

Including the non-energy benefits of energy efficiency in the investment assessment and decision-making process

Pilot assessment M-Benefits

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Pilot assessment M-Benefits

TER-16

Department of Buildings and
Heritage (DGIP)
State of Vaud - Switzerland
Full optimisation of the Mobility
and Roads Building

MBenefits analysis carried out by UNIL (Dr Catherine Cooremans), in collaboration with the Architecture and Engineering Directorate of the DGIP, which approved the content of this presentation. We would like to thank the DGIP for its collaboration on the MBenefits research project.

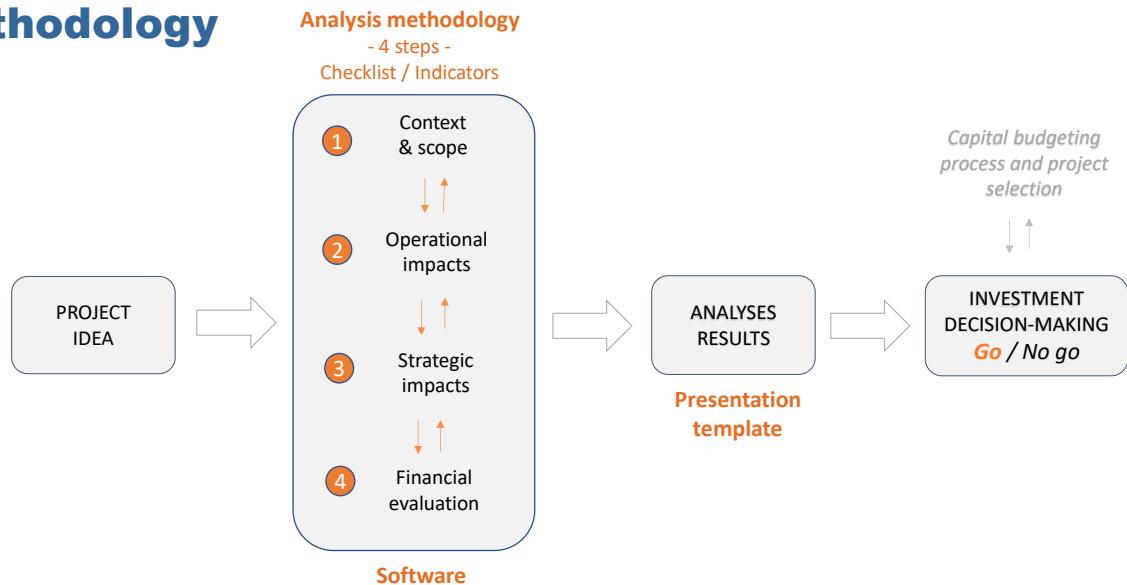


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Analysis Methodology



Step 1 – Company analysis

Activities of the Centre d'Entretien de la Blécherette (CEB) of the Canton of Vaud General Directorate of Mobility and Roads (DGMR)

- Management of the maintenance, snow removal and salting of cantonal and national roads.
- Maintenance of rolling stock (trucks, etc.).
- Communication with the General Management.

Customer segments and value proposition:

- Road users are the "clients" of the DGMR.
- The value proposition is a fast, flexible, quality and cost-controlled (preventive and corrective) maintenance of cantonal and national roads in canton of Vaud.

Step 1 – Project & scope

The energy efficiency project described, which consists of a complete optimisation of the building's technical equipment, includes 7 energy efficiency measures:

1. Optimisation of boiler operation
2. Optimisation of the operation of heating and ventilation systems
3. Optimisation of the operation of ventilation monoblocs
4. Optimisation of the operation of the painting room
5. Optimisation of compressed air production operation
6. Replacement of light sources with LEDs
7. Improvement of the distribution of domestic hot water

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Step 1 – Project & scope

Current situation and weaknesses:

- The building's installations (heating, ventilation, lighting, compressed air production) do not function optimally. This leads to over-consumption of energy and reduced comfort (thermal, visual, air quality) for the building's occupants, with a negative impact on the quality of their work.
- Over-consumption of energy leads to CO2 emissions that have an increasingly negative impact on the environment and people's health.

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Step 1 – Project & scope

Benefits of the proposed energy-efficiency measures:

- Significant improvement of the building's energy services (thermal quality, air quality, visual quality, hot water) through adjustments and, in some cases, minor equipment replacements.
- Improved working conditions for the occupants.
- Reduction of CO2 emissions and contribution to the canton's energy strategy.
- Time saving. The extension of the service life (3 years) of certain equipment thanks to optimization gives time to analyze in good conditions the future of the site (in-depth renovation of the building, or demolition and reconstruction).

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Step 2 – Energy & operations

Energy analysis

Current energy consumption:

- Energy carriers impacted: natural gas and electricity.
- Total consumption of the equipment impacted by the energy-efficiency measure:
 - Natural gas: 1'700'000 kWh/an
 - Electricity: no metering in the building

Future energy consumption (i.e. after implementation of the energy-efficiency measures):

- Estimated electricity savings for total equipment: 319'000 kWh/year.
- Estimated heat savings for total equipment: 246'000 kWh/year
- Estimated monetary savings (energy only): 63'000 CHF/year
- Reduction of the building's heat consumption: **15 %**

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Step 2 – Energy & operations

Operational analysis - Impacts of energy-efficiency measures on operational excellence:

The 4
DIMENSIONS
of
OPERATIONAL
EXCELLENCE

- **Safety:** Improved comfort and health for people working in the building thanks to better thermal, lighting and air quality conditions.
- **Quality:** Improved operational quality of the building, technical workshops and vehicle painting facilities.
- **Costs:** Reduced salary costs thanks to increased productivity of employees (due to better thermal, lighting and air quality conditions), reduced maintenance and CO2 costs, deferred investment in equipment.
- **Time:** More time to make the right decisions about the building's future (demolition or refurbishment).

Safety

Quality

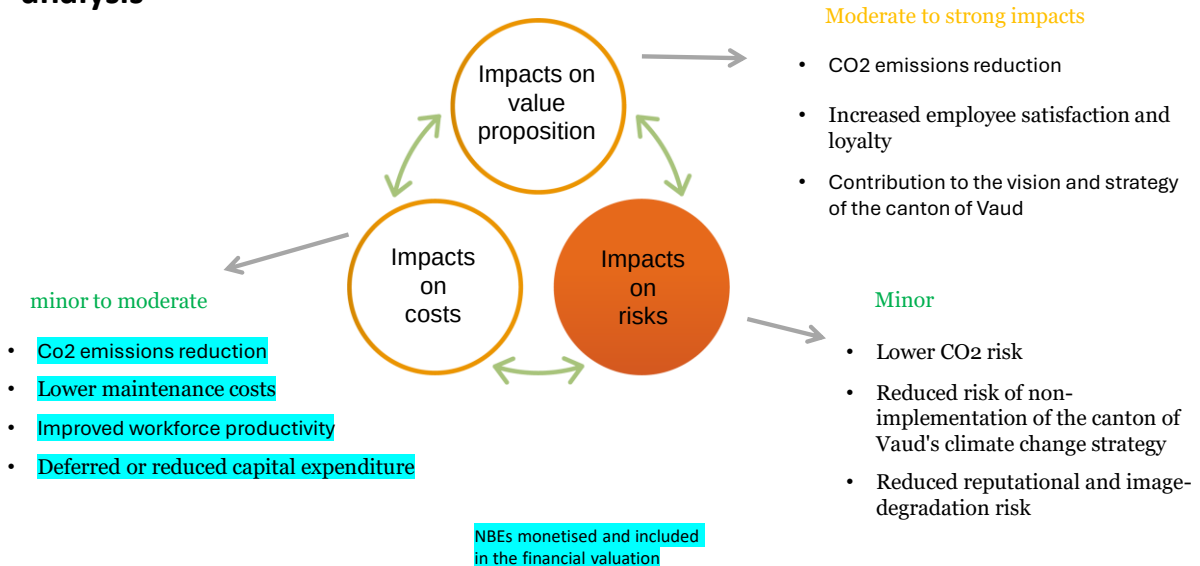
Costs

Time

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Value-Costs-Risks analysis

Step 3 – Strategic analysis



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Conclusion

Why this project is worthwhile:

- Contribution to **energy and climate strategy and mission** of exemplarity improvement of the image of the canton of Vaud administration.
- Improvement in the **productivity** of employees.
Swiss studies show that good working conditions reduce the risk of illness and absenteeism (on average 7.8 days of absence per year in public administration).
- **More time** to envisage in good conditions the future of the building.
- **High energy profitability reinforced by non-energy benefits**
Payback time reduced from 2 years to a few months.

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TER-16 – Canton of Vaud (DGIP)

ANNEXES

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Annexes :

Contribution of energy efficiency to the improvement of the comfort, well-being Health Productivity of employees and to the reduction absences turn-over



Source: BPIE, Linking indoor environmental quality And energy performance in building regulation, Report, 2018, p. 8

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Annexes : Contribution of energy efficiency to employee comfort, well-being and productivity.

Branche	Nombre de jours d'absence pour cause de maladie ou d'accident (2018)
Industrie du bâtiment	8,7
Transports et entreposage	8,7
Administration publique, défense, assurances sociales	7,6
Immobilier, autres prestations de services	7,2
Industrie manufacturière, énergie	7,0
Moyenne	6,7
Commerce, réparation	6,0
Santé et action sociale	5,7
Hôtellerie et restauration	5,4
Prestations financières et assurances	5,2
Information et communication	4,6

Tableau 6: Nombre moyen de jours d'absence par travailleur à plein temps dans différents secteurs économiques. Conversion des données fournies par l'OFS pour 2019.

Source: SUVA, De la gestion des absences au management durable Un atout supplémentaire pour les entreprises, rapport, août 2019, p.13

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Annexes : Contribution of energy efficiency to employee comfort, well-being and productivity.

TAUX D'ABSENCE

4,5% de taux d'absence (maladie/accident) en moyenne en Suisse
 2,2% dans les entreprises alémaniques de moins de 100 employés
 7,6% dans les entreprises suisses comptant entre 100 et 500 employés
 dans le secteur santé, social, formation & écoles
 Les administrations publiques romandes enregistrent un taux d'absence
 de 6% contre 3,6% en Suisse alémanique
 A l'inverse, il est de 5,7% dans les industries alémaniques contre 3,7%
 dans les industries romandes.

Source: Cerf, D., Cuendet, A., Bruttomesso, J.-C., Benchmark RH Les pratiques et l'engagement RH des entreprises sous la loupe, 2016-2017, p.8.

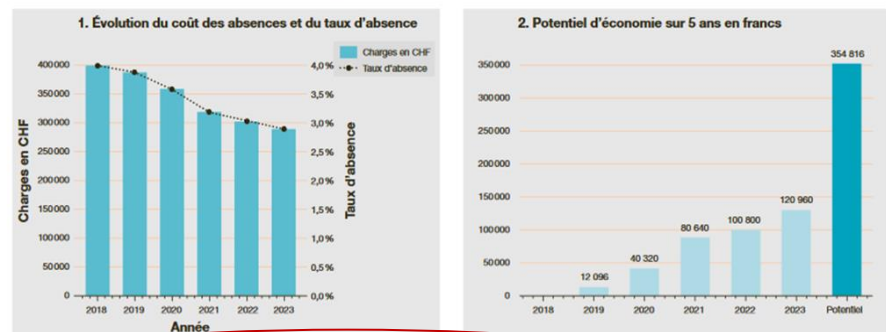
https://www.swissriskcare.ch/sites/default/files/barometre_indicateurs_rh_swiss_risk_care.pdf

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Annexes :
 Contribution of energy
 efficiency to employee
 comfort, well-being and
 productivity.

Les absences existent dans chaque entreprise et ne pourront jamais être totalement éliminées. Bon nombre d'entre elles peuvent être néanmoins évitées ou réduites dans leur durée.

Réussir à exploiter ce potentiel signifie épargner des journées d'absence inutiles. Une analyse approfondie des absences peut contribuer à identifier des potentiels d'économie ayant un impact en termes de compétitivité. Les figures 4 et 5 présentent un exemple concret.



Figures 4 et 5: Une entreprise de construction employant 80 travailleurs à plein temps dans laquelle chaque collaborateur est absent 9 jours en moyenne supporte des coûts annuels de 400 000 francs. Des investissements judicieux dans la prévention permettraient de réduire ces dépenses d'un tiers en cinq ans.

Source: SUVA, De la gestion des absences au management durable Un atout supplémentaire pour les entreprises, rapport août 2019, p.12

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Annexes : Contribution of energy efficiency to employee comfort, well-being and productivity.

Turn-over

TURN-OVER	Nb entreprises	0-100	100-500	>500	Total
Banque, finance, assurance, négoce, immobilier	86	8.2%	10.3%	11.1%	9.8%
Industrie manufact. chimie, pharma, horlogère, agro-al., autre ind.	135	16.8%	9.8%	6.7%	11%
Informatique, télécom, audiovisuel, médias, communication	45	13.4%	11.3%	7.2%	11.3%
Construction, énergie, activités techniques	57	6.8%	9.1%	9.6%	8.7%
Distribution, commerce, transports, logistique	58	11.9%	11.8%	14.6%	13.1%
Hôtellerie, restauration, tourisme	15	17.1%	17.1%	31.7%	20%
Administrations et services publics, associations, ONG	112	9.6%	8.5%	8.3%	8.7%
Santé, social, formation, écoles	94	13.5%	13.4%	11.1%	12.8%
Autres	96	12.6%	11.3%	16.5%	12.7%
Total	698	12.8%	10.6%	10.6%	11.3%

Source: Cerf, D., Cuendet, A., Bruttomesso, J.-C., Benchmark RH Les pratiques et l'engagement RH des entreprises sous la loupe, 2016-2017, p.10.

https://www.swissriskcare.ch/sites/default/files/barometre_indicateurs_rh_swiss_risk_care.pdf