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Cleantech

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Opportunities for Innovation Support in the Energy Field

For Swiss enterprises and research institutes

Executive Summary

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Exclusively responsible for the content and the conclusions of the report are the authors of the report. The descriptions of the support programmes are mostly agreed with the responsible programme operators.

PDF download of the publication

www.bfe.admin.ch/wtt → Opportunities for Innovation Support [DE: Angebote der Innovationsförderung]
The comprehensive report in German as well as the executive summary in French, English and German is available to download at the above-mentioned website.

Information about new support opportunities as well as proposals for corrections are welcome and should be sent to robert.luedi[at]bluewin.ch and be copied to cleantech[at]bfe.admin.ch.

Executive Summary

1.1 Content of this report

This report provides guidance about the opportunities for the support of innovation projects[1] in the energy field in Switzerland. It primarily addresses enterprises, public and private research and development institutes, associations, the administration and non-profit organisations interested in relevant support opportunities in the energy field.

The focus is on opportunities for innovation support, accessible for institutions and enterprises located in Switzerland. Described are the instruments for the support of innovation and new system solutions in all relevant energy fields.

All listed opportunities offer support in a larger or smaller part of the complete innovation chain. None of the described support programmes alone cover the complete innovation chain. Presented are innovation support opportunities along the complete development process starting with basic research, to demonstration projects up to the market.

The comprehensive report is structured as follows:

– *Executive Summary*: The opportunities for innovation support are summarised in *graphs 1* and *3*, and in a short form described in *table 3* of section *1.6*.

– *Section 2, Calculations and financing examples*

– *Section 3, National support opportunities in the field of energy*: Descriptions of national public programmes, primarily supported by means of the Swiss Federation.

– *Section 4, European and international support opportunities*: Descriptions of public programmes, which usually provide financial support by states and promote international cooperation.

– *Section 5, Foundations and funds* with financial means for third parties in the field of energy.

– *Section 6, Networks, export promotion and other opportunities for innovation projects in the field of energy*: The listed networks, clusters, consulting and support organisations are active at a national or international level, whereby most are also financially supported by the Swiss Federation.

Not contained in the report are instruments of pure business promotion and/or location promotion as well as many cantonal or regional activities which usually have relatively low financial means. Financial support for energy technologies already available in the market can be simply located with the help of the Swiss postal code on the website www.energie-experten.ch/de/energiefranken.html.

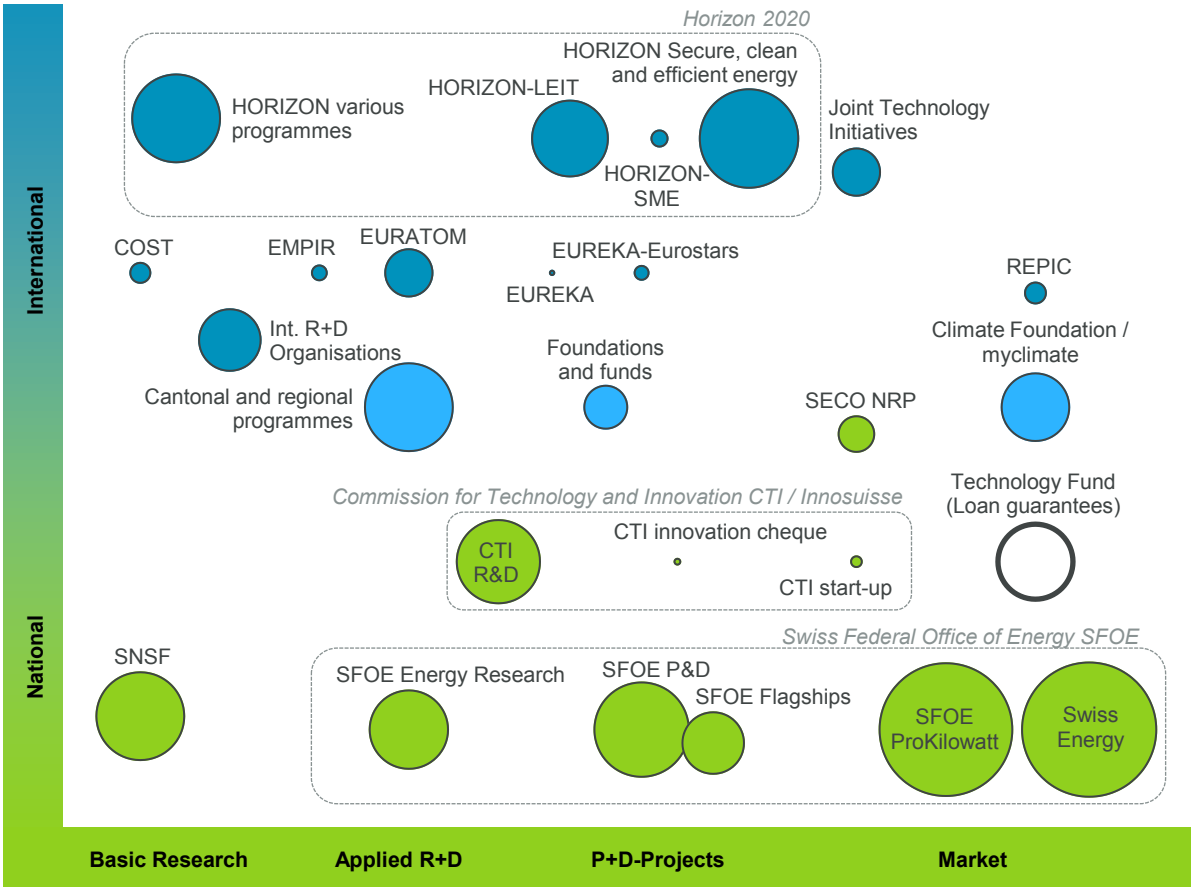
The report makes no claim to be complete. In particular, financial information is to be understood merely as guidance based on estimates, which can be subject to fast changes. For binding information it is necessary to refer to the responsible support institutions and their websites.[2]

[1] Innovation in this report is understood as a process from a project idea to a product or procedure successfully placed in the market.

[2] Information about additional programmes and corrections is welcome in view of the next update of this report and should be addressed to: robert.luedi[at]bluewin.ch and be copied to cleantech[at]bfe.admin.ch. An overview of the support opportunities beyond the energy field is available from Luedi Consulting R&D “Guide 2017 – Support Programs Research, Development, and Innovation”.

1.2 Overview of the opportunities for innovation support

Graph 1 shows important support programmes, which provide financial means for innovative energy projects in Switzerland. The vertical axis distinguishes between international and national programmes. In between, the regional or not clearly assignable programmes are listed. The horizontal axis shows the development chain and the respective position of the programmes. The size of the circles in the graph is about proportional to the annual budgets for 2017 of the respective programmes in the energy field. Taken into account is just the energy share, often as a rough estimate, for the Swiss partners in energy projects.[3] Not included are private R+D means provided by enterprises, which often exceed the public financial support significantly.



Graph 1: Support programmes for innovative projects in the energy field
Table 3 in section 1.6 contains all hyperlinks to the support programmes shown in this graph

Practically all the programmes shown in *graph 1* are open for scientific organisations. For enterprises, primarily the innovation programmes of applied research and development, pilot and demonstration projects and certainly the programmes close to the market are of interest.

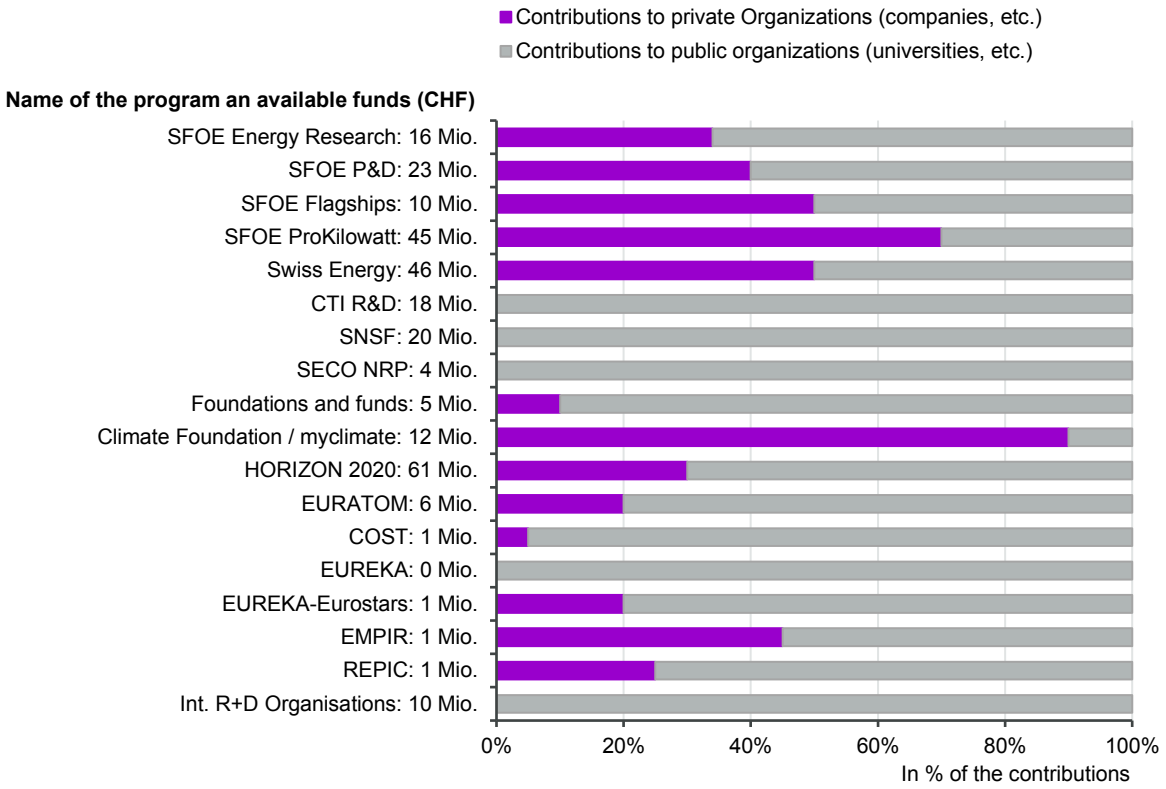
In the report, additional opportunities for innovation support are described, which not all are shown in *graph 1*, for reasons of simplicity or lack of empirical values. Among these are:

[3] For the international programmes an exchange rate of 1.10 CHF/Euro was used. In addition, for the International R+D Organisations pure supplier contacts for construction projects and components were excluded.

– Opportunities for innovation support by further Federal Offices not primarily addressing energy aspects.
– Support opportunities by cantons, cities and regions.
– The international ERA Nets.

1.3 Recipients of support means and support instruments

Graph 2 shows the shares of the annually available (energy) means allocated to private and public organisations. The allocation to the two user groups is partly based on rough estimates.



Graph 2: Distribution of funds of support programmes in the energy field
The funds shown in the graph are not always fully utilised by the support programmes.

From a company point of view it can be distinguished between two main support instruments:

– *Direct financing*: Enterprises receive direct financial support; this is usually in the context of a project consortium with other industrial and scientific partners. Examples: SFOE Pilot and Demonstration Program, Horizon 2020.
– *Indirect financing*: Enterprises are obliged to cooperate with scientific partners, whereby only the latter are entitled to receive public financial means through the support programme. Example: CTI R+D projects.

1.4 Different financing opportunities for innovative projects

Not all support programmes are relevant for companies. So for example, pure basic research programmes are seldom relevant. Before searching for external project support, companies are advised to check the different alternatives. Some of these are summarised in the following table:

	Forms of cooperation	Suitable for following situation	Most important advantages and disadvantages
w/o financial support	1 In-house development (entirely in-house)	– Fast solution – All know-how available – Secured own financing – Low R+D risks	No co-operation problems Fast start/abandonment possible *Rather conventional solutions*
	2 Cooperation with specialised company	– Fast solution – External know-how necessary – Secure down financing	Specialists bring in know-how against payment of costs *Amicable co-operation necessary*
	3 Cooperation with scientific partner (purely bilateral)	– New approaches with scientific know-how – Confidentiality secured – Financing of scientific partner(s) by the company	Choice of partner is crucial, but often a matter of luck *Different time management* *Rather suitable for smaller and not time-critical projects*
With financial support	4 Cooperation with scientific partner, which as a minimum is partly publically financed, e.g. by the CTI	– New approaches with scientific know-how and for high R&D risks – Medium-term solutions – Reduced in-house contribution	Choice of partner is crucial Public co-financing *Different time management* *Consent for project objectives between partners – contracts* *Some publication obligations*
	5 National cooperation with several partners and public financial support also for companies	– New approaches with scientific know-how and for high R&D risks – Medium- to long-term solutions – Results for several users – Reduced in-house contribution	Choice of partners is crucial Public co-financing *Different time management* *Consent for project objectives between partners – contracts* *Some publication obligations*
	6 International cooperation with several partners and public financial support	– Medium- to long-term solutions with high R&D risks – High sharing of costs and risks – Results for several users – Internationally active companies	Choice of partners is crucial Public co-financing, different support instruments *Consent for project objectives between partners – contracts* *Some publication obligations*

Table 1: Suitability as well as advantages and disadvantages of different cooperation forms

80–95 % of all development projects, resp. R+D expenditures of companies are run under cooperation forms 1 or 2 as shown in the table above. Cooperation with scientific partners on a pure bilateral level according to form 3 usually requires project assistance from qualified company staff. For the simplest forms, such as a semester, Bachelor-, Master- or a doctoral thesis limited financial means are necessary.

Just the grey highlighted areas and with regards to the intellectual property rights more risky cooperation forms (4, 5, 6) offer the opportunity for public co-financing of R+D projects. It needs to be mentioned that co-financing does not imply that a company receives direct financial support for an R+D project. For example, CTI/ Innosuisse in Switzerland uses an indirect financing model, i.e. just the scientific partners are financed by public means. Private partners need to finance their project share themselves, usually

in-kind, but are beneficiaries of the jointly achieved research project results. Direct financing for companies in the energy field is available from the SFOE, from various international programmes and to a lesser extent from other Federal Offices, which is also called resort research.

Financial contributions

Public R+D programmes support selected R+D projects with maximum shares of 40–100 % of the total project costs, depending on political priorities and market proximity. The remaining means need to be contributed in-kind by the project partners, usually from industry or other application partners. Public support for basic studies as well as external studies is up to 100 % of the total project costs.

Table 2 shows the current maximum public support levels in percent of the total project costs:

Project type	**Maximum public support as share of total project costs**	
	National – Switzerland	International
Pilot and demonstration projects	40 % (60 %[1])	50–70 %[2]
Research and development projects	50 % (100 %[1])	50–100 %[2]
Basic research	100 %	100 %
Political fundamentals for decision-making / external studies	100 %	100 %

[1] In exceptional cases.

[2] The maximum support levels of 70 % and 100 % have been used by the EU since 2014 for Horizon 2020 and related programmes.

Table 2: Public support levels for different project types

In Switzerland, the largest funding bodies for research, CTI and SNF, in principle are oriented towards the support of public research organisations, i.e. only public research organisations are supported with public means and consequently these therefore are usually in charge of the project leadership.

However, due to an increased level of public interest and due to market failures[4], e.g. in the fields of energy, environment, health, and agriculture, there is also direct financing for companies by some Federal Offices, resp. their resort research. For some international programmes with national financing through the Swiss Federation (EUREKA-EUROSTARS, EMPIR, partly ERA Nets) Switzerland also switched to a direct financing model for companies.

At the EU level the project financing was harmonised in Horizon 2020 from 2014 onwards, i.e. all organisations, enterprises, universities, NPOs, etc. are now supported and financed based on the same rules.

Public contributions are usually paid as non-reimbursable subsidies. Only in single cases of abuse or project abandonment public contributions need to be refunded. In very few programmes close to the market public contributions are provided as loans, which in case of a successful project need to be paid back. The most important examples are the Technology Fund and the loans in the frame of the New Regional Policy NRP by the Swiss State Secretariat for Economic Affairs SECO.

[4] An example of market failure is the lack of internalisation of the external costs, which for example is caused by the combustion of fossil fuels and the related emissions. A significant share of the costs caused by such emissions in the areas of health and climate change are not covered by the actual emitters but by the public sector.

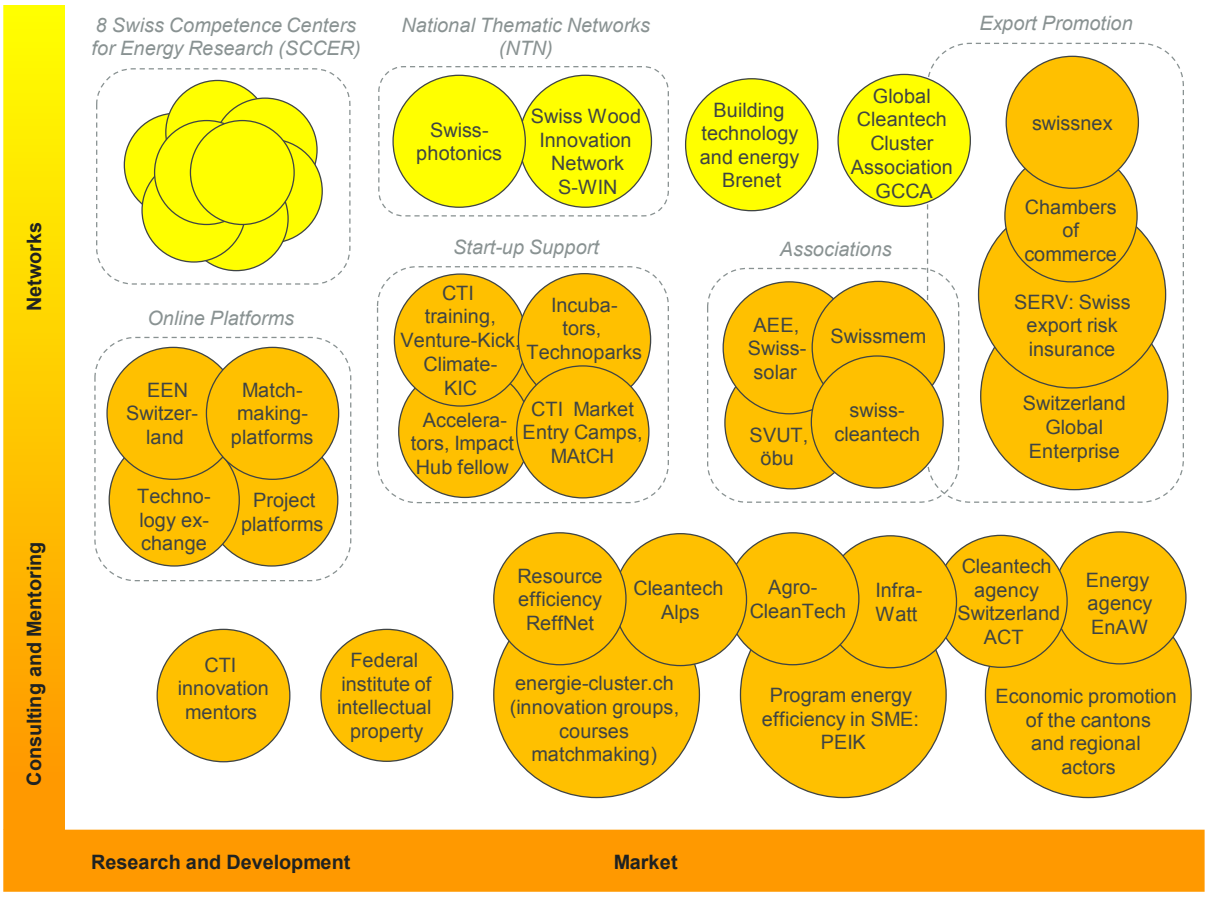
1.5 Consulting and networks for innovation in the energy field

Besides financial support for innovation projects several networks offer consulting services. Depending on the network, the services offered and the target groups are different. So some networks primarily address their own members, while others are also open for third parties or are exclusively for third parties. The services in the innovation field vary and essentially cover:

- Networking inside and outside their own sector at a national as well as international level
- Export promotion through joint exhibitor booths, consulting, and contact mediation
- Organisation of information events, seminars, brokerage events, workshops
- Moderation in the preparation of innovation projects
- Promoting young entrepreneurs
- Preparation of project applications for several members
- Technology transfer and contact mediation as well as joint calls for proposals via digital platforms
- Individual mentoring and consulting services related to administrative, technical, economic, legal and political aspects

Many industrial associations also offer some of the above listed services for their members. Besides, there are dozens of regional cluster organisations and various consultants, which offer services in the innovation field.

Graph 3 shows a few selected consulting and network organisations in the energy field. Most of the selected networks have mandates by the Swiss Federation (SFOE, FOEN, and SECO) or closely related organization as CTI, the European Union or are supported by the cantons. The different sized circles represent the greater or smaller extent of the innovation services for third parties in the energy field.



Graph 3: Selected organisations with innovation services in the energy field

1.6 Tabular overview of the opportunities for innovation support in the energy field

Table 3 shows the different programmes for innovation support in the energy field. Distinguished are national and international support programmes. In this executive summary the hyperlinks lead to the relevant websites, in the comprehensive report (in German) to the detailed description of the relevant programme. The support range is an indication only and is often roughly estimated. The number of new projects per year is also an estimate and not an upper or lower limit of projects to be supported. For comparative purposes the values for the European and international programmes in *table 3* are converted into Swiss Francs (Rate 1.10 CHF per Euro).

Table 3: Tabular overview of the opportunities for innovation support in the energy field

The herein listed links lead to the programme websites, in the comprehensive report to the detailed (German) description of the relevant programme.

Programme	Financial means, thereof energy [million CHF / year]	Support segment: Basic Research	Support segment: Applied R+D	Support segment: P+D	Support segment: Market	Support range [empirical values per project in CHF]	Maximum contribution rates [%]	Number of new projects per year [empirical values]	Form of support [Definition of direct project costs: Wages etc., w/o overhead and laboratory infrastructure]	Requirements	Recipient ö: public organisation p: private organisation (Company, NPO, etc.)
National support programmes											
SFOE – Energy Research	16, thereof 16					0–several million	up to 100 %	80 (w/o small-scale projects)	– All direct project costs	– Topics need to be within the focus of the SFOE energy research concept	ö and p
SFOE – Pilot- and Demonstration Projects (P+D)	35, thereof 35					50 000–several million	40 % (exceptionally 60 %)	40	– All direct and eligible project costs	– Innovative projects in the areas of energy efficiency and renewable energies acc. Art. 12 and 14 EnG	ö and p
SFOE – Flagship Projects (L)	10, thereof 10					10 000–several million	60 %	6	– All direct and eligible project costs	– As for P+D but with additional participation of public shareholders with a high reputation	ö and p
SFOE – ProKilowatt-Projects	45, thereof 45 (46 in 2018)					20 000–2 million	30 %	60–75	– All direct project costs	– 1–2 calls/year – Just for electricity efficiency measures – Just projects with payback of 4 years and more	ö and p
SFOE – ProKilowatt-Programmes						30 000–3 million	30 %	18-30	– All direct project costs		ö and p
SFOE – SwissEnergy	46, thereof 46 (50 in 2018)					5 000–400 000	20 % (exceptionally up to 60 %)	770–990	– Only ‘soft’ measures are supported	– No standardised requirements	ö and p
Regular CTI Projects and specific Projects	159, thereof ca. 18					50 000–990 000	50 %	~350–400 (thereof ca. 40–60 projects in the support segment “Energy”	– All direct project costs	– Min. 1 public research partner and 1 application partner – Private companies contribute 50 % in-kind and pay a cash contribution of 0–10 % in favour of the public research partner	R+D institutes, which cooperate with companies / application partners (financial support exclusively for public research partner)

Programme	Financial means, thereof energy [million CHF / year]	Support segment				Support range [empirical values per project in CHF]	Maximum contribution rates [%]	Number of new projects per year [empirical values]	Form of support [Definition of direct project costs: Wages etc., w/o overhead and laboratory infrastructure]	Requirements	Recipient ö: public organisation p: private organisation (Company, NPO, etc.)
		Basic Research	Applied R+D	P+D	Market						
CTI – Innovation Cheque	1, thereof ~0.15					fixed 7 500	100 %	100–130 (thereof 10–15 % in energy)	– Small pre-studies – Cost of wages	– Payment exclusively to public partner – Just 1 innovation check per company at the same time	R+D institutes, which cooperate with companies
Swiss National Science Foundation SNSF	2017: 937, thereof ~20 (just direct energy related means) 2018: 979, thereof ~20					Project support: 100 000–600 000 Careers support: 50 000–300 000 Others: not specified	100 %	1 150 projects 1 150 careers 1 000 others (thereof ca. 2 % in energy each)	– Wages – Costs of infrastructures – Publications, seminars, and events	– Participation restricted to scientific staff – Calls for proposals with strict specifications	ö
Bridge (CTI and SNSF)	7.4, thereof 0.4 (16.2 in 2018, thereof 0.8)					130 000–2.5 million	50–100 %	NA	– Wages 50–100 %	– Participation restricted to scientific staff of entitled research organisations as defined by CTI and SNSF	ö
SECO – New Regional Policy NRP	90, thereof 3–4					Project support: ca. 300 000 Loans: ca. 1 million	<50 % SECO >50 % cantons	ca. 200, thereof ~10 in energy	– All relevant project costs	– Co-financing by cantons and SECO is requested	ö and (p)
Federal Offices with Energy Topics	200, thereof 4 (external studies 23, thereof 0.4)					NA	Variable	NA	NA	NA	NA
Cantonal and regional programmes	NA, thereof min. 20 million					NA	Variable	NA	NA	– Variable	Variable
Foundations & Funds (w/o the large compensation programmes and w/o Climate Foundation and myclimate)	70, thereof 5 (800 from compensation programmes – KliK, KEV etc.)					Variable	Variable	NA	NA	– Variable	ö (mainly for charitable organisations)
Climate Foundation / myclimate	12, thereof 12					10 000–100 000	NA – significant own contribution requested	NA	– Compensation CO_2	– Individual grants – Variable depending on area and foundation	ö and p

Programme	Financial means, thereof energy [million CHF / year]	Support segment				Support range [empirical values per project in CHF]	Maximum contribution rates [%]	Number of new projects per year [empirical values]	Form of support [Definition of direct project costs: Wages etc., w/o overhead and laboratory infrastructure]	Requirements	Recipient ö: public organisation p: private organisation (Company, NPO, etc.)
		Basic Research	Applied R+D	P+D	Market						
Technology Fund (Federal)	25, thereof ~16 (loan guarantees)					50 000–3 million (mean value 1.7 million)	60 %	20, thereof ca. 16 in energy	– OpEx and CapEx for the commercialisation of innovation	– Applicant and lender with seat in Switzerland	p (often start-ups)
Start-up oriented possibilities	NA, thereof ~ 7 CTI-startup: 12, thereof 0.4					NA	100 %	NA CTI-startup: 80 new in coaching	– Prizes, evaluation of business ideas, CTI labels, coaching, financial intermediation, internationalisation	– Depends on support type – CTI-startup: Financing of coaches and accompanying measures, no direct financial support for start-ups	Start-ups and young entrepreneurs

Programme	Financial means, thereof energy [million CHF / year]	Support segment: Basic Research	Support segment: Applied R+D	Support segment: P+D	Support segment: Market	Support range [empirical values per project in CHF]	Maximum contribution rates [%]	Number of new projects per year [empirical values]	Form of support [Definition of direct project costs: Wages etc., w/o overhead and laboratory infrastructure]	Requirements	Recipient ö: public organisation p: private organisation (Company, NPO, etc.)
European and international programmes[5]											
Horizon 2020 [6] (w/o separately shown EU programmes and related initiatives)	7 000, thereof ~700 in energy (10 %) / Swiss share: 200, thereof ~20 in energy					600 000–100 million	100 % R+D 100 % Accompanying measures 70 % P+D	~2 300, thereof 10 % in energy)	– All direct project costs + overhead of 25 %	– Min. 3 partners from 3 EU or associated countries – Applications just on the basis of calls for proposals	ö and p
Horizon – Secure, clean and efficient energy	770, thereof 770 in energy / Swiss share: ca. 25, thereof 25 in energy					3–10 million	100 % R+D 100 % Accompanying measures 70 % P+D	300 (incl. SME projects)	– All direct project costs + overhead of 25 %	– Min. 3 partners from 3 EU or associated countries – Applications just on the basis of calls for proposals	ö and p
Horizon – Leadership in enabling and industrial technologies (LEIT)	2 200, thereof ca. 440 in energy / Swiss share: ca. 75, thereof 15 in energy					3–10 million	100 % R+D 100 % Accompanying measures 70 % P+D	1 500 (incl. SME projects)	– All direct project costs + overhead of 25 %	– Min. 3 partners from 3 EU or associated countries – Applications just on the basis of calls for proposals	ö and p
Innovation in SME	550, thereof 27 in energy / Estimated Swiss share: 3 %					Phase 1: 55 000 Phase 2: 0.5–2.75 million	70 %	Phase 1: 900 Phase 2: 300	– Phase 1: Lump sum – Phase 2: All direct project costs + overhead of 25 %	– Individual grant for SME in Phases 1 and 2 possible – Participation just for EU or associated countries – Applications just on the basis of calls	p (primarily SME) / limited for other organisations p and ö

[5] For Horizon 2020 (2014-2020) the Swiss parliament approved means in 2013 of 3.71 billion CHF, i.e. about 530 million CHF per year. A part of these means is also used for the co-financing of EUREKA-EUROSTARS, EMPIR, ERA Nets and Joint Technology Initiatives. The allocation of the means is not explicitly specified.

[6] Horizon 2020 consists of various areas, among them the following separately shown themes: Horizon – Secure, clean and efficient energy, LEIT (incl. the embedded Public Private Partnerships Energy-Efficient Buildings (EeB), Sustainable Process Industries (SPIRE)), and Innovation in SMEs. Other themes with limited energy relevance are just shown in a summarised form and cover: Strategic Energy Technology Plan, Smart, green and integrated transport, Science with and for society, Joint Research Centre of the EU, EIT European Institute of Innovation and Technology (incl. Climate-KIC) and others.

Programme	Financial means, thereof energy [million CHF / year]	Support segment				Support range [empirical values per project in CHF]	Maximum contribution rates [%]	Number of new projects per year [empirical values]	Form of support [Definition of direct project costs: Wages etc., w/o overhead and laboratory infrastructure]	Requirements	Recipient ö: public organisation p: private organisation (Company, NPO, etc.)
		Basic Research	Applied R+D	P+D	Market						
EURATOM	200, thereof 200 / Swiss share: 5–6					1.25– 470 million	100 % R+D 70 % P+D 50 % Cofund	10–15	– All direct project costs + overhead of 25 %	– Min. 3 partners from 3 EU or associated countries – Applications just on the basis of calls for proposals	ö and p
EUREKA – Network Projects	Support by the member states / CH: ~1 million CHF/year 10 % in energy					0–1.5 million	0–50 %	~90, thereof 3–6 with CH partners (10 % in energy)	– All direct project costs – Industrial projects	– Min. 2 partners from 2 countries / usually 3–5 partners	ö and (p – usually according to CTI-model w/o direct financing)
EUREKA – Clusters	Means from EUREKA – Network Projects					500 000–50 million	50 %	25–50, thereof 0–2 with CH partners (10 % in energy)	– All direct project costs – Industrial projects	– Min. 2 partners from 2 countries / but usually 10–30 partners	ö and (p – usually according to CTI-model w/o direct financing)
EUREKA – EUROSTARS	Support by the member states and the EU / CH: ~12.5 million, thereof <5 % in energy					500 000–1.65 million CH support: Max. 550 000 per project	50 % (SMEs and science) 25 % Others	~400, thereof ~30–50 with CH partners (<5 % in energy)	– All direct project costs	– Min. 2 partner from 2 countries – SME with high R+D share > 10–20 % of turnover / open for other partners – KTI rates to be used	ö and p (SME, limited for other companies)
EMPIR – European Metrology Programme for Innovation and Research	~103, thereof ca. 20 % in energy Swiss share in programme: 3.3 %					600 000–2 million	50 %	~30, thereof ~8 with CH partners (20 % in energy)	– All direct project costs + fixed share for overhead	– Usually min. 3 partners from 3 countries	ö and p
COST European Cooperation in Science and Technology	Support through the COST countries and the EU / CH: 6 million CHF/year / EU: ~2 million €/year 15 % in energy					Just coordination EU: ca. 137 000 €/year (for 20 project partners) CH credit: up to 320 000 CHF/year	Just for coordination 100 %	ca. 70 out of 80 projects with CH participation, thereof ~15 % in energy	– Coordination costs (no support for R+D tasks)	– Partners from min. 7 COST member states	ö and (p – limited number of users)

Programme	Financial means, thereof energy [million CHF / year]	Support segment				Support range [empirical values per project in CHF]	Maximum contribution rates [%]	Number of new projects per year [empirical values]	Form of support [Definition of direct project costs: Wages etc., w/o overhead and laboratory infrastructure]	Requirements	Recipient ö: public organisation p: private organisation (Company, NPO, etc.)
		Basic Research	Applied R+D	P+D	Market						
ERA Nets (Energy)	NA, primarily means from existing national support programmes					600 000–2.7 million	Depends on national programme Max. 30 % financed by the EU	Not available	– Depends on national programme	– Min. 3 partners from 3 EU or associated countries – Applications just on the basis of calls for proposals	ö and p
Joint Technology Initiatives (4 different JTIs)	~430, thereof ~165 in energy Swiss share: <4 % – means from Horizon 2020 credit					3–55 million	30–100 % depending on project type	80–85 for all 4 JTIs)	– All direct project costs	– Min. 3 partners from 3 EU or associated countries – Applications just on the basis of calls for proposals	ö and p
REPIC – Renewable Energy and Energy- and Resource Efficiency Promotion in Intern. Cooperation	1.3, thereof 1.3					20,000–150,000	50 %	10–15	– All direct project costs	– Min. 1 Swiss partner and 1 partner from a developing or transition country	ö and p
Other International (research) Organisations	Total ca. 80[7] 10 million as a return for R+D projects in the energy field					NA	Variable	NA	NA	NA	ö

[7] Taken into account are the annual investments of Switzerland. A return takes place through supplier contracts of the Swiss industry for construction and components and, to a smaller extent, through the use of the facilities by Swiss researchers in R+D projects. Only the latter is roughly estimated and taken into account in graphs 1 and 2 as R+D return.