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Gondo

White Gold, Crypto Gold: Alpine Hydropolitics

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Gondo? Readers may recall the Valais border town of Gondo from national and international headlines at the dawn of the twenty-first century. When a landslide destroyed a third of the village on October 14, 2000, sending thirteen villagers to their deaths, the disaster was broadcast to the world, triggering record donations to Swiss Solidarity.[1] It was not just nature that was involved in this tragedy—a "disaster of historic proportions," statistically speaking, much like the Valais floods of 1987 and 1993.[2] It was not just the mountain that came down with all its might into the valley after continuous heavy rainfall. It was the concrete piles that had been erected to protect against rockfall which, together with the boulders and scree, thundered down on the village and the Stockalperturm, a historic landmark. The damage totaled 70 million Swiss francs in the community of Gondo and 670 million Swiss francs in the region. With the help of SRG, the Swiss radio and television broadcaster, Swiss Solidarity was able to collect almost 76 million francs in donations after the accident. (Only the collection for the victims of the 2004 Indian Ocean tsunami brought in more.) Gondo received 14.8 million francs from Swiss Solidarity for the reconstruction of the village square, the construction of two new houses, and the renovation of the Stockalperturm, a seventeenth century storehouse and hostel that had once belonged to transit entrepreneur and paymaster Kaspar von Stockalper. In 2005, the rebuilt village center was ceremonially inaugurated.

In 2011, the mayor of Gondo, Roland Squaratti—who no longer lives in Gondo but in the next largest town, Brig-Glis—exuded optimism for the rebuilt village,[3] extolling the natural beauty of the Zwischbergen Valley to summer tourists. He also promised that the village with its two reservoirs would be able to produce clean "energy for the whole of Switzerland," emphasizing its potential for further expansion. This is how the village could return the favor to Switzerland: "clean energy as a thank-you" for the nation's support in the wake of the natural disaster. And clean energy as a form of aid to the "crisis in energy policy," the coming "electricity shortage" that Switzerland—after Fukushima and the abandonment of nuclear power—would now somehow have to address.[4]

Almost two decades after the accident, Gondo again caught the attention of the media. This time it was not a natural disaster that struck the village, but rather the prospect that hydroelectric power, or "white gold," as the people of Valais are fond of calling it, would bring new opportunities to the village of Gondo-Zwischbergen. In October 2017, the "Wallis" (Valais) regional program on Radio DRS reported for the first time that a crypto-mining start-up had been inquiring in Gondo.[5] Attracted by the lowest electricity prices in Switzerland—a side effect of an arrangement with the

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See, for example, the documentary film *Als die Schweiz den Atem anhielt: Der Erdrutsch von Gondo*, directed by Fiona Strebel, produced by SRF, Switzerland 2001, aired on July 5, 2011, https://www.srf.ch/play/tv/katastrophen/video/als-die-schweiz-den-atem-anhielt-der-erdrutsch-von-gondo?id=8da43d6e-bcec-4e23-9e08-b74f9e20d2c2 (retrieved July 3, 2020).

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I.e., statistically speaking, this kind of severe rainfall should have occurred far less frequently. See *Hochwasser 2000 – Les crues 2000. Ereignisanalyse/Fallbeispiele – Analyse des événements/Cas exemplaires*, Berichte des BWG (Bern, 2002), p. 11.

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Als die Schweiz den Atem anhielt, 2011.

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Roland Squaratti, "Gondo-Zwischbergen und die EES SA; Eine Erfolgsgeschichte," August 19, 2011, https://www.gondo.ch/downloads/Ansprache%20Einweihung%20Staumauer%20Sera%2019%208%202011%20_2_.pdf (retrieved July 3, 2020).

local electricity company, Energie Electrique du Simplon (EES)—the Valais-based company Alpine Mining from Martiny was interested in setting up a blockchain facility in the village. The Gondo community council and the start-up company agreed on a price of 0.09 francs per kilowatt-hour. Alpine Mining then installed a blockchain system or "crypto-mine" consisting of several hundred graphics cards in the empty civil defense facility. The object of desire: a digital currency called Ether.

Thomas Ludovic, the CEO of the start-up, stated in the radio broadcast in autumn 2017 that the facility consumed about 150 kW—about as much as a (Swiss) village of 400 to 500 people—and that, in addition to mining Ether, he also planned to establish a new currency on his own platform. The radio broadcast also mentioned another interested party that would use ten times as much electricity, which would require the community to invest in a new substation. Alpine Mining SA meanwhile reported (appropriately on blockchain-based social media platform Steemit, username @AlpineBlockchain): "[T]here is also the fact we are re-making history here, let me brievely [sic] explain ;-)."[6] The start-up alluded to the "gold rush" that had previously occurred in Gondo, in the 1890s, when the Parisian Société des Mines d'Or d'Helvétie settled there.[7]

This was the start of start of a minor media hype about a new crypto gold rush in Gondo. In the months that followed, the bourgeois *Neue Zürcher Zeitung*, the tabloid *Blick*, the commuters' newspaper *20 Minuten*, regional platforms, blog posts, and crypto news sites, among others, devoted reports to the digital mountain village in the Swiss Alps: at work there were modern gold miners, they said, who "[wore] neither tailcoats nor rags, but hoodies."[8] Even the American tech magazine *Wired* deemed the new gold rush in Gondo worthy of a report, including a lavish series of pictures: "The Cryptocurrency Rush Transforming Old Swiss Gold Mines."[9] The stories told were all about clean and cheap energy, the beneficial climate in the Alps (in

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Priska Dellberg, "Warum Gondo auf das Blockchain-Geschäft hofft," Radio DRS (October 20, 2017), https://www.srf.ch/news/regional/bern-freiburg-wallis/blockchains-aus-dem-bergdorf-gondo-hofft-auf-die-digitalen-goldgraeber (retrieved July 3, 2020).

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AlpineBlockchain, "Finally back on Steemit with some news about our digital gold adventure," Steemit, October 23, 2017, https://steemit.com/life/@alpineblockchain/finally-back-on-steemit-with-some-news-about-our-digital-gold-adventure (retrieved July 3, 2020).

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Hans-Peter Bärtschi, "Goldmine Gondo – Eine industriearchäologische Bestandesaufnahme," *Minaria Helvetica*, no. 16b (1996), pp. 29–81.

8

Cited in Thomas Bolzern, "Der digitale Goldrausch im Walliser Bergdorf," *20 Minuten* (May 17, 2018), https://www.20min.ch/story/der-digitale-goldrausch-im-walliser-bergdorf-154031188522; see also, for example, Priska Dellberg, "Gondo hofft auf die digitalen Goldgräber," *SRF* (October 20, 2017), https://www.srf.ch/news/regional/bern-freiburg-wallis/blockchains-aus-dem-bergdorf-gondo-hofft-auf-die-digitalen-goldgraeber;

Marcel Gyr, "Ausgerechnet das Walliser Glückskette-Dorf Gondo stimmte am deutlichsten für 'No Billag' – neu setzt der entvölkerte Grenzort auf Blockchain," *Neue Zürcher Zeitung* (March 15, 2018), https://www.nzz.ch/schweiz/spendengelder-no-billag-und-kryptowaehrungen-ld.1366165; Roman Maas, "Grüne Start-ups und Gasriesen: Schweiz wird attraktiver Krypto-Standort," *BTC Echo* (April 4, 2018), https://www.btc-echo.de/gruene-start-ups-und-gasriesen-schweiz-wird-

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attraktiver-krypto-standort/; Helmut Stalder, "Das Bergdorf Gondo erlebt einen Krypto-Rausch – doch das Bauland für neue Firmen fehlt," *Neue Zürcher Zeitung* (April 9, 2018), https://www.nzz.ch/schweiz/krypto-rausch-in-gondo-gebremst-ld.1370601. (all retrieved July 3, 2020).

Michael Hardy, "The Cryptocurrency Rush Transforming Old Swiss Gold Mines," *Wired* (September 7, 2019), https://www.wired.com/story/cryptocurrency-gold-mines-gallery/ (retrieved July 3, 2020).

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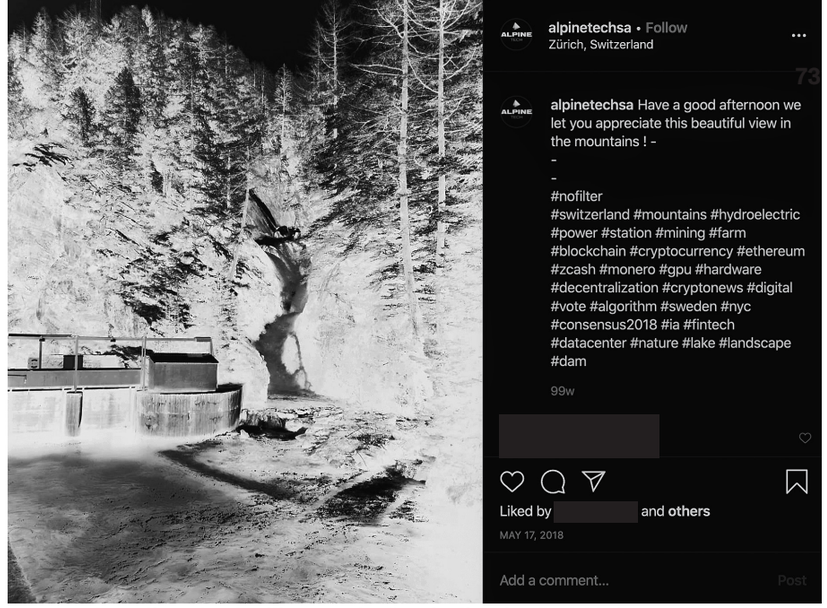
Cf. Roland Barthes, *Mythen des Alltags*, Frankfurt am Main, 1988 [Paris 1957]. According to Barthes, myths are constructed from semiological chains, and they transform stories into natural states.

Fig.1
"Have a good afternoon we let you appreciate this beautiful view in the mountains!" — Alpine Mining. (Instagram /@ alpinetechsa, May 17, 2018, Screenshot, April 16, 2020)



terms of cooling the facility), and a "revitalization" of Alpine valleys through digital gold and hydroelectric power as enablers of the digital future.

These media reports began to capture our interest. They seemed to contain particularly pointed (and, with the inclusion of a nineteenth century gold rush, particularly mythical)[10] stories of the kind we had already encountered in Switzerland's recent "digital" history. Indeed, the stories of the clean, white gold of the Alps and of high-tech infrastructures for peripheral regions had made their way not only into the buzz around Gondo, but also into Switzerland's most recent descriptions of itself as a digital economic area, as a "hub" of information flow,[11] as a "data vault,"[12] or as a country which, due to its cool alpine climate and inexhaustible energy supply, was particularly well-suited to the location of data centers. "Switzerland has the best possible environment for [the] mining process":[13] Alpine Mining SA was also happy to make use of this narrative and do its part to cultivate it. Anyone who got lost on their Instagram account would find not only photos of flashing LEDs and graphics cards and mining racks, but, above all, pictures of the natural environment: of lakes, dams, and waters tumbling down the mountains.

Fig.1

We wondered how this latest media hype surrounding the Zwischbergen Valley and the transit village of Gondo could be approached in terms of social history, environmental history, and the history of technology, and what stories might be lurking behind site propaganda and media reports.[14] That's why we made the journey to Gondo in summer 2018, on the trail of Alpine Mining and more than a few journalists. We began, much like tourists, by photographing the village and its hydroelectric and digital infrastructure. We were given a tour of the village by local authorities and spoke with employees of the Energie Electrique du Simplon SA (EES) electrical power station (which today belongs to the Alpiq Group, a pan-European energy services provider), a small EES shareholder, the community clerk, and a number of people who had moved to or away from the village. We studied old photos of Gondo, rummaged through

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See, for example, Stefan Zbornik, "Elektronische Märkte in der Schweiz: Die Zeit läuft ab!" *in Management Zeitschrift* 62, no. 1 (1993), pp. 89–94, esp. p. 94.

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asut, *Datentresor Schweiz*, Basel, 2012. The asut study had already drawn upon similar narratives, stating, for example: "the electricity mix is gaining in importance as a factor in site selection" and "Switzerland, in 9th place [in terms of sustainability] is also well-positioned, thanks to the large share of hydropower in domestic electricity production": ibid., pp. 26–27.

13

See the post from January 23, 2018, https://www.instagram.com/p/BeTPaVzjrwI/ or a similar one from December 29, 2017 (showing a little waterfall): "a source of water offering ecoresponsible electricity" [*sic*], https://www.instagram.com/p/BdSvhn_DXid/ (all retrieved July 3, 2020).

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On these connections, see also in particular: Nick Lally, Kay Kelly, and Jim Thatcher, "Computational Parasites and Hydropower: A Political Ecology of Bitcoin Mining on the Columbia River," *Environment and Planning E: Nature and Space* (2019). The real and discursive mobilization of "climate" and "water" in the context of the data center industry is currently being subjected to intense examination. See, for example, Patrick Brodie, "Climate Extraction and Supply Chains of Data," *Media, Culture & Society*

Fig. 2
Gas station, Gondo, Valais, summer 2018. (© Hannes Rickli)

documents from the archives of the community and the electrical power station, looked back to the time of the concession agreement in the late 1940s, and leafed through the *Rote Anneliese*, "the critical voice of the Upper Valais," a left-wing newspaper whose critical interventions have escorted the canton's hydroelectric policy since 1973.[15]

Chocolate Coins as a Welcome Present

The distance from Zurich to Gondo is nearly 140 km as the crow flies. Yet the journey to the southern end of the Simplon Pass, to the border village with Italy, takes three-and-a-half hours. By train to Brig. Then by bus on the winding N9 over the Simplon Pass. Past Christian Menn's Ganter Bridge, which to some is a masterpiece of Swiss engineering and to others a memorial to the disfigurement of landscapes: In general, the "winterproof N9, which is part of the national highway network," as journalist Jürg Frischknecht complained in 1987, is "one of the blockiest stretches of road in the Alps, and one which, especially on the north side, soon runs only through avalanche galleries."[16] (The Ganter Bridge itself was opened in 1980 and was perfectly adapted to the sliding slopes by using flexible bearings.)[17] At the top of the pass, the route continues: past the old "hospice" built on Napoleon's orders, past the Simplon artillery range, and past the gigantic eagle from World War II, which commemorates Mountain Brigade 11. And finally in narrow serpentine curves down to the south.

Those who arrive in Gondo have, in a way, reached the end of the road. A smugglers' fountain celebrates the golden age of smuggling between Switzerland and Italy, the story of which is told in the 1936 novel *Joachim bei den Schmugglern*: "The valley is depopulating. The number of livestock and inhabitants is decreasing year by year, and the houses are falling into disrepair. Only a few families are able to survive," people were saying even then.[18] Today there are kiosks, three gas stations, a money exchange, and a few houses, 57 percent of which are "second homes."[19] The Pension Bellevue with its café. The Stockalperturm seminar hotel, lavishly restored with Swiss Solidarity funds. And finally, the new community center on the village square built in 2015, surrounded by steep cliffs to the left and right. Several hundred cars and trucks rush past them every day. Since 2017, customs clearance is no longer carried out on site, but in Brig. Even for fresh bread, one has to drive all the way to Simplon Dorf, where the bakery is located. According to population statistics, the municipality has 77 inhabitants.[20] But when you walk through the streets at night, you hardly see any lights in the windows.

In the room where the local council meetings are held, we are welcomed by Paul Fux, a retired electrical engineer, veteran of water management, vice-communal president, and (also) a resident of Brig. On the walls are the coats of arms of long-established families (Escher, Lawiner, Squaratti, and so on). Placed in front of us are folders of documents: "Welcome to Gondo." Inside them are the usual tourist brochures: about the Simplon "Eco-Museum"; about cultural walks in the footsteps of Kaspar von Stockalper, the "Fugger of the Alps"; about trekking tours and kayaking weekends, and about panning for gold in the Zwischbergen Valley, guided by former customs officer Rolf Gruber, who has settled in Gondo. There's also a "Hydropower Excursions" brochure, which refers to the three local power plants, Gondo, Gabi, and Tannuwald, which were commissioned in 1952, 1958, and 1978, respectively.[21] Also included is a flood advisory notice from Hydro-Exploitation addressed to whitewater canoeists and potential gold-panners—it doubled as a voucher for a free visit to the Grande Dixence dam: "Don't risk your life … CONSTANT DANGER."

And finally, to everyone's delight: a golden chocolate thaler the same size as the chocolate coins issued by the Swiss Heritage Society since 1946 to raise money for the preservation of local heritage and the environment.[22] The front of the thaler flaunted the logo of Alpine Mining: an abstract geometric mountain pattern, in an accentuated start-up look. On the

Fig. 2

(2020); on water (as a coolant): Mél Hogan, "Data Flows and Water Woes: The Utah Data Center," *Big Data & Society* 2, no. 2 (2015), pp. 1–15; James Gilmore and Bailey Troutman, "Articulating Infrastructure to Water: Agri-Culture and Google's South Carolina Data Center," *International Journal of Cultural Studies* (2020).

15 Compare the website http://www.roteanneliese.ch/ as well as the retroactively digitized issues from 1974 to 1999 at https://www.e-newspaperarchives.ch. *Rote Anneliese* (a pun on *Analyse*, meaning "analysis"), the in-house magazine of "Kritisches Oberwallis" ("Critical Upper Valais," KO), first appeared in 1973 with an issue on the planned takeover of the Lonza chemicals group by Alusuisse.

16 Jürg Frischknecht, *Wandert in der Schweiz solang es sie noch gibt. Ein Wanderbuch für 35 Lokaltermine*, Zurich, 1987, p. 193.

17 René Walter, "Bemerkenswerte Spannbetonbrücken," *Schweizerische Bauzeitung* 96, no. 14 (1978), pp. 236–53, esp. p. 237.

18 Hans Zullinger, *Joachim bei den Schmugglern. Eine Erzählung aus dem Simplongebiet*, Bern, 1936, p. 9.

19 *Bericht zur Verwaltungsrechnung*, 2012, p. 19, https://www.gondo.ch/ueber-die-gemeinde/gemeindefinanzen/ (retrieved July 3, 2020).

20 Kantonales Amt für Statistik Wallis, "Ständige Wohnbevölkerung nach Geschlecht, Staatsangehörigkeit und Gemeinde," https://www.vs.ch/de/web/acf/statpop. (retrieved July 3, 2020). The number of inhabitants peaked at 249 in about 1950, dwindling to 171 in 1980, then rapidly returned to late nineteenth century levels: 78 people in 2000, a figure which has remained constant since.

21 Georg Gruner, "Die Staumauer Serra am Grosswasser im Zwischbergental," *Schweizerische Bauzeitung* 71, no. 11 (1953), pp. 159–63; and "Simplon Storage Power Plant" (undated), https://www.alpiq.com/power-generation/hydropower-plants/storage-power-plants/simplon/ (retrieved July 3, 2020).

22 On this, see Madlaina Bundi, "Geld, Gold und Schokolade. Die Anfänge des Schoggitalers," *Heimatschutz/Patromoine* 109, no. 3 (2014), pp. 6–9. See also Madlaina Bundi's licentiate thesis: *Goldene Schokolade. Die Taleraktionen von Heimat- und Naturschutz 1946–1962*, Zurich, 2002.

Fig. 3
1893 "Gondo gold" / Alpine Mining PR coins.

Fig. 3

reverse: the facsimile of a 20-franc coin from 1893. About twenty-five such coins were produced in the mint in Bern at that time, Paul Fux explained to us. These gold coins had been made from real gold—"Gondo gold"—which came from the surrounding mountains. It was excavated and processed by the Société des Mines d'Or d'Helvétie, which brought speculation and electricity and a lot of miners to the village until it went bankrupt again in 1897. After that, the mine shaft and the gold mill fell into disrepair.[23]

Knowingly or not, the PR stunt reflected the "metalism" that is widespread in the crypto scene: the unease with "central banks," with the state in general, the "politicization" of money, and so on.[24] (It is fitting that the Valaisans have the reputation of having always been freedom-loving and on their guard against the "Üsserschwyzer," the German-speaking inhabitants of the rest of Switzerland.) The analogy indeed is intentional: as is in principle the case with precious metals, the "supply" of Bitcoin is also limited (for technical and conceptual reasons). And like gold, Bitcoin, and derivatives, "alt-coins" are "mined." Unlike "fiat currencies," however (to quote the CEO of Alpine Mining),[25] they cannot be issued at will. And either form of "resource" exploitation, or this seemed to be the conceit of the chocolate coins, implies risk-taking, technological adventurism, and a pioneering spirit.

While the story of the brief Swiss gold rush in the late nineteenth century, along with the Alps, for which the company is named, was thus an essential part of Alpine Mining's image—nature, mountains, lakes—the history of modern hydroelectric power did not play a role in the marketing of the start-up. Yet that history also began at almost exactly the time when Gondo experienced its first and real "gold rush," in the 1890s, when it became possible to transport energy via high-voltage lines over long distances into the valley.[26] Subsequently, the large hydroelectric power projects in the Alps, their development as "reservoirs," came into being. Between 1920 and 1960, and particularly after World War II, the Valais Alps were developed on a large scale in terms of hydroelectric engineering. Dams were built, rivers straightened, and power stations built.[27] The driving forces behind these hydroelectric infrastructure projects were the large industrial enterprises set up in the valley from the late nineteenth century: those of the chemical industry (Lonza in Gampel in 1897, CIBA in Monthey in 1904) and the metal industry (Alusuisse in Chippis in 1908, which required large quantities of electricity for smelting aluminum).[28]

The "potential for hydrological expansion" in the Alps was soon considered "exhausted," however, and the construction of hydropower plants deemed unprofitable.[29] While nearly 100 percent of Switzerland's electricity was generated by hydroelectric power until about

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Bärtschi 1996.

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"Metalism," in turn, would be the notion that "money" ultimately reflects, or should reflect, the value of some commodity's market price rather than being determined by states, central banks, or the like. On this, see, for example, Zac Zimmer, "Bitcoin and Potosí Silver," *Technology and Culture* 58, no. 2 (2017), pp. 307–34; Lana Swartz, "What Was Bitcoin, What Will It Be? The Techno-Economic Imaginaries of a New Money Technology," *Cultural Studies* 32, no. 4 (2018), pp. 623–50; Stefan Eich, "Old Utopias, New Tax Havens: The Politics of Bitcoin in Historical Perspective," in *Regulating Blockchain: Techno-Social and Legal Challenges*, edited by Ioannis Lianos, Philipp Hacker, Stefan Eich, and Georgios Dimitropoulos, Oxford, 2019, pp. 85–98.

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Rick Nassar, "Is Crypto Mining Still Profitable? Alpinemining from Switzerland Thinks So," *Irish Tech News* (December 29, 2017), https://irishtechnews.ie/is-crypto-mining-still-profitable-alpinemining-from-switzerland-thinks-so/ (retrieved July 3, 2020).

Fig. 4
Gondo Zentrale power plant, corridor, summer 2018. (© Monika Dommann)

Fig. 4

1970, nuclear energy had long come to be seen as the energy of the future—even at Gondo Zentrale we came across an old brochure in the small archive that proclaimed exactly this: "L'énergie nucléaire est la solution de l'avenir."[30] Since then, Swiss electricity consumption has risen steadily—increasing sixfold between 1950 and 2010—and the share of hydropower in total generation has fallen steadily, to around 56 percent.[31] Then in May 2011, two months after the reactor accident at Fukushima, the Federal Council (with a female majority) announced Switzerland's withdrawal from nuclear energy. How this phase-out is to proceed, and what role hydroelectric power and alternative solar and wind energy are to play in it, is one of the most important and politically controversial issues of the present, particularly in Valais.[32]

Meanwhile, on site in Gondo, an air of timelessness hovers over the power plants and reservoirs, as well as a hint of stolidity. This certainly was the impression gained during the first stop of our little tour organized by the villagers in the summer of 2018—during our visit to the Gondo Zentrale power plant, now operated by service provider Hydro-Exploitation, which provides the maintenance personnel. The heavy turbines seemed to date from the founding period of the power plant in the 1950s. The company names on the plaques on the turbines—Sécheron, Vevey, etc.—similarly

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See, for example, William Weicker, "Zur Geschichte des Freileitungsisolators," in *Geschichtliche Einzeldarstellungen aus der Elektrotechnik*, vol. III, Berlin, 1932. For further details, see David Gugerli, *Redeströme. Zur Elektrifizierung der Schweiz 1880–1914*, Zurich, 1996, chapter 6.

27

See, for example, Damir Skenderovic, "Die Umweltschutzbewegung im Spannungsfeld der 50er Jahre," in *achtung: die 50er Jahre! Annäherungen an eine widersprüchliche Zeit*, edited by Jean-Daniel Blanc and Christine Luchsinger, Zurich, 1994, pp. 119–46; more generally: Marc D. Landry II, *Europe's Battery: The Making of the Alpine Energy Landscape, 1870–1955*, PhD dissertation, Georgetown University, 2013. Such projects met with local resistance almost immediately, as Skenderovic points out. On this, see also, for example, Erich Haag, *Grenzen der Technik. Der Widerstand gegen das Kraftwerkprojekt Urseren*, Zurich, 2004.

28

See, for example, Beat Kaufmann, *Die Entwicklung des Wallis vom Agrar- zum Industriekanton*, Zurich, 1965.

29

For example, *Landschaftsschutz in der Schweiz 1982. Tätigkeit der SL* [Schweizerische Stiftung für Landschaftsschutz], Bern, 1982, p. 5; Patrick Kupper, *Atomenergie und gespaltene Gesellschaft. Die Geschichte des gescheiterten Projektes Kernkraftwerk Kaiseraugst*, Zurich, 2003, p. 53.

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Énergie Nucléaire S.A., *Une contribution romande à l'étude de l'utilisation de l'énergie nucléaire*, Lausanne, 1958, preface, Archiv Zentrale Gondo.

31

Bundesamt für Energie, *Ausbaupotential der Wasserkraft*, Bern, 2004, p. 34.

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This raised hopes in Gondo because, in the words of mayor Roland Squaratti, a "shortage of electricity" was feared, which would necessarily have to be made up for by hydroelectric power—"but this will require rethinking on a massive scale." See Roland Squaratti, "Gondo-Zwischbergen und die EES," 2011.

Fig. 5

evoked tradition, the long history of Swiss mechanical engineering; in the side rooms, we discovered discarded insulators, antique measuring equipment, a shelf with dusty books: *L'épopée des barrages*, *Power Stations of Europe, Volume 1*, *Énergie Ouest Suisse, 1919–1944*, and so on. On the walls were black-and-white photographs from 1952, when the plant was connected to the grid: men posing in front of consoles in the control room. But appearances are deceptive. The turbines had only recently been replaced, and the old turbines from the 1950s had been shipped to Tanzania. The deserted command center and the digital gauges, some of them with IP addresses, with which the power plant had recently been outfitted, also belied the image of timelessness. The plant has been running "automatically" since 2016 and it's controlled from headquarters in Lausanne, the power plant employee told us.

This streamlining of the operation and maintenance of the power plant (renewal of the turbines, automation of the control system, and construction of the new Sera Dam in 2011) has led to a massive reduction in production costs, increased the efficiency of the power plant (more electricity for the same amount of water), and improved grid integration and stability.[33] These were obviously necessary investments, not least because European electricity prices had been in the doldrums for years—a *mauvaise conjoncture*, as the EES annual reports stated, below production costs.[34] "Wholesale prices," it was also stated at the inauguration of the new headquarters in September 2017, "remain below the production cost of hydropower."[35]

Mining in the Garage

We drove to the second stop of our little tour, the new Sera Dam, which was inaugurated in 2011. As local news reported, this was the first "new construction of a dam in Switzerland since 1989." The cost was 8.4 million francs.[36] The new Sera Dam was built by building contractor Werner Zenklusen, the mayor of the neighboring village of Simplon Dorf. Paul Fux explained the workings of the dam to us, we were awed by the engineering skills; and by the side of the road, we were once again handed flood warning leaflets, this time by two students as part of their summer job with Hydro-Exploitation. What we didn't know at the time was that the original plan was to build a new pumped-storage power station further up the mountain, not to cover the

Fig. 5 Gondo Zentrale power plant, control room, summer 2018. (© Andrea Helbling)

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Cf. "Inauguration of the Modernised Gondo Hydropower Plant in the Simplon Region," Alpiq media release (September 13, 2017), https://www.alpiq.com/alpiq-group/media-relations/media-releases/media-release-detail/inauguration-of-the-modernised-gondo-hydropower-plant-in-the-simplon-region/ (retrieved July 3, 2020). Production costs were able to be reduced from CHF 0.065 to 0.038 per kilowatt-hour.

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(Cf. "Aktennotiz in Sachen EES," e-mail from Peter Bodenmann of May 15, 2020.)

Énergie Électrique du Simplon SA, *Rapport Annuel 2015*, Brig, 2016, p. 5.

35

"Inauguration of the Modernised Gondo Hydropower Plant," 2017. Wholesale prices have somewhat recovered since. Note that these questions—such as the actual magnitude of production costs, the rentability of hydropower, and so on—are rather controversial. See e.g. Kurt Marti, "Die Strombranche gaukelte eine Milliarde Verlust vor," *Infosperber* (April 27, 2018), https://www.infosperber.ch/Umwelt/Strombranche-gaukelte-eine-Milliarde-Verlust-vor; Hansueli Schöchli, "Pikante Studie zur Wasserkraft," *Neue Zürcher Zeitung* (October 30, 2017), https://www.nzz.ch/schweiz/pikante-studie-zur-wasserkraft-ld.1325085 (all retrieved July 3, 2020).

36

"Eine Staumauer ist der Inbegriff der Wasserkraft," *Walliser Bote* (August 20, 2011), p. 5.

demand for electricity, but to arbitrage—to "refine cheap European electricity from nuclear and coal-fired power stations," as critical voices complained.[37] Not only that: in this scenario, the adjacent Laggintal valley, which had been included in the Inventory of Landscapes and Natural Monuments of National Importance (KLN) in 1979—for its "magnificent scenery and also for its botanical and faunal significance"—would have been partially flooded (by another 85-meter-high dam).[38] It did not come to that. (The village community was compensated accordingly.)[39] The fact that the disputes surrounding the waters of Gondo and the adjacent valleys actually go back decades is something we weren't aware of at the time. Nor did we imagine that further down in Domodossola, on the other side of the border with Italy, people were currently mobilizing against a new high-voltage line, the Interconnectore—an "extra-high-voltage direct-current connection" extending from Milan up into Switzerland.[40]

We had seen only one transformer station, further up the mountain—the next stop on our sightseeing tour—where the high-voltage lines (as well as some fiber optic cables) come in from Italy and go out to Switzerland. It buzzed in a monotone in front of us as we photographed the rows of insulators with our mobile phones. But the thought that virtual processes are handled by means of or via these material infrastructures, namely electricity trading, fluctuating prices, adjusted in fifteen-minute or even five-minute intervals, then didn't cross our minds. Nor was the truism that "Gondo" is but one element in a highly complex system—the electrical grid, the "mother of all critical infrastructures," as the industry is fond of saying—immediately apparent.[41] Even the fact that the "production" of cryptocurrencies requires an enormous amount of energy was only somewhat obvious in mid-2018 (hence, after all, the efforts of Alpine Mining to give itself an alpine image): that summer, the amount of energy consumed by the "global Bitcoin network" was roughly equivalent to that consumed by London. However, the true extent became apparent, or scandalized, only as the year progressed. By the end of the year, that amount of energy would nearly double again.[42] Only gradually did these elements coalesce into a single picture: attracted by media reports about a digital future for mountain regions, the deeper we drilled, the more we were confronted with rather traditional conflicts over resources. Indeed, on the basis of our discussions with community representatives and from reading

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Kurt Marti, "SPO will Naturschutzgebiet unter Wasser setzen!" *Rote Anneliese*, no. 203 (2008), pp. 4–5, esp. p. 4.

38

Ibid., p. 4; *Landschaftsschutz in der Schweiz 1982, 1982*, p. 14; see also *Bericht zur Verwaltungsrechnung*, 2012, p. 24, https://www.gondo.ch/ueber-die-gemeinde/gemeindefinanzen/ (retrieved July 3, 2020).

39

Bericht zur Verwaltungsrechnung, 2013, p. 18, https://www.gondo.ch/ueber-die-gemeinde/gemeindefinanzen/. However, the envisioned Simplon Nature Park did not materialize either; see "Gondo: Nein zum Naturpark-Projekt aufgrund energiepolitischer Aspekte," *radio rottu oberwallis* (April 18, 2012), http://www.rro.ch/cms/gondo-nein-zum-naturpark-projekt-aufgrund-energiepolitischer-aspekte-54202. (all retrieved July 3, 2020).

40

CIPRA, "Strom frisst Landschaft," July 4, 2018, https://www.cipra.org/de/news/strom-frisst-landschaft; Terna, "380 kV Italy-Switzerland Interconnector," undated, https://www.terna.it/en/projects/public-engagement/interconnector-italy-switzerland.

41

Maik Neubauer, *Das Europäische Hochspannungsnetz. Die Zukunft von Big Data und künstlicher Intelligenz in kritischen Infrastrukturen*, Wiesbaden, 2020, p. 726.

42

See, for example, Christopher Schrader, "Bitcoin-Produktion verbraucht mehr Strom als die ganze Schweiz," *Tagesanzeiger* (November 12, 2018), https://www.tagesanzeiger.ch/digital/bitcoinproduktion-verbraucht-mehr-strom-als-die-ganze-schweiz/story/10669793 (retrieved July 3, 2020); Camilo Mora et al, "Bitcoin Emissions Alone Could Push Global Warming above 2° C," *Nature Climate Change* 8 (November 2018), pp. 931–33; "Mining Their Own Business," *The Economist* (February 9, 2019), p. 73; and Christian Stoll et al, "The Carbon Footprint of Bitcoin," *Joule* 3, no. 7 (2019), pp. 1647–61.

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media reports, it had seemed evident from the start that the failure of the high-flying plans of Alpine Mining had in some way been due to the (not so benign) alpine environment, namely the avalanche or hazard zoning in the village.[43] After all, the whole village is wedged between the mountains and even the power station was built into the rock, as noted to us by Peter Seiler, whose family comes from the neighboring village of Simplon Dorf and who as a child had served as an altar boy in the churches of Gondo and Simplon Dorf in the summer. Although Mayor Squaratti already had envisioned a 500-square-meter "hall," according to the *Neue Zürcher Zeitung*, no building permit could be obtained for it, despite (or because of) the fact that since late 2017 "half a dozen cantonal offices" and a federal office had been working on the project. The preliminary assessment for rezoning ran aground in spring 2018.[44] Moreover, the capacity of the local substation was already exhausted; another one would have to be procured for several hundred thousand Swiss francs. But even that would take some time. The CEO of Swiss Alpine Mining expressed his displeasure in the media: "We're not prepared to wait six to eight months for a new transformer."[45]

Bad prospects, in other words, despite the favorable climate, for Alpine Mining and all other potentially interested crypto-mining companies in Gondo. In part, this is simply because a blockchain system ultimately consists of a collection of very, very many dedicated computers, which means that it requires not only power, but also space. Nearly 900 graphics cards or graphics processing units (GPUs) were in use in Gondo, which was rather rather modest.[46] Larger installations, such as those found in Mongolia or China's Sichuan province, where the majority of global "hash power" is concentrated—"industry" observers estimated in late 2018 that about 60 percent of all miners were (and still are) located there[47]—easily comprise tens of thousands of dedicated computers, typically so-called ASICs: Application-Specific Integrated Circuits. The hardware-related escalation in the field is of relatively

43

The proliferation of "conflicts of use" in connection with hazard zoning, zones where construction is prohibited, etc., has intensified in recent decades, fueled by increased awareness of "anthropogenic hazard potential." See, for example, Hans Kienholz, "Naturgefahren: Eine zunehmende Bedrohung?" in *Umbruch im Berggebiet. Die Entwicklung des schweizerischen Berggebietes zwischen Eigenständigkeit und Abhängigkeit aus ökonomischer und ökologischer Sicht*, edited by Ernst A. Brugger, Gerhard Furrer, Bruno Messerli, and Paul Messerli, Bern, 1984, pp. 563–88, esp. p. 585.

44

Stalder 2018; "Alpine Mining expandiert von Gondo nach Jokkmokk am Polarkreis," *1815.ch* (June 13, 2018), https://www.1815.ch/news/wallis/aktuell/alpine-mining/ (retrieved July 3, 2020).

45

"Cryptocurrency Miners Help Keep Tiny Swiss Village Alive," *Bitcoinist* (March 29, 2018), https://bitcoinist.com/cryptocurrency-miners-help-keep-tiny-swiss-village-alive/ (retrieved July 3, 2020).

46

Hardy 2019.

47

Christopher Bendiksen et al, *The Bitcoin Mining Network: Trends, Marginal Creation Costs, Electricity Consumption & Sources*, CoinShares Research (November 2018), p. 10. The number remained nearly constant; in late 2019, according to CoinShares Research, it was about 65 percent; see Christopher Bendiksen et al., *The Bitcoin Mining Network: Trends, Marginal Creation Costs, Electricity Consumption & Sources*, CoinShares Research (December 2019), p. 9. Prior to that, that is, from 2008, when Bitcoin first saw the light of day, until the early 2010s, Bitcoin mining had still been a kind of hobby. (Back then, it was pretty much still possible to mine Bitcoin on a laptop.)

Fig. 6
"Crypto-mine," Gondo, interior view, summer 2018. (© Max Stadler)

recent origin. Around 2014, according to the scene's self-historization, the "industrial era" of Bitcoin production set in;[48] around 2014, this somewhat curious hobby had turned into a relatively capital- and know-how-intensive "industry." Why? Because the "mining" of Bitcoin and similar digital currencies is in principle based on making computationally and thus energy-intensive calculations in order to validate transactions. "Proof of work" is the name of the principle that was published in a white paper by the notoriously elusive figure of Satoshi Nakamoto in 2008.[49] The operator of a mine receives a kind of "reward" in the form of Bitcoin. The business model of "miners" is based on this, and because these calculations become more difficult, i.e. more computationally intensive, the more computers participate in this game (while the "reward" decreases), the more hardware or "hash power" has to be deployed.

Fig. 6

What we encountered in Gondo in the summer of 2018, in a disused garage and in the community's civil defense facility, was thus a kind of intermediate stage. Not a hobby anymore, not quite an "industry" yet: a dark shed, bluishly lit by the LEDs; along the walls there were still tools left by the previous user, and boxes with Chinese characters, from which Ethernet cables and other accessories protruded. In the middle: the improvised cooling system, an oversized fan, plus plastic sheeting draped around racks that were equipped with GPUs from Sapphire or AMD/Radeon. A frog had strayed into the cooling water. The Alpine Mining employee who was showing us around the garage was a bit skeptical and replied only hesitantly when asked when he had moved to Gondo: two months ago.[50]

In other words, the blockchain installation in the disused garage was far from what would have been state of the art at the time.[51] But Alpine Mining was already working toward this goal. In mid-May 2018, Alpine Mining announced that although it would not be leaving Gondo, it would henceforth be focusing on a project in Sweden: "an international project of considerable magnitude."[52] The plan was to build a much, much larger data center in the far north, not far from the "Node Pole."[53] And indeed, by mid-2018, Alpine Mining could be seen setting up a much larger "crypto-mine" on behalf of the Hong Kong-based "blockchain infrastructure" provider Diginex. Reportedly, this other, rather more professional-looking computing center cost 30 million dollars. And it involved not a few hundred GPUs, but tens of thousands, with Alpine Mining—soon duly rebranded as Alpine Tech[54]—reinventing itself in the process as a supplier of know-how in matters of managing large-scale, decentralized high-performance computing (HPC) installations.[55]

When we arrived in Gondo in the summer of 2018, the entire episode, in a way, thus had already run its course: the young entrepreneurs, the CEO, CTO, and whatever their titles were—the people who were supposed to revive the village—we never saw them ourselves, except for the one young man who was maintaining the facility. We only heard about them as rumors. They were said to be in Sweden. Or: the CEO had been spotted recently in the village square. A quick look at Instagram, meanwhile, revealed the young start-up's shift to the far north: where idyllic waters, dams, and plummeting streams in and around Gondo were once featured, heavy equipment in sub-Arctic terrain was now on view.[56] The crypto gold rush in Gondo was thus only short-lived.

In the Clutches of Hydroelectric Power

Unlike what Alpine Mining insinuates in its Instagram posts, the "natural environment" surrounding the Simplon site is anything but untouched. For centuries, temporary facilities and long-term infrastructures have been piling up there. In the "Eco-Museum" in Simplon Dorf, one can even trace the history of this superimposition of infrastructures, which dates back to the early modern era—the museum was set up (for this very purpose) in the late 1980s by folklorist Klaus Anderegg on behalf of the Swiss Agency for the Environment, Forests and Landscape (BUWAL).[57] In the seventeenth century, the Stockalperweg—transit entrepreneur and paymaster Kaspar von Stockalper's route over the Simplon Pass—served to transport salt, lead, gold, coal, and other resources and goods across the Alps; Napoleon's troops later marched across the Alps there.[58] The modern village of Gondo also owes its existence to this transit road; traditionally, the inhabitants of the Zwischbergen Valley were farmers.[59] The old gold mill from the nineteenth century, whose surroundings are still contaminated with mercury due to the amalgamation process used to extract gold, also bears testimony to a landscape that has been plundered since early modern times for the purpose of extracting raw materials.[60]

Fig. 7

48 Bendiksen et al, 2019, p. 2.

49 Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System" (2008), https://bitcoin.org/bitcoin.pdf (retrieved February 1, 2020).

50 Officially, in 2017, the year Alpine Mining set up shop in Gondo, five newcomers were registered in Gondo. Five others left, none were born, and one person died. *Bericht zur Verwaltungsrechnung*, 2017, p. 12, https://www.gondo.ch/ueber-die-gemeinde/gemeindefinanzen/ (retrieved July 3, 2020).

51 To put this in perspective: whereas the facility in Valais drew about as much energy as the rest of the village, some "mines" today require as much electricity as a medium-sized town, or more. Indeed, at the time of our visit in the summer of 2018, a much larger facility was being built in Rapperswil-Jona, near Zurich, on a 3,000-square-meter site. See Demelza Hays, "Cryptocurrency Mining in Theory and Practice," *Crypto Research* (April 30, 2019), https://cryptoresearch.report/crypto-research/cryptocurrency-mining-in-theory-and-practice/ (retrieved July 3, 2020).

52 "First Steps in Sweden," May 14, 2018, https://www.instagram.com/p/BixTCnLAMPH/ (retrieved July 3, 2020).

53 Many other data centers (Facebook's among them) were already located there, attracted by tax breaks, subsidies, lower electricity prices, etc. On this, see Asta Vonderau, "Scaling the Cloud: Making State and Infrastructure in Sweden," *Ethnos: Journal of Anthropology* 84, no. 4 (2019), pp. 698–718.

54 "Alpine Mining Becomes Alpine Tech!" March 20, 2019, https://www.instagram.com/p/BvObR_nAJI_/ (retrieved July 3, 2020).

55 This was, in fact, quite a typical move for mine operators in the post-2018 crypto-depression: surviving players, such as Northern Bitcoin (turned "Northern Data"), soon refashioned themselves as "expert" providers of solutions, tending to an expansive, somewhat anarchically sprawling "high-performance" machine park. See, for example, https://northerndata.de/ (retrieved July 3, 2020).

56 See, for example, "How Do You Find Landscapes in #Sweden?" July 2, 2018, https://www.instagram.com/p/BkvIOf2gNgi/ (retrieved July 3, 2020).

57 On this, see Klaus Anderegg, "'Heimat' erfahrbar machen: Das Ecomuseum Simplon," *NIKE-Bulletin* 18, no. 2–3 (2003), pp. 4–11; and Niki Rhyner and Max Stadler, "Umbruch," in *cache 01: Gegenwissen*, Zurich, 2020.

58 Klaus Aerni, "Der Simplon als alpiner Lebensraum in Vergangenheit, Gegenwart und Zukunft," *Minaria Helvetica*, no. 16b (1996), pp. 3–22.

Fig. 7
1890s remains: gold mill piping. From a report by Hans Peter Bärtschi on industrial archaeology, 1995. (© ETH-Bibliothek Zürich, Bildarchiv / Hans-Peter Bärtschi / SIK_01-043919 / CC BY-SA 4.0)

Meanwhile, the opening of the Simplon Tunnel in 1906, then the longest railway tunnel in the world, would contribute to the plight of the small village of Gondo and the Zwischbergen Valley, because it diverted the traffic over the pass into the mountainous underground.[61] During World War II, a border fortification was built which gave the village not only that gigantic eagle monument, but also its first telephone line.[62] (There is still a military training area at the pass, which has been a cause for concern for a long time and recently as well, because "several tank howitzer target areas are located within a nationally protected landscape.")[63]

Finally, the construction of the N9 national highway from 1957 onward,[64] an infrastructure project intended to better connect the peripheral region to the rest of Switzerland, brought in trucks and motorized tourists and was thus a major encroachment on the surrounding area. The colossal Ganter Bridge mentioned above was completed in 1980. Since 2013, a new fiber optic cable also runs along the national highway, "connecting the buildings in Gondo" as well.[65]

The brief "crypto boom" in the small Valais mountain village in the early twenty-first century was in other words built upon old infrastructures and the interweaving of nature and technology, including the problems and tensions and conflicts over resources that went hand in hand with that—and will go hand in hand with it, because these will not diminish in the foreseeable future. On the contrary. The glaciers are already retreating—there are four in the territory of Gondo/Simplon that feed the plants: Rossboden, Hohmatta, Laggin, Holutrift.[66] And there is more change to come. The Swiss Water Management Association knows about these things: over the next few decades, climate change will noticeably shift, or flatten, "pumping profiles," for example (as things are and were, peak production is in summer); it'll create hundreds of new lakes, silt up others, and drive up maintenance costs (already clocking up an estimated 500 million Swiss francs annually).[67]

In order to understand the recent, supposed elective affinity of hydroelectricity and digital technology in the Zwischbergen Valley, the history of hydroelectric power use must be examined more closely, then, right up to the question of how energy policy will be shaped after the transition to new sources of energy. Water management in the Alps has always capital-

59

Conversation with Elisabeth Joris and Peter Seiler, May 1, 2020.

60

Bärtschi 1996.

61

Aerni 1958, p. 12.

62

"Ein Schweizer Tal stirbt aus," *Tages-anzeiger für Stadt und Kanton Zürich* (December 3, 1949), Folder "Historique du Simplon," Archiv Zentrale Gondo.

63

Mountain Wilderness, "Kein Aufrüsten auf dem Simplonpass," press release (July 15, 2019), https://mountainwilderness.ch/fileadmin/user_upload/Dokumente/Medien/Medienmitteilungen/2019/190715_Simplon_MW_MM.pdf. "The army's presence is very important for the revival of the village and for its commercial enterprises," as people in Gondo emphasize to the contrary. See *Bericht zur Verwaltungsrechnung*, 2016, p. 13, https://www.gondo.ch/ueber-die-gemeinde/gemeindefinanzen/ (retrieved July 3, 2020).

64

Aerni 1958, p. 12.

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Bericht zur Verwaltungsrechnung, 2012, p. 17, https://www.gondo.ch/ueber-die-gemeinde/gemeindefinanzen/ (retrieved July 3, 2020).

66

Benedict Vuilleumier and Christine Neff, *Verkannte Gletscher. Gletscherschwund in der Wahrnehmung der Schweizer Gletschergemeinden*, Bern, 2008, p. 34. In 2008, Gondo's then community clerk lamented that "the glaciers and their imminent loss" weren't much of a concern to locals (yet): ibid.

ized on the topographical gradient of the waters, where streams thunder from the heights of the mountains into the depths of the valleys.[68] With the construction of the Klöntalsee, the first modern dam in Switzerland, in 1910, a new phase in the use of hydropower in the Alps began. The construction and maintenance of these major infrastructure projects were capital-intensive, mostly driven by the towns and industrial sites in the valleys, and financed (as in Gondo) by private-sector players or in partnership with the cantons. The canton of Valais was already a leader in the production of hydroelectric power in the 1920s, far ahead of other major producers such as the cantons of Bern, Graubünden, or Ticino.[69] This led to the creation of novel nature-technology hybrids which have drastically and lastingly changed the landscape, people's interactions, and the economy between the mountain and valley communities and between the Alpine and urban cantons. (In the 1950s, Switzerland led Europe in per-capita consumption of cement.)[70]

This also applies to the power plant in Gondo-Zwischbergen, a medium-sized power plant that is part of a larger complex in the Simplon region that collects the inflows in the south of the Simplon. Engineered and built by Énergie Électrique du Simplon (EES), which was founded in 1947, the plant was commissioned in 1952. Since 1969 it has been majority-owned by Énergie Ouest Suisse (EOS),[71] which was acquired by Alpiq Holding in 2009.[72]

Fig. 8

The construction and operation of the power plant in Gondo and the related issues of expropriation and maintenance were regulated in a concession agreement between the municipal and civic community of Zwischbergen and Énergie Électrique du Simplon (EES) on March 8, 1947.[73] The EES joint stock company was founded by Geneva's banking circles, which brought the capital, the engineering know-how and also the vision of hydropower utilization to the Zwischbergen Valley. The concession contract was signed by the mayor and the community clerk; one month earlier, the Zwischbergen community assembly had approved the contract. These concession

67

Roger Pfammatter, "Situation und Perspektiven der Schweizer Wasserkraft," Referat Energie-Apéro Schwyz (Schweizerischer Wasserwirtschaftsverband) (April 2018), pp. 12–14; see also e.g. Astrid Björnsen Gurung and Manfred Stähli, *Wasserressourcen der Schweiz: Dargebot und Nutzung – heute und morgen. Thematische Synthese 1 im Rahmen des Nationalen Forschungsprogramms NFP 61 "Nachhaltige Wassernutzung,"* Bern, 2014.

68

Since the mid-nineteenth century, small and medium-sized power stations have been built on the rivers of the Central Plateau to supply the factories. In the 1890s, during what was called the Second Industrial Revolution, the era of large-scale power plants began. These used larger volumes of water, took advantage of the steeper gradients in the mountains, and distributed energy across power lines.

69

Cf. Schweizerischer Wasserwirtschaftsverband, ed., *Führer durch die schweizerische Wasserwirtschaft,* Zurich, 1921.

70

Skenderovic 1994, p. 122.

71

The other shareholders were, with equal shares: ATEL, Alusuisse, Lonza. See "Prospekt. Énergie Électrique du Simplon (EES). Simplon Dorf. 5¼ Anleihe 1972," Swiss Federal Archives E8170D-01#1996/50#242*.

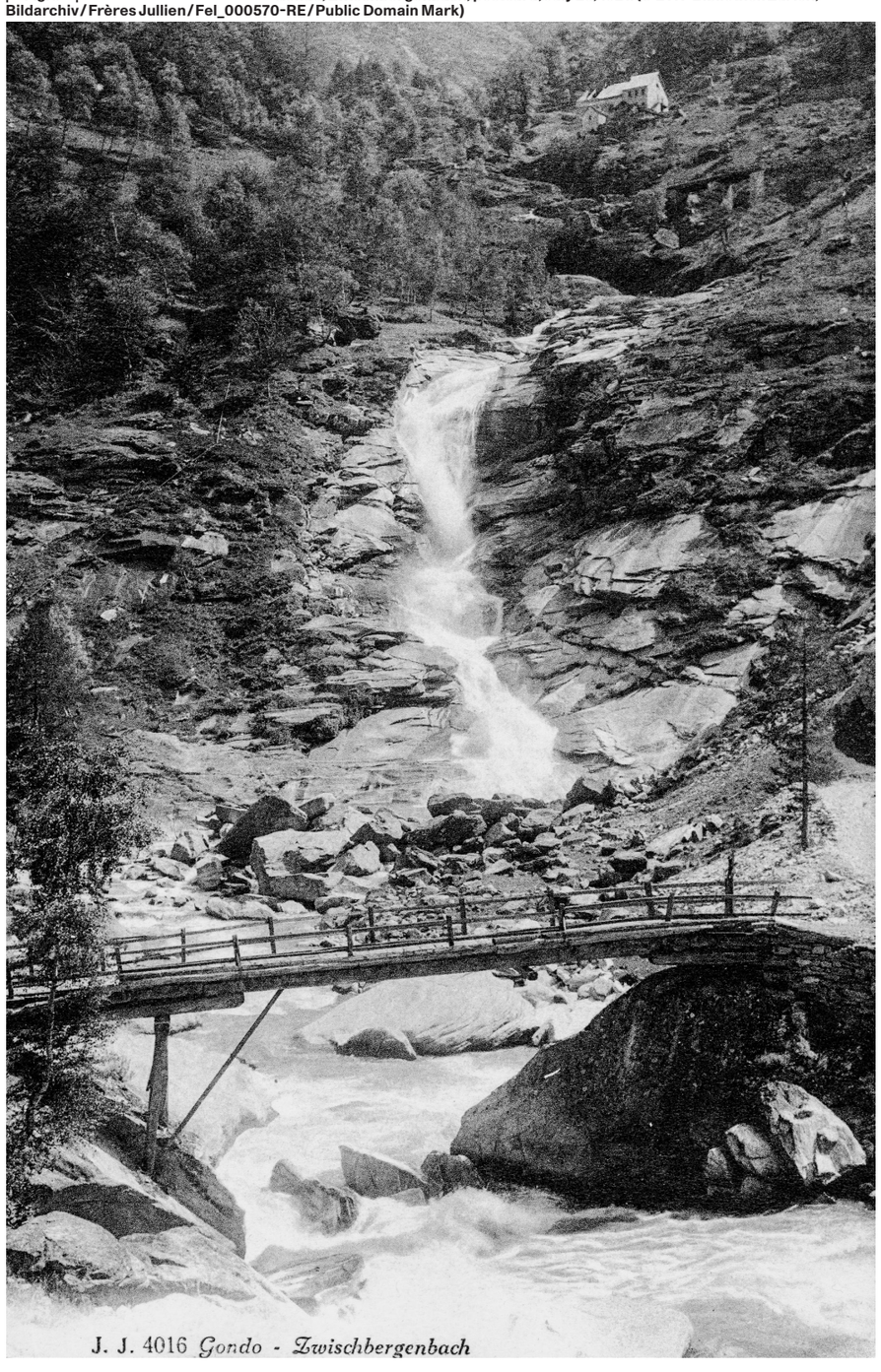
72

"Atel and EOS become ALPIQ," press release (December 19, 2018), https://www.alpiq.com/alpiq-group/media-relations/media-releases/media-release-detail/atel-and-eos-become-alpiq/. Alpiq now holds some 80 percent of EES shares and (despite its Alpine name) is involved in power stations (nuclear, fossil, wind, solar) throughout Europe—including in Hungary, Norway, Italy, and the Czech Republic; it also operates in such sectors as "Digital & Commerce" (electricity trading), "Industrial Engineering," and "Building Technology & Design." See https://www.alpiq.com/ (all retrieved July 3, 2020).

73

Konzessionsvertrag von Josef Escher (Notar in Brig) zwischen André Koechlin und Fernand Dominice, beide wohnhaft in Genf, für die in Gründung befindliche Énergie Électrique du Simplon (EES) und Anton Jordan (Gemeindepräsident) und Moritz Lauwiner (Gemeindeschreiber) handelnd für Munizipal- & Bürgergemeinde Zwischbergen, 2. März 1947, Archiv Zentrale Gondo.

Fig. 8 Gondo, Zwischbergenbach, postcard, July 29, 1921. (© ETH-Bibliothek Zürich, Bildarchiv / Frères Jullien / Fel_000570-RE / Public Domain Mark)



contracts are an interesting type of historical document because, in addition to shedding light on the rights and obligations, they also reveal the power structure within such large-scale infrastructure projects.

The duration of the concession was set at eighty years, as is customary in Valais, and it has been renewed several times since.[74] EES had the right to dam the water; the uncultivated land that was used was made available to EES free of charge. The owners were compensated for the cultivated land. The community received a one-time compensation of 50,000 Swiss francs. EES paid the community an annual water tax for the right to generate hydropower. It was agreed that the distribution of the water tax between Simplon Dorf and Zwischbergen should be determined "through expertise."[75]

It was further agreed that the residents of Zwischbergen would have the right to preferential employment in the construction and operation of the plant, and this right was actively exercised by the population. In contrast to the construction of the Simplon and Lötschberg Tunnels, for example, for which mainly Italian workers had been hired, the construction of the power plant and the dam created local jobs.[76] These were convenient to a village that the newspapers in the cities of Geneva and Zurich (quite exoticizingly) considered to be situated in one of the most remote valleys: "La plus reculée des vallées suisses."[77] "A Swiss Valley Is Dying Out" was the headline in the Zurich *Tagesanzeiger* in 1949: a place with no electric lights ("unknown"), no cash, no "trace of civilization or mechanized existence" except said telephone connection, which dated from World War II, and some trafficking in "tobacco, coffee, etc."[78] "New life was brought by the construction of the power station," industrial archaeologist Hans-Peter Bärtschi later assessed.[79] In its actual operations, this new life was fairly modest: EES brought nearly twenty permanent jobs to the village at that time. Mainly "maintenance, repair, and inspection work," as the plant regulations phrased it, in the central office, on the "transmission lines"—keeping an eye on inspection

74

In Gondo, reversion (the end of concession) is currently due to occur in 2061. See *Bericht zur Verwaltungsrechnung*, 2010, p. 27, https://www.gondo.ch/ueber-die-gemeinde/gemeindefinanzen/ (retrieved July 3, 2020).

75

Konzessionsvertrag von Josef Escher (Notar in Brig) zwischen André Koechlin und Fernand Dominice, 1947, p. 5.

76

Elisabeth Joris, "Italianità, regionale Tradition und internationale Unternehmen. Soziale Beziehungen und wirtschaftliche Konflikte im Tunnelbaudorf Goppenstein," in *Tiefenbohrungen. Frauen und Männer auf den grossen Tunnelbaustellen*, edited by Elisabeth Joris, Katrin Rieder, and Béatrice Ziegler, Baden, 2006, pp. 86–103.

77

"La plus reculée des vallées suisses," *Tribune de Genève* (May 1953), Folder "Historique du Simplon," Archiv Zentrale Gondo.

78

The place was also haunted by severe, "sheer endless" winters, cut off for weeks and months. Unsurprisingly, or so one journalist pondered in 1949, the young people of Gondo would leave for the towns, lured by "the glittering franc". See "Ein Schweizer Tal stirbt aus," *Tagesanzeiger für Stadt und Kanton Zürich* (December 3, 1949), Folder "Historique du Simplon," Archiv Zentrale Gondo.

79

Bärtschi 1996, p. 41. The "new" life of some Valais mountain villages was already viewed critically by contemporaries: "The whole social and spiritual structure of these valleys is changing in a revolutionary way," observed folklorist Richard Weiss, "by no means only in a bad sense, but always with the painful and inharmonious circumstances of any revolution." See Richard Weiss, "Alpiner Mensch und alpines Leben in der Krise der Gegenwart," *Schweizerisches Archiv für Volkskunde* 4, no. 58 (1962), pp. 232–54, esp. p. 238.

corridors, switches, warning lights, and instruments. Alcohol was not permitted, but there was work on Sundays and public holidays; the reading on the meter was reported to Lausanne over the phone.[80]

Unlike in the construction of power plants, then, very little human power was required during their maintenance and operation. And soon enough, from the mid-1960s onwards, "one-man operation" prevailed in the control room as a matter of principle—"automation" as a sword of Damocles already hung over the Gondo power station a decade after it was opened.[81] At first, this mainly meant "deskilling." EES (or EOS) thus complained early on about difficulties in "recrutement de personnel qualifié" in its "usines électriques," especially in the remote ("mal accessables") areas—and speculated about whether it would be possible to make the operation of power plants more interesting ("de rendre le service d'équipe plus intéressant") or whether it would be better to simply (semi)-automate and hire more unskilled locals—"les éléments indigènes."[82] The shift work guaranteed since 1978 in the (renegotiated) concession contract—or, rather, the guaranteed non-introduction of "remote control"—was eliminated only during the complete overhaul of the plant in 2017[83]—a "delicate" issue about which people in the village did not want to tell us much more.

Historian Elisabeth Joris, who herself comes from Visp, explains that the history of industry in Valais is essentially a history of electricity.[84] As she notes, because of hydroelectric power, industry settled in Valais and the electrical power stations were initiated and co-financed by industry. (Indeed, as late as the mid-1980s, some people even considered Valais to be the "water canton of Alusuisse.")[85] According to Joris, local people and authorities had never been instrumental in this development. But since the beginning, loyalty was bought through representation in the governing bodies. *Red Anneliese*, a local magazine Joris also was involved with, indeed has long criticized the "politics of energy" in Valais, similarly arguing that although the communities were involved on paper, they were nothing more than "straw men" in economic terms.[86] Since the 1970s, the left-wing magazine had been denouncing the prevailing hydroelectric policy: "When setting the maximum water tax rate, a policy has always been pursued over the years that primarily secured cheap electrical energy for the economic bosses and the Swiss population centers," it stated, for

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Werkordnung der Kaftwerke Gondo und Gabi (1960), and "Dienstmeldungen" (1965), Folder "General. Règlements et notes," Archiv Zentrale Gondo.

81

"Service à un seul agent" (September 24, 1963), Folder "Automation Gondo," Archiv Zentrale Gondo.

82

"Main d'ouvre dans les usines" (October 27, 1964), Folder "Valaisans. Associations et groupements," Archiv Zentrale Gondo.

83

See *Bericht zur Verwaltungsrechnung*, 2017, p. 21, https://www.gondo.ch/ueber-die-gemeinde/gemeindefinanzen/ (retrieved July 3, 2020); and Artikel 6, "Konzessions-Vertrag (Verlängerung der Konzession vom 8. März 1947)" (January 27, 1978), Swiss Federal Archives E8170D-01#2015/239#488*.

84

Conversation with Elisabeth Joris and Peter Seiler, May 1, 2020.

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"Wasserkanton Alusuisse," *Rote Anneliese*, no. 85 (November 1985), p. 6.

86

"Die Guten in die Ausserschweiz, die Teuren selber bauen," *Rote Anneliese*, no. 80 (April 1985), p. 5.

87

"Müssen Walliser von den Arabern lernen?" *Rote Anneliese*, no. 12 (June 1976), p. 8.

Fig. 9

example, in a 1976 article entitled "Must Valaisans Learn from the Arabs?"—an allusion to OPEC.[87] In the early 1980s, relations turned even more conflictual as the foreseeable end of many concession agreements—known as "reversion"—became an urgent matter for the first time; and Alusuisse-Lonza, too, faced a crisis, preparing to sell off (unprofitable) power stations to the canton.[88]

This language—OPEC, éléments indigènes, straw men—reveals that when we speak of Valaisan hydropolitics, we have to consider the dimensions of social and economic policy. In the case of Gondo as well, using capital from Geneva's banking circles to build a power station could be read as a kind of colonization project carried out by city-dwellers and industrialists in a rural area.[89] And the concession system could be described as hydropolitical corruption: On the national or cantonal level, it has posed and still poses questions of fair redistribution, of (in)correct taxation of energy companies, etc.; locally, it has caused resentment. The distribution of the water tax between the communities of Gondo and Simplon Dorf, which is to be carried out on the basis of "expertise," as was agreed upon in the concession contract, led to envy and rancor between the two villages, as Peter Seiler, whose family comes from Simplon Dorf, explained to us.[90] While the one (Simplon Dorf) has to bear higher infrastructure costs (such as for the school), the other (Gondo) is swimming in cash and is at the same time a dying community—a community in which not even the mayor or the vice-mayor still reside.

All this—the growing hunger for energy, increasing environmental awareness, the profit motive of the power companies (located down in the valley), the conflicting interests among the mountain communities—subsequently complicated the political economy of hydropower. In the "moated castle canton" of Valais, not only left-wing groups such as Critical Upper Valais (KO) got involved during the 1970s and 1980s, of course, but increasingly conservation organizations as well, including the Swiss Landscape Protection Foundation, which was established in 1970. It also turned out that nuclear power was by no means as cheap to produce as had once been hoped, so that hydropower again became more appealing for a variety of reasons. As a result, a whole series of hydroelectric power projects were soon underway,[91] including one in Gondo, which this time immediately roused the attention of nature conservationists: In the mid-1980s, the construction of a new power plant or reservoir was prevented, to the chagrin of at least some villagers.[92] The stumbling block was, once again, the beautiful Laggintal, the valley that had only recently been added to the KLN inventory. "One of the few uncharted areas on the map of benefits and profits," as it was called in the critical 1987 hiking guide *Wandert in der Schweiz solang es sie noch gibt* (Go Hiking in Switzerland

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See, for example, "Heimfall – Millionen für das Wallis," *Rote Anneliese*, no. 65 (February 1983), p. 7; and "Dossier Energie," *Rote Anneliese*, no. 86 (January 1986), pp. 6–7. One of the contentious issues here was the question of who would benefit from this reversion: individual communities? Or all inhabitants of the canton?

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Such terminology was, in any case, readily at hand. See in particular Urs P. Gasche, *Bauern, Klosterfrauen, Alusuisse. Wie eine Industrie ihre Macht ausspielt, Beamte den Volkswillen missachten und die Umwelt kaputt geht: Eine wahre Schweizer Geschichte*, Gümligen, 1981; Tobias Bauer, Greg Crough et al, *Silbersonne am Horizont – Alusuisse, eine koloniale Geschichte*, Zurich, 1989.

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Conversation with Elisabeth Joris and Peter Seiler, May 1, 2020.

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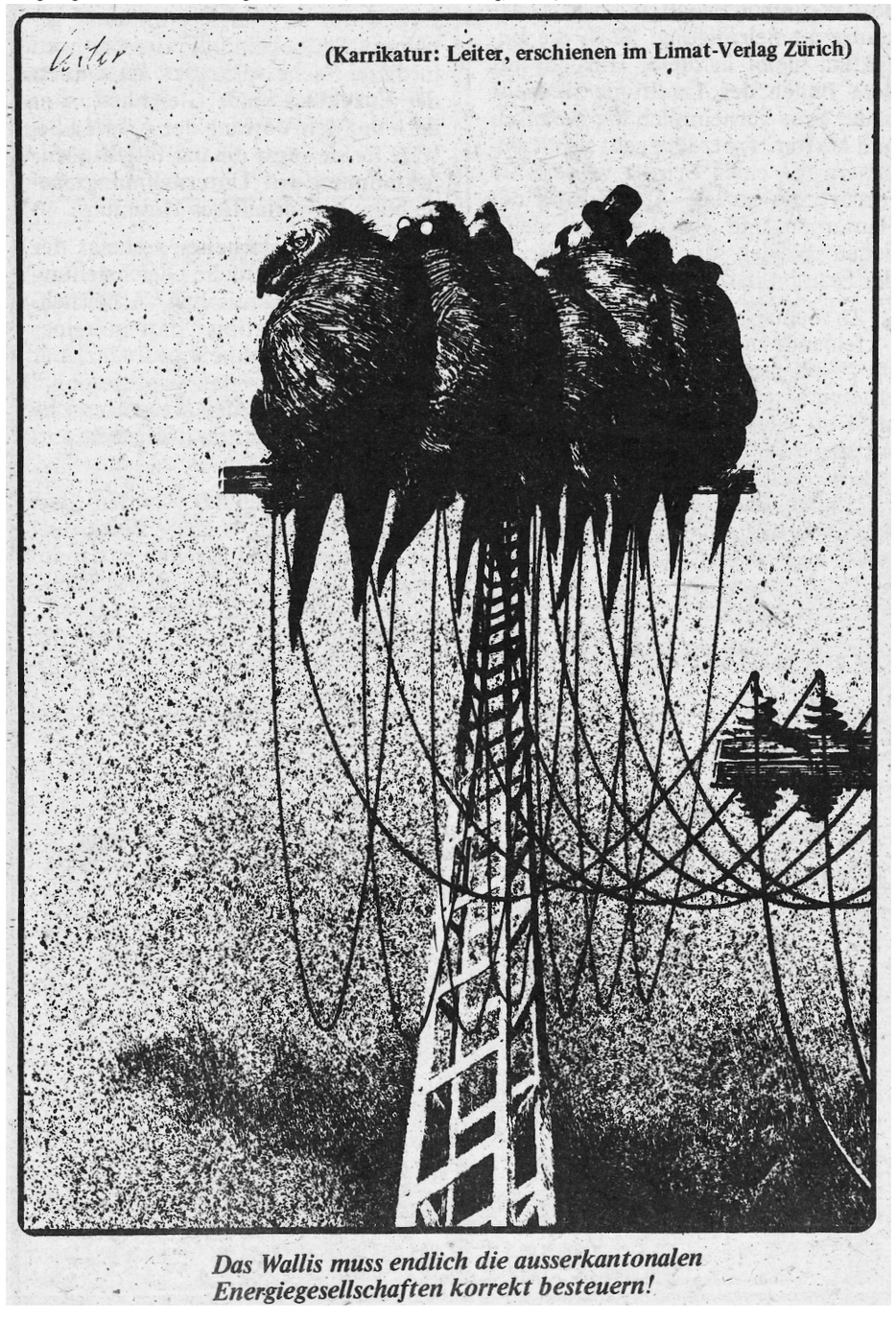
See, for example, Jürg Frischknecht, "Wem nützt die UVP?" *Energie & Umwelt* [Themenheft Pumpspeicher Schweiz], no. 4 (1988), pp. 14–17.

Fig. 9 "Valais must finally tax the extra-cantonal energy companies correctly!" — political cartoon by Martial Leiter. (Rote Anneliese, no. 54/55 (December 2, 1981), p. 16, reproduced in Martial Leiter (Ed.) *Festgenagelt: Politische Zeichnungen* 1976–1980, 1980 © Limmat Verlag, Zürich)



While It Still Exists).[93] The opponents of the project—an alliance of diverse interests, plus one or two local hoteliers—were counting on tourism informed by human geography: starting with the "salvaging" of a historic trade route, christened the Stockalperweg, the community was developed economically through "gentle" tourism.[94] Upon closer inspection, then, the hydroelectric idyll that Alpine Mining so fondly conjured up is anything but intact.

Price Collapse

We returned to Gondo in December 2018 to have another look around and browse through the archives of the power plant. At night, though, we missed the bus back to Brig, or rather, it didn't show up, so we went looking for the community clerk, who was still in his office. We sat there, listening to him expound on the significant decrease of power consumption in the town, when he broke off mid-sentence to toss eight or so oversized chocolate gold coins at us. Electricity consumption, he related, had begun to dip in May, and it collapsed "dramatically" in August, "along with the currency itself."[95] Indeed, by mid-December 2018, the price of Bitcoin, the major cryptocurrency, had dwindled to a mere USD 3,500—down from around 16,500 dollars the year before.[96] "There'll be a shakeout; only a few players will survive," our interlocutor offered, noting he'd been a bit of a "skeptic" all along. The crypto business-friendly strategy the village had adopted—"going on the offensive, hoping that might revitalize the village"—had, at any rate, failed. He then encouraged us to consume the faux gold coins: the remains of a recent, now pointless, PR effort.

Nevertheless, these two narratives, these two scenes—the enterprising "phantom village" of Gondo, controlled from Brig, and Alpine Mining, the entrepreneurial start-up in search of cheap electricity—complemented each other for a while. The attraction was mutual in many ways, as we've seen. In the end, however, the brief media hype was just another episode in a long history of booms and busts, which at best spread the name Gondo around the world via media reports and attracted a few curious people and tourists to the village. We, too, followed this hype and in the beginning quite succumbed to it. On closer inspection, however, it became clear that neither the idea of a literally natural setting, with self-sufficient people living in the backwoods mountains, nor that of the young, daring entrepreneurs "whose tattoos and urban style stood in stark contrast to the practical mountain garb of the locals,"[97] does justice to things. Behind the vision of decentralized, de-politicized and digital "gold," there is and was, in any case, another, much more profound, story: that of resources, hydropower, energy, and the symptoms of climate change: an issue that was, is, and will remain politicized.

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See, among other things, "Wasserkraftnutzung im Laggintal, Stellungnahme der Konzessionsgemeinden" (July 1982), Swiss Federal Archives E8170D-01#2015/239#488*; *Tätigkeit der SL*, 1982, pp. 13–14; "Die Guten in die Ausserschweiz, die Teuren selber bauen," 1985: 5; Frischknecht 1987, pp. 197–200.

93

Ibid., p. 191.

94

"This project … is intended to create an example of how a power plant can be placed in nature without leaving a disturbing impression for all time," argued the advocates of the power plant project; it would prevent the valley from "becoming overgrown," enable "professional alpinism," and create real jobs. See "Wasserkraftnutzung im Laggintal, Stellungnahme der Konzessionsgemeinden" (July 1982), Swiss Federal Archives E8170D-01#2015/239#488*.

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Lukas Zenklusen, community clerk (Gemeindeschreiber) since 2009, interview, December 17, 2018.

Seen in this light, the Gondo episode was anything but visionary: the specific constellation of interests in hydropower policy in the Alps hardly provides any incentives for systemic change. It was rather a symptom of path dependencies—technical, economic, and mental. Ruedi Bösiger of WWF Switzerland told us that, in his opinion, a real system change was now imminent and that in the future a large proportion of the energy would have to come from photovoltaics. However, the large electricity producers in Switzerland have been producing energy for a century from hydroelectric power and supplementing it with nuclear power. With photovoltaics, it will now be possible for production to be more decentralized in the future and to meet a large proportion of the need for electricity in a renewable and environmentally friendly way. The age of hydropower having quasi-monopoly status is slowly coming to an end.[98]

The Alps, then, as a hydro-solar "castle"? We shall see. This vision has actually been around for a while;[99] but existing interdependencies of interest continue to perpetuate the idea of the inexhaustible Alpine battery. And perhaps it is just too easy to "refine" cheap base-load electricity at peak times by means of precisely controlled pumped storage power plants[100]—a system of electricity price arbitrage not unlike crypto-mining.[101]

The age of the great Swiss myths is by no means over. The current upheaval brought about by the digitalization of the financial system in particular happily revisits the old myths of Switzerland as an Alpine country with an abundance of natural resources—despite climate change, and even though both the electricity markets and the digital infrastructures are highly globalized and decisions on the use of resources are, just as they were around 1900, not made locally but are shaped by global economic and technical processes. However, it is precisely in such a phase of technological upheaval that the old myths sell particularly well. There must be a little continuity.

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96 The other major currencies weren't making a good impression either. Ether, for example, was worth about 83 dollars, down from 1,250 dollars. This wasn't just bad news for speculators; it would have been a problem for coin producers as well, insofar as the average cost of "creating" of a single Bitcoin at the time hovered, by one estimate, somewhere in the range of 8,500 dollars (the cost of electricity being the most significant variable when it comes to the "mining process"). See Bendiksen et al 2018, p. 5.

97 "Gondo's New Gold Rush: Cryptocurrency Boom Breathes Life into Swiss Village," *The Local* (March 29, 2018), https://www.thelocal.ch/20180329/gondos-new-gold-rush-cryptocurrency-boom-breathes-life-into-swiss-village (retrieved July 3, 2020).

98 Conversation with Ruedi Bösiger, April 30, 2020.

99 Valaisan politician and EES small shareholder Peter Bodenmann, for example, has been advocating a diversified, hydro-solar vision of the Alps, if you like, for decades. See, for example, "Interview mit Peter Bodenmann zum Ausstieg aus Atom, zum Energiesparen, zum Berggebiet, zu Sonne und Wind," *Rote Anneliese*, no. 97 (June 9, 1987), pp. 6–7.

100 See Marti 2008, p. 4.

101 "Miners," as *The Economist* notes, "are arbitraging, buying an underpriced commodity (electricity) and converting it to bitcoin for a profit." See "Why Are Venezuelans Mining So Much Bitcoin?" *The Economist* (April 3, 2018), https://www.economist.com/the-economist-explains/2018/04/03/why-are-venezuelans-mining-so-much-bitcoin (retrieved July 3, 2020).