



# **Decarbonizing Swiss Real Estate**

## The Credit Suisse Case Study

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# Foreword

## WWF

Climate change will significantly affect real estate investors worldwide. The physical effects of climate change, such as changing weather patterns, will have a very direct impact on real estate investments. Demand for energy is expected to rise significantly, increasing the scarcity of non-renewable energy sources and hence prices. More indirectly, regulatory action to mitigate the worst effects of climate change will significantly influence property values. Owners of inadequately insulated buildings, for example, will be required to undertake costly retrofitting to comply with stricter legislation.

Many real estate investors are ill prepared to deal with these risks, passively waiting for governments to act first. State action is undoubtedly required to increase regulatory certainty. However, real estate actors should act today to reduce their climate change related risks, irrespective of state action. An essential first step is for investors to understand their exposure to carbon related risks. In a second step, real estate investors need to take steps to actively manage carbon related risks. These include setting long-term carbon reduction targets and implementing energy management systems.

This report is an invitation to real estate investors to analyze their carbon exposure and take the necessary mitigation measures – in the interest of both their own long-term performance and our planet's future.

THOMAS VELLACOTT  
Chief Executive Officer, WWF Switzerland

## Credit Suisse

In 2011, we explored with WWF the implications for banks of the transition to a low carbon economy, and the role that banks could play in this context. We identified four key opportunities where banks can make a significant contribution to decarbonization, one of which we aimed to explore more thoroughly in this follow-up study – the energy and carbon efficiency of real estate investment portfolios.

The buildings we live in account for over a third of the global consumption of primary energy as well as roughly a quarter of human-induced greenhouse gas emissions. The message is clear here: If sustainable development is to be realized, the carbon abatement potential in real estate needs to be tapped.

More recently, the energy efficiency of buildings is moving more into the public and political spotlight in consequence of the rising energy prices and the general debate on climate change. Regulations on the energy consumption of new buildings are being significantly tightened. Sustainable building is becoming increasingly crucial since it has a real influence on the value of a property. From an investor's perspective, it will thus become even more relevant to pay attention to sustainability aspects in future investment decisions. The questions to be considered are: What does sustainable real estate portfolio management mean in practice? And how can it be measured and improved?

This study assesses the carbon abatement potential in real estate across a broad set of levers, using the concrete case study of our own real estate investment portfolio in Switzerland. We are convinced that real estate companies and funds that have a progressive sustainability strategy in place will be better prepared for future challenges such as rising energy prices and regulatory changes. As a result we should see their portfolios outperform over the long run and contribute to the overall political targets of carbon abatement.

HANS-ULRICH MEISTER  
Chief Executive Officer Credit Suisse Private Banking and Credit Suisse Switzerland

## Executive summary

For an institutional real estate investor like Credit Suisse Real Estate Asset Management (Credit Suisse REAM) the current environment poses a significant strategic challenge: there is a high degree of uncertainty induced by both the global carbon reduction targets and the associated local carbon policies, as well as by the potential long-term change of macroeconomic factors (e.g., energy prices) and resulting market preferences of tenants.

A shift to a low carbon economy in line with the globally formulated 2°C scenario translates to a carbon abatement target for Credit Suisse REAM's Swiss real estate portfolio of at least 75% of its 2010 GHG emissions until 2050. The real estate sector will, however, likely need to reduce carbon emissions even further in order to compensate for other sectors with smaller reduction potential.

The analysis performed shows that Credit Suisse REAM would be able to realize 50–65% of the abatement potential under the current conditions. In order to be technically able to close the remaining emissions gap, the electricity consumed by the entire real estate portfolio would have to be carbon neutral by 2050. However, given the current regulatory and market constraints Credit Suisse REAM would be able to recover only part of its investment through higher rents or direct participation in energy savings.

The implications of this decarbonization challenge are two-fold:

- 1) Better and deeper carbon abatement requires professional real estate investors like Credit Suisse to have detailed and transparent energy management information, a professional investment process and decision making, a concrete target setting and long-term investment planning, improved education and clear communication towards its investors and tenants, as well as new partnerships and experiments with alternative economic models.
- 2) The decarbonization of the entire Swiss real estate sector – including the 89% of private owners with different incentives – can only be addressed with material regulatory changes, including a stronger focus on setting the right incentives and standards to accelerate deeper energy related renewals as well as more flexible tenant laws that allow landlords to pass on the full cost of investments.

# Introduction

This report is a result of a joint effort between WWF and Credit Suisse to explore the role that banks can play in the context of decarbonization. A broad set of findings on where banks can make a significant contribution towards decarbonization beyond 'business as usual' was presented in an earlier report<sup>1</sup>.

The objective of this follow-up effort is to better understand several levers that banks have, namely to take carbon abatement-related decisions in investments they control. Real estate investments are one of the biggest levers in this area. This study assesses the carbon abatement potential in real estate across a broad, but selected set of relevant levers, using the concrete example of Credit Suisse Real Estate Asset Management in Switzerland<sup>2</sup>, the largest professional real estate portfolio manager in Switzerland.

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1 Transition to a Low Carbon Economy. The Role of Banks. WWF/Credit Suisse, 2011.

2 Credit Suisse REAM's portfolio in Switzerland excludes Credit Suisse's corporate assets.

# The global decarbonization challenge and what it means for Swiss real estate

As stated in the earlier joint report<sup>3</sup>, governments agreed in Cancun to limit temperature growth to 2°C above pre-industrial levels (the '2°C pathway'<sup>4</sup>) as opposed to allowing temperature growth of up to 5°C or more, as anticipated if nothing were done to limit carbon emissions ('business as usual'). This implies reducing carbon emissions by an estimated 24% (or 14 Gt) in 2020 relative to current trends or 12% (or 6 Gt) relative to the level of 2010 emissions. Moreover, global carbon emission would peak and start declining before 2020, thereby revealing the urgency for carbon reduction and the associated regulatory change required.

In the long-term, a world-wide carbon abatement of 55% (or 28 Gt) by 2050 is required relative to the level of 2010 emissions

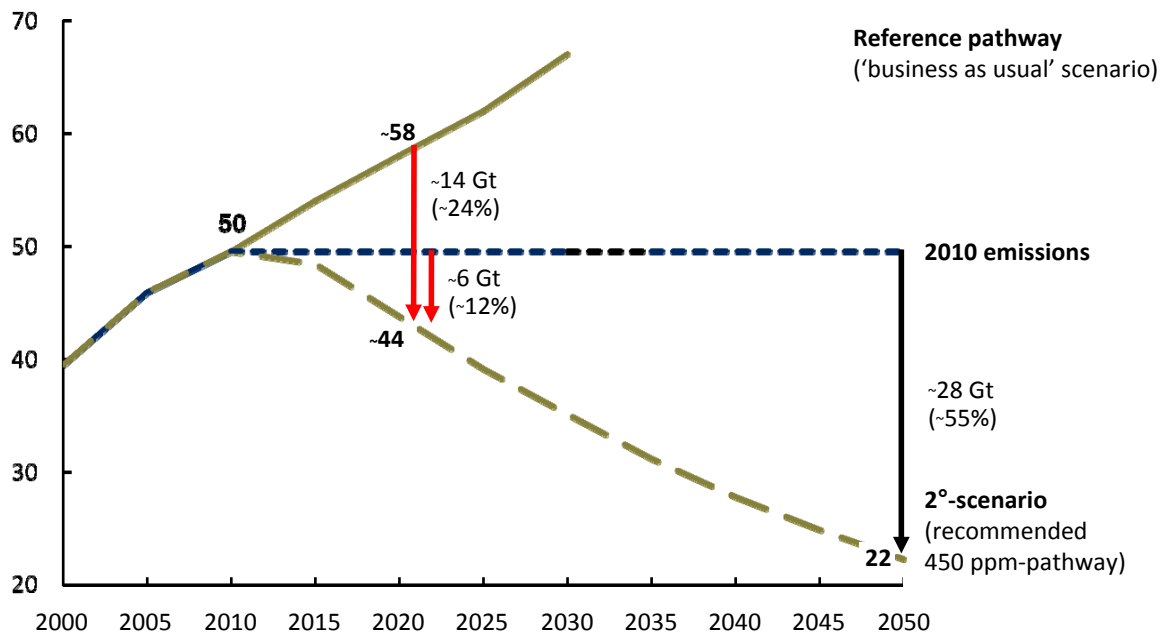
to limit temperature growth to 2°C with a probability of 50%.

The total Swiss GHG emissions as accounted are 53.4 Mt CO<sub>2</sub>e (as of 2005), of which direct HVAC (heating, ventilation and air conditions) emissions of 17.6 Mt CO<sub>2</sub>e are from the Swiss real estate sector<sup>4</sup>.

Applying the globally required abatement levels to the developed world and Switzerland, this translates to a reduction in 2050 of at least 55% (or at least 29 Mt CO<sub>2</sub>e) relative to the level of 2010 emissions as the developed world including Switzerland needs to reduce a larger share than the developing world.

## Exhibit 1: To stabilize temperature increase below 2°C, global CO<sub>2</sub>e emissions need to be reduced by 12% (2020) and 55% (2050) vs. 2010

Gt CO<sub>2</sub>e , per year



Source: WWF/CS project team based on project catalyst

3 Transition to a Low Carbon Economy. The Role of Banks. WWF/Credit Suisse, 2011.  
 4 Limiting global warming to 2°C over pre-industrial levels has been agreed to as a goal in the Cancun climate negotiations. There is a lot of uncertainty around what emission pathway can limit warming to 2°C and there is also increasing evidence that warming might need to be limited to less than 1.5°C to avoid catastrophic climate change. The pathway used here is a 450ppm CO<sub>2</sub> pathway with overshoot (i.e., emission concentrations will exceed

450ppm CO<sub>2</sub> before stabilizing at this level in the long run), and has a 50% probability of limiting warming to 2°C. It requires reducing emissions to 44 Gt by 2020 and should be seen as the minimum that needs to be done to have a reasonable chance of limiting warming to 2°C. Figures from the WWF suggest that a lower emission figure of 36 Gt might be more appropriate – this would require reductions of 22 Gt instead of 14 Gt and increase investment requirements accordingly.  
 5 Swiss Greenhouse Gas Abatement Cost Curve, McKinsey, 2009.

The politically agreed Swiss national abatement ambition requires a 20% domestic abatement relative to the level of 1990 emissions (or about 21% vs. the level of 2010 emissions). Additionally, the Swiss Government has the option to increase the target to an additional 20% (75% of which can be maximally off-set via cross-border initiatives) by the year 2020<sup>6</sup>.

The Swiss target of a 20% reduction by 2020 is in line with the European Union's "20/20/20" target that requires the reduction of EU greenhouse gas emissions of at least 20% below 1990 levels<sup>7</sup>. EU leaders also offered to increase the EU's emission reduction target to 30%, on condition that other major emitting countries in the developed and developing worlds commit to do their fair share under a global climate agreement. A unilateral shift towards a 30% target is currently discussed because the 20% target is not providing any additional incentive for further improvements following the recent recession.

To realize carbon abatement targets, real estate emissions play a particularly important role, as they are not associated to cross-border mobility or trade and therefore directly manageable and furthermore enable other elements of the decarbonization challenge via a reduced demand for fossil fuels. As a result, the required abatement for the real estate emissions will need to be higher relative to other sectors and they may need to be realized early on. The real estate sector could therefore face the situation of likely having to reduce its emission by substantially more than the 55% corresponding to the discussed 2°C scenario<sup>8</sup>.

The WWF summarizes in its recent "Energy Report" that the energy efficiency of buildings needs to be radically improved until 2050 to reduce its emissions by 100%<sup>9</sup>. In addition, timing effects of real estate-related emission reductions also need to be considered as early reductions in energy demand have positive feedback implications for the power sector decarbonization process and are hence vital for an optimal low-carbon energy mix.

There are several sources for a top-down estimate of abatement potential for Switzerland (e.g., Swiss GHG abatement cost curve, "Wettbewerbsfaktor Energie: Chancen für die Schweizer Wirtschaft"<sup>10</sup>, etc.). The technical reduction potential has been estimated to be ~24 Mt CO<sub>2</sub>e, of which ~45% or 11 Mt CO<sub>2</sub>e relate to HVAC emissions in the real estate sector by 2030. This corresponds to a reduction of about 60% of current HVAC real estate emissions over the next 20 years.

For an institutional real estate investor like Credit Suisse managing its business in this environment poses a significant strategic challenge: there is a high degree of uncertainty induced by both the global reduction targets and the associated local carbon policies, as well as by the potential long-term change of macroeconomic factors (e.g., energy prices) and resulting market preferences of tenants. In order to assess the implications of the 2°C requirement for the Swiss real estate market, and here in particular for Credit Suisse, the Swiss real estate portfolio of Credit Suisse REAM has been analyzed.

## Translating the 2°C-scenario target to the analyzed CS REAM portfolio, the required carbon abatement potential could just be achieved. However, a series of regulatory and market constraints would have to be overcome

The analyzed CS REAM portfolio comprises 828 assets (out of totally over 1,100 assets in the Swiss portfolio – most of the outstanding assets being single-tenant properties) with an asset value of approximately CHF 15.3 billion and emits 167 kt CO<sub>2</sub>e<sup>11</sup>, to which HVAC contributes 100 kt CO<sub>2</sub>e. The analyzed portfolio can be seen as relatively representative for the entire Swiss real estate market corresponding to about 0.6% of

Swiss real estate HVAC emissions (extrapolated to the whole Credit Suisse portfolio this corresponds to about 1% of Swiss real estate HVAC emissions).

The globally formulated 2°C scenario translates to a carbon abatement target for Credit Suisse REAM's portfolio of 120–167 kt CO<sub>2</sub>e or ~75–100% of current GHG emissions from HVAC and electricity usage until 2050<sup>12</sup>.

6 The to be amended Swiss CO<sub>2</sub>-act, which is currently in consultation, will require Swiss real estate to reduce its HVAC-related emissions by 40% until 2020, which is very ambitious given the historic energetic renovation rate in Switzerland of less than 1%.

7 The "20/20/20" target furthermore requires by 2020 that 20% of EU energy consumption should come from renewable resources as well as a 20% reduction in primary energy use compared to projected levels through energy efficiency improvements.

8 This would likely have severe consequences on the prioritization of abatement levers discussed in the remainder of this report (e.g., ineffectiveness to shift heating systems from oil to gas or district heating).

9 The Energy Report – 100% renewable energy by 2050, WWF/Ecofys/OMA, 2011. It is assumed that heating and cooling needs could be reduced by 60% until 2050 while the local solar thermal systems and heat pumps would fulfill the remaining heating and hot water needs.

10 Swiss Greenhouse Gas Abatement Cost Curve, McKinsey, 2009 and Wettbewerbsfaktor Energie: Chancen für die Schweizer Wirtschaft, McKinsey, 2010.

11 Data provided by the facility manager of CS REAM (Wincasa) only includes data of general electricity consumption not directly allocated to subtenants (HVAC plus portion of electricity usage); total electricity consumption thus estimated based on average Swiss values from reports of the Swiss ministry of Energy (BFE): "Der Energieverbrauch der Dienstleistungen und der Landwirtschaft, 1990 – 2035".

12 Lower reduction range of 120 kt CO<sub>2</sub> or 75% based on 55% reduction of emissions from HVAC usage and 100% reduction of indirect emissions from electricity usage; higher reduction range of 167 kt CO<sub>2</sub> or 100% based on WWF-report "The Energy Report", which assumes that emissions from HVAC-usage need to be reduced by 100% until 2050.

The lower range of the emissions gap of the 2°C scenario translated to the analyzed CS REAM portfolio can just about be closed if, and only if, three distinct contributions can actually be realized:

**1. CS REAM's tangible<sup>12</sup> abatement potential, i.e., the abatement that CS REAM is able to implement and for which CS REAM is able to recover the investment within the current regulatory and market constraints:**

Outside-in estimates amount to 35–50 kt CO<sub>2</sub>e or ~ 20–30% of CS REAM's 2010 emissions (or equivalent to about 50–65% of the technically realizable potential)<sup>14</sup>.

In terms of HVAC emissions, this tangible potential is ~ 30–40 kt CO<sub>2</sub>e or a reduction of ~30–40% of CS REAM's 2010 HVAC emissions. This corresponds to about ~50–70% of the technical potential<sup>15</sup>.

**2. The remaining 35–50% of the technical abatement potential of the portfolio that given today's regulatory and market constraints is beyond Credit Suisse's reach**

Overall, Credit Suisse's analyzed real estate portfolio has a technical abatement potential (incl. the above mentioned tan-

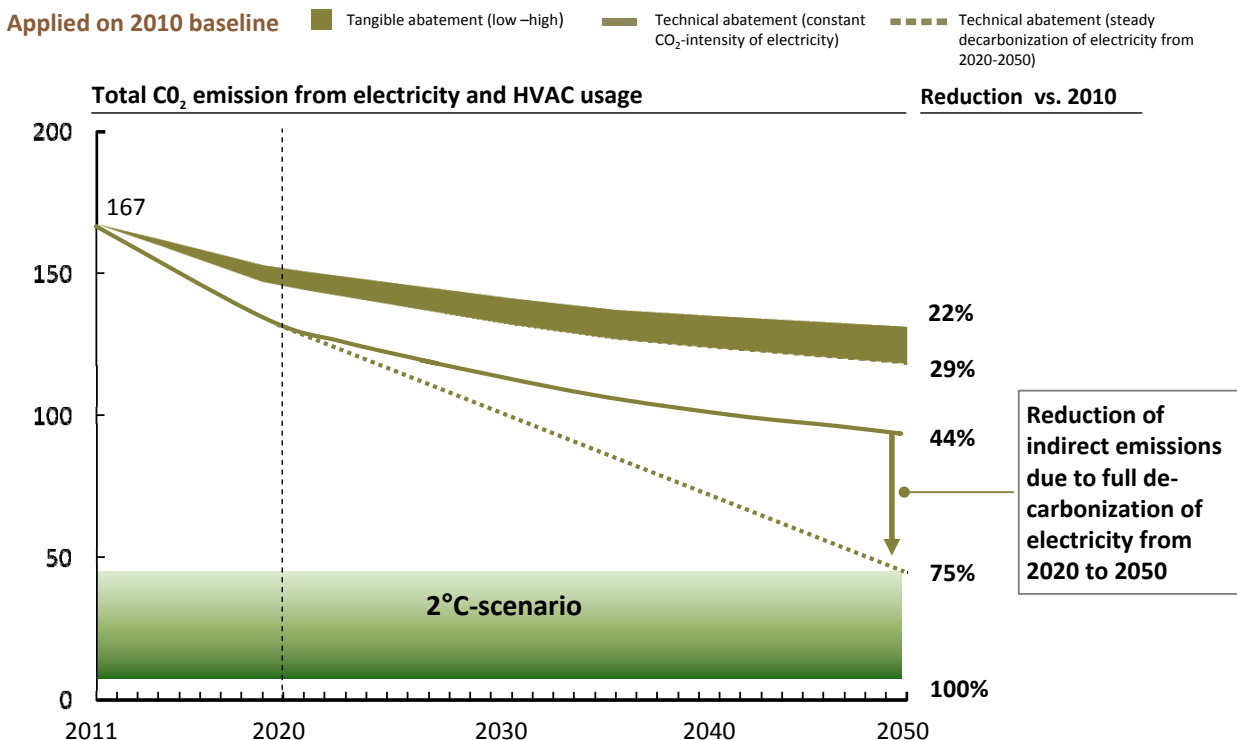
gible potential) of 44% of its total emissions or 57% of its HVAC-emissions<sup>16</sup>.

With regards to realizing the technical potential, a real estate manager accountable towards investors for returns, such as Credit Suisse, can only realize investments that can be recovered through higher rents or direct participation in energy savings. Therefore, it is unlikely that even a professional investor like Credit Suisse can achieve a 60% tangible HVAC abatement target without material changes to the regulatory environment (which would change economic incentives for owners and tenants). However, positive changes in the market environment, especially with regard to demand and rental level in the peripheries, could further increase the tangible share for Credit Suisse.

**3. Indirect abatement potential from a decarbonized electricity supply**

While the HVAC target is at least technically feasible, the electricity target would require widespread application of PV plus additional supply of (other) renewable electricity. Alternatively, Credit Suisse could choose to increase the rate of replacement of buildings in order to substantially increase the energy efficiency of its portfolio or even decide to sell energy inefficient buildings – whereas the latter would not help to decarbonize the overall Swiss real estate.

**Exhibit 2: CO<sub>2</sub> emissions abatement pathways for the analyzed Credit Suisse REAM portfolio**



Source: WWF/CS project team; Real Estate Carbon Abatement Model

13 Estimate of the share of technical potential (see below, footnote 14) that is tangible for CS REAM in regard to levers that CS REAM is able to implement and which associated savings CS REAM is able to capture (ability to recover the investment via higher rents).

14 WWF/CS project team; Real Estate Carbon Abatement Model.

15 Estimate of maximal technical abatement potential of decarbonization levers with a significant potential and a reasonable return (IRR) applied on pre-defined asset classes based on a screening system.

16 WWF/CS project team; Real Estate Carbon Abatement Model.



Furthermore, a potential second wave of systematic heating system replacements before 2050 with even more attractive heating systems based on renewable energy sources could deliver the additionally required contribution for entirely decarbonizing the real estate sector.

**The entire real estate sector – professional and private – could benefit from a set of regulatory improvements that would increase the incentives to pull all available levers for abatement, leading to a better implementation of the over 50% carbon abatement potential in real estate.**

## Credit Suisse can play a pioneering role in the Swiss real estate decarbonization

CS REAM is the largest private professional investor in Swiss real estate. Its portfolio comprises more than 1,100 assets totaling a net asset value of about CHF 27 billion as of end of May 2012, which corresponds to approximately 1% of the Swiss real estate investments.

Additionally, CS REAM is also one of the ten largest institutional real estate asset managers worldwide currently managing real estate assets worth CHF 37 billion, of which roughly CHF 10 billion of assets under management are held outside Switzerland as of end of May 2012<sup>17</sup>.

Applying historic and conventional industry standard reinvestment rates in a business as usual scenario, Credit Suisse would invest approximately CHF 5–8 billion over the next 40 years to upgrade and maintain buildings, excluding new construction. This is equivalent to 0.4–0.7% of NAV per year. These investment levels would presumably be changed should structural changes in the long-term regulatory or macroeconomic environment (e.g., energy prices) occur.

Considering the above, Credit Suisse is in a position to play a pioneering role and can thus send a signal to other real estate investors by making a first important step towards the reduction of Swiss building CO<sub>2</sub> emissions due to the following reasons:

- CS REAM is the largest private professional manager of real estate portfolios in Switzerland

- CS REAM launched the first real estate fund in Switzerland to invest in sustainable buildings only (CS REF Green Property) and implemented greenproperty, a dedicated sustainability rating for new buildings in 2009
- In 2010, CS REAM formulated a sustainability strategy for its real estate investments with the consequence that abatement-related decisions are already partly integrated in the management process
- In 2011, CS REAM introduced a dedicated person in charge of sustainability

For a professional real estate investor such as Credit Suisse REAM, the rationale for investing into carbon abatement is driven on the hand by its social responsibility to make a significant contribution. On the other hand, it is also driven by energy efficiency reasoning itself: e.g., it can be considered as a premium for protection against:

- Future energy prices increases and/or
- Potential regulatory changes that both also allow for investment in levers with relatively low positive returns

In a nutshell, Credit Suisse – together with other stakeholders such as the WWF – has the weight and position to positively influence the real estate market and the regulatory environment to facilitate carbon abatement.

<sup>17</sup> Note that due to the regional specifics all findings within this study would need adjustment when applied beyond the Swiss perimeter.

# Credit Suisse’s analyzed real estate portfolio has a technical abatement potential of ~73 Kt CO<sub>2</sub>e, corresponding to a reduction of 44%

The analyzed Credit Suisse portfolio has slightly lower carbon emissions than the Swiss average<sup>18</sup>. This is mainly due to the portfolio structure – more urban and younger than average – and past efforts to professionally manage the portfolio. Nonetheless, Credit Suisse still has significant potential to implement concrete abatement levers on its own portfolio: Note that the current Minergie standard for example typically implies a reduction of energy-usage for HVAC of around 50% (or about 60 kWh per m<sup>2</sup> and year) compared to current energy usage levels of conventional assets.

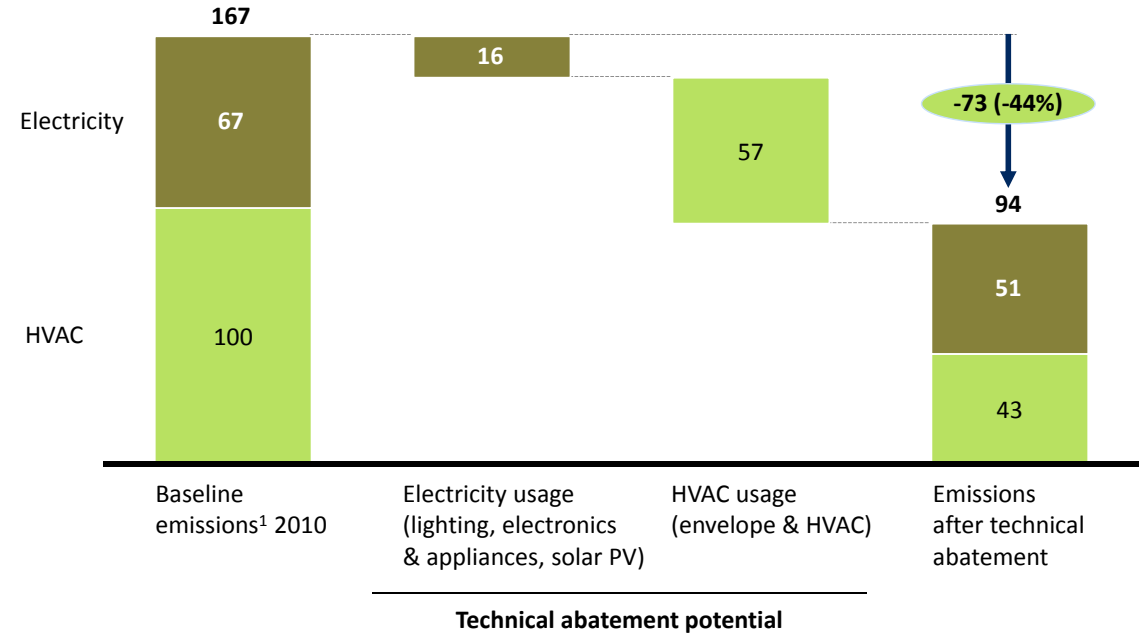
To calculate the savings potential, a top-down analysis of the CS REAM portfolio was conducted, testing all structural levers for carbon abatement. The most important levers are envelope, HVAC, lighting/electronics, appliances, and solar PV.

The application and impact of the levers – including the timing of the lever application – was determined by a “scoring” model, which takes into account the characteristics of the buildings as well as engineering data (including past cases) about carbon abatement and investment cost of the various levers.

The technical abatement potential is a rough estimate of the technically feasible abatement potential resulting from energetic renovation of existing buildings, for which there is a significantly enough impact (e.g., no further improvements of already very energy efficient buildings) and which are economically reasonable (e.g., have a positive rate of return that is not significantly lower than the typically expected return in real estate)<sup>19</sup>.

## Exhibit 3: Technically, Credit Suisse REAM could reduce about 44% of the total CO<sub>2</sub> emissions of the analyzed portfolio or about 57% of heating emissions

Analyzed portfolio of CHF 15.3 bn, kt CO<sub>2</sub>, applied on 2010 baseline



<sup>1</sup> Based on data provided by Wincasa (facility manager) and adjusted for average electricity consumption in Switzerland

Source: WWF/CS project team; Real Estate Carbon Abatement Model

<sup>18</sup> On average 14% lower emissions from HVAC usage in residential buildings and 35% lower emissions from HVAC usage in commercial buildings based on data provided by Wincasa (facility manager) for Credit Suisse and in comparison with Swiss average data as provided in the reports from the Swiss ministry of energy (BFE): “Der Energieverbrauch der Dienstleistungen und der Landwirtschaft, 1990–2035” and “Der Energieverbrauch der Privaten Haushalte, 1990–2035”.

<sup>19</sup> Certain abatement levers with negative return have also been included in the technical potential as long as their implementation can be considered to be part of the standard renovation cycle (e.g., replacement of windows).

As a novelty compared to other studies, all of the modeling includes a simulation of rates of return, assuming the savings in energy cost, at current prices, are used to pay back the extra investment. All investments, also those with negative returns, were tested and then tiered by financial attractiveness and abatement potential<sup>20</sup>.

The total cumulative incremental capital expenditure to realize the technical potential of the analyzed portfolio is estimated to be in the order of CHF 1.0 to 1.5 billion<sup>21</sup>. This corresponds to approximately 40% of the current Credit Suisse REAM investment level or 7–10% of net asset value.

The typical general renovation projects combine abatement-related measures with other renewals – for instance envelope insulation, new heating and controls on the abatement side, but also non-energetic measures such as the replacement of bath/kitchen, flooring, etc. with internal renovations. Therefore, it is difficult to segregate abatement-related investments embedded in the already planned general investment volume of CHF 5–8 billion.

A rough estimate puts Credit Suisse's embedded, abatement-related investments at around CHF 0.5–0.8 bn.

Of the CHF 1.0–1.5 billion investment needed to realize the technical abatement potential, the majority generates positive, but relatively low returns (note that 5% is a typical hurdle rate in real estate core investments)<sup>22</sup>:

- 10% of investment with returns larger than 5%, for 28 kt CO<sub>2</sub>e abatement
- 74% of investment with returns between 0–5%, for 34 kt CO<sub>2</sub>e abatement

- 16% of investment with negative returns, for 11 kt CO<sub>2</sub>e abatement. Note that negative returns are due to replacement cycles, i.e., the investment does not save enough energy to break even over the associated lifecycle, assuming the relevant parameters such as energy costs remain constant.

The analyzed levers differ widely in terms of economic and environmental attractiveness<sup>23</sup>:

- The single most attractive lever are HVAC controls – economically attractive (99% IRR) and responsible for 21% of total abatement
- Power consumption measures (i.e., appliances, electronics, lighting) are financially attractive (>100% IRR) and contribute 12% to the total abatement
- Envelope (i.e., rooftop, insulation, windows) is highly effective for abatement (45% of total abatement) but less attractive financially (average 2.4% return)
- Substitution of heating sources from oil (to district, heat pump, gas) is moderately attractive (2–11% IRR) and can deliver 12% of abatement
- The least attractive lever is roof-top PV since it is currently not creating a positive return (–2% IRR). However, this technology will become significantly cheaper by 2020 resulting in positive returns (8% IRR). PV can deliver 10% of carbon abatement.

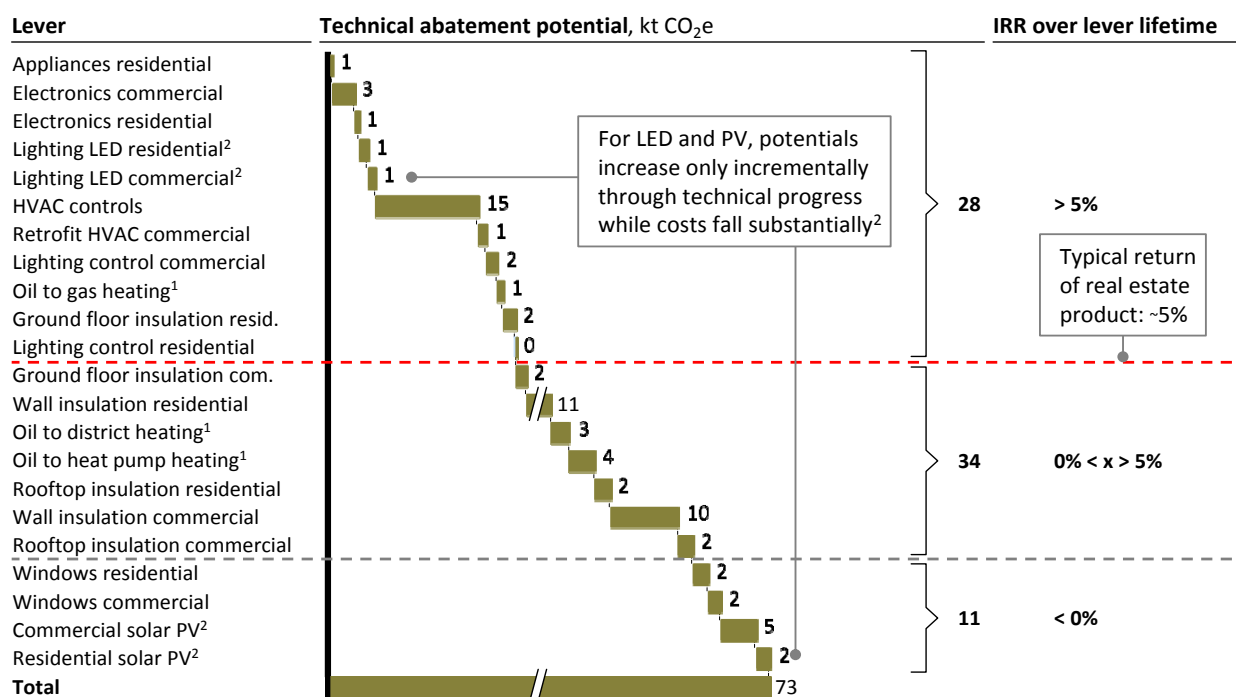
20 For calculating returns only incremental capex was considered (vs. reference cost of a non-energy efficient investment).

21 WWF/CS project team; Real Estate Carbon Abatement Model.

22 WWF/CS project team; Real Estate Carbon Abatement Model.

23 Based on 2010 energy prices in Switzerland as well as the application of forecasts of energy price increases based on the IEA 2011 report "World Energy Outlook" ("Current policies scenario").

## Exhibit 4: Overview of technical CO<sub>2</sub> abatement potential and IRR of the abatement measures applied on analyzed Credit Suisse REAM portfolio



<sup>1</sup> Assumption that current oil heating systems are changed to 1/3 gas, district heating and heat pump systems each; needs to be evaluated bottom up for each asset

<sup>2</sup> Learning curve has impact on IRR, but not on lever effectiveness in terms of abatement

Source: WWF/CS project team; Real Estate Carbon Abatement Model

The levers also differ in terms of lifetime, and so does the respective amount of emissions that are locked-in in case the decarbonization abatement is not applied in an early phase or at the most effective timing:

- Most levers (e.g., appliances, electronics, lighting, solar PV, HVAC controls, etc.) have a relatively short lifetime. This is why they can be applied several times until 2050 and thus exhibit a relatively small lock-in effect.
- On the other hand, the replacement of heating systems and especially the envelope-related levers have a longer lifetime and thus need to be applied when the next renewal is due. If not, then a relatively large amount of emissions would be locked-in until 2050 and the target reduction could not be reached.

If the trend of rising energy prices continues, this will have a significant impact on the attractiveness of decarbonization levers through increased energy (cost) savings.

The Swiss CO<sub>2</sub> tax ("CO<sub>2</sub>-Abgabe") currently corresponds to CHF 36 per t CO<sub>2</sub> or 9 CHF per 100 liters of heating oil – or less than 10% of current retail price of heating oil. The Swiss Federal Council just announced a new draft of the "CO<sub>2</sub>-Abgabe" indicating that the tax can maximally be increased to CHF 120 per t CO<sub>2</sub> or CHF 30 per 100 liters of heating oil until 2016/2018. This would correspond to an increase of the price of heating oil of about 20%.

24 E.g. comparing the heating oil retail price of about CHF 108 per 100 liter (March 2012) vs. about CHF 72 per 100 liter as of January 2009 or CHF 44 per 100 liter as of January 2004.

25 UVEK (May 11, 2012): "Anhörung zur CO<sub>2</sub>-Verordnung eröffnet" <http://www.uvek.admin.ch/dokumentation/00474/00492/index.html?lang=de&msg-id=44510>.

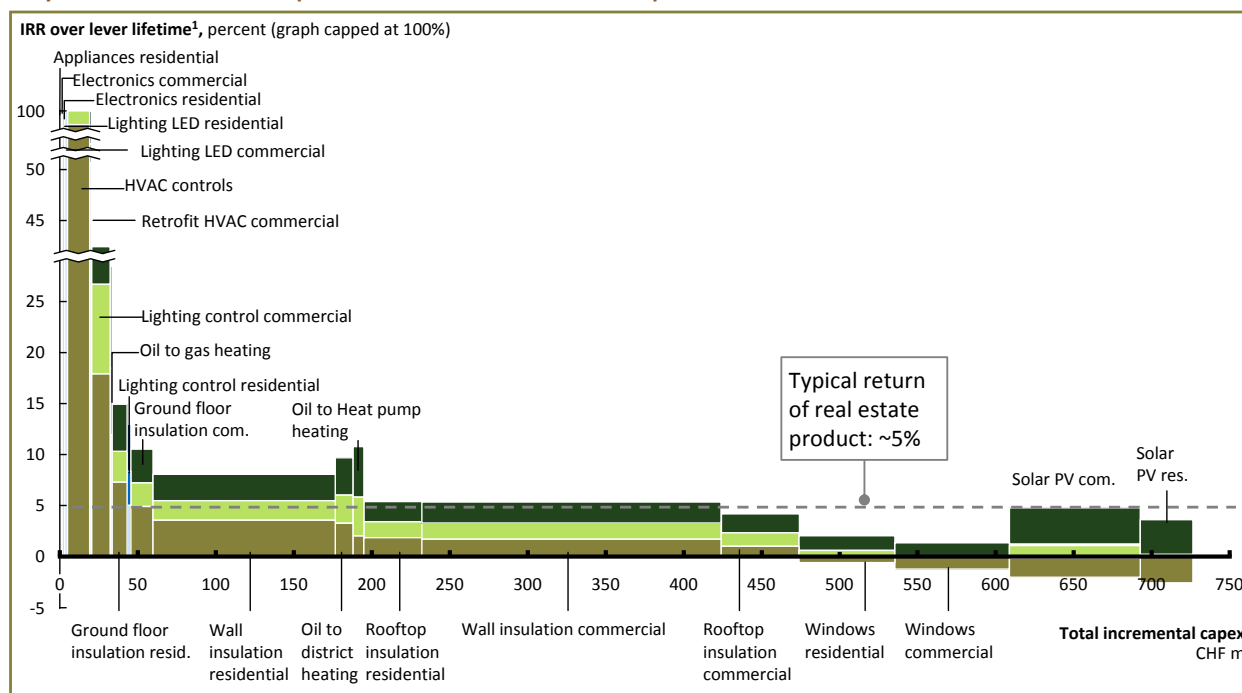
In comparison, a doubling of the energy prices would be needed to render the average IRRs of envelop levers to around 5%, which corresponds to a typical return rate of real estate investors. Evaluating such eventualities is increasingly beco-

ming relevant for the decision-making process of real estate investors as the decarbonization of a portfolio can be considered as a hedge against rising energy prices.

### Exhibit 5: IRR-curve per lever on analyzed Credit Suisse REAM portfolio for varying energy prices

Analyzed Credit Suisse REAM portfolio of CHF 15.3 bn - technical potential

- Scenario energy prices +100%
- Scenario energy prices +40%
- 2012 (2010 energy prices)<sup>1</sup>



<sup>1</sup> Includes fuel taxes. IRR is calculated on the incremental cash flows compared to business as usual for each lever. Current energy prices are based on data provided by renowned Swiss building engineers – energy price growth rates are based on IEA (World Energy Outlook)

Source: WWF/CS project team; Real Estate Carbon Abatement Model

Further abatement might result from pulling additional levers that were not in the scope of the analysis or accounted for differently:

- Tear-downs of buildings
- Shading of buildings
- Decentralized block heating
- Solar thermal collectors for water heating

The assumptions for the selected levers in terms of incremental and total investment costs, energy savings as well as CO<sub>2</sub>-abatement potential are based on real projects in Switzerland (e.g., envelope and HVAC-levers) and/or abroad, and were additionally validated bottom-up with renowned Swiss building engineers<sup>26</sup>.

<sup>26</sup> Assumptions of building envelope and HVAC-levers were validated with renowned Swiss building engineers Amstein + Walther.

# Up to 50% of the technical potential is lost due to market and regulatory constraints

Not the entire technical potential of the analyzed real estate portfolio can be realized by Credit Suisse due to market and regulatory constraints. A strict application of financial criteria would reduce the abatement potential by 15% if positive returns are required and 62% if returns of 5% were required<sup>26</sup>.

However, the intrinsic return perspective does not reflect the reality of rental real estate pricing and usage. Even financially attractive projects may end up not being implemented, or may not lead to technical savings. Sources of this leakage are:

- Overall, about 12% of abatement potential is currently out of Credit Suisse's control, as they relate to the choice of lighting, electronics or appliances by tenants.
- Investments like envelope and HVAC levers generate real returns, but the investment is borne by the owner, while the energy savings benefit the tenants (due to ancillary costs for utilities). Therefore, the attractiveness of the investment to a real estate investor does not only depend on the intrinsic return, but on Credit Suisse's ability to recover the investment via higher net rents, which in turn should correspond to lower energy costs for the tenant, keeping their overall costs constant. This is impacted by two factors:
  - Local market rates: the demand in some regions, particularly in the periphery, cannot absorb increasing rents
  - Local real estate applicable regulation: in some cantons or cities in Switzerland, real estate owners are prohibited from activating investments, which in turn curbs their ability to translate investments into rent hikes
- As a result, real estate investors may sometimes take the decision to rather sell relatively energy-inefficient buildings instead of renovating them – particularly in the periphery – to increase the overall energy-efficiency of their portfolio, which on the other hand is not contributing to an overall abatement of the real estate emissions in the market.
- Lastly, there is the experience that the higher energy efficiency may not fully put to usage, as tenants often lack the relevant information and awareness. For instance, more efficient heating systems can lead tenants to raise the average temperature while having the same level of heating cost.

- However, in a market like Switzerland, energetically efficient buildings are considered more valuable (de facto an option price on future carbon). Therefore, a real estate investor may choose to implement negative-return investments in order to protect the value of the asset, but this again requires the ability to pass the cost on to tenants.
- Based on past data and experience, we have applied a set of criteria to estimate the leakage of carbon abatement. The aggregated results are:
  - A 100% realization rate for PV
  - A 60–80% realization rate of appliances levers and the lighting control lever, and no realization of LED lighting and electronics levers
  - An average 50–70% realization rate of HVAC and envelope projects. This reflects the fact that a varying share of buildings per Credit Suisse REAM product are in locations with insufficient rent repricing potential.

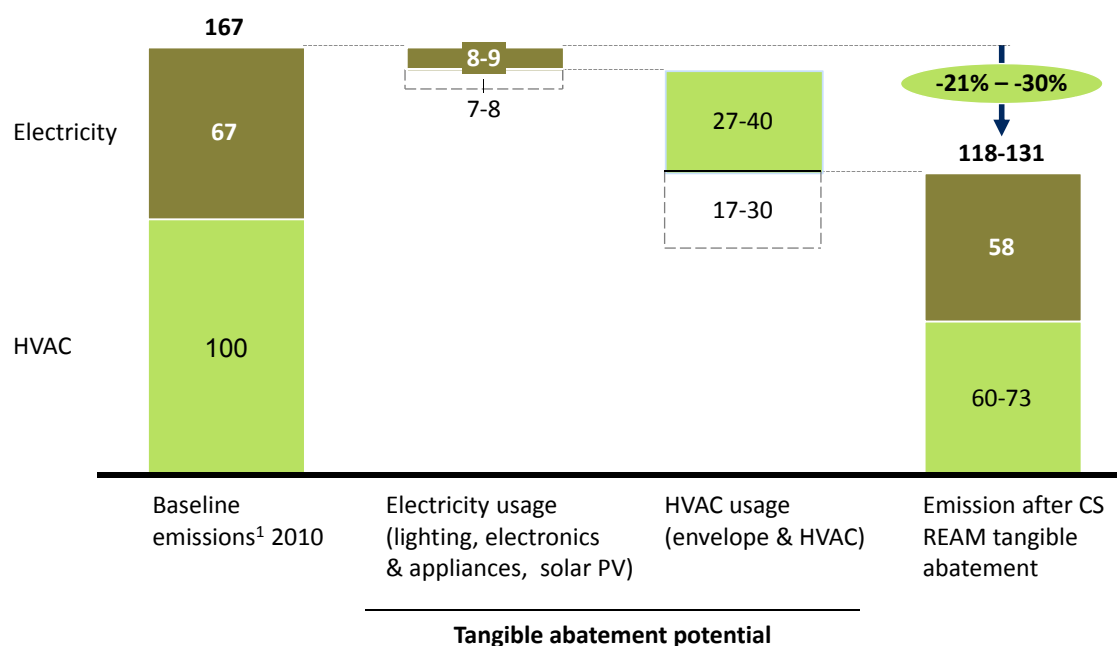
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<sup>27</sup> WWF/CS project team; Real Estate Carbon Abatement Model.

## Exhibit 6: Credit Suisse REAM analyzed portfolio has a tangible CO<sub>2</sub> abatement potential which can be implemented and captured of about 50-70%

Analyzed portfolio of CHF 15.3 bn, kt CO<sub>2</sub>, applied on 2010 baseline

OUTSIDE-IN ESTIMATION



<sup>1</sup> Based on data provided by Wincasa (facility manager) and adjusted for average electricity consumption in Switzerland

Source: WWF/CS project team; Real Estate Carbon Abatement Model

To realize the tangible potential (high case) Credit Suisse will require approximately CHF 0.8–1.0 billion of cumulative investments until 2050. This corresponds to an increase of

roughly 25–30% of Credit Suisse's total projected investment rate for energy efficiency measures<sup>28</sup>.

## Success factors for real estate investors for better and deeper carbon abatement within the current regulatory and economic constraints

For a professional real estate owner like Credit Suisse, there are five thrusts to better and deeper carbon abatement within the current regulatory and economic constraints:

### 1) Energy Management information:

An energy tracking system that delivers full transparency about energy consumption, carbon emissions, the drivers for carbon emission of each specific building, and the actual energy savings from energy-related investments as well as clear responsibilities to oversee and control the tracking system are crucial for better management of day-to-day energy consumption and for better decision-making on investments on a product basis as well as in an aggregated form for the whole portfolio.

### 2) Investments process and decision making:

As decisions are increasingly taken under uncertainty, scenario analysis and potential premiums against adverse developments (e.g., rising energy prices) should become an integral part of the decision process. Additionally, investment decisions of typical real estate investors are normally done by the product managers under his/her sole responsibility. To potentially improve the quality of investments while not adjusting responsibilities, (existing) sustainability boards or processes should assist product managers during the investment decision process.

<sup>28</sup> WWF/CS project team; Real Estate Carbon Abatement Model.

### 3) **Target setting and long-term investment planning:**

Typical real estate investors only have detailed renewal and renovation plans for about 3–5 years out, and cannot link their investment patterns to carbon abatement easily. Setting a clear long-term target and taking into account carbon abatement for the investment planning is crucial to strategically decarbonize a real estate portfolio. A scoring and lever model, which includes the implications from energy price scenarios, can help optimize the overall investment plan to anticipate abatement improvements while embedding it into the overall renovation. Additional key enablers include a fully committed top management of an investor company, associated incentive structures for project managers, and adjustments to the communication and marketing strategy.

### 4) **Education and communication**

Education on and communication of sustainability themes for tenants and investors offers real estate managers the opportunity to better highlight the financial and non-financial benefits of abatement investments as well as behavioral levers:

#### a) For investors:

Better energy efficiency of their assets is an insurance for a carbon and energy constrained future (e.g., offering a potential asset value protection against increasing regulation)

#### b) For tenants:

Understanding how to capture the benefits of energy efficiency will help them save energy cost while improving their general acceptance (including justified rent increases) and ensuring their behavior does not lead to leakage

### 5) **Partnerships and experiments with alternative economic models:**

Partnerships and/or alternative economic models could help to recover savings from abatement investments. Such models could include:

- a) Performance contracts with third parties, including the owner, the tenant and a third party that invests and collects benefits
- b) “Green leases” where the owner receives the benefit of an energy efficiency measure and the tenant commits to behavioral constraints, or
- c) Co-investments where long-term tenants share the cost of abatement with the owner

Credit Suisse REAM has already started several initiatives in line with the introduced five thrusts for better and deeper carbon abatement. For example, Credit Suisse is now in the process of building up an energy tracking system and plans to improve its target setting and 10-year investment plan to better plan and track carbon abatement initiatives.

Banks in general, such as Credit Suisse, should increasingly start thinking about their future role to facilitate the decarbonization of the real estate sector. This could, inter alia, include options such as:

- Facilitate the access to capital, especially for the large majority of private and individual building owners
- Anticipate the market opportunities for “green” investors who have an appetite for hedges against energy price increases, and in this context sharpen the value proposition towards its investor community, e.g., by developing an additional (global) green property fund
- Discuss the setup of an “Infrastructure Fund” in emerging markets that allows investors to further reduce its footprint by compensating GHG emissions via the purchase of certificates if (and only if) it can be ascertained that the reductions are based on high quality and additional projects.

## The decarbonization challenge for the entire Swiss real estate sector can only be addressed with material regulatory changes

89% of real estate is owned by private or individual owners. For these owners the investment decisions are more complex. Some may need shorter payback, others may accept uneconomic investments for ideological reasons, and some may simply not have the capital to execute attractive investments (see again the discussion in the “Transition to a Low Carbon Economy. The Role of Banks” report, e.g., in facilitating access to capital). Or they may be constrained by a lack of scale and knowledge. Accordingly, today’s renovation rates are relatively low at ~1.8% per annum, and only 0.9% of the renovations are energetic.

The entire real estate sector, professional and private, could benefit from a set of regulatory improvements that would increase the incentives to frontload energy-related investments, and to pull all available levers for abatement, leading to a faster and fuller implementation of the over 50% carbon abatement potential in real estate.



Some regulation, e.g., on emissions from heating, is very effective in improving the carbon effectiveness of real estate. The taxation of heating oil and the projected increases in electric power may be simplistic, but will be effective if taxation is high enough.

However, current energy-related regulation is fragmented and complex, and large parts of the regulation are less effective. Such examples include:

- Standards:
  - Minimum standards for insulation and energy consumption are far below the standard that owners normally apply or
  - There is a lack of standards (and even a lack of awareness) for high-impact, stand-alone abatement levers such as energy-efficient appliances or better HVAC controls
- Subsidy programs:
  - The solar power programs are subsidizing one of the least efficient levers, and the program is exhausted in Switzerland
  - Similarly, direct subsidies for insulation, windows, etc. are immaterial and often bureaucratic. In a typical total renovation, which costs up to 20% of NAV, subsidies often amount to less than 5% of the overall investment
- Tax deductions:
  - They only relate to direct energy-related investments, which are a small part of the total investment and not sufficient to anticipate renovation programs

- Tenant law:
  - Finally, current rent regulation which aims at capping rent increases directly cuts into the investments for carbon abatement

An improved and aligned regulatory agenda could include:

- A stronger focus on setting the right incentives:
  - Incentives that accelerate deeper, energy related renewals, like full tax deductibility of HVAC and envelope investments, or even entire renovations if certain minimum standards (e.g., Minergie) are fulfilled
  - Even stronger incentives (often via standards) for stand-alone, high-impact levers like HVAC control, appliances and potentially non-oil heating (similar to the “cash for clunkers” programs<sup>29</sup> to accelerate substitution of the car fleet)
- Tougher minimum standards for new constructions (e.g., for new urban constructions), and a review of current limitations to high-density construction
- More flexible tenant laws that allow landlords to pass on the full cost of energy-related investments through adjusted rents

## Conclusion: To fulfill the requirements of the 2°C scenario translated to Credit Suisse, Credit Suisse would need to be able to realize its entire technical potential. In addition, the Swiss consumption electricity mix would need to be green by 2050

The globally formulated 2°C target emission profile translates to a carbon abatement target for Credit Suisse’s portfolio of 120–167 kt CO<sub>2</sub>e or 75–100% of current GHG emissions from HVAC and electricity usage until 2050<sup>30</sup>.

The translated requirements from the 2°C scenario imply that the lower range of a 75% reduction of current GHG emissions can only be achieved if

- For HVAC-usage: the entire technical potential of levers can be realized by 2050
- For the electricity usage: the entire electricity consumed by the CS REAM portfolio would need to be CO<sub>2</sub>-neutral by 2050

29 E.g., C.A.R.S. program in the US, Department of Transportation (2009): <http://www.dot.gov/affairs/2009/dot13309.htm>.

30 Lower reduction range of 120 kt CO<sub>2</sub>e or 75% based on 55% reduction of emissions from HVAC usage and 100% reduction of indirect emissions from

electricity usage; higher reduction range of 167 kt CO<sub>2</sub>e or 100% based on WWF report “The Energy Report – 100% renewable energy by 2050”, which assumes that emissions from HVAC-usage need to be reduced by 100% until 2050.

Both objectives are very difficult to realize. In order that a professional investor such as CS, let alone a private building owner can achieve a technical abatement potential of 60% of the HVAC emissions, material changes to the regulatory environment are necessary.

If even a 100% reduction of the building sector's emissions is required until 2050 to overcompensate for other sectors' emissions (e.g., from flight transportation, agriculture, etc.) as indicated by the WWF<sup>31</sup>, an additional shift in heating systems would be required replacing the remaining share of gas and local district heating systems (e.g., in a potential second wave of systematic heating system replacements before 2050 with even more attractive heating systems based on renewable energy sources).

In the short-term, the Swiss 20% reduction target with a 40% reduction of real estate HVAC-related emissions until 2020 is very ambitious compared to the abatement potential that seems to be realizable in Swiss real estate until 2020 without substantial frontloading of energy-related investments (e.g., a substantial increase in the replacement rate of oil and gas heating systems with heat pumps).

Finally, the very ambitious Swiss target for real estate by 2020 shows exemplarily how an investment decision needs to be taken under high (regulatory) uncertainty, and that early investments in decarbonizing levers can thus be seen as a hedging instrument against future regulations.

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31 The Energy Report – 100% renewable energy by 2050, WWF/Ecofys/OMA, 2011.

# Glossary

<b>GHG</b>	Greenhouse gas
<b>HVAC</b>	Heating, ventilation and air conditioning
<b>Incremental capex</b>	The additional incremental capital expenditure of an energy efficient vs. the reference cost of a non-energy efficient renovation
<b>IRR</b>	Internal rate of return
<b>Kt/Mt/Gt CO<sub>2</sub>e</b>	Kilo-tons/Mega-tons/Giga-tons of CO <sub>2</sub> equivalents
<b>LED</b>	Light-emitting diode
<b>NAV</b>	Net asset value
<b>PPM</b>	Parts per million
<b>PV</b>	Photovoltaic
<b>CS REAM</b>	Credit Suisse Real Estate Asset Management
<b>Tangible abatement potential</b>	The tangible abatement potential is the part of the technical abatement potential that CS REAM is able to implement (e.g., direct access or direct responsibility through facility manager) and for which CS REAM is able to recover the investment (e.g., through adjustment of rent given local market prices and regulatory constraints)
<b>Technical abatement potential</b>	The technical abatement potential is a rough estimate of the maximal technically feasible abatement potential resulting from energetic renovation of existing buildings, for which there is a significant enough impact (e.g., no further improvements of already very energy efficient buildings) and which are economically reasonable (e.g., have a positive rate of return that is not significantly lower than the typically expected return in real estate). Certain abatement levers with negative return have also been included in the technical potential as long as their implementation can be considered part of the standard renovation cycle (e.g., replacement of windows)

