After Fukushima: A New Role for Energy Taxes in Switzerland

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Outline

1. The Swiss energy tax project
   - Swiss energy production and consumption patterns
   - Energy Strategy 2050
   - Swiss institutional setting

2. Pigouvian taxes versus subsidies and regulation

3. Designing the energy tax
   - Mode of taxation
   - Redistribution of tax revenues
   - Transition from a system centered around subsidies and regulation toward a system centered around taxes
   - Other specific issues
# The Swiss energy tax project

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 2011</td>
<td><strong>Fukushima nuclear accident</strong></td>
</tr>
<tr>
<td>25 May 2011</td>
<td><strong>Decision not to build new nuclear plants</strong></td>
</tr>
<tr>
<td></td>
<td>New energy strategy</td>
</tr>
<tr>
<td>30 Nov. 2011</td>
<td><strong>Decision to examine variants of tax on energy</strong></td>
</tr>
<tr>
<td>18 April 2012</td>
<td><strong>Decision on energy strategy</strong></td>
</tr>
<tr>
<td></td>
<td>- First stage: more subsidies and regulation</td>
</tr>
<tr>
<td></td>
<td>- Second stage (starting 2021): transition to a system focused on an energy tax</td>
</tr>
<tr>
<td>28 Sept. 2012</td>
<td><strong>Decision to prepare two consultations on an energy tax</strong></td>
</tr>
<tr>
<td></td>
<td>- A first consultation in 2013</td>
</tr>
<tr>
<td></td>
<td>- A second consultation in 2014</td>
</tr>
<tr>
<td>4 Sept. 2013</td>
<td><strong>Decision to launch first consultation</strong></td>
</tr>
</tbody>
</table>
LES 5 CENTRALES NUCLÉAIRES DE SUISSE

Leibstadt (1984)
Réacteur à eau bouillante
Puissance nette: 1190 MW

Gösgen (1979)
Réacteur à eau pressurisée
Puissance nette: 985 MW

Mühlberg (1972)
Réacteur à eau bouillante
Puissance nette: 373 MW

Beznau I (1969)
Réacteur à eau pressurisée
Puissance nette: 365 MW

Beznau II (1971)
Réacteur à eau pressurisée
Puissance nette: 365 MW

Sources: AIEA, swissnuclear  Design: Kai Reusser
Nuclear power plants produce 40% of electricity in Switzerland

Electricity production

Source: “Statistique suisse de l’électricité 2012”

Data: “Production d’électricité selon le type de centrales”
Growing energy consumption
Growing share of electricity

Source: "Graphiques de la statistique globale suisse de l'énergie 2012"
Energy Strategy 2050

- **Two scenarios**
  - PCF (policy of the Federal Council)
  - NEP (new energy policy) is more ambitious

- **Drastic reduction of energy consumption**
  From 840 PJ in 2010 to 565 (PCF) or 451 (NEP) in 2050

- **Drastic reduction of CO₂ emissions**
  From 40.0 million tons CO₂ in 2010 to 21.8 (PCF) or 11.4 (NEP) in 2050

- **Stabilization of electricity consumption**
  From 212 PJ in 2010 to 219 (PCF) or 191 (NEP) in 2050
  (in both cases a reduction of consumption per capita)
Current taxes on energy

Table 3: Taxes sur la consommation d'énergie actuellement en vigueur

<table>
<thead>
<tr>
<th>Taxe</th>
<th>Agent énergétique</th>
<th>Taux de taxation</th>
<th>Recettes</th>
<th>Utilisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxe CO₂ sur les combustibles</td>
<td>Huile de chauffage, gaz naturel, charbon</td>
<td>36 CHF/t CO₂</td>
<td>Env. CHF 550 millions</td>
<td>Programme Bâtiments (1/3) Redistribution à la population et à l'économie (2/3)</td>
</tr>
<tr>
<td>Supplément LE- ne sur l'électricité</td>
<td>Electricité</td>
<td>0,45 ct./kWh</td>
<td>Env. CHF 280 millions</td>
<td>Rétribution à prix coûtant du courant injecté Appels d'offres publics soumis aux règles de la concurrence</td>
</tr>
</tbody>
</table>

Source: Report „Passage d'un système d'encouragement à un système d'incitation"

- 1 January 2013
  (some increase already planned not included)
- The oil tax (5 billion on motor fuels, 20 million on heat fuels) is not included
First package of Energy Strategy 2050

Goals

• Reduction of energy consumption
• Increase of renewable energy

Means

• Subsidies
• Regulation
• Limited taxes increases (to 2.3 ct/kWh, 84 CHF/ton CO₂)

More info: “Message relatif au premier paquet de mesures de la Stratégie énergétique 2050"
Tax level needed if the first package is to be replaced by a tax

<table>
<thead>
<tr>
<th></th>
<th>Scénario PCF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2020</td>
</tr>
<tr>
<td>Taxe énergétique(^{44}) sur les combustibles et les carburants, en CHF/t CO(_2) (valeurs réelles, base de prix 2008)</td>
<td>60-70</td>
</tr>
<tr>
<td>Selon le modèle de redistribution</td>
<td>11</td>
</tr>
<tr>
<td>Taxe sur l’électricité (supplément sur le prix de l’électricité, en %)</td>
<td>60-70</td>
</tr>
</tbody>
</table>

Source: Ecoplan (2012), chap. 4.

Source: Report „Passage d’un système d’encouragement à un système d’incitation“
The Swiss institutional setting (I)

- **Our report proposes a constitutional article**
  This implies a citizens’ vote

- **Green-liberal voter initiative**
  “Replace value-added tax with a tax on energy”

- **Green voter initiatives**
  - „Green economy“
  - „Stop nuclear power“
The Swiss institutional setting (II)

Federal Government

• Largest parties are included
• All federal councillors are equal (president by rotation)
The Swiss institutional setting (III)

Consultations

• Inside the federal administration and federal government
  - Interdepartmental working groups
  - Consultation of offices
  - Co-report procedure
  - Discussion in the Federal Council

• Outside the federal administration
Pigouvian taxes (I)

- **Goal (at least primary)**
  Correct a negative externality

- **Means**
  Apply a tax equal to the negative externality (to the extent that it has not already been internalized)
Pigouvian taxes (II)

- **Tax / Subsidies or Regulation**
  - The existence of negative externalities is the main market failure justifying environmental policy
  - Individuals are free to choose the most efficient solutions
  - Incentive to do more than what is subsidized or imposed by law
  - No need for the State to have knowledge of promising technology (incomplete knowledge)
  - Windfall gains
  - Rebound effect
  - Utilization of the tax revenues to (partially) offset negative side-effects
Pigouvian taxes (III)

• **Standard-price approach**
  What if you do not know the value of the externalities?
  - Computing the tax needed to attain some politically defined goal (e.g.: quantity of CO\(_2\) emissions)
  - Achieve the goal with minimal abatement costs
  - The goal may not be optimal (but second-best)

• **Other caveats**
  - National borders, exceptions
  - Market failures other than negative externalities (positive externalities of R&D, irrationality, etc.)
Pigouvian taxes (IV)

- **First dividend**
  Environmental impact

- **Second dividend**
  Reduces distortions
  (using the tax revenue to reduce other taxes)
  - Weak form: relative to another use of the revenues from the Pigouvian tax
  - Strong form: relative to the absence of the Pigouvian tax

- **Third dividend**
  Innovation

Remember: Welfare / GDP
Design of the energy tax

- Budgetary neutrality
- Avoid increasing tax-to-GDP ratio
- Avoid regressivity of revenue distribution
- Avoid detrimental impact on competitiveness
Questions for consultation (I)

1. Should taxes on energy be used to achieve the goals of energy and climate policies? (See Chapter 3)

2. In your view, what are the main measures that should be implemented in order to achieve the aims of the energy strategy 2050? (See Chapter 3)
   a) Incentives schemes
   b) Support schemes
Tableau 2: Conséquences macroéconomiques d'un système d'incitation en 2050

<table>
<thead>
<tr>
<th>Ecart en % par rapport au niveau du scénario de référence Poursuite de la politique énergétique actuelle (PPA)</th>
<th>Scénario Mesures politiques du Conseil fédéral (PCF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bien-être (y c. bénéfices secondaires)</td>
<td>0,0 à 0,3</td>
</tr>
<tr>
<td>Selon variante de redistribution choisie</td>
<td>- 0,6 à 0,2</td>
</tr>
<tr>
<td>Produit intérieur brut (PIB)</td>
<td></td>
</tr>
<tr>
<td>Selon variante de redistribution choisie</td>
<td>- 0,4 à 0,6</td>
</tr>
<tr>
<td>Emploi</td>
<td></td>
</tr>
<tr>
<td>Selon variante de redistribution choisie</td>
<td></td>
</tr>
</tbody>
</table>

Source: Ecoplan 2012, chap. 4.4 et 5.3, propre synthèse des auteurs du rapport.

Source: Report „Passage d’un système d’encouragement à un système d’incitation“
Questions for consultation (III)

Revenue side of tax on energy

3. In your view, how should taxes on heating fuels be designed? (See Chapter 5.1.1.1)
   a) Tax according to CO\textsubscript{2} content?
   b) Tax according to CO\textsubscript{2} and energy content?

4. In your view, how should taxes on motor fuels be designed? (See Chapter 5.1.1.2)
   a) Tax according to CO\textsubscript{2} content?
   b) Tax according to CO\textsubscript{2} and energy content?
   c) Taxed at the same rate as heating fuels?
   d) Taxed at a lower rate than heating fuels?
There are currently higher taxes on transportation than on heating

<table>
<thead>
<tr>
<th>Current tax [ct/liter]</th>
<th>Heating fuels (*)</th>
<th>Motor fuels (**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil tax</td>
<td>0.3</td>
<td>73.12</td>
</tr>
<tr>
<td>CO₂ Tax</td>
<td>9.55 (***), 0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9.85</td>
<td>73.12</td>
</tr>
<tr>
<td>(***) 36 CHF / Ton CO₂</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*) Extra light heating oil
(**) Unleaded gasoline
(***) 36 CHF / Ton CO₂

Source: Oil tax, CO₂ Tax

Economic Policy Seminar, University of Lausanne / P.-A. Bruchez / 3.10.2013
## Taking spending on roads into account

### Road account 2010

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenues from private motorized transportation</td>
<td>CHF 8.4 billion</td>
</tr>
<tr>
<td>Road expenditure attributable to private motorized transportation</td>
<td>CHF 7.3 billion</td>
</tr>
<tr>
<td>Cost coverage</td>
<td>115%</td>
</tr>
</tbody>
</table>

Source: [Link](#)
Questions for consultation (V)

5. Taxes on electricity can currently only be levied through a uniform energy tax on the consumption of electricity, independently of the way in which it is generated. In your view, how should the goals of increasing the part of electricity generated using renewable energy be achieved under these conditions? (See Chapter 5.1.1.3)

a) Mainly by the compensatory feed-in remuneration scheme (KEV)?

b) By refunding the revenues of the tax on electricity to consumers of electricity generated by renewable sources of energy?

c) Other possibilities, and if so what would they be?
6. Should firms that are exposed to international competition and are energy-intensive or greenhouse-gas-intensive get a refund for the tax? (See Chapter 5.2.2)

a) Yes

b) No
7. In your view, how large should the group of firms who are exempted from the tax be? (See Chapter 5.2.2)
   a) Smaller than currently planned (Reference pa. Iv. 12.400/law on CO$_2$)?
   b) The same as currently planned?
   c) Larger than currently planned?

Information

- 12.400: group of firms exempted from tax on electricity would go from 300 now to 600.
- Law on CO$_2$: 40 to 70 firms exempted with emission quota, 1000 to 1500 firms exempted without emission quota.
Questions for consultation (VIII)

8. In your view, what should firms that are eligible for the refund be obliged to do in return? (See Chapter 5.2.2.4)
   a) Sign an agreement on objectives with an obligation to invest in measures to improve energy efficiency?
   b) Sign an agreement on objectives without an obligation to invest in measures to improve energy efficiency?
Questions for consultation (IX)

The use of the revenues of the tax on energy

9. How should the revenues of the tax on energy be used? (See Chapter 6)
   a) In the case of the current tax on greenhouse gases, the revenues that are not earmarked are redistributed to households on a lump-sum basis through health insurance and to firms proportionally to their payroll. Do you consider this type of redistribution to also be appropriate in the case of higher revenues from a future tax on energy?
   b) Would it be better to redistribute through tax credits or checks rather than through health insurance?
   c) Should the revenues of the tax on energy also be compensated for by lowering other taxes? If so, which taxes should be lowered? How much of the amount to be redistributed should be used to lower taxes?
### Questions for consultation (X)

**Tableau A 1: Résultats des diverses variantes d’un système d’incitation (2050)**

<table>
<thead>
<tr>
<th>Année 2050</th>
<th>Bien-être (y. c. bénéfices secondaires)</th>
<th>PIB</th>
<th>Emploi</th>
<th>Répartition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecarts en % par rapport au niveau du scénario de référence «Poursuite de la politique énergétique actuelle» (PPA)</td>
<td>PCF</td>
<td>PCF</td>
<td>PCF</td>
<td></td>
</tr>
<tr>
<td>Scénario</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variantes principales</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V.1</td>
<td>Redistribution par tête aux ménages privés</td>
<td>0,0</td>
<td>- 0,6</td>
<td>- 0,4</td>
</tr>
<tr>
<td>V.2</td>
<td>Baisse de la TVA</td>
<td>0,1</td>
<td>0,2</td>
<td>0,0</td>
</tr>
<tr>
<td>V.3</td>
<td>Baisse de l’impôt sur les bénéfices</td>
<td>0,1</td>
<td>- 0,3</td>
<td>- 0,1</td>
</tr>
<tr>
<td>V.4</td>
<td>Baisse des cotisations AVS</td>
<td>0,2</td>
<td>- 0,3</td>
<td>0,1</td>
</tr>
<tr>
<td>V.5</td>
<td>Baisse de l’impôt sur le revenu</td>
<td>0,3</td>
<td>0,0</td>
<td>0,6</td>
</tr>
<tr>
<td>Variantes mixtes*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V.6a</td>
<td>Redistribution de 50 % par tête aux ménages privés et baisse de la TVA</td>
<td>0,1</td>
<td>- 0,6</td>
<td>- 0,2</td>
</tr>
</tbody>
</table>

Source: Report „Passage d’un système d’encouragement à un système d’incitation”
Questions for consultation (XI)

Possible variants of an incentive scheme

10. Which of the two variants for the development of an incentive scheme do you prefer? What are the reasons for which you prefer this variant? Can you envisage other variants? (See Chapter 7)

11. Would you prefer that other instruments, which are not mentioned in this report, be used to achieve the aims of energy and climate policies? (See Chapter 7)
Tableau 1: Eléments-clés des deux variantes

<table>
<thead>
<tr>
<th>Variante d'incitation</th>
<th>Taxe sur l'énergie</th>
<th>Compensation</th>
<th>Combinaison d'instruments visant à atteindre l'objectif</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assiette fiscale</td>
<td>Niveau possible de la taxe en 2050&lt;sup&gt;a)&lt;/sup&gt;</td>
<td>Redistibution aux ménages et aux entreprises, affectation obligatoire à des mesures d'encouragement</td>
</tr>
<tr>
<td>1</td>
<td>Combustibles: teneur en CO₂</td>
<td>env. 84 - 150 fr./t CO₂&lt;sup&gt;b)&lt;/sup&gt; = 22 - 39 ct./l huile de chauffage</td>
<td>Redistibution aux ménages et aux entreprises, affectation obligatoire à des mesures d'encouragement</td>
</tr>
<tr>
<td></td>
<td>Carburants: aucun</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Electricité: teneur en énergie = consommation</td>
<td>env. + 10 %&lt;sup&gt;b)&lt;/sup&gt;</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Combustibles: teneur en CO₂ et év. en énergie</td>
<td>210 fr./t CO₂&lt;sup&gt;c)&lt;/sup&gt; = env. 55 ct./l huile de chauffage</td>
<td>Redistibution aux ménages et aux entreprises et baisses d'impôts ou de taxes, réduction rapide de l'affectation obligatoire à des mesures d'encouragement</td>
</tr>
<tr>
<td></td>
<td>Carburants: teneur en CO₂ et év. en énergie</td>
<td>max. env. 120 fr./t CO₂&lt;sup&gt;c)&lt;/sup&gt; = env. 29 ct./l essence</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Electricité: teneur en énergie = consommation</td>
<td>= + 22 %&lt;sup&gt;c)&lt;/sup&gt;</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: Report „Passage d'un système d'encouragement à un système d'incitation“

Federal Department of Finance FDF

Federal Finance Administration FFA
Questions for consultation (XII)

Design of the transition

12. Which variants for the transition do you prefer? (See Chapter 8)
   a) Transition variant A (pre-determined increase in energy tax in the long term / support schemes for achieving short and medium-term aims)?
   b) Transition variant B (early achievement of aims through tax on energy / rapid and foreseeable reduction of support schemes)?
   c) Other possibilities, and if so, what would they be?
Questions for consultation (XIII)

The impact on other taxes

13. How important do you consider it to be to ensure budgetary neutrality by lowering other taxes? (See Chapter 9.3)
   a) Very important?
   b) Important?
   c) Not that important?
14. If budgetary neutrality is to be ensured by lowering taxes, which measures do you prefer? (See Chapter 9.3)

   a) *Compensating possible fluctuations by flexibly changing lump-sum redistributions to households or redistribution to firms according to employers‘ contributions to old-age insurance?*

   b) *A one-off adjustment of tax rates on the basis of forecasts made at the time the tax on energy is introduced?*

   c) *Periodically adjusting the tax rate according to the revenues of the tax on energy?*
Links


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

- Report
- Government-contracted studies (some are only in German, others only in English)
- Documents for the consultation (you can see for example who is consulted)
What next?

• Deadline for feed-backs (15 December 2013)

• Result of the consultation to be delivered to the Federal Council (first quarter 2014)

• Preparation of the next consultation (end 2014)

• Message of the Federal Council to the Parliament

• Decision of the Parliament

• Citizens‘ vote
Background slides
Pigouvian taxes (V)

Tax versus Cap-and-Trade: are they equivalent?
Pigouvian taxes (VI)

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

Emissions

Quantity

Price

Ex-post

Ex-ante

Tax versus Cap-and-Trade: are they equivalent?
Pigouvian taxes (VII)

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

But:

- Where do the targets come from? Could they be changed? Safety valve
- Will the market work?
- The word “tax“
- Transparency, rent-seeking
- National borders

Differences between taxes, between cap-and-trade systems
Switzerland imports as much electricity as it consumes

Source: "Statistique suisse de l’électricité 2012"
Swiss energy consumption patterns

Source: "Graphiques de la statistique globale suisse de l’énergie 2012"
Swiss energy production and consumption patterns

Source: "Graphiques de la statistique globale suisse de l’énergie 2012"
# Energy Strategy 2050

Tableau 1: Evolution de la consommation d’énergie et d’électricité ainsi que des émissions de CO₂ par scénario

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2010</th>
<th>2020</th>
<th>2035</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PCF</td>
<td>NPE</td>
<td>PCF</td>
<td>NPE</td>
<td>PCF</td>
</tr>
<tr>
<td>Consommation d’énergie finale (PJ)</td>
<td>777</td>
<td>840</td>
<td>767</td>
<td>734</td>
<td>639</td>
</tr>
<tr>
<td>Consommation d’énergie finale par personne et par année (GJ)</td>
<td>107,8</td>
<td>106,5</td>
<td>90,9</td>
<td>87</td>
<td>71,9</td>
</tr>
<tr>
<td>Consommation d’énergie électrique (PJ)</td>
<td>185</td>
<td>212</td>
<td>211</td>
<td>210</td>
<td>208</td>
</tr>
<tr>
<td>Consommation d’énergie électrique par personne et par année (GJ)</td>
<td>25,7</td>
<td>26,8</td>
<td>25,0</td>
<td>24,9</td>
<td>23,5</td>
</tr>
<tr>
<td>Emissions de CO₂ (mio t)</td>
<td>39,2</td>
<td>40,0</td>
<td>32,6</td>
<td>29,2</td>
<td>28,1</td>
</tr>
<tr>
<td>Emissions de CO₂ par habitant (t)</td>
<td>5,4</td>
<td>5,1</td>
<td>3,9</td>
<td>3,5</td>
<td>3,2</td>
</tr>
</tbody>
</table>

Source: Report „Passage d’un système d’encouragement à un système d’incitation"
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