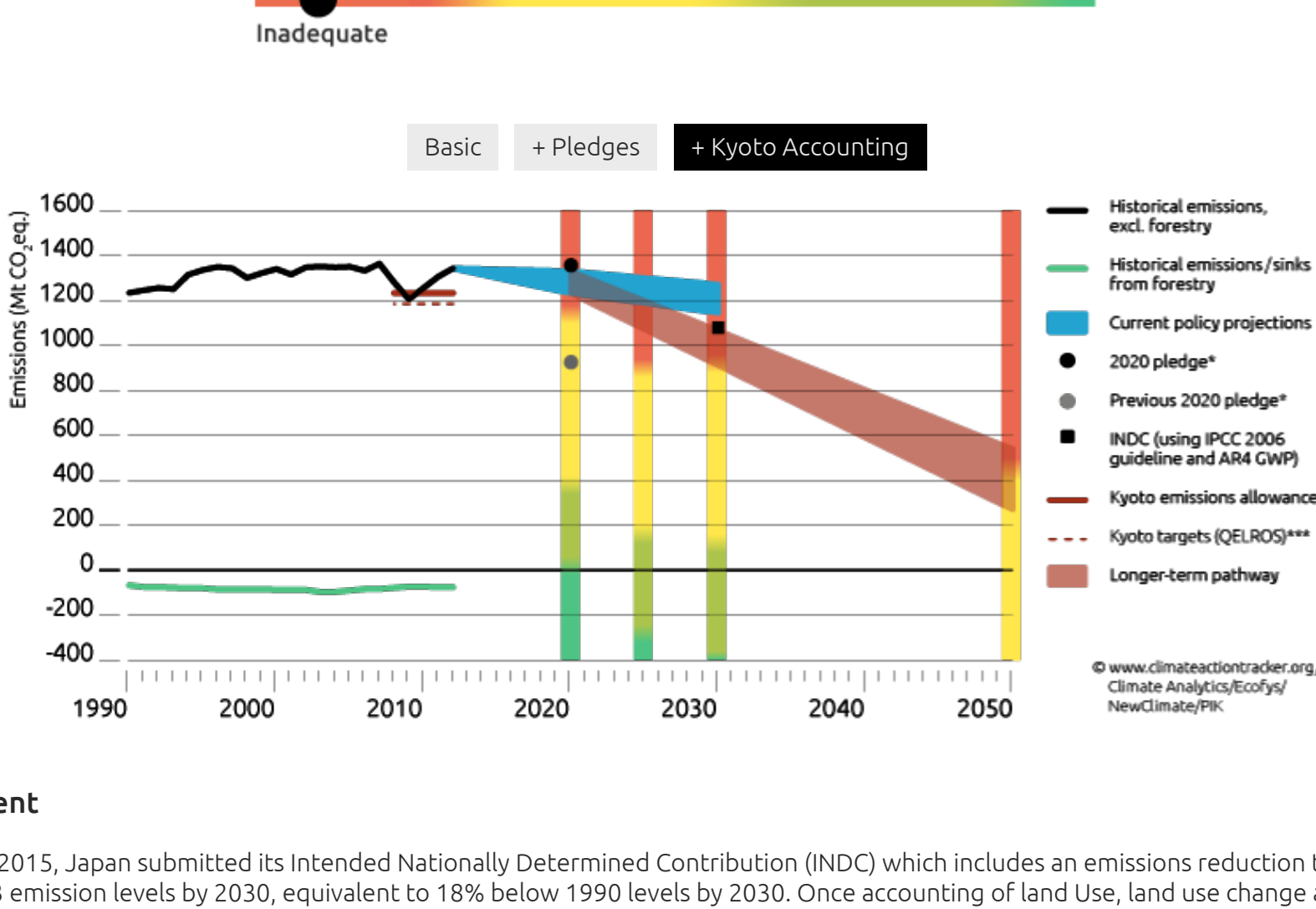




Rating



Assessment

On 17 July 2015, Japan submitted its Intended Nationally Determined Contribution (INDC) which includes an emissions reduction target of 26% below 2013 emission levels by 2030, equivalent to 18% below 1990 levels by 2030. Once accounting of land Use, land use change and forestry (LULUCF) accounting credits that Japan proposes is taken into account this target is reduced to 23.3% below 2030 (15% below 1990) levels of greenhouse gases from fossil fuel and industry.[1] The Japanese Government also proposes using the Japanese Crediting Mechanism (JCM), which could reduce the domestic target further to approx. 16 -20% below 2013 (7 – 11 % below 1990).

We rate this target as “inadequate”: if all countries adopted this level of ambition, global warming would likely exceed 3-4°C in the 21st century. With the policies it already has in place, Japan can almost reach its proposed INDC target without taking any further action.

In addition, the energy strategy that was developed in conjunction with the target is not in line with what is needed to transform Japan’s energy sector to a low carbon economy. Indeed, the contrary is the case, as coal-fired power plants are set to play an increasingly important role in Japan. The share of low carbon options in the energy supply sector will increase only slightly from 37.5% before the Fukushima crisis (2009; IEA 2013) to approximately 42-46% in 2030, if the Government’s stated aim of a 20-22% share of nuclear electricity is reached, or less if this is not the case.

LULUCF is an issue in the INDC, given that Japan, intends to use credits obtained through LULUCF accounting to meet its 2030 target. According to the INDC, the Japanese Government intends to use accounting rules “in line with approaches equivalent to those under the Kyoto Protocol”. This means that the activities of forest, cropland/grazing land managements and revegetation are projected to generate a credit of roughly 2.6% of industrial emissions in 2013. This reduces the effectiveness of the 2030 goal from an 18% reduction from 1990 levels to about 15%.

There is also concern in relation to Japan’s proposed overseas crediting system (JCM). According to the INDC, while no crediting from the JCM system was assumed in calculating the target bottom up, in the implementation of the target JCM credits of a value of 50 – 100 MtCO₂e could be applied to the 2030 goal. These credits are to be obtained from Japan’s own bilateral offset programme that includes the installation of efficient coal power stations in developing countries. This would decrease Japan’s domestic emissions target to app. 16 -20% below 2013 (7 – 11 % below 1990) and could degrade global efforts to decarbonise the energy system.

2020 pledge: In November 2013 Japan revised its earlier 2020 pledge, aiming to reduce its emissions by 3.8% below fiscal year 2005 levels of industrial GHG emissions by 2020. This would be equivalent to an increase of 5.2% above 1990 levels before accounting for Japan’s proposed use of forest management credits, which would add about 3.1% to the allowed 2020 industrial emissions,[2] or, in total, allowing an increase of about 8.3% above 1990 levels. In addition it has been estimated that about 20 MtCO₂e of overseas credits could be used (Kuramochi 2014a), adding a further 1.6% to the allowed domestic emission. After taking into account LULUCF and overseas credits credits, Japan’s 3.8% below 2005 pledge for 2020 translates into a total increase in domestic emissions in 2020 of about 10% above 1990 levels.

The November 2013 revised 2020 pledge was a serious decrease in ambition compared to the original Copenhagen pledge of 25% below 1990 levels. If it follows through on its renewable energy policy, Japan would be on track to meet the revised 2020 pledge without having to use forest sinks and overseas credits, despite the fact that it has stopped the operation of the vast majority of its nuclear power plants. While a weaker implementation of its renewables policy would lead to an emissions level that is 22 MtCO₂e or 1.7% higher than the revised 2020 target, a stronger implementation of renewables could lead to an emissions level that is 67 MtCO₂e or 5.2% lower than the revised 2020 target.

Pledge and post-2020 contribution

Post 2020 target

Japans INDC for the post 2020 period includes an emissions reduction target of 26% below 2013 in 2030, which, we calculate, would correspond to a target of 18% below 1990 levels. The target contains 37 MtCO₂e of credits from LULUCF in 2030. A large share will come from forest management, as it was the case for the pre 2020 target of Japan. This could reduce the effectiveness of the target.

In addition the Japanese Government is intending to allow the use of carbon credits from its bilateral Japanese Crediting Mechanism (JCM). In total the INDC foresees the potential use of credits equalling between 50 – 100 MtCO₂e in 2030, which could reduce the domestic emission reduction target further to 16-20% below 1990.

The apparent absence of consideration of a 2025 target by Japan is a significant issue. The question of the length of commitment periods post 2020 remains unresolved, but many governments are calling for five years (2021 to 2025) in large part due to the risk of locking in low levels of ambition if 2030 is set as the end date for commitments. Japan’s proposed 2030 target confirm this concern.

In parallel to developing its GHG target under the INDC, Japan developed an energy strategy that forms an integral part of achieving this target. This strategy, which is the basis of the calculation of the GHG targets, foresees that 20- 22% of the electricity will be supplied by nuclear energy, 22-24% by renewable energy and the remaining 56% by fossil fuel sources. This strategy stands in strong contrast to what would be compatible with a long-term, 2 degree compatible strategy. Two important aspects highlight why this is the case.

First, the energy strategy foresees a relatively large share of base load power plants (i.e. nuclear and coal fired power plants) of 46% - 48% in 2030 of total electricity production. Increasing the role of base load technologies in an energy system is the diametric opposite of what can be observed in most countries on a path to a low carbon society. Strategies in most countries foresee a significant increase of variable renewable energy resources. This requires a paradigm shift in how energy systems are structured and managed and will increase their complexity. Such shifts take time and require the development and rollout of new technologies such as differently designed distribution networks (see e.g. Bloomberg 2015). Japan’s proposed energy strategy will not only delay this necessary shift, but will also put Japanese industry at a competitive disadvantage with other countries that are currently undertaking these shifts.

Second, fossil fuel power plants will remain having an important role in Japan’s energy mix (56% in 2030), of which 23% are expected to come from coal fired power plants. This share could increase even further as the foreseen nuclear contribution is challenged by the desire of a large portion of the public to phase out nuclear power plants (Reuters 2015). The strategy is paralleled by a recent surge in the planning and construction of coal fired power plants that, according to an independent Japanese NGO, could lead to an increase of Japan’s total GHG emissions of 10% of 1990 emissions or 127 MtCO₂e (Kiko Network 2015). They calculate there are 43 new coal plants in the pipeline, which would add 21.2GW to the system.

2020 Pledge

On 15 November 2013, Japan announced a new pledge to reduce emissions by 3.8% below fiscal year 2005 levels by 2020. This pledge will result in an emissions level of 1,299 MtCO₂e in 2020, which is equivalent to 5.2% above 1990 levels (MOE 2013).

We estimate that LULUCF accounting in the Form of forest management leads to a credit of 38 MtCO₂e in 2020[3], equivalent to about 3.1% of 1990 industrial emissions. As proposed by the Government of Japan these credits will lead to an allowed emissions level under the revised pledge of 1,337 MtCO₂e in 2020, or about 8.3% above 1990 levels. In addition, the use of overseas credits can further increase the total allowed domestic emission levels under the pledge by 20 MtCO₂e to 1357 MtCO₂e in 2020, or 10 % above 1990 levels. This pledge has not yet been enshrined in domestic legislation (Kuramochi 2014a).

Prior to the economic downturn in 2009, Japan’s emissions had been fairly steady (1,300 – 1,370 MtCO₂e) since the mid-1990s. However, the economic downturn, along with the Fukushima catastrophe, has caused much greater fluctuations in emissions over the last five years.

For their original Copenhagen pledge, Japan communicated a target of a 25% emissions reduction below 1990 levels by 2020. This target was conditional on the establishment of a fair and effective international framework, in which all major economies participate, and on agreement by those economies on ambitious targets.

Revision of the original pledge raises the 2020 target by 356 MtCO₂e, and increases the 2020 Emissions Gap (UNEP, 2013) by 3-4%. While the Japanese government claims that this revision is mainly due to the future exclusion of nuclear energy from the energy mix (MOE 2013), our analysis indicates that the revision cannot be fully explained by removing nuclear energy from the energy mix (see box . Instead, it represents a decreased level of ambition (see below and CAT briefing on Japan 2013).

Japan’s Kyoto target (2008-2012) was at -6% relative to base year (1990) emission levels.

Kyoto Protocol	
Member of KP CP1 (2008-2012)	yes
Member of KP CP2 (2013-2020)	no
KP CP1 target (below base year)	-7%
KP CP2 target (below base year)	n.a.
Convention	
Copenhagen pledge	-25% by 2020
Reference year for pledge	1990
Revised Pledge, Warsaw 2013	-3.8% by 2020
Reference year for revised pledge	2005
- Revised pledge relative to 1990	+5.2%
INDC	
INDC published July 2015	
2030 target	-26%
Reference year	2013
- Equivalent Relative to 1990	-18 %
2030 target without LULUCF credits	-23.3%
- Equivalent Relative to 1990	-15 %
Economy wide GHG coverage	LULUCF – forest management credit likely

Decreased pledge a necessary response to reduction in contribution from nuclear energy?

The IEA World Energy Outlook’s Current policies scenario (IEA, 2013) projects that Japan’s nuclear energy would contribute with 220 TWh to Japan’s electricity supply. If all nuclear power in this scenario were to be replaced by coal-powered generation, an extra 197 MtCO₂e would be emitted. This is equivalent to 15% of Japan’s current emissions. As the policies scenario assumes current economic growth rates and no other mitigation, this value represents the upper end of emissions that can be expected from a total abandonment of nuclear power generation in Japan under current policies.

Even in a worst-case scenario in which nuclear was replaced entirely by coal, the expected increase represents only 55% of the increase in emissions from the original Copenhagen pledge to the new 2020 target. The remaining 45% must therefore represent a change in Japan’s political will to reduce emissions.

If the shortfall in supply from attributable to be taken up by oil, gas, or renewables, instead of coal, the portion of the revision in Japan’s target attributable to national circumstances would be much lower. If replaced by oil, the shut-down of nuclear production would represent 38% of the overall reduction in ambition, 23% in the case of gas, and 0% for a scenario where it is fully replaced by renewables.

One option under consideration by Japan to reach the original Copenhagen pledge was to increase nuclear capacity to 40% of total electricity generation. This share could increase even further as the foreseen nuclear contribution is challenged by the desire of a large portion of the public to phase out nuclear power plants (Reuters 2015). The strategy is paralleled by a recent surge in the planning and construction of coal fired power plants that, according to an independent Japanese NGO, could lead to an increase of Japan’s total GHG emissions of 10% of 1990 emissions or 127 MtCO₂e (Kiko Network 2015). They calculate there are 43 new coal plants in the pipeline, which would add 21.2GW to the system.

Fair share

We rate the INDC 2030 reduction target of 26% (23.3% after LULUCF credits) below 2013 levels as “inadequate” as it is only in line with the very least stringent effort sharing categories (capability/costs). Our assessment identifies a relatively large gap[4] compared to the level at which we would rate Japan’s contribution as “medium”. Under our CAT analysis a “medium” rating would require an emission level of 936 MtCO₂e in 2030 or 24% below 1990 emission level, a “sufficient” rating would require an emission level of 137 MtCO₂e in 2030 or 89% below 1990 emission levels. This stands in stark contrast to Japanese claim that the INDC is in line with a 2 °C target.

We rated Japan’s 2020 pledge “inadequate” as the emissions level is higher than a effort sharing category suggests. We would rate Japan’s former target of a 25% emissions reduction below 1990 levels as “medium”. This is slightly stricter than the rating in previous years, as the assessment now includes approaches that allow negative emissions allowances (esp. the GDR approach). For Japan, the categories equal cumulative per capita emissions and responsibility/capability/needs, and in later years also the approaches that focus on capability alone suggest negative emissions allowances.

Current policy projections

Currently implemented policies will lead to emissions levels of between 1,232 and 1,330 MtCO₂e (0%-8% above 1990) in 2020 and 1,145 and 1,272 MtCO₂e (-7% – 3% compared to 1990) in 2030, excluding LULUCF. The range for each year depends on the success of the implementation of Japan’s renewable strategy. The lower end of the range assumes that Japan will meet its renewable energy targets for electricity generation, as put forward in the 2010 Basic Act on Energy policy. The upper end represents a situation where the currently implemented feed-in tariff will exceed this target. This can be achieved by implementing all currently approved RE capacity until 2020 and by continuing RE growth at a similar rate thereafter.

Japan’s feed-in tariff can be regarded as relatively ambitious. At feed-in rates of between 19 and 46 c/kWh, and differentiated tariffs for solar, wind, hydro, geothermal and biomass, the historic experience from other countries shows that feed-in tariffs could lead to an unprecedented renewable energy growth for Japan. Experience in Germany has shown that effective policies can lead to average growth rate in the share of RE of 1.35 percentage points per year[5]. However there are currently a number of barriers in Japan, especially related to access to the grid, which will have to be overcome before this potential can be reaped.

After the 2011 earthquake, the Japanese Government decided to revise its energy policy and committed to reducing its reliance on nuclear energy. In 2013 the government laid out an Innovative Strategy on Energy and Environment that included the goal to phase out nuclear energy. In 2011, nuclear power plants have stopped operating until they will be able to comply with higher safety standards. In 2014, the Government announced the new Basic Energy Plan of 2014 (METI 2014) that calls for a reintroduction of nuclear energy. As of April 1, 2015, 23 reactors in 14 nuclear power plants have applied for a restart under new more stringent safety standards. To date 5 reactors with a total of 4.41 GW have passed the safety examination and have been approved for restart, however none has restarted as of yet (Nuclear Regulation Authority Japan 2015) largely due to local opposition.

An important aim of the Basic Energy Plan of 2014 is to diversify the energy mix away from nuclear towards renewable energy. However, the plan does not specify how the Japanese Government intends to achieve this. The 2010 Basic Energy plan established renewable targets for electricity generation of: 12.5% in 2020 and 7% in 2030. In 2012, the Renewable Energy Act was introduced to support these targets. It institutes a feed-in tariff (FIT) and general funding for distribution networks. As of January 2015 roughly 75 GW (95% of which is PV) have been approved for the FIT. However only 16,7GW of renewables began operating as of January 2015 (Government of Japan 2015).

Before the recently initiated transformation of the electricity supply sector, Japan had already introduced effective policies in the building sector of energy efficiency in transport, industry and buildings. These policies were recently complemented by additional policies in the building sector (Top runner standard for building materials) and a Global Warming Tax. The latter is a low upstream environmental tax at a maximum price of 2.89 US\$/tCO₂e in 2016 and will likely have only have marginal effects on GHG emissions. Furthermore, the GHG impact of these complex recently introduced policies is difficult to quantify, and has not been quantified by other institution yet (Kuramochi 2014a). We have not attempted to quantify these policies for this update yet either.

Assumptions

Post 2020 target

The target for 2030 was calculated using figures of Japan’s National Greenhouse Gas Inventory Report for the year 2013 (Greenhouse Gas Inventory Office of Japan (GIO) Center for Global Environmental Research, National Institute for Environmental Studies, 2015) and Japans INDC. As described in the INDC, we calculate the emission reduction target on the basis of the emission levels for 2030 and 2013 as described in the INDC.

It is important to note that the INDC target cannot be directly compared with the policy pathways shown: Whereas the calculations for the policy pathway use the IPCC 1996 guidelines including GWP from the First assessment report, the pledge calculations are based on the IPCC 2006 guidelines and assume GWP from 4th IPCC Assessment report. Since the official CRF data for the year 2013 was not available as of July 2015 we were not able to convert either calculations to make them comparable. Furthermore this makes a comparison of the pledge to the effort sharing results difficult as these were also evaluated using IPCC 1996 guidelines. However given that the methane emissions in Japan are relatively low and that the gap between the proposed target and the level needed to achieve a ‘medium’ rating under the CAT is relatively large (app. 140 MtCO₂e) we still rate the contribution as inadequate.

Pledge

Targets for 2020 were calculated from fiscal year 2005 according to Japan’s Fifth National Communication to the UNFCCC (2010). We calculated Japan’s LULUCF accounting quantities in 2020 for afforestation, reforestation and deforestation using the current Kyoto rules. For forest management, Japan’s proposed reference level is zero. We also apply a cap on forest management (either 3% of the base year emissions or 15% of the activity whichever is less), since Japan wants to continue using the Kyoto Protocol rules for forest management.

Current policy projections

For the analysis of current policy projections we used the WEO 2014 Current Policy scenario (IEA 2014) which covers various climate related policies and their impact on CO₂ emissions. These datasets were combined with non-energy data from US EPA (US EPA 2012) and EdGAR (JRC/PBL 2012).

The WEO foresees a relatively large share of nuclear energy plants in electricity (20% in 2020 and 14.9% in 2030). While this is supported by the current assumptions of the government, it is not supported by the rate of restart of currently shut down nuclear power plants. We assume a share of nuclear in the electricity mix of 10% in 2020 and 7% in 2030, based on the share of nuclear power plants that have applied for a restart and assumptions on phase out (depending on their relative age). We assumed a restart of the 19 nuclear power plants that applied, assuming that these reactors will be gradually phased out over time, as plants turn older than 40 years.

Furthermore the future development of Renewable Energy in the electricity mix (RE) is highly uncertain as on the one hand a relatively ambitious support scheme exists while on the other hand RE targets are relatively conservative. Therefore we additionally quantified the development of renewable energy in electricity generation. We implemented two scenarios, representing the range of possible future development of RE installation. For the higher emissions case we assumed a RE targets for electricity generation of 12.5% and 20% will be implemented for 2020 and 2030 respectively. For the lower emissions scenario we assumed that the currently existing ambitious feed-in tariff will be successful and lead to growth rates similar to those observed in other countries, here in particular Germany.

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Footnotes

[1] The Japanese INDC submission contains a table with detailed a bottom-up calculation of the 2030 GHG emission reduction target. A total reduction of 26% below 2013 can only be obtained if we interpret the total projected removals from LULUCF activities as credits to be added to the overall allowances in 2030. Further clarity on accounting rules assumed to obtain these credits and on projected emissions from LULUCF activities is needed for the proper assessment of the uncertainties related to these numbers.

[2] Japan's 2013 (revised 2014) First Biennial Report refers to an estimated 38 MtCO₂e credit from forest management in 2020, equivalent to about 3.1% of 1990 industrial GHG emissions.
http://unfccc.int/files/national_reports/biennial_reports_and_iar/submitted_biennial_reports/application/pdf/br1_jpn_resubmission_v02.pdf

[3] In its 2013 BUR Japan states: "In accordance with "Basic Plan for Forest and Forestry" and "Act on Special Measures concerning Advancement of Implementation of Forest Thinning, etc."(2013), the Government will aim to secure the upper forest absorption level agreed in COP17, 3.5% (average of the period from 2013 to 2020) and contribute to the forest sector in the future. In order to achieve these objectives, the Government will work on the following through a variety of policy approaches: appropriate forest development such as thinning and afforestation, the proper management and preservation of protected and other forests, promoting the use of timber and woody biomass, promoting forest development programs where people participate in, accelerated implementation of initiatives to establish sustainable forest management practices, and promoting measures to diffuse seeds and seedlings that grow well"

[4] We explicitly do not mention a number here, please see the methodology section for an explanation

[5] Although Japans electricity grid is different from Germany in that it is an isolated system, experience has shown that low levels of renewable energy penetration do not require large modifications to the system



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