



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
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Bundesamt für Energie BFE  
Office fédéral de l'énergie OFEN  
Ufficio federale dell'energia UFE  
Swiss Federal Office of Energy SFOE

## Swiss Energy Strategy 2050: concept, status, next steps

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**BFE** Bundesamt für Energie



# Energy Strategy 2050: objectives





# The challenges

- **Population growth:** Energy for more and more people
- **Infrastructure:** Power plants and networks are old and need to be replaced and expanded (regardless of the new energy strategy)
- **Security of supply:** Switzerland's integration into international cooperation mechanisms is key
- **Pricing and market:** Tendency towards higher energy prices, securing free supplier choice, maintaining international competitiveness of Swiss companies
- **Climate change:** CO<sub>2</sub> emissions under control, climate change impact on domestic energy production (hydropower) after 2050
- **Plus a new challenge:** Post-Fukushima.  
This all has to be achieved while Switzerland simultaneously withdraws from nuclear energy on a step-by-step basis!



# Structure of the presentation

1. Framework
2. Main goals of the energy strategy 2050
3. Specific measures
4. Energy and electricity mix
5. Economic costs
6. Next steps and conclusion





# Framework

- **Federal government specifies framework conditions** in accordance with Article 89 of the Federal Constitution.
- Energy industry is responsible for **energy supply security** (Energy Act, Article 4, paragraph 2).
- On 25.5.2011, Federal Council announces **decision to phase out nuclear energy**.
- Parliament adopts this resolution.
- SFOE is mandated to develop a new energy strategy.
  - Consultation procedure: 28.9.2012 to 31.1.2013







# New energy strategy 2050 and measures in consultation

## **New energy policy** (= target scenario):

- stabilisation of electricity demand from 2020 onwards
- annual per capita CO<sub>2</sub>-emissions at 1-1.5 tons in 2050

## **Measures of first package** (= measure based scenario)

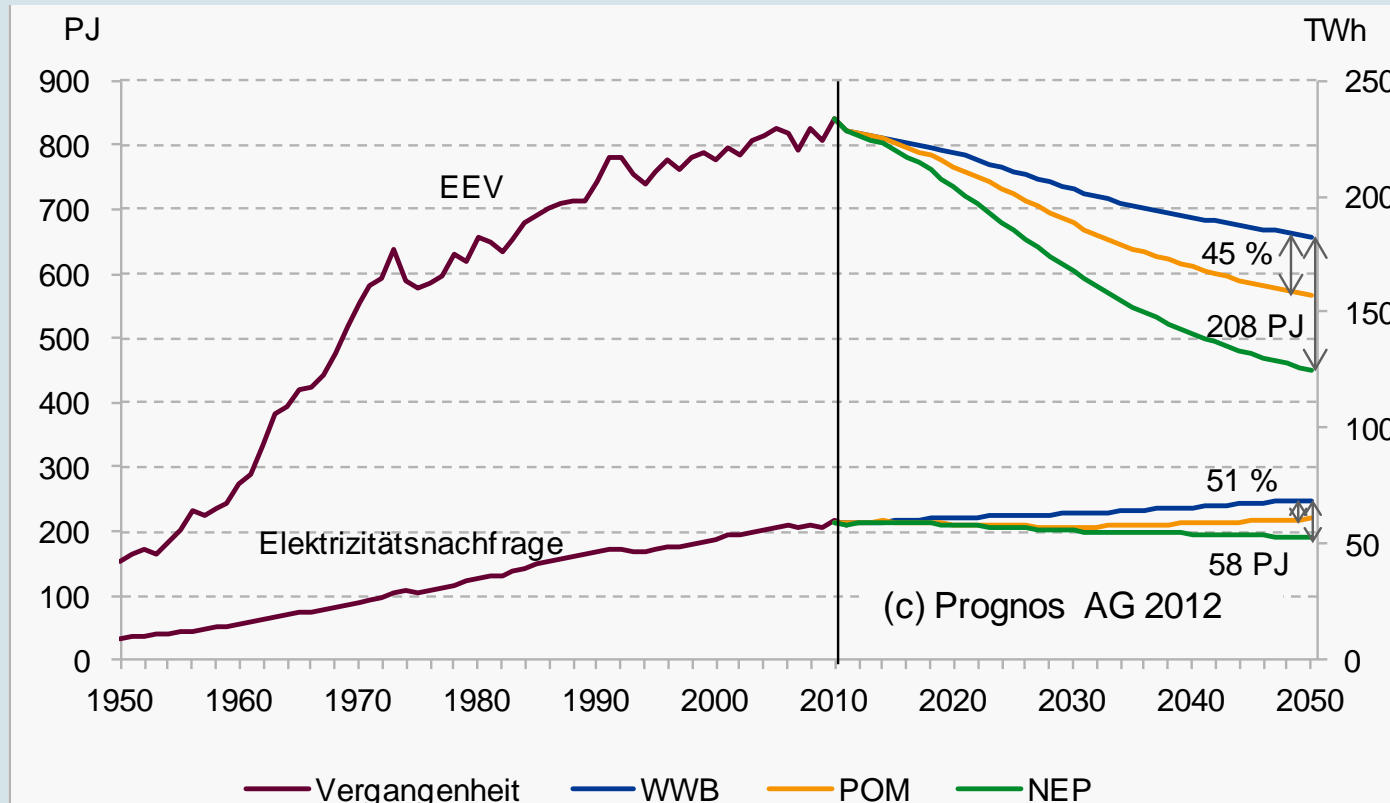
- what is possible with available/foreseen technologies
  - given today's international cooperation
- allows to reach almost 50% of target of new energy policy

## **From 2020 on:**

- strategic redefinition of climate and energy policy
- energy levy on all energy carriers



# Final energy and electricity consumption



## Szenarien:

WWB = Weiter wie bisher / Business as usual

POM = Pol. Massnahmen / first measures package

NEP = Neue Energiepolitik / new energy policy

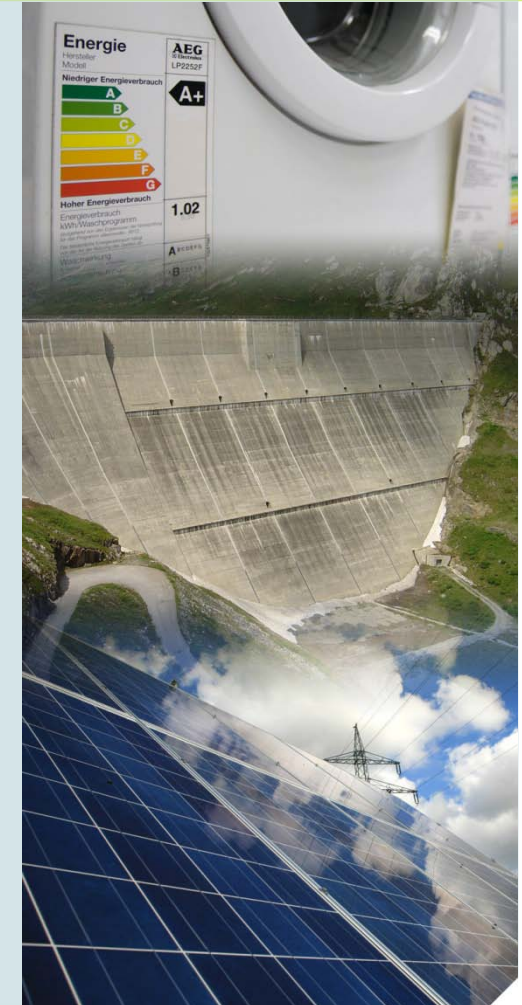
## Weitere Abkürzungen:

EEV = Endenergieverbrauch / final energy cons.



# Energy Strategy 2050

1. Enhance energy efficiency
2. Develop renewable energy production
  - Hydropower: + 3.2 TWh  
(+ pump storage for integration of new renewable energies)
  - New renewable energy: unlocking sustainable potentials  
(24.2 TWh)
3. Meet residual demand through:
  - Electricity production with fossil fuels  
(combined heat and power, gas and steam turbines)
  - Electricity imports

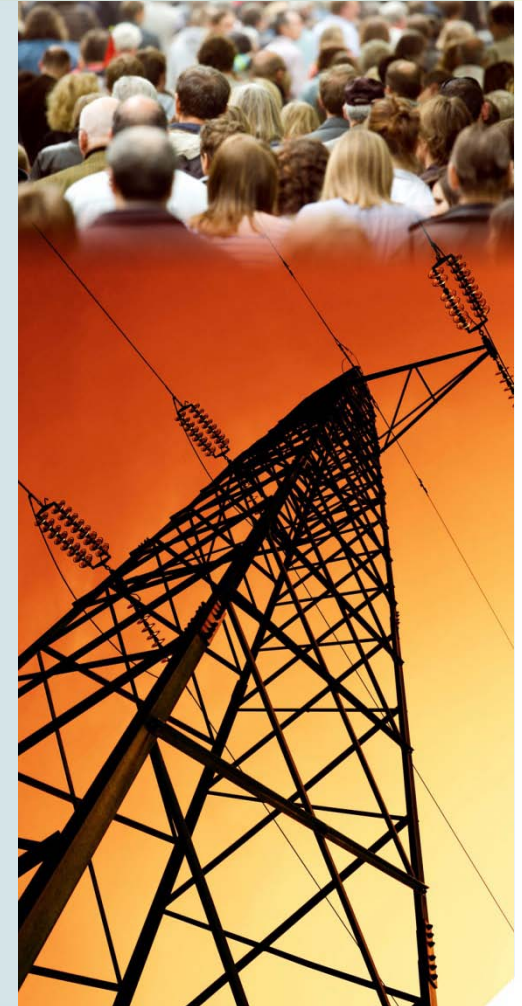






# Energy Strategy 2050

4. Extension of the electricity grid
  - important investments needed
  - development towards a smart grid
5. Increased promotion of energy research
  - coordinated energy research plan
6. Exemplary function of the government
7. Increased international cooperation
  - electricity negotiations





# Energy efficiency is the core of the new policy

## **Buildings:**

- tax law
- buildings programme
- cantonal building codes (MuKEn)

**Industry and services:** target agreements, incentive models, competitive calls for tenders, voluntary measures (SwissEnergy programme)

**Mobility:** CO<sub>2</sub> emission regulations, rail transport, voluntary measures (SwissEnergy programme)

**Electrical appliances:** efficiency requirements, consumption requirements, voluntary measures (SwissEnergy programme)

**Energy supply companies:** binding efficiency targets



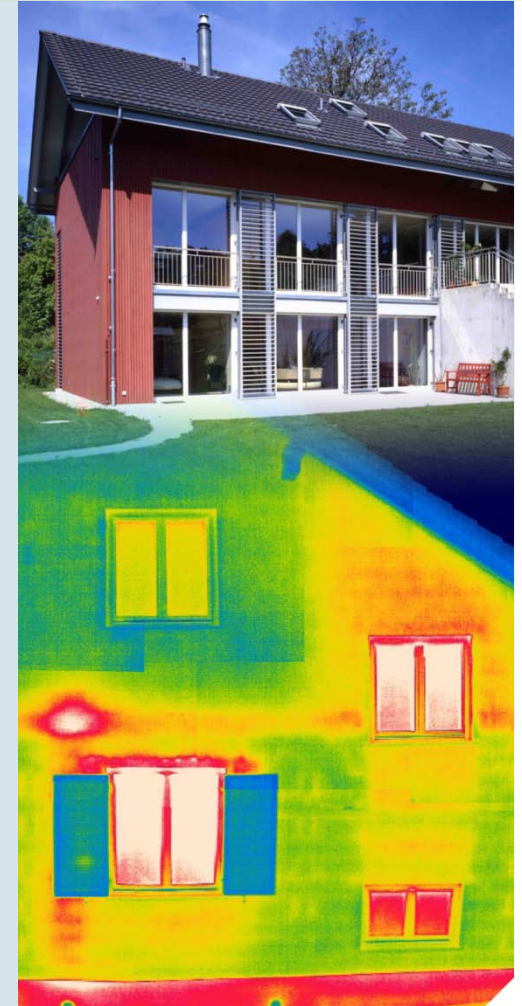
# Measures concerning buildings

## **Buildings are of main importance:**

- 49% of fossil energy consumption
- 37% of electricity consumption
- 1.64 million buildings

## **Adaptation of tax law**

- Tax deductions for energy-efficiency measures if certain compliance criteria is satisfied (e.g. MINERGIE, GEAk category)
- Entitlement for tax bill deduction of total costs for complete renovations over a period of several years





# Measures concerning buildings II

## Strengthening of Buildings programme

- Increase in total federal and cantonal funding to 600 million Swiss francs p.a.
- Increase in federal global funding of cantonal promotion programmes
- “GEAK Plus” for financial contributions from the Buildings programme and for ownership transfers of buildings
- Utilisation-ratio bonus for achievement of minimum energy standards
- Contributions from Buildings programme also for energy-efficient replacement (not only renovation)
- Incentives to substitute fossil heating and use renewable energies in renovation
- Programme to promote substitution of electric heating systems and boilers
- Promotion of local and district heating networks and connections

**Das Gebäudeprogramm**



**Le Programme Bâtiments**





## Measures concerning buildings III

### Tightening of cantonal building codes (MuKEN)

- Increase renovation rate (currently 0.9%)
- More stringent regulations for new buildings and renovations
- Intensified efforts in structural engineering w.r.t electricity consumption – SIA 380/4
- Introduction of energy inspection requirement for building services
- Introduction of energy optimisation requirement



Konferenz Kantonaler Energiedirektoren  
Conférence des directeurs cantonaux de l'énergie  
Conferenza dei direttori cantonali dell'energia  
Conferenza dals directurs chantunals d'energia



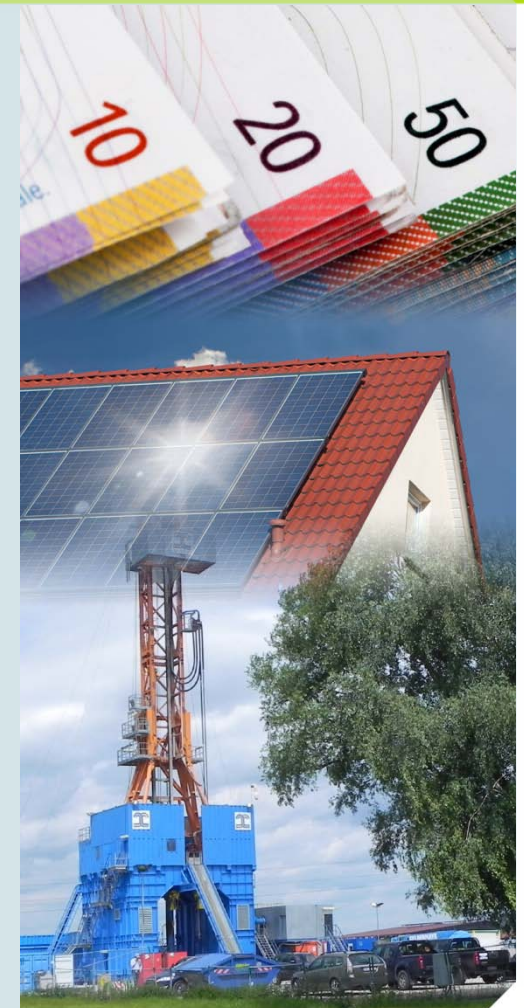
# Renewable energy to be promoted: increased financial support (and spatial planning)

## Changes to the feed-in tariff system:

- More funds: elimination of funding cap (except for photovoltaics)
- Shorter remuneration period, option of auctions, market-oriented rates
- No further support for certain facilities (e.g. waste incineration plants)
- Clearer implementation structure

## and:

- Small photovoltaic systems (< 10 kW): one-time investment contribution (30% of investment costs) instead of feed-in tariff
- New own-consumption regulations for all producers
- Deep geothermal energy: increased funding





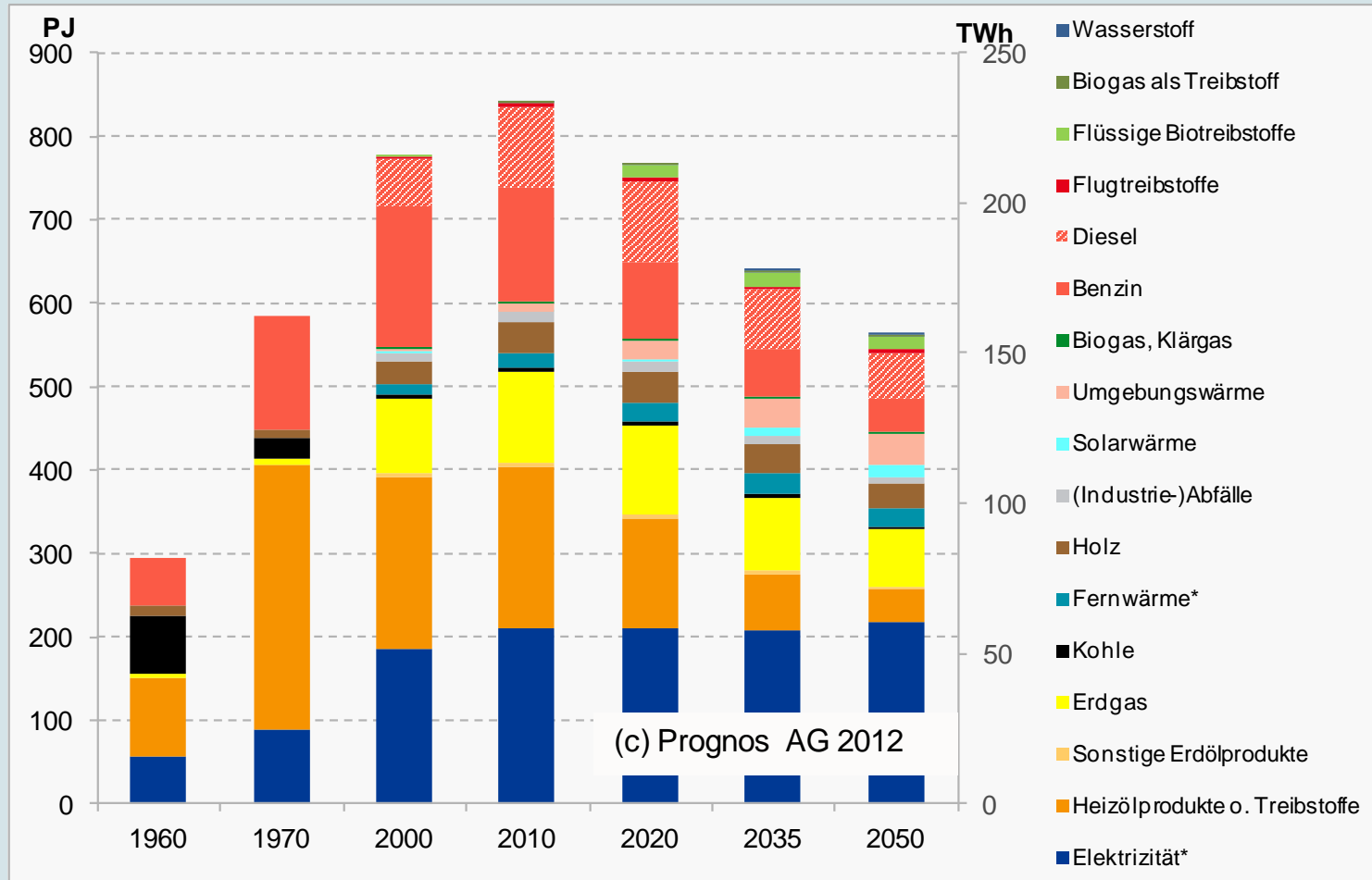


## Swiss coordinated energy research action plan: promotion in four main directions

- 1. Increase in capacity for energy research (32 teams by 2016)**
- 2. Development of five priority fields (more might follow)**
  - Efficiency technologies
  - Energy systems, network components and smart grids
  - Electricity and heat storage
  - Electricity production from renewable energy
  - Economic, social and legal aspects
- 3. Competitive financial support for research projects**
- 4. Promotion activities of the SNF (NFP, NFS, promotion of professorships)**

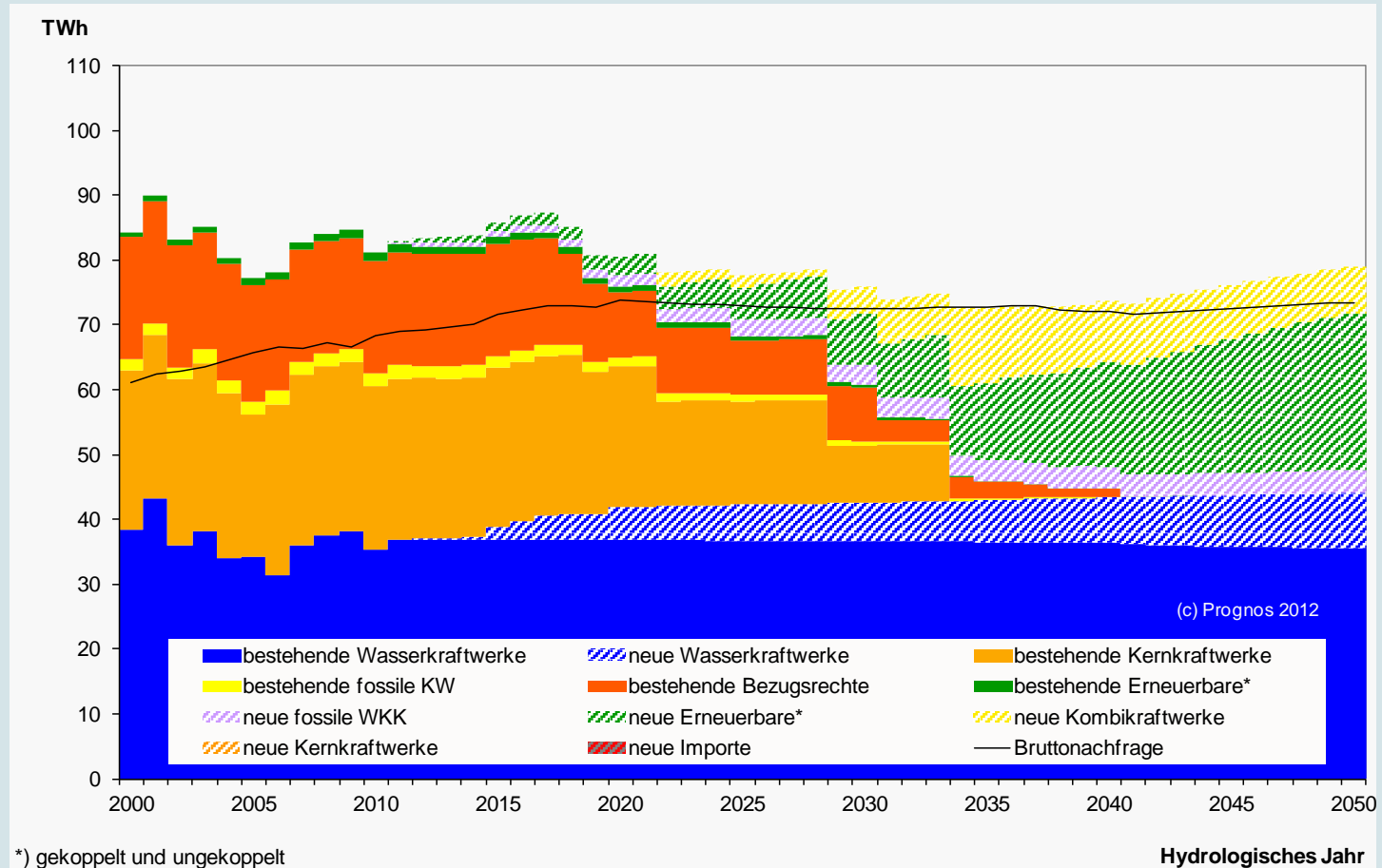


# New energy mix





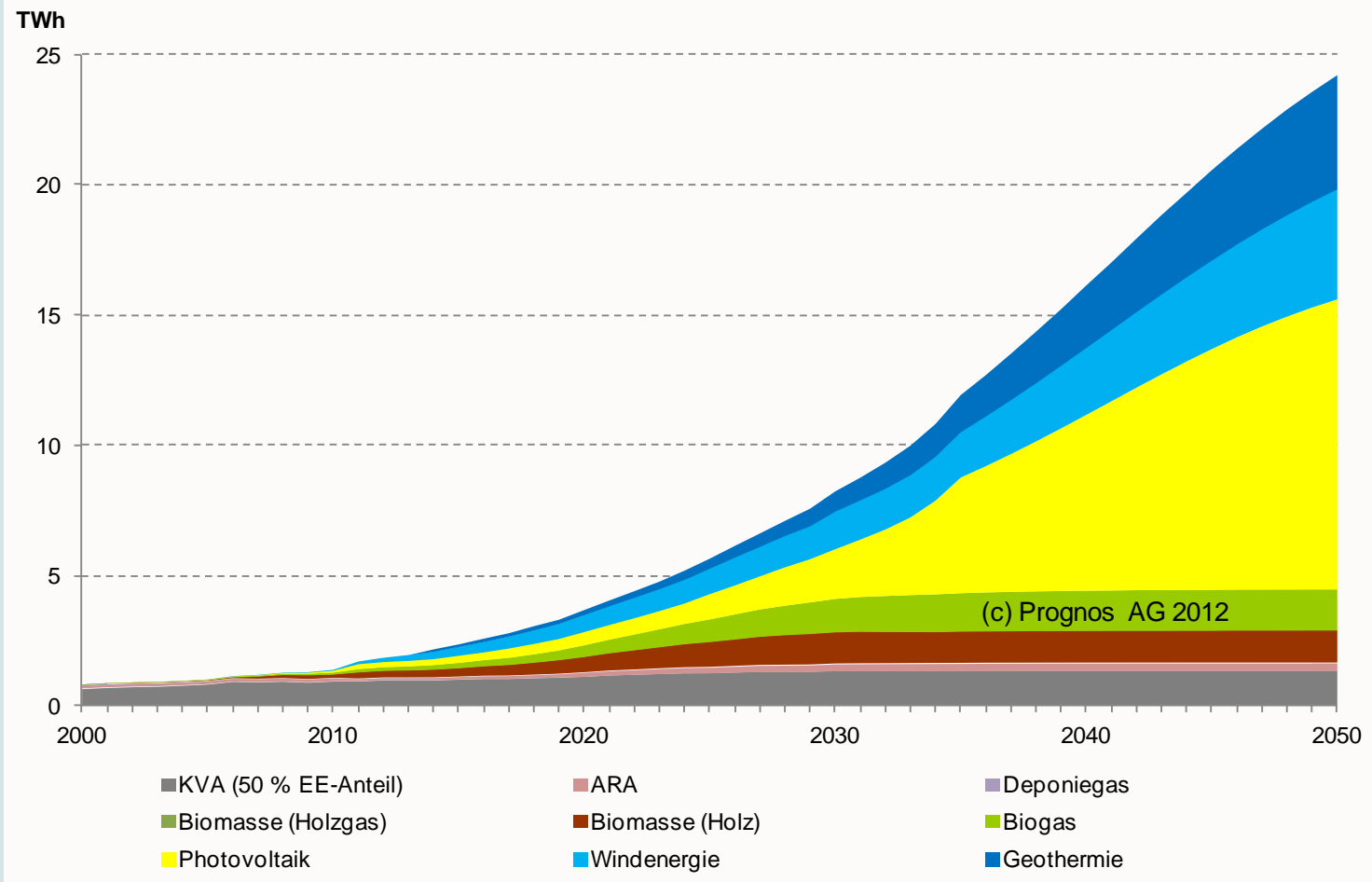
# New electricity mix



Electricity supply scenario, political measures, variant C&E



# Long-term approach to electricity production from new renewable energy sources





## Overall economic costs

### Economic model:

- CO<sub>2</sub> and electricity demand targets and electricity mix are imposed
- taking into account interactions among markets and agents in economy
- all results are reported in comparison to business as usual scenario

### Shadow price of political measures:

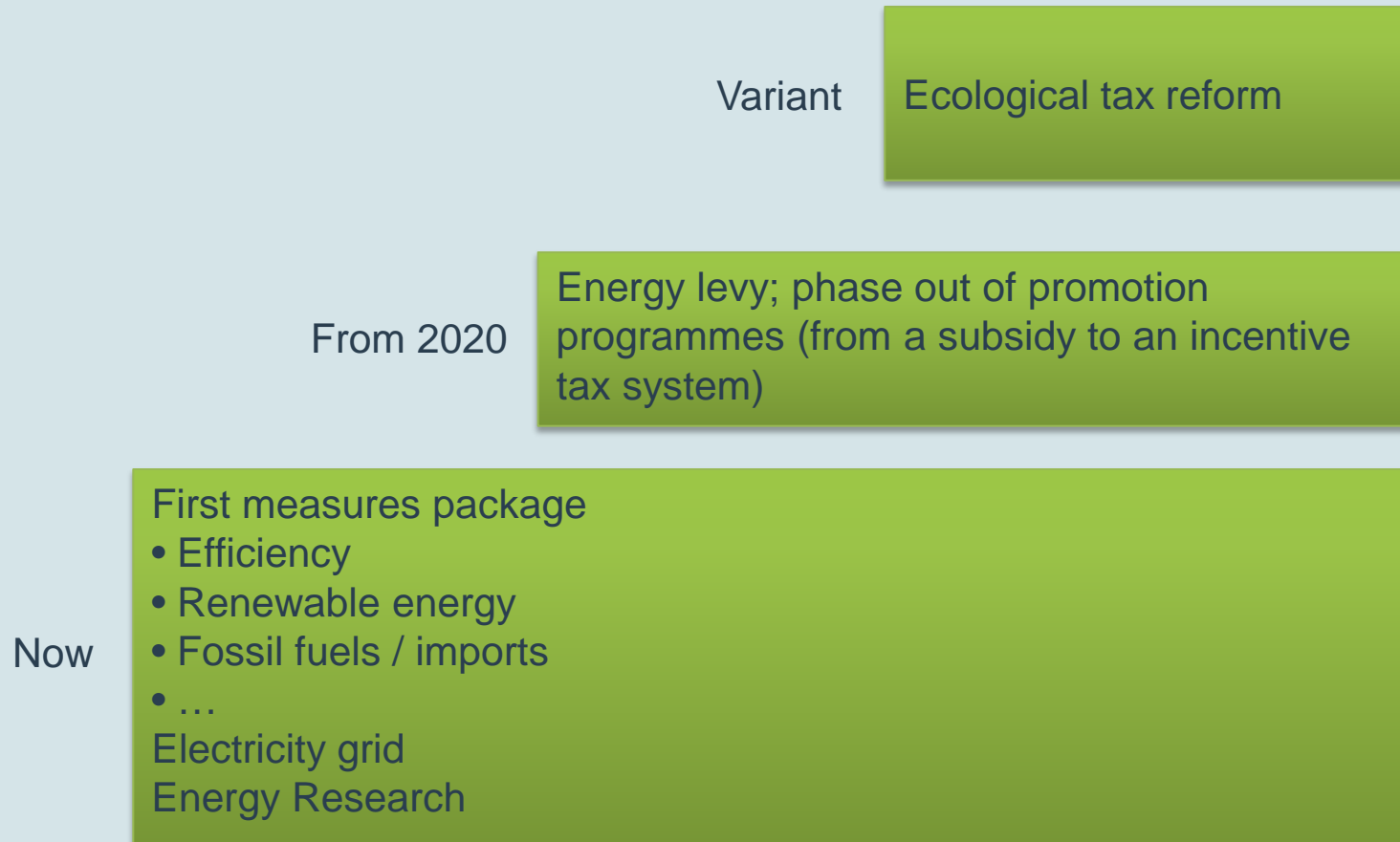
- CO<sub>2</sub>-fee: 70-210 Swiss francs per tonne CO<sub>2</sub>
- electricity fee: 11-22 % surcharge on electricity tariff

### Economy-wide effects:

- welfare effects including secondary benefits:  
slightly positive (+0.06% in 2050)
- annual GDP growth: 0.98% instead of 1%
- employment: slightly negative (-0.2% in 2050)



# Energy Strategy 2050: next steps







## Conclusions

- Energy strategy 2050: main focus on energy efficiency and increased importance of renewable energy
- A first bundle of measures is in consultation
- From 2020 on: phase out of subsidies and introduction of an energy tax covering all energy carriers
- The energy transition is ambitious, but feasible and economically viable
- The participation of all actors is necessary: energy supply companies, firms, consumers, cantons, researchers etc.



# Feedback is very welcome!

[www.energiestrategie2050.ch](http://www.energiestrategie2050.ch)  
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# Appendix



# Swiss coordinated energy research action plan: focus on 5 priority fields of action

## **1. Efficiency technologies**

e.g. electric motors, information & communication technology, efficient private mobility, buildings, fuel cells and hydrogen

## **2. Energy systems, networks and electricity transmission**

e.g. transmission systems, network components, smart grids, integration of renewable energy

## **3. Energy storage**

e.g. electrochemical storage, supercaps, electrolysis

## **4. Electricity production (primarily renewable energy)**

e.g. geothermal energy, biomass, CHP, nuclear safety

## **5. Economic, social and legal aspects**

e.g. role/influence of regulator, promotion models



# Transition costs

- + Investments in efficiency
- Savings in energy costs / imports
- + Costs of increase in production capacities  
(thanks to reduction in demand, these are lower than without a reduction)
- + Networks

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**= Total 39 billion Swiss francs**

Supply option C&E | Sources: Prognos 2012, Consentec 2012





# Energy Strategy 2050: current timetable

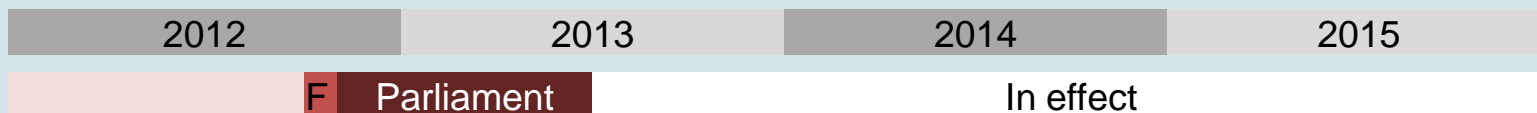
## Energy Strategy 2050: Measures package I



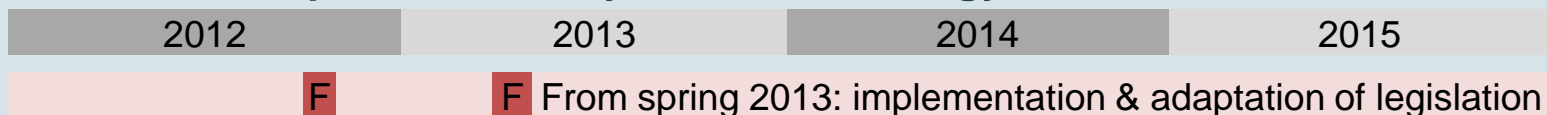
## Parl. init. 12.400 (higher feed-in rem. fee, relief for large consumers)



## Swiss coordinated energy research action plan



## Detailed concept for electricity networks strategy



Key: F = Federal Council; C = Consultation; Opt. ref. = optional referendum