision and Inspection Institution (GSESII) to conduct an overall inspection of the project to keep the project in good operating order after the transfer. | • The transferred project should be in good operating order as defined in the concession agreement |
| 11 | The performance test of the project was conducted in 2014 under the inspection of the government, which is defined in the concession agreement to keep the project in good operating order after the transfer. | • The transferred project should be in good operating order as defined in the concession agreement |
| 12 | Guangxi Investment Group Co., LTD. (GIG) had established a special team as the representative of the government to conduct transfer work and one of the most important responsibilities taken by GIG is to keep the project in stable and continuous operation. | • Stability and continuity of public services provided by the project during the transfer stage |

## IV. EXPERT VALIDATION OF KEY ISSUES

### A. Expert Selection

Three experts were invited to validate the key issues in transfer stage identified through case studies. All the three experts have more than six years of working experience in BOT projects. One of them is from an investment company and the other two experts are from consulting companies who have conducted consulting work for more than 10 BOT projects.

### B. Validation Process

The validation process is as follows: First, the methodology of identifying the key issues through case studies was introduced to each of the three experts and a list of the identified key issues was provided to each of them as well. Then, an interview with each of the three experts was conducted. In the interview, the expert was requested to comment on whether the identified key issues are sound, and the expert's comments and analysis were noted down in the interview and coded after the interview. In addition, there was an open discussion with the expert in each interview on various issues related to transfer management in BOT projects. The expert was asked to give suggestions on management measures against each issue. After that, the key issues were adjusted taking into consideration the comments of the three experts. Finally, a meeting with the three experts was held to further validate the revised key issues and eventually a list of key issues was finalized.

### C. Outputs of Expert Validation

The finalized key issues in transfer stage identified are: (1) concession period extension; (2) post-transfer management; (3) stability and continuity of public services; (4) complete transfer of the documents and software; (5) the transferred project

should be in good operating condition; (6) performance-based post-assessment of the project; (7) personnel training and staff placement; (8) dispute over the government and concessionaire's fulfillment of obligations; and, (9) opportunistic behavior of the concessionaire. In addition, the detail analysis on each issue and a proposed framework of transfer management for BOT project are also prepared based on the case studies and the expert interview and discussions.

## V. Analysis of the Key Issues

### A. Concession Period Extension

Whether the concession period could be extended or not should be decided by the government before starting the project transfer, which is one of the key issues in the transfer stage, and normally the concession period extension means more profit to the concessionaire. The concession period of BOT projects in China is mostly 20 to 30 years, and according to the Measures for the Administration of the Concession of Infrastructure and Municipal Public Utilities issued by the central government of China, the concession period should be less than 30 years. However, there are mainly three possible situations in which the concession period may be extended after expiration in practice.

First, the government might ask for concession period extension and require the concessionaire to continue to operate the project due to various reasons after expiration, such as to keep the public services stable and continuous. In such situation, negotiations will be conducted between the government and the concessionaire, and a supplementary contract will be needed to manage the project in the extended concession period.

Second, the concessionaire may apply for a concession period extension, because normally a concession period extension means more profit to the concessionaire. After performance-based assessment conducted by the government, the concessionaire can have a concession period extension approved by the government if the project receives a good evaluation in the assessment. But there could be several regulations on the approval of concession period extension. For example, in Hunan province, the concession period extension shall be less than 4 years, and the approval of concession period extension shall be no more than once to the concessionaire.

Third, if the government did not fulfill all its obligations during the concession period as defined in the concession agreement, the concessionaire may ask for compensation before transfer of the project back to the government, and sometimes the concession period extension will be allowed by the government as compensation to the concessionaire. For example, in the Shenzhen Shajiao B project, the government and the investor had a dispute over the government's fulfillment of the contract. As defined in the concession agreement, the government should purchase at least 60% of the maximum power generation every quarter at a floating price. However, the government failed to fulfill the obligation in several quarters even though the total power purchased by the government at a floating price was more than 60% of 10-year maximum power generation. After negotiations, the concession period was extended for one year as compensation to the concessionaire [7].

### B. Post-Transfer Management

Before the concession period expires, the government needs to decide the management mode after taking over the project from the concessionaire, which is one of the key issues during the transfer stage. Generally, there are three management modes that can be applied for post-transfer operation of a project.

First, the project can be owned by the government and operated by a new operator under an operation and maintenance (O&M) contract. In this situation, all the rights and assets are owned by the government after the transfer. For example, in the CHT project in Hong Kong, the government decided to select a new operator through open tendering to take over the role of the former concessionaire to run the CHT as a public tunnel under a management, operation and maintenance (MOM) contract, and all the rights and assets were vested in the government after the transfer [2].

Second, the government in mainland China sometimes may nominate a new operator to take over projects, and the nominated operator will take on all the responsibilities of management, operation and maintenance. In this situation, all the rights and assets of the project will always vest in the new operator permanently after the transfer, and the new operator nominated by the government is always a state-owned company. For example, the government nominated SEG to take over the Shenzhen Shajiao B power station after project transfer in 1999, and SEG is owned by the local government.

Third, the project could be owned and operated by a new operator under a transfer-operate-transfer (TOT) or renovated-operate-transfer (ROT) arrangement. In this situation, the ownership of the project will be transferred to the new operator for a certain number of years and then transferred back to the government as defined in the TOT or ROT contract. For example, according to the Measures for the Administration of the Concession of Municipal Infrastructure and Public Utilities in Shanghai, if the government decides to select a new concessionaire to manage the project after transfer, the new concessionaire should be selected through open tendering, and the original concessionaire can also attend the tendering, and the original concessionaire will have priority under the same conditions.

### C. Stability and Continuity of Public Services

Most of the infrastructure projects are important in providing public services, so the stability and continuity of public services provided by the project during the transfer stage is one of the key issues that should be handled well.

On one hand, the government will require the concessionaire to continue operating the project during the transfer stage to keep the public services stable and continuous. For example, according to the Measures for the Administration of the Concession of Municipal Public Utilities in Shanxi Province, the concessionaire is required to keep operating the project

during the transfer stage under a temporary O&M contract to keep the public services stable and continuous.

On the other hand, the well-organized personnel training of the new operator is important to guarantee the stability and continuity of public services during the transfer stage. For example, in the Shenzhen Shajiao B project, the well-organized personnel training was conducted by the experts from the concessionaire, which guaranteed the smooth transfer of the project to the new operator in 1998 [7].

Besides, early preparation for transfer is necessary and sometimes a smooth transition of the original staff in the project to the new operator is needed to keep the public services stable and continuous. For instance, in the CHT project in Hong Kong, the government began to prepare for the transfer of the CHT two years before the concession period expired, and based on well-organized staff transition and personnel placement, the tunnel was stopped for only a few minutes to allow the changeover of management between the outgoing and incoming operators, which was quite a smooth transfer without major disagreement [4].

*D. Complete Transfer of the Documents and Software*

All the documents and software related to building, operation and maintenance are important for the new operator to know the project well and operate the project in a good working order after transfer, and should be completely transferred to the government and the new operator. For example, according to the Measures for the Administration of the Concession of Municipal Public Utilities in Shanxi Province, the concessionaire is required to collect and keep all the documents related to the building, operation and maintenance during the whole concession period and completely transfer them to the government.

The copyright of software used in the project usually belongs to the concessionaire, which is important to the operation of the project and needed by the new operator after the transfer. Therefore, to solve this problem, it is suggested that the government and new operator use the necessary software at no cost only for operating a project after transfer, but the copyright still belongs to the original concessionaire.

*E. The Transferred Project Should Be in Good Operating Condition*

The project should be in good operating condition after the transfer to keep the public services stable and continuous. The detailed requirements of project condition and operation performance when the concession period expires are always defined in the concession agreement or supplementary contract signed by the government and the concessionaire. For example, the requirements of assets' condition and residual durable years of the project might be defined in the contract. To meet such requirements, restorative repairs should be conducted and paid for by the concessionaire before the transfer. Sometimes the concessionaire may hire a third-party consulting company to conduct an overall assessment of the project. For example, in the Laibin B project, EDF (Synergie) hired the Guangxi Special Equipment Supervision and Inspection Institute (GSESII) to conduct an overall condition assessment of the project after restorative repairs.

Before transfer, the government will conduct a performance test on the project to check the operation conditions. For example, in the Laibin B project, the government hired a group of technical experts from Guangxi Power Grid Company (GPGC) to conduct an inspection of the performance test of the project before transfer.

*F. Performance-Based Post-Assessment of the Project*

A comprehensive performance-based post-assessment of the project is necessary during the transfer stage because the decision regarding concession period extension made by the government is always based on this assessment, and the lessons learnt from the assessment are quite helpful to the government for developing similar projects in the future. For example, according to the Regulations on the Concession of Municipal Public Utilities in Xinjiang Province, the decision of concession period extension should be made based on the performance-based post-assessment of the project.

The post-assessment is always conducted by an independent third party, which is normally a consulting company and the assessment should include various aspects of the project, such as management of design, build, finance and operation during the concession period, risk management, financial audit, effectiveness audit and legal audit, and an overall assessment of the value for money (VfM) of the project is needed as well.

*G. Personnel Training and Staff Placement*

The personnel training of the new operator and staff placement of the concessionaire is important to achieve the smooth transfer of a BOT project. Because the project is managed by the concessionaire for many years, well-prepared personnel training conducted by the concessionaire is helpful to the new operator to keep the public services provided by the project stable and continuous. Also, some of the original staff in the project might be rearranged or even lose their jobs which may have a negative impact on the project transfer, so a well-designed staff placement of the concessionaire is important to transfer the project successfully and peacefully. For example, in the Guangxi Laibin B project, because there are not enough job positions in other projects, EDF hopes to transfer most of the staff to the new operator. However, it is expected that the salary paid by the new operator will be much less than the original concessionaire. Therefore, there was a serious dispute between the workers and concessionaire on the compensation issue, which had a negative impact on the project transfer.

For the personnel training, the concessionaire is always required to conduct training for the new operator before transfer as defined in the concession agreement. For example, in the Shenzhen Shajiao B project the personnel training of the new operator was conducted by the experts from the concessionaire several years before the transfer, which enabled the new operator to smoothly take over the project [7].

For the staff placement, the government may suggest the new operator to employ the original staff in the project primarily

under the same conditions, which could be considered as the transition of the staff of the concessionaire, such as the situation in the CHT project in Hong Kong [4]. However, normally this is not a compulsory assignment to the new operator. And, the government will require the concessionaire to rearrange the staff well who are not employed by the new operator.

*H.Dispute Over the Government and Concessionaire's Fulfillment of Obligations*

When the concession period is going to expire, the government and concessionaire might have a dispute over each other's fulfillment of the obligations as promised in the contract. If the government fails to fulfill all the obligations defined in the contract, the concessionaire may ask for compensation during the transfer stage. For example, in the Shenzhen Shajiao B project, as defined in the concession agreement, the government should purchase at least 60% of the maximum power generation every quarter at a floating price. However, the government failed to fulfill this obligation in several quarters even though the total power purchased by the government at a floating price is more than 60% of 10-year maximum power generation. Therefore, the concessionaire asked for compensation, and after negotiation, the concession period was extended for one year as compensation to the concessionaire [7]. If the concessionaire fails to fulfill all the obligations as promised in the contract, the government may call in the quality/maintenance guarantee issued by the concessionaire.

*İ. Opportunistic Behavior of the Concessionaire*

There are mainly two kinds of opportunistic actions that might be taken by the concessionaire during the transfer stage, which are: (1) hiding the special technology or particular raw material used in the project; and, (2) overusing the facilities before project transfer. Such opportunistic behaviors should be carefully investigated and well managed by the government.

First, to acquire the advanced technology used in a project and management experience learnt from the project is one of the key objectives of using a BOT arrangement to deliver infrastructure and public services in developing countries. However, sometimes the concessionaire might hide the special technology or particular raw material used in operations, which causes the new operator to still need to pay a high cost to the original concessionaire for the special technology application or raw material [5].

Second, when the concession period is going to expire, the concessionaire may overuse the facilities to pursue maximum profit without proper maintenance and replacement, which was found in the Shenzhen Shajiao B project. In such situation, the project is always still in good operating order in the short term and may not be found by the government during the transfer stage. However, the overusing of equipment will have a negative impact on the project operation in the long term and should be carefully investigated by the government during the transfer stage.

## VI. Framework of Transfer Management for BOT Projects

*A. Two-Year Overall Plan for Transfer Management*

Before starting the preparation work for the project transfer, the government should decide whether the concession period can be extended or not. Based on the government's guidelines and regulations on PPP projects, a framework of concession period extension management to the government is provided in Fig. 2.

If the project is determined to be transferred back to the government after the concession period has expired, the preparation work should start early enough to achieve a smooth transfer. Zhang and Kumaraswamy [4] suggested that the government should begin to consider the entire "transfer" issue three to five years before the actual transfer. The three cases show that transfer work usually starts two years ahead of the expiry date. Because the concessionaire may lack interest in keeping the operation and maintenance at a high level of quality, when considering its imminent departure from the project, the government needs to closely monitor the operation and maintenance in this period before project transfer.

A suggested two-year overall plan for transfer management of BOT projects is provided by the authors, as shown in Fig. 3, based on the lessons learnt from the case study and the authors' experience in BOT practice in China. Most preparation work is conducted in the first year and after the establishment of the transfer management committee, and a detailed transfer procedure is planned one year before the transfer date. For example, in the CHT and Laibin B projects, the preparation work for their transfer started about two years before the transfer date, which gave the governments enough time to tackle the related issues during the transfer stage.

*B. Preparation for the Transfer*

A great deal of preparation work needs to be carried out before commencing the project transfer procedure. Normally there are four main items of preparation work that should be handled well by the government and the concessionaire, which are: (1) decision on the post-transfer management mode of the project and the new operator selection; (2) establishment of the transfer management committee; (3) last restorative repair conducted by the concessionaire; and, (4) quality/maintenance guarantee issued by the concessionaire for guarantee of good operating order after transfer.

1. Decision on the Post-Transfer Management Mode and the New Operator Selection

Before project transfer, the government needs to decide on the post-transfer operation mode of the project, as shown in Fig. 4. If the project needs to be renovated or expanded after transfer, it is suggested to select the second or third option shown in Fig. 4, because there will be extra capital expenses after transfer which can possibly be undertaken by the new operator more efficiently than the government.

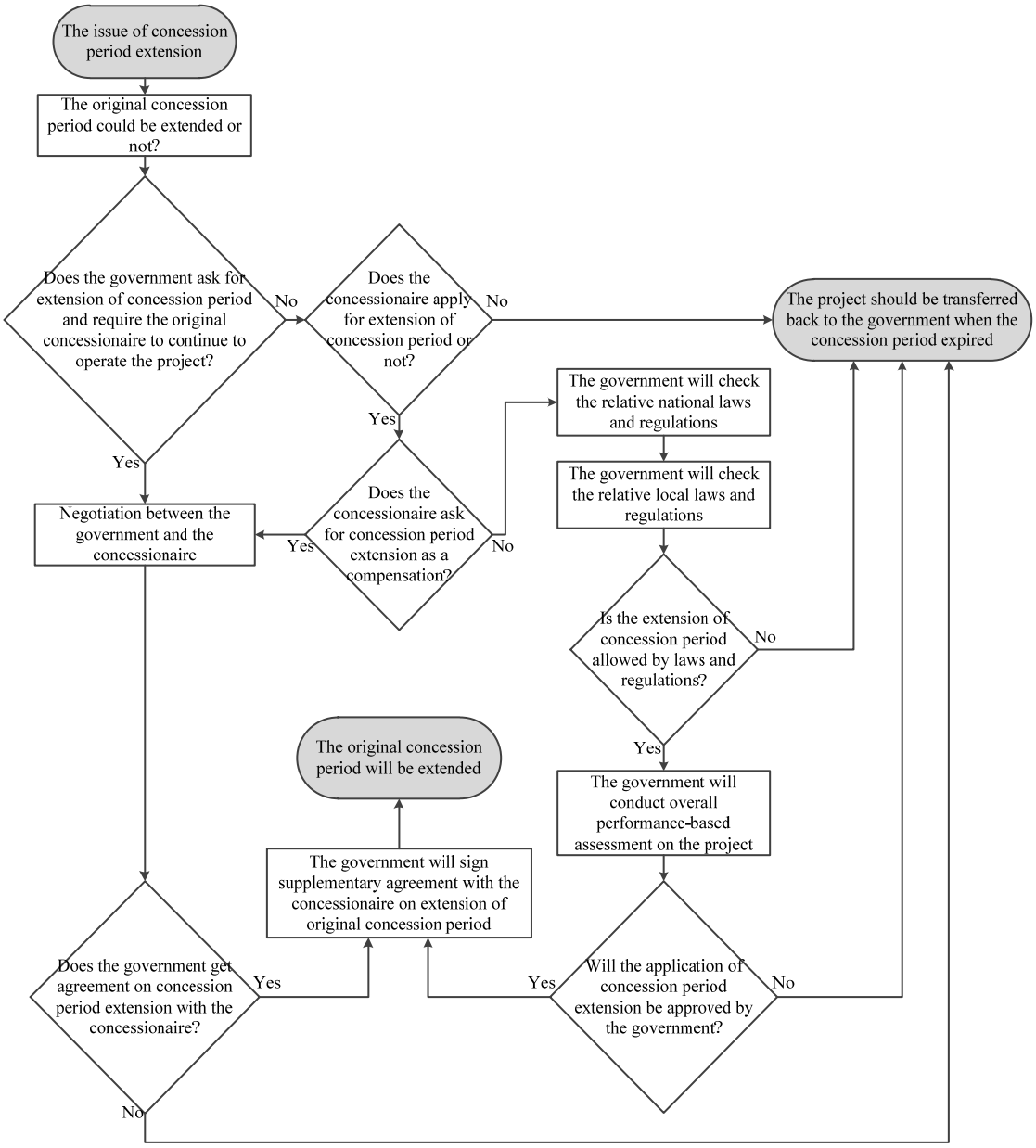


Fig. 2 Framework of concession period extension management

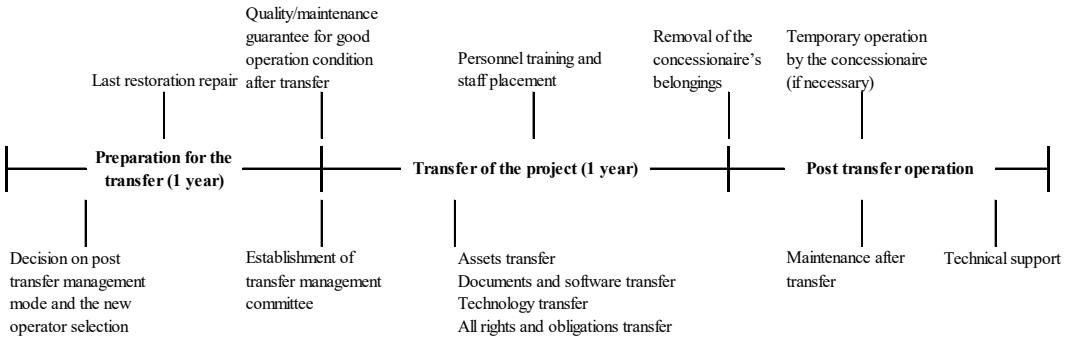


Fig. 3 Two-year overall plan for transfer management

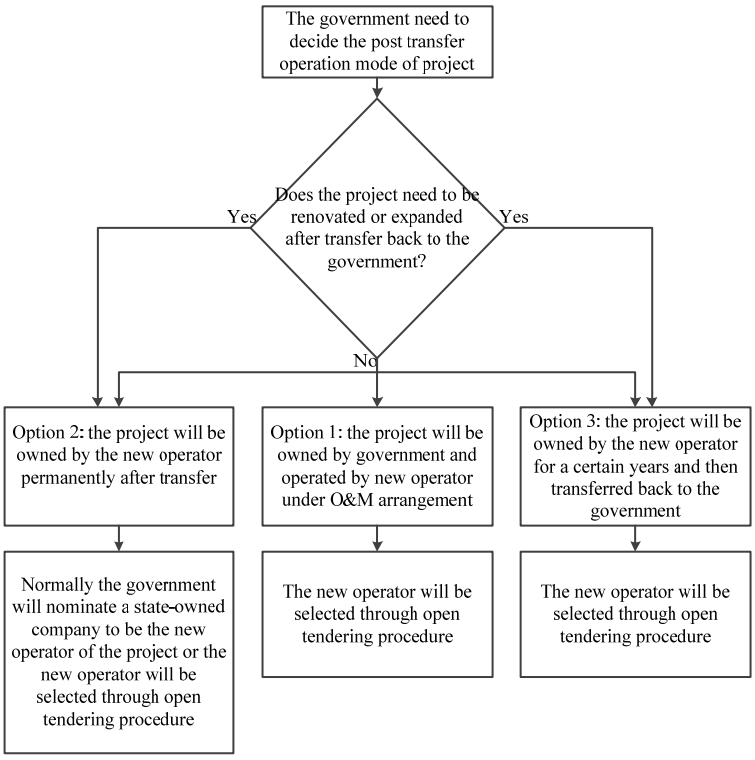


Fig. 4 Post-transfer management mode and the selection of new operator

In the CHT project, the Hong Kong government started to prepare the tendering documents for a MOM contract for the post-transfer running of the project in late 1997, two years before the official transfer of the project [4].

If the government decides to select a new concessionaire to manage the project after transfer under a TOT or ROT arrangement, the original concessionaire may also attend the tendering and will have priority under the same conditions. In such situation, if the original concessionaire wins the tendering, the transfer procedure will be terminated and instead, the government and the concessionaire will conduct negotiations on the new concession agreement.

2. Establishment of the Transfer Management Committee

Normally, 12 months before the transfer date, the transfer management committee will be established by both the government and the concessionaire to take on the responsibilities of managing the whole transfer procedure and dealing with each issue during the transfer stage. Sometimes the selected new operator is also involved in the transfer committee to achieve a smooth transfer.

The transfer list, which is one of the most important documents during the project transfer, is prepared by the transfer management committee. All the assets, documents, software, rights and obligations, etc. need to be transferred and should be defined clearly in the transfer list.

3. Last Restorative Repair

Before the transfer, the concessionaire should conduct the last restorative repair to keep the project in good operating condition as defined in the concession agreement, and the cost is always taken on by the concessionaire. A detailed plan of last restorative repair should be submitted to the government and approved by the government. After the last restorative repair, the performance test should be conducted under the government's supervision. In the Guangxi Laibin B project, the restorative repair was conducted by EDF in 2013, about two years before the official transfer of the project. And before the performance test, EDF hired the GSESII to conduct overall condition assessment of the project after restorative repair to make sure that the project was in good condition.

4. Quality/Maintenance Guarantee for Good Operating Order after Transfer

A quality/maintenance guarantee should be issued by the concessionaire to the government to guarantee good operating order after transfer. The quality/maintenance guarantee is suggested to be issued about one year before the transfer, and the amount of the quality/maintenance guarantee could be equal to the accumulated revenue in a certain period before the transfer which is suggested to be the same as the warranty period after transfer. For example, in a BOT waste-to-energy incineration project in Jiangsu province in China, the warranty period after transfer was six months, as defined in the concession agreement, and the quality/maintenance was equal to the sum of the project revenue in the last six months of the concession period. The quality/maintenance guarantee should be returned after the warranty period.

*C. Transfer of the Project*

1. Personnel Training and Staff Placement

The personnel training of the new operator and staff placement of the concessionaire is important to achieve a smooth transfer of the BOT projects. Normally, the concessionaire will be responsible for conducting training for the new operator and the training program usually takes six to 12 months before transfer. A test of operating management should be conducted by the government and transfer management committee on the new operator to make sure that the new operator could manage the project successfully after the transfer.

Zhang and Kumaraswamy [4] recommended that the former concessionaire's operation and maintenance staff be retained to tap their experience and expertise, rather than swell the ranks of the unemployed. Also, the government will require the concessionaire to rearrange those staff well who are not employed by the new operator, and the concessionaire should make sure that no negative influence will be caused by employment issues of all the original staff in the project. For example, in the Guangxi Laibin B project, the salary paid by the new operator will be much less than the former concessionaire. Therefore, there is a serious dispute between the workers and concessionaire on the compensation issue, which had a negative impact on the project transfer.

2. Asset Transfer

The asset transfer includes facilities transfer, documents and software transfer; technology transfer; all rights and obligations transfer.

All the facilities of the project should be transferred back to the government when the concession period expires, and a comprehensive condition assessment of the facilities should be conducted by the government or the new operator before the transfer. All the facilities that need to be transferred will be clearly defined in the transfer list. And, the concessionaire should make sure that there is no limit on all the rights of the transferred facilities.

All the documents and software related to building, operation and maintenance projects should be transferred to the government and the new operator, including technical, management and insurance documents and software, such as maintenance logs, specifications, user guide, drawings, management system software, etc., and all the documents and software that need to be transferred will be clearly defined in the transfer list which is prepared by the transfer management committee. If the copyright of software belongs to the concessionaire, it is suggested that the government and the new operator should obtain authorization from the concessionaire to use the software only in this project.

The technology related to the operation and maintenance of the project should be transferred or authorized to the government or the new operator, especially in developing countries in which the BOT arrangement is always considered as the way of importing advanced technology and management experience. However, sometimes the concessionaire might hide the special technology or particular raw material used in operation, which causes the new operator to still need to pay a high cost to the original concessionaire for the special technology or raw material [5]. Therefore, the government should pay more attention to the technology transfer during the transfer stage.

Generally, without permission from the government, the concessionaire should not have a longer effective contract relationship than the concession period with other parties. All rights and obligations of the project should be transferred back to the government as defined in the concession agreement, for example, normally the obligatory right of the project should be transferred back to the government for free.

3. Removal of the Concessionaire's Belongings

All the belongings including assets and goods which are not on the transfer list should be removed by the concessionaire without hindering the project's operation, and the government or the new operator will not be responsible for caring for such concessionaire belongings.

4. Cost and Fees during the Project Transfer

Generally, the government, new operator and concessionaire should undertake their own costs and fees arising during the project transfer unless there are specific conditions defined in the concession agreement.

*D. Post-Transfer Operation*

1. Temporary Operation by the Concessionaire

Before the government or new operator selected by the government can take full responsibility for operating the project, the concessionaire should be responsible for the temporary operation under the government's requirements to keep the public services provided by the project stable and continuous. In such situation, it is suggested that the government notify the concessionaire at least three months before the transfer, and a supplementary contract on temporary operation should be signed by the government and concessionaire.

2. Maintenance after Transfer

Normally the concessionaire will be responsible for the maintenance works of the project during the warranty period after the transfer and should provide all the spare parts and equipment needed for the project operation. The new operator will take the responsibility for maintenance after the warranty period.

3. Technical Support

After the warranty period, the new operator may still need technical support from the concessionaire, especially in some projects involving related complicated operation skills, such as waste-to-energy incineration projects or urban metro projects. In such situations, the government may require the concessionaire to provide technical support for a certain period after the warranty period, and normally the concessionaire should be paid by the government or the new operator for providing such services.

## VII. Conclusion

BOT arrangements have been widely used in different sectors in China during the last 30 years. As the first batch of BOT projects in China was developed in the late 1980s and early 1990s, some of them entered the transfer stage in recent years after the concession period expired. The research on the transfer management of BOT projects is urgent due to the lack of relative experience in the transfer management of BOT projects. Therefore, this study selected three BOT projects which have been transferred back to the government successfully to analyze the key issues in the transfer stage, and several key issues have been identified based on the case studies. The expert interview and expert discussion meetings were also held to validate the key issues in transfer stage identified in case studies and give detail analysis on each issue.

A framework of transfer management for BOT project has been provided by the authors and it is suggested that the government should begin to consider the entire "transfer" issue early enough to achieve a smooth transfer. A two-year overall plan of transfer management for the government has been designed based on based on the lessons learnt from the cases and the expert interview and discussions. The whole transfer procedure can be divided into three phases, which are: (1) preparation for the transfer; (2) transfer of the project; and, (3) post-transfer operation.

## Acknowledgment

This study is financially supported by the National Natural Science Foundation of China (Project Number: 71472052).

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