IBIP TECHNICAL GUIDE

Natural Resources Canada

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Canada

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1. Program Overview

A component of "Encouraging Appropriate Capital Investment" in the industry set of measures under the 2000 Action Plan on Climate Change, the Industrial Building Incentive Program (IBIP) is designed as a **Demonstration Program** to increase the energy efficiency of new buildings designated for manufacturing and other industrial activities.

1.1. Introduction

Over five years, the government will invest $1.1 billion in the Action Plan and other climate change initiatives. When fully implemented, these initiatives are expected to take Canada about one-third of the way to the GHG-reduction targets agreed upon during the Kyoto Protocol negotiations in 1997. At these negotiations, Canada committed to reduce its GHG emissions to six percent below 1990 levels in the period between 2008 and 2012, a 26-percent reduction from "business-as-usual" levels. IBIP is expected to contribute to a reduction of about 10 kiloton's in greenhouse gas (GHG) emissions.

The Office of Energy Efficiency at Natural Resources Canada is offering IBIP until March 31, 2006. Building owners and developers can seize this opportunity to save money and help Canada meet its international commitment to reduce greenhouse gas emissions at the same time.

1.2. Mandate

The mandate for the program is found in the Energy Efficiency Act (http://laws.justice.gc.ca/en/E-6.4/index.html).

1.3. Objective

The Industrial Building Incentive Program (IBIP) is designed to improve the energy efficiency and reduce GHG emissions by fostering the integration of building and process design in new industrial facilities.

1.4. Program Description

IBIP is a Natural Resources Canada (NRCan) program intended to encourage the design and construction of energy-efficient industrial buildings. It extends the precepts of the Commercial Building Incentive Program (CBIP) to the industrial sector.

Given that in many instances there are design peculiarities for buildings in that sector, **IBIP is focused more on affecting the market through information programming rather than the broad application of financial incentives.**

To qualify, building designers must show that their “proposed” building design is expected to consume 25 % less building energy than a standard or “reference” MNECB building:

- 15 % of the proposed building energy savings must be attributed to building improvements,
- A further 10% building energy savings are related to the integration of process into building systems by:
  - The transfer of energy from the process to the building systems and/or;
  - Process improvements that reduce building system loads.

Here is an example:

- MNECB Reference Consumption: 10,000 GJ
- IBIP proposed Building Consumption: 7,500 GJ
- Energy Savings: 2,500 GJ (10% process integration @ 1,000 GJ, 15% building improvements @ 1,500 GJ)

To determine the building savings, the CBIP rules apply. The building must be modelled in EE4.CBIP. The reference building is defined as a building designed to meet the mandatory requirements of the Model National Energy Code for Buildings (MNECB) with process loads excluded.

Process integration savings should be determined using EE4.CBIP (by including the process loads in the model used for predicting building energy savings). However, under certain circumstances, DOE2 or spreadsheet calculations may be used to simulate features that cannot be modelled in EE4.CBIP. They should be used to demonstrate any contribution that minimizes the building heating or cooling load.

It is important to note that the savings from process integration improvements are calculated in relation to the energy use of a MNECB reference building (without the process loads) and are not related to the amount of energy used by the process. The MNECB building model is prepared simply with the EE4.CBIP space function values.

1.5. Incentive

The incentive level has been designed to cover the extra cost of designing highly energy efficient industrial buildings. The IBIP incentive for a building that meets the program criteria will be calculated as a one-time financial incentive per building. It will equal twice the difference between the estimated annual energy costs of the new building as compared to a similar building designed according to the MNECB, to a maximum of $80,000.

IBIP offers up to $2,000 for a consultant to be specifically assigned to provide technical support for your project submission. This free assistance is available for each file with a valid Expression of Interest (EOI) number.

This amount of $2,000 for consulting support is available for assistance in preparing the technical proposal and for the modeling.

It is in the interest of the simulators to do their homework first in order to maximize the benefits of the free but limited support provided by NRCan.

Note that IBIP is a **discretionary program**, and that NRCan will approve projects within the limits of available funding.

1.6. IBIP Procedure

Completing an IBIP submission requires involvement from various members of the design team. The specific steps are outlined below, and the person responsible for the completion of each task in provided in square brackets '[ ]'.

Step 1: Send a Letter of Commitment signed by the building owner's (president or chief executive officer) to become an Industrial Energy Innovator. [Owner].

Step 2: Submit a completed Expression of Interest Form [Owner]. After receiving this form, an IBIP representative will contact the building owner (or authorized representative) to discuss eligibility of the project for IBIP.

Step 3: Read the IBIP Technical Guide for details on IBIP process representations and building modelling procedures. Review the *Procedures for modelling buildings to MNECB and CBIP* and EE4.CBIP.com website for the correct representation of building related measures. [Consultant]

Step 4 Ensure the building meets the requirements of the MNECB and revise the building design where the mandatory items are incomplete. Fill out the Model National Energy Code for Buildings (MNECB) Mandatory Checklist using the proposed building design drawings and specifications. [Consultant, design engineers and architect]

Step 5 : Complete the On-line Screening Tool to estimate the reference and proposed building energy performance. [Consultant]

Step 6:
a) Submit the Initial Technical Proposal. As mentioned above in section 1.5, building owners are eligible to receive funding of up to $2,000 for assistance from NRCan specifically assigned consultants to prepare the technical proposal and for help with the building simulation. For unique processes, a schematic description of the operation may be useful. [Owner-Consultant]

b) IBIP representative will then contact you to clarify eventual concerns and can offer a preliminary approval of the proposed process integration concept. Since new rules may be listed on the website, this step will help ensure your interpretation is up to date. [Owner]

Step 7: Use EE4.CBIP software to simulate and assess the energy performance of the building excluding process and to help verify design compliance with the MNECB. Confirm that the building component reduces energy consumption by at least 15% compared to the MNECB reference. [Consultant]

Step 8: Identify conventional practice for process energy use and benchmark conventional energy consumption for comparison with the IBIP proposal. To identify the **IBIP Baseline**, represent the conventional process energy use together with the energy consumption of the proposed building. [Consultant]

Step 9: Characterize the energy consumption of the process integration measures in the EE4.CBIP Proposed Building model, or calculate the credit value in a spreadsheet, based on the reported building performance to arrive at a final energy savings amount for the IBIP Proposed. The final process integration savings are **IBIP Baseline** minus **IBIP Proposed**. [Consultants]

Step 10: Complete the final application package, including Performance Worksheets simulation files, drawings and appropriate documentation on the process improvements, including specifications and manufacturers' literature. During the review process, IBIP representative may contact the submitter with additional questions on the application. The submission checklist included as appendix in form D should be used to verify that all required documentation is sent to NRCan. [Owner]

Step 11: The IBIP team verifies that the design qualifies for an incentive and, upon approval, an IBIP representative forwards a Contribution Agreement to the building's owner for signature. The owner signs the Contribution Agreement and returns the contract to IBIP. [Owner]

Step 12: Request the initial payment using the Initial Payment Request Form. If all terms and conditions are met, NRCan will forward 80 percent of the incentive payment to the building's owner. [Owner]

Step 13: After the building has been constructed in compliance with the IBIP submission, the owner can request the final payment by filling out a Final Payment Form. When IBIP team receives proof of project completion according to the approved design (an occupancy permit, and a photograph of the building), an IBIP representative will forward the final payment of 20 percent. [Owner]

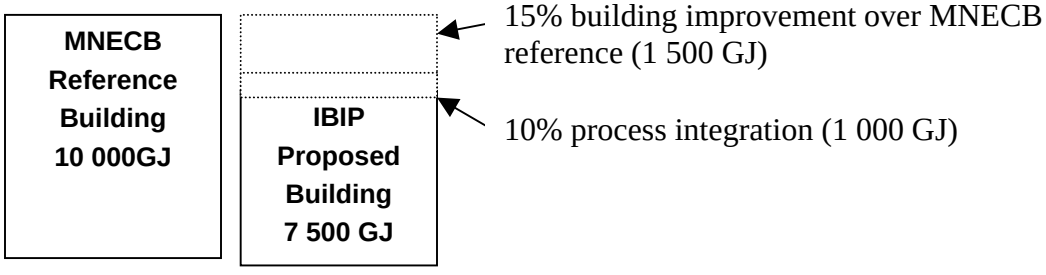
Step 14: When the project is completed, a representative of Natural Resources Canada may present upon request a certificate or bronze plaque at the building's opening. [Owner]

2. Program Eligibility

Based on the Program Description, the industrial building must be a minimum of 25% more energy efficient than an MNECB reference to be eligible for an IBIP incentive.

A graphical representation of the split of the 25% savings is shown in Figure 1.

Figure 1: Representation of savings as minimum targets



Please note that a modified procedure exists for refrigerated warehouses as described in Appendix 6.

2.1. Eligible Buildings

Any new industrial building as defined by the MNECB, that will be heated or cooled and intended for human occupancy, may be eligible for an IBIP contribution.

2.2. Buildings Excluded from IBIP

The following buildings with process loads are excluded from the IBIP:

- Retail food stores
- Ice arenas
- Agricultural and intensive livestock operations
- Restaurants
- Universities
- Hospitals
- Municipal

2.3. Eligible Process Energy Measures

The only energy savings processes admissible will be those integrated into the building systems (i.e. those that impact the building energy consumption).

The minimum process integration requirement for the IBIP program is 10% of the MNECB reference building energy. The IBIP acceptable processes are expected to fall into the two following categories:

2.3.1. Process Measures with Transfer of Energy from the Process to the Building Systems

Examples include, but are not limited to:

- Heat recovery on fume hood exhaust: Use of heat recovery on fume hood exhaust. Transfer potential is dependant on type of fume hood (laboratory, kitchen, industrial).

- Refrigeration heat recovery from the condenser and compressor to heat air or water: Use of recovered heat to reducing loads elsewhere in the building for space or domestic water heating.

- Heat or cooling recovery on exhaust air from processes: Use of reject heat or cooling to reduce heat/cooling loads elsewhere in the building. An example could include use of recovered energy from ovens for space heating.

- Heat recovery on wastewater from processes: Use of recovered heat or cooling to reduce loads elsewhere in the building.

- Heat recovery from water-cooled compressors: Use of recovered heat or cooling to reduce loads elsewhere in the building.

2.3.2. Process measures for reduction in the heating, cooling or ventilation load on the building systems

Examples include, but are not limited to:

- Low velocity or area restricted fume hoods: Potential process measure for reduced airflow through fumes hoods. The process measure is dependent on type of fume hood (laboratory, kitchen, industrial).

- Electric forklifts instead of propane: Potential process measure for reduction in building ventilation.

- Equipment controls: Process measure available for controls that shut off equipment when not in use. The equipment must have an impact on building systems.

2.4. Excluded Process Measures

Strict process improvements that have a negligible effect on building system energy are not allowed.

Industrial organizations are encouraged to contact Industrial Energy Innovators (IEI) program for assistance with more efficient process.

3. Procedure to Determine IBIP Energy Targets and Savings

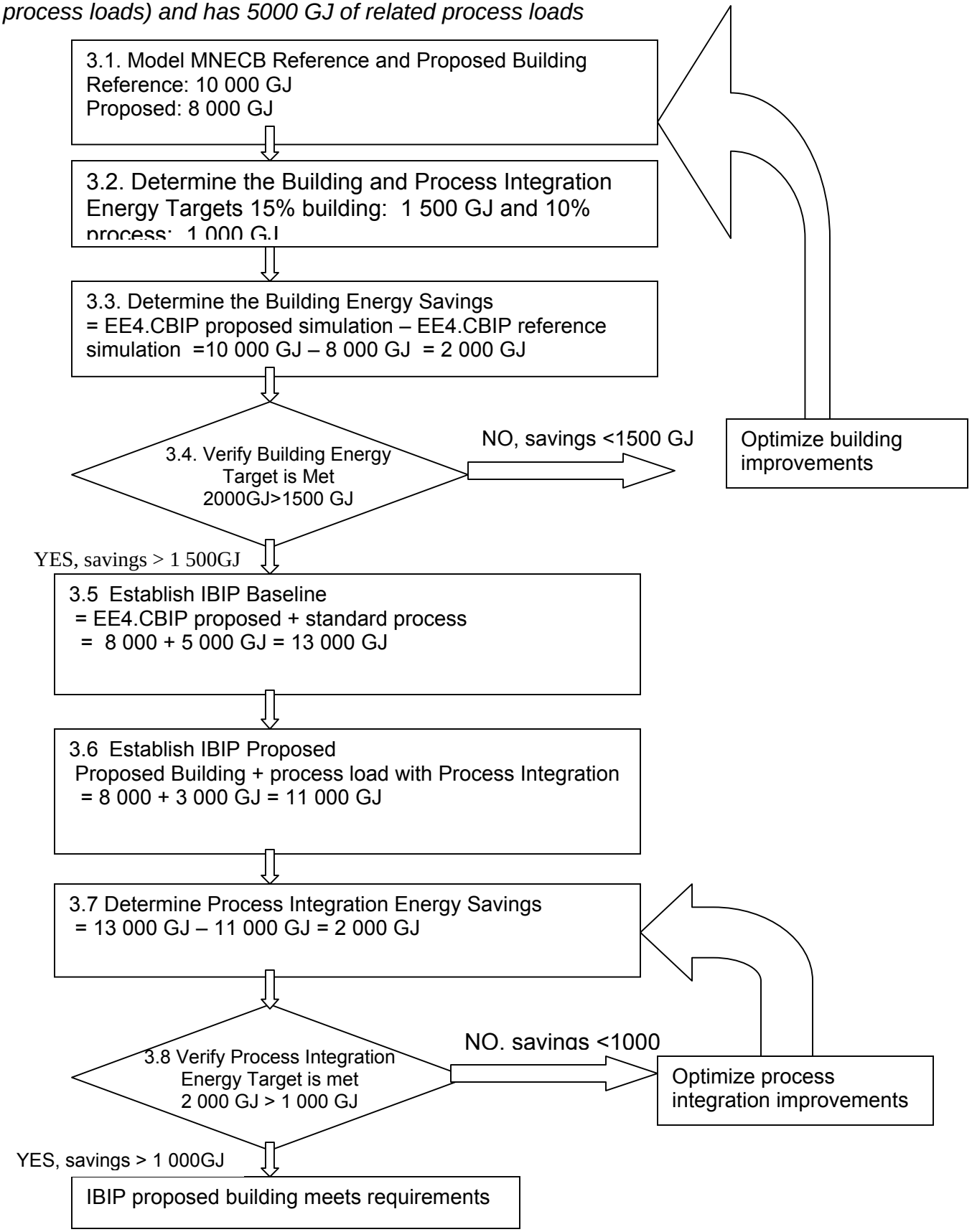
Simulations are used to determine:

A. **MNECB Reference** building energy excluding all processes
B. **Proposed Building** excluding process
C. **IBIP Baseline**
D. **IBIP Proposed**

The building energy savings minimum target is 15% of MNECB building reference
The process energy integration minimum target: 10% of MNECB building reference

An overview of this procedure is described below.

Figure 2: Example case of a building that requires 10 000 GJ to operate (excluding all process loads) and has 5000 GJ of related process loads



3.1. Model MNECB Reference Building and Proposed Building

The first step is to model in EE4.CBIP the **MNECB Reference** building and the **Proposed Building** excluding process loads. Any heating, cooling or ventilation capacity required to meet process loads should be excluded. By entering in EE4.CBIP information on the **Proposed Building** excluding process, the software will generate annual energy use numbers for a "proposed" and a "reference" simulation. The "reference" output is the **MNECB Reference** and the "proposed" output is the **Proposed Building (**excluding Process).

Detailed guidance on modeling the building is found in *Procedures for Modeling Buildings to MNECB and CBIP part 1*. The EE4.CBIP.com website should also be consulted for updates on modeling procedures and work-arounds.

A typical example is a building that has a manufacturing process that gives off waste heat and requires exhaust fans to remove fumes from the process. When the energy required to run the equipment is excluded, there would be no internal heat gains from the process. The exhaust fan and the make-up air system would be reduced in size to just meet the occupant ventilation loads. The cooling system would be downsized proportionally to the cooling load equivalent to the internal heat gain from the occupants and usual cooling loads (if the space is air conditioned). The heating capacity of the make-up air system would also be reduced proportionally to the ventilation load required for the occupants. Likewise, the fan powers would also be reduced proportionately to the reduction in airflow.

In some buildings the ventilation airflow for the process is so large that this air is also used to meet the heating or cooling loads of the space. These systems tend to be constant-flow 100% outdoor air systems with no air recirculation. For these cases, the ventilation load is reduced to meet just the occupant ventilation loads. The total airflow is reduced to the value required to condition the space for occupancy. The HVAC system would be modified to be a VAV system but without variable speed drives. The fan power would be reduced in proportion to the reduction in airflow.

3.2 Determine Building and Process Integration Energy Targets

There are two targets that must be met to qualify for IBIP: one for the building and one for the process integration. To determine these annual energy targets, multiply the **MNECB Reference** building energy consumption in MJ by:

- 15% for the building energy target; and
- 10% for the process energy target.

If both of these targets are met, the building will qualify for IBIP.
The targets must be expressed in terms of energy in MJ, not as a percentage.

3.3 Determine the Building Energy Savings

As described in 3.1, EE4.CBIP automatically generates the reference and proposed simulation in one run. The building energy savings are calculated by subtracting the **Proposed Building** from the **MNECB Reference** building modelled in 3.1.

Building Energy Savings = **MNECB Reference** - **Proposed Building**

3.4 Verify Building Energy Target Is Met

If the **Proposed Building,** excluding process energy use, consumes 15% less energy than the **MNECB Reference** building, i.e. the "Building Energy Savings" is greater than the building energy reduction target, the building meets the building energy savings requirements.

Verify: Building Energy Savings ≥ 15% x MNECB Reference

If the building savings are less than 15%, the building does not qualify for IBIP. If possible, optimize the building design for increased energy efficiency and re-simulate the savings and the targets.

3.5 Establish IBIP Baseline

The next step is to determine the building energy consumption with the standard process energy load included. This is the **IBIP Baseline**:

IBIP Baseline = Proposed Building + Load from standard industry process

Whenever possible, the calculation should be done using EE4.CBIP to account for the interaction of process load reduction on heating and cooling loads. This calculation is done by re-simulating the building, including the process load representing industry standard practice. Documentation and justification for the standard practice loads must be included in the IBIP submission.

The process loads and reductions in HVAC system capacities excluded in 3.1 are included in the EE4.CBIP model of the **IBIP Baseline**. HVAC equipment sizes and characteristics should match the values on the design drawings.

Internal heat gain from process equipment should be entered in the "Equipment/Process" tab at the Room level. Documentation and justification of the value of the process loads used in EE4.CBIP must be provided. When this file is run, the program will simulate the performance of the "**IBIP Baseline**". Use the proposed building simulation results only. Disregard the "reference" created from this run.

The energy required to run the process equipment need not be entered into the EE4.CBIP model if it will be the same in the proposed (**IBIP Proposed,** not yet modelled) and **IBIP Baseline**.

3.6 Establish the IBIP Proposed

The next step is to apply the process integration improvements to the model. Process integration savings are either by heat transfer from the process to the building or an improved process reducing the energy load on the building. This will provide the performance of the **IBIP Proposed** building.

IBIP Proposed = Proposed Building + Process load on the building after process integration

There are three ways to determine the process integration energy savings:

- All process load and integration can be modelled in EE4.CBIP for **IBIP Baseline** and **IBIP Proposed** buildings;

- Calculations are performed outside the model using spreadsheet or software and conditions can be entered into EE4.CBIP accounting for the interaction effect. This method may require the size of the HVAC systems to be increased to accommodate the higher loads.

- Calculations are performed outside the model using spreadsheet or software such as DOE-2.1 from the IBIP Baseline and conditions that cannot be input into EE4.CBIP. These calculations require the professional design engineer's signature and seal. In the case of DOE-2.1 simulations, all modifications to the DOE input file must be identified. Calculations must demonstrate how the load was calculated and how the savings were converted to energy units in MJ. This option is not available if the process improvement results in reduced heat gains to the building or is the use of recovered heat to displace heating load.

Further details on the calculation procedures are provided in Section 4.

3.7 Determine the Process Integration Energy Savings

The process integration energy savings are calculated by subtracting the **IBIP Proposed** building from the **IBIP Baseline** building modelled in steps 3.5 and 3.6.

Process Integration Savings **= IBIP Baseline** – **IBIP Proposed**

3.8 Verify Process Integration Energy Target Is Met

The difference in energy use between the **IBIP Baseline** and the **IBIP Proposed** is the process integration energy savings. If the process integration savings are greater than the process energy target, the project meets the process energy savings requirements.

Verify: Process Integration Savings ≥ 10% x MNECB Reference

If the process integration savings are less than the process energy target, the IBIP requirements are not met and the building does not qualify for IBIP. If possible, optimize the process integration measures and recalculate the savings and targets.

4. Procedure for Calculation of Specific Process Energy Savings Measures

The following is a list of allowable process measures and how to model them. Documentation supporting all calculations done outside of EE4.CBIP must be provided in the submission report. For DOE2.1e work-arounds, comments must also be included in the .doe file, explaining the code that was entered. In all of these cases, the calculation of building energy savings is the same and is described in Section 3.1. The modelling procedures described in this section only deal with the calculation of the process energy integration.

When performing calculations, heat recovery may be applied to the building load. Savings beyond building load are not eligible savings.

Special instructions for refrigerated warehouses are included in Appendix 6.

4.1. Room Temperature Exhaust Air Heat Recovery

There are three common process exhaust air applications: laboratory fume hoods, kitchen exhaust hoods and industrial processes. A fume hood system consists of all the fume hoods connected together in a common exhaust system. Energy efficiency requirements for these applications are covered in Section 6.3.6 of ASHRAE 90.1-2001. The ASHRAE requirements are considered standard practice and IBIP credits are only achieved for exceeding these requirements.

ASHRAE requires exhaust air heat recovery where the supply fan air flow is both 2400 L/s (5000 CFM) or greater and 70% outdoor air or greater. The heat recovery system must be at least 50% effective. Exceptions[1] include

- Commercial kitchen (grease) hoods
- Systems exhausting paint, toxic, flammable or corrosive fumes or dust

[1] Some jurisdictions refer to NFPA 96.2001 section 8.2.1.1 related addendums

If your local superceding requirement is different, please contact your Account Manager.

For fume hood systems with an exhaust rate greater than 7500 L/s, ASHRAE 90.1-2001 states that the fume hood shall have a heat recovery system with at least 50% recovery effectiveness or a variable air volume system that is capable of reducing the exhaust and makeup air by 50% or more (i.e., demand control, special ventilation rate control). Exempt systems are discussed under 4.1.1.

Thus, for IBIP simulation purposes, the **IBIP Baseline** building with exhaust air heat recovery is assumed to have a 50% effective heat recovery system when required by ASHRAE 90.1. If the **IBIP Proposed** building uses a demand controlled ventilation system to comply with ASHRAE 90.1, then the **IBIP Baseline** building has a demand controlled system and no heat recovery.

4.1.1. Heat Recovery Exempt Systems

For systems that do not require heat recovery (i.e. small systems), the modelling procedure should be completed in EE4.CBIP. The **MNECB Reference** and **Proposed Building** simulation are done with room ventilation requirements defined by the space function. For the **IBIP Baseline** simulation, the ventilation rate is increased to the total fume hood exhaust flow according to Section 5.5 of the *Procedures for Modelling Buildings to MNECB and CBIP*. The heat recovery effectiveness is then defined and the fan power increased to account for the additional pressure drop of the heat recovery system. The difference between the **IBIP Proposed** building and the **IBIP Baseline** building is the process integration energy saving.

4.1.2. Systems Requiring Heat Recovery

If ASHRAE requires the system to have heat recovery, process integration energy savings are only counted for fume hoods that have effectiveness greater than 50%. Systems exempt from the 50% heat recovery as per ASHRAE are discussed in 4.1 and 4.1.1.

To determine the process integration energy savings, two simulations are done. In the first simulation, the total ventilation load and a 50% effective heat recovery system are added to the **Proposed Building** load model to create the **IBIP Baseline**. The second simulation will use the "as-designed" heat recovery effectiveness to create the **IBIP Proposed** building. The fan powers in the **IBIP Baseline** and **IBIP Proposed** simulations are kept the same.

4.1.3. Systems Using Special Ventilation Rate Controls

If the proposed process uses special ventilation rate controls (VRC), the operating schedule in the **IBIP Proposed** simulation is reduced according to the MNECB rules for modelling occupancy sensor VRC. It is acknowledged that fume hood VRC will not use the same control equipment than other non-industrial space. However for compliance purposes for IBIP, the parameters of operation can be simulated using the modelling strategy for occupancy sensors described in the EE4.CBIP modelling manual.

If the VRC strategies are used for compliance to ASHRAE 90.1, the controls are considered standard industry practice for that system. The **IBIP Baseline** building would use the same operating schedule as the **IBIP Proposed** building. Thus there would be no penalty or savings for this measure. (The complete measure simulation would be done in EE4.CBIP.)

If VRC was not used to comply with ASHRAE then the controls are considered an improvement over the standard process. The **IBIP Baseline** simulation will be done using the longer schedule. This would be modelled with outside determination of the expected energy consumption of the proposed and standard process then input into EE4.CBIP.

If the proposed building uses both demand control and heat recovery ventilation, the IBIP Baseline would have demand control and heat recovery energy. Savings are calculated using the procedure described in "Heat Recovery Exempt Systems" in Section 4.1.1. This situation can be modelled entirely in EE4.CBIP.

4.2. Refrigeration Processes

This question is available in Appendix 6 (Refrigerated Warehouses).

4.2.1. Reuse of refrigeration reject heat

The transfer of refrigeration reject heat to the building is a viable IBIP measure.

DOE2.1e is capable of modeling the reuse of refrigeration reject heat. Therefore, this energy saving measure can be done by entering the appropriate code and providing the supporting documentation in the submission report.

The preferred option is to use EE4.CBIP. To do this, a simulation with no process load (**Proposed Building**) must first be run to determine building savings. The energy used for space heating in the proposed building is recorded (found in the BEPS report in the generated .sim file by EE4.CBIP).

First, estimate the refrigeration load to create the **IBIP Baseline** building. If the load is not known, it should be assumed to be half the installed refrigeration capacity (i.e. refrigeration equipment runs 50% of the time). Once the reject heat is added to the building using the procedures described under Process Load in the *Procedures for Modeling Buildings to MNECB and CBIP*. This will create the **IBIP Baseline** building.

The second step is to enter the amount of reject heat to obtain the **IBIP Proposed** building. The amount of reject heat is entered as a process load and scheduled in those zones where the reject heat is delivered. The rate of waste heat recovery would be entered into the "Equipment/Process" tab and EE4.CBIP run again. If the addition of heat recovery changes the COP of the process refrigeration system, a manual calculation should show the change in process chiller electricity consumption. It is not necessary to include the process chiller in the

EE4.CBIP model. The **IBIP Proposed** simulation is then run and the energy used for space heating is recorded. (The reject heat is found in the BEPS report in the generated .sim file).

To determine the process integration savings, subtract the space heating energy for the **IBIP Proposed** building from the space heating energy from the **IBIP Baseline** building.

4.3. Miscellaneous Processes

This guide does not cover all possible process integration but some are discussed below.

4.3.1. Process heat recovery

The energy required for space heating can be reduced by recovering heat off of the processes (i.e. heat from ovens, heat from process waste water, etc.). Calculation of how much heat can be recovered from the process is not handled in EE4.CBIP and must be performed separately. Detailed calculation or supporting documentation must be provided to show how much heat is rejected to the space. For submission purposes these calculations must require the professional design engineer's signature and seal.

In this case, the **IBIP Baseline** is identical to the **Proposed Building** excluding process.

Once the rate of waste heat recovery is determined, it should be entered into the "Equipment/Process" tab and the schedule for the process entered into the "Schedule" in the zone tab. EE4.CBIP is then run. The **IBIP Proposed** simulation is run and the energy used for space heating for the proposed building recorded (found in the BEPS report in the generated .sim file).

To determine the process integration savings, subtract the space heating energy for the **IBIP Proposed** from the space heating energy for **IBIP Baseline**.

4.3.2. Electric forklifts

Electric forklifts cost more to buy and run than propane forklifts. However, savings can be found in the reduction of building ventilation.

The procedure to model the savings requires outside calculation of the ventilation effect. The **IBIP Baseline** simulation is run with the higher ventilation rate required for propane forklifts. The ventilation rate is modified in EE4.CBIP by manipulating the occupancy load in EE4.CBIP. The **IBIP Proposed** building is modelled with the ventilation rate suitable for electric forklifts.

The difference in energy use between the **IBIP Baseline** and **IBIP Proposed** is the process saving measure due to using electric forklifts.

4.3.3. Equipment controls

Controls that automatically shut off equipment when they are not in use and directly reduce energy consumption of building systems are allowable measures in the IBIP program. Documentation, signed and sealed by the professional design engineer, must be provided indicating the impact on the schedule as a result of the controls. Calculations of the effect of these controls on the operating schedule are not handled in EE4.CBIP and must be performed separately. The equipment or fan energy will often be a product of the added electrical capacity, indicate in the space tab of EE4.CBIP.

The **IBIP Baseline** simulation is modelled with the standard equipment schedule added to the proposed building without process. The **IBIP Proposed** building is then modelled with the revised schedule and electrical capacity.

The difference in energy use between the **IBIP Baseline** and **IBIP Proposed** is the process saving measure due to equipment controls.

5. Submission Requirements for IBIP

The IBIP submission requirements are captured in the CBIP/IBIP submission checklist. The IBIP submission must include the following items:

- All items required for CBIP submissions (complete set of drawings and specifications, zoning diagram, report describing modeling assumptions).

- All EE4.CBIP files used to establish the reference buildings and determine savings (1 EE4.CBIP file for **MNECB reference** and improved building excluding process; and when applicable 1 EE4.CBIP file for **IBIP baseline** and **IBIP proposed** building).

- Custom modified DOE2.1 files with notes indicating code added (if applicable).

- Copies of spreadsheets and/or results from other software tools used to determine savings (if applicable).

- Description of how the process energy savings were determined (with numbers and reference to the EE4.CBIP and/or other software files).

- Definition and substantiation of what is considered standard practice for the improved process integration.

6. Forms

Forms may change so please refer to the website for the most recent versions.

A. Letter of Commitment
(http://oee.nrcan.gc.ca/industrial/opportunities/innovator/commitment-letter.cfm?attr=0)

B. Expression of Interest
(http://oee.nrcan.gc.ca/industrial/financial-assistance/new-buildings/choice-expression.cfm?attr=0)

C. Initial Technical Proposal
(http://oee.nrcan.gc.ca/industrial/financial-assistance/new-buildings/choice-proposal.cfm?attr=0)

D. MNECB Mandatory Checklist
(http://www.oee.nrcan.gc.ca/commercial/financial-assistance/new-buildings/apply/requirement-checklist.cfm?attr=0)

E. CBIP/IBIP Submission Checklist
(http://www.oee.nrcan.gc.ca/commercial/financial-assistance/new-buildings/apply/cbip-ibip-submission-checklist.cfm?attr=0)

F. Performance Path Worksheet
(http://www.oee.nrcan.gc.ca/commercial/financial-assistance/new-buildings/apply/choice-performance.cfm?attr=0)

G. Initial Payment Request Form
(http://oee.nrcan.gc.ca/industrial/financial-assistance/new-buildings/choice-initialpayment.cfm?attr=0)

H. Final Payment Form
(http://oee.nrcan.gc.ca/industrial/financial-assistance/new-buildings/choice-finalpayment.cfm?attr=0)

7. Appendices (from 1 to 4)

Appendix 1: IBIP Consultants
(http://www.oee.nrcan.gc.ca/industrial/opportunities/new-buildings/third-parties.cfm?attr=0)

Appendix 2: Model National Energy Code of Canada for Buildings (1997)
(http://irc.nrc-cnrc.gc.ca/catalogue/energy2.html)

Appendix 3: Definitions according the MNECB
MNECB ref: E-1.1.3.2 (1)

Appendix 4: MNECB Requirements Checklist
(http://www.oee.nrcan.gc.ca/commercial/financial-assistance/new-buildings/apply/requirement-checklist.cfm?attr=0)

Appendix 5: MNECB administrative regions

Appendix 6: Refrigerated warehouses

Appendix 5: MNECB administrative regions

Appendix 6: Refrigerated Warehouses

In refrigerated warehouses, the energy consumption of the refrigeration system represents a significant portion of the energy for the building. The energy needed for refrigeration in warehouses is considered process load under the MNECB because the code is silent on the subject. Under MNECB E-1.1.3.2(1) warehouses are listed as industrial occupancy and therefore must be treated under IBIP.

IBIP Requirements for Refrigerated Warehouse:

- All MNECB mandatory requirements must be met.
- Combined building and process integration measures must demonstrate 25% less consumption than the MNECB reference.
    - Building measures can represent any percent of the 25% energy savings.
    - The process measures must clearly contribute to building energy. In most cases, the requirement to contribute to the building will limit eligible process measures to heat recovery from refrigeration. More efficient refrigeration equipment alone will not be an eligible process integration measure.

As with all projects, a completed initial technical proposal will be required to allow NRCan to evaluate the measures.