CB 5 – Association of social care providers - APSSCR

Country: CZ

SUMMARY

1-Residential Care Home for Elderly People - Bechyně, Czech Republic

1/ Identification of the partner

RCHEP Bechyně
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RCHEP Manager: **Mgr. Alena Sakařová**

2/ RCHEP main issues

The RCHEP consists of three multiple storey buildings made of bricks. The "A" building has four storeys, the "B" building has two storeys and the "C" building has three storeys. The facility was constructed in 1913 and it was partly renovated in 1997 – exchange of windows and entrance door. The RCHEP is situated at the town square of Bechyně. It provides its services to 65 clients and employs 40 people.

Type of construction of the whole facility is heavy. Even when the facility was renovated in the past, no energy efficient technologies were used in order to improve energy performance of the facility. Building envelope, roof construction, doors and windows are not insulated at all. Based on the evaluation of the SAVE AGE questionnaire, gas heating, hot water system, lighting and electric equipment of the office and a part of the home itself were characterized as outgoing. The RCHEP has implemented no energy management system.

Lack of financial resources is the main barrier which prevents realization of energy saving investments.

3/ Action Plan of the RCHEP

As aforementioned, the facility is not in a good condition, and so it is absolutely necessary to realize technological and organisational measures in order to improve energy performance of the facility.

- It will be necessary to realize complete insulation – building envelope, roof construction, doors and windows (four or six chamber outer frame and double or triple glazing).
- Heating and hot water system unconditionally require (due to its condition) complete renovation. These systems have great energy saving potential. Regardless fuel type, quality of heat sources, heating units, heat pumps and regulation units improves constantly which means also energy efficiency of these technologies increases.
- In order to gain high efficiency of heating system, heat source has to be chosen wisely. Power of heating system is determined by calculation of building heat loss which is the main factor of total heat energy consumption. Determination of heat source power by calculation of building heat loss costs several thousand crowns, but it can save much more on investment and operating costs. Accurate dimensioning of the heat source is also an important condition in order to achieve high efficiency, optimal operation and low emission of the heat source.

- Next, it will be necessary to realize investments in office equipment, part of the operation and energy management and monitoring system.
- Ventilation is the next issue which is closely related to the topic and it includes manual ventilation and forced ventilation which uses ventilation recovery units to recover heat.
- Efficient use of heat generation belongs to the field of energy saving either. This term includes generation of solar energy or heat generated by users and facility operation.
- Another efficient heat saving tool is for example solar energy and its use to produce hot water or combined production of electricity and heat in cogeneration units.
- Monitoring of energy consumption and its regular evaluation is essential.
- Employees must be better motivated to save energy.
- We also recommend sharing experience in field of energetics with others (RCHEPs). It is wise to use advices and consult with energetic experts.

Following measures were implemented due to the lack of financial resources of the investor.

1. Energy Economy Optimisation

The purpose of Energy-economy optimisation of a building is maximum reduction of building operating costs through reduction of heat loss and variation of different heating systems according to specific needs of building users. The proposal of energy-economy optimisation can be worked out both for construction of a new building and renovation of an old building.

Mathematical model of a building will be created and it will provide several possible solutions of insulation and it is followed by a comparison which contains variation of heating, ventilation and hot water production according to specific needs of the client. Individual proposals can be compared considering investment costs, operating costs to gain and consume energy, cash-flow (considering growth of energy prices) and determination of risk. This comparison allows choosing an optimal solution in relation to energy balance, investment payback and optimisation of operating costs.

2. „ENERGY EFFICIENCY“

TÜV SÜD provides Czech companies a solution in field of energy saving. The support is provided from the beginning of the project to its end and it intends to maximize the range of realized energy savings. Specific procedure is chosen based on the will to secure energy savings in a simple and efficient way. This service is provided by TÜV SÜD as an independent, professional counselling company which has no business interests in favouring specific energy saving appliances or technologies. TÜV SÜD Czech became an education partner of the South Bohemian Chamber of Commerce in field of low energy and passive houses and energy saving within project “Energy Efficient Building South Bohemia – Lower Bavaria. This project is financed by the European Union, through the European Fund for Regional Development within programme European Territorial Cooperation – Aim 3 Czech Republic – Free State of Bavaria 2007 – 2013.

Product called “Energy savings in practice” is appropriate to subjects of private and public sector. It is advantageous for the possibility of Energy Performance Contracting which is used especially when financial resources of the client are limited.

EPC – Energy Performance Contracting is a method to finance energy saving measures. The company which provides the EPC is fully responsible for realization and effects of the measure. Client does not spend any investment resources for the measure; the investment is covered only from the savings achieved. EPC usually includes project proposal, its realization, regular maintenance of installations and monitoring and evaluation of achieved savings.

4/ Energy efficiency activities implemented in the RCHEP

Insulation of the building (walls, windows, entrance door)

Improvement of the current heating system, (increase efficiency)

Measures which need to be secured:

- Turn off electric devices when they are not in operation
- Turn off lights, use daylight every time it is possible

5/ Behavioural measures for residents and visitors

All measures implemented in this field are focused on raising awareness about energy saving of all clients and visitors which is realized by trainings, methodical and didactical tools and also by installation of awareness signs which show how save energy properly.

6/ Monitoring when available

Monitoring is not available.

7/ Conclusion

The main barrier which prevents to invest in energy saving is lack of financial resources which are essential in order to implement energy saving measures. That is why following procedure is proposed.

Procedure to achieve savings:

Phase	Activity	Output
Identification of energy saving potential	This procedure includes Listen to client's needs and opinion, gain documentation, see the building / facility	A report which includes energy saving potential identified, the estimated range of possible savings, payback period, proposal (and price) of Feasibility study which is related to the recommended measures (description of individual measures, their specification, costs and savings) **Processing time**: 1 – 2 weeks
Feasibility study	Provision of individual proposal of the measure; consult the realistic procedure with the potential contractor, analysis and evaluation of all influences of the measure to the energy system. It is possible to realize the measure immediately as the FS is ready.	Technical report which contains specific estimations made by contractors, description of the procedure taking into consideration the local specifications (shutdown and so on). Economical evaluation of cash-flow. If it is required, possibility of financing through EPC will be checked. Check of the influence of the measures. **Processing time**: 2 – 4 weeks
Realization of the measure	Supervision of harmony between the work actually realized and the original intention of the investor – quality and complete supply in order to gain desired savings.	Inspection report about the realization phase itself, final report, amendment of project documentation. **Processing time**: according to the range of the project – it will be specified in the Feasibility study

2-Residential Care Home for Elderly People U ZLATÉHO KOHOUTA, Czech Republic

1/ Identification of the partner

Contributory organization

Zborovská 857
Hluboká nad Vltavou
373 41 Hluboká nad Vltavou

Founder – Town of Hluboká nad Vltavou, Czech Republic

Residential care home for elderly people - U Zlatého kohouta, Czech Republic
Mail: domov.duchodcu@hluboka.cz

RCHEP Manager: **Jan Slepička,**
Tel.: +420 387 966 160

2/ RCHEP main issues

RCHEP resides in a multiple storey building which was constructed in 1995. The type of construction is heavy and it is constructed of standard materials. Although the building was already renovated, no energy efficient technologies were used in order to improve energy performance of the building. Building envelope and roof are not insulated at all, even when the envelope covers 2193, 97 square meters. Windows and doors are not insulated sufficiently. According to the SAVE AGE questionnaire, gas heating, lighting and electrical equipment of the office and of the home itself were characterized as outgoing. Despite the fact that annual average electricity consumption reaches up to 64881, 67 kWh and annual average heating energy consumption comes up to 388370, 37 kWh, no Energy management system has been implemented in the RCHEP yet.

Lack of financial resources is the main barrier which prevents realization of energy saving investments.

3/ Action Plan of the RCHEP

As aforementioned, the facility is not in a good condition, and so it is absolutely necessary to realize technological and organisational measures in order to improve energy performance of the facility.

- It will be necessary to realize complete insulation – building envelope, roof construction, doors and windows (four or six chamber outer frame and double or triple glazing).
- Heating system requires (due to its condition) complete renovation. These systems have great energy saving potential. Regardless fuel type, quality of heat sources, heating units, heat pumps and regulation units improves constantly which means also energy efficiency of these technologies increases.
- In order to gain high efficiency of heating system, heat source has to be chosen wisely. Power of heating system is determined by calculation of building heat loss which is the main factor of total

heat energy consumption. Determination of heat source power by calculation of building heat loss costs several thousand crowns, but it can save much more on investment and operating costs. Accurate dimensioning of the heat source is also an important condition in order to achieve high efficiency, optimal operation and low emission of the heat source.

- Next, it will be necessary to realize investments in office equipment, part of the operation and energy management and monitoring system.
- Ventilation is the next issue which is closely related to the topic and it includes manual ventilation and forced ventilation which uses ventilation recovery units to recover heat.
- Efficient use of heat generation belongs to the field of energy saving either. This term includes generation of solar energy or heat generated by users and facility operation.
- Another efficient heat saving tool is for example solar energy and its use to produce hot water or combined production of electricity and heat in cogeneration units.
- Monitoring of energy consumption and its regular evaluation is essential; energy costs should be divided for example according to individual departments.
- We also recommend sharing experience in field of energetics with others (RCHEPs). It is wise to use advices and consult with energetic experts.
- Employees must be better motivated to save energy.

In regard to the lack of financial resources of the investor, following measures are recommended:

A. Undertake Energy Audit

Annual energy consumption of all forms of energy in the organization is the determinative factor which decides whether there is an obligation to undertake an energy audit. The obligation border is 35 000 GJ per year and it is defined by law, specifically No. 406/2000 Coll. The purpose of energy audit is to analyse energy flows in a facility (building) or when a new power source is installed. Specific energy saving potential is detected during the audit. Then, measures (in order to achieve these savings) are proposed and evaluated in relation to financial options. Energy audit can be used in order to gain grant or loan to a project (building insulation, implementation of renewable resource system), search for energy savings and improve energy performance of the building. Following services are provided within energy audit: evaluation of building construction, heating, hot water production, lighting system, electrical devices and evaluation of energy efficiency in technological processes. Next, energy audit provides at least two combined solutions (including financial requirements) in order to improve energy performance. In the end, implementation of one of these solutions is recommended by the audit and it is also justified.

B. „ENERGY EFFICIENCY“

TÜV SÜD provides Czech companies a solution in field of energy saving. The support is provided from the beginning of the project to its end and it intends to maximize the range of realized energy savings. Specific procedure is chosen based on the will to secure energy savings in a simple and efficient way. This service is provided by TÜV SÜD as an independent, professional counselling company which has no business interests in favouring specific energy saving appliances or technologies. TÜV SÜD Czech became an education partner of the South Bohemian Chamber of Commerce in field of low energy and passive houses and energy saving within project “Energy Efficient Building South Bohemia – Lower Bavaria. This project is financed by the European Union, through the European Fund for Regional Development within programme European Territorial Cooperation – Aim 3 Czech Republic – Free State of Bavaria 2007 – 2013.

Product called “Energy savings in practice” is appropriate to subjects of private and public sector. It is advantageous for the possibility of Energy Performance Contracting which is used especially when financial resources of the client are limited.
EPC – Energy Performance Contracting is a method to finance energy saving measures. The company which provides the EPC is fully responsible for realization and effects of the measure. Client does not spend any investment resources for the measure; the investment is covered only from the savings achieved. EPC usually includes project proposal, its realization, regular maintenance of installations and monitoring and evaluation of achieved savings.

4/ Energy efficiency activities implemented in the RCHEP

New A++ (energy class) washing machines were bought
Energy efficient lighting
Leaflets, signs and other measures in order to raise awareness:

- Turn off electric devices when they are not in operation
- Turn off lights, use daylight every time it is possible

5/ Behavioural measures for residents and visitors

All measures implemented in this field are focused on raising awareness about energy saving of all clients and visitors which is realized by trainings, methodical and didactical tools and also by installation of awareness signs which show how save energy properly.

6/ Monitoring when available

Monitoring is not available.

7/ Conclusion

The main barrier which prevents to invest in energy saving is lack of financial resources which are essential in order to implement energy saving measures. That is why following procedure is proposed.

Procedure to achieve savings:

Phase	Activity	Output
Identification of energy saving potential	This procedure includes Listen to client's needs and opinion, gain documentation, see the building / facility	A report which includes energy saving potential identified, the estimated range of possible savings, payback period, proposal (and price) of Feasibility study which is related to the recommended measures (description of individual measures, their specification, costs and savings) **Processing time**: 1 – 2 weeks
Feasibility study	Provision of individual proposal of the measure; consult the realistic procedure with the potential contractor, analysis and evaluation of all influences of the measure to the energy system. It is possible to realize the measure immediately as the FS is ready.	Technical report which contains specific estimations made by contractors, description of the procedure taking into consideration the local specifications (shutdown and so on). Economical evaluation of cash-flow. If it is required, possibility of financing through EPC will be checked. Check of the influence of the measures. **Processing time**: 2 – 4 weeks
Realization of the measure	Supervision of harmony between the work actually realized and the original intention of the investor – quality and complete supply in order to gain desired savings.	Inspection report about the realization phase itself, final report, amendment of project documentation. **Processing time**: according to the range of the project – it will be specified in the Feasibility study

3-Residential Care Home for Elderly People - Pohoda, Czech Republic

1/ Identification of the partner

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RCHEP Manager - Jiří Vít
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2/ RCHEP main issues

Residential care home for elderly people POHODA is funded by the town of Netolice and it was built in order to substitute RCHEP in Prachatice monastery. The construction began in 200 and operation of the RCHEP started in April 2002.
The RCHEP is situated in a calm and friendly part of conservation zone in Netolice. It resides in a multiple storey heavy construction building. Administrative places and clients' accommodation are located in four above-ground storeys; dining room and kitchen are in the basement. The building is completely barrier free, clients' rooms and bathrooms are accessible to wheelchairs. There are 84 beds available in single bedded and double bedded rooms. All rooms have their own bathroom with a shower. There is a bathroom with a bath and a lift device at every department (the RCHEP has 5 departments). Every room is equipped with a fridge and a TV socket outlet. All beds are equipped with local communication devices. There is a common room with a kitchen and TV at every department. The facility also provides their clients' nursery service, barber shop, ergo therapy room and a café. It is possible to go to a RCHEP doctor.
Despite the fact that the building was constructed in 2002 with use of standard materials, no modern energy efficient technologies were used in order to improve energy performance of the building. Building envelope and roof are not insulated at all, even when the envelope covers quite a large area. Windows and doors are not insulated sufficiently. No Energy management system has been implemented in the RCHEP yet.
Lack of financial resources is the main barrier which prevents realization of energy saving investments.

3/ Action Plan of the RCHEP

As aforementioned, the facility is not in a good condition, and so it is absolutely necessary to realize technological and organisational measures in order to improve energy performance of the facility.

- It will be necessary to realize complete insulation – building envelope, roof construction, doors and windows (four or six chamber outer frame and double or triple glazing).
- Heating system requires (due to its condition) complete renovation. These systems have great energy saving potential. Regardless fuel type, quality of heat sources, heating units, heat pumps and regulation units improves constantly which means also energy efficiency of these technologies increases.

- In order to gain high efficiency of heating system, heat source has to be chosen wisely. Power of heating system is determined by calculation of building heat loss which is the main factor of total heat energy consumption. Determination of heat source power by calculation of building heat loss costs several thousand crowns, but it can save much more on investment and operating costs. Accurate dimensioning of the heat source is also an important condition in order to achieve high efficiency, optimal operation and low emission of the heat source.
- Next, it will be necessary to realize investments in office equipment, part of the operation and energy management and monitoring system.
- Ventilation is the next issue which is closely related to the topic and it includes manual ventilation and forced ventilation which uses ventilation recovery units to recover heat.
- Efficient use of heat generation belongs to the field of energy saving either. This term includes generation of solar energy or heat generated by users and facility operation.
- Another efficient heat saving tool is for example solar energy and its use to produce hot water or combined production of electricity and heat in cogeneration units.
- We also recommend sharing experience in field of energetics with others (RCHEPs). It is wise to use advices and consult with energetic experts.
- Employees must be better motivated to save energy; trainings are not sufficient tools to achieve this target.

4/ Energy efficiency activities implemented in the RCHEP

Installation of energy efficient lighting system

Installation of solar thermal collectors

Measures which need to be secured:

- Turn off electric devices when they are not in operation
- Turn off lights, use daylight every time it is possible

5/ Behavioural measures for residents and visitors

All measures implemented in this field are focused on raising awareness about energy saving of all clients and visitors which is realized by trainings, methodical and didactical tools and also by installation of awareness signs which show how save energy properly.

6/ Monitoring when available

Monitoring is not available.

7/ Conclusion

Following measures are recommended in relation to the fact that the facility is quite new and the investor has limited financial resources:

1. Thermal screening

Thermal (infrared) screening of a building reveals the places where heat leaks out of the building – places, which lack sufficient or appropriate thermal insulation, so called thermal bridges, and defects in building construction which cannot be seen by naked eye. We can use thermal screening in order to reveal the real state of the art of the building which is not necessary the same as it is written in the technical documentation. Thermal screens can create a good background for an energy efficiency project and they can be also used to control the quality of realized measures. Another way to use thermal screens is check of heating system.

2. Energy Efficiency Retrofit Survey

Next option is to work out energy efficiency study via Energy Efficiency Retrofit Survey. EERS represents an **efficient, quick** and in comparison with energy audit also **less expensive** method of **determination of energy saving potential in buildings and operation facilities.**

In case EERS is used, energy balances are replaced with professional estimations based on inspection carried on by a team of experts. In the end, short and well arranged report is created. It contains a structured package of measures to achieve energy savings:

- Identification of energy saving measures
- Cost-free measures
- Measures with a 2 year payback period
- Measures with a 4 year payback period
- Measures with an 8 year payback period
- Measures with payback period longer than 8 years
- Quantification of annual energy savings through expert estimation
- Determination of investment and operating costs of the measure
- Determination of simple payback period or calculation of other economy efficiency criteria

Energy Efficiency Retrofit Survey study is created by a team of construction physics and building energetic experts. Following tasks are realized within the service:

- Summary and overview of systems which demand the most energy
- Local inspection during the operation of the facility, (not interrupted shift operation is awaited)
- Local inspection when the facility is not in operation, (weekends, free days, shift change)
- Analysis of energy consumption and performance needs
- Analysis and proposal of energy efficient measures
- Analysis and proposal of supplementary renewable energy resources
- Proposal of following procedure based on determination of operating time and optimisation of unit operating regimes and plans of operating units

4- Residential Care Home for Elderly People Mistra Křišťana- Prachatice, Czech Republic

1/ Identification of the partner

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2/ RCHEP main issues

Type of construction of the building where the RCHEP resides is heavy. It is a multiple storey building which was constructed in 2002. Clients are accommodated in 37 double bedded and 26 single bedded rooms. There is a bathroom at every client's room. Rooms are equipped with furniture owned by the RCHEP and it is possible to furnish the room also with clients' own furniture and appliances. Fire alarm, communication device and TV and internet socket outlets are installed in every room.

The building envelope is not insulated properly and roof is not insulated at all. Insulation of windows and doors is not sufficient. There has been no Energy management system implemented in the RCHEP.

Lack of financial resources is the main barrier which prevents realization of energy saving investments.

3/ Action Plan of the RCHEP

As aforementioned, the facility is not in a good condition, and so it is absolutely necessary to realize technological and organisational measures in order to improve energy performance of the facility.

- It will be necessary to realize complete insulation – building envelope, roof construction, doors and windows (four or six chamber outer frame and double or triple glazing).
- Heating system requires (due to its condition) complete renovation. These systems have great energy saving potential. Regardless fuel type, quality of heat sources, heating units, heat pumps and regulation units improves constantly which means also energy efficiency of these technologies increases.
- In order to gain high efficiency of heating system, heat source has to be chosen wisely. Power of heating system is determined by calculation of building heat loss which is the main factor of total heat energy consumption. Determination of heat source power by calculation of building heat loss costs several thousand crowns, but it can save much more on investment and operating costs. Accurate dimensioning of the heat source is also an important condition in order to achieve high efficiency, optimal operation and low emission of the heat source.

- Next, it will be necessary to realize investments in office equipment, part of the operation and energy management and monitoring system.
- Ventilation is the next issue which is closely related to the topic and it includes manual ventilation and forced ventilation which uses ventilation recovery units to recover heat.
- Efficient use of heat generation belongs to the field of energy saving either. This term includes generation of solar energy or heat generated by users and facility operation.
- Another efficient heat saving tool is for example solar energy and its use to produce hot water or combined production of electricity and heat in cogeneration units.
- We also recommend sharing experience in field of energetics with others (RCHEPs). It is wise to use advices and consult with energetic experts.
- All employees must be better motivated to save energy.

4/ Energy efficiency activities implemented in the RCHEP

Partial insulation of the building (walls, windows)

Improvement of the heating system

Improvement of ventilation/air conditioning

Improvement of the heating system

Investments in energy efficient equipment of the office

Installation of energy efficient lighting system

Measures which need to be secured:

- Turn off electric devices when they are not in operation
- Turn off lights, use daylight every time it is possible

5/ Behavioural measures for residents and visitors

All measures implemented in this field are focused on raising awareness about energy saving of all clients and visitors which is realized by trainings, methodical and didactical tools and also by installation of awareness signs which show how save energy properly.

6/ Monitoring when available

Monitoring is not available.

7/ Conclusion

Following measures are recommended because of the lack of investor's financial resources and because the building is quite new (there is just lack of most modern technologies).

<u>1. Thermal screening</u>

Thermal (infrared) screening of a building reveals the places where heat leaks out of the building – places, which lack sufficient or appropriate thermal insulation, so called thermal bridges, and defects in building construction which cannot be seen by naked eye. We can use thermal screening in order to reveal the real state of the art of the building which is not necessary the same as it is written in the technical documentation. Thermal screens can create a good background for an energy efficiency

project and they can be also used to control the quality of realized measures. Another way to use thermal screens is check of heating system.

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2. Energy Efficiency Retrofit Survey

Next option is to work out energy efficiency study via Energy Efficiency Retrofit Survey. EERS represents an **efficient, quick** and in comparison with energy audit also **less expensive** method of **determination of energy saving potential in buildings and operation facilities.**

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- Identification of energy saving measures
- Cost-free measures
- Measures with a 2 year payback period
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Energy Efficiency Retrofit Survey study is created by a team of construction physics and building energetic experts. Following tasks are realized within the service:

- Summary and overview of systems which demand the most energy
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- Analysis of energy consumption and performance needs
- Analysis and proposal of energy efficient measures
- Analysis and proposal of supplementary renewable energy resources
- Proposal of following procedure based on determination of operating time and optimisation of unit operating regimes and plans of operating units

5-Residential Care Home for Visually Impaired Palata - Prague, Czech Republic

1/ Identification of the partner

Palata – Home for visually impaired
Na Hřebenkách 737/5
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150 00
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Mail: servis@palata.cz

RCHEP Manager: Ing. Jiří Procházka
Tel: +420 257 314 666
Tel: +420 604 208 389
Mail: prochazka.jiri@palata.cz

2/ RCHEP main issues

Type of building construction is heavy. The RCHEP resides in a multiple storey, historical building which was constructed in 1893. It was renovated and rebuilt in 2008.
The RCHEP is situated in a nice environment of Smíchov, southern from Strahov. It is surrounded by a 3 hectare English landscape park. It was constructed in 1893 and renovated in a modern way between 2003 and 2008. The main building has three barrier free storeys and it is equipped with three voice control elevators which are suitable to handicapped people.
Due to the renovation, Palata became one of the most modern humanitarian facilities in the Czech Republic. The renovation allowed the RCHEP provide its clients new barrier free single bedded rooms, special hygienic equipment and a large rehabilitation complex: a gym for fitness exercise, electric cure, massage and water cure which can be used also by clients with severe mobility impairment. Clients with multiple disabilities can use daily individual service, which is situated in a comfortable atrium. Moreover, they are accessible from every floor by special elevators. Catering of Palata is comparable to other high quality catering services. Catering is provided to 183 clients.
The building envelope (because of the historical origin) is not insulated properly and roof is not insulated at all. Insulation of windows and doors is not sufficient.

3/ Action Plan of the RCHEP

As aforementioned, the facility is not in a good condition, and so it is absolutely necessary to realize technological and organisational measures in order to improve energy performance of the facility.

- It will be necessary to choose a mean of complete insulation of building envelope, roof and several windows and doors (four or six chamber outer frame and double or triple glazing) in the future. Historical aspects of the building have to be considered.
- Heating system requires (due to its condition) complete renovation. These systems have great energy saving potential. Regardless fuel type, quality of heat sources, heating units, heat pumps

and regulation units improves constantly which means also energy efficiency of these technologies increases.

- In order to gain high efficiency of heating system, heat source has to be chosen wisely. Power of heating system is determined by calculation of building heat loss which is the main factor of total heat energy consumption. Determination of heat source power by calculation of building heat loss costs several thousand crowns, but it can save much more on investment and operating costs. Accurate dimensioning of the heat source is also an important condition in order to achieve high efficiency, optimal operation and low emission of the heat source.
- Next, it will be necessary to realize investments in office equipment, part of the operation and energy management and monitoring system.
- Ventilation is the next issue which is closely related to the topic and it includes manual ventilation and forced ventilation which uses ventilation recovery units to recover heat.
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- Another efficient heat saving tool is for example solar energy and its use to produce hot water or combined production of electricity and heat in cogeneration units.
- We also recommend sharing experience in field of energetics with others (RCHEPs). It is wise to use advices and consult with energetic experts.
- All employees must be better motivated to save energy.

4/ Energy efficiency activities implemented in the RCHEP

Washing machines

Cooling

Partial insulation of the building (walls, windows)

Improvement of the heating system

Improvement of ventilation/air conditioning

Improvement of the heating system

Cogeneration unit (Micro CHP) since 2010

Installation of energy efficient lighting system

Measures which need to be secured:

- Turn off electric devices when they are not in operation
- Turn off lights, use daylight every time it is possible

5/ Behavioural measures for residents and visitors

All measures implemented in this field are focused on raising awareness about energy saving of all clients and visitors which is realized by trainings, methodical and didactical tools and also by installation of awareness signs which show how save energy properly.

6/ Monitoring when available

Monitoring is not available.

7/ Conclusion

Especially due to the renovation, Palata became one of the most modern humanitarian facilities in the Czech Republic.

Following measures are recommended because of the lack of investor's financial resources and because the building is quite new (there is just lack of most modern technologies).

1. Thermal screening

Thermal (infrared) screening of a building reveals the places where heat leaks out of the building – places, which lack sufficient or appropriate thermal insulation, so called thermal bridges, and defects in building construction which cannot be seen by naked eye. We can use thermal screening in order to reveal the real state of the art of the building which is not necessary the same as it is written in the technical documentation. Thermal screens can create a good background for an energy efficiency project and they can be also used to control the quality of realized measures. Another way to use thermal screens is check of heating system.

2. Energy Economy Optimisation

The purpose of Energy-economy optimisation of a building is maximum reduction of building operating costs through reduction of heat loss and variation of different heating systems according to specific needs of building users. The proposal of energy-economy optimisation can be worked out both for construction of a new building and renovation of an old building.

Mathematical model of a building will be created and it will provide several possible solutions of insulation and it is followed by a comparison which contains variation of heating, ventilation and hot water production according to specific needs of the client. Individual proposals can be compared considering investment costs, operating costs to gain and consume energy, cash-flow (considering growth of energy prices) and determination of risk. This comparison allows choosing an optimal solution in relation to energy balance, investment payback and optimisation of operating costs.

6-Residential Care Home for Elderly People - Soběslav, Czech Republic

1/ Identification of the partner

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2/ RCHEP main issues

The RCHEP resides in a new, multiple storey heavy construction building which was built in 2003. **Senior House has four above ground storeys with an outbuilding** – there is located the kitchen. Kitchen equipment corresponds with modern trends and hygienic standards (HACCP evaluation). The outbuilding (kitchen) is interconnected with the main building.
Technical and administrative background are situated in the **first floor** of the main building – hotel reception, administrative room, rehabilitation room, buffet, laundry room, cloakroom and room for staffs, maintenance room, gas boiler plant, storage and morgue.
The **second floor** contains nurses room, common room, common bathroom, chapel, medical storage, five single bedded and ten double bedded rooms with balconies.
On the **third floor,** you can find pharmaceutical room, hobby room with a kitchen (cooker, oven), common bathroom, smoking room, cleaning storage, seven single bedded and ten double bedded rooms.
The last storey is the fourth floor with common room, common bathroom, gym, deposit storage, cleaning storage, six single bedded and nine double bedded rooms.
All these rooms are barrier free.
Building envelope is insulated with polystyrene (only 5 cm thick), roof is not insulated at all and insulation of windows and doors is not sufficient. No Energy management system has been implemented in this RCHEP.
Lack of financial resources is the main barrier which prevents realization of energy saving investments.

3/ Action Plan of the RCHEP

As aforementioned, the facility is not in a good condition, and so it is absolutely necessary to realize technological and organisational measures in order to improve energy performance of the facility.

- It will be necessary to realize complete insulation – building envelope, roof construction, doors and windows (four or six chamber outer frame and double or triple glazing).

- Heating system requires (due to its condition) complete renovation. These systems have great energy saving potential. Regardless fuel type, quality of heat sources, heating units, heat pumps and regulation units improves constantly which means also energy efficiency of these technologies increases.
- In order to gain high efficiency of heating system, heat source has to be chosen wisely. Power of heating system is determined by calculation of building heat loss which is the main factor of total heat energy consumption. Determination of heat source power by calculation of building heat loss costs several thousand crowns, but it can save much more on investment and operating costs. Accurate dimensioning of the heat source is also an important condition in order to achieve high efficiency, optimal operation and low emission of the heat source.
- Next, it will be necessary to realize investments in office equipment, part of the operation and energy management and monitoring system.
- Ventilation is the next issue which is closely related to the topic and it includes manual ventilation and forced ventilation which uses ventilation recovery units to recover heat.
- Efficient use of heat generation belongs to the field of energy saving either. This term includes generation of solar energy or heat generated by users and facility operation.
- Another efficient heat saving tool is for example solar energy and its use to produce hot water or combined production of electricity and heat in cogeneration units.
- We also recommend sharing experience in field of energetics with others (RCHEPs). It is wise to use advices and consult with energetic experts.
- All employees must be better motivated to save energy.

4/ Energy efficiency activities implemented in the RCHEP

Partial insulation of the building (walls - 5mm, windows)

Installation of energy efficient illumination

Improvement of ventilation/air conditioning

Measures which need to be secured:

- Turn off electric devices when they are not in operation
- Turn off lights, use daylight every time it is possible

5/ Behavioural measures for residents and visitors

All measures implemented in this field are focused on raising awareness about energy saving of all clients and visitors which is realized by trainings, methodical and didactical tools and also by installation of awareness signs which show how save energy properly.

6/ Monitoring when available

Monitoring is not available.

7/ Conclusion

Following measures are proposed due to the historical aspects of the building and to the lack of financial resources of the investor.

<u>1. Thermal screening</u>

Thermal (infrared) screening of a building reveals the places where heat leaks out of the building – places, which lack sufficient or appropriate thermal insulation, so called thermal bridges, and defects in building construction which cannot be seen by naked eye. We can use thermal screening in order to reveal the real state of the art of the building which is not necessary the same as it is written in the technical documentation. Thermal screens can create a good background for an energy efficiency project and they can be also used to control the quality of realized measures. Another way to use thermal screens is check of heating system.

2. Energy Efficiency Retrofit Survey

Next option is to work out energy efficiency study via Energy Efficiency Retrofit Survey. EERS represents an **efficient, quick** and in comparison with energy audit also **less expensive** method of **determination of energy saving potential in buildings and operation facilities.**

In case EERS is used, energy balances are replaced with professional estimations based on inspection carried on by a team of experts. In the end, short and well arranged report is created. It contains a structured package of measures to achieve energy savings:

- Identification of energy saving measures
- Cost-free measures
- Measures with a 2 year payback period
- Measures with a 4 year payback period
- Measures with an 8 year payback period
- Measures with payback period longer than 8 years
- Quantification of annual energy savings through expert estimation
- Determination of investment and operating costs of the measure
- Determination of simple payback period or calculation of other economy efficiency criteria

Energy Efficiency Retrofit Survey study is created by a team of construction physics and building energetic experts. Following tasks are realized within the service:

- Summary and overview of systems which demand the most energy
- Local inspection during the operation of the facility, (not interrupted shift operation is awaited)
- Local inspection when the facility is not in operation, (weekends, free days, shift change)
- Analysis of energy consumption and performance needs
- Analysis and proposal of energy efficient measures
- Analysis and proposal of supplementary renewable energy resources
- Proposal of following procedure based on determination of operating time and optimisation of unit operating regimes and plans of operating units

2. „ENERGY EFFICIENCY“

TÜV SÜD provides Czech companies a solution in field of energy saving. The support is provided from the beginning of the project to its end and it intends to maximize the range of realized energy savings. Specific procedure is chosen based on the will to secure energy savings in a simple and efficient way. This service is provided by TÜV SÜD as an independent, professional counselling company which has no business interests in favouring specific energy saving appliances or technologies.

Product called “Energy savings in practice” is appropriate to subjects of private and public sector. It is advantageous for the possibility of Energy Performance Contracting which is used especially when financial resources of the client are limited.
EPC – Energy Performance Contracting is a method to finance energy saving measures. The company which provides the EPC is fully responsible for realization and effects of the measure. Client does not spend any investment resources for the measure; the investment is covered only from the savings achieved. EPC usually includes project proposal, its realization, regular maintenance of installations and monitoring and evaluation of achieved savings.

Procedure to achieve savings:

Phase	Activity	Output
Identification of energy saving potential	This procedure includes Listen to client’s needs and opinion, gain documentation, see the building / facility	A report which includes energy saving potential identified, the estimated range of possible savings, payback period, proposal (and price) of Feasibility study which is related to the recommended measures (description of individual measures, their specification, costs and savings) **Processing time**: 1 – 2 weeks
Feasibility study	Provision of individual proposal of the measure; consult the realistic procedure with the potential contractor, analysis and evaluation of all influences of the measure to the energy system. It is possible to realize the measure immediately as the FS is ready.	Technical report which contains specific estimations made by contractors, description of the procedure taking into consideration the local specifications (shutdown and so on). Economical evaluation of cash-flow. If it is required, possibility of financing through EPC will be checked. Check of the influence of the measures. **Processing time**: 2 – 4 weeks
Realization of the measure	Supervision of harmony between the work actually realized and the original intention of the investor – quality and complete supply in order to gain desired savings.	Inspection report about the realization phase itself, final report, amendment of project documentation. **Processing time**: according to the range of the project – it will be specified in the Feasibility study

7-Residential Care Home for Elderly People G-Centrum Tábor, Czech Republic

1/ Identification of the partner

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RCHEP Manager: PhDr. Jaroslava Kotalíková
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2/ RCHEP main issues

Type of construction of the RCHEP is heavy. It is a multiple storey building which was constructed in 1998. The RCHEP provides its services to their 143 clients at 54 double bedded and 39 single bedded rooms – each of them has their own bathroom. These rooms are equipped with furniture which belongs to the RCHEP and home clients can also bring their own furniture and appliances.
Building envelope is not insulated sufficiently. Roof of the building has no insulation at all and insulation of windows and doors is not sufficient. No Energy management system has been implemented in this RCHEP.
Lack of financial resources and redistribution of financial resources are the main barriers which prevent realization of energy saving investments.

3/ Action Plan of the RCHEP

As aforementioned, the facility is not in a good condition, and so it is absolutely necessary to realize technological and organisational measures in order to improve energy performance of the facility.

- It will be necessary to realize (step by step) complete insulation – building envelope, roof construction, doors and windows (four or six chamber outer frame and double or triple glazing) in the future.
- Heating system requires (due to its condition) complete renovation. These systems have great energy saving potential. Regardless fuel type, quality of heat sources, heating units, heat pumps and regulation units improves constantly which means also energy efficiency of these technologies increases.
- In order to gain high efficiency of heating system, heat source has to be chosen wisely. Power of heating system is determined by calculation of building heat loss which is the main factor of total heat energy consumption. Determination of heat source power by calculation of building heat loss costs several thousand crowns, but it can save much more on investment and operating costs. Accurate dimensioning of the heat source is also an important condition in order to achieve high efficiency, optimal operation and low emission of the heat source.

- Next, it will be necessary to realize investments in office equipment, part of the operation and energy management and monitoring system.
- Ventilation is the next issue which is closely related to the topic and it includes manual ventilation and forced ventilation which uses ventilation recovery units to recover heat.
- Efficient use of heat generation belongs to the field of energy saving either. This term includes generation of solar energy or heat generated by users and facility operation.
- Another efficient heat saving tool is for example solar energy and its use to produce hot water or combined production of electricity and heat in cogeneration units.
- We also recommend sharing experience in field of energetics with others (RCHEPs). It is wise to use advices and consult with energetic experts.
- All employees must be better motivated to save energy.

4/ Energy efficiency activities implemented in the RCHEP

Installation of energy efficient illumination

Measures which need to be secured:

- Turn off electric devices when they are not in operation
- Turn off lights, use daylight every time it is possible

5/ Behavioural measures for residents and visitors

All measures implemented in this field are focused on raising awareness about energy saving of all clients and visitors which is realized by trainings, methodical and didactical tools and also by installation of awareness signs which show how save energy properly.

6/ Monitoring when available

Monitoring is not available.

7/ Conclusion

Following measures are recommended because of the lack of investor's financial resources, redistribution principles and because the building is quite new – constructed in 1998. There is just lack of most modern energy technologies.

1. Thermal screening

Thermal (infrared) screening of a building reveals the places where heat leaks out of the building – places, which lack sufficient or appropriate thermal insulation, so called thermal bridges, and defects in building construction which cannot be seen by naked eye. We can use thermal screening in order to reveal the real state of the art of the building which is not necessary the same as it is written in the technical documentation. Thermal screens can create a good background for an energy efficiency project and they can be also used to control the quality of realized measures. Another way to use thermal screens is check of heating system.

2. Energy Efficiency Retrofit Survey

Next option is to work out energy efficiency study via Energy Efficiency Retrofit Survey. EERS represents an **efficient, quick** and in comparison with energy audit also **less expensive** method of **determination of energy saving potential in buildings and operation facilities.**

In case EERS is used, energy balances are replaced with professional estimations based on inspection carried on by a team of experts. In the end, short and well arranged report is created. It contains a structured package of measures to achieve energy savings:

- Identification of energy saving measures
- Cost-free measures
- Measures with a 2 year payback period
- Measures with a 4 year payback period
- Measures with an 8 year payback period
- Measures with payback period longer than 8 years
- Quantification of annual energy savings through expert estimation
- Determination of investment and operating costs of the measure
- Determination of simple payback period or calculation of other economy efficiency criteria

Energy Efficiency Retrofit Survey study is created by a team of construction physics and building energetic experts. Following tasks are realized within the service:

- Summary and overview of systems which demand the most energy
- Local inspection during the operation of the facility, (not interrupted shift operation is awaited)
- Local inspection when the facility is not in operation, (weekends, free days, shift change)
- Analysis of energy consumption and performance needs
- Analysis and proposal of energy efficient measures
- Analysis and proposal of supplementary renewable energy resources
- Proposal of following procedure based on determination of operating time and optimisation of unit operating regimes and plans of operating units

8-Residential Care Home for Elderly People - Žinkovy, Czech Republic

1/ Identification of the partner

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335 54 Žinkovy
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Fax: +420 371 593 113
Mail: dks@dkszinkovy.cz

RCHEP Manager**: Ing. Karel Vostrý**

2/ RCHEP main issues

RCHEP Žinkovy resides in a facility which contains four multiple storey buildings – A, B, C and D.
The "A" building which was built in 1900 was completely renovated. Since the renovation, the entrance has been barrier free and there have been 17 rooms; every one of them is equipped with adjustable bed, bedside table, chairs, table, TV and cupboard with a safe inside. Single bedded rooms have their own bathroom, double bedded rooms are coupled and they share common bathroom. Bathrooms are fitted with a barrier free shower, toilet and sink. Administration and technical department of the RCHEP, doctors', nurse room, kitchen for clients, room for visitors, rehabilitation room and common bathroom are also situated in this building.
The "B" pavilion was constructed in 1975 and the renovation was undertaken in 2006. This building is barrier free either. It provides 21 beds at 12 rooms. Single bedded rooms have their own bathroom. Double bedded rooms are coupled and they share common bathroom, the same as in the building "A". Rooms are equipped in the same way as in the building "A". Furthermore, this pavilion provides a common kitchen, common rooms, winter garden, nurse room and dining room for clients. Kitchen, storages and dining room for staffs are situated in the basement.
The "C" building was constructed in 1985 and it has two storeys. Clients are accommodated in single bedded and double bedded rooms which are coupled and every couple shares common bathroom. Toilets are separated from bathrooms. There are 22 rooms in this building which are fitted with beds, bedside tables, cupboards, tables, chairs and TVs. There is a kitchen at both storeys. Entry to this building is barrier free and it has also its own nurse room, pedicure, common bathroom and a common room.
The "D" pavilion is completely barrier free and it was built in 2009. It provides 22 beds at 12 rooms. Single bedded rooms have their own bathrooms (barrier free shower, toilet and sink), the rest (double bedded) rooms are coupled and they share a bathroom (the same equipment as at the single bedded ones – barrier free shower, toilet and sink). Clients' rooms are fitted with adjustable beds, bedside tables, tables, chairs, TVs and cupboards with a safe inside.
Furthermore, the "D" pavilion provides their clients common kitchen, common room, nurse room and barber shop. There is also a laundry room.

In 2010, the “A” building was completely renovated. The renovation was not simple because of the age and historical outward of the building. The biggest problem which appeared during the renovation was the fact that several roof beams were damaged by wood-decay fungus. It was necessary to locate those damaged beams and replace them with other construction elements.
Another thing that caused problems was high humidity of the basement; nowadays staffs cloakroom, morgue, storage room and elevator engine room are situated in one half of the basement. Gas boiler plant and a workroom are situated in the second half. The high humidity was mostly reduced by drainage pipes. After that, outdoor drainage was realized. All clients’ rooms are fitted with new furniture and appliances. Most of offices and other rooms are fitted with new furniture and appliances as well.
At the end of 2010, former economy building was transformed into a warehouse, new roof was installed, walls and windows were renovated and finally new floors were laid. Building envelope was renovated and painted.
Outdoor lighting was replaced with new, energy efficient one in the whole facility. Sewerage was also renovated. Most of rooms were fitted with window blinders. Building envelopes are insulated with polystyrene, roofs are not insulated at all and windows and doors are not insulated sufficiently. No Energy management system has been implemented in this RCHEP.
Lack of financial resources is the main barrier which prevents realization of energy saving investments.

3/ Action Plan of the RCHEP

As aforementioned, the facility is not in a good condition, and so it is absolutely necessary to realize technological and organisational measures in order to improve energy performance of the facility.
It will be necessary to realize complete insulation – building envelope, roof construction, doors and windows (four or six chamber outer frame and double or triple glazing).

- Heating system requires (due to its condition) complete renovation. These systems have great energy saving potential. Regardless fuel type, quality of heat sources, heating units, heat pumps and regulation units improves constantly which means also energy efficiency of these technologies increases.
- In order to gain high efficiency of heating system, heat source has to be chosen wisely. Power of heating system is determined by calculation of building heat loss which is the main factor of total heat energy consumption. Determination of heat source power by calculation of building heat loss costs several thousand crowns, but it can save much more on investment and operating costs. Accurate dimensioning of the heat source is also an important condition in order to achieve high efficiency, optimal operation and low emission of the heat source.
- Next, it will be necessary to realize investments in office equipment, part of the operation and energy management and monitoring system.
- Ventilation is the next issue which is closely related to the topic and it includes manual ventilation and forced ventilation which uses ventilation recovery units to recover heat.
- Efficient use of heat generation belongs to the field of energy saving either. This term includes generation of solar energy or heat generated by users and facility operation.
- Another efficient heat saving tool is for example solar energy and its use to produce hot water or combined production of electricity and heat in cogeneration units.
- Monitoring of energy consumption and its regular evaluation is essential.

- We also recommend sharing experience in field of energetics with others (RCHEPs). It is wise to use advices and consult with energetic experts.
- All employees must be better motivated to save energy.

These proposed measures are confirmed with the analysis of annual electricity consumption per client/year and annual heat consumption per client/year.

4/ Energy efficiency activities implemented in the RCHEP

New A++ (energy class) washing machines were bought

New, efficient cooling system

Insulation of the building (walls, windows)

Improvement of the current heating system

Installation of energy efficient illumination

5/ Behavioural measures for residents and visitors

All measures implemented in this field are focused on raising awareness about energy saving of all clients and visitors which is realized by trainings, methodical and didactical tools and also by installation of awareness signs which show how save energy properly.

6/ Monitoring when available

Monitoring is not available.

7/ Conclusion

Following measures are proposed due to the lack of financial resources of the investor.

1. Thermal screening

Thermal (infrared) screening of a building reveals the places where heat leaks out of the building – places, which lack sufficient or appropriate thermal insulation, so called thermal bridges, and defects in building construction which cannot be seen by naked eye. We can use thermal screening in order to reveal the real state of the art of the building which is not necessary the same as it is written in the technical documentation. Thermal screens can create a good background for an energy efficiency project and they can be also used to control the quality of realized measures. Another way to use thermal screens is check of heating system.

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2. Energy Efficiency Retrofit Survey

Next option is to work out energy efficiency study via Energy Efficiency Retrofit Survey. EERS represents an **efficient, quick** and in comparison with energy audit also **less expensive** method of **determination of energy saving potential in buildings and operation facilities.**

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- Cost-free measures

- Measures with a 2 year payback period
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- Measures with an 8 year payback period
- Measures with payback period longer than 8 years
- Quantification of annual energy savings through expert estimation
- Determination of investment and operating costs of the measure
- Determination of simple payback period or calculation of other economy efficiency criteria

Energy Efficiency Retrofit Survey study is created by a team of construction physics and building energetic experts. Following tasks are realized within the service:

- Summary and overview of systems which demand the most energy
- Local inspection during the operation of the facility, (not interrupted shift operation is awaited)
- Local inspection when the facility is not in operation, (weekends, free days, shift change)
- Analysis of energy consumption and performance needs
- Analysis and proposal of energy efficient measures
- Analysis and proposal of supplementary renewable energy resources
- Proposal of following procedure based on determination of operating time and optimisation of unit operating regimes and plans of operating units

9-Centrin CZ s.r.o. , Czech Republic

1/ Identification of the partner

Non-government medical institution

Residential care home for elderly people Zruč nad Sázavou,
Náměstí Míru 597, Zruč nad Sázavou, 285 22

RCHEP Manager: Helena Bednářová
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2/ RCHEP main issues

This RCHEP resides in a ten storey building – the construction type is heavy. It was built in 1975; standard materials were used for the construction and the last renovation was undertaken in 2010. Building renovations enabled to implement energy efficient technologies in order to improve energy performance of the building – building envelope was insulated with rockwool which is unfortunately just 10 cm thick.
Roof is not insulated at all and not every window and door is insulated sufficiently. No device or system was characterized as outgoing in the SAVE AGE questionnaire. In spite of that, lighting system and office equipment are not in perfect condition. Even that annual electricity consumption reaches up to 126654 kWh and annual heat consumption is 890409 kWh, no Energy management system has been implemented in the RCHEP and no one has been chosen as a person who is responsible for RCHEP energy management.
Lack of financial resources is the main barrier which prevents realization of energy saving investments.

3/ Action Plan of the RCHEP

As aforementioned, the facility is not in a good condition, and so it is absolutely necessary to realize technological and organisational measures in order to improve energy performance of the facility.

- It will be necessary to realize complete insulation – building envelope, roof construction, doors and windows (four or six chamber outer frame and double or triple glazing).
- Heating system unconditionally requires (due to its condition) complete renovation. These systems have great energy saving potential. Regardless fuel type, quality of heat sources, heating units, heat pumps and regulation units improves constantly which means also energy efficiency of these technologies increases.
- In order to gain high efficiency of heating system, heat source has to be chosen wisely. Power of heating system is determined by calculation of building heat loss which is the main factor of total heat energy consumption. Determination of heat source power by calculation of building heat loss costs several thousand crowns, but it can save much more on investment and operating costs. Accurate dimensioning of the heat source is also an important condition in order to achieve high efficiency, optimal operation and low emission of the heat source.

- Next, it will be necessary to realize investments in office equipment, part of the operation and energy management and monitoring system.
- Ventilation is the next issue which is closely related to the topic and it includes manual ventilation and forced ventilation which uses ventilation recovery units to recover heat.
- Efficient use of heat generation belongs to the field of energy saving either. This term includes generation of solar energy or heat generated by users and facility operation.
- Another efficient heat saving tool is for example solar energy and its use to produce hot water or combined production of electricity and heat in cogeneration units.
- Monitoring of energy consumption and its regular evaluation is essential; energy costs should be divided for example according to individual departments.
- We also recommend sharing experience in field of energetics with others (RCHEPs). It is wise to use advices and consult with energetic experts.
- All employees must be better motivated to save energy.

Following measures are proposed due to the historical aspects of the building and to the lack of financial resources of the investor.

1. Undertake Energy Audit

Annual energy consumption of all forms of energy in the organization is the determinative factor which decides whether there is an obligation to undertake an energy audit. The obligation border is 35 000 GJ per year and it is defined by law, specifically No. 406/2000 Coll. The purpose of energy audit is to analyse energy flows in a facility (building) or when a new power source is installed. Specific energy saving potential is detected during the audit. Then, measures (in order to achieve these savings) are proposed and evaluated in relation to financial options. Energy audit can be used in order to gain grant or loan to a project (building insulation, implementation of renewable resource system), search for energy savings and improve energy performance of the building. Following services are provided within energy audit: evaluation of building construction, heating, hot water production, lighting system, electrical devices and evaluation of energy efficiency in technological processes. Next, energy audit provides at least two combined solutions (including financial requirements) in order to improve energy performance. In the end, implementation of one of these solutions is recommended by the audit and it is also justified.

2. „ENERGY EFFICIENCY“

TÜV SÜD provides Czech companies a solution in field of energy saving. The support is provided from the beginning of the project to its end and it intends to maximize the range of realized energy savings. Specific procedure is chosen based on the will to secure energy savings in a simple and efficient way. This service is provided by TÜV SÜD as an independent, professional counselling company which has no business interests in favouring specific energy saving appliances or technologies.

Product called “Energy savings in practice” is appropriate to subjects of private and public sector. It is advantageous for the possibility of Energy Performance Contracting which is used especially when financial resources of the client are limited.

EPC – Energy Performance Contracting is a method to finance energy saving measures. The company which provides the EPC is fully responsible for realization and effects of the measure.

Client does not spend any investment resources for the measure; the investment is covered only from the savings achieved. EPC usually includes project proposal, its realization, regular maintenance of installations and monitoring and evaluation of achieved savings.

4/ Energy efficiency activities implemented in the RCHEP

Improvement of heating system

Installation of energy efficient lighting system

Improvement of the current heating system

Turn off lights, use daylight every time it is possible

5/ Behavioural measures for residents and visitors

All measures implemented in this field are focused on raising awareness about energy saving of all clients and visitors which is realized by trainings, methodical and didactical tools and also by installation of awareness signs which show how save energy properly.

6/ Monitoring when available

Monitoring is not available.

7/ Conclusion

The main barrier which prevents to invest in energy saving is lack of financial resources which are essential in order to implement energy saving measures. That is why following procedure is proposed.

Procedure to achieve savings:

Phase	Activity	Output
Identification of energy saving potential	This procedure includes Listen to client's needs and opinion, gain documentation, see the building / facility	A report which includes energy saving potential identified, the estimated range of possible savings, payback period, proposal (and price) of Feasibility study which is related to the recommended measures (description of individual measures, their specification, costs and savings) **Processing time**: 1 – 2 weeks

Feasibility study	Provision of individual proposal of the measure; consult the realistic procedure with the potential contractor, analysis and evaluation of all influences of the measure to the energy system. It is possible to realize the measure immediately as the FS is ready.	Technical report which contains specific estimations made by contractors, description of the procedure taking into consideration the local specifications (shutdown and so on). Economical evaluation of cash-flow. If it is required, possibility of financing through EPC will be checked. Check of the influence of the measures. **Processing time**: 2 – 4 weeks
Realization of the measure	Supervision of harmony between the work actually realized and the original intention of the investor – quality and complete supply in order to gain desired savings.	Inspection report about the realization phase itself, final report, amendment of project documentation. **Processing time**: according to the range of the project – it will be specified in the Feasibility study

10- Residential Care Home for Elderly People - Máj, Czech Republic

1/ Identification of the partner

RCHEP Máj
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contributory organization

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Fax: +420 389 106 931
Mail: info@ddmajcb.cz
RCHEP Manager: **Ing. Pavel Janda**

2/ RCHEP main issues

RCHEP resides in a multiple storey building which used to be a hotel in the past. The building was transformed into the RCHEP between 2002 and 2003.

The hotel originally consisted of two buildings. Kitchen, restaurant and other commercial spaces were situated in the first building, engine room and hotel rooms in the second one. Two new storeys and a four-storey outbuilding were built within the transformation. Total price of hotel transformation outreached 128 million CZK.

Another storey was also added to the entrance hall and so it was necessary to strengthen the construction of the hall. Cylindrical columns are used excellently – they are architectonically interesting and they fill the spacious hall.

Platform of the building looks almost like a shamrock. There is a "core – plaza" which interconnects four corridors. Clients' rooms are situated at the corridor which is wide enough (for a wheelchair or for a bed). Corridors are fitted with hand rails made of wood. The only problem is windows – there is only one window at the end of each corridor, because there is no space, where it would be possible to install another window.

Rooms are equipped with modern furniture. Both single bedded and double bedded rooms provide their clients a small bookcase, a chest which could be used for TV, a cupboard, a mobile bedside table, a shelf (usually situated above bed), a table and two chairs. There is also an antechamber with a shoe shelf.

Every room is equipped with TV socket outlet, several socket outlets (electricity), a telephone, a communication device which is used for communication with the staff, blinders and curtains.

Every room has its own toilet and bathroom. Clients can use barrier free showers which are fitted with a seat.

Building envelope is insulated with polystyrene which is just 5 cm thick, roof is not insulated at all and windows and doors are not insulated properly.

RCHEP has implemented no energy management system.

Lack of financial resources is the main barrier which prevents realization of energy saving investments.

3/ Action Plan of the RCHEP

As aforementioned, the facility is not in a good condition, and so it is absolutely necessary to realize technological and organisational measures in order to improve energy performance of the facility.

- It will be necessary to realize complete insulation – building envelope, roof construction, doors and windows (four or six chamber outer frame and double or triple glazing).
- Heating system unconditionally requires (due to its condition) complete renovation. These systems have great energy saving potential. Regardless fuel type, quality of heat sources, heating units, heat pumps and regulation units improves constantly which means also energy efficiency of these technologies increases.
- In order to gain high efficiency of heating system, heat source has to be chosen wisely. Power of heating system is determined by calculation of building heat loss which is the main factor of total heat energy consumption. Determination of heat source power by calculation of building heat loss costs several thousand crowns, but it can save much more on investment and operating costs. Accurate dimensioning of the heat source is also an important condition in order to achieve high efficiency, optimal operation and low emission of the heat source.
- Next, it will be necessary to realize investments in office equipment, part of the operation and energy management and monitoring system.
- Ventilation is the next issue which is closely related to the topic and it includes manual ventilation and forced ventilation which uses ventilation recovery units to recover heat.
- Efficient use of heat generation belongs to the field of energy saving either. This term includes generation of solar energy or heat generated by users and facility operation.
- Another efficient heat saving tool is for example solar energy and its use to produce hot water or combined production of electricity and heat in cogeneration units.
- We also recommend sharing experience in field of energetics with others (RCHEPs). It is wise to use advices and consult with energetic experts.
- Better motivation of employees to save energy must be secured.

4/ Energy efficiency activities implemented in the RCHEP

Renovation and modernization of cooling system

Partial insulation of the building (5 cm thick polystyrene)

Improvement of heating system

Installation of energy efficient illumination

Improvement of ventilation and air conditioning

Measures which need to be secured:

- Turn off electric devices when they are not in operation
- Turn off lights, use daylight every time it is possible

5/ Behavioural measures for residents and visitors

All measures implemented in this field are focused on raising awareness about energy saving of all clients and visitors which is realized by trainings, methodical and didactical tools and also by installation of awareness signs which show how save energy properly.

6/ Monitoring when available

Monitoring is not available.

7/ Conclusion

Following measures are proposed due to the lack of financial resources of the investor.

1. Thermal screening

Thermal (infrared) screening of a building reveals the places where heat leaks out of the building – places, which lack sufficient or appropriate thermal insulation, so called thermal bridges, and defects in building construction which cannot be seen by naked eye. We can use thermal screening in order to reveal the real state of the art of the building which is not necessary the same as it is written in the technical documentation. Thermal screens can create a good background for an energy efficiency project and they can be also used to control the quality of realized measures. Another way to use thermal screens is check of heating system.

2. Energy Efficiency Retrofit Survey

Next option is to work out energy efficiency study via Energy Efficiency Retrofit Survey. EERS represents an **efficient, quick** and in comparison with energy audit also **less expensive** method of **determination of energy saving potential in buildings and operation facilities.** In case EERS is used, energy balances are replaced with professional estimations based on inspection carried on by a team of experts. In the end, short and well arranged report is created. It contains a structured package of measures to achieve energy savings:

- Identification of energy saving measures
- Cost-free measures
- Measures with a 2 year payback period
- Measures with a 4 year payback period
- Measures with an 8 year payback period
- Measures with payback period longer than 8 years
- Quantification of annual energy savings through expert estimation
- Determination of investment and operating costs of the measure
- Determination of simple payback period or calculation of other economy efficiency criteria

Energy Efficiency Retrofit Survey study is created by a team of construction physics and building energetic experts. Following tasks are realized within the service:

- Summary and overview of systems which demand the most energy
- Local inspection during the operation of the facility, (not interrupted shift operation is awaited)
- Local inspection when the facility is not in operation, (weekends, free days, shift change)
- Analysis of energy consumption and performance needs
- Analysis and proposal of energy efficient measures
- Analysis and proposal of supplementary renewable energy resources
- Proposal of following procedure based on determination of operating time and optimisation of unit operating regimes and plans of operating units