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

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Abstract

The present paper analyses and compares how federalism in Austria and Switzerland affected climate change mitigation in the strongly decentralised building sectors of the two countries. This is of interest because the environmental significance of federal political systems is still unclear. We first review the literature on federalism in the context of environmental policy-making, and on climate policy integration. We then summarise the polities, governance arrangements, and policies relevant for the focus of the paper. By analysing who initiated and coordinated policies aiming to increase the energy efficiency of buildings at what time, we show that respective policy changes neither emerged bottom-up nor diffused between provinces/cantons but were usually triggered by federal and/or EU interventions. This is remarkable because building policies always were and still are largely in the hands of sub-national actors. We conclude that the building sectors of the two countries became more efficient despite, not because of federalism. To avoid the problems highlighted here we suggest to further centralise building policies (a challenging option for Austria), and/or to engage the provinces/cantons in the process of international target setting early on.

Keywords: Federalism, environmental federalism, climate change mitigation, climate policy integration, building policy, Austria, Switzerland

1. Introduction

Comparing climate change mitigation policies in Austria and Switzerland is interesting for several reasons. On the one hand, the comparison is interesting because they have some policy-relevant characteristics in common. First, they are two small neighbouring countries (with less than 10 Mio inhabitants and a very small share of global greenhouse gas emissions) that committed themselves to cut their greenhouse gas (GHG) emissions under the Kyoto Protocol. While Austria agreed to reduce its 1990 emissions by 13% until 2008-2012 (Umweltbundesamt 2012a, 49), the Swiss target was -8% for the same period. Second, both countries have federal political systems that give their sub-national authorities (i.e. the nine Laender in Austria and the 23 cantons in Switzerland) considerable power in selected policy areas, in particular in building policies. 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 2013a, 25), households in Switzerland have a share of about 18%.[1] Finally, both countries were able to reduce emissions from their growing building sectors substantially. While Austria reduced its 1990 emissions from buildings by 25% until 2012 (Umweltbundesamt 2013a, 70), Switzerland reduced them by about 15% (BAFU 2015).

On the other hand, comparing the two countries is also interesting because of two important differences that should not be overlooked. First, although both countries have federal political systems, Swiss federalism is generally more decentralised than the Austrian one, and it gives the electorate a key role in deciding about policies via plebiscites. Second, 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% with domestic mitigation (BAFU 2013, 2014), Austria did not reduce but increase its GHG emissions by 5.9% above the 1990 level, which was 18.9% above its Kyoto target (Umweltbundesamt 2013a, 50). 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).

Table 1: Climate change mitigation in the Kyoto Period (1990 – 2008/2012)[2]

Country	Population (in millions)	CO2 emissions per capita (tons)	Kyoto target	Domestic GHG emissions	Building sector emissions
Austria	8.5	7.8	-8%	-6%	-25.5%
Switzerland	8.2	4.6	-13%	+5.9%	-15%

Obviously, several puzzles could be addressed when comparing climate change mitigation in the two neighbouring countries, but we have to focus on a central one. What we are interested in is the role federalism played in reducing GHG emissions in the two countries. Did federalism facilitate or hinder climate change mitigation? A good way to answer this question is to focus on a sector with significant GHG emissions that is governed mainly through sub-national authorities. As shown above the building sector fulfils these criteria in both countries. While a simple quantitative analysis would confirm

[1] 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 on 3/2/2016.

[2] Population data are for 2014 and CO2 emissions per capita for 2011, both taken from http://data.worldbank.org/indicator/EN.ATM.CO2E.PC; accessed on 5/14/2016.

what most scholars found for climate change mitigation in the US (i.e. that federalism is helpful in curbing GHG emissions; see section 2), our qualitative analysis concludes that these successes happened despite, not because of federalism.

The country studies summarised and compared here have been conducted in 2013/2014, and they have been published as stand-alone cases.[3] Since we used similar research designs and because we found interesting similarities and differences in the two countries, it is worthwhile comparing them. Both country studies analyse climate change mitigation during the Kyoto period between 1990 and 2012. They 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 policy-makers (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 & Clar 2015; Casado-Asensio & Steurer 2016b). The following section introduces federalism and policy integration as the two main concepts of the present paper. Based on these concepts it also operationalises how we assess the effects of federalism on climate policy-making. Section 3 briefly outlines polity aspects and section 4 some national policies relevant for the core of the case studies presented in section 5, the greening of building policies. Sections 6 compares the two cases and section 7 provide a concluding discussion.

2. Federalism and climate policy integration

"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 policies adopted elsewhere (Keman 2000). For the purpose of our two case studies, it is sufficient to emphasise that the key instruments of both Austrian and Swiss building policies (i.e. building standards and subsidy programs) have traditionally been in the hands of sub-national entities known as Laender (Austria) and cantons (Switzerland). Thus, understanding climate change mitigation in the building sector helps to determine the role federalism plays in environmental policy-making in general, and in climate policy-making in particular.

The effects of federal political systems on environmental policy-making have been studied for decades, but unfortunately "environmental federalism" research produced contradictory findings (Millimet 2013), and several potential pros and cons of federal political systems. On the negative side, federal systems can hinder (environmental) policy-making 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

[3] 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 in meaningful ways. For further details on methods and findings on the Austrian case, see Steurer & Clar (2015), for Switzerland see Casado-Asensio & Steurer (2016b).

or even contradictory and consequently ineffective policies (Peters 1998: 296; Goulder and Stavins 2010; Galarraga et al. 2011: 165). In addition, the economic rivalry between sub-national entities can result in a race to the bottom of environmental standards, in particular when this enhances economic competitiveness (Wälti 2004: 603). 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: 139-157): 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: 761; Chappell and Curtin 2013; Millimet 2013). Second, functionalist approaches emphasise 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: 263). Finally, federalism can bring policy-making closer to the citizens and thereby improve the acceptance of governmental decisions (Millimet 2013: 34).

Some scholars think that it depends mainly on the scale of the environmental problem whether pros or cons dominate. While federal political systems seem to provide the flexibility necessary for solving small-scale environmental problems such as water pollution, they seem to be inadequately fragmented for solving national or global environmental problems such as climate change mitigation (Esty 1996: 570; Macey & Butler 1996: 25; Adelman and Engel 2008). 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 by providing counter-evidence. Since the US never ratified the Kyoto Protocol (Steurer 2003), several studies showed that its federal political system enabled its sub-national units (in particular progressive states such as California) to successfully fill national regulatory voids (Rabe 2007; Lutsey and Sperling 2008; Corfee-Morlot 2009). Based on the US, similar cases such as Canada and Australia[4], and the figures presented above for Austria and Switzerland, one could hypothesise in dissent to the scholarly literature that federal states have considerable advantages in mitigating climate change compared to unitary ones. In the present paper, we test and reject this assumption.

A key to assess the effects of federalism on climate policy-making is whether the federal polity setup resulted in mutual learning and autonomous policy diffusion rendering federal coordination obsolete, or rather in delayed and/or watered-down policies, triggered inter alia through federal coordination. Consequently, we will pay close attention to who the main actors were in greening building policies. If federal (or even EU) interventions played a key role in triggering policy changes, federalism can be interpreted as a hindering factor that was only overcome via coordination from the top. However, before we can analyse our empirical material accordingly, we have to introduce climate policy integration as the dependent variable of our case study.

[4] 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 on 2/2/2016). 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 on 12/18/2015). For the positive effects of federalism in Canada see Rabe 2007, for Canada and Australia see Gordon and Macdonald 2014.

As most industrialised countries, Austria and Switzerland both struggled with implementing effective mitigation policies, inter alia because it requires often disputed policy changes in many sectors at all levels of government (Bartle and Vass 2007: 39). Building on the concept of environmental policy integration (short EPI; Lafferty and Hovden 2003; Jordan and Lenschow 2010), this challenge is often referred to as climate policy integration (CPI). While the ultimate purpose of CPI regarding mitigation is to reduce carbon emissions (also referred to as "CPI as outcome"),[5] the concept is also concerned with the procedural aspects of integration ("CPI as governance"), and the policy instruments implemented to meet these ends ("CPI as output") (Kok and de Coninck 2007; Adelle and Russel 2013). Usually, CPI as governance (e.g. through coordination and negotiation) leads to CPI as output (in the form of laws, subsidies or taxes) that (aim to) curb greenhouse gas emissions (Adelle and Russel 2013). According to the environmental and climate policy integration literatures, the integration of environmental or climate concerns into non-environmental sectors depends on all the factors that shape policy-making in general. To put highly complex policy processes in simple terms, CPI as outcome (or CO_2 emission cuts) depends, inter alia, not only on effective policy mixes (or on CPI as output) and on adequate governance arrangements that facilitate coordination between all relevant actors (or on CPI as governance). CPI as outcome also depends 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).

Obviously, the key challenge of CPI in any state setting is to integrate climate concerns into other (non-environmental) sectors at the same level of government. However, as our case studies demonstrates, 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 Laender and canton governments have integrated climate change mitigation concerns horizontally into their building policies but also what role vertical interactions between federal and sub-national actors played in this regard. In addition, we are also interested in how far good practices diffused among Laender and cantons.

3. Climate change mitigation polity in Austria and Switzerland

Although the political systems of Austria and Switzerland are both federal ones they are quite different. Before we dive into the details of national and regional climate policy making in the two countries, we briefly introduce the polity aspects that are relevant for understanding our cases.

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.[6] 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. Alt-

[5] Note that CPI as outcome in the context of climate change adaptation is concerned with reducing vulnerabilities and enhancing resilience.

[6] The full names of the three ministries are Federal Ministry of Agriculture, Forestry, Environment and Water Management; Federal Ministry of Science, Research and Economy; Federal Ministry for Transport, Innovation and Technology (status May 2016).

hough Austria is a federal state that gives the nine provinces limited formal responsibilities (Schneider & Bröthaler 2012, 13; Erk 2004), they do have the right to decide and to act on a few policy issues, building policies being one of them. The Austrian Laender 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 big) provinces have considerable informal influence on federal policy-making (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 federal agreements on improving building standards and altering subsidy schemes, and it can introduce new subsidies (if tolerated by the provinces). Shifting competencies from provincial to federal governments has been discussed repeatedly in the past but proofed politically infeasible because the provinces usually pressure against such changes at their expense (Karlhofer & Pallaver 2013; Bußjäger 2003; Sickinger 2002).

Although federalism in Switzerland is more pronounced than in Austria, the key actor in climate policy-making 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 part of the Environment Department) (UVEK 2011: 12). For this purpose, the Environment and Energy Offices in the Environment Department rely on several federal and cantonal Conferences (Schenkel 2000: 172), 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 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 (even fiscal ones), again fully including building policies (Strebel and Widmer 2012).[7] While vertical coordination between federal and cantonal actors in Austria relies heavily on federal agreements, Switzerland relies on a "gigantic infrastructure" (Tschäni 1987: 90) of coordination that aims to reconcile cantonal and federal interests in a variety of policies (Bolleyer 2006: 8; Vatter 2008: 22; Füglister 2012; Füglister 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 policy-making (Fleiner 2009). In contrast to Austria, the Swiss federal government adopted a constitutional reform in 2007 through which it 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: 105). 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: 87; Bolleyer 2006: 14; Füglister 2012). To avoid this, cantons are usually eager to find common positions and solutions through extensive coordination (Füglister and Wasserfallen 2014: 405).

[7] See also http://www.endk.ch/de/EnDK/Ziel-und-Zweck, accessed on 2/2/2016.

Obviously, Swiss federalism underwent significant changes in recent years while the Austrian polity system remained unchanged (albeit change was repeatedly deemed necessary by many policy-makers and analysts). Thus, it seems that Austria is characterised by "crystalline" and Switzerland by "dynamic federalism": Although the nine Austrian provinces have fewer competencies than the 23 Swiss cantons, they seem to be more immune against federal interventions and competency shifts than their Swiss counterparts are.

4. Federal climate change mitigation policies in Austria and Switzerland

Before we analyse the details of climate policy integration in the building sector we briefly review major federal mitigation policies that were also relevant for greening building policies (for a more comprehensive overview, see Bednar-Friedl et al 2014[8]).

In Austria, federal mitigation policies during the Kyoto Period were dominated by offsetting increasing emissions with the purchase of emission certificates for about Euro 700 Million. 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 has taken 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, 8). Although the strategy was the only noteworthy federal policy that was meant to guide provincial, regional, and local mitigation policies (Wunder 2004, 27), 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 & 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, 8; Lebensministerium 2007, 24). Obviously, the decision to offset increasing emissions not domestically but with emission certificates has long been taken. Nevertheless, 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. Although formally adopted by the federal government, most interviewees agreed that the revised climate strategy was politically even less relevant than its predecessor was (see also Warnstorff 2011, 29).

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, 77f), 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

[8] For Austria, see also http://www.lse.ac.uk/GranthamInstitute/legislation/countries/austria/; for Switzerland, see http://www.lse.ac.uk/GranthamInstitute/legislation/countries/switzerland/; accessed on 5/13/2016.

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.[9] 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[10] 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 (Oberösterreichische Landesregierung 2013; Landesregierung Steiermark 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 case sectoral targets will not be met. Consequently, the provinces cannot be sanctioned in case they fail to meet the disputed building sector target. This also hampers the 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 policy-makers 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 section5), 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 stabilise that years' 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 & Steurer 2014). In 1992, federal environmental, economic and fiscal units discussed a carbon tax (Schenkel et al. 1997; Knoefpel 1997; Clivaz 2001: 33), 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 fore-

[9] http://www.parlament.gv.at/PAKT/VHG/XXIV/NRSITZ/NRSITZ_00124/ SEITE_0261.html, accessed on 9/25/12.
[10] The social partners include the Austrian Economic Chambers, the Chamber of Labor, the Chamber of Agriculture, and the Austrian Trade Union Federation.

saw two successive tracks, both managed by the Environment Office (Ingold 2010: 45) 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: 53, see also section 5.2), and the introduction of two emission reduction targets: 15 per cent for heating and 8 per cent for motor fuel emissions by 2010 compared to 1990.[11] 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. USD 230[12] per t/CO_2), 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: 46). 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 approx. one US cent. The revenues, administered by a newly created private body (the Climate Penny Foundation), were used to subsidise building refurbishment (see the following sub-section) and purchase emission certificates (Schäfer 2009: 692).

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: 52). In 2007, they resulted in the introduction of a heating fuel tax (starting at USD 13 per t/CO_2; raised to USD 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. USD 133 per t/CO_2 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 CO2 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 mitigation 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, 139), the new target resembles merely the stabilisation of 1990 emissions.

5. How constant federal dripping wore provincial/cantonal stones: Greening the building sectors in Austria and Switzerland

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

[12] All USD amounts in this paper were calculated by the authors based on the exchange rates applicable at the time of approval of the relevant piece of legislation or publication of document.

In the introduction we showed that emissions from the building sector declined significantly in Austria and in Switzerland. Since building policies are fully decentralised in both countries, it seems that federalism facilitated the greening of the building sector after all. However, by analysing the details of who did what and when, this section shows that the opposite is true: apart from improvements unrelated to policy-making, repeated federal interventions were necessary to achieve this.

5.1. Austria

In Austria, the federal government repeatedly negotiate federal agreements on thermal building standards, first in 1980 (mainly to protect people from rising energy prices), then in 1995 (this time to transpose the EU's SAVE directive 93/76). However, both times the thermal standards to be integrated into provincial building codes were far behind the state of the art of new buildings (Steurer 1999, 214; Hütter 2007, 20f). 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 subsidise not only home ownership but also thermal refurbishment, more efficient heating systems, and the use of climate-friendly energy sources in households (Lebensministerium 2002, 17). Since most provinces did hardly change their schemes on their own (AEA & Umweltbundesamt 2005, 18f), 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,[13] 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 1992 was also outdated from the outset, neither the federal nor the provincial governments tried to rectify this (Wunder 2004, 42; Amann 2010, 4). Consequently, the provinces failed to meet some requirements of the EU directive on the energy performance of buildings (2002/91/EC), among them establishing standardised procedures for setting thermal building standards, improving the efficiency of heating/cooling systems, and mandating energy certificates (RH 2009, 29; Amann 2010, 4). 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 standardised procedure set out in the EU directive (OIB 2007; Amann and Hüttler 2007, 9). 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, 9). While the EU obviously 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 2009). In 2009, shortly after climate change concerns peaked worldwide, a package deal with the

[13] http://www.klimaaktiv.at/bauen-sanieren/gebaeudedeklaration.htm; accessed on 5/13/16.

provinces enabled the federal government to negotiate another federal agreement on building standards (Streimelweger 2010, 548),[14] 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 (Amann 2010, 5; RH 2009, 3), but not all standards in all provinces (Steurer & 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,[15] and the provinces are still in the process of updating their building regulations rather sluggishly in two more iterations.[16] Based on the EU regulation, new buildings have to be almost CO2 neutral from 2021 onwards (Ministerium für ein lebenswertes Österreich 2015, 23).

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 & Denk 2014, 86-92). In 2009, it provided € 61 million for the refurbishment of residential and almost € 40 million for commercial buildings, and this resulted in a modest increase of refurbishment projects by 0.5% (WIFO et al. 2010, 5). Without explanation, the federal government suspended the refurbishment cheque programme in 2010 (Lebensministerium 2012, 12) and re-introduced it for 2011-2014 with similar annual budgets.[17] Surprisingly, the federal intervention did not lift the refurbishment rate above 1% (Oberhumer & Denk 2014, 88-92).[18] Since the provincial housing promotion subsidies for refurbishment projects amount to about € 700 million annually (Oberhumer & Denk 2014, 88-92), why was the overall effect of the comparatively big federal programme so small? According to federal representatives, the experts we interviewed, and the Austrian Court of Audit (RH 2009, 45), the desired effect was cancelled out by subsequent cuts of provincial subsidies for thermal refurbishment (see also Amann 2010; Oberhumer & Denk 2014, 92, 110).[19] We asked our interviewees whether this zero-sum game of provincial and federal refurbishment subsidies was intended, and if not, how it can be explained. According to a key policymaker, the federal government did not consider this possibility and therefore neglected to coordinate its intervention with the provinces. Even worse, it did not attempt to rectify this failure later one when the zero-sum game character of the federal intervention was revealed. Consequently,

[14] BGBl. II Nr. 251/2009: *15a-Vereinbarung zur Emissionsreduktion im Gebäudesektor*.
[15] EAVG Energieausweis-Vorlage-Gesetz 2012: Bundesgesetz über die Pflicht zur Vorlage eines Energieausweises beim Verkauf und bei der In-Bestand-Gabe von Gebäuden und Nutzungsobjekten.
[16] http://www.oib.or.at/ and https://www.oib.or.at/node/1616469, both accessed on 5/14/16.
[17] http://www.umweltfoerderung.at/kpc/de/home/umweltfrderung/fr_private/energiesparen/; accessed on 7/28/13. http://www.umweltfoerderung.at/kpc/de/home/umweltfrderung/fr_private/energiesparen/; accessed on 7/28/13.
[18] See also http://wirtschaftsblatt.at/home/life/immobilien/1227532/index; http://www.ots.at/presseaussendung/OTS_20130314_OTS0093/endlich-konsens-bei-der-zweckbindung-der-wohnbaufoerderung; both accessed on 7/28/13;
[19] http://derstandard.at/1378249110083/Eigenheim-ohne-Foerderung-im-Trend; accessed on 9/16/13. http://derstandard.at/1378249110083/Eigenheim-ohne-Foerderung-im-Trend; accessed on 9/16/13.

the annual refurbishment rate is still around 1% and climate change mitigation in the building sector far below its desired potential (Oberhumer & Denk 2014, 88).

5.2. Switzerland

The storyline of greening the building sector in Switzerland is very similar to Austria: Swiss cantons also altered building standards and refurbishment subsidies in several small steps, but most of them only because of federal and EU interventions. Although inter-cantonal coordination of energy policies existed since 1979 and the Federal Council developed non-binding energy prescriptions for new buildings already in the 1980s (BFE 2005), these initiatives were ineffective (Braun 2003; BFE 2011a: 33). This changed in 1990 when energy policy competences were broadly enshrined in the Swiss Constitution and federal actors stepped up their interventions in cantonal building policies since then. 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: 467). 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 2011a: 36). 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, e.g. 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: 394). 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[20] module of 2000 improved the energy standards of new and retrofitted buildings considerably, but still at relatively unambitious levels (BFE 2005, 2011a; Strebel and Widmer 2012). More ambitious optional MuKEn modules were adopted to give leading cantons the possibility to 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.[21] In addition, harmonisation across cantons was again hampered because cantons transposed modules differently (BFE 2005; Sager et al. 2014).

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

[20] MuKEn stands for "Mustervorschriften der Kantone im Energiebereich" – Cantonal Model Prescriptions in the Energy Area.

[21] In 2003, 15 of the 26 cantons had implemented the basic module. By 2007, 25 of the 26 cantons did so (BFE 2003, 2008).

building policy field. However, like in Austria, the 2002 EU Energy Efficiency of Buildings Directive[22] and the 2006 EU Action Plan for Energy Efficiency quickly rendered the improved standards obsolete. Arguing that inter-cantonal harmonisation 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 2011a: 38; Sager et al. 2014: 357; 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 per cent 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 finalised implementation not before 2014, policymakers expect it to be substantial (BFE 2011a; 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 also in this area (BFE 2011a). The Energy2000 action plan, for example, included not only new building standards (see above). It 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 2011a).

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 cofinance 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 greenhouse gas 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: 25; federal interviewee). The programme aims to promote building refurbishment and the modernisation of heating systems through subsidies provided by federal and cantonal authorities in equal shares and negotiated in so-called "convention

[22] The directive was binding for Switzerland because the non-member country is closely affiliated with the EU and transposes most EU rules one-on-one.

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 & Steurer 2016b).

6. Comparison

Based on the details of two cases summarised above we now compare them with regard to the policy instruments used to green the building sector (CPI as policy output) and the underlying governance/coordination processes that triggered them (CPI as governance). The role federalism and respective polity reforms in Switzerland played in this regard are addressed in a concluding discussion afterwards.

In the previous section we have seen that the Austrian provinces and the Swiss cantons are responsible for both key instruments that regulate the building sector: building standards and housing promotion schemes. Of course, these were also the instruments employed to reduce GHG emissions from the building sector in both countries. However, neither the Austrian provinces nor the Swiss cantons embraced CPI on their own but only after numerous federal and EU interventions. Then, most of them did what was required (sometimes with considerable delay) but not more. This brings us to key actors and governance processes. Regarding actors, the federal Environment Ministry in Austria and the Environment and Energy Offices of the Environment Department in Switzerland were the key actors in greening building policies. They usually negotiate policy changes with provincial/cantonal policy-makers, and occasionally also adopted complementary federal policies. Negotiating provincial policy changes made extensive vertical coordination indispensable in both countries, but 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 (often in the context of housing promotion schemes). With the latter, they pushed CPI in provincial building policies in a targeted way. 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 (the latter at the latest with the 2009 agreement). In Switzerland, extensive vertical coordination is a normal condition of policy-making. 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. In Switzerland, the "gigantic infrastructure" (Tschäni 1987: 90) of vertical coordination produced a thought-through subsidy regime for thermal refurbishment, co-financed by the federal government and the provinces. In Austria, in contrast, a lack of coordination turned a federal refurbishment programme that was meant to complement provincial subsidies into a federal zero-sum game because it animated the provinces to redirect their subsidies away from thermal refurbishments. 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 timely, EU directives came into play in both countries in very similar ways. The most remarkable similarity is that sub-national policymakers did not transpose EU rules directly but waited until they were pressured to do so by "federal intermediaries". This applies in particular to the EU Energy Efficiency of Buildings Directive from 2002. Its transposition kept Austrian and Swiss policy-makers at federal and cantonal levels busy for several years. Yet, the edge Switzerland has gained over Austria in mitigating climate change is also visible 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. Exceptions to this rule were a few provinces/cantons that took CPI in the building sector more seriously than others. While the federal systems in both countries empowered them to pioneer climate change mitigation, they were nevertheless unable to trigger mutual learning and/or to diffuse their pioneering policies among their peers, let alone to engage them in a race to the top.

The important role EU and federal interventions played repeatedly in greening sub-national building policies, and the lack of sub-national policy diffusion from pioneers to laggards both emphasise the passive stance most provinces have taken towards climate change mitigation. Thus, it is safe to assume that without Europeanisation and frequent federal interventions, the building sector would have reduced less emissions than it actually did. Although it is very difficult to quantify the effects of federal policy interventions they were certainly not the only reason for declining emissions. Other reasons were the oil price surge in the late 2000s, subsequent fuel switches (mainly from oil to biomass, gas, ambient heat and district heating), and warmer winters (Steurer & Clar 2015; see also Umweltbundesamt 2012b, 67; Umweltbundesamt 2013a, 79). These reasons relativise but don't change our main findings on federalism in climate change mitigation.

7. Concluding discussion

What role did federalism play in reducing GHG emissions from the building sector? As our comparison already summarised, our findings do not point towards federalism facilitating mutual learning and a positive competition towards climate change mitigation unleashed by sub-national pioneers. Instead, we found federalism in Austria and Switzerland to be responsible for incoherent and environmentally inadequate building policies, and for delayed as well as watered down policy changes that were difficult to improve once in place. In this vein, building standards were always behind the status quo of new buildings, and refurbishment rates remained notoriously low so that it could take about 80-100 years to refurbish the buildings stocks in both countries. Even these sluggish policy changes did not come from the provinces/cantons autonomously, but they depended on complex interactions between federal and cantonal actors and policies. Obviously, these vertical interactions were necessary to overcome the obstacles federalism posed for greening building policies. If provinces and cantons were the main drivers behind CPI in the building sector, these interactions would not have been necessary. However, since federalism triggered neither a race to the top nor one to the bottom, the metaphor that summarises our findings best is federalism as "a multi-level steeplechase" that further complicates an already complex policy challenge, at least in countries where federal governments have committed themselves to emission reductions.

Since this finding is in clear contrast to the US climate policy history (see section 1), we cannot generalise it for all federal countries and settings, but we can highlight that the relationship of federalism and climate change mitigation is more complex as a look at the US conveys. Important intervening variables that have to be considered when assessing the role of federalism in climate change mitigation are not only federal positions towards climate change mitigation but, most likely, also the size of the countries. While federalism in large countries enables regional governments to fine-tune climate change mitigation to regional circumstances (including popular support), this functional justification of federalism is absent in the two small countries we analysed - at least for building policies. With less than 10 million inhabitants that see climate change in similar ways across the two countries, and national territories comparable to rather small US states such as Maine, there is no functional need for decentralised building policies in Austria and Switzerland.

From this main finding, we finally draw two policy-relevant conclusions. First, since the federal polity of building policies in Austria and Switzerland cannot be justified on functional but only on historical grounds, the most appropriate (and promising) way to cope with the problems described above would be to centralize building policies. Decentralised building policies may have made sense when they were mainly concerned with safety standards and aesthetics in a time before climate change. Since this has changed profoundly, the polity setup should follow suit. Of course, federal actors would also struggle with greening building policies on their own because policy integration (horizontally or vertically) is rarely an easy task (Peters 1998; Steurer 2007). Yet, after what we have seen above, the challenge of horizontal policy integration within a single or between two ministries in the same government that is committed to reduce GHG emission seems parsimonious compared to negotiations between one or more federal actors on the one hand, and nine provincial or 23 cantonal governments on the other. While putting this conclusion 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 federal political system was repeatedly in flux 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, 1), we found that Austria and Switzerland had no difficulties in negotiating and adopting the Kyoto Protocol - but in implementing it afterwards. This was due to the fact that both governments have adopted the Kyoto target without consulting the provinces/cantons. Consequently, federalism in both countries detached the international obligation from vital sub-national policies on the ground, and as shown above a complex web of vertical interactions was necessary to bridge this detachment. As the Austrian and Swiss 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 synchronise international (or European) and domestic effort sharing negotiations early on so that sub-national governments are obliged to meet own targets. This gives federal actors the opportunity to put international and domestic political pressure on sub-national actors in case they reject ambitious targets for sectors they are politically responsible. The fact that all federal countries in Europe (among them Germany) failed to do so until now suggests that governments have taken target-setting for climate change mitigation rather lightly so far (Casado-Asensio & Steurer 2016a). Governments are well-advised to change this practice when targets become more ambitious and harder to reach. While this applies already to the Swiss 2020 target, Austria is still amidst a grace period that may end as soon as the EU allocates its 2030 target among its Member States.

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