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The Role of Government in Supporting the Emergence of Clean Energy Venture Capital Investing in Switzerland

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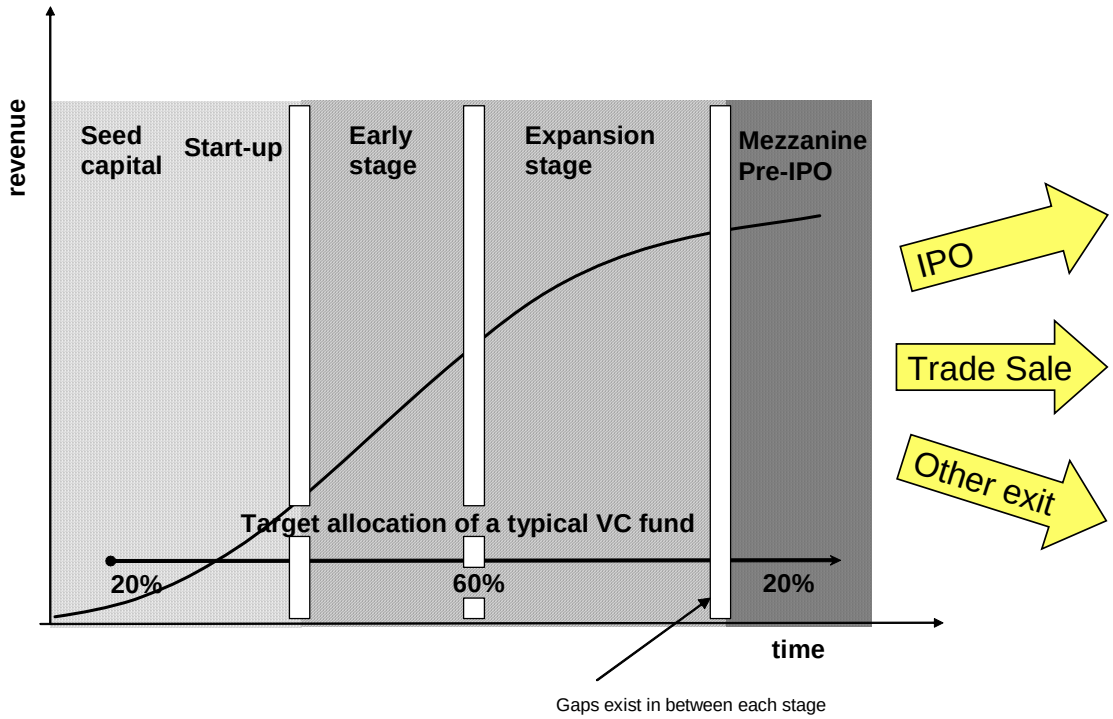
Executive Summary

Clean energy innovation suffers from a double-externality problem.[1] As any innovation, new clean energy technologies create positive external effects in the innovation phase (R&D spillover), but in addition, they avoid negative external effects in the diffusion phase – in other words, they provide a high societal value, but not necessarily a higher private value to the customer[2]. As a consequence, sustainable energy investors may not only be hesitant to invest because they are uncertain whether they can capture the full value of the new technology, but also because they are uncertain whether consumers will prefer the firm's products over a competing product that has lower value to society (e.g. higher CO2 emissions) but may create the same private value (e.g. generating electricity). This double-externality problem calls for government to take measures to avoid market failure in the form of a suboptimal level of investment in clean energy innovation. The low levels of venture capital investment in clean energy ventures in Switzerland tend to indicate a case of market failure.

Possible measures to overcome this market failure can either directly address different stages of the financing cycle for clean energy ventures (see figure 1), or they can indirectly address the issue..

Fig. 1: The financing cycle for clean energy ventures



[1] Rennings, 2000.
[2] Kaas, 1992.

In terms of direct measures, this report discusses the following possibilities:

Stage of investment	Seed/start-up	Early stage	Expansion	Later stage
Typical players involved	• Research labs • Universities/ETHs • Universities of Applied Sciences (FH)	• Business Angels • CTI	• VCs • Banks	• Stock Market • Large Energy Corporations (as Trade Sale Buyers)
Key challenges	• Technology Transfer	• Funding beyond prototype status	• Fundraising challenges for energy VCs; • Mainstream VCs lack understanding of energy	• Lack of exit opportunities • Risk-aversion of incumbents • Unfavourable market conditions for clean energy
Possible government measures	• Provision of seed finance • Enhanced networking	• Tax incentives for early-stage investments	• Co-funding energy VC funds • Educate VCs	• Feed-in tariffs

While there are challenges for clean energy ventures on each stage of the financing cycle, a particular issue is the transition from one stage to the next. For example, while seed funding is relatively well addressed and early-stage funds can also be identified, the transition to the expansion stage seems to be often a major barrier for clean energy ventures in Switzerland (marking the typical "technology valley of death"). Therefore, government should try to pay particular attention to facilitating interaction between players of different stages, and provide targeted funds to address these critical overlaps (e.g. pilot plants that bridge the gap from early-stage prototype development to commercial market introduction).

In terms of indirect measures, we particularly recommend a better coordination between Swiss and EU innovation policies with a particular focus on clean energy innovation. This will not only allow for additional funding for Swiss clean energy ventures, but also enable faster market access to the larger and often more attractive European clean energy markets through reduced market entry barriers. In addition to innovation policies, policies that support the end market for clean energy deployment also play an important role, because ventures initially rely on a strong home market to lay a foundation for their growth. With this regard, feed-in tariffs have demonstrated strong effectiveness to support the emergence of a clean energy market in Germany, Spain and (historically) Denmark. In Switzerland, there has been no similar financial support so far, but important "soft" contributions to support market development have been made under the "Swiss Energy" programme.

The following table summarizes the eight main challenges that we identified for growing the market for venture capital investments in Swiss clean energy ventures, as well as corresponding possible solutions:

Key Challenges	Solutions	Who could implement
1. Lack of early-stage/expansion finance for Swiss clean energy ventures	- Introduce start-up funds from Cantonal banks (e.g. ZKB) or via regional private investment initiatives	- Cantons and Banks
2. Lack of expansion/later-stage finance	- Educate mainstream VCs on clean energy - Set up clean energy fund-of-fund to co-invest with private energy VCs - Use part of Climate Cent to invest in Swiss clean energy ventures (or their projects)	- Business Schools and ETHs - SFOE with CTI & SECO - Climate Cent Foundation
3. Lack of exit opportunities	- Provide advice for international listing opportunities for Swiss clean energy ventures (like Israeli IPOs on Nasdaq) - Improve interface with possible trade sale buyers from Swiss energy and engineering industry (e.g. Clean energy venture buyers' group)	- SFOE if establishes department with investor expertise, or in cooperation with SECO - CTI with help from SFOE
4. Lack of incentives for investors	- Tax incentives for clean energy venture investors	- Swiss Federal Dept. of Finance, Cantons
5. Lack of VC/research lab networking	- Set up a specific energy sub-programme of CTI Invest	- CTI with help from SFOE; Non-profit organisations such as BASE, energiecluster.ch
6. Lack of entrepreneurial culture among Swiss energy engineering talent	- Include entrepreneurship in MBA/engineering curricula - Establish joint education pro-grammes on energy entrepreneurship between ETHs and business schools - Coaching for clean energy start-ups - Introduce energy category in business plan competition such as Venture 2006	- EPFL, ETHZ, etc. - ETH and business schools; Universities of Applied Sciences - CTI start-up with help from SFOE - ETH Zurich and McKinsey with help from SFOE
7. Lack of a favourable home market for Swiss clean energy ventures	- Provide a clear and reliable long-term policy framework (vision, targets and instruments) - Introduce feed-in tariff or similar support scheme for clean energy	- Swiss Federal Council and Parliament with support from SFOE
8. Lack of coordination with EU policies	- Consider bilateral agreement with EIB/EIF to facilitate EU fund-of-fund investments in Swiss VC funds - Actively participate in the development of new EU programme CIP	- SFOE + CTI + SECO - SFOE + State Secretariat for Education and Research SER

In the body of our report we also provide a quick review of the existing numerous initiatives and programmes in Switzerland, as well as policies and programmes implemented around the world to promote innovation and support the venture capital industry. Our study based on interviews of more than 20 professionals in the field has shown that there is a strong voice in Switzerland asking for an overview role of the federal government in this area.

1 Introduction

Venture investment in new and renewable energy technology is growing rapidly around the world. Depending on what source one refers to, between $500 million - $1 Billion was invested in this sector in 2004. Still, clean energy's share of the total venture pool remains tiny, though it has doubled over the past four years. Clean-technology ventures received 1.2 percent of the total amount of venture capital invested in 2000. In 2004, the $520 million that venture capitalists invested in the area accounted for 2.6 percent of the overall venture pie.[3] The proportion of venture capital funding in the area is growing, but it is still very small.[4]

Meanwhile, Switzerland is home to some of the world's most sophisticated technology and yet its venture capital industry is still undeveloped. Swiss banks, pension funds and asset managers have more than ample capital to invest. Nevertheless, Switzerland is not known for being a centre of entrepreneurship or of venture capital industry. Investors tend to be very risk-adverse.

What is the reason for this situation in Switzerland for start-ups in general? Are there simply not enough projects worth pursuing[5] and therefore we must focus more on new ideas in the R&D stage, or does the government need to organise special assistance to existing start-ups in their early-stages of development? Finally, is the state not providing enough assistance already: fiscal incentives, low-interest loans, state procurement, etc.? We look at the situation for all start-up companies in Switzerland while focusing on the environment and particular challenges to overcome as well for start-up companies developing specifically clean energy technologies. What are the key challenges and what is the government's role in filling possible gaps? These are the basic questions that this pre-study attempts to answer.

In making progress towards better defining "The role of government in supporting the emergence of a sustainable energy venture capital industry in Switzerland" we have interviewed a variety of Swiss and foreign experts in the area, spanning venture capitalists, entrepreneurs, government representatives, and a few energy, legal, financial and fiscal experts. We have also included a scoping of what programs exist today in Switzerland (on federal and state levels) and what programs exist in other countries to support entrepreneurs and the venture capital industry, and in particular clean energy innovation and investments. We include the perspective of experts interviewed throughout the report, include their critical analysis of current programs and draw possible recommendations for Switzerland based on their input.

Further work in this area would be important to explore how basic principles and ideas could be applied, where funding sources could be obtained, analysing the successful cases of programs implemented abroad in more detail and how they might be adapted to Swiss circumstances, as well as a further exploration of the concrete options possible to coordinate better the diverse set of current federal and state programs in Switzerland, for example via a national coordinated approach as opposed to a disaggregated approach.

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[3] Rivlin, Gary, "Green investments: The color of money" The New York Times, Thursday, June 23, 2005.

[4] According to Wuestenhagen and Teppo, 2005, this share has been continuously rising since 2000, with a particular significant increase in Europe. This paper points out data from Nth Power which shows that sustainable energy accounted for $526m or 2% of overall VC investments in 2003.
Note that statistics with regard to the level of VC or Private Equity investments can be different depending on the source. People sometimes are unclear whether they refer to just venture capital or all private equity (including venture capital) in their figures. Often figures for all private equity are about twice as high as those just including venture capital (the difference being large buyout deals etc.). In addition, people differ in their definition of "energy" and "clean energy".

[5] A few years ago, a Swiss bank that was considering establishing a venture capital finance division concluded that there were not enough promising technology companies in Switzerland to make the project worth pursuing. Source: Heerde, Frederick, "The venture capital investment environment in Switzerland", Source: PWC, 29/05/2001, featured in AltAssets website: www.altassets.com

2 What basis is there for explaining the problematic of lack of sufficient venture capital investment in clean energy technology

The overall level of capital investment in sustainable electricity technologies and other sustainable energy technologies is not sufficient to make a significant difference in the penetration rate of renewable energy.[6] As stated above, clean energy venture capital, for example, now accounts for less than 3 percent of the overall venture capital investment pie. Although this level is expected to rise, it is still much lower than for example in biotechnology or software.[7] Why is this? One reason is the difficult pathway of the innovation process for clean energy technology. The other is the way the venture capital industry has changed in its regard for interesting intellectual property, since the late 1990s.

There has been a serious migration of venture capital investors away from serving the needs of most start-up companies, and this has happened in all countries. When interesting intellectual property (IP) prospects might have had a chance at winning some level of early stage investment in the late 1990s, today's venture investors are typically looking at revenue producing (or near revenue stage) enterprises, with well protected IP, operating prototypes and at least the initial elements of the final management team in place.[8] According to a report by the Clean Energy Group, this shift has been driven by a confluence of historical and market factors. Clean energy investments generally need more time than other types of venture capital investments to break-even.[9]

Major innovations have to traverse a long and risky 'innovation chain' to get from basic R&D to market diffusion. Energy innovations primarily concern efficiency and conversion processes, making the commercial incentives for innovation far weaker than in IT or pharmaceuticals, for example, where product differentiation is a major driver[10]. The share of energy revenues devoted to RD&D, at under 0.4% in the power sector, is less than a tenth of that in such innovative sectors[11]. Clean energy innovation suffers from a double-externality problem.[12] As any innovation, new clean energy technologies create positive external effects in the innovation phase (R&D spillover), but in addition,

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[6] Moore and Wüstenhagen, "Innovation and Sustainable Energy Technologies: the role of venture capital", 2004.
[7] Wüstenhagen and Teppo, „Do venture capitalists really invest in good industries?", 2006.
[8] CEG, "The Potential for Transatlantic Investment in Clean Technology – An Opportunity Assessment of the Clean Energy Sector", a report supported by the Carbon Trust, March 2005.
[9] "Venture Capital firms making seed stage investments have not historically been shown to produce an return on investment superior to that achieved by firms targeting later stage (and hence theoretically less risky) deals. In addition, the extraordinarily long development time typical of clean technology enterprises has meant that very substantial levels of capital must be mobilized over time to bring a new concept to fruition. One of the most respected clean energy venture capitalists maintains that every clean energy investment needs a minimum of 10 years and $100 million to reach breakeven. In addition, observers of the clean energy sector in the US note that it has been plagued by lower multiples on commercial sales than structurally comparable investments in the biotech or telecom sectors, further depressing investor returns…. In addition, "these factors, in turn, have opened a window for later funding rounds that achieve quite attractive pricing, higher than might have been anticipated given the declining underlying risk level. Many of the institutional investors who capitalize venture capital funds have shifted towards shorter fund investment cycles (with many now seeking 5-7 year fund investment liquidations, rather than the 10-12 year cycles that were common a decade ago)." From CEG report, March 2005.
[10] K. Neuhoff, "Large scale deployment of renewables for electricity generation", (OECD SG/SD/RT, Paris, 2004).
[11] R. Margolis, D. Kammen, *Science*, 285:690-692 (1999).
[12] Rennings, 2000.

they avoid negative external effects in the diffusion phase – in other words, they provide a high societal value, but not necessarily a higher private value to the customer.[13] As a consequence, sustainable energy investors may not only be hesitant to invest because they are uncertain whether they can capture the full value of the new technology, but also because they are uncertain whether consumers will prefer the firm's products over a competing product that has lower value to society (e.g. higher CO2 emissions) but may create the same private value (e.g. generating electricity). In addition, according to experienced entrepreneur, Nicolas Wavre (CORE), "The most critical phase is between the R&D to the industrial phase." This double-externality problem calls for government to take measures to avoid market failure in the form of a suboptimal level of investment in clean energy innovation. The low levels of venture capital investment in clean energy ventures in Switzerland tend to indicate a case of market failure.

Figure 2: The innovation chain, stages, interventions and technology changes[14]

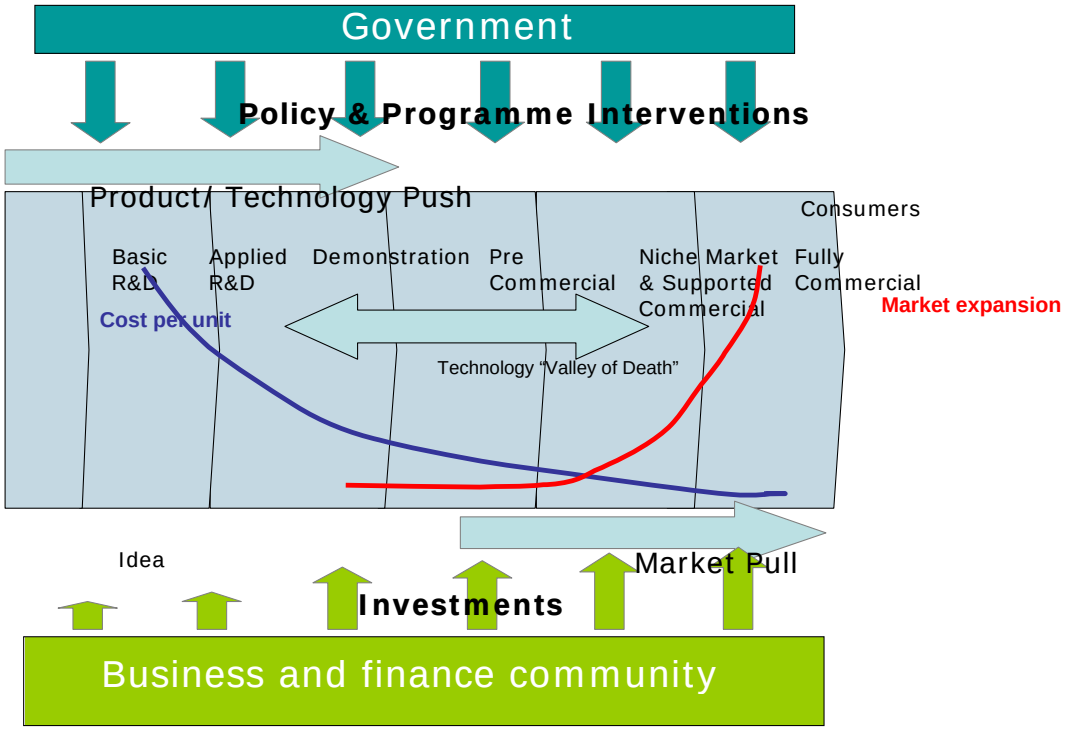

Figure 2 illustrates various stages of the innovation chain along with in particular the way that technology changes through each stage. Generally market expansion occurs in the niche market/supported commercial and fully commercial stages. Cost per unit of the technology falls over time as the technology is optimised in initial stages and then optimised for market conditions and due to economies of scale as well as learning over time when applied in the demonstration, pre-commercial, niche-market or supported commercial to fully commercial deployment stages. This is another motivating reason for government intervention in supporting the commercialisation of technologies.

As indicated these stages are also generally referred to in the literature as the technology "valley of death". Although we have not studied the success and failure rates of Swiss clean energy start-ups in

[13] Kaas, 1992.
[14] Figure adapted from M. Grubb, et al. 2005, unpublished paper.

Switzerland in any substantial depth in this pre-study, it appears, from speaking to experts in the field, that there is a 'technology valley of death' in Switzerland for start-up clean energy companies, especially after the well-supported R&D stage. Results from interviews will be covered in later chapters. Some funding has been available from SFOE in the past, but this funding has been unfortunately cut recently by the government.

This means that many good Swiss clean energy technologies are likely to remain stuck in less mature stages or will be lost opportunities for the Swiss economy[15].
Without government support, their only chance is obtaining private investment funding in the early stages, which according to the professionals interviewed, is difficult to obtain, as most wealthy individuals in Switzerland prefer (perhaps for fiscal reasons) to invest outside of the country or in pension funds which themselves do not invest much in Swiss start-ups. Why is this? What are the various aspects of the Swiss entrepreneurial and investment climate, together with the aspects of the global clean energy market, which lead to lack of sufficient "angel investors" for seed capital and true venture capital investment in Swiss start-up companies offering innovative clean energy technologies? The next section will explore this question and later chapters will explore what government might be able to do to encourage further private investment in Swiss clean energy technology start-ups.

3 Where does clean energy entrepreneurship and venture capital in Switzerland stand today? Cultural, environmental, legal and fiscal aspects and an analysis of key challenges

First of all, it is important to point out that the CTI is a very successful program in Switzerland to develop new technologies from top universities in Switzerland, and prepare entrepreneurs via coaching and training for business plan development and presentation to investors. It still exists and has been well applauded by most professionals interviewed for this study.

The gap is in the stage between the well-financed R&D stage in Switzerland and the stage in which venture capitalists or major investors are interested in start-ups. Many never arrive to that stage because there is a lack of seed financing in the country from both public and private institutions, as well as a lack of angel investors.

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[15]According to one entrepreneur interviewed, "…1 million CHF of the governments funding (CTI, SFOE, etc…) brings in average 2 millions CHF in private investments… In my case: 4 million CHF (cumulate CTI, SFOE, FOGA, SIG, Axpo, SIL) projects over 6 years gave me the credibility to raise 8 million CHF private funding outside Switzerland." He also stated "companies like Conergy, Solarworld, Q-cell, etc. have raised hundreds of millions of VC money from all around the world". In his opinion the government's implementation of the EEG law in Germany which supports renewable energy innovation also had much to do with this influx of foreign investment for green energy into the country.

This is not in fact very surprising, as the "technology valley of death" in the central stages of the innovation chain is a problem found in many countries across various new technology sectors. This is especially the case for energy technologies. Public RD&D by itself has failed to bridge the gap in either quantity or its linkage to commercially exploitable results: innovation is sparse and energy technologies founder because of the very different needs of private and public sectors.[16] The incentives for *low-carbon* innovation, whose value depends upon uncertain government policies to internalise carbon costs at some point, are still weaker.

Many countries have already recognised this problem and therefore have implemented special support programmes to address this gap. Some of these programmes are reviewed in a later chapter. Some countries also attempt to address some of the gaps in between the stages (as shown in figure 1). Switzerland has several programmes to address the gap between university research and technology transfer, but again, few exist to support the gaps after technology has been transferred to start-ups.

Several key issues are leading to low investment in start-ups, in Europe, in general. They are:

1. The current venture capital market is not in good shape in most European countries.[17]
2. There are few exit opportunities in Europe for venture capital investments in start-ups.[18]
3. There may be a lack of sufficient deal flow for venture capitalists.[19]
4. Entrepreneurs in Europe have a low "entrepreneurial culture".[20]
5. Institutional investors, such as banks and pension funds, do not invest much in Swiss start-ups or SMEs for that matter.[21]
6. Private investors (or angel investors) do not have as favourable tax incentives to invest in start-up companies, in many European countries, as American angel investors do.[22]

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[16] L. Murphy, P. Edwards, "Bridging the Valley of Death: Transitioning from Public to Private Sector Financing" (National Renewable Energy Laboratory, Golden, Colorado, 2003). And T. Foxon, "Inducing Innovation for a low-carbon future: drivers, barriers and policies" (Carbon Trust, London, UK, 2003).

[17] According to a study by AltAssets, "After the Goldrush - A Survey of European Venture Capital Firms", October 2002, the following conclusion was outlined after conducting an extensive survey of 125 European venture capital firms: "Some markets look reasonably healthy but others look in a miserable state. The German market in particular looks vulnerable to a severe shake-out, while the French and UK markets are markedly more upbeat. The various regions also often have very different approaches to venture investing, sometimes reflecting cultural idiosyncrasies and sometimes short-term market conditions."

[18] Comment made by one venture capitalist interviewed for this study: "A main problem is the lack of exit opportunities for venture capitalists in most European countries, like in France. But there is an initiative underway now to develop exit opportunities for start-ups in France. The UK and the US have better opportunities". However, there are activities in France to encourage innovation financing (see later section for details).

[19] One venture capital firm's experience points to this aspect, according to both professionals from SAM interviewed for this study. However, an entrepreneur interviewed said this is not a good argument because VC firms located in Switzerland are active on a European level and so have a good selection of start-ups to choose from.

[20] The biggest long-term concern among European VCs, expressed by 78 percent of respondents in the AltAssets study, is the need for a more entrepreneurial culture. According to the study "Although not entirely unsurprising, this challenges the assertion that the Continent underwent a massive cultural change during the late 1990s to produce a less risk-averse generation of entrepreneurs. Much of that change is, in fact, judged to have been only skin-deep. Venture firms have complained that entrepreneurs in many regions have disappeared back into the safer confines of big business and are reluctant to expose themselves again to the violent fluctuations of the venture capital industry. It also suggests a degree of scepticism about the impact of governmental initiatives to promote entrepreneurship."

[21] Various interviewees confirmed this and explained that this is most probably due to the energy market bubble bursting in 2000, and some even mentioned the lack of presence of banks in earlier years is probably linked to the losses experienced by many Swiss banks in the early 80s when they invested more freely in SMEs.

[22] In the US, private investors obtain a much larger tax write-off for their investments in start-ups. In France for example, this write-off is only 20% of the investment. In Switzerland, the tax law is complex as it varies by Canton. There was a change for venture capital investments in 2000. The Federal Law on Venture Capital entered into force on 1.5.2000 (it is limited in time - 10 years). Venture capitalists and business angels can profit from

7. There is clearly a difference in the interests of venture capitalists and entrepreneurs that leads to lack of sufficient "good" deals for venture capitalists.[23]

On improving exit opportunities

Most of the current stock exchanges in Europe do not support companies that have low initial earnings. There is a need for an exchange particularly conceived for small companies. This is being considered in France. Note that it is easier for venture capitalists to find exits for their investments in the US and in the UK, according to Benoit Balmana, a venture capitalist interviewed for this study.

On increasing deal flow for venture capitalists

The best way to increase deal flow may be simply in finding means (either direct or indirect) to support more start-ups throughout the period of time, which can be several years, of which they struggle in the technology "valley of death" in producing their product and deploying it in niche markets or supported markets.

The amount of good start-up opportunities on the market for venture capitalists is also a function of the entrepreneurial culture in the country (discussed below). It depends on the R&D support of the country, which is quite good in Switzerland. It also depends on the perception of entrepreneurs about their likelihood of support and success in their country's financial and energy market, which may not be so high in Switzerland. Finally, it depends on people. If there is a low societal recognition for entrepreneurs in the country, if failure is accepted very negatively in the culture, then it is understandable that young entrepreneurs will emerge at a lower rate than in more entrepreneurial cultures.

certain tax abatements and tax relief. The venture capital companies don't have to pay the stamp duty and they can profit from the participation deduction under easier conditions than regular companies. To take advantage of these regulations the company must be recognised as a venture capital company by the Federal Department of Economic Affairs. At the present time there are only 10 recognised companies and 3 provisionally recognised companies. Business Angels can make a deduction for subordinated loans they grant for the foundation of new companies. For more information on the law, the regulation and additional information, see:
http://www.kmuinfo.ch/kmuinfo/index.html?n=n&Art=SEITE1.1&SeiteID=06.02.02_bundesgesetz_uber_rkg
Also, there are general regulations for investments in companies in special economic development areas. The confederation grants tax relief if the cantons do the same. The cantons do it based on art. 23 par. 3 StHG (Federal Tax Harmonization Law), the confederation based on a Federal resolution. Other general available tax relief depends on the companies' activities (Holding companies, domicile companies, international sales companies, service companies, finance branches) or the companies' structure (principal company).
At this time, the Swiss Parliament is discussing the business law reform II. It includes measures for the promotion of venture capital. The conditions for a tax relief should correspond with the new regulations concerning individuals (conditions for the partial taxation of investment income of individuals). These provisions will not enter into force before 2007. (Fiscal law information available thanks to Stephan Raas, from IFF, UNISG).

[23] For example, two venture capitalists interviewed complain that start-ups in Switzerland are not professional enough (as business leaders), and that people are the key to success. Yet entrepreneurs in Switzerland interviewed complained that venture capitalists want to come in at a time when entrepreneurs have already done all the work in developing the product, putting it on the market, etc. At this stage many entrepreneurs do not want to compromise by giving up management power, and in any case, many at this stage do not need venture capitalists to survive. In fact, many complained that venture capitalists are not acting as real venture capitalists any more as they have stopped taking real early-stage risk in their investments.

On fostering an entrepreneurial culture

According to one venture capitalist interviewed for this study: "it is important that the entrepreneurs understand the market and the competitive landscape and economics or "value proposition" --- that their product for example is really lower cost than the competitors'. Many times they don't have this ----they haven't spent time on understanding the competitors and the basic cost structure and they have not compared to other competing companies. A way to help them is to get retired people involved or others with knowledge that can help them". He calls them "gray foxes". Government programs like CTI or SwissEnergy could continue to support coaching, perhaps with a special program for the specific challenges of clean energy technology start-ups, focusing on including a network of "gray foxes" experienced in dealing with such challenges.

Finally, how does one address the issues listed in the previous section with regard to fostering a society which values entrepreneurial activity?

Switzerland is probably one of the best countries in the world for the quality of its physical infrastructure, legal and commercial infrastructure, teaching and post-university training, and governmental system efficiency. However, Switzerland may be less well ranked in the area of encouraging an entrepreneurial spirit in its primary school and secondary school teaching. One expert interviewed in a study conducted for the Global Entrepreneurship Monitor Rapport 2003" stated: "The school system in Switzerland is too serious and often stressful. It is regrettable that as soon as children enter school, they have to forget their dreams, and their motivation, and creativity to adopt a preconceived and standardized scheme."

Furthermore, according to the GEM report, "On one hand, the Swiss economy offers numerous well-compensated employment opportunities (compared to neighbouring countries). The opportunity cost of entrepreneurship is very high: the entrepreneur that starts his business should give up a series of advantages – salary, bonus, social benefits and paid holiday. On the other hand, there is a certain mentality in Switzerland about security which tends to reject risk-taking and does not accept failure. It is not well-understood that one can learn more from errors than from success. It is a well-known phenomena, where creating and innovating should test, and enter inevitably sometimes into a dead-end. Innovation has a price. »

Therefore, one area where the government may be able to intervene is in the development of an educational program starting in primary schools, investing in creative ideas of students throughout their academic journey. Although the United States is no longer the best example[24], it has been a good example in the past in terms of an early educational system that values creativity.[25]

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[24] Now, the U.S. government is cutting key areas of R&D spending, while corporate R&D funding was also down by nearly $8 billion in 2002, the largest single-year decline since the 1950s. State governments have slashed funds for higher education and for arts and culture while pumping up funds for stadiums, convention centers, and other bricks-and-mortar projects. (from book excerpt, *Flight of the Creative Class*, "The U.S. must invest more in R&D and universities to retain its best and brightest". By Richard Florida, May 2005.)

[25] One example is support for a special class geared towards encouraging creativity in children that are tested in first grade for their propensity for creativity or for their advanced way of thinking. A select group of students who score well on this "test" are allowed to participate in a special class at variable times, in place of their normal English class. In this class, students are coached by a teacher trained in developing their creativity in the arts, science, writing, conceptual development, etc. and in general working with the personal interests of the children. (Source: M.J. Bürer)

On encouraging institutional investors like pension funds to invest in Swiss SMEs and in particular clean energy start-ups

The Swiss financial environment has been dominated by banks, whose lending practices are ill suited to financing companies in the new economy, according to Mr. Frederick Heerde of PricewaterhouseCoopers. He notes that one Swiss bank, when making a presentation at a seminar on entrepreneurship, cited profitability, a strong balance sheet, and the absence of a previous business failure as its lending criteria. However, according to Mr. Heerde, the fiscal and legal environment in Switzerland has also contributed to the lack of entrepreneurship and venture capital investment. Several fiscal and legal obstacles have hindered both the creation of new technology businesses as well as the creation of venture capital investment funds that might provide financing to such businesses, according to him. The difficult legal and fiscal environment fuelled a vicious circle: the limited number of entrepreneurs failed to attract venture capitalists, while the lack of available financing failed to attract entrepreneurs.[26] But according to Mr. Heerde, investors are not active mainly because of cultural aversion to risk and a fear of failure. This viewpoint was also generally repeated by several of the professionals we interviewed. A few pointed to the market down turn in 2000 as one reason for slow activity of the market, and others blamed the continuing risk-aversion on the large losses by Swiss banks in the early 1980s.

Nevertheless, in the last few years important change has occurred and hopefully will continue to occur to encourage pension funds in particular to invest in venture capital funds. In 2000, the regulations governing Swiss pension fund investment policy were modified effectively to permit investment in venture capital funds.[27] In addition, a special venture capital fund, Renaissance PME, was created in 1998 especially for Swiss pension funds. In return for accepting restrictions on investments, notably that 90 percent of its capital be invested in Switzerland, Renaissance was granted tax exempt status by Swiss authorities. On 30 June 2005, Renaissance PME became in charge of the management of two investment groups: RENAISSANCE TECHNOLOGIES I with a nominal capital of CHF 72 million and RENAISSANCE TECHNOLOGIES II with a nominal capital of CHF 29 million. Most of the investments to date from these funds are biomedical and pharmaceutical companies.[28]

It remains to be seen whether the change in the regulations and the initial success of Renaissance PME will encourage Swiss pension funds to invest in venture capital on a more widespread basis.

As for encouraging venture capital funds via fiscal means, one would imagine that there is enough incentive in Switzerland because Switzerland has no capital gains tax for individual taxpayers. However, in fact from the venture capitalist's stand-point there are a few fiscal and legal obstacles in Switzerland.[29] From the entrepreneur's point of view, there are also many fiscal and legal obstacles, according to Mr. Heerde.[30]

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[26] Heerde, Frederick, "The venture capital investment environment in Switzerland", Source: PWC, 29/05/2001, featured in AltAssets website: www.altassets.com

[27] Even before the regulations changed, pension fund investment in venture capital was not unknown in Switzerland. Certain well funded Swiss pension funds have historically invested in venture capital.

[28] http://www.renaissance-pme.ch/fr/home.htm

[29] 1. A tax-transparent investment vehicle, such as a limited partnership, is not practical for investment funds in Switzerland. Thus investors in venture capital funds domiciled in Switzerland have difficulty taking advantage of the absence of a capital gains tax. The only Swiss legal entity available for venture capital investment funds is a corporation. Capital gains are thus subject to double (rather than no) taxation – once at the fund level and again on distribution as dividends to shareholders. 2. Provisions in the investment regulations governing Swiss pension funds permitted investment in non-Swiss private equity only on an exception basis, strongly discouraging Swiss pension fund managers from investing in venture capital funds, most of which invest in non-Swiss companies. Thus venture capitalists had great difficulty raising money from Swiss pension funds, which might have constituted their most important source of investors. 3. There was no government support for venture capital investment funds - matching government investment, guarantees or tax advantages - such as exists in several other countries. (Source: Heerde, 2001)

[30] 1. Creation of a Swiss corporation requires a minimum of CHF100,000 of equity capital, of which CHF50,000 must be paid in on the date of incorporation. 2. A minimum value per share of CHF10 made financing difficult.

Nevertheless, according to Mr. Heerde, Switzerland did feel the passion prevalent elsewhere for high-technology entrepreneurship and venture capital investment in the late 1990s. Entrepreneurship and venture capital investment increased, despite the unfavourable fiscal and legal environment for investment. Industry and lobbying groups put pressure on the government to eliminate some of the obstacles cited above. In the meantime, Swiss entrepreneurs and venture capitalists attempted to find ways of dealing with the remaining obstacles.

The current situation in Switzerland is the following:

Some Swiss venture capital funds are corporations that qualify as holding companies for cantonal and communal tax purposes.[31] Holding companies are exempt from capital gains tax at the cantonal and communal level. At the federal level, gains on the sale of investments that represent at least 20 percent of the investee are exempt from tax, if they have been held for at least one year. Not all venture capital fund gains will qualify for this exemption. Furthermore, the structure does not solve the problem of taxation at the investor level.[32] The next section will explore the change of law in 2000 where Switzerland created a special vehicle for venture capital investment called the Venture Capital Company (VCC).[33]

Furthermore, the arena for early seed investment has so far not been sufficiently explored. Europe (apart from the UK which is further advanced in this respect), is re--discovering the potential of technology-induced value generation despite the momentary high-tech aversion.

It is important to consider all ways that government can play a role in trying to change the mind-set of Swiss financial institutions towards investment in what will increasingly become the country's most valuable asset in future years (given trends in globalisation, etc.): that is the knowledge of its scientists

As share values of successful start-ups multiplied in subsequent rounds of financing, prices per share quickly became too high. Some companies faced the prospect of going public at prices of CHF1,000 per share or more. The transfer of share premium to share capital to create more shares with a lower price is subject to withholding tax at prohibitive rates. 3. Taxation of stock options - vital for attracting and retaining key employees - is extremely unfavourable for start-up companies. Stock options generally are taxed when granted, based on values determined using the Black-Scholes option pricing model, which is ill-suited to start-up companies. The Black-Scholes model is applied differently from canton to canton. In some cantons, the taxable values of stock options computed using the Black-Scholes model effectively prohibit the issuance of employee stock options. Employees of start-ups have been known to refuse stock options rather than pay taxes on options that may never be exercised. 4. There is a lack of qualified personnel available in many fields and a limited number of permits available for foreign workers.

[31] Cantonal and communal tax represents two-thirds to three-quarters of a corporation's total tax burden.

[32] In order to permit Swiss investors to take advantage of the absence of capital gains tax for individuals, holding company funds generally commit to their investors that the company will become listed, so that investors will be able realise the return on their investment by selling their shares and recognising a capital gain, rather than receiving taxable dividends. One fund, New Venturetec AG, was created through an initial public offering in 1997. Non-quoted holding company funds include ETF Group, HPI Ltd, MiniCap AG and Ventis Ltd. Holding company funds may encounter difficulties in listing their shares, particularly under current market conditions.
The most common structure currently used for venture capital funds is the offshore limited partnership, generally domiciled in the Channel Islands, with perhaps a parallel fund domiciled in the US for US investors. Even a Swiss cantonal bank, when considering establishing a venture capital fund, intended to use a Jersey limited partnership. Offshore limited partnerships include Index Ventures I and II, Vision Capital, Invision funds, and Absolute Ventures. Offshore partnerships are not taxable, and it is hoped that Swiss tax authorities will respect the nature of capital gains distributions and not impose tax on such distributions to individual Swiss investors. (Source: Heerde, 2001)

[33] The VCC can benefit from lower thresholds for exemption from capital gains tax at the federal level, as long as it meets certain conditions - principally that it invest 50 per cent of its capital in Swiss companies under five years' old, that the investment sold must be at least five per cent of the investee company and have a value of at least CHF250,000. (Source: Heerde, 2001).

and engineers.[34] This is especially important for the clean energy sector which is going to become an increasingly important sector in years to come, both for addressing Swiss energy demands and foreign needs for clean and efficient energy technology. This is stimulated largely by growing global concern about petroleum dependency, the increasing price of oil, concerns about nuclear energy safety, combined with the growing concern about climate change in the world.

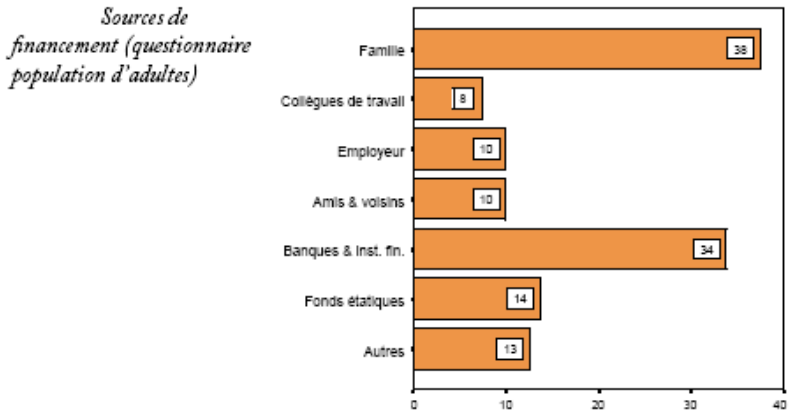
There are several options to consider here. One is to provide further fiscal incentives to institutional and private investors for their investment in clean energy technology start-ups. Another option is to establish a public policy which requires pension funds, for example, to invest a minimum percentage in sustainable energy technologies.[35]

On stimulating more private financing of start-ups in Switzerland

Entrepreneurs in Switzerland are now highly dependent on family and friends for seed financing.

Figure 3 shows the different sources of finance used by 127 entrepreneurs identified in an interview with 2000 adults.[36] The family constitutes the first sources of finance, in 38 cases. The third source is friends, neighbours, colleagues, or employers which finance 28 projects in the sample considered. State funds participated in 14 projects.

Figure 3:



Taxation amendments in Switzerland

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[34] Several entrepreneurs as well as government representatives agreed that Switzerland's added value is in it's scientific and engineering excellence and that this is currently being lost. One entrepreneur which is now located again in Switzerland personally experienced what is called "brain-drain" of know-how to another country – in this case the United States after graduating from EPFL - because of more favourable government support schemes for start-ups developing clean energy technologies (SBIR, state programs like California's PIER program, etc.)

[35] Comment by interviewee.

[36] According to the report "Global Entrepreneurship Monitor Rapport 2003", the financial situation in Switzerland is relatively good with regard to other GEM countries. Switzerland is classed as 10th place.
The GEM study methodology includes the following empirical sources : (1) a telephone survey of a sample of people in Switzerland aged 18-64 in 31 countries associated with the project; the people interviewed were asked about their participation and their attitude with regard to entrepreneurship; (2) interviews with experts in each country; et (3) a mixture of national data from international oganisations such as the OECD, the World Bank, the IMF, and the International Labour Organisation (ILO). In Switzerland, the telephone interviews with 2,000 adults was conducted by a call survey institute Taylor Nelson Sofres in May and June 2003. As for experts, they were selected for their knowledge and influential positions in entrepreneurship. A total of 18 experts were interviewed in Switzerland.

The following tax-related amendments provide or will provide for a more attractive tax environment for the private equity sector - a further sign that Switzerland recognizes the significance of the private equity industry[37]:

- since May 1 2000 the Federal Law on Venture Capital Companies has provided for various tax benefits to promote the establishment of start-ups through improved access to venture capital. To qualify as a venture capital company (VCC) for Swiss tax purposes, the VCC must (among other criteria) be organized as an investment company domiciled in Switzerland and must invest at least half of its funds in innovative, internationally oriented start-ups managed in Switzerland. A significant proportion of VCC's operations must also be in Switzerland. Qualifying VCCs are exempt from stamp duty (1 per cent share issuance tax) irrespective of whether funds are raised through equity contributions, subordinated loans or other forms of financing. Furthermore, the participation exemption on dividend income and capital gains has lower thresholds. Finally, special tax relief is granted to individual investors granting qualified subordinated loans to start-ups;
- it is planned to abolish the share issuance tax (1 per cent) for all equity contributions of SFr1 million or less to Swiss stock corporations;
- new legislation designed to achieve reduced taxation of stock options granted to employees of start-up companies is under consideration;
- a new tax package is being drafted by the Federal government. Among other improvements, the package will aim at introducing various tax related improvements such as: (i) reduced taxation of "business angels"; (ii) special tax treatment of capital gains realized by individuals on the sale of investments in stock corporations; and (iii) the possibility for corporate venture capitalists to elect to be taxed as a tax transparent vehicle.

Already the LSCR law of 2000 for investment by business angels, allows these private investors to benefit from subordinated loans to companies similar to those in which VCCs invest. The are able to deduct from their tax payments a maximum of 50% of the loans from their taxable income (subject to a maximum lifetime deduction of CHF 500,000), provided that the VCC makes an investment in the same company within one year of the loan. This means that a loan of a maximum 1 million CHF can qualify. However, this deduction must be added back to taxable income to the extent that the loan is repaid. If the loan is not repaid, the investor may deduct 50 percent of the losses in excess of the amount originally deducted, up to a maximum of CHF 250,000. Accordingly, the maximum deduction for a loss of CHF1,000,000 or more is CHF 750,000.[38] However, according to Mr. Heerde, the incentives provided by the VCC vehicle are not significant.

More improvement on the tax side to make such measures more effective, as well as more widely applicable and understandable may be needed according to one experienced entrepreneur interviewed, as well as others interviewed for this study. For example, another experienced Swiss entrepreneur believes that the best thing the government can do is provide fiscal incentives. "Instead of buying shares of Nestle, GE, etc. if you invest in a company that is starting-up in Switzerland, you should get a fiscal bonus. … The intermediate phase can be supported by private individuals. … A representative from Canton Vaud believes there should be a complete tax write-off for investments in start-ups in the Canton. He notes that the change in law made a few years ago is not so helpful.[39]

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[37] Source: Barnes, Mark. And Kühni, Beat. "Swiss private equity: structural issues and recent developments" Source: Lenz & Staehelin. *Bleicherweg 58, Zurich, CH-8027, Switzerland, 41 1 204 1212, www.lenzstaehelin.com* 19/08/2002.

[38] Art. 54 LSCR, and Heerde, 2001.

[39] This representative of Canton Vaud actually prefers that the government focus on providing seed money at the federal level for small projects.

On facilitating the convergence of interests

Divergences in what investors want and entrepreneurs want are also barriers to success, and the complexity of the venture capital industry can be difficult for entrepreneurs who are trained as engineers. This is why business development training and coaching is so important, especially in Switzerland where many innovations emerge from the technical universities which are specialised in engineering and traditionally have not included a business education for engineers.

However, having said that, there is also a need for more effort by venture capitalists to play the true role of venture capitalists – early stage risk taking. If they are not able to do so because the European market is not well at this time, it may be appropriate for government to take up part of this early-stage risk, at least until venture capitalists begin to play a more risk-taking role on the market. Otherwise, it may wish to encourage more private sector investment (as mentioned before via fiscal incentives), or otherwise via seed-financing, public support for the management costs of specialised funds for clean energy start-ups, or availability of government guarantees or low-interest loans. This view was supported by the majority of the professionals interviewed for this study. Some preferred the fiscal incentives approach more than other options. Few believed that facilitating easier legal structures for venture capital firms would make a big difference, but could help.[40]

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[40] One financial expert interviewed for this study, also mentioned many firms have already left Switzerland (having off-shore legal structures), partly because of less favourable tax conditions for these companies here, and because of legal structures, yet they can still be active investors in Switzerland. He noted that currently "cost-centers" or their management offices are taxed on expenses instead of profits in Switzerland, which is a disincentive itself for doing business in Switzerland. He noted in an article written about this subject: "For private equity investment, the establishment of a Swiss business vehicle which is both tax transparent and has limited liability protection for investors and the manager as well as the adoption of a professional investor exemption to the distribution rules would seem to be a clear priority. However, while there is hope that the tax transparency will come out of the proposed new tax package, it would seem at present that this will only benefit the venture capital segment of the private equity industry." Barnes, Mark. And Kühni, Beat. "Swiss private equity: structural issues and recent developments" Source: Lenz & Staehelin. *Bleicherweg 58, Zurich, CH-8027, Switzerland, 41 1 204 1212, www.lenzstaehelin.com* 19/08/2002.

Table 1: Enterprise Development Gaps as Seen in Many Entrepreneurial Clean Energy Companies (Murphy, 1999 and Murphy, et al, 2002)

	Start-up Clean Energy Companies Frequently Have	Investors Want
People	Strong technical expertise; a desire to retain ownership and control	Well-rounded and experienced management team; including start-up experience.
Product	Protected intellectual property position; technical benefits well defined; often still focused on technology and not on developing a marketable product	Protected intellectual property position; a clearly defined product or set of products; market drive and clear customer benefits well articulated
Strategy	Narrow technology focus with limited profitability horizon	Strong market focus with sustained high profitability and technology platforms, which allow for product and market diversification
Markets	Technology push; often oriented to attracting more sponsored R&D; competitive position not well defined	Market creation and technology pull; many identified customers (min. $100M/yr. Potential market opportunity) and poised for rapid growth; competition well understood
Financing	Inadequate justification and definition on amount of investment required or expected, return on investment (ROI) and exit strategy	Clearly defined plan for use of funds to grow business providing high ROI (40%) and a clear exit strategy (~5 yrs) described
Business Plan	Incomplete or nonexistent	A comprehensive and integrated picture of all of the above – to bring the technology to market

Table 2. Typical qualifying requirements for the next round of financing and key processes involved for specific financing rounds (based on table in Pratt's Guide to Venture Capital Sources)

	Financing Round	Who Typically Plays	Typical Qualifying Requirements for Next Round	Key Processes
Technology Creation	Bootstrapping Concept Generation	Entrepreneur	▪ Exciting technology concept, linked to a market need ▪ Applications identified	▪ Research ▪ Development ▪ Marketing
	Pre-Seed: Technology Development	Personal / Public Support (e.g. DOE/ATP /SBIR/States)	▪ Key patents applied for/secured ▪ Technical feasibility and initial commercial feasibility with prototype demonstrated ▪ A plan for taking the business forward is available ▪ Substantial market need quantified and competition identified	▪ Development ▪ Engineering ▪ Marketing
Market Focused Business Maturation	Seed: Prove a concept qualifies for start-up capital	Individual Angels Angel Groups Early-stage Venture Capitalists	▪ Business/commercialization plan available; ▪ Specific markets, including competition, well characterized; and initial customers identified ▪ Attractive market-ready products /or processes available. ▪ Management team identified	▪ Development ▪ Engineering ▪ Manufacturing ▪ Marketing
	Start-up: Complete product development and initial marketing	Select Individual Angels Angel Groups Early-stage Venture Capitalists	▪ Launch of commercial product and/or process ▪ Strong management team in place ▪ Rapidly expanding customer base	▪ Manufacturing ▪ Marketing
	First: Initiate full-scale manufacturing and sales	Venture Capitalists	▪ Large customer base, and still growing by new constituents ▪ New products and new processes	▪ Research ▪ Development ▪ Engineering ▪ Manufacturing ▪ Marketing

Table 2 identifies the financial sources, typical players, qualifying requirements for next round financing, and key processes for two basic stages of technology innovation and deployment:

technology creation and market focused business maturation. Table 3 shows different kinds of financing that are available at different stages of development.[41]

Table 3: Sources of Business Development Financing Opportunity and Complexity[42]

Table A-1: Sources of Business-Development Financing Opportunity and Complexity

Stage of Development	Risk Profile and Principal Risk Elements	Financial Characteristics	Typical Financing Instruments
Start-Up	Highest: Management Product Market Financial	Losses Minimal assets Negative cash flow	Founders' equity Angel equity
Growth	Moderate: Management Financial	Break-even to profitable Rapidly growing assets Negative or modestly positive cash flow	Bank loans (mid-later growth) Leases (equipment) Private equity (early growth) Public equity (later growth) Strategic alliances
Maturity	Lowest: Competition	Profitable Stable asset levels Positive cash flow	Bank loans (working capital) Leases (equipment) Public and private equity Strategic alliances Mezzanine debt Private and public debt placements
Decline/ Turnaround	High: Financial Management Product strategy Market strategy	Losses Declining asset values Cash flow positive or negative (asset liquidation)	Asset-based financing Public equity (dilutive) Turnaround investors

An excellent source on private equity can be found in Josh Lerner's note[14]

Issues affecting clean energy investments

We have already seen the many barriers and challenges to investment in Switzerland for start-up companies developing innovative technology. This is combined with the particular disadvantages that clean energy technology start-ups also tend to face. Some of these are:

1. **Cost of clean energy technology is still too high for consumers to easily adopt.**[43] This means the time to market is even longer for clean energy technologies. Government support programmes, financial or market instruments are needed to correct for market failure.[44]

2. **Uncertainty and risks are combined.** The added uncertainty and risk of deploying a new energy technology in a consumer market for energy equipment that reacts conservatively (especially in Switzerland), is added to the high risk of investing in a start-up company. In addition, to these risks, policy and investment risks related to clean energy in particular, are added. Two other major barriers to widespread implementation of clean energy technology identified in several related reports on

[41] The table is based on one in *Pratt's Guide to Venture Capital Sources (21)*, the leading source of information on the topic. Angel financing has been added by NREL to this table. An excellent source on private equity can be found in Lerner, 1999.

[42] Source: NREL and Pratt's Guide to Venture Capital Sources.

[43] For example, one entrepreneur stated in his interview: "The investment price of renewable energy is the real barrier".

[44] This was the general view of the experts interviewed. Even those that did not like the idea of government intervention in supporting venture capital via a public-private fund for start-ups believed that it was appropriate for the government to establish laws that would support clean energy technologies such as renewable energy support schemes implemented across Europe, in particular Germany.

clean energy[45], which we consider under this point are: 1) markets are driven by uncertain regulatory policies, and 2) there is a perception that the level of returns is too low to attract substantial venture capital investment into the market. But with regard to Switzerland in particular, the conservative behaviour of Swiss consumers is particularly important, as many venture capitalists still believe that a new technology should succeed first in its local market before being exported outside the country successfully.[46]

3. **Real public acceptance of alternative technologies is still low.** According to a study by PSI conducted for SFOE, "Renewable energy carriers possess a basically high level of public acceptance. This is also true for wind energy, when the acceptance is on a general level. However at the local level strong opposition to specific wind projects can arise, because this opposition is always based on landscape protection aspects."[47] This finding appears to be true as well for other alternative technologies. For example, Swiss people may generally be supportive of renewable energy technology, but when asked to install a new technology in their homes, they are reluctant to take the risk or pay the additional up-front cost of such technology.
According to one entrepreneur interviewed, the government could do a lot more to help companies' products enter the market more easily. For example, government could buy the first volume of the production, so that the start-up can go to the bank to borrow money in order to up-scale. Second, the government could implement a law like the EEG law in Germany. This would be a policy of "Strategic deployment" of the technology on to the market. These policies or programmes can help any company in the renewable energy sector, such as feed-in tariffs, or some other policies.[48]

4. **The Energy industry is very capital intensive.** This is one of the main reasons why it is more difficult to find successful exits for clean energy venture capital investments, as opposed to IT technology start-up investments, for example. It also leads to less venture capital investment in the sector compared to other sectors.[49] The sector has a very limited track-record of successful exits for venture investors[50]. The International Energy Agency forecasts that investment in the world's energy infrastructure over the coming 30 years will total USD 16 trillion – and the only way to find those sorts of figures is via the debt markets. Debt financiers do not like risks; they therefore do not like new and unproven technologies. The typical venture investor is looking for an exit in three to five years, yet many potential portfolio companies are selling into markets that require a five year operating history before mainstream financiers will back its products, and even then will not proceed without long-term service contracts and/or substantial warranties, impossible for the average venture-backed company to provide. Not surprisingly, therefore, the list of failed venture-backed companies in the energy space is long: Metallic Power, founded in 1995 to develop zinc-air fuel cell batteries, used USD 40 million in venture financing before finally closing down in September 2004. Norwegian

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[45] CEG report "Clean Energy Initiative: How Foundations, State Funds and Social Investors Could Pursue Joint Investments", August 2003; and "Investor Perspectives on Renewable Power in the UK", Carbon Trust, December 2003.

[46] However, note that according to an important Canadian government official interviewed, one of the most successful green energy technology companies in Canada sold their product directly to U.S. customers and did not have to prove success in the Canadian market first.

[47] Other studies have been conducted in Switzerland, notably about wind energy, which explore the challenges for public acceptance in Switzerland for this technology in particular, although as wind energy technology is fairly well developed and is dominated already by foreign companies, and therefore it is not particularly relevant to the questions we explore about technologies emerging from Swiss start-ups.

[48] From interview with one entrepreneur: "For example, the EEG law in Germany shows that in just 10 years, the government was able to encourage the market developments. Now they are the biggest market in the world. It has had a huge impact on the economy…with more than 40,000 employees in this new sector … now it is really like an automobile company. The application of the EEG law has definitely attracted hundreds of millions of Euros into the Renewable energy sector…"

[49] According to Wuestenhagen and Teppo (2005), data from Nth Power which shows that sustainable energy accounted for $526m or 2% of overall VC investments in 2003.

[50] See also Wüstenhagen and Teppo, 2005.

waste-to-energy developer Energos spent over USD 110 million before being acquired last year by the UK's Ener.G.[51]

And yet, as the surge in venture investing and fund-raising shows, the belief that it is possible to make money in renewable and clean energy is gaining ground in the venture community. Most of the current venture investors in the area are focusing on companies that are targeting "here-and-now" markets, rather than those whose market development is heavily contingent on either policy decisions or the initiatives of other players.

Some venture capitalists are realising now that some exits may take as long as seven years, although they still expect most exits after 3-5 years. One venture capitalist indicated that they now expect longer exits for the clean energy technologies they invest in. However, one must note that this fund is supported by the likes of Gaz de France and other industrialists with an interest in innovative energy technologies. Finally, he advises that the government should play a role in offering seed-financing, however he expresses scepticism against public-private partnerships. In his experience, the needs of private investors and the public sector often diverge and this will lead to dissatisfaction, or else the public sector money being used to serve the private sector's interests.

5. VC firms have little knowledge about alternative energy technology. Most venture capitalists have a business or banking background and are unable to assess whether the company they are considering financing really has a new and competitive technology to sell. Therefore, they focus most of their investment on business with conventional technology. VCs in Switzerland have few contacts in universities and research institutions. This is something that can be improved with networks in Switzerland, such as those which have recently sprung-up in the area of sustainable technologies. Although we will explore networks in various regions of Switzerland in the next section, some good examples of networks are: the European Energy Venture Fair[52], the Cleantech network[53], etc.

Bridging the Gap in Switzerland

To sum-up, a real effort is needed in Switzerland to bridge the gaps : within the technology "valley of death" for start-ups but also the gaps in expectations between venture capitalists, entrepreneurs, and more work is needed to better define the appropriate role of the government in dealing with this. In later chapters we will explore what is already being done in Switzerland and what other countries are doing. However, a more in depth analysis is still needed to explore the advantages and disadvantages of the direct and indirect measures we have identified in this pre-study.

In this section, we have explored the various aspects of Switzerland (cultural, legal, fiscal, market-size, etc.) that lead to a more difficult territory and therefore perhaps a more dangerous technology "valley of death" in Switzerland for start-ups in general. It is important to understand these aspects in order to explain to various economic constituents why it is important for government to have a larger role in bridging this gap.

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[51] Other companies which have been shut down include: Bowman Power Systems, AstroPower, MayFlower Energy and Border Biofuels. The UK's Arbre Energy was forced to close its pilot biomass gasification plant after just eight days of operation. German wind turbine manufacturer Nordex has completed a forced refinancing by Goldman Sachs and turnaround specialist CMP. Wind project developer Plambeck Neue Energien has failed to publish its 2004 results while it negotiates a new credit line, EnergieKontor, whose shares peaked at around EUR 120, now trades for EUR 1.70, etc.

[52] http://www.europeanenergyfair.com/

[53] http://www.cleantech.com/

Many of the issues we explored here are interlinked. Even the positive aspects of Switzerland such as the diversity in its culture, different languages spoken, and the focus on engineering excellence, play a role in reducing the venture capital activity in the country.[54] Perhaps one should not attempt to change all aspects that appear to be a barrier, but rather attempt to find better ways to navigate and obtain the specific sustainable economic development goals of Switzerland, and perhaps in different ways than in what appears today to be the best countries for venture capital investment. According to an entrepreneur active in Canton Vaud interviewed for this study, Switzerland cannot depend on the venture capital industry to finance its clean energy technology future. In fact already in 1981 he wrote that a simple transposition of the American model of venture capital to the Swiss circumstances is not possible[55]. According to him, the best way for the government to react is to give people (like Business Angels) better conditions to invest in Swiss clean energy start-ups. "If they fail, the government has saved its money. If they succeed, the companies that emerge will generate profits and generate taxable income for the government."

Others interviewed felt that the government should play a more direct role. For example, one experienced entrepreneur and member of the Swiss Federal Energy Research Commission (CORE) believes that government programs like SFOE can do a lot by simply setting clear priorities for Swiss energy technology needs. [56] It makes sense that if government agencies like SFOE set the example and invest in key areas (seed funding or co-financing), after setting clear priorities based on an in-depth study of clean energy technology options, then institutional or private investors may follow by also investing in these "best" technologies for Switzerland's sustainable energy development.

Another example of direct support is what our interviewee from Canton Vaud would like to see more of: more money at the federal level for small projects and seed-capital. He notes that currently SECO is unfortunately not playing a role in this area, while it is spending more resources to help foreign start-ups (see next section for more information on SOFI and micro-credits for foreign SMEs). The question is who should be responsible for promoting clean energy technologies in Switzerland? Some may believe it is SECO's responsibility. Others might believe it is with SFOE.

However, one might point out that while the strategy suggested above by the entrepreneur interviewed would not support all good clean energy technologies emerging from Swiss technical universities, it may risk losing technologies with a high export potential. According to our Canadian

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[54] According to one experienced entrepreneur, "Venture capitalists are interested in investment for maximum of 5 years. They come in when the start-up is starting to put products on the market. The start-up needs capital to set up a manufacturing tool. The VC firm is in for 5 years and then they sell it and it goes "public". In the states, it is possible in 5 years and in Switzerland it is just impossible. To get a growth rate, you need more time. It's already a different language country (changing but…), then you can go to France, then outside Europe. So it is always a different culture, languages, etc. and that makes the process take more time. In the US, the culture is the same everywhere. This makes a lot of difference and we have finally a limited venture capital industry. The growth rate of companies is too low. So, one issue is directly related to the size of the market (at the start of market deployment in the local market) and this is even more important for energy. Also, the culture in Switzerland is much more engineering-oriented than commercial-oriented. You find many small companies managed by engineers and they are more interested in technical issues than sales. Both issues make the development of the market slower."

[55] Jenny, Alain, "Le financement des petits et moyennes enterprises: une nécessité pour la Suisse", editorial in *Revue économique et sociale*, Bulletin de la Société d'études économiques et socials, Lausanne, 39th year, February 1981. In this review he examines the failure of an early European venture capital institution founded by General Doriot, founder of one of the principle American venture capital companies (ARD): the European enterprise development company (EED). Unfortunately, it disappeared following several bad experiences. He identified 6 key differences between the United States and Europe in this article that led to the failure: 1. the not so well developed market in Europe at that time, 2. the lack of risk-taking individuals that follow a leader in Europe, as in the US, 3. high charges in Europe, 4. a market in Europe which is not homogenous, 5. the international monetary crisis and petroleum crisis was very unfavourable to EED, 6. the business climate, spirit for challenges, and governmental support (NASA, Army, SBA, etc.) were more favourable in the USA.

[56] Point of view expressed by one entrepreneur interviewed. On asked what SFOE can do: "They can do a lot by becoming more selective – that is not working on everything. I know many examples where technology was developed and then sold to the US because there was no interest for it in our country."

interviewee, technologies do not have to be demonstrated successfully in their home country before being exported successfully, as long as there is easy access to at least one large export market. Canada is betting on sales to the US market for many of its supported innovations. Then again, Canada also has a great need for clean energy technology to be applied within its borders. The priority for the country (making money from exports, or meeting domestic clean energy needs) depends on the eyes of the beholder. Perhaps in some cases both objectives may be met with the same technology.

4 Where does government support in Switzerland stand today? Current Swiss entrepreneurship/VC support programmes

Much is already done by the Swiss innovation promotion agency (Commission for Technology Innovation), KTI/CTI to promote innovation by encouraging a more entrepreneurial culture in Switzerland and connecting start-ups to venture capitalists. The CTI network includes members and services of KTI/CTI the Innovation Promotion Agency, Venturelab, CTI Investor Association, the CCSO network, seco, Centre Suisse d'Electronique et de Microtechnique (CSEM), the Federal Department of Economy Affairs, universities, techno-parks, venture capitalists, business angels, consultation and promotion offices (Genilem, Venture 2004), foundations (W.A. de Vigier Stiftung, Gebert Rüf Foundation), etc.

Other programmes for innovation and support for start-ups in each canton (state) are active in similar ways, yet some are beginning to offer more financial support, such as Canton Vaud. In addition, some Cantonal banks are starting to offer venture capital finance for start-ups, such as in Zurich.

A quick review of some key programmes is provided here, while an assessment of their effectiveness is provided later as based on interviews conducted with entrepreneurs and representatives of a few of these programmes[57]:

Nationally-active initiatives:

1. **BASE** (www.energy-base.org/) is headquartered in Basel/Switzerland and has offices in Freiburg/Germany and Colmar/France. BASE aims to bridge the gap between sustainable energy enterprises, especially SMEs, and the finance sector to foster strategic partnerships for the purpose of increasing investment in clean energy options. In March 2001, the Canton of Basel-Stadt and the United Nations Environment Programme (UNEP) established BASE as a UNEP Collaborating Centre with the function of supporting UNEP's energy programme, particularly in the area of promoting new approaches to financing sustainable energy in developing countries. BASE helps to mobilize investment in sustainable energy by: 1. Serving as information clearinghouse and communication centre in the field of financing sustainable energy; 2. Acting as independent broker to help project developers access funding and help investors identify profitable investment opportunities; 3. Providing a platform for entrepreneurs and investors to build partnerships; 4. Promoting innovative financing instruments; and 5. Developing practical tools to facilitate investment in sustainable energy.

[57] This is not an in-depth review of all programmes existing in Switzerland. A more in-depth study exploring all related programmes and initiatives, and studying further their effectiveness in meeting their objectives, would have exceeded the scope and limited funding of this pre-study.

2. **Venture Lab** (www.venturelab.ch/dt/home.asp) is meant to improve the entrepreneurial awareness of 1500 students from the high technical institutes in Switzerland and train 500 young entrepreneurs about firm management.

3. **CTI Start-up** (www.ctistartup.ch/) involves coaching of young entrepreneurs and assistance to help their projects improve until they can be accepted by the venture capital specialists. Until March 2004, experts of the CTI have examined 700 projects where 89 of them have received the label CTI Start-up. Until this date, the selected projects have created 950 jobs.

4. **CTI Invest** (www.cti-invest.ch/) is meant to bring together business ventures, entrepreneurs, investors and their respective networks. CTI Invest stages regular events where the companies can present themselves and where the members can evaluate them and network. The CTI Investor Association was founded on May 6th, 2003 and is registered in Bern. It has been renamed to CTI Invest starting in 2005. The association fosters entrepreneurial thinking and acting and assists entrepreneurs that are currently in the CTI Start-up coaching process or are already holders of the CTI Start-up Label. CTI Invest organises match-making events and networking events.

Regional Initiatives:

5. Swiss Technopark, Zurich (http://www.technopark.ch/) Technopark Zurich was opened in 1993 as a technology transfer undertaking. Start-up companies offering technological performance interact with well-established firms and various research groups in wide-ranging fields and disciplines. Apart from the ETH Zurich and associated engineering colleges in Winterthur and Zurich, some 190 enterprises, organisations and projects employing about 1400 people occupy rental floor areas totalling 44,300 m2. Technopark Zurich claims to have a 91% success quota of innovative start-up companies.

6. **Grow** (www.grow-waedenswil.ch/) is home to start-ups[58] and provides opportunities for cooperation provided by a network. It: 1. offers partnership and support of experienced practitioners from business and science; 2. Coaches/supports start-ups in legal and organisational questions; 3. puts the infrastructure of the University of Applied Sciences Waedenswil; (HSW) at start-ups' disposal, including laboratories, classrooms and an international academic network; 4. Integrates start-ups into the existing regional network and arrange direct contact with partner and professional organisations; and 5. provides cost-efficient premises and infrastructure.

7. **EPFL Science Park** (www.parc-scientifique.ch/PSE/index.php) is meant to transfer technology between the university and the industrial sector. The Science Park develops and rents commercial offices at EPFL to house : company hubs, start-ups or spin-offs, and service providers. The Science Park provides innovative high-tech start-ups and SMEs with coaching and counselling in the area of : strategic management, commercial development and fund-raising, contract negotiation, and mediation.

8. **Novatlantis** (www.novatlantis.ch/) takes the findings and results of recent research within the ETH domain and applies them to projects designed to promote sustainable development in major urban settlements. By using practical examples, they seek to demonstrate what a sustainable future might be like. Working with researchers and scientists from the ETH domain, they initiate multidisciplinary projects. In partnership with governmental bodies and industry, they run projects, which reflect the societal and technical aspects of sustainability.

9. GRANIT (www.granit.net) stands for Group of Research and Applications in Nature – Innovation – Technologies. It is a meeting point between research and the market for environmental protection. It has experience in pilot demonstration projects, networking local sustainable

[58] The companies now based in grow work mainly in the field of life sciences (biotechnology, chemistry, food technology, pharmaceuticals) and computer science, and most of them grew out of the university environment.

development, environmental planning and is now developing an environmental technology center in Orbe, Switzerland.

10. CREAPOLE (www.creapole.ch) is a center of resources for the creation of start-ups in the Canton of Jura. CREAPOLE supports start-ups in furnishing them with personalised consulting, education, and helping them in the process of priority setting in starting of a company and in the allocation of financial support.

11. Capital Proximité (www.capitalproximite.ch) is an association that is used to join investors and entrepreneurs in Canton Vaud. It is supported partially by the Canton Vaud and also other partners. The Canton started the initiative. Private investors invest in the start-ups. It involves a database of standardised information on investors and another database with the profiles of companies. Capitalproximité accompanies their parties in the concretisation of their projects. It groups all the actors in the area of economic promotion in Canton Vaud: CODEV (regional associations), DEV (Vaud economic development) and DEC (Economic department).

12. Foundation for Innovation and Technology (FIT) (www.fit-foundation.ch) In speaking to Mr. Coulon from Canton Vaud, he noted that the Canton is supporting organisations who are financing start-up companies in the region, such as FIT, which he says is very successful. He said he envisioned that in the future real seed money will be available from the government for start-ups in the region. What is available now is pre-seed money or personal loans. 100,000 CHF is available to entrepreneurs with a good idea, but they must return the money (based on honor and with no interest). 4 million CHF has been financed in projects. Organisations involved include: EPFL, state of Vaud, Sandoz foundation, Bobst (a company in Vaud) and several other industrialists, the city of Lausanne, etc.[59]

13. Ecoparc (www.ecoparc.ch/) in Canton Neuchatel is an information exchange platform offering a documentation center, an annual Forum, regular seminars, a network SME.ne, and publications. It is also a center of competence for companies concerned about integrating sustainable development in their business activities. Neuchatel also has a semi-private venture capital fund.[60]

14. Y-Parc (www.y-parc.ch) is the Scientific and Technological Park of Yverdon-les-Bain. It's objective is to encourage the transformation of concepts and ideas from the laboratory into products and services that succeed on the market. It organises young entrepreneurs and favours collaboration between the companies and offers common services, consulting about technology transfer, technological change and business development.

15. SODEVAL (www.sodeval.ch) is the Society for the economic development of Valais. It offers consulting and financial assistance to entrepreneurs.

16. GENILEM (www.genilem.ch) is a partnership of start-ups in French-speaking Switzerland, a center that offers training, consulting and tools for entrepreneurs, free coaching, consulting antennas, and is supported by corporations, the public sector and 15 institutions.

17. Other start-up networks include:

a. **APTE**, Zurich (www.apte.ch)
b. **BioValley**, Switzerland (www.biovalley.ch)

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[59] The Canton of Bern has done the same thing. Another similar initiative is in the Canton of Solthurn which uses a foundation to support entrepreneurship and organises a prize every year. There are about 100 prizes in Switzerland for innovation.

[60] However, according to one experienced entrepreneur/investor interviewed, a Board Member in Canton Neuchatel of this semi-private fund, "one can not invest more than 300,000 CHF per case. If the files are very good it goes to VCs. If not they are not so good/ too risky, they do not find capital. Most of the time, it's the quality of the entrepreneurs that makes the difference. There are not enough start-ups. For example, 8 will fail and 2 are remaining."

c. **Business Tools AG**, Zurich (www.btools.ch)
d. **FirstTuesday**, Zurich (www.firsttuesday.ch)
e. **Gründungsplattform des Kantons Zürich** (www.gruenden.ch)
f. **IFJ Institut für Jungunternehmen**, St-Gall (www.ifj.ch)
g. **START**, St-Gall (www.startglobal.org/en/...)
h. **Greater Zurich Area** (www.zurichnetwork.ch)
i. **ZfU Zentrum für Unternehmensführung AG**, Thalwil (www.zfu.ch)
j. **Startup News** (www.news.ch)

Finally, several websites exist that reach out to scientists in Switzerland (as they often serve other purposes such as job-postings, etc.), such as **Swiss Science** (www.swiss-science.org). These sites could also possibly be used to increase the link between scientists and investors.

Seco programs for SMEs:

SOFI
Seco has implemented as part of its development cooperation the Seco Start-up fund (SSF) which is a credit facility established by SECO in 1997. The administration of the fund was delegated to the Swiss Organisation for Facilitating Investments (SOFI). This fund is designed to promote private sector investment projects in countries in economies under development or in transition. The aim of the SSF is to share business costs and risks with the investor. It does so by feasibility studies and business plan support, co-financing the initial investment phase (up to 3 years after start of operations). Financing by the SSF is in the form of a loan that must be repaid within 5 years from the time the loan agreement is signed.

Swiss Investment Fund for Emerging Markets
Since June 2005, Seco has also put Sifem in charge of the management of its investment portfolio in developing countries which includes 200 million dollars of investments in micro-credits, microfinance funds, or private equity funds. Former staff of Seco and DDC manage this Swiss investment fund for emerging markets.[61]

Finally, there are a number of policies in Switzerland that serve a means for promoting clean energy innovation, at least indirectly. We particularly look at a new development, the Climate Cent Foundation, and explore whether it could be used to promote a sustainable venture capital industry in Switzerland. Further work is needed to explore what other policies could be implemented to encourage further venture capital investment for promising clean energy start-ups in Switzerland, as successful take-up of new technology in the local market is an important criteria still for many venture capital firms today.

Current policies for promoting clean energy technologies

The Swiss government has a number of new laws that affect energy and climate policy. There is still a lot to do. Other countries, like Germany, are ahead of the game on policies to promote renewable energy technology, for example.

[61] Article "Le Seco délègue la gestion de microcrédits : Une société privée a recu un mandat pour 18 mois », Le Temps, Wednesday, 12 October 2005.

The Climate Cent Foundation -
http://www.stiftungklimarappen.ch

On how the Climate Cent can help

A representative of the Climate Cent Foundation provided the following information: "We have a CO2 target from 2008-2012. Most of the emissions we may reduce by purchasing CO2 credits from abroad. However, the rest (about 200 million tons) needs to be done domestically. We now have 1.5 rappen per litre of petrol/diesel which makes 100 million CHF per year of the foundations' income for its fund and the contract with the government is for several years. We expect to spend about 500 million CHF in Switzerland, and we can invest in emission reduction equipment in Switzerland. We can do this by funding single projects like substitution of an old furnace by a wood-fired furnace to the owner and we are paying for the emission reductions in the future - paying per ton of CO2 reduced. We will make a tender so people can give their bids at what price they think they can make it. It will help SMEs indirectly, but we won't support the companies themselves. We just look at the CO2, not specific technologies."

Therefore, this programme may indirectly help start-ups that are able to successfully deploy their technological solutions before 2012, if they meet the CO2 reduction objectives of the Climate Cent Foundation, and if the programme is extended after its two-year test period. Because one can never be absolutely certain about the CO2 reduction potential which could result if this programme directly supported these firms, as opposed to the projects which win contracts under the planned competitive bid, the Climate Cent Foundation is not a programme which most of the initiatives considered in this report could depend on as a financial resource.

On renewal and extension of Climate Cent, and possible application to venture capital finance for sustainable energy technologies

"Time will tell about how to expand the program in scope and in time." Our interviewee's personal opinion was that eventually if there was enough money from a future energy tax such as an extension of the Climate Cent or the CO2 levy on heating, that this money might be used in a venture capital fund for clean energy technologies, but that it should ensure that the government does not get involved in taking equity in such investments, but rather participates via loans or guarantees or funding of administrative costs to attract private investors.

According to one cantonal representative interviewed, "Cantons are very hopeful about the Climate Cent foundation, especially because we have a few very interesting projects in the pipeline (biodiesel, biogas, etc.)". The limited time horizon of the current Climate Cent (until 2012) and the focus on near-term emission reductions make it unlikely that this will be the appropriate source for venture capital finance in the future, but perhaps this could be reconsidered for the post 2012 timeframe.

On ecological tax reform

According to the SFOE website, "The negative decision by the electorate on 24 September 2000 and the rejection by both the Federal Council and Parliament of the people's initiative calling for a secure pension fund (AHV) by taxing energy instead of employment, does not mean that the government will discontinue to actively pursue its current energy and climate policies. SwissEnergy, the CO2 Act, the Federal Electricity Supply Act (with measures for the promotion of renewable energy and ensuring a secure energy supply), the new Nuclear Energy Act and (in the longer term) ecological tax reform all pursue the same goal of sustainable energy supply."

Many people interviewed in our study agreed that Switzerland's value-added is in its high-tech industry and the start-up technology companies emerging from its highest technical schools, EPFL and ETH, among others. Many technologies are already at risk of being lost because of insufficient

support after the R&D stage. One government programme administrator said "I see lots of good projects and we miss half a million to help them." [62]

While ecological tax reform may eventually free additional financial resources for federal seed investment in start-ups, as some experts have suggested, the government could consider other areas where it can act in the meantime, including exploring where other financial resources may be located for a seed-capital fund or how it can better coordinate activities in various Swiss cantons.

5 What is the relevance of current Swiss programmes and what can be improved?

Entrepreneurial coaching facilitated by CTI appears to be well appreciated in Switzerland.

As mentioned before, Switzerland is doing quite a good job via CTI and various regional programmes in promoting entrepreneurship, coaching and connecting entrepreneurs with venture capital funds. However, as found in this pre-study, venture capital funds are not necessarily meeting the financial needs of start-ups in Switzerland. Perhaps CTI and other initiatives could improve their outreach to private investors, but this idea should be further explored.

There is a need for more seed-capital and true VC investment.

The area that requires most attention is in improving the climate for investment and the facilitation of seed capital for start-ups (the demand that venture capitalists are not fulfilling today). There are no real government programmes in this area. Seed capital is now being offered by cantonal banks like in Zurich, but amounts are limited.[63] According to our interviewee from Zurich Kantonalbank, if government could either administrate or feed funds each year into Swiss-wide seed-money funds, like that being conceived by Mr. Von Waldkirch, this would probably be a good idea.[64] We propose to explore further such ideas in future research.

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[62] One government programme administrator said: "We are missing the money and Germany is missing the other parts (like entrepreneurship education)." On the role of SECO: "it is really about having seed funding otherwise we are in deep trouble. We have to support this. I see lots of good projects and we miss half a million to help them. It's really a sad story. We have good technology. That is why we founded CTI-Invest (a private organisation) sponsored by the government. I am convinced it is a good platform for networking, preparing them to meet investors, and generation of seed and first stage capital. CTI start-up (coaching) was also presented in Brussels lately and was successfully received".

[63] Our interviewee from Zurich Kantonalbank explains: "ZKB will plan to invest in about 20-25 cases each year which is about 15 million CHF/year of investment. We are not planning to expand, but if there are not good indicators we will be forced to close. We are not like a venture capital fund. We are only an investor of up to 50-500,000 CHF each year in the seed capital phase."

[64] The representative from Zurich Kantonalbank also commented in the interview: "Government should not invest directly in the companies, but help them finance the registration processes for products or so-on, and handle investments in start-ups better as far as taxes are concerned."

Support from cantons is variable and could be better coordinated.

We interviewed one representative from the Basel Area Business Development. He described that, in his opinion, eastern Switzerland generally only has very limited support for start-ups after R&D stages, while western Switzerland often does much more. He mentioned Canton Vaud and Canton Jura as examples. However, an expert from Canton Vaud felt that Switzerland in general has limited support.[65] One entrepreneur supported the idea of a partnership between the federal and cantonal level.[66] Another entrepreneur in Geneva, complained about the lack of concrete results from various technology transfer programmes in Geneva. He stated "if there was spare money to play with, the best thing for cantons and federal governments to do is to place the money with professional fund managers". Many believed a nationally led effort is needed, while cantons know their entrepreneurs and industrialists best, therefore more collaboration between the federal and state governments is apparently of great need in Switzerland.

Government should continue to study what works and where money would be best allocated.

According to one entrepreneur "Yes, we should do more. Government funds are needed to invest in the early stage of companies, because VC firms are not doing this job. … But government needs to study concrete cases of what has worked in the past and what has not worked and why. It should establish criteria for where the money is best allocated. … The federal government should lead. The mandate for assisting environmental technology deployment should be with the Federal Office of the Environment….we should use the existing structure in a light way, rather than building a heavy structure."

Perhaps an overarching programme could be initiated by SFOE, together with the Department of the Environment, which was praised by the entrepreneur interviewed, for its good work in the past to promote clean technological innovation and encourage collaboration among competing start-ups. Further work is needed to explore exactly how this could be undertaken, the possible role of SFOE, and with which financial support.

Further consider synergies with Swiss climate and energy laws.

Finally, further work is needed to explore how existing climate and energy policies could be used to further stimulate investment in clean energy start-ups and further promote the a sustainable venture capital industry in Switzerland. This could build on an evaluation of the experiences of the Carbon Trust (UK) and the Climate Cent foundation in Switzerland.

[65] For example, our interviewee from Canton Vaud.
[66] Entrepreneur from Canton Vaud.

6 What are other countries doing?

Several other countries in Europe, Canada, and notably the United States have implemented programmes to support entrepreneurs financially in the early stages of market deployment.

North America

Canada

Canada has realised the importance of assisting start-ups across the "valley of death". A high-level Canadian government representative interviewed at an innovation event in France, Mr. Graham R. Campbell, Director General of the Office of Energy R&D, Natural Resources Canada, explained that the Canadian Development Bank (BDC) has venture capital funding and technology seed investments for Canadian start-up firms of about 500 million Canadian dollars.[67] Sectors of activity are: advanced technologies, information technology, life sciences, and telecommunications.

United States

The United States is known around the world for its SBIR programme, Small Business Association investment incentives and programmes, among others, which have allowed a good basis for the emergence of new technology start-ups and for venture capital investment.

U.S. SBIR
The Small Business Innovation Research (SBIR) Programme is a competitive three-phase award system which provides qualified small business concerns with opportunities to propose innovative ideas that meet the specific research and research and development needs of the U.S. Federal Government.[68]
Three phases of the SBIR Programme:

- Phase I is a feasibility study to evaluate the scientific and technical merit of an idea. Department of Education (ED) awards are for periods of up to six (6) months in amounts up to $75,000.
- Phase II is to expand on the results of and further pursue the development of Phase I. ED awards are for periods of up to two (2) years in amounts up to $500,000.
- Phase III is for the commercialization of the results of Phase II and requires the use of private sector or non-SBIR Federal funding.

This programme has served as a model for some of the programmes around the world which have been reviewed in an annex to this report. Of those, Australia, Belgium, Hong Kong, Hungary, Wales and the UK (although not a grant scheme) seem to be similar to the U.S. SBIR programme.

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[67] Over the years, BDC Venture Capital has invested some $900 million in more than 400 companies and currently has $500 million committed to its investees. In addition, $129.9 million has been committed to the funds.
[68] U.S. Department of Education's SBIR website (http://www.ed.gov/programs/sbir/index.html) explains the reason the SBIR programme was created: "The U.S. Congress established the Small Business Innovation Research (SBIR) Program to stimulate technological innovation, utilize small business to meet federal research and development needs, and increase private sector commercialization."

Other US Federal, NREL and State Programmes

There is a wide range of sponsorship opportunities for technology development at both the federal and state levels. Each agency and national lab, if involved, will have its own specific needs and requirements. The major forms of federal technology development sponsorship are grants, subcontracts, and Cooperative Research and Development Agreements (CRADAs). For example, the National Renewable Energy Laboratory (NREL) subcontracts with its industry and university partners. The majority of these subcontracts are awarded using a competitive process – via a Request for Proposals (RFP), with R&D partners that are part of a technology programme such as Photovoltaics, Wind, Biomass Power, etc. See http://www.nrel.gov/st.html for a short list of the major technologies.[69]

An example of a DOE grant programme is the Inventions and Innovations Program for very early-stage companies.[70] Other government grants and additional funding can be found on a number of sites.[71]

Several linkages that are of interest can be accessed through the NREL site. These include The Advanced Technology Program (ATP)[72] of the Department of Commerce and the National Institute of Standards and Technology. ATP uses partnerships with the private sector in early-stage investment, and aims at accelerating the development of innovative technologies that promise significant commercial payoffs. There are often parallel types of mechanisms within the states. [73]

In addition, networks of professionals help to share experience among professionals in the field, and special networks exist for states that are more pro-active than others in promoting clean energy technology. For example, the Clean Energy Group[74] works with an alliance of clean energy state funds and performs research on clean energy. Some of this work is of particular relevance to the topic of our pre-study.[75] A study conducted by CEG and another conducted by the UK's carbon trust, both agree that to overcome the barriers[76] to widespread implementation through increased investment, mechanisms for collaboration between state and federal government institutions, public sector organisations and the private sector to accelerate sharing of knowledge and investment in clean

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[69] Depending on the entrepreneurial business, and the specific RFP, cost share may be required. Selection criteria also will vary, but quality of technical approach and team – along with fit within the framework and needs of a given technology program – are usually major elements. To become a subcontractor in a technology program, you should respond to the RFPs and get your organization on the solicitation list. See: http://www.nrel.gov/contracts/index.html
NREL/DOE does Cooperative Research and Development Agreements (CRADAs), as well as "work for others" (WFO), in which NREL acts as a subcontractor to the entity wanting the work done. CRADAs allow industry members access to NREL staff and facilities. The projects must be carried out on a noninterfering basis with ongoing DOE programs, and focus on technology research or development issues of mutual interest to the industry partner and to NREL. CRADAs are either "no funds exchanged" or "funds in" from the industry partner to NREL. No Web site is available as of this writing. Finally, NREL also licenses its technology to industry. See: http://www.nrel.gov/technologytransfer/lic.html .

[70] Their Web site is at: http://www.oit.doe.gov/inventions/.

[71] Including: http://www.nrel.gov/technologytransfer/entrepreneurs/gfp.html

[72] http://www.atp.nist.gov

[73] An excellent source for a whole range of state incentives can be found at the Web site National Database of State Incentives for Renewable Energy (DSIRE) http://www.dsireusa.org.

[74] www.cleanegroup.org

[75] In 2004, the UK Carbon Trust supported the Clean Energy Group to explore the potential for and market interest in the creation of a Transatlantic Investment Network. The opportunity assessment aimed to analyse: trends in the clean energy sector and the immediate investment opportunities, identify institutions active in the sector and the financial resources/products utilized, and investigate the barriers to sustainable investment to accelerate the market. 40 face to face interviews were conducted by CEG, based on a customized questionnaire. The result is a report called "The Potential for Transatlantic Investment in Clean Technology – An Opportunity Assessment of the Clean Energy Sector", March 2005.

[76] Barriers to investment are reviewed in Wüstenhagen and Teppo (2005). Some of the barriers stated in these reports are: markets driven by uncertain regulatory policies, a limited investment pool to fund early commercial projects, and the perception that the level of returns is too low to attract substantial venture capital investment into the market.

technology companies and projects, need to be created. Other interesting organisations which exist in the US among professionals include CleanEdge[77] and Cleantech Venture Network[78].

There are several public-private leveraging initiatives between US state funds and their VC partners. The funds with specific VC elements are: the Massachusetts Green Energy Fund,[79] and the California Clean Energy Fund (CalCEF).[80]

Others that exist (outside of the US) are: the UK Carbon Trust VC fund[81], and the Australian CVC Renewable Energy Equity Fund (REEF)[82]

We suggest that it would be a good idea to conduct a further study of such public-private leveraging initiatives, including a full description of how they work, who they involve, an analysis of the challenges they have faced, how they overcame such challenges, and how their experiences could serve as lessons learned for the possible establishment of a such an initiative in Switzerland, if there is further research interest in this area.

Europe

EIF (http://eif.eu.int/) is the European Investment Fund. The EIF's activity is centred upon two areas, venture capital and guarantees: EIF's venture capital instruments consist of equity investments in venture capital funds and business incubators that support SMEs, particularly those that are early stage and technology-oriented; EIF's guarantee instruments consist of providing guarantees to financial institutions that cover credits to SMEs.

Under its i2i initiative[1], launched in 2000, the European Investment Bank (EIB) has invested to date close to 15.3 billion in research, development and innovation. The Bank has allocated an extra 20 billion for lending over the 2004-2006 period. Over the same period a further 1 billion is foreseen for EIF venture capital operations and another 3 billion for SMEs guarantees. Altogether the EIB group plans to lend up to 50 billion by 2010 through a broad range of instruments adapted to different needs.

European Investment Fund (EIF)

– As part of its priority to contribute to the Lisbon strategy EIF became in 2000 the EIB group's specialised subsidiary for venture capital, with an investment capacity reaching 4 billion. As outlined in the "Growth initiative", EIF will step up the provision of venture capital, guarantees and advisory activities to R&D projects.

– Up to now, EIF support for risk capital funds - including the Community-funded scheme "European Technology Facility Start-up" - amounts to 2.5 billion spread across 185 risk capital funds, supporting 1500 high technology businesses to the tune of 10 billion. In 2003, the EIB approved the

[77] See: www.cleanedge.com Clean Edge, The Clean-Tech Market Authority, is a research and strategy firm that helps companies, investors, governments, and nonprofits understand and profit from emerging clean-energy markets. Our offerings include: industry research reports and publications, strategic marketing services and co-sponsored conferences and events.
[78] www.cleantech.com The Cleantech Venture Network™ LLC is a membership organization bringing insight, opportunities and relationships to investors, entrepreneurs and service providers interested in clean technology. We do this through related information products, advisory and online services, and the Cleantech Venture Forum™ series of events.
[79] http://www.massgreenenergy.com/
[80] http://www.calcef.org/
[81] http://www.thecarbontrust.co.uk/carbontrust/low_carbon_tech/dlct2_4.html
[82] http://www.greenhouse.gov.au/renewable/reef/

earmarking of an additional 500 million to allow the EIF to increase its investment capacity by more than 1 billion under the EIB "Risk Capital Mandate".

– The end result of EIF operations has meant that more than 250,000 SMEs have benefited from EIF guarantees. Approximately 150,000 loans were granted under the Community-funded Multi-Annual Programme for enterprises (MAP) and 7,000 micro enterprises received 180 million in support under the "micro-credit window".

– Of all SMEs who have benefited from venture capital since 1997, EIF has financed 15%. This represents about 1800 high-growth and innovative companies.

– In January 2004, the EIF signed a commitment to invest 4.5 million in VIVES, with other co-investors including KBC and Fortis banks, both EIF shareholders. The fund is managed by Sopartec, the technology transfer and investment company of Université Catholique de Louvain (UCL). This fund will focus exclusively on companies in their seed and start-up phase. It will focus on new technology-based firms, which are either spin-offs from the UCL or companies benefiting from a strategic partnership with UCL. A strategic partnership between UCL and a potential portfolio company is defined as an agreement covering the management of intellectual property rights or the establishment of a research contract aimed at validating a technology concept.

– The EIF made the commitment to invest 15 million in "Innovacom 5", a pan-European fund targeting new technology-based firms with a specific emphasis on new materials and components, telecom hardware, software and telecommunication networks, enterprise software, services and content. The fund, managed by the Paris-based Innovacom, recently achieved a second closing bringing the fund to 120 million. As the venture capital subsidiary of France Telecom, Innovacom has helped successfully launch innovative telecommunications and information technology start-ups since 1988, such as Business Objects, Cobalt Networks, Gemplus, Infovista, Intershop and LastMinute.com. With offices in Paris, Stockholm and San Francisco, Innovacom is an active early-stage investor principally in France and in Scandinavian countries and selectively in Germany, Austria and Belgium.

– EIF and the Commission (DG Research) are finalising a cooperation agreement to assess the feasibility and definition of the operational modalities of a new type of risk capital investment vehicle linking centres of excellence from different European countries. The aim is to define a new scheme which bridges the financing gap between research and early stage investment and could be implemented by the EIF with possible future EIB group and/or Community resources. This new type of seed vehicle would be taken up by a network of leading universities and research centers in Europe which may decide to work and invest together in sectoral pre-seed and technology transfer. This requires a long-term approach and special instruments to bridge the existing gap between research and commercialization.

European Bank for Reconstruction and Development (EBRD)

– The Commission (DG Research) is preparing with EBRD a cooperation agreement to gear part of the interventions of EBRD in acceding countries to support industrial research and innovation. The Commission and EBRD share a number of common objectives, such as fostering innovation and a competitive knowledge-based economy, and are exploring ways to combine and optimise their funding possibilities.

CIP - Competitiveness and Innovation Programme 2007-2013

On 6 April, the Commission presented its proposal for a seven-year framework programme for competitiveness and innovation.[83] More than four billion euro has been earmarked for initiatives during the next budgetary period 2007-2013. A Parliament report on the proposal is scheduled for adoption in the ITRE committee on 22 November 2005

The new framework programme merges several already existing measures into one comprehensive programme to boost the competitiveness and productivity of European businesses (especially SMEs) while at the same time proposing support for eco-innovation and sustainable energy.
The CIP consists of three sub-programmes:

- The Entrepreneurship and Innovation Programme, which brings together activities in the areas of entrepreneurship, SMEs, industrial competitiveness and innovation;
- The ICT Policy Support Programme, which will promote the speedy adoption of information and communication technologies (ICTs) and comprises existing measures such as eTEN, eContent or Modinis;
- The Intelligent Energy-Europe Programme, which brings together actions to accelerate the uptake and promotion of energy efficiency and to increase investments in and awareness-raising of renewable energy sources. Existing measures such as 'SAVE', 'ALTENER', or 'STEER' are part of this subprogramme.

The CIP will add a *new risk capital instrument* to the existing instrument fostering SME start-ups. This non-grant-based instrument is aimed specifically at innovative and high-growth SMEs, which need capital at their crucial growth phase.

The Competitiveness and Innovation Programme is complementary to the 7th framework programme for research (FP7). It will be open for participation to members of the EEA, candidate countries, countries of the western Balkans, and, under certain conditions, to countries participating in the EU's neighbourhood policy. The Swiss participation is currently under negotiation.

Intelligent Energy Europe (2003-2006)

(http://europa.eu.int/comm/energy/intelligent/index_en.html) is a programme of the European Union for intelligent energy use and more renewables. It has a total budget of 250 million Euros, which is used to co-finance international projects, events, and the start-up of local or regional agencies in 4 main fields:

- Energy efficiency and rational use of energy, in particular in buildings and industry (SAVE)
- Promotion of new and renewable energy sources for electricity, heat, and biofuels (ALTENER)
- Energy aspects of transport, fuel diversification, biofuels and energy efficiency (STEER)

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[83] Stimulating the competitiveness of SMEs, fostering and promoting eco-innovation, energy efficiency and renewables, and accelerating the process leading to a fully-fledged information society are the objectives of the Competitiveness and Innovation Framework Programme 2007-2013.

- Promotion of renewable energy sources and energy efficiency in developing countries (COOPENER)

Within these 4 areas, funding is available for projects which enhance European capacity for the more intelligent use of energy and the wider use of renewables. This includes, for example, input into European policy development creation of certification and labelling systems; monitoring of market conditions; promotion of sustainable energy; spreading of best practice; capacity building etc. To date, Intelligent Energy – Europe supports almost 90 exciting international projects for energy efficiency and renewables - and there will soon be even more.

ETAP (http://europa.eu.int/comm/environment/etap/) or the European Environmental Technologies Action Plan is the policy of the European Commission meant to stimulate the development and uptake of environmental technologies. The EU's ***Lisbon Strategy*** identifies economic, social and environmental aspects as key to growth. ETAP is composed of actions around three main themes:

- Getting from Research to Markets;
- Improving Market Conditions;
- Acting globally.

The Environmental Technologies Action Plan (ETAP) will promote environmental technologies in the EU. The question is where and how? Channelling yet more money into research programmes might not be the solution, according to one venture capitalist. Green Procurement is already on their agenda, yet it finances today's technologies. Nevertheless, this would be an extremely important measure for existing established European SMEs providing clean energy, as it would do much to support their entry in the European market and lower cost of technology over time. One of the major issues is the provision of venture capital and entrepreneurial support for technology developers. According to one venture capitalist interviewed, financial initiatives like FIDEME[84], are neither sufficient nor do they provide added-value to a technology, according to the venture capitalist.

According to the same VC, neither EIF nor ETAP have a specific programme for clean technology venture capital at present. The Directorate of Energy and Transport (DG TREN[85]) has horizontal action plans (such as for sustainable transport and sustainable energy systems) but in his opinion, their budgets are too small to provide a substantial impulse to clean technology venture capital.

A large and healthy clean technology industry might be the most important key towards the Lisbon goals. Yet EIB allocates some 85% of energy financing to non-renewable generation projects.[86]

In conclusion, we particularly recommend a better coordination between Swiss and EU innovation policies with a particular focus on clean energy innovation. This will not only allow for additional

[84] A French fund supported with 15 million Euros by ADEME, the French agency for research in energy (see later section), and 30 million Euros from industrialists. See: http://www.ademe.fr/htdocs/actualite/plaqfid.pdf, for more information.

[85] To learn more about DG TREN and its research in the 6th Framework Programme, see video files at: www.managenergy.tv/me_portal/mst/12/?search=simple&searchString=DG+TREN#
For example, in a presentation by Mr. Fotis Karamitsos, Director, DG TREN, the following achievements in Europe were highlighted: Capacity of wind turbines has increased, installation costs for wind energy has reduced and decreasing costs have occurred for solar and bio-energy and work on fuel-cells for transport. He noted that renewable energy will be a priority with demonstration project support, as well as further support for clean fossil fuel technologies like CO2 capture and storage. Finally, hydrogen technology will be promoted in the DG TREN activities.

[86] Source: Venture capitalist and member of the European CleanTech VC investors.

funding for Swiss clean energy ventures, but also enable faster market access to the larger and often more attractive European clean energy markets through reduced market entry barriers. A first step is developing a further understanding of all the relevant European programmes and an assessment of their effectiveness and relevance to Switzerland's objectives.

France

There are several initiatives for innovation financing in France. Several of the most important ones were indicated by the French venture capitalist and the ADEME representative interviewed for this study.

1. The first one is the "concours" for financing start-up validation & creation. Every year it spends 30 million Euros.[87] The competition celebrates its 5-year anniversary, which allows a first measurement of the impact of such public assistance in the creation of start-ups. Since the launch of the competition in 1999, 600 start-ups have been created and 94% of them are still active. To give a better chance of survival, the government provides start-ups with practical, legal and financial assistance in place by the Ministry for Research:
    - The option to house the start-up in one of 31 public business incubators near scientific sites. They can also benefit from scientific resources and technologies, consulting and continuing education.
    - At a networking forum, private investors and financiers are presented at Sorbonne, the same day that prizes are awarded, to allow them to concretely advance in their project.
    - Former winners of the prize are available as coaches, to help them out in their experiences.
    - Meetings with investors and access to the largest funds with capital for start-up enterprises.

2. Another initiative in France is the "statut Jeune Entreprise Innovante" a new system of tax exonerations for start-ups[88]. The Finance Law of 2004 created this statute called JEI. It is meant for SMEs of less than 8 years old that are engaged in research and development activities which represent less than 15 % of their expenses, as long as they meet 5 conditions. As long as they meet these conditions, they can benefit from reduced tax payments on their profits, and a total exoneration of their annual fixed tax payments. For the tax on profits, the fiscal advantage consists of a total exoneration on profits during 3 years followed by a partial exoneration of 50% during 2 years.

3. In addition, the French agency of Innovation (Anvar)[89] deals with different financial instruments for innovation financing. The mission of Anvar is : "Promoting and financing innovation in French industry particularly for SMEs. Facilitating the emergence of new products and processes in all fields of activity. Anvar operates under the aegis of the Ministries of Industry, SMEs and Research." It has 289 M euros annual budget. From 1981 to 2003, 5.38 billion euros enabled Anvar to share the risk of innovation with more than 37,860 companies and laboratories, supporting more than 84,650 technological innovation projects. The role of the Agency is to meet with the needs and requirements of French SMEs, through its 25 regional offices, by offering a multi-faceted professional approach: Providing information, access to consultancy services and expertise; Establishing contacts with technical partners (laboratories, technology

[87] http://www.recherche.gouv.fr/technologie/concours/
[88] http://www.recherche.gouv.fr/technologie/mesur/jei.htm
[89] www.anvar.com

transfer agencies); and Assisting in the search for partners to set up industrial and commercial partnerships, and in looking for capital funds for start-up or growing companies.

Anvar organizes European technology exchanges and investment forums, and circulates via its 24 regional offices information on European R&D and EU programmes. Anvar gives financial support in the form of interest-free loans, repayable if the project is successful, covering up to 50% of the expenditure relating to the innovation programme or technology transfer. This support can also be a grant (up to 25,000 euros) to finance, in some cases, more selective programmes with a view to: Preparing or completing innovation programmes (market survey, design, patents); Facilitating the setting up of innovative companies; Raising the technology level of SMEs (hiring researchers, scientific and technical information, etc…); and Encouraging SMEs to become more involved in European technological cooperation projects within Eureka (seeking for partners and drawing up formal cooperation agreements), or within the Sixth Framework Programme. Decisions to finance are taken by the regional officers, and are based on both technical, economic and financial experts' reports.

4. Finally, Mr. Jean-Louis Plazy[90], ADEME, confirmed the support-schemes in France, including those of ADEME, for start-ups. The Agency for Environment and Energy Management also supports start-up firms in the area of clean energy and energy-efficiency. For example, for small and medium-sized businesses, ADEME emphasizes assistance with decision making, diagnosis or preliminary diagnosis, as well as facilitating access to various financing schemes and guarantee funds. Additionally, the agency is pursuing its research activities into leading technologies, such as fuel cells, which are likely to penetrate markets in the medium term.

United Kingdom

In the UK, **the Carbon Trust** works with businesses and the public sector to help them reduce their carbon emissions and so minimise the long term effects of climate change. They offer a wide range of services, including a unique bank of knowledge on the commercial, legislative and technological impact climate change is likely to have on the business community.

The primary aim is to help businesses implement programmes that reduce carbon emissions through:

- Free energy saving advice tailored to business, through publications, Helpline and expert Energy Surveys
- Financial support – interest-free loans for SMEs and access to Enhanced Capital Allowances for energy saving investments
- Carbon Management programme – considering wider carbon related issues such as emissions trading, renewable energy, and non-energy emissions.

They also support the longer term development of new technologies for carbon reduction. These include new ways in which energy will be generated, used and managed. The work includes projects on marine energy, fuel cells and advanced metering. They partner with investors to invest in companies developing low carbon technologies, and provide support for research and development.

According to one UK-based energy expert interviewed, the reception of the Carbon Trust among businesses is mixed. Some believe that the fund should be more effective at returning investors' money, and others believe that the government is taking too much advantage of its position.

[90] Deputy Director, Air, Noise and Energy Efficiency Division, Agency for Environment and Energy Management, Valbonne, France. http://www.ademe.fr/

However, he notes that the venture capital management team at the Carbon Trust is extremely professional.[91] He also noted that Scotland also has a program for the promotion of start-ups.
The UK is home to one of the few viable markets for start-up exits outside the US – London Stock Exchange's Alternative Investment Market (AIM). Venture capitalists from all over the world, including the United States, use this market. By the end of January 2005, 1,035 companies were listed on the market, of which 120 were international companies, compared to 1,021 just one month earlier. Since AIM opened, almost 10 years ago to the day, more than 1,800 companies have joined, raising over £15bn collectively through a combination of new and further issues. Last year, the market accounted for 68% of all initial public offerings in Western Europe, raising a total of £4.6bn. And according to research released by Ernst & Young at the end of May, the UK attracted the largest number of listings internationally, with AIM driving that growth. [92] However, the success and durability of this market is still yet to be proven, and some clean energy venture capitalists criticize AIM for providing fast-track IPO opportunities for immature companies.

According to a report by the UK's Carbon Trust written in 2004, "There has been over £1 billion of investment across 223 transactions in UK clean technology companies since 2000 (excluding grants and private donations)." The report suggests that "the potential for the investors to exit these investments exists via a growing trade sale market and a smaller but important IPO market."[93]

Germany

According to one Swiss government agency administrator interviewed, the German system is better for government support of start-up green companies, but the Swiss system is better in coaching and educating/preparing entrepreneurs for eventual proposition of their business plans to venture capital funds.

Bundesministerium für Wirtschaft und Technologie (http://www.BMWI.de)

Tax Policy

With its tax policy, the German government has given decisive impulses to strengthen SMEs. The reform measures adopted for the years 1998 to 2005 give SMEs some 15 billion euros in tax relief in their respective year of establishment. SMEs were relieved in the rough amount of 8 billion euros alone in 2001.

To cut the burden of bureaucratic hurdles that impedes SMEs in particular, the federal government established a project group at the end of 1999 that is studying all specific indications of possibilities for more efficient systems and procedures and that is translating them insofar as possible into proposals for action. In addition, the Federal Ministry of Economics and Technology has issued a publication providing 150 good examples of how government agencies and local authorities can make their services "business friendly."

SME policies and programmes

With its SME policy, the German government aims to strengthen the performance and competitiveness of SMEs and offer them new growth and development possibilities. In particular, the start-up process in Germany is to be given additional dynamic, and the stability and growth of existing companies supported.

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[91] Interview with UK energy expert.
[92] Perry, Michelle, "AIM - the viable alternative", in: *Accountancy Age,* 14 June 2005.
http://www.accountancyage.com/accountancyage/features/2137887/aim-viable-alternative
[93] Report by the Carbon Trust. See:
http://www.thecarbontrust.co.uk/carbontrust/about/publications/Investment%20Trends%20in%20UK%20Clean%20Technology%202000-2004.pdf

Entrepreneurship

Entrepreneurial dynamic in Germany is fostered by, among other things, programmes at schools and universities that familiarize students with issues of entrepreneurship. The initiative to set up university chairs for start-up studies, which has been undertaken by the German government in co-operation with the Deutsche Ausgleichsbank, has grown to include the participation of additional partners from the business sector and has resulted in the establishment of 42 chairs. More chairs are in the process of being established. The EXIST program has thus far furnished financial assistance to five regional networkers which create and operate models to motivate, train, and support start-up entrepreneurs from universities. More than 350 innovative business start-ups have been launched by the EXIST regions. Some of them are also receiving financial assistance from the EXIST-Seed program.

Furthermore, as part of the JUNIOR school project launched by the Deutsches Institut der Wirtschaft, students in school grades nine and above establish mini-companies operating under market conditions while participants learn under school supervision the appropriate responses to issues arising in self-employment. During the 2001/2002 school year, some 220 mini companies with 3,000 students from 12 German states participated in the project. And in 2001, the first business camp for mini companies was held, also to promote enterprise and individual responsibility. There are also many other school initiatives in the individual German states, as well as a brochure-binder developed by the Deutsche Ausgleichsbank with practice-related school material on self-employment which has already been sent to 14,000 teachers.

Financing

The imperfections encountered on capital markets can present obstacles that are hard to overcome for start-up entrepreneurs and for SMEs. The German government is therefore supporting start-up entrepreneurs and SMEs with a set of financing-assistance instruments tailored to their needs. The establishment of companies in the more traditional fields such as handicrafts is thus assisted by the ERP (European Recovery Program). In 2001, a total of some 5.6 billion euros were made available for ERP loans at favorable interest rates. In addition, start-ups and existing companies are being assisted by programmes of both assistance banks (Deutsche Ausgleichsbank and Kreditanstalt für Wiederaufbau), which in 2001 gave more than 10 billion euros to fund loans granted to SMEs. The introduction of the so-called start-up funding program, which was established for the special purpose of covering the capital needs of smaller start-ups (up to 50,000 euros) and gives borrowers' banks an 80 % release from liability, has proved to be particularly helpful for start-up entrepreneurs. Women are taking advantages of this possibility to a greater-than-proportional extent. Since its launching in May 1999, more than 17,000 start-ups have been assisted with a loan volume of nearly 550 million euros. To help start-up entrepreneurs and SMEs gain access to bank loans, loan guarantees have also been made available as the security normally required by banks.

In the field of risk capital, the German government makes available in considerable volumes venture capital for young technology companies above all via the VTC - Venture Capital for Small Technology Companies. The funds are provided either as direct co-investment via the Deutsche Ausgleichsbank's technology venture capital fund association or as venture capital via the venture capital donors refinanced by the Kreditanstalt für Wiederaufbau. Through this program, more than a half billion euros in risk capital were mobilized in 2000 for some 1,000 young companies. While only companies in which venture capital donors have already taken stakes have been able to receive assistance under the VTC - Venture Capital for Small Technology Companies program, the VTC - Early Phase program, established in June 2001, helps start-up entrepreneurs even if there has not yet been any involvement by commercial stakeholders. The technology venture capital fund association takes on shares of up to 150,000 euros per company. With these programmes, the federal government is assisting the development of a private risk capital market in Germany. It is providing supplementary support for these direct measures by strengthening the business angels market. Under the "Business Angel Network Germany," some 40 business angel networks which were created only in the past few years have been joined together.

Technology and Innovation

In the field of technology, R&D, and innovation, there are a number of assistance measures especially aimed at helping improve SMEs' technology base. The new PRO INNO program (PROgram INNOvation Capabilities for SMEs) aims at intensifying R&D cooperation both among SMEs and with the scientific community. This also entails the temporary transfer of staff from companies to research facilities and vice versa, as well as companies' support for the exploitation of innovations. In addition, the program "Technologies of the Future for SMEs" and the program "Support for Innovative Networks," which was launched in September 1999, assists demanding collaborative projects within which SMEs, including handicraft firms, cooperate with research facilities and universities.

Special assistance is given SMEs in Germany's new states in the form of the program to "Assist Research, Development, and Innovation in SMEs and External Industrial Research Facilities in Germany's New States." The program section for "R&D Staff Assistance" is aimed at stimulating SMEs in the goods producing industries in Germany's new states and strengthening and expanding their personnel base in the R&D sector. The program section for "R&D Project Assistance" supports SMEs in trade and industry and assists external industrial research facilities in the development of new products and processes. The InnoRegio competition is also tailored to the special innovation circumstances in Germany's new states; it assists new forms of regional cooperation among educational and research facilities, business, and administrations, thus helping develop marketable products and services.

Kreditanstalt für Wiederaufbau
http://www.kfw.de

The analyses performed by KfW's Department of Economics focus on small and medium-sized enterprises (SMEs) in Germany - their financing needs, their innovative behaviour, their activities abroad, their economic situation, their earnings situation, their equity resources, their access to investment and venture capital, in short: everything that is relevant to SMEs and SME policy. On this website information material on topics of current interest is available in German - such as Basel II/Rating, tradable certificates in climate protection, the regional development of eastern Germany or securitisation transactions.

A listing of all relevant organisations in Germany working to support start-up companies is available in an annex to this report.[94]

Analysis of country programmes:

Many programmes exist in various countries, but many like the UK are still struggling to improve the situation for start-ups and SMEs in general. Programmes like the Carbon Trust try to bridge the interests of the private sector and the public sector. One venture capital investor looks back on his own personal experiences and expresses scepticism about the idea of combining public and private interests in the same fund. Other funds specific to clean energy interests struggle with issues like the public and private sector acceptance of renewable energy. Start-ups in these countries also face issues similar to those faced by Swiss start-ups. Lessons can be learned from their experiences. At this stage ideas can be gained from this review which could be applied to Switzerland. However, more can be learned about the effectiveness of these schemes and measures implemented elsewhere with a more in depth analysis as a possible follow-up activity to this pre-study.

[94] Gathered from EarlyBird Venture Capitalists in Germany (http://www.earlybird.com/en)

7 What are the main challenges that must be faced?

The VC investment climate in Switzerland for small start-up companies in the area of clean energy has been identified in our study to be very low. This is probably due to a number of reasons, but the main ones are indicated here from our analysis:

1. **Under-proportional deal flow.** There is not a large enough sample of start-ups. SAM's experience also points to this aspect. Much of this problem has to do with the clearly smaller size of Switzerland compared to countries like the United States. Government programs like CTI start-up are working to help entrepreneurs improve their business plans. A long-term strategy could also consider implementing an educational program starting in primary schools that awards and promotes creativity in students. However, several prizes already exist in Switzerland for entrepreneurship at higher levels. Therefore, in general government and non-governmental initiatives in this area are effectively playing their role.

2. **Small local initial market for development.** Start-ups often believe they must develop their products on the local market they are based in (especially in the energy sector), before exporting to other countries. However, due to the different languages and cultures in Switzerland that a start-up must work with, it grows much less rapidly than a start-up in a similar field in the United States, for example, where the culture is more uniform. VCs are not interested in companies that grow more slowly than the average expected growth. VC firms have generally expected products to be well placed in the market after 5 years of investment, maximum, according to one expert interviewed. This presents the case for government involvement in seed-financing for early years of start-ups. Some venture capitalists welcome this idea, especially if such funds are managed by professional fund managers rather than government departments.

3. **Lack of sales-focus.** Entrepreneurs in Switzerland tend to be engineering-focused and not sales-focused enough, according to one professional interviewed. Many banks and investors we interviewed complained that there are few good management teams in start-ups in Switzerland. Venture capitalists claim that the management team counts more than the technology. This problematic is a result of the fact that the energy technologies emerge from research institutions and again these technically-very professional entrepreneurs do not easily give up control of their companies. Coaching of entrepreneurs may help to narrow the gap between investors' and entrepreneurs' expectations.

4. **No clear strategic technologies set by government.** There is no clear direction from the government about what key technologies investors should invest in. One expert interviewed mentioned if there was a clear direction given by SFOE, and the government put some money to supplement private money into these areas, VC money would follow easily after technologies were seen through all major initial development stages.

5. **Not so favourable tax provisions.** More favourable tax provisions especially for private investors would help to ensure people with a lot of money to invest in Switzerland invest in the future of the Swiss economy (via start-ups) and not in emerging markets and foreign stock markets as they do now.[95] Many take huge risks on such markets, and would likely take the same amount of risk investing in Swiss start-ups, if they had more favourable tax conditions, up to full tax write-offs for the amount invested in start-ups in Switzerland (or at least clean energy start-ups). Current revisions in the tax law are not sufficient according to those interviewed for this study.

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[95] Opinion of Nicolas Wavre and others interviewed.

6. **VC firms have little knowledge about alternative energy technology.** This is something that can be improved with networks in Switzerland such as those which have recently sprung-up in the area of sustainable technologies.

7. **Lack of belief in alternative energy technology.** Swiss investors as well as Swiss consumers are conservative.[96] It is even harder for clean energy technologies to obtain VC finance, private investor seed money, or project pilot financing, in Switzerland.

8 What new initiatives could improve the situation in Switzerland?

Some basic ways to encourage VC investment in clean energy technologies and support entrepreneurs and innovation in general have been identified by this study. We conclude with the following principle findings at this time:

1. There is a market failure for investment in start-up companies in Europe, especially in Switzerland and clean energy technology start-ups.

2. Switzerland is doing fairly well in terms of its efforts to support R&D, technology transfer and its recent efforts to support entrepreneurship in the country via coaching, for instance.

3. There is a great need for government to take a role in ensuring that good start-ups emerging in the country do not fail to obtain venture capital finance because they can not survive the technology "valley of death".

4. What that role is, whether it is of direct support via seed-financing, or whether it is an indirect role via tax and legal incentives for private and institutional investors and via laws that support the market for alternative clean energy technologies, should be decided on a more in-depth analysis of successes and failures in Switzerland with such measures, and outside of Switzerland. This subject could be addressed as a topic under SFOE's Energy Policy Fundamentals research programme (EWG), possibly with a focus on the role of SFOE and other government agencies in Switzerland in building the bridge from research to the market.

5. SFOE may wish to consider the benefits of concentrating on a select set of technologies which would offer the greatest benefits from the combined perspectives of (a) helping Switzerland to meet its sustainable energy needs of the future, and (b) helping Swiss companies to create value and employment by serving the global marketplace for clean energy. This has a link to CORE's current work on energy technology roadmaps for Switzerland.

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[96] "They will require a company to prove about 10 years worth of experience in implementing a given technology without any problems, before investing in it or agreeing to implement it for their use". The opinion of one experienced entrepreneur in Switzerland who was interviewed.

In this pre-study, we have contrasted various approaches to the role of government, suggested by the experts interviewed, in previous chapters. We also provided a quick overview of the various approaches in different countries around the world.

We briefly suggest a number of specific options that might require further exploration and consideration, and suggest who could undertake leadership in each area:

1. Improve links between researchers and investors. (CTI with OFEN for energy expertise and network)

2. Use tax incentives as a means of encouraging venture capital and seed-financing. (Swiss Federal Dept. of Finance)

3. Develop a fast track system for protection of intellectual property rights, allow for easy legal company structures and reduce bureaucratic hurdles for start-ups. In general, do everything possible to make entrepreneurship easier for start-ups in Switzerland, without compromising other important priorities. (Collaboration among SECO, Swiss Federal Dept. of Finance and others)

4. Encourage cantons to provide seed capital for promising clean energy start-ups, by demonstrating examples of successful initiatives around Switzerland. Also market the efforts of cantons to include in the mandates of their cantonal banks the appropriation of a minimum amount in seed financing for start-ups in the canton (e.g. what Zurich Kantonalbank is now starting to do again). (Cantons and their banks)

5. Support the development of an entrepreneurial culture in schools. Focus on developing self confidence, perseverance, creativity, optimism, responsibility, team spirit, autonomous energy and initiative. (State Secretariat of Education and Research [SER], Cantonal Departments of Education...)

6. Consider setting-up a semi-private fund or fund of funds for early stage capital in the clean energy sector in Switzerland, but administered by professionals. For example, it could be a government-sponsored fund-of-fund that becomes a Limited Partner in Swiss Energy Venture Capital Funds. (SFOE with CTI and SECO)

7. Study further where funding can be obtained or leveraged with public funds, from foundations, corporations, banks, pension funds or other institutions in Switzerland. Study existing structures further, advantages and disadvantages of different approaches. (SFOE)

8. Encourage pension funds to invest even a small percentage of total coffers into clean energy start-up firms in Switzerland. (Start with a dialogue/forum sponsored by SFOE and CTI.)

9. Develop a policy of financial capital recycling in the sectors that generate new employment growth in the country and meet environmental and energy supply objectives. (SECO with SFOE)

10. Investigate the possibility of outlining a limited amount of strategic technology areas for Switzerland and concentrate limited funds on those areas, attracting thereby more investment in these key areas. (SFOE via CORE)

11. Support clean energy technologies, or in particular the renewable energy market, by implementing a support mechanism either for customers of clean energy technology or for sales of clean energy. (Swiss Federal Council, Swiss Parliament, Cantonal administration, with support from SFOE)

12. Actively participate in European activities and consider a Bilateral Agreement with EIB/EIF to enable them to co-invest in Swiss energy VC funds. (SFOE, together with SER)

13. Arrange for KTI/CTI to allocate a certain percentage of funding to sustainable energy ventures. (CTI)

14. Evaluate the Carbon Trust's (UK) experience and explore long-term possibilities to use part of carbon taxes (CO2 levy, Climate Cent) to invest in Swiss energy technology ventures or their projects. (SFOE, Climate Cent Foundation)

15. Set up a new investor-focussed subsection of Swiss Energy, dedicated to connecting VCs and energy entrepreneurs and educating mainstream investors about clean energy opportunities. This can be based on a review of experiences with supporting events like the European Energy Venture Fair, BASE Coaching, etc. (SFOE)

16. Introduce something similar to Swissnex (San Francisco) within Switzerland, connecting science and the VC community. (CTI)

17. Focus on transition points (e.g. from R&D to seed financing, from angel to VC investments, from VC exits to IPO or trade sale) and assemble task force to address the specific challenges at these points. (SFOE)

18. Introduce a Crisis Management Team that will be activated in cases like the recent Sulzer Hexis grounding. (SFOE)

Given the many different avenues we have outlined which could help fill the gap for venture capital finance in Switzerland for clean energy technologies, we would like to draw attention to three recommendations for more in-depth consideration.

A stakeholder consultation or Forum.

First, there was wide support among those interviewed that cooperation is needed between the federal and cantonal governments in Switzerland to address this issue. A good first step might be to organise a Forum to further poll ideas of interested parties in Switzerland.

Create a government-supported fund-of-funds for expansion-stage clean energy venture investments in Switzerland

A fund of funds is one way for the federal government to support venture capital funds in the sector on their investments in Swiss start-ups. Such a fund of funds could be initiated with the support of key major Swiss corporations and financial institutions interested in the sector. It could be initiated by SFOE in cooperation with CTI and SECO (in particular, SECO's task force on SMEs). Experience with the European Investment Fund and the Carbon Trust (UK), as well as with the cleantech VC allocation of public pension funds in California (CalPERS and CalSTRS), should be taken into account when designing such an investment vehicle. A formal feasibility study for such a Swiss clean energy VC fund of funds would have exceeded the scope of this pre-study, but should be conducted as a next step towards realizing this idea. Aspects to consider include the appropriate management structure, investment policy, appropriate size, pros & cons of requiring investments in Switzerland only, etc. Cooperation with private sector funds in this area is strongly recommended.

A "Seed Stage Partnership" for clean-energy start-ups in Switzerland.

Another approach along these lines is what one could call a "clean energy technology seed stage partnership".[97] Such a partnership could be initiated and led by the federal government, but partly administered locally, with funds sourced from a variety of private and public sources as well as foundations. A percentage of pension funds could be placed into this fund, foundations could participate and private investors could take part as well.

Its main purpose would be to provide seed stage financing for clean technology, and potentially related service companies in Switzerland. This partnership could begin in Switzerland and eventually seek partners outside of Switzerland. This vehicle could have a number of specific attributes, to be most effective[98]:

1. Seed stage funds organised to make quite small stage investments, such as 200,000 CHF or less, and have the capacity to make successive rounds of investments as the start-up company develops.

2. Seed funds are believed to be most effective when they have the capacity to work at the local level, providing the type of "hands on" assistance that a start-up enterprise requires. Local governments or cantonal governments involved in the partnership would help to provide this type of support.

3. One of the limitations that clean energy technology start-ups face is the limited time and energy expertise that investors (such as angel investors) have. Seed stage investments would benefit from the support of a highly professional venture management team hired for the partnership's seed capital fund management. Such support could entail:

    a) Expertise in corporate sales prospects[99] ;

    b) Strong energy industry expertise and contacts;

    c) Solid energy technology credentials;

    d) Essential venture capital company-building skills.

4. Successful seed funds could be less than 70 million CHF in capitalisation to allow for careful allocation and management of each investment.

Again, this is called a partnership because funds could be obtained from a variety of sources in Switzerland, but leveraged first with the support of the federal government and the most active cantonal governments. Such a partnership bringing together expertise in the field and a variety of funding sources would potentially help overcome the reluctance presently felt in the investor community for the clean energy technology sector and support the clean energy end-market.

If it can not provide financial backing, at least SFOE could provide support to such initiatives, in terms of providing direction and professional expertise in the area of clean energy technology.
To sum-up, the venture capital industry has changed and investment in the clean energy sector is still too low today for a number of reasons pointed out in this report. We can not wait for the industry to

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[97] This idea has been proposed also by the Clean Energy Group in the US in a report they prepared for the UK's Carbon Trust, however their idea in this particular case was to develop a transatlantic seed stage partnership which could work with a pool of North American and European clean energy enterprises.

[98] Some of these were identified in the above mentioned CEG/Carbon Trust report as well. We have adapted them for Swiss conditions and based on the findings of our study.

[99] As well as floatation potential, though this is seen as a decreasingly productive exit avenue for clean energy ventures over the near term.

change back to the industry it was in the late 1990s, nor can we wait for the market to suddenly change its perception about clean energy technology, without providing the industry with reasons to change this perception. Either the government could show its direct support for clean energy technologies, and/or its indirect support via a policy supporting the renewable energy market in Switzerland, for example. Our study based on interviews with over 20 experts has revealed that government does have a role to play. In this report, we have explored what those roles could be.

In order to end with a few positive words, the authors wish to emphasize that this research has revealed that many activities are already underway to support the emergence of a sustainable energy venture capital industry in Switzerland. If we continue our aspirations, together we are likely to create a structure for the promotion of clean energy start-ups that all countries can look to as an example.

Buddha (c.563-483$_{BC}$) : "What we are today comes from our thoughts of yesterday, and our present thoughts build our Life of tomorrow. Our life is the creation of our mind."

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Annex 1

Experts Interviewed

Venture Capitalists

1. Venture Capitalist (Gina Domanig and Mr. Gianni Operto, SAM, Zurich)
2. Venture Capitalist/Seed financier - Oliver Schaerli, Head of Start-up finance at Zurich Kantonalbank
3. Venture Capitalist (Mr. Even Bakke, BankInvest)
4. Venture Capitalist (Mr. Benoit Balmana, EmerTec Gestion, France)

Entrepreneurs

5. Swiss entrepreneur in french-speaking Switzerland (Dr. Alain Jenny, Chairman of Granit SA, Lausanne)
6. Swiss entrepreneur, (Mr. Gisiger, CEO Moletherm, Geneva)
7. Swiss entrepreneur and investor, (Dr. Loretan, Board member, Stirling Systems, AG, Zurich)
8. Swiss entrepreneur and investor, (Dr. Nicolas Wavre, part of Coré, Commission Federal pour la Recherche Energetique, part-time lecturer at EPFL)
9. Swiss start-up company business management firm (Mr. Andreas Schlegel, co-owner, Awtec, Zurich
10. Swiss entrepreneur, (Mr. Alexandre Closset, VHF Technologies SA)
11. French entrepreneur, (Thierry Lamouche, Director, CEDRE)

Government

12. Government/Canton Vaud (Mr. Francois de Coulon, Financing of new projects and start-ups, Dept. Economic and Health Services, Economic Development of Canton Vaud)
13. Government/Canton Basel (Mr. Rolf Rothing, Economic Promotion agency, Basel)
14. Government/SECO (Ms. Susanne Grossman, SOFI, Zurich)
15. Klimarappen foundation (Mr. Marco Berg)
16. SFOE (Mr. Mathias Gysler)
17. ADEME (Mr. Jean-Louis Plazy, Deputy Director, Air, Noise and Energy Efficiency Director, Valbonne, France)
18. Natural Resources Canada (Mr. Graham R. Campbell, Director General, Office of Energy R&D, Ottawa, Canada)

Other

19. Mr. Jan Anders Manson (from EPFL, technology transfer)
20. Mr. Mark Barnes (Geneva financial expert)
21. Mr. Adam Chase (Clean energy expert from consulting company E4tech. Company is based in London and Lausanne)
22. Mrs. Allison Schumacher (US clean energy expert from the Clean Energy Group (CEG), US.

Basic interview questions:

- Why have banks and VC firms taken little interest in start-ups and financing clean energy technology development in Switzerland?
- What other institutions might take an interest in meeting the need to finance Swiss start-ups in energy or sustainable development technologies?
- What do you think the government's role is in encouraging VC finance into clean energy start-ups in Switzerland? What would you recommend the government do?
- What do other countries do right?

Annex 2

Definitions, Annexes and References

Definitions for Early Investment Types

(Source: BusinessFinance.com : http://www.businessfinance.com/equity-investments.htm)

Capital Type	Capital Type Definition
Equity Loan	Offer of an ownership position to induce the loan or can be a note that has an option to convert from debt to equity.
First Round Funding	Typically funding that accomodates growth. Company may have finished R&D. Funding is often in the form of a convertible bond.
Second Round Funding	Maturing company where a future leveraged buyout, merger or acquisition and/or initial public offering is a viable option.
Later Stage Funding	Mature company where funds are needed to support major expansion or new product development. Company is profitable or breakeven.
Merger and Acquisition Funding	The combination of two companies. If one company survives, it is a merger. If both survive, it is an acquisition.
Mezzanine Funding	Company's progress makes positioning for an Initial Public Offering viable. Venture funds are used to support the IPO.
Seed/Startup Funding	Earliest stage of business, typically no operating history. Investment is based on a business plan, the management group backgrounds along with the market and financial projections.

Equity loan is typically an "investment" in a company that is secured by a certain amount of that company's shares and structured, in part or whole, as a loan. Investment banks will provide funds secured by the "equity" or ownership shares of your company.

Companies that receive funding are those in large rapidly growing markets, or in niche markets which are not targeted by major players.

Investment Stage
Early and later stage companies with a founder and partial management team with revenue or profits and the need for expansion capital.

Size of the Investment
Typically $1-2 million initially with up to $5-10 million over the life of the investment.

Duration
Investments typically are for 3-5 years, but sometimes may last longer.
Seed funding is provided to develop a concept, create the initial product and carry out the first marketing efforts. A company is usually very young (around one year) and has not produced a product or service for commercial sale. The assembly of the key management team is in progress or has just taken place.

Seed capital is mostly provided by angel or private investors. These early stage funds have become a primary source for emerging businesses needing to get started. If you fit this description, what terms are you willing to accept for the investment?
Are you willing to share control with others?
Will you share confidential information with prospective investors?
Do your financial statements accurately reflect the operation?
Are you willing to give up a large ownership stake in the company?
Can your business deliver an investment return of at least 30%?
Is there a clear path to exit the investment within three years?
Is the total market size at least $1 billion?
Have the technology and business strategies been validated?
Are you willing to accept additional executives in the business?

First round funding or "venture capital" typically follows seed and early stage capital that was used to build the business' full-time management team, develop the business' first saleable product, and demonstrate that the business is very likely to be profitable.

Before approaching funding sources the following should be completed:

- **Financial Analysis:** Identifying all sources of revenue, assessing likely business costs, determining capital needs and modeling financial projections.
- **Market Research:** Consisting of primary and secondary research to determine market size, market growth potential and other relevant factors.
- **Competitive Analysis:** Identify relevant competitors and assess their strengths and weaknesses as an aid in determining underserved market needs and potential market demand for a new business' products and/or services.
- **Business Plan Development:** Developing thorough, actionable plans for implementing your mission statement and, subsequently, turning a profit.

First round funding sources are primarily hands-off investors who will open their rolodexes to aid you with their contact base and open their wallets to invest in your ready-for-market business.

Second Round Funding - Remain profitable and expand
Second round funding is working capital for the initial expansions of a company that is producing and shipping, and has growing accounts receivable and inventories. Financing at this juncture strengthens the balance sheet and provides a solid base to solicit bank loans. Naturally, the question to follow is:
Are you in the second round?

After a successful launch proves the viability of your business model, funds will be needed to further develop the marketing plan, hire more staff and management, and establish strategic alliances in the market. That third benchmark is often referred to as the second-stage, or the series B round. For purposes of talking to investors, the first round of external funds should generally be called series A and the second external round series B. This way, each subsequent round of external investors knows where they stand with respect to prior investors.

The key is to know your growth track, determine your sales and profit benchmarks, and be shrewd when it comes to valuing each stage. Do you fit into a second round expansion scenario?

Mezzanine Funding - Short Term Lending for the Long Term Benefit
Mezzanine funding, in a generic sense, is a venture capital term used to describe funding for a company that is somewhere between being a startup and IPO. It can come in the form of stand-alone subordinate debt (the most common) or equity transactions.

This additional financial leverage can facilitate:

- Mergers and acquisitions financing
- An emerging growth opportunity
- A management or other leveraged buyout
- Corporate debt refinancing
- Recapitalization
- Corporate restructuring

As subordinate debt, the rate and terms of mezzanine funding follows suit with the position it holds along the company's evolution. As late-stage venture capital, its position, in many cases, is amidst the final round of financing prior to an IPO. Committed at this level, it usually has less risk as well as less potential appreciation than at the startup level. However, there is more risk with greater potential appreciation than in an IPO.

Annex 3

Innovation Support Schemes in Europe and Israel

The TrendChart policy monitoring network tracks developments in innovation policy measures in 33 European countries.[100] An innovation policy measure is defined as any activity that mobilises:

- Resources (financial, human, organisational) through innovation orientated programmes and projects;
- Information (road-mapping, technology diffusion activities, coordination) which is geared towards innovation activities;
- Institutional processes (legal acts, regulatory rules) designed to explicitly influence environment for innovation.
- To achieve public policy objectives in area of innovation:
- With a percentage of (national) public funding;
- On a continuing basis (usually not a one-off 'event');
- Where the target group or eligible participants include enterprises.

Innovation Policy Information

The policy information base provides easy access via an enhanced search function to policy information and news items collected by the Trend Chart network of country correspondents. Correspondents monitor a range of publication and events including: official government policy documents (White Paper, etc.); opinions of consultative bodies; evaluation reports; academic studies and scientific articles on innovation and innovation related events, awards and media.

Who is Who in Innovation

The Who's who database of the TrendChart provides an overview of the key innovation stakeholders in each of the 33 countries and three country zones covered by the network of correspondents. The Who's who includes information on the following categories of persons:

- Managers of innovation policy measures contained in the TrendChart database of measures;
- Participants to TrendChart policy workshops;
- Members of the Group of Senior officials of EU Member States on Innovation Policy which oversees the work of the TrendChart network in coordination with the European Commission;
- The Country Correspondents of the Trend Chart network as well as other senior experts and managers of the TrendChart;
- Individuals who have subscribed to the Trend Chart news service and who have completed the required information in the profile form.
- Individuals who have subscribed to the Trend Chart news service and who have completed the required information in the profile form.

[100] Source: European TrendChart on Innovation, an initiative of the European Commission, Enterprise & Industry Directorate General, Innovation Policy Development unit. (See: http://trendchart.cordis.lu/)

Innovation Policy Measures by Typology of Objectives

Typology of objectives	AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	EL	HU	IS	IE	IL	IT	LV	LI	LT	LU	MT	NL	NO	PL	PT	RO	SK	SI	ES	SE	CH	TR	UK
I.Fostering and Innovation Culture																																	
I.1. Development of a strategic medium-to-long term vision of innovation challenges and innovation potential	14	1	1	2	2	0	5	2	5	7	3	8	5	3	0	1	5	0	3	0	0	2	6	1	6	2	0	0	4	2	5	2	8
I.2. Increase understanding of the nature of drivers and barriers of innovation activity in enterprises with a view to informing the policy-making process	6	8	1	2	0	0	3	0	4	5	4	4	1	2	0	1	0	0	2	1	0	1	0	0	5	3	0	2	4	2	2	1	7
I.3. Improve the effectiveness of the policy-cycle in order to increase the impact of public intervention activity and outputs in enterprises	15	2	1	0	0	0	4	1	1	7	2	1	3	1	0	1	1	0	1	1	0	0	3	0	6	4	0	1	8	2	2	3	5
I.4. Encourage mutual policy learning and networking between policy-making at regional, national and EU levels	26	6	1	3	4	0	3	2	0	6	4	4	1	1	1	0	3	0	1	5	0	2	5	6	14	4	3	2	3	5	1	7	12
II.1. Enhancing the role of public procurement and standardisation as drivers of new innovative products services by enterprises	5	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	1	3	0	0	1	0	3	2	0	0	3	0	2	1	0
IV.6. Promote adequate support to enterprises aimed at new and developing markets	25	6	1	0	1	2	1	4	3	13	3	11	8	1	4	6	1	0	2	2	0	0	9	0	7	7	2	4	7	7	11	3	3
II.Establishing a Framework conducive to Innovation																																	
II.2. Reducing the administrative and transaction costs for enterprises in fulfilling their legal, administrative, fiscal, etc. obligations	15	0	0	0	12	0	0	0	0	1	0	0	2	1	0	0	0	0	1	2	0	0	0	0	0	5	1	1	0	2	0	0	0
II.3. Maximising the positive influence of new legislation or regulations on innovation activity in enterprises	7	9	0	1	0	0	1	0	0	5	3	1	0	0	1	0	0	0	1	2	0	0	0	0	6	4	0	1	0	0	1	6	3
II.4. Increase rates of expenditure on research and technological innovation in enterprises	2	1	1	0	0	0	4	0	0	1	1	1	1	0	0	3	1	0	2	1	0	0	1	1	1	0	0	0	3	0	0	1	0
II.5. Encourage the uptake of strategic technologies, notably ICT	1	0	1	1	0	0	2	0	1	2	0	2	0	0	0	0	0	0	3	2	0	0	0	0	1	3	0	0	0	0	0	0	0
III.1. Facilitate access of enterprises to skilled personnel	13	6	1	3	9	0	1	5	5	12	6	1	5	4	8	18	4	0	2	5	0	2	3	5	24	4	3	3	19	4	0	8	11
III.2. Facilitate the acquisition and transfer of	2	3	2	0	0	1	0	0	0	0	0	1	0	2	0	5	0	0	1	0	1	1	1	0	3	0	0	0	1	0	0	4	5

Source: http://trendchart.cordis.lu/tc_policy_measures_overview.cfm

Some of the featured innovation policy measures
Enhancing the role of public procurement and standardisation as drivers of new innovative products services by enterprises (http://trendchart.cordis.lu/)

Estonia
Peatee, (EEBone)
KülaTee (Village Road)
France
Facilitated access of innovative SMEs to public procurement
Netherlands
SBIR pilot
Norway
OFU and IFU (Offentlige og industrielle forskning...
Romania
INFRAS Programme for the consolidation of standard…
CALIST Programme for Quality and Standardisation…
Spain
Espana.es (ESPANA.ES)
PISTA -
Digital Cities
United Kingdom
Small Business Research Initiative

Optimising the legal/regulatory framework for the development of private innovation financing (http://trendchart.cordis.lu/)

Austria
Jungunternehmer/innen-Förderungsaktion...
Innovationsprogramm Unternehmensdynamik…
AWS: Life Science Austria (LISA…
Bulgaria
National Innovation Fund
Cyprus
Guarantees for Loans to Small and Medium Enterprise
High Technology - Business Incubators
Finland
FINNVERA Small loan programme
Capital loans for R&D in companies
Centre of Expertise Programme
TULI-programme
PreSeed Finance / LIKSA, INTRO & DILLI
France
Fund for the Promotion of Venture Capital
Unipersonal Risk Investment Company
Germany
Innovative Regional Growth Poles
InnoRegio - innovative networks in Eastern Germany (incl. Interregional Alliances)
Information Centres (Patent Information Centres, Thematic Information Centres, Private Information Agencies)
Promotion of Inventors at the Fraunhofer Patent Bureau for German Research
FUTUR (Technology Foresight, former: Delphi 1998)
Thematic R&D programs - Sustainability, Environment, etc.
Israel
Amendment of basic industrial R&D (1984) law
Establishment of Biotechnology Incubator
International Cooperation between Israeli companies

The Law for the Encouragement of Industrial R&D
Centers for Technological Entrepreneurship – Biotech, etc.

Luxembourg

Research and development incentive scheme ….
Innovation loan
Start-up loan
R&D incentive scheme of the Ministry of Economy
Development capital for SMEs

Netherlands

Venture Capital scheme (Regeling Durfkapitaal)
TechnoPartner

Poland

Improvement of accessibility of external financing

Portugal

Credit Enhancement Securitization Fund (FGTC)
Venture capital Syndication Funds (FSCR)
Financial Innovation - Action B (POE)
Financial Innovation - Action A (POE)

Romania

INFRATECH National Programme for the development
of the innovation and technology transfer (ITT) infrastructure Sectoral R&D Programmes
Core Research and Development Programmes
CERES Programme for basic research of socio-economic and cultural interest
MENER Programme for Environment, Energy and Resources…
AMTRANS Programme for Civil Planning and Transport…….

Slovenia

Subsidised credit to SMEs
Research Group financing scheme (Research Group Pr
Subsidies for technology centres/parks

Spain

Aids for the Promotion of the Technical Research …
Fostering the R&D and the Innovation in Objective…
R&D Projects of National Programmes -Applied Research
PROFIT - Programme to Encourage Technical Research…
Public Venture Capital to NTBF s by ENISA particip…
PETRI Programme: Projects for Encouraging the Res…
ARTEPYME II: Subsidies for projects of advanced technology…
Espana.es (ESPANA.ES)
Thematic networks about co-operative Research in …
Support measure to venture capital for New Technology…
Plan for the strengthening and competitiveness of…
Credits for activities developed in Scientific and…
PIIC-Projects for industrial and concerted research…
CDTI financial support/ Ayudas CDTI
R&D Projects of National Programmes. Co-operation
Concerted and Co-operative industrial research and…
Initiative of Support of Industrial Technology, Se…
SME Initiative for Industrial Development / Network…
SME Initiative for Industrial Development / Finance…

Sweden

EXSITE Explorative System-Integrated Technologies

United Kingdom

UK High Technology Fund
Corporate venturing "matchmaking project
Venture Capital Trusts
COMMUNITY INVESTMENT TAX RELIEF

Increase the availability of private sector innovation financing to enterprises

(http://trendchart.cordis.lu/)

Austria

Ref	Title
AT 4	ideas x investment (i²)
AT 92	building of tomorow , Sub-Program of sustainable
AT 79	AWS: Life Science Austria (LISA)
AT 72	Staatspreis for Innovation
AT 15	Eigenkapitalgarantie / Equity Capital Guarantees
AT 78	BMWA: LISA - Life Science Austria

Belgium

Ref	Title
BE 53	Wallonia: Business Angels Networks
BE 73	Flanders: VINNOF (Vlaams Innovatiefonds, Flemish …
BE 28	Business Angels Network (BAN) Flanders
BE 11	Solvay Business Angels Connect
BE 62	Wallonia: Venture capital for university spin-offs
BE 46	FIRD - Fonds pour l'industrialisation et la commercialisation

Bulgaria

Ref	Title
BG 15	National Innovation Fund

Cyprus

Ref	Title
CY 12	Guarantees for Loans to Small and Medium Enterpris
CY 5	High Technology - Business Incubators
CY 23	Support to female entrepreneurship

Czech Republic

Ref	Title
CZ 32	ZARUKA

Estonia

Ref	Title
EE 21	Financing schemes for innovative enterprises offer

Finland

Ref	Title
FI 13	PreSeed Finance / LIKSA, INTRO & DIILI
FI 28	Seed Financing - Financing Programme for Early Sta

France

Ref	Title
FR 9	SOFARIS (Société Française de garantie des finance
FR 15	Fund for the Promotion of Venture Capital (Fonds d
FR 13	Seed-capital funds (Fonds de Capital d'Amorçage)
FR 59	Unipersonal Risk Investment Company (Société Unipe
FR 10	Mutual Funds for Innovation (Fonds Communs de Plac
FR 35	Co-investment funds for young enterprises

Germany

Ref	Title
DE 12	Technology Venture Capital Programmes
DE 70	Thematic R&D programs - Health, Design of Working
DE 71	Thematic R&D programs - Transportation, Space, Co
DE 69	Thematic R&D programs - Information and Communica
DE 68	Thematic R&D programs - New Technologies

Greece

Ref	Title
GR 46	Reinforcement of Youth Entrepreneurship
GR 48	Support to female entrepreneurship
GR 36	New Economy Development Fund S.A. (TANEO S.A.)

GR 1	Investment law (Support to private investment for
GR 39	Programme for the exploitation of research results

Iceland

Ref	Title
IS 16	Enlarging the Competitive Funds

Ireland

Ref	Title
IE 19	Business Angels Database

Israel

Ref	Title
IL 9	Ammendment of basic industrial R&D (1984) law
IL 10	Establishment of Biotechnology Incubator
IL 11	International Cooperation between Israeli companies
IL 3	YOZMA
IL 4	The Law for the Encouragement of Industrial R&D -
IL 7	Centers for Technological Entrepreneurship - Biote

Italy

Ref	Title
IT 48	Guarantee Fund for SMEs-Special section on Digital
IT 20	Incentives for the acquisition of new machinery -

Latvia

Ref	Title
LV 62	Credit support for SME development

Luxembourg

Ref	Title
LU 15	Resarch and devevelopment incentive scheme of the
LU 16	Innovation loan
LU 9	Start-up loan (Prêt de démarrage)
LU 2	Development capital for SMEs (Capital-développemen
LU 1	R&D incentive scheme of the Ministry of Economy (R

Netherlands

Ref	Title
NL 3	BBMKB SMEs Credit Guarantee scheme (Besluit Borgst
NL 23	Venture Capital scheme (Regeling Durfkapitaal)
NL 43	TechnoPartner

Norway

Ref	Title
NO 5	The Seed Capital Scheme (Såkornkapitalordningen)

Poland

Ref	Title
PL 30	Loans for realisation of innovative investments
PL 29	Improvement of accessibility of external financing

Portugal

Ref	Title
PT 38	Programme for Supporting and Encouraging the Parti…
PT 32	Credit Enhancement Securitization Fund (FGTC)
PT 31	Venture capital Syndication Funds (FSCR)
PT 24	Financial Innovation - Action A (POE)
PT 15	Small Company Initiatives System (SIPIE)
PT 16	Company Modernization Incentive System (SIME)

Romania

Ref	Title
RO 19	Programme for the development of industrial and …
RO 13	INVENT Programme for stimulating invention application…
RO 8	CORINT Programme for Co-operation and International…
RO 1	RELANSIN Programme for Economic Revival through …

Slovenia

Ref	Title
SI 19	Subsidised credit to SMEs
SI 3	Subsidies for technology centres/parks

Spain

Ref	Title
ES 49	Aids for the Promotion of the Technical Research …
ES 50	National Plan for Scientific Research, Technological…
ES 9	Fostering the R&D and the Innovation in Objective
ES 13	R&D Projects of National Programmes -Applied Research…
ES 17	PROFIT - Programme to Encourage Technical Research
ES 39	Public Venture Capital to NTBF s by ENISA participation…
ES 4	Instituto de Crédito Oficial (ICO) financial …
ES 7	PETRI Programme: Projects for Encouraging the …
ES 22	ARTEPYME II: Subsidies for projects of advanced …
ES 41	Espana.es (ESPANA.ES)
ES 38	Thematic networks about co-operative Research in …
ES 32	Support measure to venture capital for New Technolgy…
ES 27	Plan for the strengthening and competitiveness of …
ES 23	Credits for activities developed in Scientific and…
ES 24	PIIC-Projects for industrial and concerted research…
ES 1	CDTI financial support/ Ayudas CDTI
ES 12	R&D Projects of National Programmes. Co-operation
ES 8	Concerted and Co-operative industrial research and…
ES 6	Initiative of Support of Industrial Technology
ES 5	SME Initiative for Industrial Development / Network
ES 3	SME Initiative for Industrial Development / Financ

Sweden

Ref	Title
SE 13	The Venture Capital Database - Riskkapitaldatabase
SE 23	EXSITE Explorative System-Integrated Technologies

United Kingdom

Ref	Title
UK 70	Enterprise Capital Funds
UK 61	Enterprise Investment Scheme
UK 38	Higher Education Innovation Fund (HEIF)
UK 44	Regional Innovation Fund
UK 53	Regional Venture Capital Funds
UK 60	Venture Capital Trusts

European Innovation Links :

http://www.alphagalileo.org
http://www.akvaplan.niva.no
http://www.eaalce.org
http://www.devzerog.com
http://www.iago.eu.com
http://www.torinowireless.it
http://www.lut.fi
http://www.eib.org
http://www.ipb-ag.com
http://www.itecconsultoria.com

Annex 4

The UK Consultation paper on innovation policy

The Department of Trade and Industry (DTI) and the Treasury issued a joint consultation paper in May 1998 entitled 'Innovating for the future: Investing in research and development'. Some of the questions asked in the consultation and responses from one constituent – the Royal Society – are featured below. This is included in our pre-study because it provides an example of what such a consultation could also deliver to Swiss decision-makers. It also provides a bit more insight into what the challenges are in the UK for investment in innovation, some of which are quite similar to those that have been identified in Switzerland as a result of our pre-study on this topic.

Sources of finance for innovation and R&D

- W*hat steps can be taken to improve knowledge and understanding of R&D related investments among finance providers, pension fund trustees and institutional fund managers?*

Some examples: 1. An example of a venture which is aiming to address this lack of knowledge is the Biotechnology Young Entrepreneurs Scheme. 2. A £50 million University Challenge fund is to be set up to 'turn British inventions into British business'. £20 million will be provided by the Government, with the remainder being provided by large companies and charities. The fund will be run as a competition and bids assessed by a panel of experts.

- *How can the impediments to investment in technology-based SMEs, including the availability of management expertise, be addressed?*

According to one group which provided comments, "The decision of the Charities Commission to allow charities to fund start-up companies could be an invaluable source of finance in the UK and the government should continue to encourage charities to invest in innovation.There appear to be two extremes of capitalism with a continuous spectrum in between. The first seeks a return on investment via the capital growth of the shares held over a period. This is prevalent in certain countries, ie Japan, Germany, and in certain sectors in the USA. It results in corporations driving for market share and to create or enter new markets and seem to nurture R&D and long-term innovation. At the other extreme, returns are sought as annual dividends and there is great pressure for these to grow. This tends to be the case in the UK, where the principal shareholders are largely institutional (such as insurance companies and pension funds), and need an annual income to pay out on policies and pensions. Also in the UK there has been little distinction between income tax and Capital Gains Tax (CGT). This extreme is believed inimical to longer term, more risky innovation. The recent tapering of CGT in the UK may well help to alleviate this and the Government may wish to consider increasing the taper, if the early response to it is propitious. The use of a segmented process for technology transfer can be beneficial and can be compatible with the above (see page 4). Entry into each stage of the process is controlled by a 'Gatekeeper' and each stage would involve creating a team which comprises all the needed skills and experience - technology, marketing, supply chain, financial/commercial, and others where relevant - who work together to bring the project to the next stage. It could also include a post-launch evaluation leading to wider roll out of the innovation and the generation of a further product, if justified.

Failure and bankruptcy carry a stigma in the UK, not nearly so obvious in other countries such as the USA; the consequences for the UK innovators are usually disastrous and punitive. We need to learn to distinguish between valiant failure and incompetence failures. Our laws and perceptions need to reflect this and to be changed to mitigate these problems.

Investment in start-up ventures may be encouraged if seed-funding that failed was made tax deductible. Particularly in the case of existing SMEs who may have to risk everything in order to pursue an innovation. The risk of innovation would also be decreased if tax losses were allowed, or loans provided that were repayable only when profit emerged.

The government might, for example through the HEFCs, or other appropriate bodies, provide a grant element to the universities to cover the costs of employing temporary cover for staff who wish to set up in business, or to work with existing UK companies to progress the exploitation of radical innovations. This would make such an endeavour more attractive to the staff and would also give the universities first hand knowledge of the abilities of potential staff recruits.

- *What can be done to encourage the UK venture capital industry to take more interest in early stage finance?*

"Seed finance - finance provided to research, assess and develop an initial concept before a business has reached the start-up phase.

The profile of the venture capital industry in the UK is completely different to that in other countries (such as the US) where Corporate Venturing may be the norm. In certain sectors in the UK very few venture capital companies will invest in start-up companies as the costs are too great. In other sectors, such as biotechnology, a large proportion of the investment has been from venture capital. This difference is primarily due to the fact that biotechnology companies typically require a much larger start-up sum than do those based on physical sciences innovation. The difference in sectors highlights the fact that sectors should be treated individually in strategies for increasing innovation. As structured at present, the UK does not have a ready source of the smaller sums (£100Ks) to take innovative ideas through the initial prototype at which point more conventional funding may be employed.

The main problem lies with innovations that are radical and long-term or involve the use of new knowledge. The time to market, the higher risk levels, and a tendency to underestimate the prospective benefits, conspire to make a discounted cashflow cost/benefit analysis usually appear very unattractive, particularly in contrast to safer, shorter-term, or more incremental, options (eg depositing the money in a bank, or building society, or purchasing shares, or unit trusts). The more so if the high initial risks are used to discount the high costs of the later stages, for example through averaging both risks and annual spend. In addition, the major benefits in a radical innovation are usually obtained from the second, or subsequent, generations of products, or services. A model which avoids this involves segmenting the endeavour into stages and requiring the (notional) purchase of an 'option to proceed' by the members of the subsequent stage. Only if the output of the previous stage is deemed of sufficiently good value as an investment will the innovation progress to the next stage. This allows the high initial risks to be used to discount the low initial spend and for the subsequent risks to be used to discount the subsequent high costs of each later stage. This form of analysis might well encourage venture capital companies to invest more in start-ups and radical innovations. The Society would be willing to work with government to discuss what might constitute a 'stage' or how a stage would be closed before moving on to the next stage."

- *Does more need to be done to bring together business angels and SMEs?*

"We strongly support the fact that the European Commission has stated that it will be exploring ways to set up a European Business Angels network. We feel that the government should explore ways to support this initiative.

At the European level, we also support the LIFT Help Desk for Financing Innovation, which has been set up as part of the EU Innovation Programme. This seeks to support and direct participants in Community research, technology and development programmes in finding sources of finance for exploitation of results.

Universities that have companies set up in order to provide advice and help to researchers wishing to start companies are able to hold seminars for Business Angels at which Venture capital - a means of financing the start-up, development, expansion, restructuring, or acquisition of a company. Venture capital provides equity capital to enterprises not quoted on a stock market. Corporate venturing - seed-funding or start-up finance provided by large, established companies to researchers in

the science base or SMEs. Business Angels - individuals who are prepared to use their financial resources to make risk investments based on their experience and interests.

The formation of a UK Business Angels network would also facilitate access to finance. Such a network could be initiated by DTI through the business LINK programme.

- *What can be done to encourage more corporate venturing, and to encourage cooperation, more generally, between large and small firms to promote innovation?*

Tax incentives are important to encourage corporate venturing. One way for this to happen would be via a fiscal regime such that the corporate venturing organisation would see an increase in its share value. It is notable that corporate venturing has been increasingly prominent in some sectors, in particular pharmaceuticals, in which companies are moving towards corporate venturing rather than buying up smaller companies as a means of growth.

Schemes set up by the government to encourage cooperation between large companies and researchers in the science base are welcomed. In particular, SMART and Teaching Schemes are valuable, although the financial benefits may be relatively unattractive. However, such schemes are presently far too complex. The sheer number of schemes is confusing to SMEs. In particular, with LINK schemes, the difficulty of applying for funding and the level of bureaucracy involved acts as a deterrent.

Efforts to improve innovation should be focussed not only on academia, or on SMEs, but also on large companies. To this end the government could reduce the real cost of R&D by allowances, or reduce the risk of losing money through market failure of an innovative product.

Tax treatment of R&D expenditure and intellectual property

- *How desirable is reform of the tax treatment of IP-related transactions?*

We believe that all IPR earnings and outgoings should be taken into account when compiling figures for taxable profit since this would highlight IP as an integral part of the business.

- *Is there a role for further tax incentives to R&D? For example, might an R&D tax credit be a cost-effective way of enhancing R&D and innovation?*

We are in favour of tax credit schemes for R&D expenditure, since we believe that by investing in R&D, the government will be indicating that it recognises its value and thus encourage other investors to do likewise. There is a strong correlation between countries that have in place a tax credit system and countries that are considered to be centres of innovation.

Intellectual property

- *How much do problems with IP matter to the innovation process as a whole, particularly to the availability of finance and ease of collaboration?*

Increasing pressure for academic researchers to publish their results means that patents are often applied for before an investigation has been carried out into the potential application of the discovery and before any market research has been done. It is important that research scientists have access to information and advice on IPR. We strongly support a system that would allow an inventor to apply for a patent up to a year after publication of results, as exists in the US.

The number of patents held by an SME is sometimes given an exaggerated level of importance by venture capital companies as it is easier to quantify than 'know-how' of the individuals in the SME, although often the latter is far more important.

The complexity and expense of the patent system in the UK often impact upon cooperation schemes such as the LINK scheme run by DTI, in that it is necessary to negotiate complex secrecy agreements with sponsor companies before any work may commence. The government would be able to improve matters by pressing for a cheaper and more efficient procedure. We therefore support recent moves by the government to abolish certain fees charged by the Patent Office and to decrease others. It is also important to stress that different strategies for licensing may be appropriate for different products. For example, some products may benefit from a non-exclusive licensing approach rather than an exclusive one.

- *Do we have the right balance between protecting IP and allowing the diffusion of innovation?*

We believe that the current balance between protection and dissemination is adequate.

However, we also believe that the acquisition of protection for inventions serves to facilitate the dissemination of information rather than inhibiting it.

- *Should there be a greater number of options for the formal protection of IP; so allowing greater flexibility; or would this, by adding complexity, make matters worse?*

SMEs frequently find the current system of IPR protection confusing and expensive and it is therefore likely to confuse matters further if alternative options are made available. It is often preferable to enter into Non-Disclosure Arrangements rather than attempt to obtain a patent.

There is an urgent need for uniformity of treatment of software internationally as currently it is not patentable in the UK and other countries, but can be patented in the US, Canada, and EU. Since hardware platforms are becoming standardised, at least with regard to the operating systems that run on them, increasing amounts of intellectual property are in the form of computer programmes. Software is subject to copyright laws, but in terms of creativity and intellectual property, patenting is preferable. An urgent review of this is necessary and we support a move to making software protectable in a way that is comparable to patenting.

We support the introduction of a 'fast-track' scheme for patent application which the government could consider incorporating into its 'One stop Shop' system. We also welcome the Cities initiative in

providing basic training in how to write patent applications and protection of intellectual property rights.

- *How can protection of IP be made more easily understandable, particularly for SMEs?*

Appropriate training in IPR is vital at all levels, from undergraduate to senior researcher, whether of an organisation or a teaching or research establishment.

The US Patent Office is perceived as very open and actively encourages dialogue after submission of an application, whereas the European Patent Office is seen as nontransparent and unhelpful in many cases. We strongly support the initiative by the UK Patent Office to make more information and help available. The protection of IP is a particular problem for many universities and SMEs.

- *How can the acquisition and defence of IPR be made more affordable, particularly for SMEs?*

The cost of applying for patents at EU level is currently prohibitive, largely due to the fees for translations. The government should press for a reduction in the number of official languages into which an application must be translated, or provide financial help to SMEs for this purpose. The problem of cost applies even more strongly to the cost of applying for patents in Japan. Indeed, so much so, that one often relies on patent cover in the US, Canada and EU as providing the only cost effective cover worthwhile. We would support the use of a system similar to that used in the US, whereby the inventor can patent up to one year after public disclosure, since this would offer a more affordable and flexible alternative.

Contingency payments for defence of patents would greatly reduce the disadvantage currently faced by UK SMEs relative to US companies, to which this facility is already available.

Annex 5

SBIR-like Foreign Government Support Schemes for Innovative Technology (Source: research done by Prof. Poh Kam Wong, National University Singapore, in the context of the Global Entrepreneurship Monitor GEM)

Country	Scheme/ Organisation	Description
Australia	Commercialising Emerging Technologies (COMET) http://www.ausindustry.gov.au/content/level3index.cfm?ObjectID=F6A7F8B4-4008-49E0-9628332E1D2E3A12&L2Parent=AEB901E5-7CB8-4143-A3BF33B2423F9DA6	COMET supports early-growth stage companies, spin-off companies and individuals to commercialise their innovation. A merit based assistance program which provides business assistance through access to private sector consultant Business Advisers as well as access to merit based financial assistance. The total amount of financial assistance available under COMET is capped at $120,000 (exclusive of GST) per customer. Financial assistance to individuals is limited to a maximum of $5,000 (exclusive of GST) for management skills development. There is no minimum COMET grant size.
Austria	AplusB. FFG (Austrian Research Promotion Agency) commissioned to run program by the Austrian Federal Ministry of Transport, Innovation and Technology http://www.tig.or.at/en/funding programms/aplusb/index.html	Funds innovative, technology-oriented spin-offs from the academic sector and provides professional support for scientists. Focus is on early phases of the start-up process. This involves counselling and assistance during the actual start-up phase and establishing the idea of entrepreneurship more firmly in academic theory and practice. 5 AplusB-Centres have been established in which start-ups are qualified, counselled and coached.
Belgium	Institute for the promotion of Innovation by Science and Technology in Flanders (IWT-Flanders) http://www.iwt.be/iwt_engels/	IWT supports RTD-projects for industrial basic research activities, projects for industrial development activities, and projects for strategic basic research of industrial relevance.The RTD-projects are funded as follows:Projects for industrial basic research activities: a subsidy of 50% of the overall project costs (with an additional 10% for SME's); Projects for industrial development activities: a subsidy of 25% (with an additional 10% for SME's); In addition to the subsidy SME's can apply for a subordinated loan up to 80% of the project costs; Extra incentives are available for Eureka (+10%), Aeronotics and Space (+ 10%), Sustainable Technological Development (+ 10%); Projects for strategic basic research in specific RTD-programmes with industrial relevance: a subsidy of 100%; Post-graduate grants and post-doctoral fellowships are fixed allowances. The RTD-projects for industrial basic research or for industrial development, are submitted by industrial enterprises. These are the so-called "bottom-up" projects, in all scientific or technological disciplines.Applications for RTD-support can be introduced continuously and co-operation with universities or other research institutes is not mandatory. There is a special scheme for SME-projects with special attention for administrative simplification.
Brazil	INOVA – Innovation Agency of Unicamp (Campinas University).	Site in Spanish. Unable to determine yet

	www.inova.unicamp.br	
Chile	FDI (CORFO) www.corfo.cl	FDI program finances business incubators at universities. It also has a seed capital funding that gives about $US 50 000 to firms showing potential growth through innovations. Site in Spanish.
Finland	TuLi Program by Centre of Expertise for Digital Media, Content Production and Learning Services http://www.uudenmaanosaamiskeskus.fi/digibusiness/english/default.cfm?dept0=10211&cd=10211&depth=1	Suports commercialization of the results of research projects carried out in universities, college universities and research institutes. TULI services are available to public-funded research projects, research groups and researchers, and is targeted for drafting, evaluating and developing the research-based business ideas of researchers. Services take the form of external consultation services offered by experts e.g. preliminary marketing surveys, competition surveys, drafting of preliminary business plans, investigations on copyright, or other measures required at the initial phase of research-based commercialization of business ideas.
Germany	Federal Ministry for Education and Research http://www.bmbf.de/	Website program descriptions are in German
Holland	Actieprogramma Technopartner (site in Dutch only) www.ez.nl	Program for stimulating technological start-ups, including a scheme for stimulating commercialization of scientific knowledge by new business start-ups. *(info provided by Sanders Wenneker, website is in Dutch)*
Hong Kong	Small Entrepreneur Research Assistance Programme (SERAP) http://www.itf.gov.hk/eng/SERAP.asp	SERAP is a technology entrepreneurship programme for pre-venture capital stage financing of technology entrepreneurs to start-up, carry out research and development, and to conduct market validation. A grant of up to $2 million will be provided on a dollar-for-dollar matching basis
	HK Applied Science and Technology Research Institute Company Ltd (ASTRI) www.astri.org	Performs R&D for tech transfer to industry, develop needed technical HR and act as a focal point that brings together industry and university R&D.
	HK Science and Technology Parks Incubation Programme www.hkstp.org	HKSTP offers a comprehensive range of services to cater for the needs of industry at various stages, ranging from offering a series of management and technical support programmes through industry and university collaboration; nurturing technology start-ups through the Incu-Tech programme support at a Tech Centre; providing advanced facilities and support services in the 22-hectare state-of-the-art Hong Kong Science Park for applied R&D activities; providing land and premises in the three Industrial Estates totaling 239 hectare for hi-tech manufacturing.
Hungary	Gazdasági Versenyképesség Operatív Programja GVOP 3.3.3 http://www.gkm.gov.hu/balmenu/operativprogramok/gvop/gvop-2005-333.html	Economic Competetiveness Operative programme partially sponsored from European Union funs. As a programme named GVOP 3.3.3. is aiming to support small business innovation and innovation transfer as well as the commercialization of R&D. The size of the fund for year 2005 is 600 million HUF that is aboit 2,4 million Euro or about 3 milion USD. *(Information is from Szerb Laslo, website is in Hungarian)*
Ireland www.enterprise-ireland.com	The R&D Awareness Initiative and the R&D Feasibility Support	Encourage companies to understand the benefits of R&D and provide some grant support to scope out a particular R&D project.
	Research Technology and Innovation (RTI) Scheme	Supports commercially focused, industry led projects in product and process development. Concentrates on high

		quality, risk intensive R&D projects. All manufacturing and internationally traded services companies in Ireland are eligible, but SMEs are elgible for grants that cover a higher % of project costs than LEs. Scheme is particularly directed at established companies planning to undertake their first R&D projects, and companies significantly developing their existing R&D activity. Grant is non-repayable up to a maximum limit after which it is repayable subject to certain conditions being fulfilled
	Innovation Partnership Initiative	Provides financial support to encourage companies to undertake research projects with Irish universities and institutes of technology. All manufacturing, processing and internationally tradable service companies, with an operating base in the Irish Republic, collaborating with Irish third-level institutions are eligible
	Commercialisation Fund - Technology Development Phase	Research funding in areas of technology of medium term interest to industry in Ireland leading to technologies, products or processes that can provide the basis of new businesses in Ireland or can improve the competitiveness of industry in Ireland through licensing agreements. Funding is in the form of a grant.
	Commercialisation Fund - Proof of Concept	Academic researchers (individuals or small groups) work on short applied projects to develop a product concept through to a stage where a route to commercialisation is clear. Either a campus company or licensing may be involved in the planned route to commercialisation. Financial grant given
	The R&D Awareness Initiative and the R&D Feasibility Support	Encourage companies to understand the benefits of R&D and provide some grant support to scope out a particular R&D project.
Mexico	PYME Segment of Economic Secretariat www.economia.gob.mx	Some Mexican local governments have programs to promote clusters through SMEs and providing them with public and private funds. Site in Spanish
Thailand	Thailand Research Fund (TRF) http://www.trf.or.th	Thailand Research Fund (TRF) - Division 5 promotes university-industry research projects for technology commercialization. Grants are made to individual researchers and are for research projects, not commercialisation efforts
UK	Indutrial and Research Projects for Undergraduate Students (IRPUS) http://www.ipus.org	Site in Thai. Unable to determine details
Wales	SMARTCymru by Welsh Development Agency (WDA) www.wda.co.uk/smartcymru	R&D scheme to assist new product and process development. Grant funding is given for: technical feasibility and commercial viability investigation, R&D, pre-production prototype development, exploitation costs. Also provides expert advice given by project mentor. Funding usually geared to micro- small- and medium-sized enterprises in Wales.

Annex 6

Banks, innovation prizes and VC firms in Switzerland

Swissbanking.com

Links
- www.ebk.admin.ch
- www.efv.admin.ch
- www.finweb.admin.ch
- www.snb.ch
- www.bis.org
- www.fbe.be
- www.ibfed.org
- www.iasb.org
- www.iosco.org

General Web links:
Details of government departments: http://www.admin.ch/ch/e/index.html

Index of Swiss business: http://www.swissdir.ch

Swiss Federal Statistical office: http://www.admin.ch/bfs/eindex.htm

Institutions with Prizes for Innovation:

Businessplan-Wettbewerb Innovation04
Institut für Jungunternehmen
Kirchligasse 1
9010 St. Gallen
T +41 71 244 09 24
www.innovation03.ch

Regions-Verband Schwarzwasser
Schwarzwasser-Preis
Dorfplatz 22
3150 Schwarzenburg
T +41 31 731 09 53
F +41 31 731 32 11
info@schwarzwasser.ch
www.schwarzwasser.ch

De Vigier-Stiftung
jcstrebel@devigier.ch
www.devigier.ch

Schweizer Innovationspreis der Idée Suisse
info@idee-suisse.ch
www.idee-suisse.ch

Design Preis Schweiz
designnet@designcenter.ch
www.designpreis.ch

St. Galler Kantonalbank
KMU Primus; Bereich PGK/Mx
St. Leonhardstrasse 25
9001 St. Gallen
T +41 0800 880 999
F +41 71 231 32 80
karin.zanitti@sgkb.ch
www.sgkb.ch/kmuprimus

Dyson Student Award
▹tryser@prw.ch
▹www.dyson.ch

Entrepreneur of the Year
ATAg Ernst & Young AG
Postfach 5272
8022 Zürich
T +41 1 286 36 51
▹brunhilde.peschl@zh.aey.ch

Gewerbe Treuhand
Verleihung Zentralschweiz.
Neuunternehmer-Preis
Postfach
6002 Luzern
T +41 41 319 92 92
F +41 41 319 92 93
▹www.glt.ch

Glarner Kantonalbank
Bereich Geschäftskunden
Hauptstrasse 21
8750 Glarus
T +41 55 646 73 01
F +41 55 646 73 05
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▹www.glkb.ch

Ideen-Oskar
▹info@idee-suisse.ch
▹www.idee-suisse.ch

Prix alliance F
▹office@bsf.ch
▹www.bsf.ch

Stiftung der Baloise Bank SoBa zur Förderung der Solothurnischen Wirtschaft
Amtshausplatz 4
4502 Solothurn
T +41 32 626 06 02
▹www.baloise.ch

Swiss Economic Award
▹info@swisseconomic.ch
▹www.swisseconomic.ch

Swiss Technology Award
▹urs.stuber@awa.so.ch
▹www.swisstechnology-award.ch

Swiss Venture Club
Schlössli
Rubigenstrasse 35
3123 Belp
T +4131 819 69 00
F +4131 812 01 22
▹info@swiss-venture-club.ch
▹www.swiss-venture-club.ch

Uplus Rheintal
Coaching für neue Unternehmen
alte Landstrasse 106
9445 Rebstein
T +41 71 777 60 65
F +41 71 777 60 66
▹info@uplus.ch
▹www.uplus.ch

ZKB Pionierpreis Technopark
▹grieder@technopark.ch
▹www.technopark.ch

Venture Capital Firms:

Dipartimento delle Finanze e dell'Economia
Uffico della promozione economica
Viale S. Franscini 17
6501 Bellinzona
T +41 91 814 35 41
F +41 91 814 44 57
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Dr. Jost Harr
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Winkelriedstrasse 37
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www.wtt-zentralschweiz.ch

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Boulevard de Grancy 1
1006 Lausanne
T +41 21 614 34 44
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Bodmerstrasse 9
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F +41 43 344 38 39
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www.newvalue.ch

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Schlössli / Rubigenstrasse 35
3123 Belp
T +41 31 819 69 00
F +41 31 812 01 22
postmaster@swiss-venture-club.ch

Venture 2004
office@venture.ch
www.venture.ch

Venture Capital Zentralschweiz AG
Kapellplatz 2 / Postfach
6002 Luzern
T +41 41 410 68 89
F +41 41 410 52 88
info@vcz.ch
www.vcz.ch

Venture Incubator AG
Metallstrasse 6
6300 Zug
T +41 41 729 00 00
F +41 41 729 00 01
info@vipartners.ch
www.ventureincubator.ch

SECA Swiss Private Equity & Corporate Finance Association
Postfach 4332
6304 Zug
T +41 41 724 65 75
F +41 41 724 62 50
info@seca.ch
www.seca.ch

Annex 7

Swiss websites related to technology transfer and others of interest

Research Institutes and Technology Transfer Agencies

Centredoc – Courtier en information, Neuchâtel	www.centredoc.ch
Institut de recherche fédéral pour la forêt, la neige et le paysage	www.wsl.ch
EPFL CREATE	www.startupcafe.ch
Ingenieure für die Schweiz von morgen	www.ingch.ch
Juratec Delémont	www.juratec.ch
Le Cast, Lausanne	castwww.epfl.ch
Paul Scherrer Institut, Villigen	www.psi.ch
Polygon, Fribourg	www.unifr.ch/polygon
SKAT, St-Gall	www.skat.ch
Unitec Genève	www.unige.ch/unitec
Unitectra Technologietransfer, Berne et Zurich	www.unitectra.ch
Université de Lausanne	www.unil.ch
WTT Basel	www.zuv.unibas.ch/wtt
WTT-Zentralschweiz	www.wtt-zentralschweiz.ch
Zürcher Hochschule Winterthur	www.zhwin.ch

Patent Offices and Patent Banks

American Patent and Trademark Law Center	www.patentpending.com
Delphion-Patentserver	www.delphion.com
DPMA - Deutsches Patent- und Markenamt	www.dpma.de/index.html
EPO - European Patent Office	www.epo.co.at/index.htm
esp@acenet	www.espacenet.ch
Institut fédéral pour la propriété intellectuelle	www.ige.ch
United States Patent and Trademark Office	www.uspto.gov
Recherche "full text" sur brevets américains	www.uspto.gov/patft/index.html
WIPO - World Intellectual Property Association	www.wipo.org/eng/main.htm

Start-up Networks

APTE, Zurich	www.apte.ch
BioValley, Zurich	www.biovalley.ch
Business Tools AG, Zurich	www.btools.ch
FirstTuesday, Zurich	www.firsttuesday.ch
Gründungsplattform des Kantons Zürich	www.gruenden.ch
IFJ Institut für Jungunternehmen, St-Gall	www.ifj.ch
CTI Start-up, Berne	www.ktistartup.ch
START, St-Gall	www.startglobal.org/en/...
Greater Zurich Area	www.zurichnetwork.ch
ZfU Zentrum für Unternehmensführung AG, Thalwil	www.zfu.ch
Venture Lab	www.venturelab.ch
Startup News	www.news.ch

Technology creation centers

biotop - Life Science Inkubator Zürich-Schlieren	www.biotop-inkubator.ch/
Bündner Zentrum für Förderung von Jungunternehmen	www.initial-gr.ch/
Businesspark Zoug	www.businessparkzug.ch
CCSO Direktionszentrum, Fribourg	www.ccso.ch
Gründerzentrum Berne	www.grueze.ch
HTC High-Tech-Center, Thurgau	www.high-tech-center.ch
innoBE AG, Berne	www.innobe.ch
ITS Industrie- und Technozentrum Schaffhausen	www.its.sh.ch
PSE-Parc Scientific, Lausanne	www.parc-scientifique.ch
Start Gründungszentrum Zürich	www.start-gzz.ch
Technologiezentrum Bodensee	www.tebo.ch

Technologiezentrum Linth	www.tzl.ch
Technopark Zürich	www.tpzh.ch
Technopark Luzern	www.technopark-luzern.ch
Y-Parc AG, Yverdon-les-Bains	www.y-parc.ch

Venture Capitalists

Altium Capital AG, Zollikon	www.altiumcapital.com
Armada Ventures, Küsnacht	www.avcg.com
BrainsToVentures AG, St-Gall	www.b-to-v.com
DVC Deutsche Venture Capital	www.dvcg.de
Earlybird Venture Capital GmbH & C. KG, Munich	www.earlybird.com
HBM BioVentures, Baar	www.hbmbioventures.com
Index Ventures	www.indexventures.ch
Invision AG, Zoug	www.invision.ch
Nextech Venture, Zurich	www.nextechventure.ch
Novartis Venture Fund, Bâlel	www.venturefund.novartis.com
Partners Group, Zoug	www.partnersgroup.ch
Private Equity Holding AG, Zoug	www.peh.ch
VCF Venture Capital Finance, Zoug	www.vcf.ch
Ventis Management AG, Zoug	www.ventis.ch
Venture Incubator AG, Zoug	www.ventureincubator.ch
Venture Partners AG, Zurich	www.venturepartners.ch
ViewPoint Capital Partners AG	www.viewpointpartners.com
Vontobel Private Equity	www.vontobel.ch/privateequity
ZKB Corporate Finance	http://www.zkb.ch/...

Prizes for young entrepreneurs

Prix De Vigier	www.devigier.ch
ESPRIX, Prix suisse de la qualité en business excellence	www.esprix.ch
Swiss Economic Award	www.swisseconomic.ch
Swiss Technology Award	www.swisstechnology-award.ch

On-line Counter for start-ups

PMEadmin: guichet pour la création d'entreprise. La solution la plus simple et la plus rapide pour inscrire votre nouvelle entreprise au registre du commerce, à la TVA et à l'AVS.

www.kmuadmin.ch

Annex 8 – Economic and Financial Links

Economic promotion organisations

Amt für Wirtschaft und Tourismus, Grisons	www.awt.gr.ch
Amt für Wirtschaft und Arbeit, Solerne	www.awaso.ch
Amt für Wirtschaft und Arbeit des Kantons Zürich	www.awa.zh.ch
Bureau de délégué aux questions économiques, Neuchâtel	www.ne.ch/promeco
Bureau de Développement Economique, Jura	www.jura.ch/dev
Conseil pour le Développement économique du canton de Vaud	www.dev.ch
Département de l'Economiee de l'Emploi et des Affaires Extérieures, Genève	www.geneve.ch/deee
Fachstelle Wirtschaftsfragen FWF, Lucerne	www.luzern.ch/wirtschaft
KMU-Dienst, Zurich	www.awa.zh.ch/awa/wf/...
Promotion économique du canton de Fribourg	www.promfr.ch
Staatssekretariat für Wirtschaft, Berne	www.kmuinfo.ch
Standort-Marketing Aargau	www.ag.ch/wirtschaft
Stiftung zur Förderung der Appenzell A. Rh. Wirtschaft	www.wifoeAR.ch
Valais Economic Development Corporation, Sion, Naters	www.sodeval.ch
Volkswirtschaftsdirektion des Kantons Zug	www.zug.ch/economy
Wirtschaftsförderung Basel-Stadt und Basel-Landschaft	www.baselarea.org
Wirtschaftsförderung Kanton Bern	www.berninvest.com
Wirtschaftsförderung des Kantons Thurgau	www.wifoe-tg.ch
Wirtschaftsförderung Schaffhausen	www.sh.ch/wf/wifo_d.htm
Wirtschaftsförderung des Kantons St. Gallen	www.wifsg.ch
WirtschaftsRaum Thun	www.wrt.ch

Financial links in Switzerland

Swiss Association of Banks

Schweizer Bankiervereinigung
Aeschenplatz 7
4052 Basel
Switzerland
Tel: (+41) 612959393
Fax: (+41) 612725382

Surveillance and markets institutions

Swiss Federal Finance Administration (SFFA)	www.aff.ch
Swiss National Bank (SNB)	www.snb.ch
Swiss Stock Exchange (SWX)	www.swx.ch
Swiss Federal Banking Commission (CFB)	www.ebk.ch
Eurex	www.eurexchange.com
Swiss Banks Ombudman, Zurich	www.bankingombudsman.ch

National banking and financial associations

Swiss Bankers Association (SBA), Basel	www.swissbanking.org
Association of Foreign Banks in Switzerland	www.foreignbanks.ch
Swiss Private Bankers Association	www.swissprivatebankers.com
Swiss Insurance Association (SIA), Zurich	www.svv.ch
Association Suisse des Banques de Crédit et Etablissements de Financement (VSKF), Zurich	www.vskf.org
Swiss Funds Association (SFR), Basel	www.sfa.ch
Swiss Association of Assets Managers (SAAM), Zurich	www.vsv-asg.ch
Swiss Association of Independant Securities Dealers (SASD), Zurich	www.svue.ch
Association of Futures Markets (AFM)	www.afm-org.hu
The Financial Markets Association (ACI Suisse), Zurich	www.acisuisse.ch
Central Bank (RBA), Bern	www.rba-holding.chhttp://www.rba-holding.ch/
Convention of Independent Financial Advisors (CIFA), Geneva	www.cifafound.ch
Swiss Group of Independant Financial Advisors, Geneva	www.gscgi.ch
International Financial Risk Institute (IFCI), Geneva	riskinstitute.ch
Swiss Financial Analysts Association (SFAA), Zurich	www.sfaa.ch
SIS Swiss Financial Services Group AG, Zurich	www.sisclear.com/sis/index.htm
Swiss Association of Market Technicians (SAMT), Geneva	www.ifta.org/SAMT
Swiss Futures and Options Association (SFOA), Geneva	www.sfoa.org
Swiss Society of Investment Professionals (SSIP), Zurich	www.ssip.org
Association of Swiss Cantonal Banks (ASCB), Basel	www.vskb.ch
Union Suisse des Banques Raiffeisen, St. Gallen	www.raiffeisen.ch

Regional banking and financial associations

Geneva Financial Center (GFC)	www.geneve-finance.ch
Geneva Private Bankers Association	www.genevaprivatebankers.com
Lausanne – Vaud Région Financière	www.banques-finance-vaud.ch
Associazione Bancaria Ticinese	www.abti.ch

Association pour le Développement des Compétences Bancaires (ADCB)	www.edubank.ch
International Financial Management Association (IFMA)	www.ifma-geneva.org
Association Romande des Intermédiaires Financiers (ARIF)	www.arif.chhttp://www.ifma-geneva.org/
Society of Trust and Estate Practitioners, the Suisse-Romande branch of STEP	www.step-swissromand.ch
Zurich financial center	www.zurich-financial-center.ch
Basel financial center	www.bankenbasel.ch

Non banking supporting associations to the Swiss financial center

Alliance pour une Suisse Forte	www.suisseforte.ch
Forum Place Financière Suisse (FPFS)	www.forumfinanzplatz.ch
Union des Intérêts de la Place Financière lémanique (UIPF)	www.uipf.ch

Banking and financial information providers

Reuters	www.reuters.com
Bloomberg	www.bloomberg.com
Telekurs	www.telekurs.ch
UBS Dictionary of Banking	http://rc.geneve.ch/www.ubs.com/e/about/bterms.html

Central bank

Swiss National Bank, Börsenstrasse 15, CH-8022 Zürich (tel: 631-3111; fax: 631-3911; e-mail: snb@snb.ch).

Financial Companies

Swiss Association of Asset Managers (SAAM) ASG - www.vsv-asg.ch	
Geneval regional office 13, Avenue Krieg 1208 Geneva	**tél.** **+41 (0) 22 347** **fax** **+41 (0) 22 347**

Swiss Group of Independant Financial Advisors GSCGI - www.gscgi.ch	
Secretariat 3, rue du Vieux-Collège CP 3255 1211 Geneva 3	**tél.** **+41 (0) 22 317 11 11** **fax** **+41 (0) 22 317 11 77**

Groupement Patronal Corporatif des Gérants de Fortunes de Genève Fiduciaire Duchosal RFF	
4, route de Florissant CP 392 1211 Geneva 12	**tél.** **+41 (0) 22 839 66 66** **fax** **+41 (0) 22 346 85 81**

SFBC
Swiss Federal Banking Commission
Schwanengasse 12, Postfach
CH-3001 Berne

E-mail: info@ebk.admin.ch
Phone: +41 (0)31 322 69 11
Fax: +41 (0)31 322 69 26

Objectives
The supervisory activity of the SFBC pursues the objectives of "protecting creditors", "protecting investors", "guaranteeing the functionality of securities markets" and "maintenance of the function".

The SFBC monitors compliance with legal prescriptions, issues rulings which are necessary to implement the Law and in this respect, has an all-embracing right to obtain information.

The Act on Administrative Procedure, which governs in particular the rights of the recipients of rulings, is applicable to all administrative proceedings instituted by the SFBC. Administrative appeals to the Swiss Federal Supreme Court against a ruling of the SFBC are allowed. The proceedings before the Federal Court are conducted in accordance with the Federal Act on the Administration of Justice. Significant decisions of the Federal Court are published.

Annex 9

Links to information in Germany

Business Angels in Germany

BAND Business Angels Netzwerk Deutschland e.V.
http://www.business-angels.de/

Business Angel Venture
http://www.business-angel-venture.de

CatCap Corporate Finance
http://www.venture-lounge.de/2004/index.htm

Forum Kiederich Gründerinitiative
http://www.forum-kiedrich.de/de/index.php

The Angels' Forum
http://www.angelsforum.com

Upside-Ventures
http://www.upside-ventures.de

Entrepreneurship centers in Germany:

Arbeitsgemeinschaft deutscher Technologie- und Gruenderzentren
http://www.adt-online.de

Business Association of Stanford Engineers
http://bases.stanford.edu/site/index.jsp

Business Development Center SACHSEN
http://www.bdcs.de

Cyberforum e.V. - Infoline für Unternehmer
http://www.chancenkapital.de/index.jsp

Deutsches Eigenkapitalforum
http://www.eigenkapitalforum.com/

Deutschland Innovativ
http://www.dein.de

EXIST- Existenzgründer aus Hochschulen, bundesweit
http://www.exist.de

Existenzgründerinstitut Berlin
http://www.existenzgruender-institut.de

EXZET - Existenzgründerzentrum Stuttgart
http://www.exzet.de/

Forum KIEDRICH GmbH
http://www.forum-kiedrich.de

Gründernetzwerk Köln
http://www.gruenderzeit.de/

Gründerregion Aachen
http://www.gruenderregion.de/

Gründerzentrum der KfW
http://www.gruenderzentrum.de

MIT Entrepreneurship Center
http://entrepreneurship.mit.edu/

Silicon Saxony e. V.
http://www.silicon-saxony.net

Tanned Feet - The Entrepreneurs's Help Page
http://www.tannedfeet.com

Government Support Programs in Germany

Bundesministerium für Wirtschaft und Technologie
http://www.BMWI.de

Deutsche Ausgleichsbank
http://www.dta.de/

Kreditanstalt für Wiederaufbau
http://www.kfw.de

tbg Technologie - Beteiligungsgesellschaft
http://www.tbgbonn.de

Organizations

Bundesverband der Deutschen Venture Kapital Gesellschaften
http://www.bvk-ev.de/

Bundesverband Junger Unternehmer (BJU) - Gründerwerkstatt
http://www.BJU.de/Gruenderwerkstatt

EVCA - European Private Equity & Venture Capital Association
http://www.evca.com

NVCA - National Venture Capital Association (US)
http://www.nvca.org

The Entrepreneur Network
http://tenonline.org/index.html

The Foundation for Enterprise Development
http://www.fed.org

The Young Entrepreneurs' Organization
http://www.yeo.org

Venture Capital Institute
http://www.vcinstitute.org

Young Venture Capital Society
http://yvcs.org

Research

CORDIS - European Research
http://www.cordis.lu/

DataMerge - Sourcing Capital World
widehttp://www.datamerge.com

Dun & Bradstreet
http://www.dnb.com/dnb/dnbhome.htm

Eurek Alert!
http://www.eurekalert.org

European Patent Office
http://www.european-patent-office.org

Federal Communications Commission
http://www.fcc.gov/

Food and Drug Administration
http://www.fda.gov/

Forrester Research
http://www.forrester.com

Hoovers
http://www.hoovers.com/

IBM Patent Database
http://www.patents.ibm.com/

Jupiter Research (E-business
http://www.jupiter.com

Medline
http://www.ncbi.nlm.nih.gov/PubMed/

Nasdaq
http://www.nasdaq.com/

Netacademy
http://www.businessmedia.org

Nielsen NetRatings
http://www.nielsen-netratings.com

Red Herring Online - Message Boards
http://boards.redherring.com/WebX?1@@.ee6b2c1

Research Online
http://www.research-online.de

SG Cowen Securities Research
http://www.sgcowenresearch.com

Small Business Administration
http://www.sbaonline.sba.gov/

Statistisches Bundesamt
http://194.95.119.6

Strategic Patent Web Site
http://www.rjpatent.com/

Technology Guide
http://www.techguide.com/index1.html

The US Domain Registration Services
http://WWW.nic.us

The US Domain Registration Services
http://WWW.nic.us

United States Patent and Trademark Office
http://www.uspto.gov/

US Census Bureau
http://www.census.gov/

US Patent and Trademark Office
http://www.uspto.gov

Bundesamt für Energie BFE
Worblentalstrasse 32, CH-3063 Ittigen · Postadresse: CH-3003 Bern
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