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After Fukushima: A New Role for Energy Taxes in Switzerland

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Outline

1. Preliminary discussion about energy and climate policy

- Role of the state
- Instrument choice

2. The Swiss energy tax project

- Swiss energy production and consumption patterns
- Energy Strategy 2050, climate policy
- Swiss institutional setting

3. Designing the energy tax

- Tax base and tax rate
- Use of tax revenues



1. Preliminary discussion

- **Role of the state**

Energy and climate policy: what justifications for the intervention of the state?

- **Instrument choice**

Incentive taxes versus alternatives

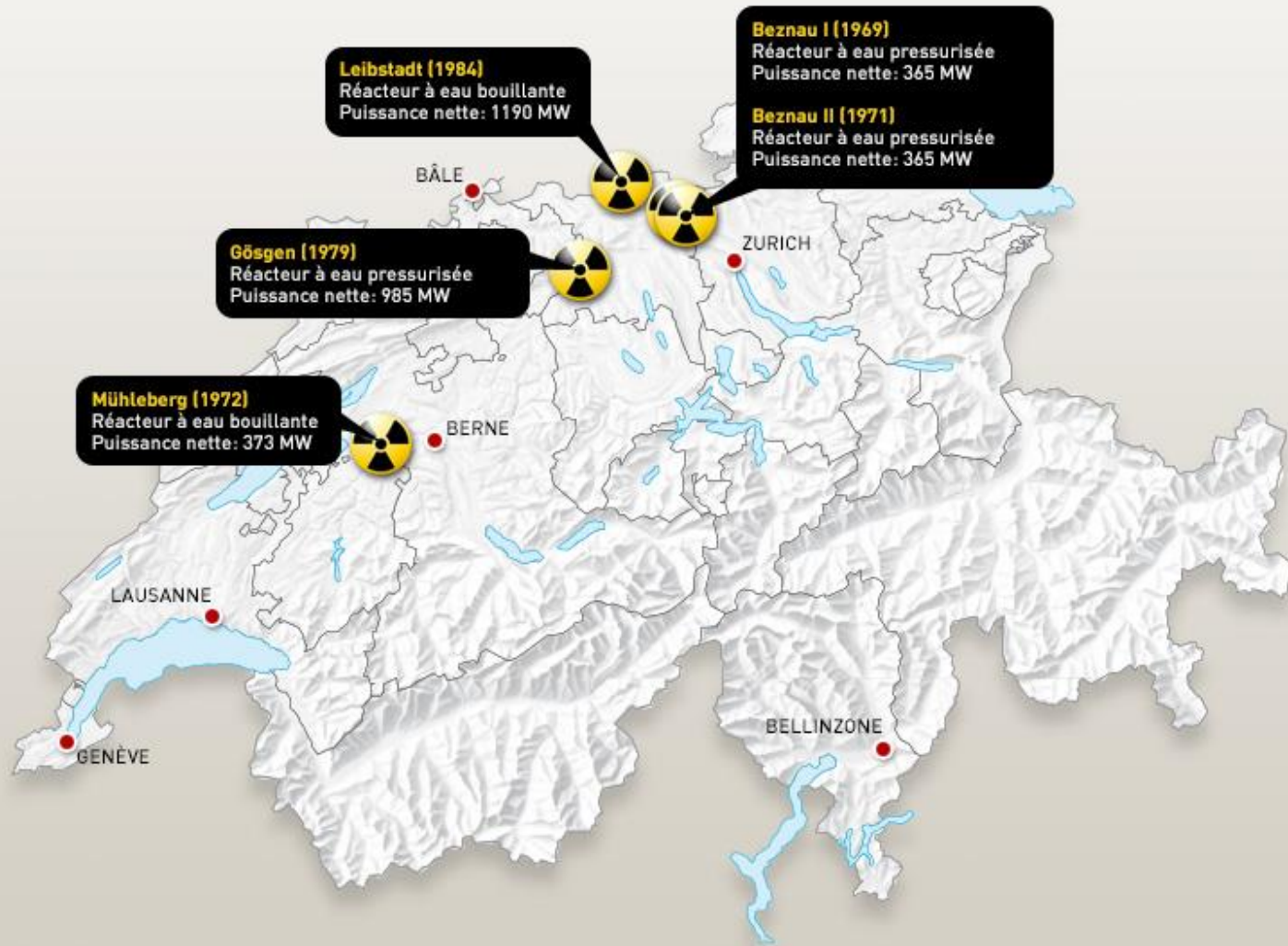


2. The Swiss energy tax project

- Swiss energy production and consumption patterns
- Energy Strategy 2050
- Swiss institutional setting



LES 5 CENTRALES NUCLÉAIRES DE SUISSE

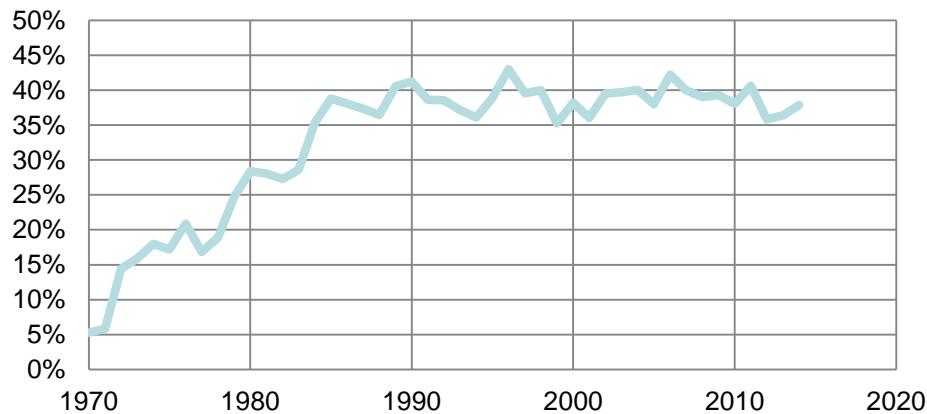


Sources: AIEA, swissnuclear Design: Kai Reusser

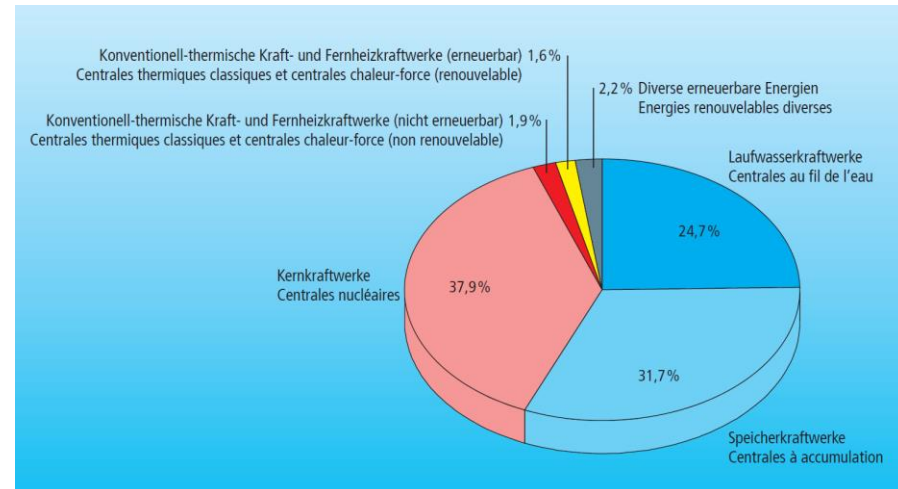


Nuclear power plants produce 40% of electricity in Switzerland

Share of nuclear power plants in Swiss electricity production



Data: « [Production d'électricité selon le type de centrales](#) »



Source: « [Statistique suisse de l'électricité 2014](#) »

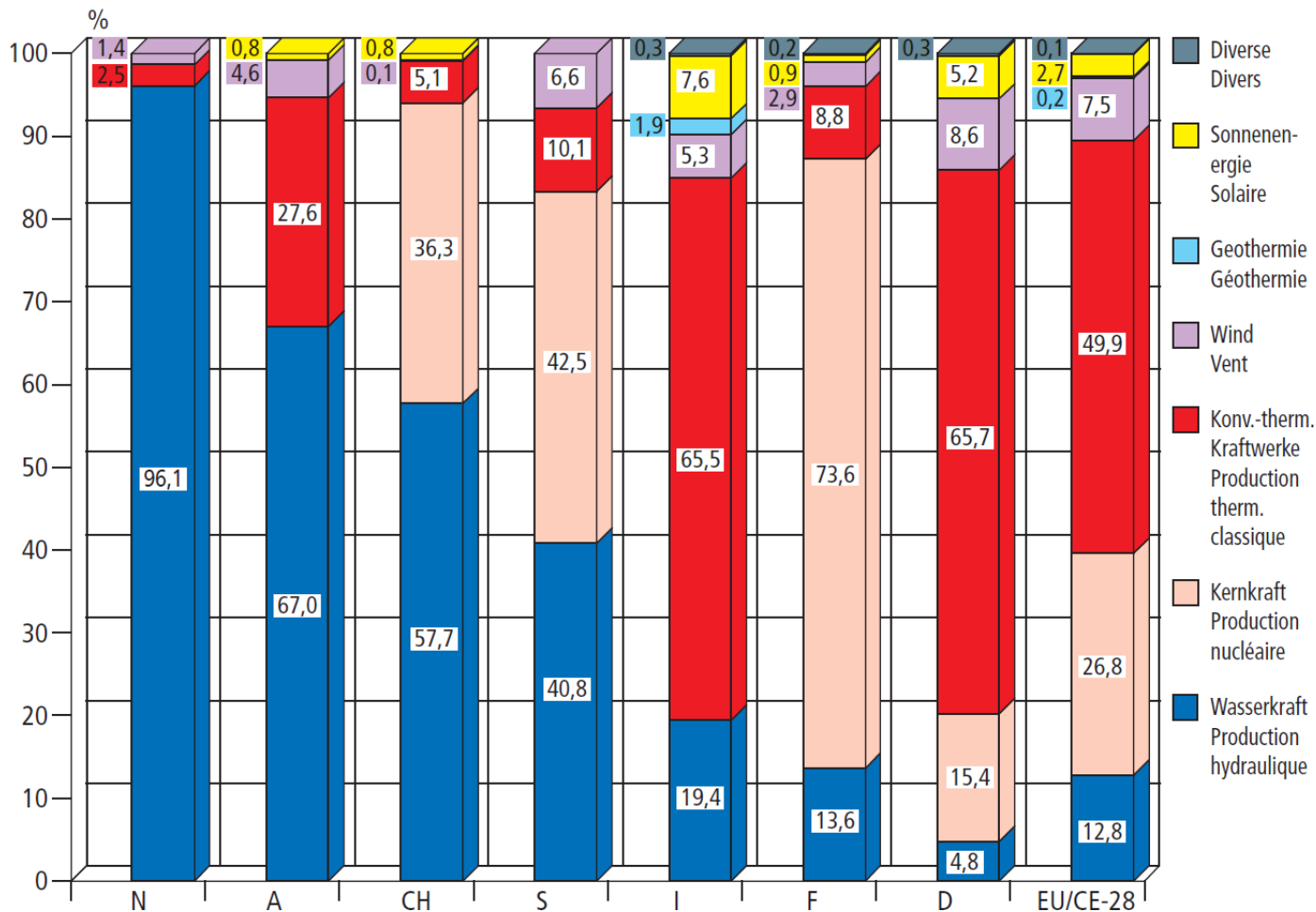


1.5 Internationaler Vergleich

1.5 Comparaison internationale

Fig. 5
Produktions-
struktur
einiger
Länder 2013

Fig. 5
Structure
de production
de divers pays
2013



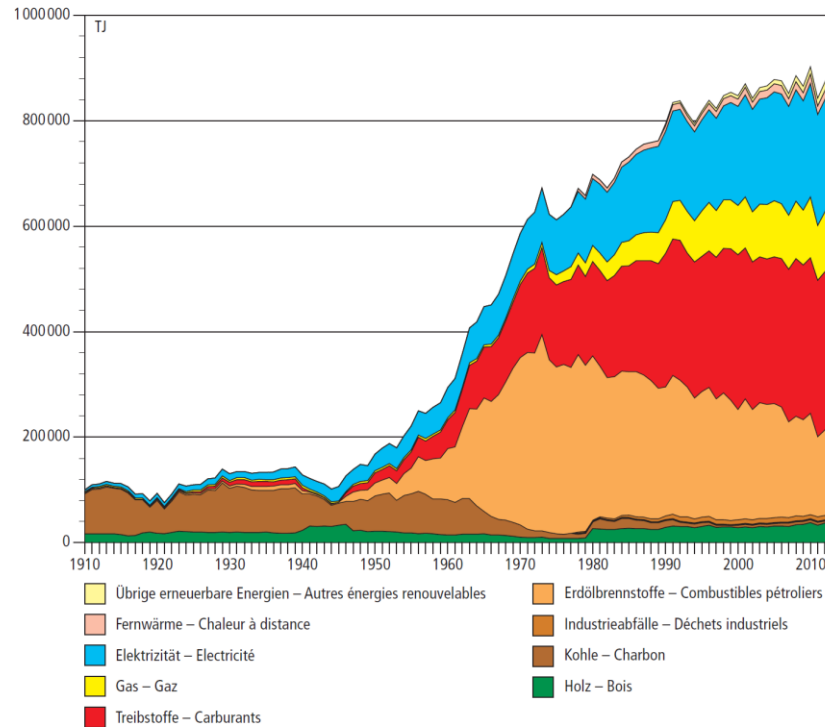
Source: « [Statistique suisse de l'électricité 2014](#) »



Growing energy consumption

Growing share of electricity

Endenergieverbrauch 1910–2014 nach Energieträgern
Consommation finale 1910–2014 selon les agents énergétiques



Source: « [Graphiques de la statistique globale suisse de l'énergie 2014](#) »

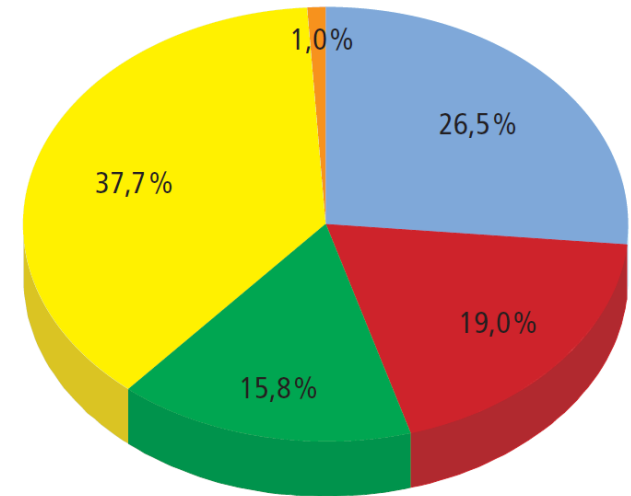
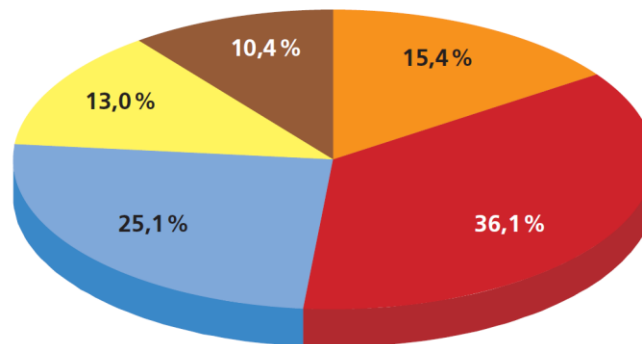


Energy consumption

Anteil 2014 der vier Sektoren in %
Parts en 2014 des quatre secteurs en %

Aufteilung des Endverbrauchs nach Energieträgern (2014)
Répartition de la consommation finale selon les agents énergétiques (2014)

- Erdölbrennstoffe – Combustibles pétroliers
- Treibstoffe – Carburants
- Elektrizität – Electricité
- Gas – Gaz
- Rest – Reste



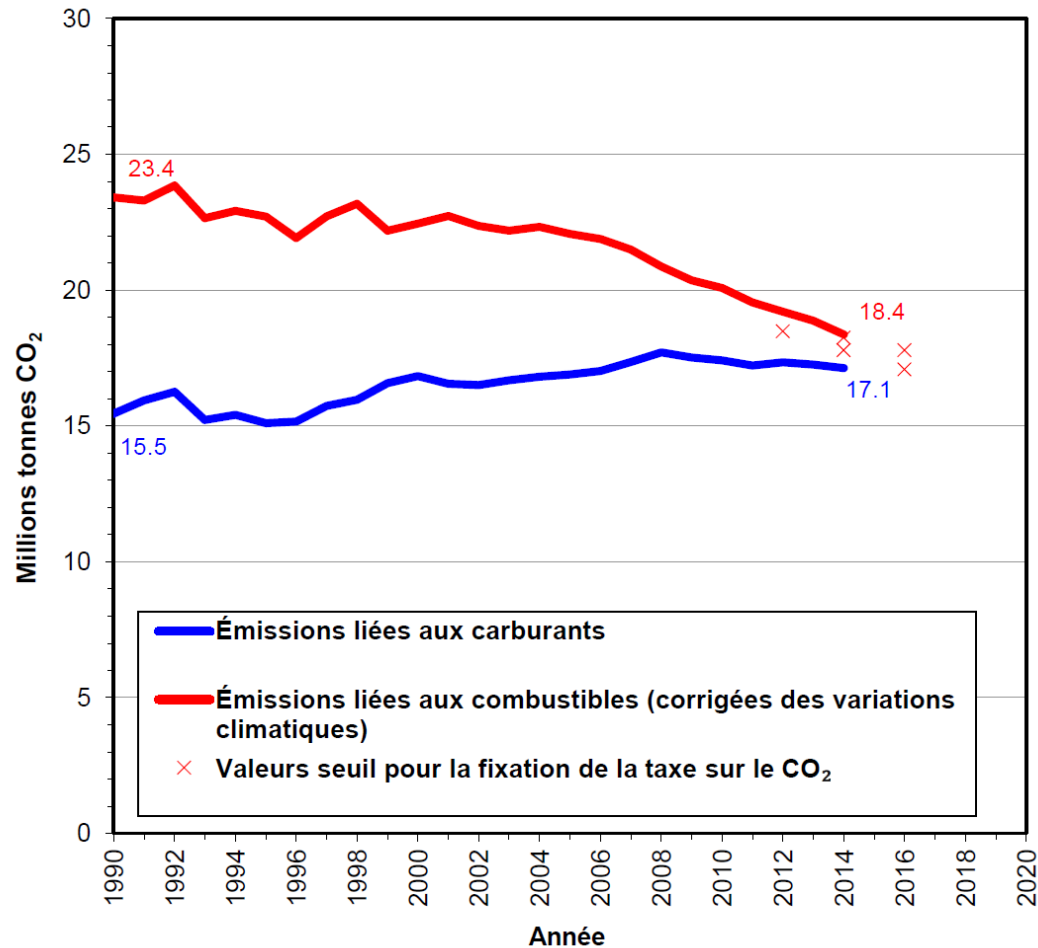
- Haushalte – Ménages
- Industrie – Industrie
- Dienstleistungen – Services
- Verkehr – Transport
- SD – DS

SD Statistische Differenz inklusive Landwirtschaft
DS Différence statistique y compris l'agriculture

Source: « [Graphiques de la statistique globale suisse de l'énergie 2014](#) »



CO₂-Emissions - Past



Source: « [Émissions de gaz à effet de serre d'après la loi sur le CO₂ et d'après le Protocole de Kyoto, 2e période d'engagement \(2013-2020\)](#) »



Current taxes on energy

	Tax base	Tax rate	Tax use
CO2	Fossil heating fuel (no motor fuel)	60 CHF/tCO2 (heating fuel oil:16 ct./l) current law allows 120 CHF/tCO2 (*)	2/3 redistributed 1/3 subsidies
Electricity	Same rate for all sources of electricity	1.1 ct/kWh current law allows 1.5 ct/kWh (**)	100% subsidies

Not included in the table: mineral oil tax (mostly on motor fuels), etc...

(*) 84 CHF/tCO2 starting on January 1, 2016

(**) 1.3 ct/kWh starting on January 1, 2016



Energy Strategy 2050

Phasing out of nuclear power plants, while preserving security of supply and achieving CO2 reduction goals

Goals

- Reduce energy consumption
- Increase renewable energy

First package

- Subsidies
- Regulation
- Limited tax increases

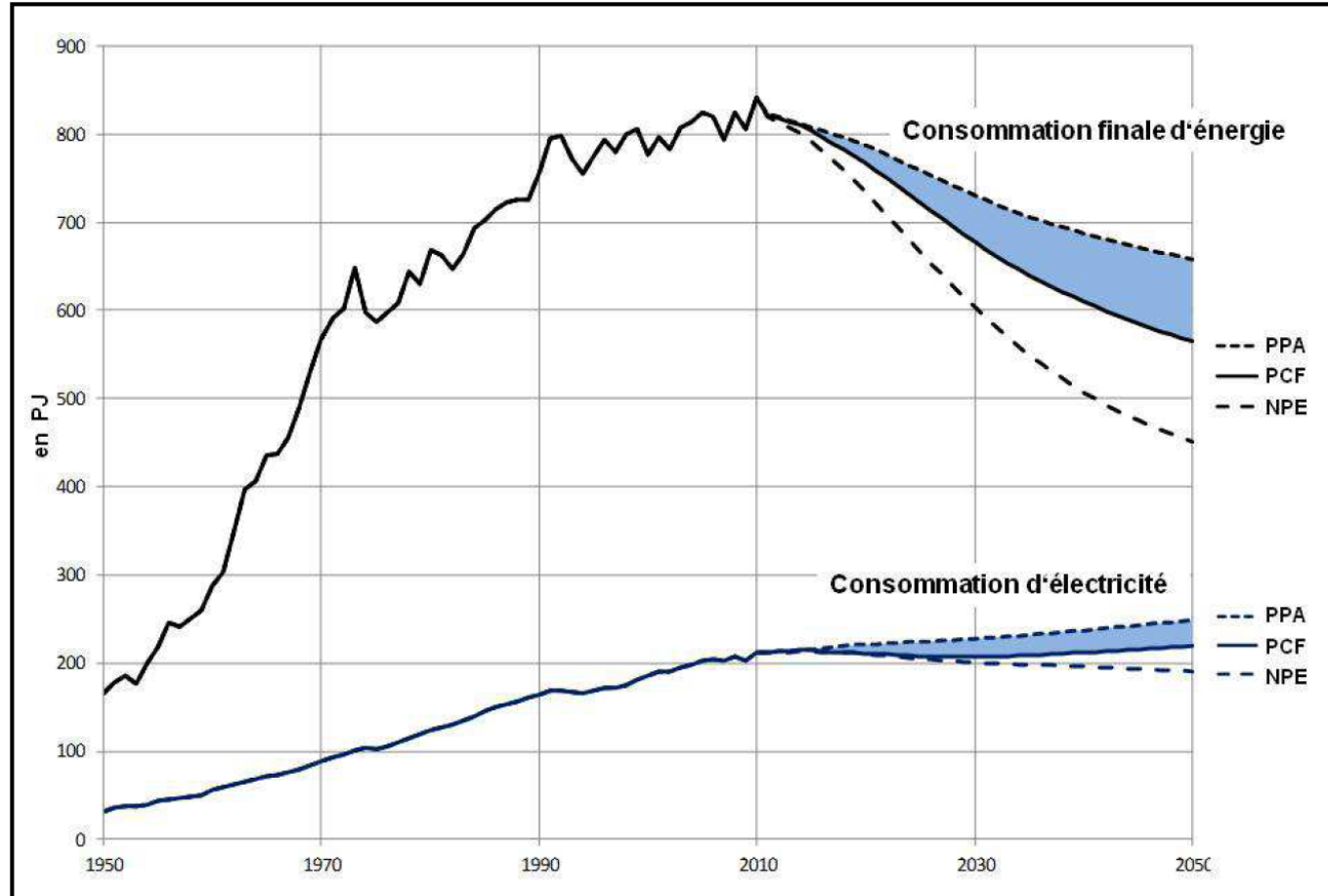
More info: « [Message relatif au premier paquet de mesures de la Stratégie énergétique 2050](#) »

Second package

- Taxes rather than subsidies



Energy Strategy 2050



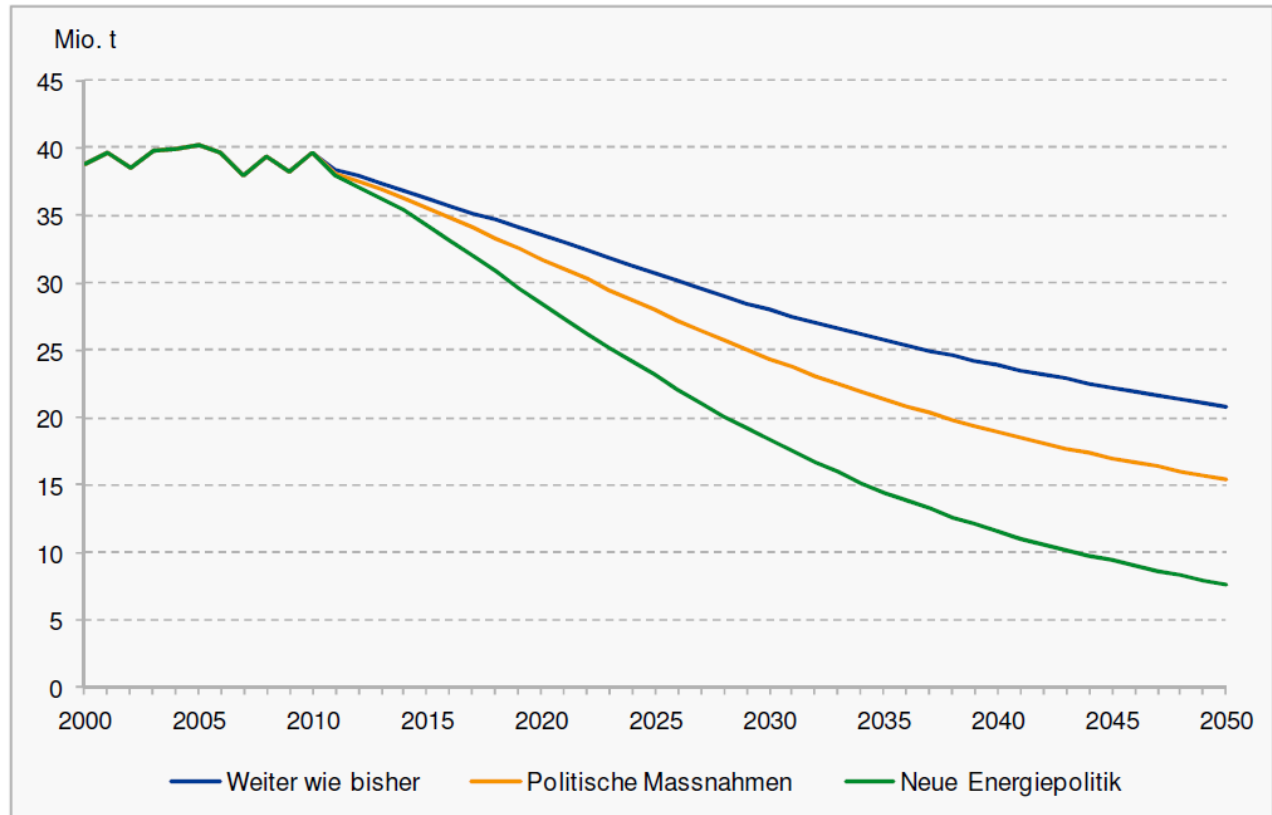
Source: Prognos 2012.

Source: « [Message relatif au premier paquet de mesures de la Stratégie énergétique 2050](#) »



CO₂-Emissions - Scenarios

Figur 5-18: Szenarienvergleich
Absolute CO₂-Emissionen der Brenn- und Treibstoffe* ohne Stromerzeugung, in Mio. t



*ohne statistische Differenz und sonstige Umwandlung

Quelle: Prognos 2012

Source: Prognos (2012), « [Die Energieperspektiven für die Schweiz bis 2050](#) »



Energy law (proposal of the Federal Council)

Reduction of consumption

(per head and year, relative to 2000)

	2020	2035
Total energy	-16%	-43%
Electricity	-3%	-13%

Production of renewable electricity

	2020	2035
Not hydro	Min. 4.4 TWh	Min. 14.5 TWh
Hydro	-	Min. 37.4 TWh



Climate policy

Swiss commitments

- **2008 to 2012: honored**
First commitments of Kyoto Protocol period have been honored, partly thanks to purchases of CO₂-Certificates (goals defined in the CO₂ Act were not met).
- **2020: 20% reduction**
Switzerland intends to reduce domestic greenhouse gases by 2020 by at least 20 per cent in comparison to their level in 1990.
- **Post 2020: 50% reduction**
Switzerland aims to reduce greenhouse gas emissions by 50% relative to 1990 levels by 2030. At least 30% of this reduction must be achieved within Switzerland itself.

Means

- Revision of CO₂ Act
One revision came into force 1 January 2013, further revisions
- Increase of incentive tax



The Swiss institutional setting

- Direct democracy
- Largest parties are included in the federal government
- All federal councillors are equal (president by rotation)
- Consultation process





3. Designing the energy tax

Discussion during the seminar:

- Tax base and tax rate
- Use of tax revenues

For taxes on electricity and CO2

Take into account impact on:

- competitiveness
- growth
- revenue distribution
- tax to GDP ratio
- public budget
- complexity and transparency, etc.



Electricity	CO2
Goal of the tax	
<ul style="list-style-type: none">• Reduction of electricity consumption• Increase production of renewable electricity in Switzerland?	<ul style="list-style-type: none">• Reduction of CO2 emissions How much in Switzerland (rather than abroad)?
Tax rate and tax base	
<ul style="list-style-type: none">• Renewable electricity taxed less ?<ul style="list-style-type: none">- WTO, EU- Hydropower also taxed less ?- Tax-rate difference large enough?	<ul style="list-style-type: none">• Heating fuel versus motor fuel<ul style="list-style-type: none">- Incentive effect of current taxes (but infrastructure and other externalities)- Impact of a new tax on other tax revenues- Current heavy vehicle charges- Gasoline tourism- Political feasibility
<ul style="list-style-type: none">• Tax level (internalization / Standard price approach / political feasibility ?) Other instruments?• Exceptions (competitiveness)• Time schedule	
Use of tax revenues	
General budget / earmarked subsidies / redistributed (which channel?)	



What next?

- Proposal of the Federal Council to the Parliament (last quarter 2015)
- Decision of the Parliament
- Compulsory referendum



Conclusion

Even a policy that makes a lot of sense according to economic textbooks may face strong political opposition and be complicated to implement.



Link

http://www.efv.admin.ch/d/dokumentation/finanzpolitik_grundlagen/els.php

See for example (in three languages: German, French, Italian)

- Background paper ([Link to the French version](#))
- Rapport explicative ([Link to the French version](#))
- Government-contracted studies (some are only in German, others only in English)
- Documents concerning the pre-consultation (who is consulted, their answers, as well as a report summarizing the answers)
- Documents concerning the last consultation
- Various articles and presentations



Background slides



Subsidies for positive externalities

Tax	Subsidies
<ul style="list-style-type: none">• Negative externalities Getting all relative prices right (whereas for example subsidizing public transportation gives an incentive to commute to work)• No rebound effect• State has limited knowledge• No windfall gain• Utilization of tax revenues to offset negative impact	<ul style="list-style-type: none">• Positive externalities• <i>Word „tax“ and political economy</i>• <i>Cost and distributive impact relatively intransparent</i>

Distinguish between subsidies financed by the general budget versus by an energy tax
Tax expenditures
Incidence



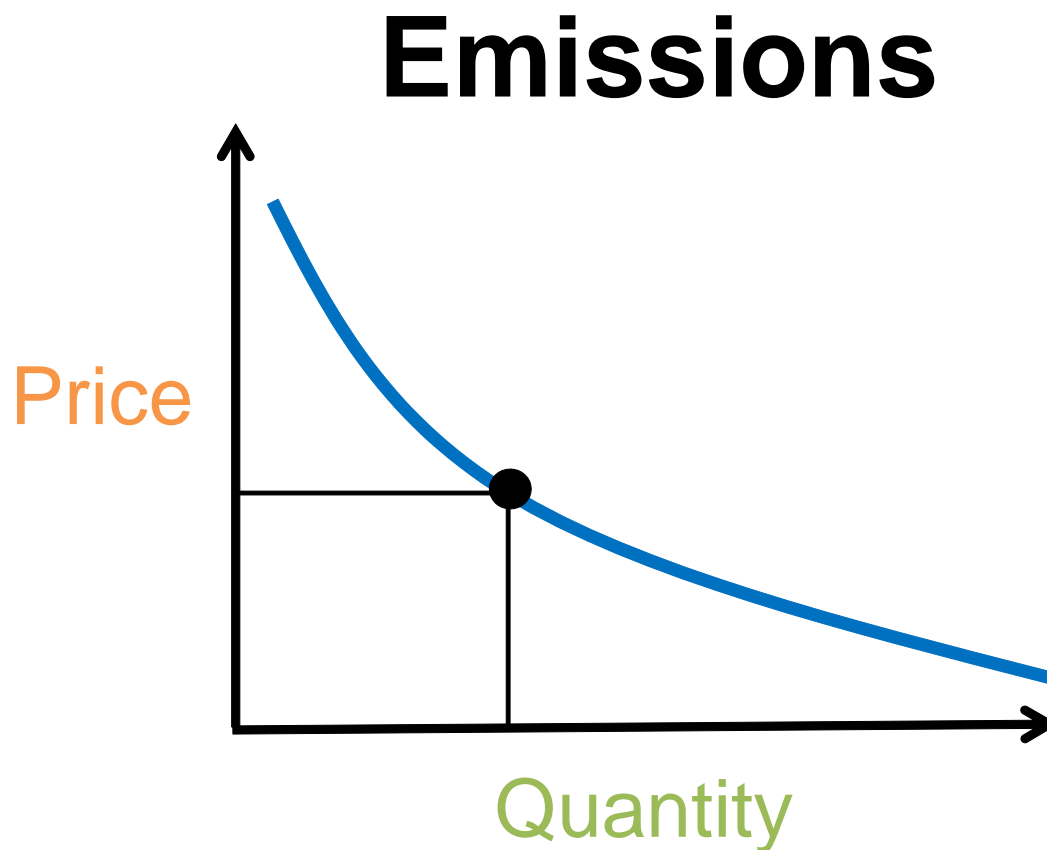
Cap & Trade is complex

Tax	Cap & Trade
<ul style="list-style-type: none">• Price set• Less uncertainty for investors• No need for a (well functioning) certificate market (whereas tax system already exists)• Lower administrative costs• A cap may also work as a floor that cancels the impact of other measures: reducing one's own or a sub-national entity's emissions will not reduce global emissions (except if related certificates are destroyed)• Effort continues during recessions (effort smoothing, marginal cost of abatement does not fluctuate over time)	<ul style="list-style-type: none">• Quantity set• International Cap & Trade can allow for purchase of foreign certificates• Effort reduced during recessions since cap more easily attained (shock absorber)• <i>Word „tax“ and Political economy</i>• <i>Rent seeking (example: receiving free allowance while new firms must buy certificates).</i>

Tax schemes can vary considerably according to their design. So do Cap & Trade schemes. Compare schemes with comparable design (for example: do not compare a tax where revenues go into the general budget with a cap & trade scheme where certificates are allocated for free, but with a cap & trade scheme where certificates are auctioned). Taking resetting of goals and safety valves into account reduces the difference between tax versus cap & trade.

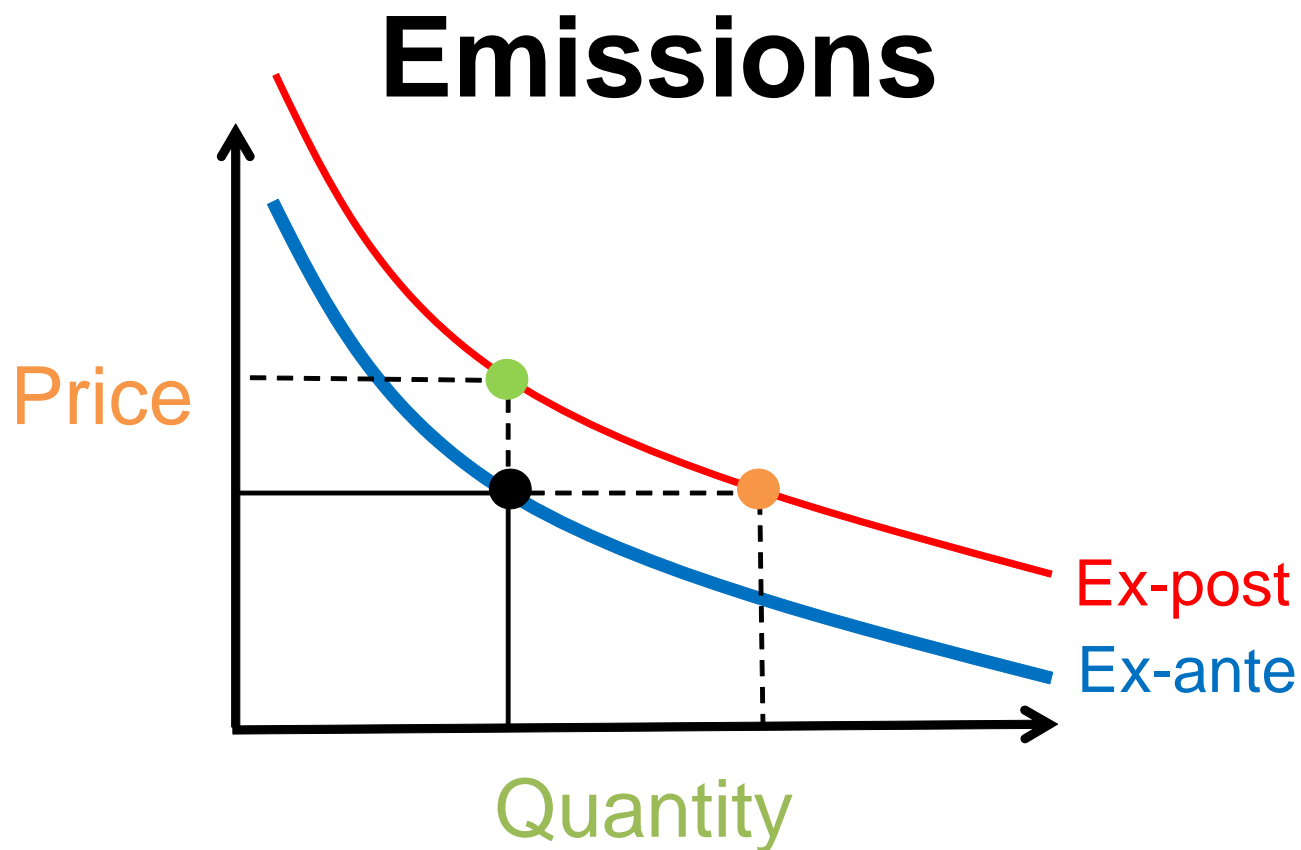


Tax versus Cap-and-Trade: are they equivalent?





Tax versus Cap-and-Trade: are they equivalent?





Regulation as a targeted complement

Tax	Regulation
<ul style="list-style-type: none">• Individual freedom• Efficiency Given heterogeneity (one size fits all is not optimal) and the fact that the state has limited knowledge (even worse in dynamic environment)• Comprehensiveness Tendency not to regulate when the cost of compliance is very high (example: existing buildings). Tendency to leave some channels unregulated. Regulation typically suffers from rebound effect. Tax charges for the remaining consumption. More stringent requirements for performance for new installations can have the pernicious effect of postponing retirement and discouraging entry• No scarcity rent• Exceptions for energy intensive firms in international competition• Lower administrative cost for controlling compliance than for detailed technology mandate. Privacy concerns• Incentive to innovate (but regulation setting global standards incites to innovate in order to meet these standards) <p>Regulation may be close to tax if sanction for failure to comply is of a pecuniary nature.</p>	<ul style="list-style-type: none">• Regulation that sets global performance standards (ex: energy consumption in residential buildings per m2) infringes less on individual freedom than regulation that sets technology mandates.• Assuming compliance, regulatory requirements will be satisfied since it is compulsory and not merely an incentive (the cost of satisfying the law is however uncertain and the overall goal may not be achieved because of unregulated channels)• Little efficiency loss if little scope for choosing the most cost-effective measure (when basically all available abatement measures must be implemented) or if heterogeneity is small (so that one relatively simple rule can be efficient for all cases).• Limits to the effectiveness of taxes (irrationality, nearsightedness, principal-agent problems, etc.) and low elasticity• Fairness issues (given wealth heterogeneity)• <i>Political economy. Cost and distributive impact not transparent</i>



Taking spending on roads into account

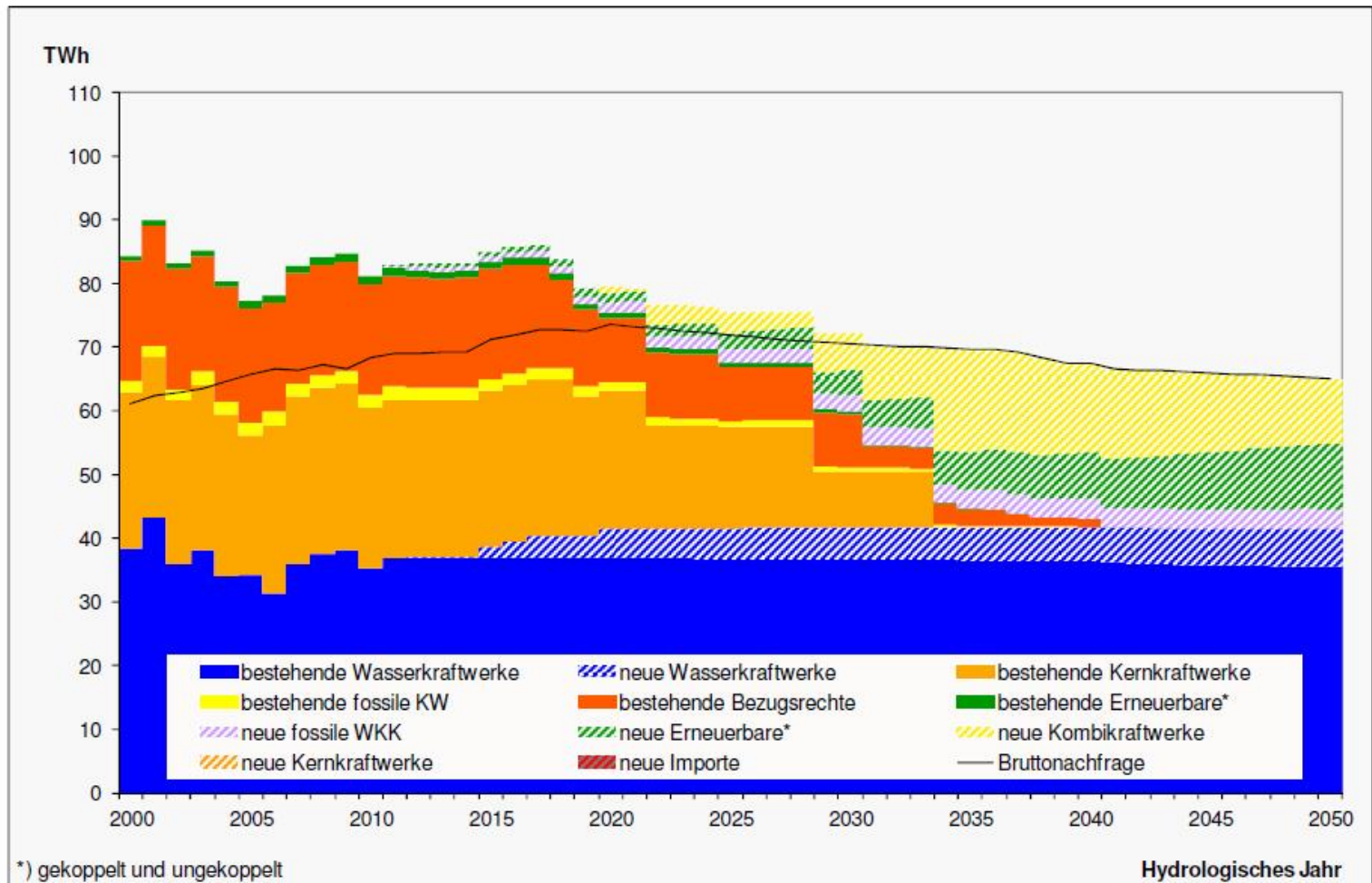
Road account 2011	
Fiscal revenues from private motorized transportation	CHF 8.4 billion
Road expenditure attributable to private motorized transportation	CHF 7.2 billion
Cost coverage	118%

Source: [Swiss road account](#)



Figur 8-47:

Szenario „Neue Energiepolitik“, Variante C
Perspektiven der Elektrizitätsversorgung, hydrologisches Jahr, in
 TWh_{el}/a



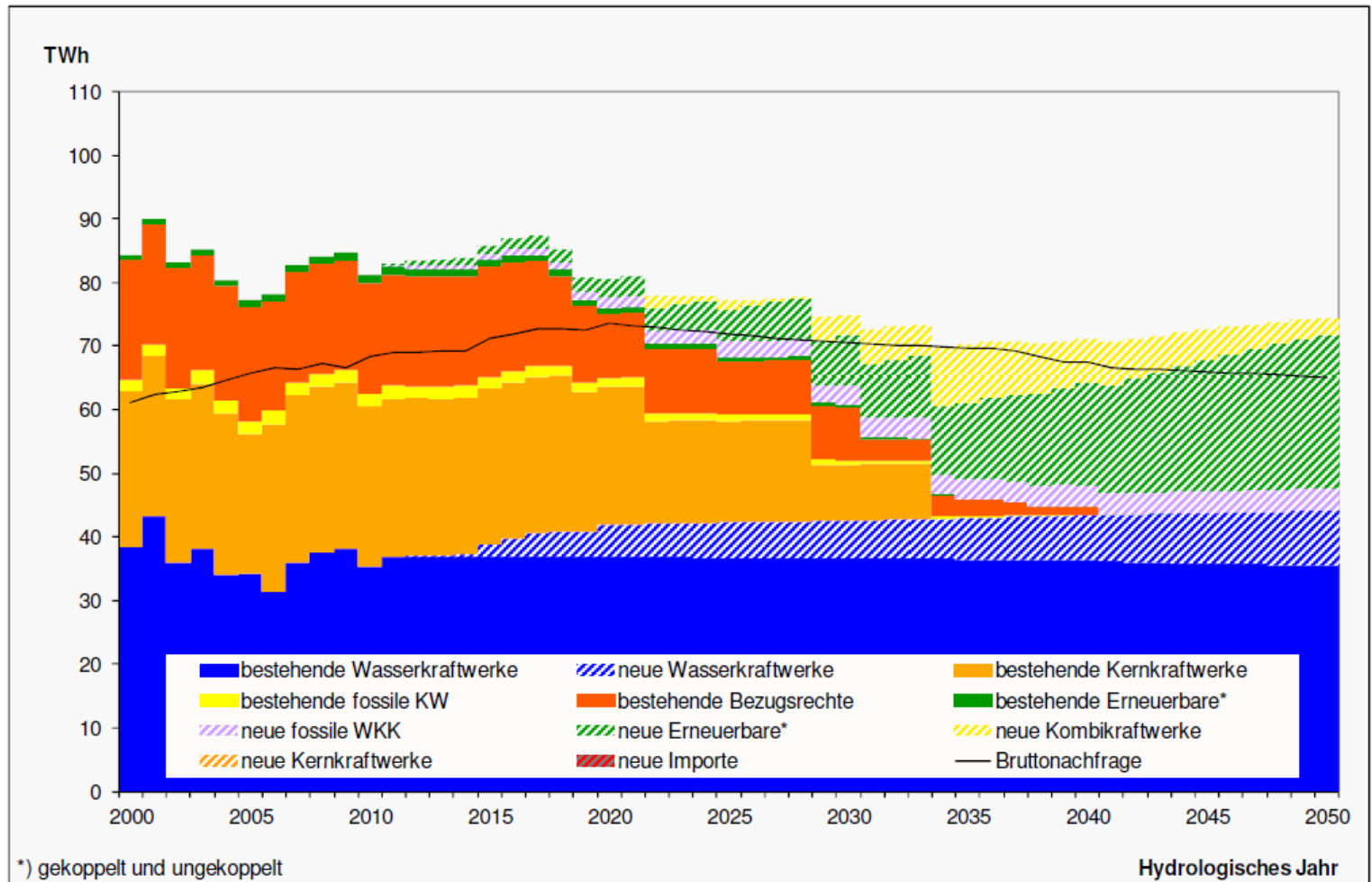
Quelle: Prognos 2012

Source: Prognos (2012), « [Die Energieperspektiven für die Schweiz bis 2050](#) »



Figur 8-50:

Szenario „Neue Energiepolitik“, Variante C&E
Perspektiven der Elektrizitätsversorgung, hydrologisches Jahr, in
 TWh_{el}/a



Quelle: Prognos 2012

Source: Prognos (2012), « [Die Energieperspektiven für die Schweiz bis 2050](#) »



Fig. 7
Flussdiagramm der
Elektrizität 2013 (in GWh)

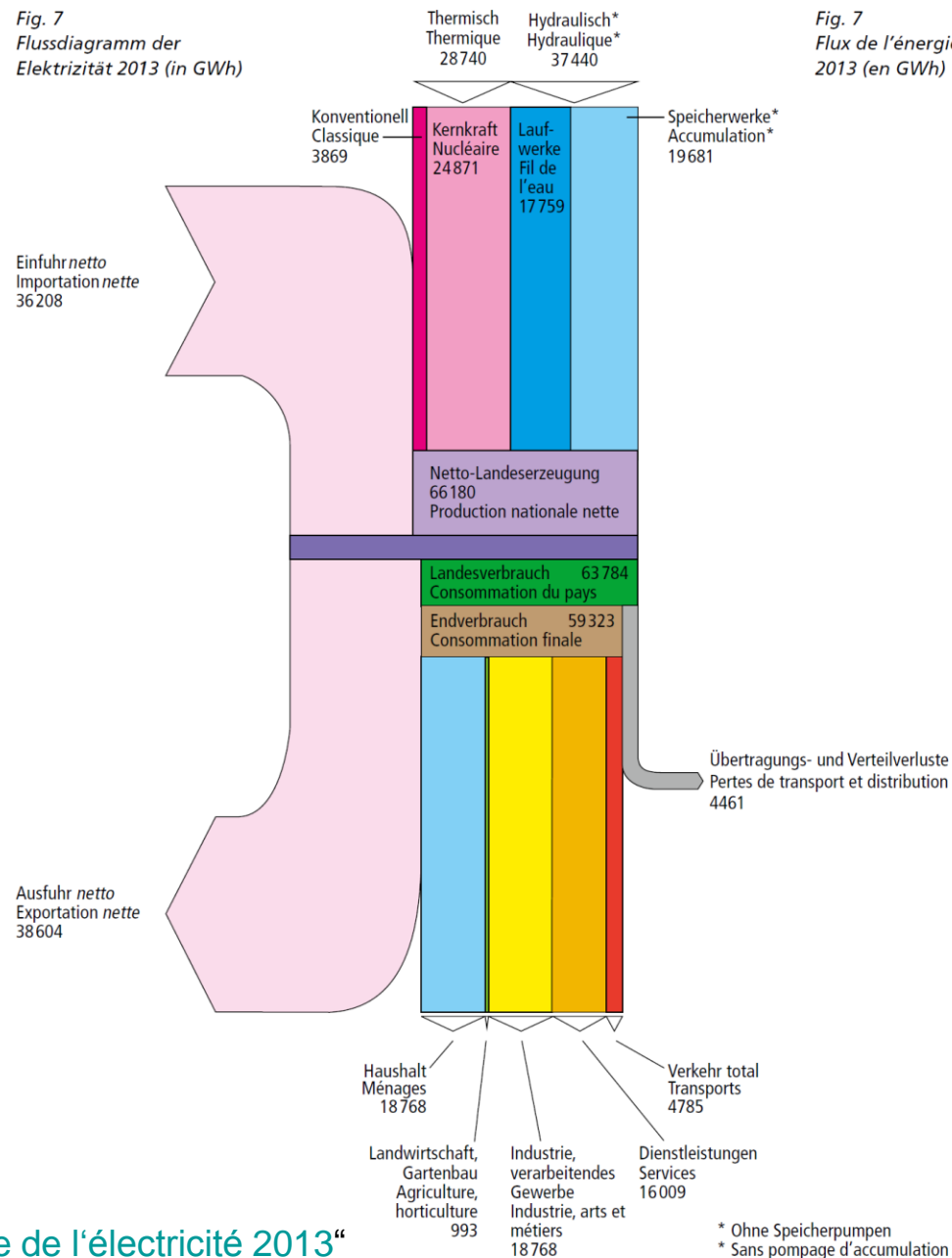


Fig. 7
Flux de l'énergie électrique
2013 (en GWh)

Source: „[Statistique suisse de l'électricité 2013](#)“



Abbildung 5-1: Höhe der CO₂- und Stromabgabe in den Szenarien POM und NEP

	Szenario POM			Szenario NEP		
	2020	2035	2050	2020	2035	2050
Reduktion im Vergleich zur Referenzentwicklung WWB						
CO₂-Emissionen (exkl. Stromproduktion, Fernwärme)	-5%	-17%	-26%	-15%	-44%	-63%
Stromnachfrage	-5%	-10%	-12%	-5%	-15%	-23%
CO₂-Abgabe [CHF/t CO₂]						
Lohnnebenkosten (50%), Pauschal (50%)	70	140	210	150	540	1'140
Lohnnebenkosten (50%), Gewinnsteuer (50%)	70	140	210	150	550	1'150
Lohnnebenkosten (50%), Gewinnsteuer (25%), Pauschal (25%)	70	140	210	150	550	1'140
Gewinnsteuer (50%), Pauschal (50%)	60	140	200	150	540	1'130
Gewinnsteuer (50%), direkte Bundessteuer (50%)	70	140	210	150	550	1'150
Stromabgabe [als %-Zuschlag auf dem Strompreis]						
Lohnnebenkosten (50%), Pauschal (50%)	11%	23%	22%	12%	31%	40%
Lohnnebenkosten (50%), Gewinnsteuer (50%)	11%	23%	22%	12%	33%	42%
Lohnnebenkosten (50%), Gewinnsteuer (25%), Pauschal (25%)	11%	23%	22%	12%	32%	41%
Gewinnsteuer (50%), Pauschal (50%)	11%	23%	21%	12%	31%	40%
Gewinnsteuer (50%), direkte Bundessteuer (50%)	11%	24%	22%	13%	35%	43%
Einnahmen aus der CO₂- und Stromabgabe [in Mrd. CHF pro Jahr]						
Lohnnebenkosten (50%), Pauschal (50%)	3.3	5.7	5.8	5.1	11.5	13.1
Lohnnebenkosten (50%), Gewinnsteuer (50%)	3.3	5.7	5.8	5.1	11.7	13.3
Lohnnebenkosten (50%), Gewinnsteuer (25%), Pauschal (25%)	3.3	5.7	5.8	5.1	11.6	13.2
Gewinnsteuer (50%), Pauschal (50%)	3.3	5.6	5.7	5.0	11.4	13.0
Gewinnsteuer (50%), direkte Bundessteuer (50%)	3.3	5.7	5.8	5.2	11.9	13.5

This table shows the tax rates needed if the incentive tax were the unique instrument used to reach the levels of CO₂ emissions and electricity consumption in the scenario.

Source: Ecoplan (2012),
« Volkswirtschaftliche Auswirkungen einer ökologischen Steuerreform »



Earlier votes

Vote 24 September 2000 [Link](#)

Rejected “Solar“ voter initiative

Rejected Counter-proposal of the Parliament to „solar“ voter initiative

Rejected Counter-proposal of the Parliament to the withdrawn “Energy and Environment“ voter initiative

Vote 2 December 2001

Rejected “To guarantee AVS – taxing energy rather than labor“ voter initiative

Vote 8 March 2015

Rejected “ Energy tax not VAT“ voter initiative

The three ballot proposals of 24 September 2000

Table 1. The three ballot proposals of 24 September 2000

Name	Date	Base	Rate	Expected revenue	Use
Green tax reform	Starting in 2004 ^a	Non-renewable fuels, on the basis of energy content account is taken of existing taxes	Growing, up to 0.02 CHF per KWh	2.5–3 billion CHF	To lower social security contributions (expected: – 1.3 percentage point)
Energy conservation package	2001 until 2010, possibly 2015	Non-renewable fuels on the basis of energy content	0.003 CHF/KWh	450 million CHF	At least 1/4 for each of: promotion of energy conservation, promotion of of renewable energy, amortization investments in hydroelectric plants
Solar initiative	Starting before 2004, max rate in 2005, ends in 2025	Non-renewable fuels on the basis of energy content	Growing from 0.001 CHF/KWh to 0.005 CHF/KWh	Up to 880 million CHF	1/2 for promotion of solar energy incl. biomass), 1/2 for energy conservation

Source: Thalmann 2004. pg.186.



3. Possible implementation

Examples		Combination 1		Combination 2		Combination 3		Combination 4	
Purely for illustration		2021	2030	2021	2030	2021	2030	2021	2030
Electricity	+ ct/kWh	2.3	4.5	2.3	4.5	2.3	4.5	2.3	4.5
	Tax revenue year 2030 Billion CHF		2.19		2.13		2.12		2.05
	Objective achieved	100%		100%		100%		100%	
Climate CO2	Heating fuel + ct/l	25	44	32	63	32	63	32	89
	Gasoline + ct/l	0	0	0	0	1.3	13	2.6	26
	Tax revenue year 2030 Billion CHF		1.67		2.19		2.86		4.03
	Objective achieved	18%		28%		46%		71%	
Impact of the tax		Very weak incentive		Weak incentive		Moderate incentive		Strong incentive	
Still to be done		A great deal		A lot		Moderate		Little	

Source: adapted from [Ecoplan 2015](#)