

# Climate change mitigation in Austria and Switzerland: The pitfalls of federalism in greening decentralized building policies

Reinhard Steurer , Christoph Clar  and Juan Casado-Asensio

## Abstract

*The present paper analyses and compares how federalism in Austria and Switzerland affected climate change mitigation in the fully decentralized building sectors of the two countries during the Kyoto Period (1990–2012). This is of interest because the environmental significance of federal political systems is still contested. We first review the literature on federalism in the context of environmental and climate policymaking, and we show that the effects of federal political systems can be positive or negative (depending on interactions between politics and problem characteristics). We then summarize the two qualitative country studies. By analysing who initiated and coordinated respective policies at what time and why, we show that respective policy changes neither emerged bottom-up nor diffused between provinces/cantons, although the latter are fully responsible for building policies. While most policy changes were triggered by federal and/or European Union interventions, the provinces/cantons usually delayed and/or watered down policy changes to smallest common denominator solutions. Based on these findings we conclude that the building sectors of the two countries became more efficient despite, not because of federalism. Against this background we recommend centralizing building policies, or to engage sub-national actors in national target-setting early on.*

*Keywords:* Federalism; environmental federalism; climate change mitigation; climate policy integration; building policy; Austria; Switzerland.

## 1. Introduction

Although the effects of federalism on policymaking in general, and on environmental policymaking in particular have, been debated for decades, it is still unclear whether potential advantages or disadvantages prevail for particular policy issues (Steurer and Clar, 2018). Despite inconclusive findings, policy scholars tend to emphasize the advantages of federalism for mitigating climate change, *inter alia* because federal polity settings enable regional governments to compensate for federal inaction. A prominent point in case that gave rise to this view is the United States. Since it never ratified the Kyoto Protocol (Steurer, 2003), several studies showed that its federal political system enabled its states (in particular California) to successfully fill national regulatory voids (Rabe, 2007; Lutsey and Sperling, 2008; Corfee-Morlot, 2009), sometimes in iterative cycles together with federal authorities (Carlson,

2008). The present paper tests and relativizes this finding for (small) federal states that have been committed to the Kyoto Protocol: i.e., Austria and Switzerland. We assess the role federalism plays in mitigating climate change in the two countries by analysing the greening of a sector with significant greenhouse gas (GHG) emissions that is governed mainly by sub-national authorities. As shown below, the building sector fulfils these criteria in both countries.

The two cases analysed here have some characteristics in common that are relevant for their comparison (for an overview, see Table 1). First, they are two small neighbouring countries (with less than 10 million inhabitants and a very small share of global GHG emissions) that committed themselves to cut their GHG emissions under the Kyoto Protocol. While Austria agreed to reduce its 1990 emissions by 13% until 2008–2012 (Umweltbundesamt, 2012a, 2012b), the Swiss target was –8% for the same period. Second, both countries have federal political systems that allocate considerable power in selected policy areas to their sub-national authorities (i.e., the nine Länder/provinces in Austria and the 23 cantons in Switzerland). This applies in particular to building policies, nowadays mainly concerned with thermal building standards and housing promotion

Reinhard Steurer, Christoph Clar and Juan Casado-Asensio are at InFER - Institute of Forest, Environmental, and Natural Resource Policy, University of Natural Resources and Life Sciences (BOKU), Feistmantelstraße 4, 1180 Vienna, Austria. E-mail: reinhard.steurer@boku.ac.at, christoph.clar@boku.ac.at, juan.casadoasensio@oecd.org

**Table 1. Austria and Switzerland during the Kyoto Period between 1990 and (2008-)2012**

Country	Population in millions (change)	CO2 emissions t/capita (change)	Kyoto target	Change of total GHG emissions	Change of building sector emissions
Austria	7.7–8.4 (+9,1%)	7.5–7.39 (–1,5%)	–13%	+5.9%	–25.5%
Switzerland	6.7–8 (+19,4%)	6.35–4.72 (–25,7%)	–8%	–6%	–15%

Source: <https://data.worldbank.org/indicator/EN.ATM.CO2E.PC?locations=AT-CH>; <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=AT-CH&view=chart> (accessed 29 January 2018) plus the sources cited in the text.

schemes (that can be used for improving energy efficiency). Third, since both countries have similar moderate (Alpine) climates, reducing emissions from buildings was equally important for their Kyoto performance. While the residential sector in Austria accounts for about 13% of total GHG emissions (Umweltbundesamt, 2013), households in Switzerland have a share of about 18%.<sup>1</sup> Finally, both countries were able to disproportionately reduce emissions from their growing building sectors. While Austria reduced its 1990 emissions from buildings by 25% until 2012 (Umweltbundesamt, 2013), Switzerland reduced them by about 15% (BAFU, 2015). All this gives the impression that federalism in both countries facilitated climate change mitigation in decentralized building policies. By analysing in detail how these performances came about, the remainder of the present paper questions this impression for both countries.

Apart from these similarities, the following differences are worth mentioning. First, Switzerland is ahead of Austria in mitigating climate change. While Switzerland reduced its GHG emissions by 6% during the Kyoto period and almost met its target of –8% domestically (BAFU (Bundesamt für Umwelt), 2013, 2014), Austria did not reduce but increased its GHG emissions by 5.9% above the 1990 level so that they were finally 18.9% above the national Kyoto target (Umweltbundesamt, 2013). This difference is aggravated by the fact that CO2 emissions per capita are significantly lower in Switzerland than in Austria (for an overview see Table 1). Second, while Austria is a European Union member, Switzerland is not. However, since the latter is closely affiliated with the EU, it transposes most EU regulations one-on-one. In the conclusions, we highlight a remarkable linkage between these two differences, i.e., how the EU membership of Austria weakened its domestic climate change mitigation performance.

Several puzzles could be addressed when analysing and comparing climate change mitigation in the two neighbouring countries. For reasons explained above, we are interested in what role federalism played in integrating climate change mitigation in the Austrian and Swiss building

sectors (also referred to as “greening” building policies). Since the emission cuts achieved in this decentralized sector far surpassed domestic GHG emission trends, the figures summarized in Table 1 seem to confirm the advantages of federalism in climate change mitigation, as highlighted by the US case. However, a deeper look into the two cases reveals that these emission reductions were realized despite, not because of federalism. We compare them here because it allows us to re-affirm within-case findings in a comparative way, and because this is the only way to better understand some noteworthy differences and their effects, in particular the one about EU membership.

The country studies summarized and compared here have been conducted in 2013/2014, and they have been published as stand-alone cases.<sup>2</sup> For the Kyoto period 1990–2012, they both analyse federal climate change mitigation policies and building policies in all provinces/cantons as well as in a few leading ones. We included the latter because if they have difficulties with greening their building policies, so do all the others. The case studies are based on a qualitative analysis of the relevant written material (i.e., scholarly literature, studies and assessments, policy documents) and semi-structured face-to-face interviews with experts and federal as well as sub-national policymakers (14 for Austria and 15 for Switzerland). All interviews were conducted in German and interview quotes were translated by the authors (for further details on methods see Steurer and Clar 2015; Casado-Asensio and Steurer, 2016b).

The following section introduces federalism and policy integration as the two main concepts used here. Based thereupon, it also operationalizes how we assess the effects of federalism on climate policymaking. Section 3 briefly outlines polity aspects and section 4 references national policies relevant for the core of the two case studies presented in section 5, the greening of building policies. Section 6 compares the two cases and section 7 provides a concluding discussion with two recommendations.

<sup>1</sup> For Switzerland see <http://de.statista.com/statistik/daten/studie/448003/umfrage/co2-emissionen-aus-brennstoffen-in-der-schweiz-nach-wirtschaftssektoren/> and <http://de.statista.com/statistik/daten/studie/448086/umfrage/treibhausgas-emissionen-in-der-schweiz-nach-wirtschaftssektoren/> (accessed 2 March 2016).

<sup>2</sup> Large parts of the two original case study papers have been used here without quoting or referencing them because this is the only way a comparison like this can be published meaningfully. For further details on methods and findings on the Austrian case, see Steurer and Clar (2015); for Switzerland see Casado-Asensio and Steurer (2016b).

## 2. Climate policy integration and federalism

As with most industrialized countries, Austria and Switzerland both struggle with implementing effective mitigation policies, *inter alia* because it requires often disputed policy changes in sectors usually not concerned with environmental issues (Bartle and Vass, 2007), such as the building sector. This challenge is often referred to as environmental or climate policy integration (EPI or CPI; Lafferty and Hovden, 2003; Jordan and Lenschow, 2010; Adelle and Russel, 2013). While the ultimate purpose of CPI is to reduce carbon emissions (i.e., CPI as outcome), the concept is also concerned with the procedural aspects of integration (i.e., CPI as governance), and the policy instruments supposed to deliver these ends (CPI as output) (Kok and de Coninck, 2007; Adelle and Russel, 2013). Ideal-typically, CPI as governance (i.e., coordination) produces CPI as output (in the form of laws, subsidies or taxes) that aim to curb GHG emissions (Adelle and Russel, 2013). In general, policy integration outputs depend on all factors that shape policymaking in general. To put highly complex policymaking processes in simple terms, CPI as output depends on adequate governance arrangements that facilitate coordination between all relevant actors (i.e., CPI as governance), on polity issues such as ministerial and federal structures (i.e., on who is responsible for what), on sectoral actors and their (mutual or conflicting) interests (i.e., on who wants what), and on resources, capacities and power relations (i.e., on who can do what) (Lafferty and Hovden, 2003; Jordan and Lenschow, 2008, 2010; Adelle and Russel, 2013).

The key challenge of CPI in any polity setting is to integrate climate concerns into all policies concerned with sectors causing GHG emissions at the same level of government. However, as our case studies demonstrate, federal countries such as Austria and Switzerland add a vertical dimension to this horizontal challenge, with all the potential pros and cons briefly reviewed above. Thus, the present paper analyses not only how Austrian provinces and Swiss cantons have integrated climate change mitigation concerns horizontally into their building policies, but also what role vertical interactions between the federal government (responsible for delivering carbon emission cuts) and state/cantonal actors (responsible for building policies) played in this regard. This brings us to the longstanding literature on federalism in environmental policymaking (also known as “environmental federalism”).

“Federal polity is characterized by ‘sharing power’ and by ‘dividing power’ in a vertical fashion” (Keman, 2000:193). In reality, this characterization can play out in many different types of federalism, and according to Keman (2000), these types can be differentiated based on who has the “right to decide” and/or the “right to act” on certain issues. While the right to decide “refers to the competence to design and pass policies on its own or in cooperation with a superordinated institution” (Biela *et al.*,

2012:448), the latter is concerned with implementing (or enforcing) policies adopted elsewhere (Keman, 2000; see also Wälti, 2004). For the purpose of the present paper, it is sufficient to emphasize that the provinces/cantons in both countries have the sole right to decide and to act on building policies. Therefore, analysing how Austria and Switzerland succeeded to green these policies is more a question of coordination/negotiation than one of policy implementation in a federal setting (Wälti, 2004; Marquardt, 2017). This analysis allows us to determine the role federal polity setups plays in mitigating climate change. Yet, why is this important?

As highlighted above, decades of “environmental federalism” research produced several (potential) pros and cons of federal political systems in solving environmental problems, and overall contradictory findings (Wälti, 2004; Millimet, 2013). On the negative side, federal systems can hinder (environmental) policymaking because they entail a larger number of decision-makers and institutional duplicities, both making it more likely that policy changes are blocked, delayed or watered down (Tsebelis, 2002). A failure to effectively coordinate the many actors and policies between different levels of government is likely to result in redundant, incoherent or even contradictory and consequently ineffective policies (Peters, 1998; Goulder and Stavins, 2010; Galarraga *et al.*, 2011). In addition, the economic rivalry between sub-national entities can result in a race to the bottom of environmental standards (Wälti, 2004). In contrast, other scholars found the following three advantages of federal political systems compared to unitary ones (for an overview see Nice, 1987; Adler, 2005): first, fragmented responsibilities and duplicities do not have to result in delays or races to the bottom. They may also trigger experimentation, mutual learning and a positive competition (or a race to the top) by diffusing policy innovations between sub-national entities (Kloepfer, 2004; Chappell and Curtin 2013; Millimet, 2013), sometimes in interaction with federal authorities (Carlson, 2008). Second, functionalist approaches emphasize that federalism promotes the flexibility and the fine-tuning of national policies to regional specifics, an advantage particularly important in large, incoherent countries (Keman, 2000; Adler, 2005; Jahn and Wälti, 2007). Finally, federalism can bring policymaking closer to the citizens and thereby improve the acceptance of governmental decisions (Millimet, 2013).

Several scholars think that it depends mainly on the scale of the environmental problem whether pros or cons of federalism dominate. While federal political systems seem to provide the flexibility necessary for solving small-scale environmental problems such as waste management and water pollution, they seem to be inadequately fragmented for solving national or global environmental problems such as climate change mitigation (Esty, 1996; Macey and Butler, 1996; Adelman and Engel, 2008; Steurer and Clar, 2018). If the effects of federal political systems depended only on the scale of an environmental problem, this would

be the end of the story, suggesting that federal political systems are ill-equipped to mitigate global climate change. However, countries lagging behind in climate change mitigation at the national level re-opened the debate with counter-evidence. Based on the US and similar cases such as Canada and Australia,<sup>3</sup> some scholars highlighted in dissent to parts of the environmental federalism literature that federal countries have advantages in mitigating climate change (see section 1 for references). Let us now test and relativize this finding for small European countries that have been committed to the Kyoto Protocol.

A key to assess the effects of federalism on mitigating climate change in Austria and Switzerland is whether their federal polity setup resulted in mutual learning and/or the autonomous diffusion of CPI among provinces/cantons, rendering federal coordination obsolete. Conversely, repeated efforts of federal coordination may highlight a rather passive role of provinces and cantons in climate change mitigation. In this regard, it is crucial to detect whether provinces/cantons readily embraced or obstructed federal coordination efforts. Against this background we will pay close attention to who the main actors were in greening sub-national building policies.

### 3. Climate change mitigation polity in Austria and Switzerland<sup>4</sup>

Although the political systems of Austria and Switzerland are both federal, they are nevertheless different. The key climate policy actors in Austria are the Federal Environment Ministry and the Federal Economy Ministry (also responsible for energy), plus the Transport and Technology Ministry.<sup>5</sup> The federal government (in this case lead by the Environment Ministry) adopted the Kyoto target on its own without consulting the provinces and without formally sharing burdens/efforts domestically. Although Austria is a federal state that gives the nine provinces limited formal responsibilities (Erk, 2004; Schneider and Bröthaler, 2012), they do have the right to decide and act on a few policy issues, building policies being one of them. The Austrian provinces have full control over the two most

important instruments relevant for greening the building sector, i.e., (thermal) building standards and subsidy schemes for new buildings and for retrofitting old ones. Since provincial governments and the governors of (in particular large) provinces have considerable informal influence on federal policymaking (mainly due to party financing and voter mobilization), federal ministries usually refrain from pressuring provinces towards certain policies. Instead, they seek cooperation via agreements according to article 15a of the federal constitution (Art 15a B-VG) that are binding for both sides (henceforth referred to as federal agreements). If the Environment Ministry wants to reduce GHG emission, it can negotiate with federal agreements on improving building standards and altering subsidy schemes, and it can introduce new subsidies (if tolerated by the provinces). Shifting authority from provincial to federal governments has been discussed repeatedly in the past but proved politically infeasible because the provinces usually pressure against such changes at their expense (Sickinger, 2002; Bußjäger, 2003; Karlhofer and Pallaver, 2013).

Although federalism in Switzerland is more pronounced than in Austria, the key actor in climate policymaking is also the Federal Environment Department. However, since it consists of seven offices, horizontal integration in Switzerland does not start with coordinating policies between the seven federal departments but between offices within departments (in particular among the Federal Offices for the Environment, for Energy and for Spatial Development, all parts of the Environment Department) (UVEK, 2011). For this purpose, the Environment and Energy Offices in the Environment Department rely on several federal and cantonal conferences (Schenkel, 2000), and since 2008 on an Interdepartmental Climate Policy Committee that involves 11 federal offices from four departments and is also open to the cantons. Like in Austria, the Swiss federal government also adopted the Kyoto target without consulting or formally sharing it with the cantons. This is even more remarkable because the Swiss cantons have the right to decide and to act on more issues than Austrian provinces (even fiscal ones), again fully including building policies (Strebel and Widmer, 2012).<sup>6</sup> While vertical coordination between federal and cantonal actors in Austria relies heavily on federal agreements, Switzerland relies on a “gigantic infrastructure” (Tschäni, 1987) of coordination that aims to reconcile cantonal and federal interests in a variety of policies (Bolleyer, 2006: 8; Vatter, 2008; Füglistner, 2012; Füglistner and Wasserfallen, 2014). Because federal and cantonal governments share many responsibilities, one can even say that constant vertical interactions mark “business as usual” in Swiss policymaking (Fleiner, 2009). In contrast to Austria, the Swiss federal government adopted a constitutional reform in 2007 through which it

<sup>3</sup> Canada formally withdrew from the Kyoto Protocol in 2011, but started to ignore it much earlier (see <http://www.cbc.ca/news2/politics/story/2011/12/12/pol-kent-kyoto-pullout.html> (accessed 2 February 2016)). Australia ratified the Kyoto Protocol only because it was granted a very weak mitigation target that allowed it to *de facto* increase its emissions (see <http://theconversation.com/australia-hit-its-kyoto-target-but-it-was-more-a-three-inch-putt-than-a-hole-in-one-44731> (accessed 18 January 2015)). For the positive effects of federalism in Canada, see Rabe (2007), and for Canada and Australia, see Gordon and Macdonald (2014).

<sup>4</sup> For more details on the Austrian case, see Steurer and Clar (2015), for Switzerland see Casado-Asensio and Steurer (2016b).

<sup>5</sup> Until December 2017, the full names of the three ministries were Federal Ministry of Agriculture, Forestry, Environment and Water Management; Federal Ministry of Science, Research and Economy; Federal Ministry for Transport, Innovation and Technology.

<sup>6</sup> See also <http://www.endk.ch/de/EnDK/Ziel-und-Zweck> (accessed 2 February 2016).

introduced jointly negotiated, goal-oriented federal-cantonal contracts (called “convention programmes”) that usually foresee co-financing (Fischer *et al.*, 2010). These programmes are negotiated by various (political and administrative) conferences (Linder and Vatter, 2001). For building policies, the relevant conference is the Swiss Conference of Cantonal Energy Directors (in short, the Energy Conference). Another difference to Austria is that Federal Departments can interfere with cantonal competences through federal legislation when cantonal heterogeneity blocks the solution of persistent problems (Vatter, 1999, 2004; Bolleyer, 2006; Füglistner, 2012). To avoid this, cantons are usually eager to find common positions and solutions through extensive coordination (Füglistner and Wasserfallen, 2014: 405).

While Swiss federalism underwent significant changes in recent years, the Austrian polity system remained unchanged (albeit change was repeatedly deemed necessary by many policymakers and analysts). Thus, it seems that Austria is characterized by “crystalline” and Switzerland by “dynamic federalism”: although the nine Austrian provinces have fewer competencies than the 23 Swiss cantons, the former seem to be more immune against federal interventions and competency shifts than the latter.

#### 4. Federal climate change mitigation policies in Austria and Switzerland<sup>7</sup>

In Austria, federal mitigation policies during the Kyoto Period were dominated by offsetting increasing emissions with the purchase of emission certificates for about 700 Million euro. Closing the 19% gap between actual emissions and the Kyoto target (see Table 1) with relatively cheap emission certificates was the single most important climate policy decision the Austrian government took during the Kyoto period. This already indicates that other federal policies, including two climate strategies and a climate change act, were not effective. In 2002, the federal government and the Conference of Provincial Governors for the first time agreed on a common climate strategy that aimed to reach the Kyoto target by defining emission reduction targets and measures for seven priority areas, space heating and small-scale consumption being one of them (Lebensministerium, 2002). Although the strategy was the only noteworthy federal policy that was meant to guide provincial, regional, and local mitigation policies (Wunder, 2004), its political status deteriorated quickly because climate change was neither a priority for the then centre-right federal government nor for the provinces.

After a critical evaluation of the 2002 climate strategy (AEA and Umweltbundesamt, 2005), the strategy was revised from 2005 onwards and adopted by the federal

government in 2007 (Lebensministerium, 2007). Although GHG emissions increased in the meantime, the emission reduction targets for most sectors were lowered (for the building sector from –27% to –20% until 2010 compared to 1990) (Lebensministerium, 2002; Lebensministerium, 2007). Although this change was merely symbolic (the decision to offset increasing emissions not domestically but with emission certificates has long been taken), the provinces never agreed on the strategy, in particular because they thought the lower target for the building sector (easily surpassed later on) was still too ambitious. Thus, most interviewees agreed that the revised climate strategy was politically even less relevant than its predecessor was.

Since both federal climate strategies failed to cut GHG emissions, the Federal Environment Ministry saw the need for a climate protection law with sectoral targets and sanctions for missing them. Announced already in the government programme of 2008 (Bundeskanzleramt, 2008), it took the federal and provincial governments three years to negotiate a seriously flawed law that stated neither emission targets for sectors or levels of government, nor concrete measures, nor sanctions for missed targets (Klimaschutzgesetz; BGBl. I Nr. 106/2011). When the Austrian National Assembly adopted the law in October 2011, the Minister said that “with regard to climate protection the previous ‘can’ turns into a ‘must’”, and that Austria will join the UK as a European frontrunner in climate change mitigation.<sup>8</sup> Considering the flaws mentioned above, this was either wishful thinking or deception of the public. Well aware of the loopholes in the law, the Federal Environment Ministry tried to close them in additional rounds of negotiations with other ministries, the provinces, and the four social partners<sup>9</sup> immediately after its adoption. Although the amended law states detailed emission reduction trajectories for six sectors until 2020 (Novelle Klimaschutzgesetz, 2012) and the federal government as well as the provinces approved an action programme in 2013, the improvements are merely symbolic for two reasons. First, since the provinces (and the social partners) regard some sectoral targets as too demanding (in particular the one for the building sector that foresees emission cuts of 13.5% between 2013 and 2020) they rejected the entire amendment (see e.g., Landesregierung Steiermark, 2013; Oberösterreichische Landesregierung, 2013). Second, despite lengthy negotiations with the provinces, the Federal Environment Ministry was not able to find a consensus on how to share the costs for emission certificates in the case that sectoral targets will not be met. Consequently, the provinces cannot be sanctioned if they fail to meet the disputed building sector target. This also hampers the

<sup>8</sup> [http://www.parlament.gv.at/PAKT/VHG/XXIV/NRSITZ/NRSITZ\\_00124/SEITE\\_0261.html](http://www.parlament.gv.at/PAKT/VHG/XXIV/NRSITZ/NRSITZ_00124/SEITE_0261.html) (accessed 25 September 2012).

<sup>9</sup> The social partners include the Austrian Economic Chambers, the Chamber of Labour, the Chamber of Agriculture, and the Austrian Trade Union Federation.

<sup>7</sup> For more details on the Austrian case, see Steurer and Clar (2015), for Switzerland see Casado-Asensio and Steurer (2016b).

prospects of the work programme that was formulated in parallel to the amendment. The work programme 2013/2014 details mitigation measures for the six sectors specified in the law. The measures were formulated by sectoral working groups that involved representatives from seven federal ministries, all nine provinces, the four social partners, the Environment Agency Austria and interest groups (such as the Federation of Austrian Energies). Among the provinces, informal coordination took place between sectoral policymakers and non-state experts. The working group on the building sector agreed, *inter alia*, to further improve (i) the energy efficiency of public buildings, (ii) minimum standards for new buildings, and (iii) thermal refurbishment through provincial housing promotion and federal support (Lebensministerium, 2013). Since the history of greening the building sector has shown that the provinces will not do this on their own (see section 5), the work programme foresees “negotiations on a new 15a agreement regarding measures in the building sector” (Lebensministerium, 2013:10).

In Switzerland, only a few emission certificates had to be purchased to meet the Kyoto target because more effective federal policies have been implemented much earlier. In 1990, the Energy Office passed the Energy2000 action plan to stabilize that year’s carbon emissions by 2000, a goal eventually reached (but not necessarily due to the action plan, for the effectiveness of such strategies and plans, see Casado-Asensio and Steurer, 2014). In 1992, federal environmental, economic and fiscal units discussed a carbon tax (Schenkel *et al.*, 1997; Knoefpel, 1997; Clivaz, 2001), but it was never adopted because businesses feared losing competitiveness (Ingold, 2010). In 1995, the Environment Office drafted a Carbon Act in close cooperation with businesses (Ingold, 2011). The Swiss Parliament approved it in 1999 for a ten-year period—12 years before the Austrian government passed a similar yet much softer law (see above). The back then “worldwide rather outstanding” piece of legislation (Kumbaroglu and Madlener, 2003:194) intended to reduce carbon emissions by 10% by 2010 compared to 1990, surpassing the Swiss Kyoto target by 2%. The Act foresaw two successive tracks, both managed by the Environment Office (Ingold, 2010) and covering the main emitting sectors (transport, buildings, industry). The first track consisted of voluntary measures for all three key sectors, notably through the SwissEnergy programme (Ingold 2007, see also section 5.2), and the introduction of two emission reduction targets: 15% for heating and 8% for motor fuel emissions by 2010 compared to 1990.<sup>10</sup> It also envisaged a green fiscal reform and an

emission-trading scheme. The second track (to be introduced only if the first track failed to deliver) foresaw a carbon tax on fossil motor and heating fuels (max. US \$230<sup>11</sup> per t/CO<sub>2</sub>), earmarked to finance building refurbishment (see section 5). In 2001, it became evident that voluntary measures were insufficient, but the Finance Department rejected the green fiscal reform (foreseen in the first track) and the second track altogether (Ingold, 2010). To solve this impasse, the Department for Economic Affairs supported the introduction of a Climate Penny for motor fuels. In 2005, the Swiss Parliament introduced the Penny against opposition from the Environment and Energy Offices and taxed a litre of fuel with approximately one US cent. The revenues, administered by a newly created private body (the Climate Penny Foundation), were used to subsidize building refurbishment (see the following sub-section) and purchase emission certificates (Schäfer, 2009).

Since the Penny Foundation scheme posed legal problems (a private entity was collecting a tax that had not gone through a referendum) and proved to be insufficient in curbing transport-related emissions, negotiations on a carbon tax re-emerged after all (Ingold, 2010). In 2007, they resulted in the introduction of a heating fuel tax (starting at US\$13 per t/CO<sub>2</sub>; raised to US\$40 in 2010) and a national emissions trading system for the Swiss industry (BAFU, 2007). In 2009 and 2011, the Energy and Environment Offices renewed the Penny Foundation scheme and the Carbon Act. The renewed Act triggered a few new measures in additional sectors, raised the carbon tax (max. US\$133 per t/CO<sub>2</sub> by 2020), and replaced the building refurbishment programme of the Penny Foundation with reinforced federal-cantonal collaboration (see the following section). In exchange for being excluded from the tax, transport emissions were regulated through the renewed Climate Penny, voluntary agreements and projects.

Overall, we conclude that Switzerland pursues climate change mitigation more rigorously than Austria, and this is likely to continue at least until 2020. Despite comparatively low CO<sub>2</sub> emissions per capita (see Table 1), Switzerland adopted the EU-wide target of cutting 1990 GHG emissions by 20% until 2020, and reaching this target will require considerable additional efforts. Austria, in contrast, managed to negotiate a tame target that is unlikely to trigger ambitious mitigation policies: the federal government pledged to reduce GHG emissions by 16%—yet not based on 1990 but on 2005 levels. Since emissions in 2005 were 17.8% above those of 1990 (Umweltbundesamt, 2008), the new target resembles merely the stabilization of 1990 emissions.

<sup>10</sup> The SwissEnergy programme also aimed to cut carbon emissions by 10% between 2000 and 2010 (baseline 1990), to ensure that total electricity consumption during the same period did not increase by more than 5%, and to increase the proportion of renewable energy as a share of overall energy supply in Switzerland (see also Sager *et al.*, 2014).

<sup>11</sup> All US\$ amounts in this paper were calculated by the authors based on the exchange rates applicable at the time of policy adoption.

## 5. How constant federal dripping wore provincial/cantonal stones: greening the building sectors in Austria and Switzerland<sup>12</sup>

In the introduction we showed that emissions from the building sector declined significantly in Austria and in Switzerland. Since building policies are fully decentralized in both countries, a quantitative study would most likely interpret this development in favour of federalism. However, by analysing qualitatively the nitty-gritty of who did what and when, the remainder of the paper shows that the two countries greened their building sector despite, not because of federalism.

### 5.1. Austria

In Austria, the federal government repeatedly negotiated federal agreements on thermal building standards, first in 1980 (mainly to protect poor households from rising energy prices), and again in 1995 (this time to transpose the EU's SAVE directive 93/76). However, both times the new thermal minimum standards to be integrated into provincial building codes were far behind the state of the art of new buildings (Steurer, 1999; Hütter, 2007). The climate strategy from 2002 aimed to cut building sector emissions by 27% until 2010 compared to 1990, mainly by reforming provincial housing promotion schemes. These schemes are long-established social policies that were now expected to subsidize not only home ownership but also thermal refurbishment, more efficient heating systems, and the use of climate-friendly energy sources in households (Lebensministerium, 2002). Since most provinces hardly changed their schemes on their own (AEA and Umweltbundesamt, 2005), the Environment Ministry introduced a programme that was not foreseen in the climate strategy: from 2004 onwards, the klima:aktiv programme promoted climate friendly technologies and services in the areas of buildings, energy consumption, renewable energies and mobility. Regarding buildings, the programme developed voluntary thermal standards,<sup>13</sup> supported lighthouse projects, promoted the training of building professionals, and informed home builders and businesses on climate friendly options. Since these federal activities complemented rather than substituted provincial policies, the provinces tolerated the comparatively small programme (Bitterling, 2010).

Although the second federal agreement on thermal building standards from 1995 was also outdated from the outset, neither the federal nor the provincial governments tried to rectify this (Wunder, 2004; Amann, 2010). Consequently, the provinces failed to meet some requirements of the EU directive on the energy performance of buildings

(2002/91/EC), among them establishing standardized procedures for setting thermal building standards, improving the efficiency of heating/cooling systems, and mandating energy certificates (RH Rechnungshof, 2009; Amann, 2010). When the EU opened infringement proceedings in 2006 it was a wake-up call for both federal and provincial policymakers. First, the federal government transposed parts of the directive with a federal law mandating energy certificates that inform potential buyers and tenants about the thermal quality of buildings. Second, the provinces agreed to update their thermal standards for new and refurbished buildings in compliance with the standardized procedure set out in the EU directive (OIB, 2007; Amann and Hüttler, 2007). Finally, federal and provincial governments concluded a federal agreement (BGBl. II Nr. 19/2006) that aimed to better use provincial housing promotion schemes for improving the thermal quality of new buildings, and for promoting thermal refurbishments (Amann and Hüttler, 2007). While the EU spurred vertical interactions between federal and provincial actors domestically, the outputs of the new policies were poor: the thermal minimum standards were again far behind the status quo, and the housing promotion schemes had only very small effects on refurbishment rates (RH Rechnungshof, 2009). In 2009, shortly after climate change concerns peaked worldwide, a package deal with the provinces enabled the federal government to negotiate another federal agreement on building standards (Streimelweger, 2010, 548),<sup>14</sup> and it brought further improvements. The provinces agreed to raise the unambitious standards from 2006 in 2010 and 2012. The agreement conveyed minimum standards that exceeded some of the existing ones in all provinces (RH Rechnungshof, 2009; Amann, 2010), but not all standards in all provinces (Steurer and Clar, 2015). More importantly, the 2010 standard for single-family homes was again lagging behind the status quo of new buildings, and only the one for 2012 closed the gap. In 2010, another EU directive on the energy efficiency of buildings (2010/31/EU) updated the calculation and certification of the energy performance of buildings, and it required nearly zero-energy buildings as common standard in the future. The federal government updated the federal law on energy certificates in 2012,<sup>15</sup> and the provinces are still in the process of updating their building regulations, rather sluggishly, in two more iterations.<sup>16</sup> Based on the EU regulation, new buildings must be almost CO<sub>2</sub> neutral from 2021 onwards (Ministerium für ein lebenswertes Österreich, 2015, 23).

<sup>12</sup> For more details on the Austrian case, see Steurer and Clar (2015), for Switzerland see Casado-Asensio and Steurer (2016b).

<sup>13</sup> <http://www.klimaaktiv.at/bauen-sanieren/gebaeuedeklaration.htm> (accessed 13 May 2016).

<sup>14</sup> BGBl. II Nr. 251/2009: *15a-Vereinbarung zur Emissionsreduktion im Gebäudesektor*.

<sup>15</sup> EAVG Energieausweis-Vorlage-Gesetz 2012: Bundesgesetz über die Pflicht zur Vorlage eines Energieausweises beim Verkauf und bei der In-Beitrag-Gabe von Gebäuden und Nutzungsobjekten.

<sup>16</sup> <http://www.oib.or.at/> and <https://www.oib.or.at/node/1616469> (both accessed 14 May 2016).

Since the provinces geared their housing promotion schemes rather slowly towards promoting energy efficiency, the federal government intervened also here with a ‘refurbishment cheque programme’ (‘Sanierungsscheck’). Apart from stimulating the then depressed economy, the programme also aimed to approximate the notoriously low refurbishment rate of around 1% to the 3% demanded in the federal climate strategy from 2007 (Oberhumer and Denk, 2014). In 2009, it provided €61 million for the refurbishment of residential buildings and nearly €40 million for the refurbishment of commercial buildings, and this resulted in a modest increase of refurbishments by 0.5% (WIFO et al., 2010). Without explanation, the federal government suspended the refurbishment cheque programme in 2010 (Lebensministerium, 2012) and re-introduced it for 2011–2014 with similar annual budgets.<sup>17</sup> Surprisingly, the federal intervention did not lift the refurbishment rate above 1% (Oberhumer and Denk, 2014).<sup>18</sup> Since the provincial housing promotion subsidies for refurbishment projects amount to about €700 million annually (Oberhumer and Denk, 2014), why was the effect of the comparatively big federal programme negligibly small? According to federal representatives, the experts we interviewed, and the Austrian Court of Audit (RH Rechnungshof 2009), its desired effect was cancelled out by subsequent cuts of provincial subsidies for thermal refurbishment (see also Amann, 2010; Oberhumer and Denk, 2014).<sup>19</sup> We asked our interviewees whether this zero-sum game of provincial and federal refurbishment subsidies happened unintentionally, and if so, why. According to a key policymaker, the federal government did not consider this scenario and therefore neglected to coordinate its intervention with the provinces. Even worse, it did not attempt to rectify this failure later on when the zero-sum character of the federal intervention was revealed. Consequently, the annual refurbishment rate is still around 1% and climate change mitigation in the building sector far below its desired potential (Oberhumer and Denk, 2014).

## 5.2. Switzerland

The storyline of greening the building sector in Switzerland is very similar to the one in Austria: Swiss cantons also altered building standards and refurbishment subsidies in several small steps, but most of them were due to federal and EU interventions. Although inter-cantonal coordination of energy policies has existed since 1979 and

the Federal Council developed non-binding energy prescriptions for new buildings in the 1980s (BFE, 2005), these initiatives were ineffective (Braun, 2003; BFE, 2011). This changed in 1990 when energy policy competences were broadly enshrined in the Swiss Constitution, and federal actors intensified their interventions in cantonal building policies. In 1992, the federal Energy Office passed a building refurbishment initiative (see below), and it facilitated a non-binding ordinance on nationwide building energy standards (“Model Ordinance for Rational Energy Use in Civil Engineering” of 1992; see Strebel, 2011). However, as various federal level interviewees declared, most cantons were sceptical: while some stopped attending Conference meetings, most others rejected the ordinance because they opposed any kind of federal intervention in cantonal responsibilities. Since a few front-running cantons (such as Bern and Basel-Stadt) improved their energy standards on their own and took advantage of the federal programme, cross-cantonal regulatory differences even widened.

In 1998, a federal energy act clarified the repeatedly contested distribution of responsibilities for energy policies (BFE, 2011). Concerning building policies, the act confirmed that cantons set and implement the energy standards for old and new buildings and regulate the use of renewable and non-renewable energies for heating and hot water. However, it also enabled the federal government to intensify its interventions, for example, by passing energy framework legislation, to consult and monitor cantons concerning energy issues, and to support cantonal building policies with federal subsidies and goal-based global contributions (Strebel and Widmer, 2012). As we show below, federal actors put this option into practice immediately. The Energy Act from 1998 also rendered inter-cantonal coordination obligatory, and it gave the Energy Conference (mainly driven by cantons pioneering energy efficiency) an open mandate to negotiate new cantonal “model prescriptions on energy efficiency” (MuKEN; see also Sager *et al.*, 2014). Although not legally binding, the basic MuKEN<sup>20</sup> module of 2000 improved the energy standards of new and retrofitted buildings considerably, but still at relatively unambitious levels (BFE, 2005, 2011; Strebel and Widmer, 2012). More ambitious optional MuKEN modules were adopted so that leading cantons could guide others in going beyond the basic prescriptions, but this rarely happened (cantonal interviewee). Although cantonal implementation of the MuKEN was foreseen until 2003, it took several years longer.<sup>21</sup> In addition, harmonization across cantons was again hampered because cantons transposed modules differently (BFE, 2005; Sager *et al.*, 2014).

<sup>17</sup> [http://www.umweltfoerderung.at/kpc/de/home/umweltfrderung/fr\\_private/energiesparen/](http://www.umweltfoerderung.at/kpc/de/home/umweltfrderung/fr_private/energiesparen/) and [http://www.umweltfoerderung.at/kpc/de/home/umweltfrderung/fr\\_private/energiesparen/](http://www.umweltfoerderung.at/kpc/de/home/umweltfrderung/fr_private/energiesparen/) (both accessed 28 July 2013).

<sup>18</sup> See also <http://wirtschaftsblatt.at/home/life/immobilien/1227532/index;> [http://www.ots.at/presseaussendung/OTS\\_20130314\\_OT0093/endlich-konsens-bei-der-zweckbindung-der-wohnbaufoerderung](http://www.ots.at/presseaussendung/OTS_20130314_OT0093/endlich-konsens-bei-der-zweckbindung-der-wohnbaufoerderung) (both accessed 28 July 2013).

<sup>19</sup> <http://derstandard.at/1378249110083/Eigenheim-ohne-Foerderung-im-Trend> (accessed 16 September 2013).

<sup>20</sup> MuKEN stands for “Mustervorschriften der Kantone im Energiebereich”, namely, Cantonal Model Prescriptions in the Energy Area.

<sup>21</sup> In 2003, 15 of the 26 cantons had implemented the basic module. By 2007, 25 of the 26 cantons did so (BFE, 2003, 2008).



The cantonal “model prescriptions” on energy efficiency and the federal intervention possibilities represent first breakthroughs in the vertical integration of the hitherto highly fragmented Swiss building sector. However, like in Austria, the 2002 EU Energy Efficiency of Buildings Directive and the 2006 EU Action Plan for Energy Efficiency quickly rendered the improved standards obsolete. Arguing that inter-cantonal harmonization was not capable of developing nationwide standards that met EU requirements in time, the federal government threatened to co-opt additional cantonal energy competences (BFE, 2011; Sager *et al.*, 2014; federal and cantonal interviewees). Against this background the cantons agreed to improve their standards faster and more stringently via a new round of Conference negotiations from 2007 onwards (Ingold, 2010, 2011). In 2008, 50% stricter building standards, an energy label for buildings (consistent with EU requirements), a mandatory target for non-renewable energy use that was optional under the MuKEn 2000, prescriptions for large consumers, and a prohibition of electric resistance heaters (EnDK, 2008) were passed by the Energy Conference two years ahead of what was originally planned, all to be implemented by 2010. To empower these new MuKEn standards, the federal Energy Act was revised in 2009, effectively giving more legal weight to the inter-cantonal agreement. Although it is too early to evaluate the effectiveness of these changes because cantons finalized implementation not before 2014, policymakers expect it to be substantial (BFE, 2011; Sager *et al.*, 2014).

As with building standards, promoting refurbishment was originally the sole responsibility of the cantons, but only a few pioneers introduced respective programmes early on. Thus, the constitutional reform of 1990 prepared the ground for a more active role of the federal government in this area (BFE, 2011). The Energy2000 action plan, for example, included not only new building standards (see above), but also aimed to promote the refurbishment of buildings with federal subsidies. Since federal and cantonal funds had to be matched, the pioneer cantons modified their own refurbishment programmes in line with federal requirements, and only a few others launched new ones (Basel-Landschaft, Fribourg, Lucerne, St Gallen). While evaluations show that federal funds had accelerated refurbishment in participating cantons, the majority showed no interest in the federal programme (BFE, 2011).

Based upon the Energy Act of 1998, the Energy Office replaced Energy2000 with the broader SwissEnergy programme (“EnergieSchweiz”) in the year 2000. Among other things, it continued to co-finance refurbishment programmes in cantons that were willing to adopt at least the MuKEn 2000 standards for retrofitted buildings. SwissEnergy also strengthened vertical integration and trust between federal and cantonal policymakers, *inter alia* by increasing the involvement of the federal Energy Office in the Energy Conference (cantonal interviewees). It also enabled the Energy Office to monitor the implementation of refurbishment programmes based on regular visits and

cantonal self-assessment reports. However, Swiss federalism also complicated this endeavour: since no agreement was reached on the structure and contents of cantonal self-assessments, reports were so unreliable that some laggard cantons suddenly appeared to be among the pioneers (BFE, 2008; federal interviewees). Consequently, the GHG emission reductions of the programme are unknown.

In 2005, the Climate Penny Foundation launched another Buildings Programme that initially competed with and later was merged with SwissEnergy (BFE, 2008; federal interviewee). The programme aims to promote building refurbishment and the modernization of heating systems through subsidies provided by federal and cantonal authorities in equal shares and negotiated in so-called “convention programmes”. While the effects of the merged Buildings Programme on refurbishment rates and carbon emissions are unclear (federal interviewee), it is well documented that the full potential of the programme was not exploited by the cantons until 2013 (for details see Casado-Asensio and Steurer, 2016b).

## 6. Comparison

Although Austrian provinces and the Swiss cantons are solely responsible for building policies, most of them did not implement green building standards and housing promotion schemes (the two key instruments for improving the energy efficiency of buildings) on their own, but only after federal and/or EU interventions. Then, most of them only did what EU directives or federal agreements required them to do, sometimes with considerable delays. This brings us to key actors and governance processes. Since the Environment Ministry in Austria and the Environment and Energy Offices of the Environment Department in Switzerland were the key actors in the two cases, we can conclude that federal actors were the main driving forces behind the greening of provincial building policies. They repeatedly negotiated policy changes with provincial/cantonal policymakers, and occasionally they even implemented complementary federal policies. While provincial policy changes required extensive vertical coordination in both countries, some differences stand out. In Austria, federal actors focused their vertical coordination efforts on adopting general policies (i.e., two mitigation strategies and a climate change act), and on a series of binding federal agreements on thermal building standards. Since provincial policymakers repeatedly ignored (or even opposed) general mitigation policies, several federal agreements were required to advance CPI in the provinces. Although the agreed standards were usually behind the status quo of new buildings, they nevertheless raised awareness for CPI and improved building standards on average (at least from 2009 onwards). In Switzerland, extensive vertical coordination is a normal condition of policymaking. Consequently, respective efforts were commonplace and not focused on a few federal policy interventions. This also had

positive implications for federal building policies meant to complement cantonal ones. The “gigantic infrastructure” (Tschäni, 1987: 90) of vertical coordination across Switzerland produced a thought-through subsidy regime for thermal refurbishment, co-financed by the federal government and the provinces. In Austria, by contrast, a lack of coordination turned a federal refurbishment programme that was meant to complement provincial subsidies into a federal zero-sum game, that is, the provinces cut their refurbishment subsidies in proportion to federal spending. The Austrian climate protection law from 2011 and the Swiss Carbon Acts from 1999 and 2011 replicate this pattern: While the Swiss act was one of the first worldwide that induced policy change (although not exactly as intended), the Austrian law was unable to solve the impasse between federal and provincial actors, and it was too little too late for the Kyoto Period that ended in 2012.

If federal actors failed to coordinate the greening of provincial/cantonal building policies, EU directives came into play in both countries. The most remarkable similarity is that sub-national building policymakers in both countries did not transpose EU rules directly but waited until they were pressured to do so by “federal intermediaries”, not because of lack of expertise and/or funds, but simply because most of them were not interested in environmental issues. This applies in particular to the EU Energy Efficiency of Buildings Directive from 2002. Its transposition required federal interventions in Austrian provinces and Swiss cantons for several years. Yet, the edge Switzerland has gained over Austria in mitigating climate change materialized also here. While Austria became active only after the EU opened infringement procedures in 2006, the Swiss cantons became active after the Swiss federal government threatened to intervene a few years earlier.

While EU interventions helped to green the building sectors in both countries, Austria’s EU membership also had an opposite effect on climate change mitigation in general, which is often overlooked. Since Article 7 of the Kyoto Protocol allows its parties to participate in emissions trading “supplemental to domestic actions”, the non-EU member Switzerland had to deliver domestic GHG emission cuts and made only light use of emission trading. In contrast, Austria closed its entire 18.9% gap between the Kyoto Target and actual emissions (for details see Table 1) with cheap emission certificates worth about 700 million euro (Steurer and Clar, 2015). This was possible because the EU 15 was party to the Kyoto Protocol, and Austria was free riding on emission cuts achieved by other member states. Since EU membership usually has positive effects on national environmental policies (Tobin 2017), the Austrian case is a remarkable exception to this rule, made possible by the quoted “loophole” of the Kyoto Protocol. This is one of the root causes for why Austria became a laggard in mitigating climate change, visible in particular in comparison to Switzerland (for complementary explanations that implicitly build on this one, see Tobin, 2017 and Steurer and Clar, 2015).

## 7. Concluding discussion

What role did federalism play in reducing GHG emissions in the building sector? Our findings summarized above do not point towards federalism facilitating mutual learning and a positive competition towards climate change mitigation unleashed by sub-national pioneers. On the contrary, our empirical material shows repeated instances of how federalism in Austria and Switzerland was responsible for slow and inadequate progress in greening the building sector of both countries. Most policy changes did not emerge bottom-up in the provinces/cantons, but they were due to EU and/or federal interventions that relied on complex vertical interactions. The important role EU and federal interventions played repeatedly in greening sub-national building policies, and the lack of mutual learning and sub-national policy diffusion from pioneers to laggards both emphasize the passive stance most provinces have taken towards climate change mitigation. On this empirical ground, we conclude that without Europeanization and frequent federal interventions, greening provincial building policies in the two countries would have advanced much slower (if at all). If provinces and cantons would have been the main drivers behind CPI in the building sector, these vertical interactions would not have been necessary. We also did not find “iterative federalism” in the sense that federal authorities innovate policies by singling out one or a few states for special regulatory endeavours before making them applicable to all (Carlson, 2008). The few front-running provinces/cantons certainly helped the federal governments of the two countries to improve regulatory building standards nationwide, but mainly in the sense that the sub-national opposition federal actors usually faced was not an unanimous block. In short, the empirical evidence summarized above shows that the building sectors of the two countries became more efficient despite, not because of federalism. Since federalism triggered neither a race to the top nor one to the bottom, the metaphor that summarizes our findings best is federalism as “a multi-level steeplechase” that further complicated an already complex policy challenge.

Since this finding is in contradiction with climate policies in the US (see Section 1) we cannot generalize it for all federal countries and settings. However, if we take a closer look at how California (a state much bigger than the two countries analysed here) struggles with convincing its counties to pursue climate change mitigation, resemblances re-emerge.<sup>22</sup> Thus, we conclude further that the relationship of federalism and climate change mitigation also depends on various intervention variables, among them the federal government’s position on climate change mitigation, their disposition to engage in “iterative federalism” as described by Carlson (2008), and perhaps also the size of a country. Regarding the

<sup>22</sup> See e.g. [http://www.opr.ca.gov/docs/2016\\_California\\_Jurisdictions\\_Addressing\\_Climate\\_Change\\_Summary.pdf](http://www.opr.ca.gov/docs/2016_California_Jurisdictions_Addressing_Climate_Change_Summary.pdf) (accessed 12 January 2018). We thank one of the reviewers for pointing this out.

latter, federalism in large countries enables regional governments to fine-tune climate change mitigation to regional circumstances (including popular support). However, with less than 10 million inhabitants and national territories comparable to small US states such as Maine, there is no functional need for decentralized building policies in Austria and Switzerland. Regarding the significance of federal politics, a few pioneering provinces/cantons could have made a noteworthy difference—if the Austrian and Swiss federal governments rejected climate change mitigation. However, since the two cases analysed here are different to the US with regard to federal politics, they are also different regarding the role of federalism in climate change mitigation.

Since our findings are based on two qualitative case studies, our conclusions can be generalized analytically but not empirically or statistically (Yin, 2003). Although they show how challenging it is to better understand complex issues such as climate change mitigation in federal polity settings, and although in particular our main conclusions highlight the interpretative nature of scientific evidence, we are confident that they can be replicated for most decentralized CPI challenges in (small) federal countries that adopted climate change mitigation targets but failed to share them with sub-national authorities. Since this applies only to two other European countries (Belgium and Germany), this claim should be tested empirically. Another line of research worth pursuing is an extended comparison with the building policies of two unitary countries with high heating demand (such as Finland and Sweden). Apart from testing the validity of our conclusions for federal countries, this most dissimilar case design would also shed light on how climate change mitigation is pursued in a policy field shaped by different polity settings.

The following two recommendations can be drawn from our findings. First, since federalism in Austrian and Swiss building policies is no longer functional, the polity setup should be questioned critically. Decentralized building policies may have been functional when they were mainly concerned with aesthetics (and safety issues) in a time before climate change. Nowadays, the polity setup should be re-matched with the main problem characteristics faced by the sector, i.e. energy efficiency (for more details on the matching challenge in climate policy making, see Steurer and Clar 2018). Although horizontal policy integration can be as challenging as vertical interactions (Peters, 1998; Steurer, 2007), integrating energy efficiency concerns into building policies within the same government (ideally within the same ministry) that is committed to reduce GHG emission seems parsimonious compared to negotiating respective agreements between one or more federal actors on one hand, and nine provincial or 23 cantonal governments on the other. While putting this recommendation into practice is difficult in Austria's "crystalline federal system" (see Section 2), there is a chance to further strengthen federal actors in Switzerland because its political system was repeatedly subject to reforms in recent decades.

Second, while Hudson asserted, "[f]ederal systems present more difficulties for international treaty formation than

perhaps any other form of governance" (Hudson, 2012), we found that Austria and Switzerland had no difficulties in negotiating and adopting the Kyoto Protocol—but in implementing it domestically afterwards. This was due to the fact that both governments have adopted the Kyoto target without consulting the provinces/cantons. By doing so, they detached the international obligation from vital sub-national policies, and as shown above a complex web of vertical interactions, was necessary to rectify this shortcoming. As both cases show, first agreeing on targets internationally and later trying to share them domestically is easy prey of federal politics. Why should provinces share efforts they never agreed upon? To avoid similar problems in the future, federal governments should synchronize international (or European) and domestic effort sharing negotiations early on so that they can hold sub-national governments accountable for meeting targets. This gives federal actors the opportunity to divert international political pressure at least partially to sub-national actors in case the latter reject ambitious targets for sectors for which they are responsible. The fact that all four federal countries in Europe (i.e., Austria, Belgium, Germany and Switzerland) failed to negotiate mitigation targets with sub-national authorities suggests that national governments have taken target-setting for climate change mitigation rather lightly so far (Casado-Asensio and Steurer, 2016a). Federal governments are well advised to review this practice carefully once mitigation targets become more ambitious – and more difficult to reach.

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## Appendix A: List of interviews for Austria

### A.1. Non-governmental experts

Organisation	Date
Austrian Society for Environment and Technology (ÖGUT)	1/8/13
Austrian Court of Audit; Division 2B3 Comprehensive Environmental Protection/ Agriculture and Forestry	29/1/13
Austrian Institute of Economic Research (WIFO)	4/4/13

### A.2. Federal policymakers

Organisation	Date
Federal Ministry of Agriculture, Forestry, Environment and Water Management; Division V/2 Environmental Economics, Energy Policy	15/1/13
Federal Ministry of Agriculture, Forestry, Environment and Water Management; Division V/4 Air Pollution Control and Climate Protection	22/1/13
Federal Ministry for Transport, Innovation and Technology; Division III/1 3 Energy- and Environmental Technologies	29/1/13
Federal Ministry of Agriculture, Forestry, Environment and Water Management; Division V/4 Air Pollution Control and Climate Protection	29/1/13
Federal Ministry of Economy, Family and Youth; Task Force Klima	31/1/13
Federal Chancellery; Division IV/2 Environment, Sustainability, Transport	2/6/13
National Assembly; Committee on the Environment	

### A.3. Provincial policymakers

Organisation	Date
Office of the Styrian Provincial Government; Climate Protection Coordination	13/2/13
Office of the Styrian Provincial Government; Energy Officer	13/2/13
Office of the Styrian Provincial Government; Energy and Housing Department	14/2/13
Office of the Upper Austrian Provincial Government; Climate Protection Officer	

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## Appendix B: List of interviews for Switzerland

### B.1. Non-governmental experts

Organisation	Date
Scientific expert	16/1/13
World Wildlife Foundation (WWF)	14/14/13

### B.2. Federal policymakers

Organisation	Date
Federal Office for Spatial Development	17/1/13
Federal Department of the Environment, Transport, Energy, and Communication	17/1/13
Conference of Cantonal Energy Directors	14/1/13
Federal Finance Administration	16/16/13
Federal Office for the Environment	15 & 16/1/13
State Secretariat for Economic Affairs	15/1/13
Swiss Federal Office of Energy	16 & 17/1/13

### B.3. Provincial policymakers

Organisation	Date
Office for Environmental Integration and Energy, Basel-Stadt	18/1/13
Office for Environmental Protection and Energy, Basel-Landschaft	18/1/13