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# 1200 BUILDINGS PROJECT ADVICE SHEET

## Adopting an effective retrofit process

A retrofit is a reasonably complicated process, especially if you want to keep tenants in the building while the works are in progress. Therefore, it is important to adopt an effective process with defined stages. At present, there is no industry standard for an effective retrofit process, so the one provided below is based on experiences of building owners, advice from engineers and the *AIRAH Application Manual DA27 - Building Commissioning*.

This process assumes that you have already conducted a Building Improvement Plan, also referred to as a Retrofit Action Plan, Energy Audit, Asset Master Plan, or Environmental Management Plan, and you are ready to proceed with the retrofit recommendations that have been advised in these reports.

In a typical retrofit, the five stages of the process will be:

- **Plan**
- **Design**
- **Implement**
- **Commission**
- **Handover**

This process will not continue in a straight path, from beginning to end. There will be stops and starts. Some things you will be able to implement quickly, whereas others will need further planning and investigation. Flexibility and problem solving is the name of the game within a staged process.

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What happens at each stage?

## Plan

1. **Benchmark system performance**
   A baseline must be set against which the outcomes of the retrofit project can be measured (preferably National Australian Built Environment Rating System (NABERS). (This may have already been established in previous investigations and reports.)

2. **Set clear objectives**
   Energy and water efficiency objectives need to be clearly expressed. These are generally made as proposed NABERS and / or Green Star rating improvements. This is formally documented in a project operating requirements (POR) document.

3. **Assemble a team**
   It may be advisable to adopt a team approach. The team may include building management, current service contractors, tenant representatives and independent sustainability or commissioning consultants to advise and monitor the process.

4. **Review essential services**
   Check that essential services maintenance logs have been retained, and include these in the retrofit project if it is deemed necessary to upgrade the system. This will include smoke control, fire dampers, etc.

## Design

1. **Draft Basis of Design (BOD)**
   This document provides a design solution for the retrofit, specifying the concept and design schematics for all upgrades, modifications and replacements for the mechanical plant and equipment. It may also include plans for building modifications to reduce energy loads (glazing, insulation, blinds, etc). As the building owner, you will need to assess this document and evaluate the cost implications from a return on investment perspective. This design will be developed to meet the POR.

2. **Model solution to meet the objectives**
   It's most likely the consultant will develop a set of models to ensure that their design solution will meet the objectives as specified in the POR.

3. **Draft Technical specifications**
   These will be drawings, models and designs that the contractors will use to install the system.

4. **Develop Implementation plan**
   An implementation plan is developed showing how the retrofit project will be scheduled. Ensure tenant's welfare during the works is considered in the plan.

## Implement

1. **Tender analysis and selection**
   Tenders may be sought for the project implementation stage. Contractors will need to be selected.

2. **Organise contractor contracts**
   Contracts will be devised and signed by all contractors.

3. **Implement the plan**
   Contractors implement the plan across the period specified in the Implementation plan and contracts. Ensure that tenants, if they are to be retained in the building, are well advised of work progress and schedules, and are disrupted as little as possible.

4. **Update building documentation**
   Contractors update all systems documentation, particularly Operation and Management manuals.

## Commission

1. **Conduct tests on equipment performance**
   Contractors ensure that equipment is functioning as designed.

2. **Conduct tests on building performance**
   Contractors ensure that the building is performing as designed.

3. **Verify objectives have been met**
   An independent contractor (for example, Independent Commissioning Agent) measures and verifies building performance against industry benchmarks (NABERS) and against building baseline (POR).

## Handover

1. **Fine tune equipment and systems**
   Contractors may be engaged to continue testing and balancing the building over a 12-month period.

2. **Conduct training**
   All management staff and maintenance contractors are trained in the way the building is to be operated and maintained.

3. **Handover all building documentation**
   All building documentation, including O&M and BMCS Manuals, Building User Guides, As-installed drawings, etc. are stored safely and are accessible to all building management staff and maintenance contractors.

4. **Survey occupant and building operating staff**
   Occupants and operating staff are surveyed and interviewed to establish whether the systems as designed are performing to their expectations, regarding the quality of air and controls.

**Find out more**
*AIRAH APPLICATION MANUAL DA27 -Building Commissioning*
www.airah.org.au/Content/NavigationMenu/Publications/TechnicalPublications2/default.htm