Alpiq – Energy with a future

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Agenda

- Alpiq
- Electricity market
- Global warming
- What energy source for the future?
- Hydropower and its challenges
- Support to hydropower

Alpiq

Creation 1rst Feb. 2009

Headquarter of the company in Lausanne

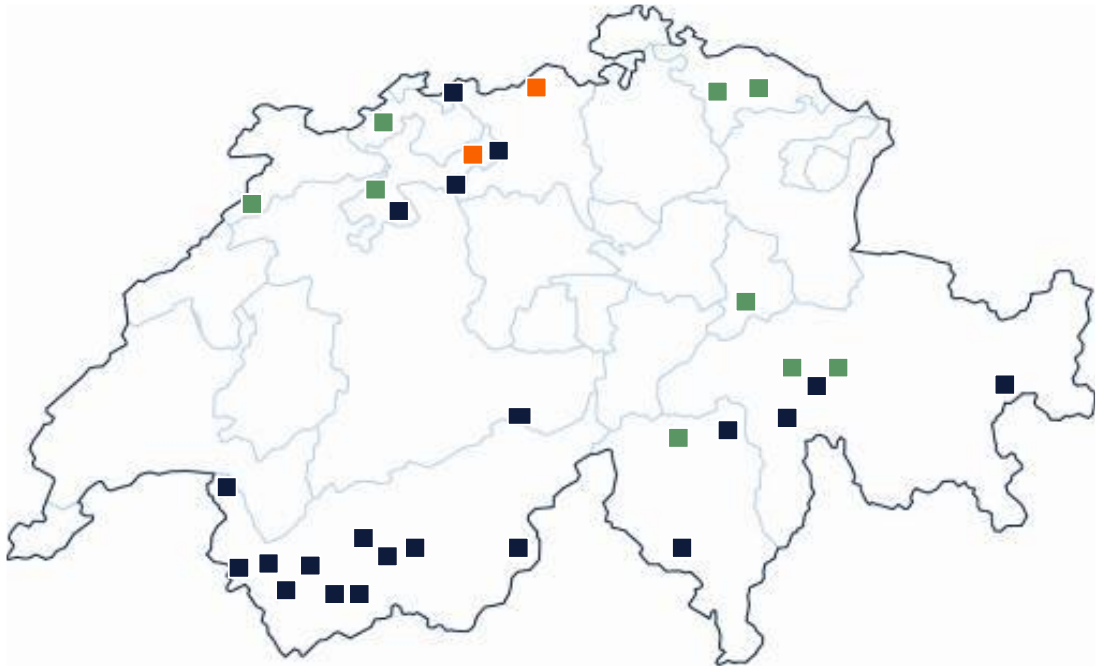
Active in 30 countries throughout Europe

Key figures 2017:
- Net turnover CHF 5.5 billion
- EBITDA before exceptional items of CHF 245 million
- 1’600 employees (1rst August 2018)

2018 : sale of the Engineering Services business to Bouygues for CHF 850 million (including 7’650 employees)

Structure:
- Generation Switzerland
- Generation International
- Digital & Commerce
- Financial Services

Alpiq: Electricity generation in Switzerland

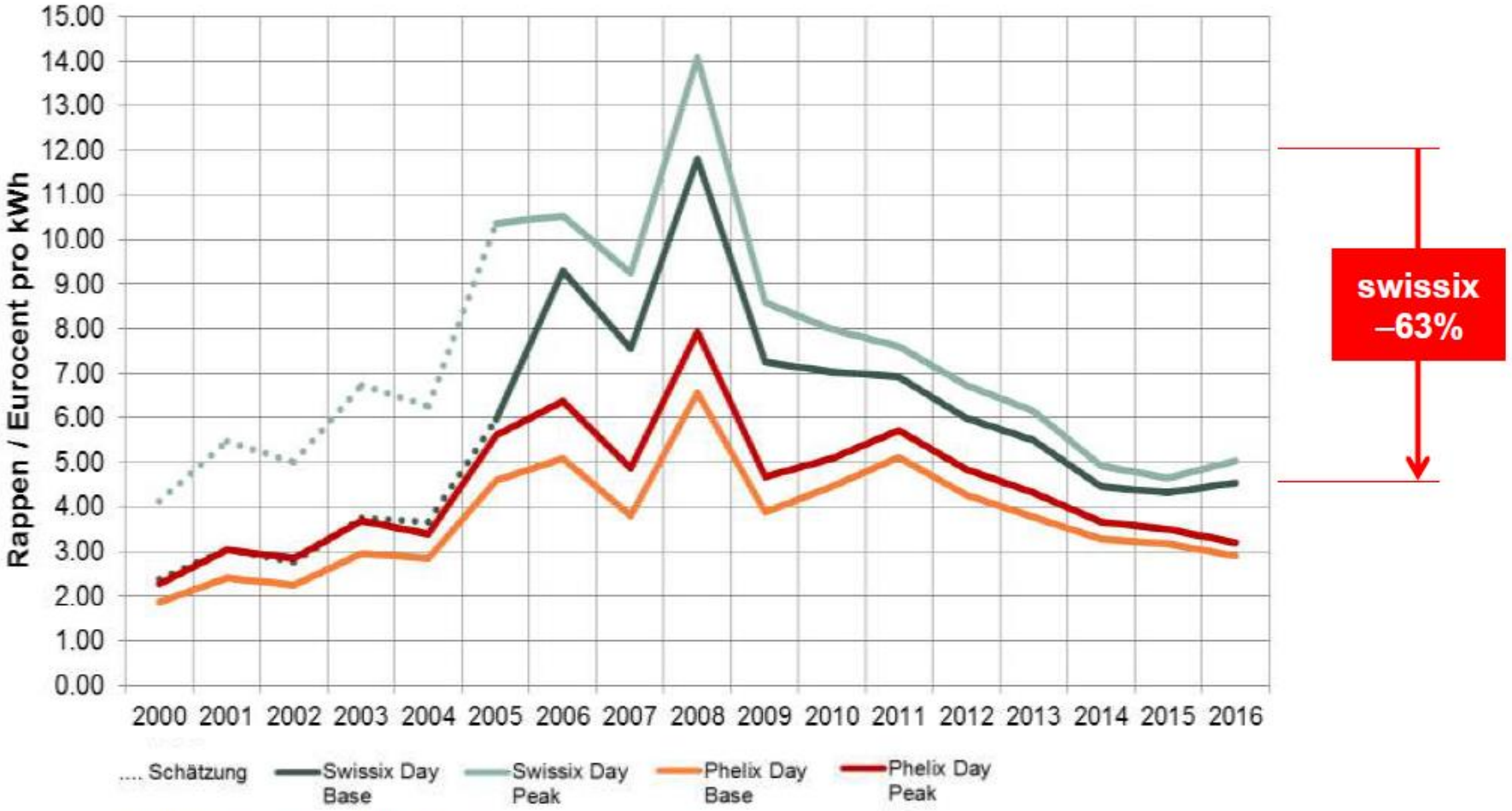


Generation output

- Hydropower (3,907 GWh/year)
- Nuclear power (4,401 GWh/year)
- Small-scale hydropower, wind, photovoltaics (48 GWh/year)

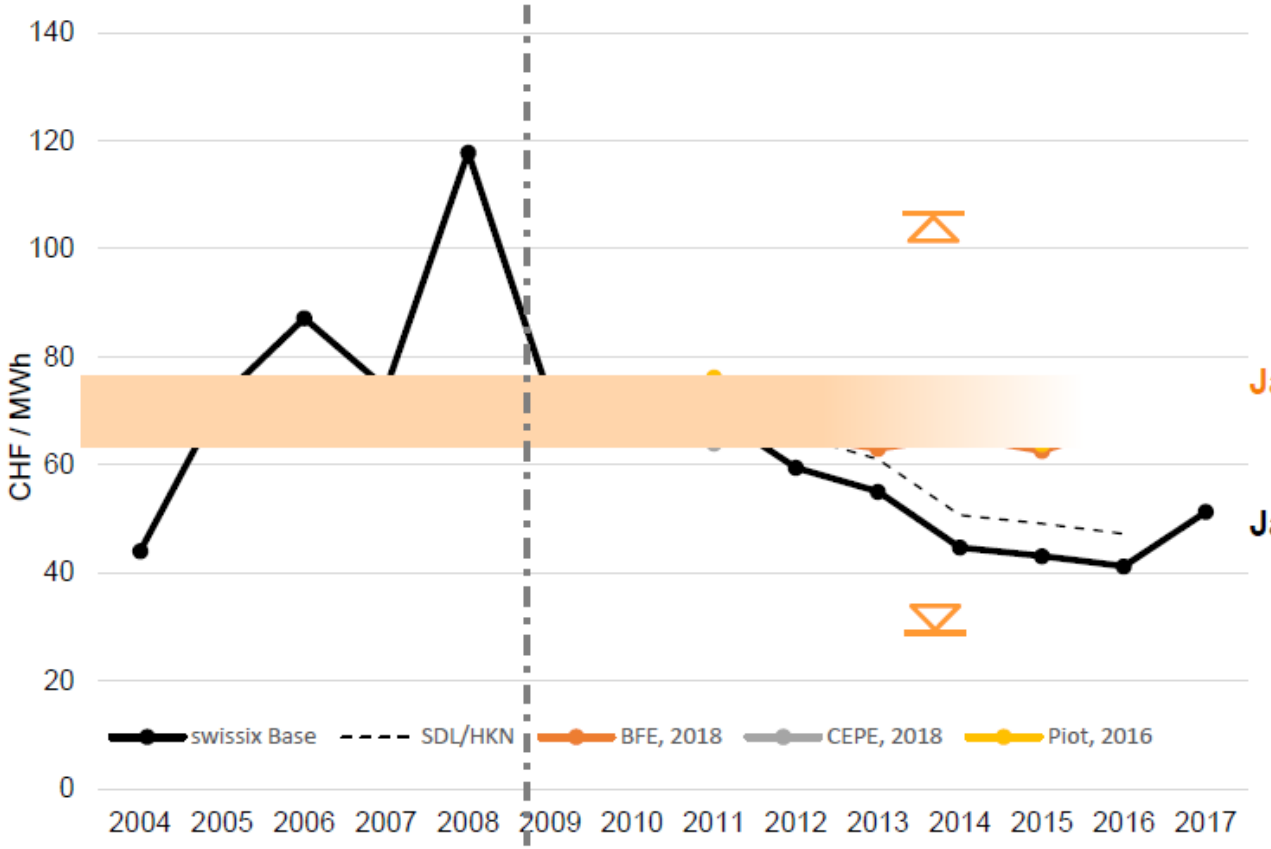
Source: Alpiq Annual Report 2017

Electricity price



[Wholesale market prices 2000-2016;
Source: BHP, 2017; SWV 2017]

Electricity price vs. electricity cost



Jahreskosten 2011 – 2016
6.3 – 7.6 Rp./kWh

BFE > 2016
6.7 Rp./kWh

Jahrespreise 2011 – 2016
4.7 – 7.5 Rp./kWh

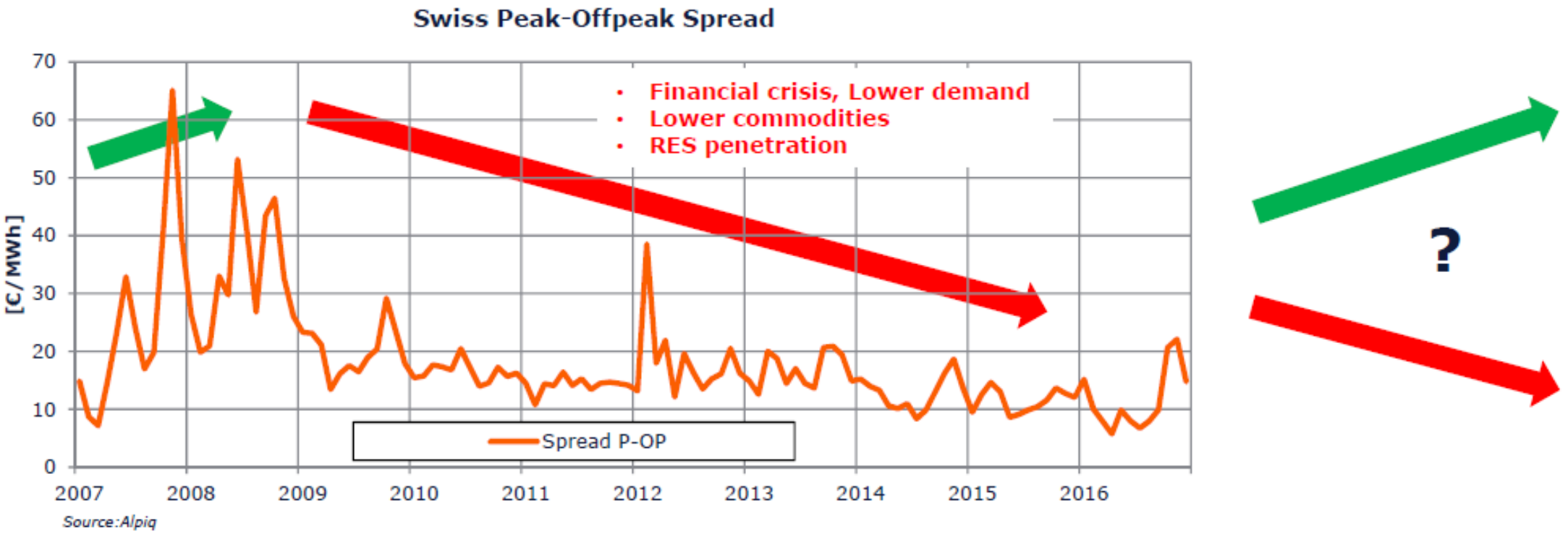
BFE > 2016
4.7 Rp./kWh

→ 40% financial costs
35% taxes
25% operational costs

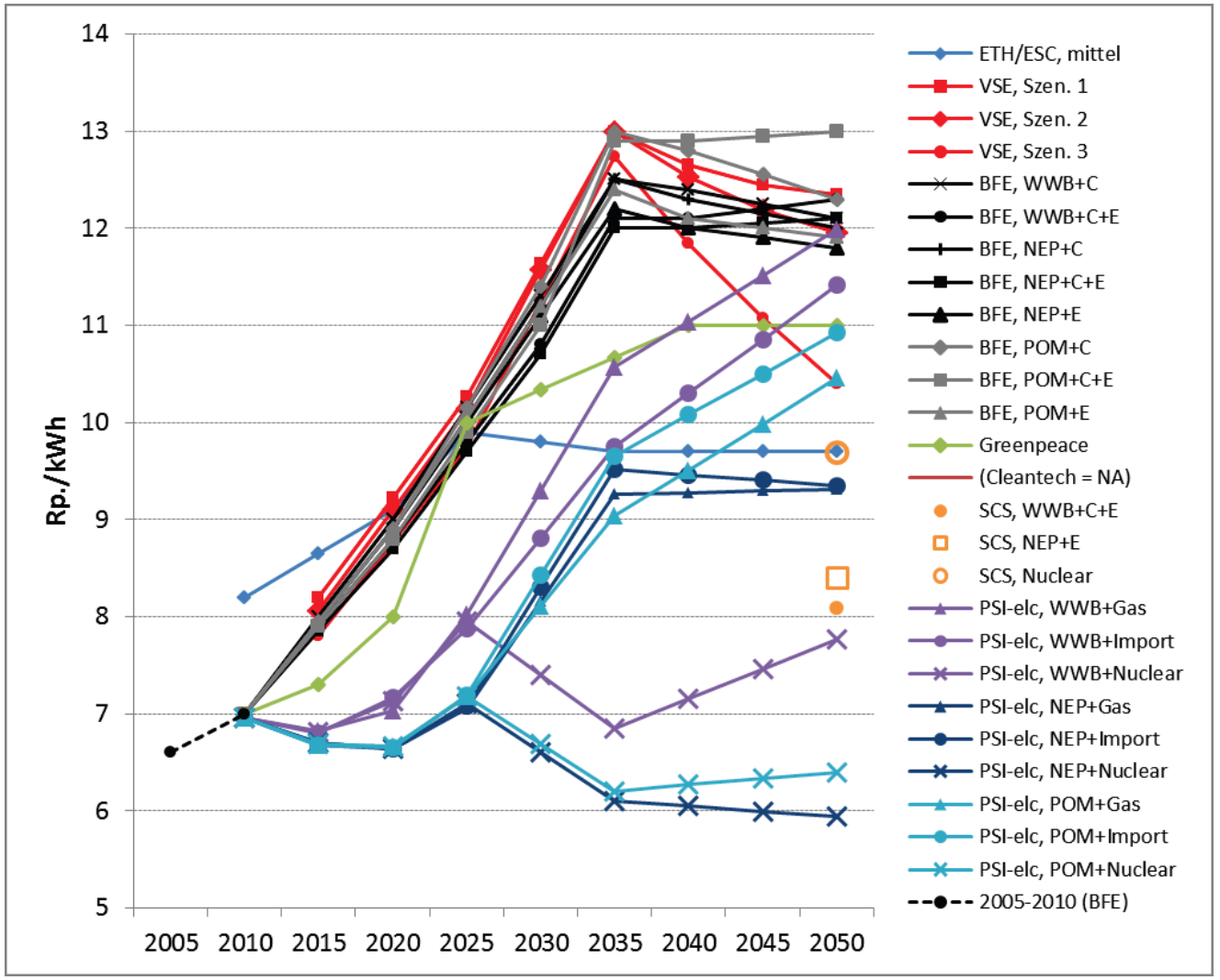
Energiestrategie 2050:
Marktprämie WK 2018 – 2022:
aus Netzzuschlag 0.2 Rp./kWh
~ 0.6 Rp./kWh, max. 1.0 Rp./kWh

Jahrespreise swissix Base 2004-2017, zzgl. Optimierte Erträge aus SDL/HKN vs. mengengewichteter Durchschnitt der Gestehungskosten Wasserkraft 2011-2016 auf Stufe Aktionär, exkl. Pflichtdividenden, inkl. Gemeinkosten und Eigenkapitalkosten
(Grafik: SWV, 2018; Datenquellen: ENTSO-E Transparency Platform, 2018; Kostenstudien Piot, 2016, BFE, 2018 und CEPE, 2018)

Electricity price : the peak-offpeak spread



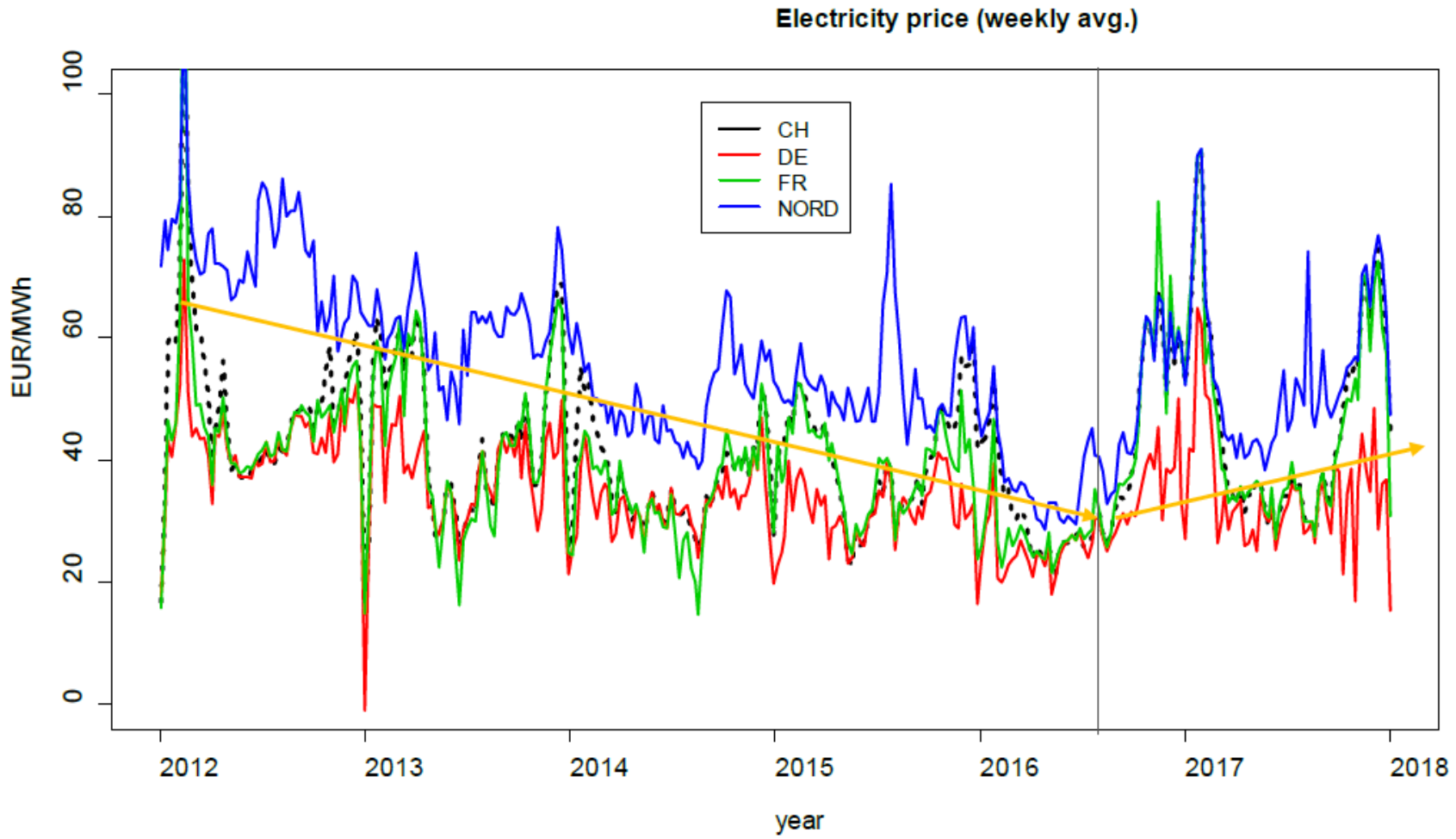
Electricity price : forecasts



Levelized production cost of mix. Costs of import are included. PSI-elc: add-on to match starting 2010 costs; ETH/ESC: without add-on; Cleantech: no value; PSI-sys: no value (only technology costs and shares)

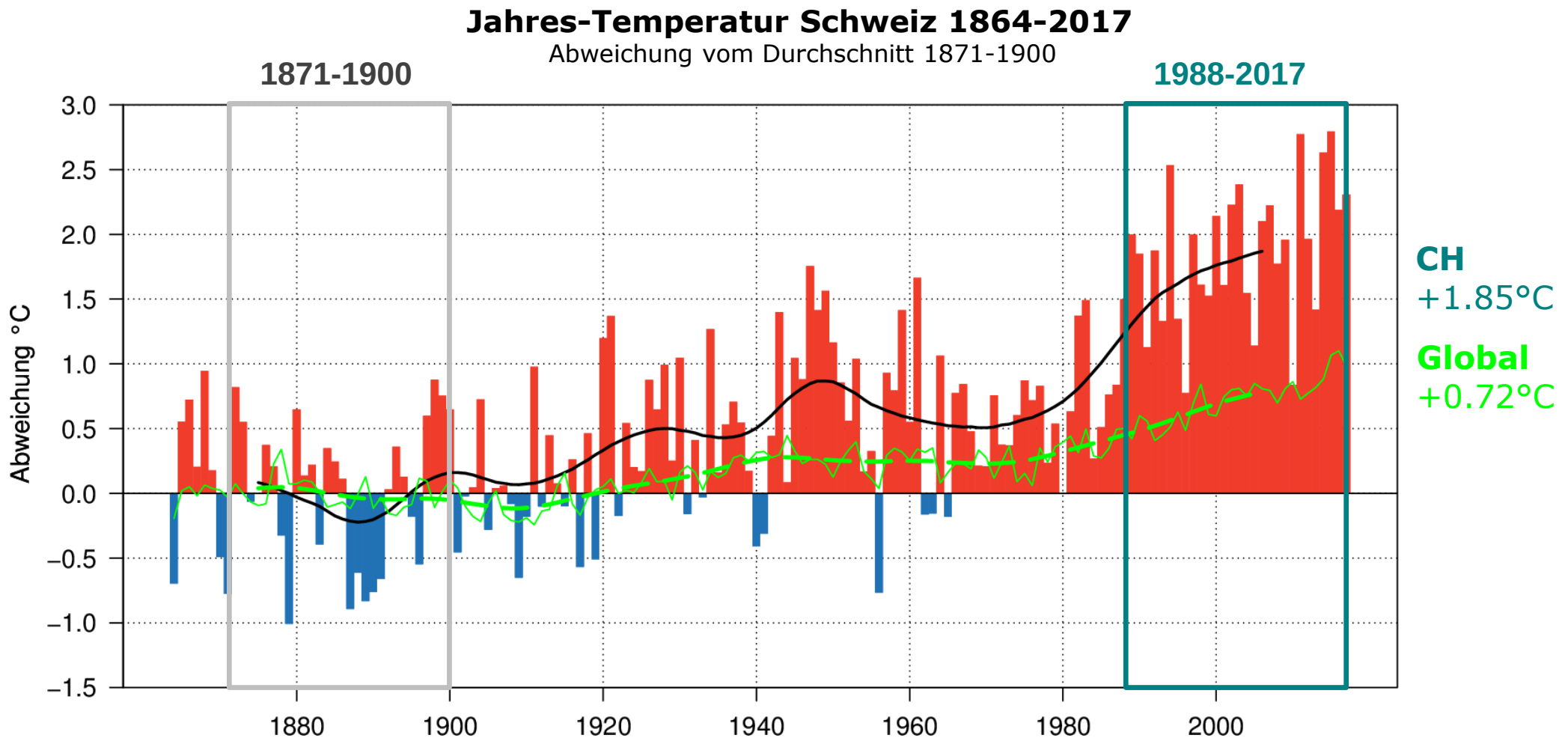
Source : Review of Swiss Electricity Scenarios 2050, PSI 12/2014

Electricity price evolution



Source : SCCER-SoE Annual Conference, 13.09.2018

Global warming : CH



Source : MeteoSwiss, 2018

What energy source for the future ?

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	Lifetime (years)	LCOE ($/MWh)	Emissions (gCO_2/kWh)	Predictable	Flexible	Storable	Applicable in Switzerland
Coal	40	78	820	yes	no	(yes)	no
Gas – combined cycle	30	79	490	yes	(yes)	(yes)	(yes)
Biomass – cofiring/dedicated	30 - 40	89 - 180	230 - 740	yes	no	(yes)	yes
Nuclear fission	60	99	12	yes	no	(yes)	yes → no
Geothermal	30	89	38	yes	(yes)	(yes)	To be demonstrated
Hydropower	50	35	24	yes	yes	yes	yes
Solar PV	25	160 - 220	45	no	no	no	yes
Solar - concentrated	20	200	27	no	no	no	To be demonstrated
Wind onshore	25	84	11	no	no	no	yes
Wind offshore	25	170	12	no	no	no	no

Source : IPCC, 2018

Generation costs

Table 2: Generation costs for newly built renewable power plants in Switzerland and offshore wind abroad (in Rp. /kWh).

Technology	New plants		
	Today	2035	2050
Large hydro[9]	7-30	7-30	7-30
Small hydro	12-28	14-33	14-34
Wind - Switzerland	13-21	10-17	9-15
Wind - offshore	13-27	12-23	10-20
Photovoltaic: 10 kW 1000 kW	18-31 8-13	9-22 4-10	8-19 3-9
Wood cogeneration[10]	18-36	18-41	18-45
Agricultural biogas[11]	20-49	18-50	16-51
Deep geothermal[12]	Not available	16-58	13-47

Source : Potentials, costs, and environmental effects of electricity generation technologies, SFOE, 11/2017

Potential of renewable energies

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Table 1: Exploitable potentials for renewable electricity generation in Switzerland (in TWh/a).

Technology	Production 2015/2016	2035	2050
Large hydro[2]	32.7	32.7-34.0	32.7-34.0
Small hydro[3]	3.5	4.3-5.5	4.3-5.5
Wind energy	0.1	0.7-1.7	1.4-4.3
Photovoltaic[4]	1.1	5.5-16	11-19
Wood-fired cogeneration	0.1	0.1-0.6	0.1-1.1
Agricultural biogas	0.1	0.1-0.7	0.1-1.3
Deep geothermal	Not available	Still not seen as available on a large scale	4.5 (target)

Source : Potentials, costs, and environmental effects of electricity generation technologies, SFOE, 11/2017

Hydropower is facing many challenges

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- Low electricity price
- Construction costs
- Maintenance costs
- Climate changes
- Taxes (water fees)
- Environmental requirements : fish passage, minimal flow, sediment transport, hydropeaking mitigation, revitalization, landscape protection (cost ca. 1 GCHF up to 2030)
- Concession (new and renewal)

Energy Strategy 2050 – Support to hydropower

Measures for the development of renewable energies

Administrative

1. National interest
2. Shorter approval procedures

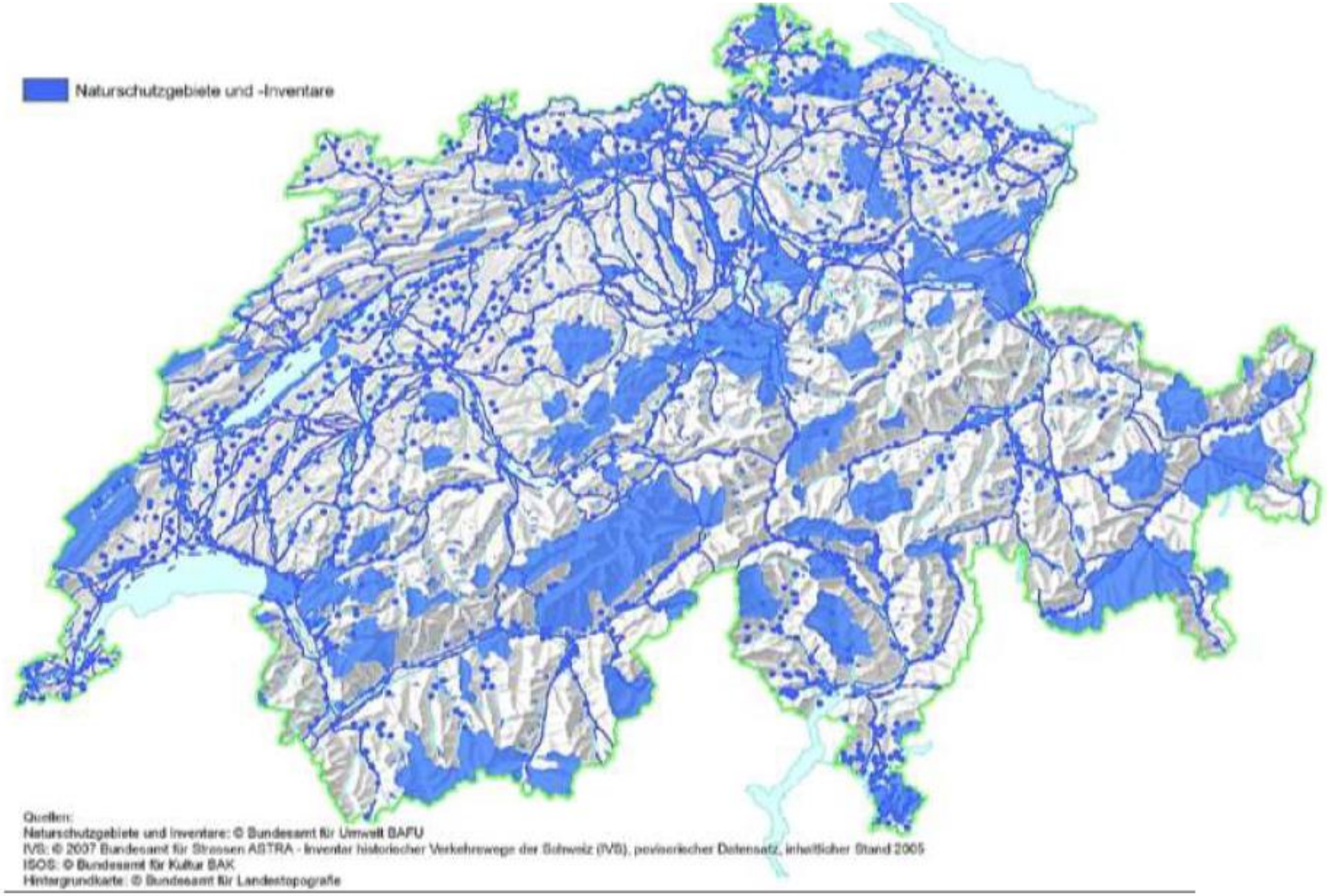
Financial

1. Feed-in remuneration system
2. Investment subsidies
3. Support for existing large-scale hydro-electric power plants

Energy Strategy 2050 – Support to hydropower

National interest : weighing of interests environment - production

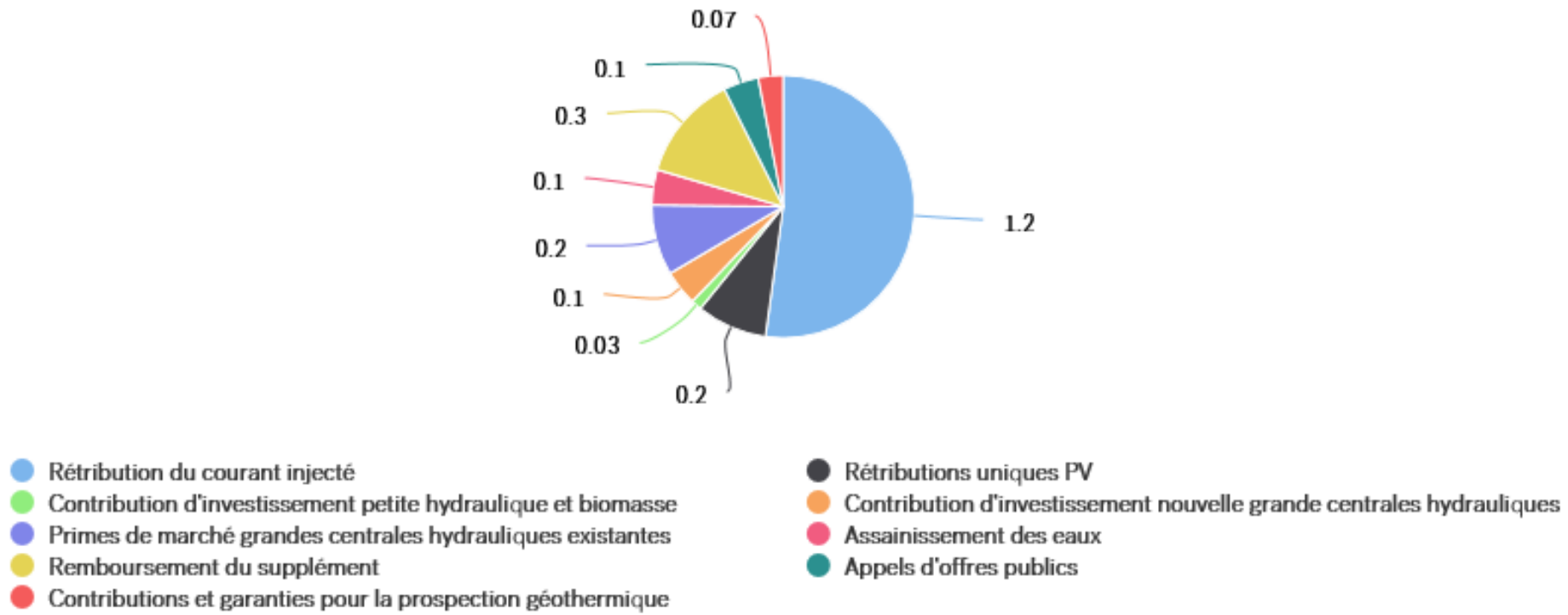
IFP zones = ca. 20% of CH surface



Energy Strategy 2050 – Support to hydropower

Financial support

Extra taxes of 2,3 ct/kWh from 1rst Jan. 2018 (previously 1,5 ct/kWh)



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Investment subsidies – Feed-in remuneration system

Synthesis

	A. Contribution d'investissement (applicable jusqu'à 2030)				B. Rétribution du courant injecté (SRI) (applicable jusqu'en 2022)
		Taux de contribution max			
	Puissance	P ≤ 10 MW	P > 10 MW		Conditions requises
1. Installations nouvelles ou remplacement complet d'une installation	P > 10 MW		35%		Doit être une nouvelle installation 1 MW ≥ P ≤ 10 MW
2. Agrandissement	P ≥ 300 kW	60%	35%		
3. Rénovation notable	P ≥ 300 kW	40%	20%		
4. Exceptions	Pas de puissance minimale requise	60% (agrandissement) 40% (rénovation)	35% (nouv. instal. ou agrandis.) 20% (rénovation)		Doit être une nouvelle installation 0 < P ≤ 10 MW *[4]
5. Centrales de pompage turbinage	Aucune contribution				

N.B. The authorization to built must be already granted

Politique énergétique 2050 – Mesures de soutien à l'hydraulique

Investment subsidies

Requests 2018 :

- Small hydro : 22 requests - 53 MCHF Available 13 MCHF → waiting list
- Large hydro : 5 requests - 141 MCHF Available 40 MCHF → waiting list

Previsional 2019 :

- Small hydro : available 50 MCHF
- Large hydro : from 2020 (2 years cycle)

Regulatory regime adaptation

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What do we need ?

- Full electricity market opening
- Electricity market agreement with Europe
- Green default basic supply
- Adaptation of the water tax regime (e.g. flexibilisation of the water fees)
- Introduction of capacity remuneration scheme
- Wind and solar generation must bear some of the costs they cause (need for capacity reserve and compensation of unpredictability)
- Resetting of balance between environment and energy
- Adaptation of the electrical grid

Thank you for your attention

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