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# 1200 BUILDINGS PROJECT ADVICE SHEET

Considering retrofitting your building?

The tenants are constantly complaining about the air conditioning; it's always too hot or too cold.

The electricity bills are increasing dramatically. The air conditioning and heating system is on its last legs, constantly breaking down resulting in high maintenance costs.

The building is not attracting the right tenant any more.

These may be some of the reasons why you are considering a retrofit. But, where do you start? What should you look out for when considering this expensive decision? How do you ensure that the retrofit will achieve the results that you want?

Consider the following 10 steps, advice based on the experiences of building owners who have recently completed building retrofits.

## Conduct a building assessment

### Step 1

It's important to know exactly how your building is performing across the board. You may want to engage a company that conducts assessments, or work with your building management team to do this.

Look at all elements of the building – building façade and roof, windows, lighting, HVAC, control systems, water, lifts, etc. The purpose is to identify the problems and establish a baseline for how the building is currently operating so that when the building is completed you have a way of measuring its improvement.

### What is a retrofit?

Retrofit applies to the modification, upgrade or replacement of mechanical systems including heating, ventilation and cooling (HVAC), building controls systems (BMS), façade improvement, lighting upgrades and more. See Advice Sheet #4 – Building Technologies

A retrofit is necessary where mechanical systems have reached the end of their life and are no longer economic to service or modify.

It may be that advice provided by consultants indicate that more extensive work is necessary on the whole structure of the building – this would entail more significant costs, and is referred to as a building refurbishment.

## Work with a reputable consultant

### Step 2

Find a reputable consultant you can work with. They would most likely be from an engineering or energy sustainability background. They will investigate the building, prepare cost effective solutions, design a technical specification for the retrofit, assist with the tendering process (or suggest a suitable contractor) and ensure the final commissioning of the building's systems is completed.

Depending on the scope and size of the project, you may need to engage one or several consultants specialising in different aspects of the retrofit process.

Work with them to set clear objectives for the retrofit eg a 4.5 Star NABERS rating.

### How do I find a reputable consultant

A consultant may be an Environmentally Sustainable Design (ESD) /sustainability consultant, mechanical / design engineering consultant or independent commissioning agent.

Seek advice from the Australian Institute of Refrigeration, Airconditioning and Heating (AIRAH), The Energy Efficiency Council (EEC) [www.eec.org.au](http://www.eec.org.au), the Industry Capability Network (ICN) [www.icnvic.org.au](http://www.icnvic.org.au) or the City of Melbourne 1200 Buildings Program.

Questions to ask: What are their qualifications: What other similar work have they done? Can they provide referees?

## Find out more and seek funding support

### Step 3

The City of Melbourne provides support for “greening” your building. You can visit the 1200 Buildings website for more information.

Funding is available from the Sustainable Melbourne Fund, a unit trust set up by the City of Melbourne to support Council's environmental objectives. The State and Commonwealth Governments may also assist in defraying the costs of retrofitting.

## Plan

### Take time to plan

#### Step 4

Planning is the important part of the process. Make sure everything is considered: Is there a space for the tradesmen to work out of? What logistics will be necessary to bring in the new equipment? Is the work schedule accurate? You may find it necessary to engage a project manager (or appoint your building manager) to undertake this planning and to manage the retrofit.

Make sure that all the regulations that may impact on the project are understood and complied with.

### What regulations do I need to consider?

See Advice Sheet #3

## Design

### Reduce energy load on the building first

#### Step 5

A great deal can be done to reduce the energy load on a building before attempting costly changes to the mechanical HVAC systems.

The more that is done to reduce energy load, the smaller, cheaper and more energy efficient the mechanical system will need to be. Depending on the building, energy load can be reduced by: air sealing the building, insulating the roof, double glazing or tinting windows, hanging external or internal blinds, installing low voltage lights and motion sensors, creating heat sinks, installing solar power and finding ways to increase the lettable floor space.

### What is energy load?

Energy load is created by heat. This can be from direct sunlight (radiant - windows) or indirect (conductive - roofs and walls), from the equipment used in the building (computers, lights, stoves, etc) and from the occupants (heat from bodies). Air conditioning is provided to lower the temperature generated by these heat sources.

See Advice Sheet #4

## Select appropriate and cost effective technologies

### Step 6

A wide range of technologies are available - from chilled beams, wind turbines, variable speed drive fans to co/tri-generation. The choice will depend on the type of building. Your consultant will advise on this. Don't be persuaded by the most 'trendy green' option or equipment vendors. The most important thing is the level of control that you have over the building - that it ends up controllable and relatively easy to manage.

A Building Management Control System (BMCS) with effective sub-metering is essential, both to control the building and to see how it is performing.

### What technologies should we choose?

See Advice Sheet # 4

## Implement

## Select reputable contractors

### Step 7

You may engage one or several contractors through tender or other processes. You need to make sure that they are reputable and have worked on similar projects. Your consultant will help in selecting the right contractor.

Contractors need to be flexible and committed to your primary objective to improve energy / water efficiency.

### How do I find reputable contractors?

Contractors will include plumbers, air conditioning contractors and electricians. They may work for the same company, or sub-contract.

Questions to ask: What is their experience? Have they worked on similar buildings? How have they previously worked to timelines/budgets? Can they provide referees?

See Advice Sheet #6

## Keep tenants on side

### Step 8

Most building owners need to maintain a cash flow while doing the building retrofit. Therefore, keeping tenants in the space while the retrofit is happening is critical. This is not always easy to manage.

Keeping tenants informed right from the start, even before you begin the work, will help. Explain what is happening and why, and how they will benefit (better air quality, improved working conditions, etc).

### What strategies should I adopt to keep tenants on side?

See Advice Sheet #8

## Manage the process

### Step 9

The retrofit will most likely be disruptive, noisy and dusty. The degree will depend on the size and nature of the retrofit itself. Ceilings may need to be replaced. Old mechanical systems may have to be stripped out. It may be necessary to do the work floor-by-floor, or as the tenants vacate (a more expensive and slow option). Work out of office hours where possible, provide dedicated lifts for tradespeople, insulate the floors, and progressively remove rubbish. Communicate with your tenants at all stages of the project.

### What is a typical process for a retrofit?

See Advice Sheet #6

## Commission Handover Ongoing

## Make sure the building is commissioned

### Step 10

Make sure everything that has been installed is working correctly. The contractor needs to ensure this: have them demonstrate that the objectives you first set out have in fact been achieved. You (or your building manager) need to feel comfortable that you can take over the control of the building. Training on the Building Management Control System should be part of the hand-over. Don't sign off until you are sure that everything works as it should and all the documentation (manuals, plans, etc) has been provided.

It is worthwhile having the contractor come back to re-tune the building after 12 months of operation.

The best way to ensure that commissioning is conducted correctly and that all the important documentation is developed and provided is to engage a reputable independent commissioning agent. Their job is to review the entire commissioning processes.

Maintaining the building after the building has been commissioned is an ongoing process, which involves monitoring performance, fine-tuning and tweaking. Doing this will ensure that the building continues to perform as it was intended.

### Where can I find out more about commissioning?

See Advice Sheet #6 , #7 and #9

*AIRAH Application Manual DA27 - Building Commissioning*  
[www.airah.org.au/Content/NavigationMenu/Publications/TechnicalPublications2/default.htm](http://www.airah.org.au/Content/NavigationMenu/Publications/TechnicalPublications2/default.htm)