RE GENERATE

A SELF-SUFFICIENT COMMUNITY

LOPITA DAS

IN PARTNERSHIP WITH ALLYSON REYES

Degree Project: Research - 20/FA-ARCH-501-09

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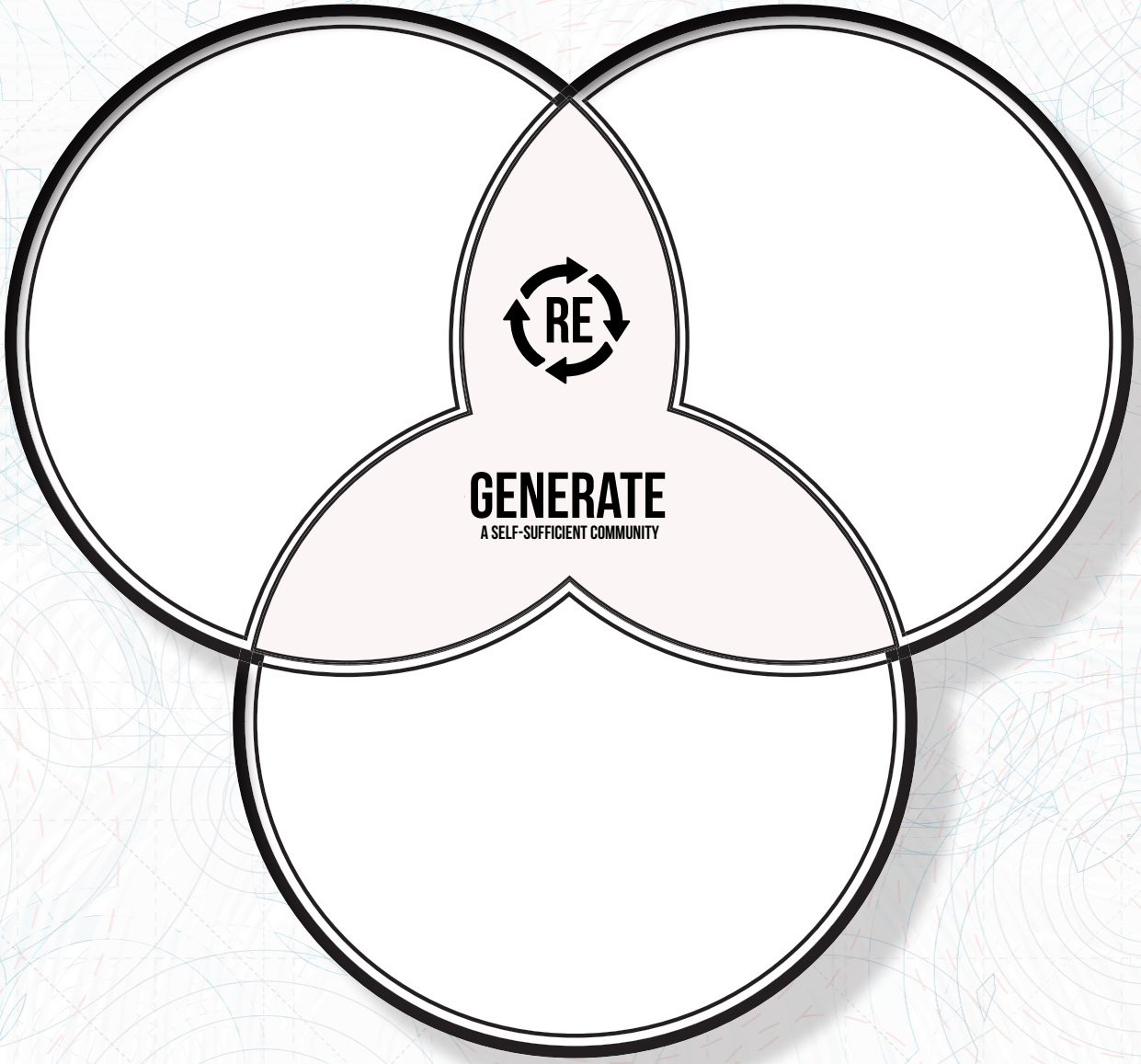
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What new architectural paradigms emerge when we discover our relationship towards energy?

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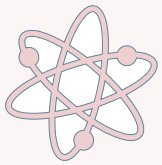
Negligent Past



1942
-Creation of Manhattan Project

1945
-Bombs dropped in Hiroshima & Nagasaki

1945
-First Nuclear Explosion

1951
-First Nuclear Power Plant

1970
-Construction of Pripyat and Chernobyl Power Plant begins

1979
-200,000 Rally to protest Nuclear Energy

-Concrete Sarcophagus placed over fourth reactor
14 December 1986

-Flights deposit sand, lead, clay and boron on site
27 April- 1 May 1986

-Evacuation of 50,000 people
27th April 1986

-Soviet minister writes to not evacuate Pripyat
20:00:00

-Firefighters arrive at scene
01:35:00

-Fire alarm activated
01:26:53

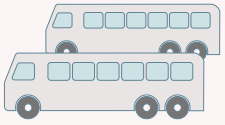
-1,000 ton lid lifts by the first explosion
01:23:45

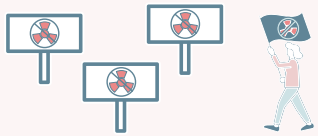
-Reactor reaches 120 times its full power
01:23:44

1986
26th April

-Test begins
25th April 1986

-Three Mile Island Reactor suffers partial meltdown
1979



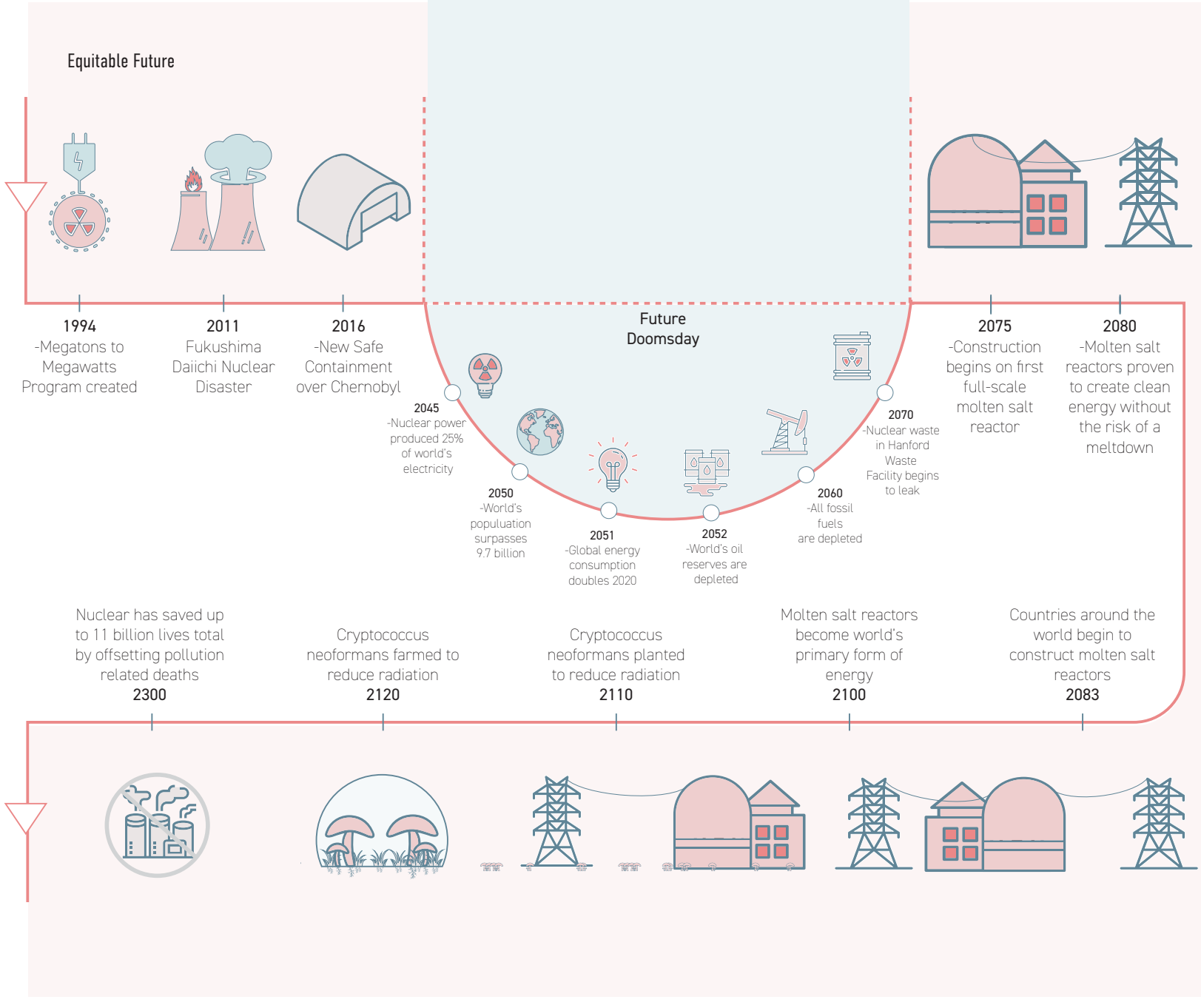


Author: Allyson R. and Lopita D

CAN OUR WAY OF LIVING ACKNOWLEDGE OUR ACTIONS?

Learning from our negligent past and hoping towards an equitable future, ReGenerate: A self-sufficient community proposes a new way of living where the architecture restores the environment into a symbiotically co-existing autonomous community. The architecture would repair anthropogenic change and mitigate towards safe localized energy producing community. This self-sufficient community will become a prototype for energy production within the local fabric by reinstating adjacency and hence responsibility.

As we explore the history of the universe, energy was the predominant element of genesis. Energy and human evolution go hand in hand. Human history can be described through a series of major impacts of the surrounding natural environment mediated by the discovery of fire and energy use. The extent of human capacity is the consequence of our ability to harness energy. Energy is all around us, a spiritual energy field also exists within us humans, an aura, which reflects the state of being and the health of oneself. Our aura is a dynamic force constantly flowing, flashing, vibrating, expanding, and decreasing. The flow of energy transfers in and out of the human and into our living environment. Energy is all encompassing, and the need for harnessing energy can be integral to the prosperity and health of Earth and our self.



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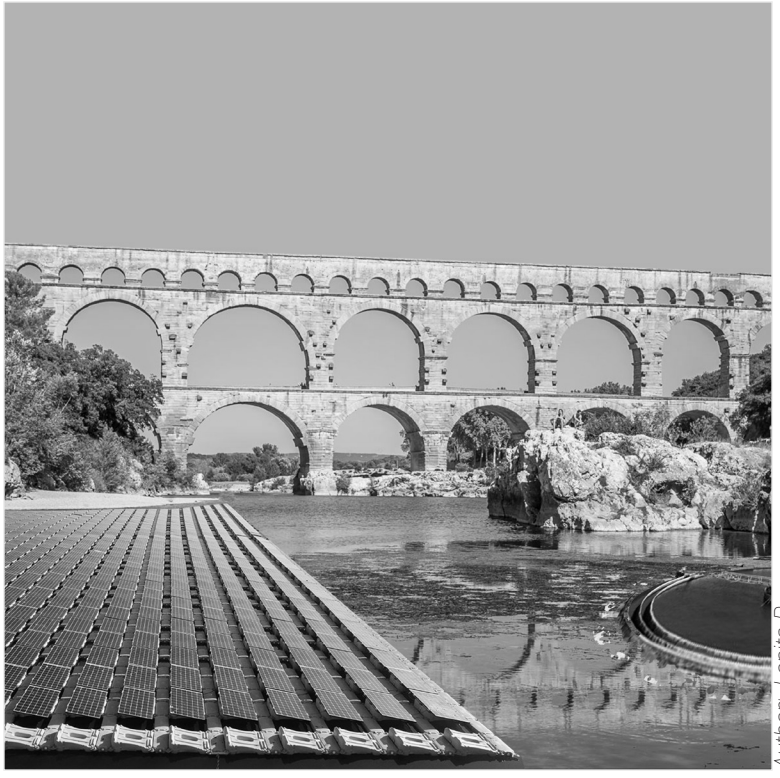
Nuclear power is the only zero-carbon technology able to provide consistent, base load power to the world. But this drive to harness energy has resulted in many disasters, such as the accidents in Chernobyl, Three-Mile Island and Fukushima Daiichi. Because of these events, nuclear production is infamous for disasters. How can we change the public's perception of nuclear production as the public's fear has reduced the potential of nuclear power and stunted the advancement of energy production? These disasters have had a universal impact on our environment and ecology. Studying Chernobyl as a site for human intervention, the prototype seeks to reduce the radioactivity and make it safe for rehabilitation for the affected.

Can our way of living acknowledge the past neglect and respond to an equitable future? We believe a self-sufficient community will protect environmental neglect. Our current way of living suggests further depletion of natural resources as the human population increases. In order to achieve a self-sufficient community, it must be cohesive and address the well-being of the community through its living environment. By incorporating all aspects of production into the community, the drive for consumerism will depreciate as the people engage in the act of making and move towards a common goal of advocating for a sustainable way of living. These communities will offer paradigms of what human ingenuity is capable of when it rediscovers its lost sensitivity toward our environment. Can architecture help to regenerate the world?

WHAT IS OUR CURRENT PREDICAMENT?

Pont-du Gard Aquaduct, France

Water is known as a necessity for human life, but it is often forgotten how influential water is in so many facets of so many different cultures. Much of Roman society was built around their aqueduct system, and it carried as much symbolic meaning as it did functional purpose.



Author: Lopita D

Kazamura Lava Caves, Hawaii

Created by the goddess of volcanoes, Pele, in an act of simultaneous creation and destruction. 'Unlike regular caves, which are the result of centuries of erosion and dissolution, lava tubes are forged in one creative act – like a work of art.

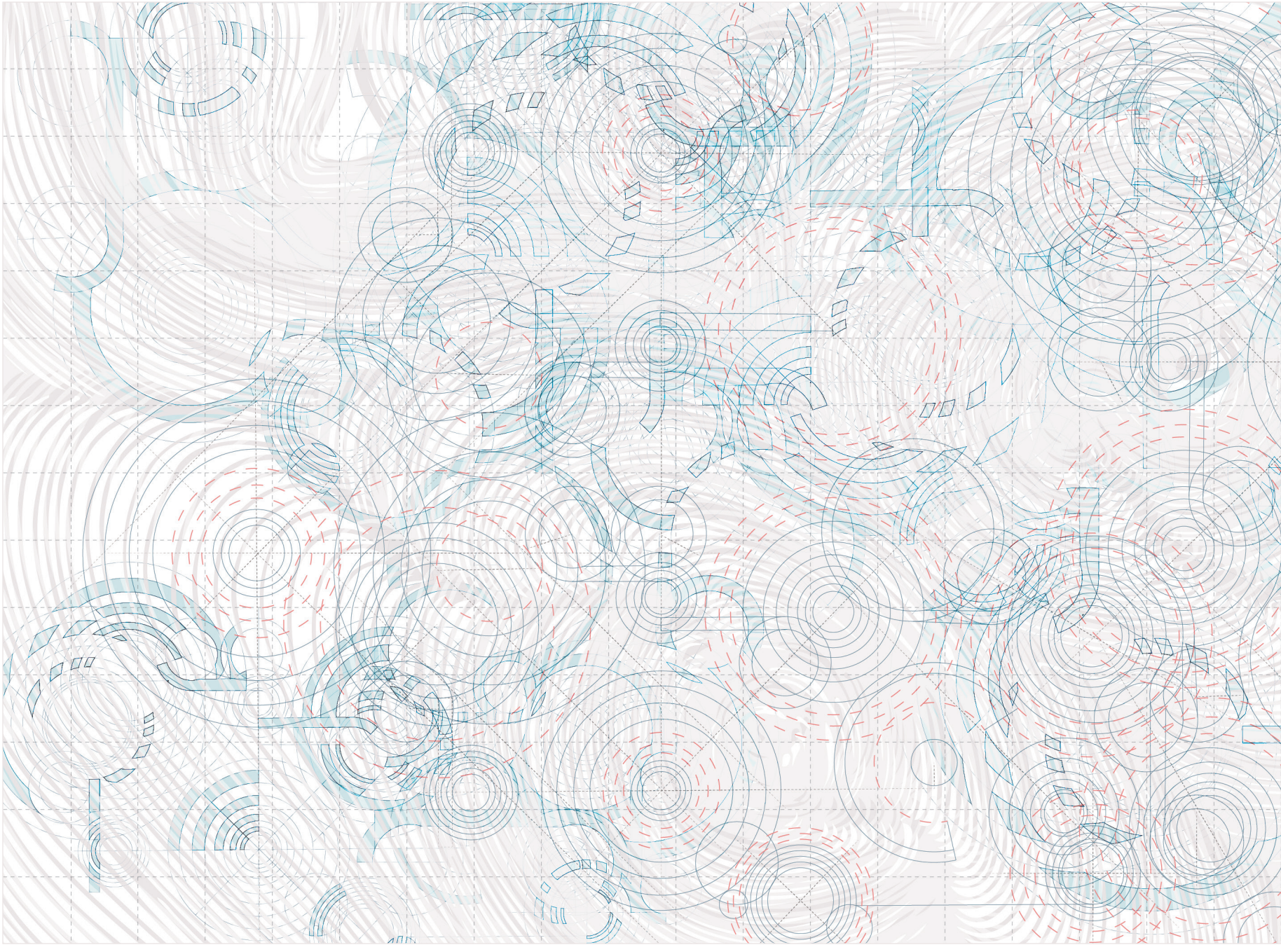
Author: Lopita D

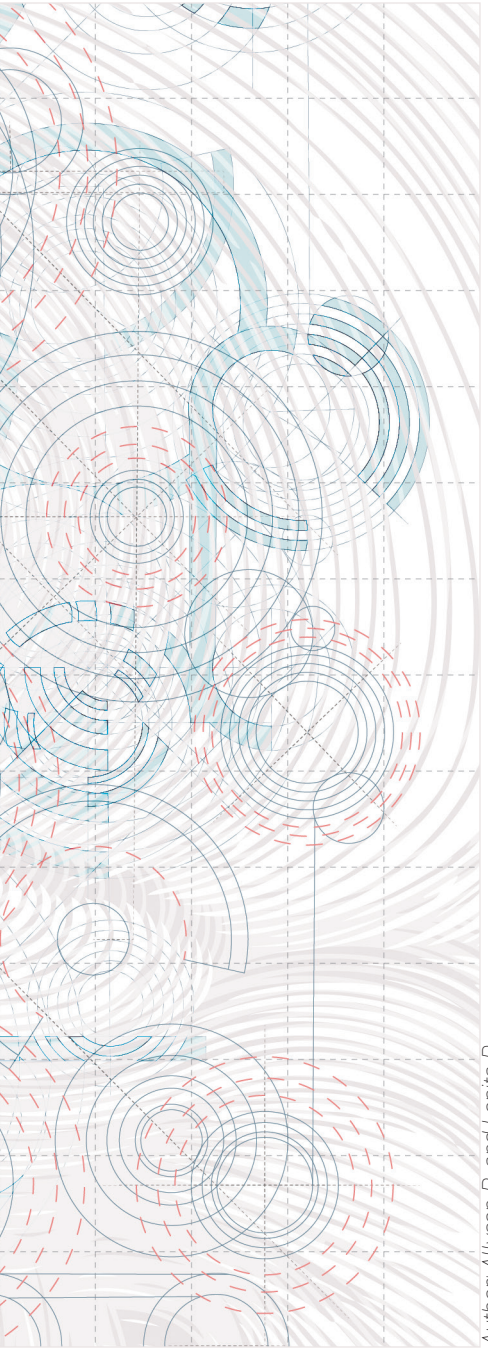
Author: Lopita D

Chernobyl Accident, Ukraine

The exclusion zone is eerily quiet, yet full of life. Due to the exclusion of human activity around the shuttered power plant, the numbers of wildlife have increased and has transformed into a refuge for all kinds of animals.

The urgent need to respond to the ecological issues the earth has endured is long overdue. Constant neglect of the earth and its resources has caused permanent damage that we must rectify in order to move forward. Natural landscapes have manufactured into urban cityscapes in lieu of our ability to harness energy. Energy production has become an integral part of our human society. The methods have evolved from coal to solar to nuclear, but the quest is still on. The world needs a safe and clean source of energy that is able to support our high demand without destroying the planet. Although integral to the city life, energy production has distanced itself from the community, out of mind and out of site.





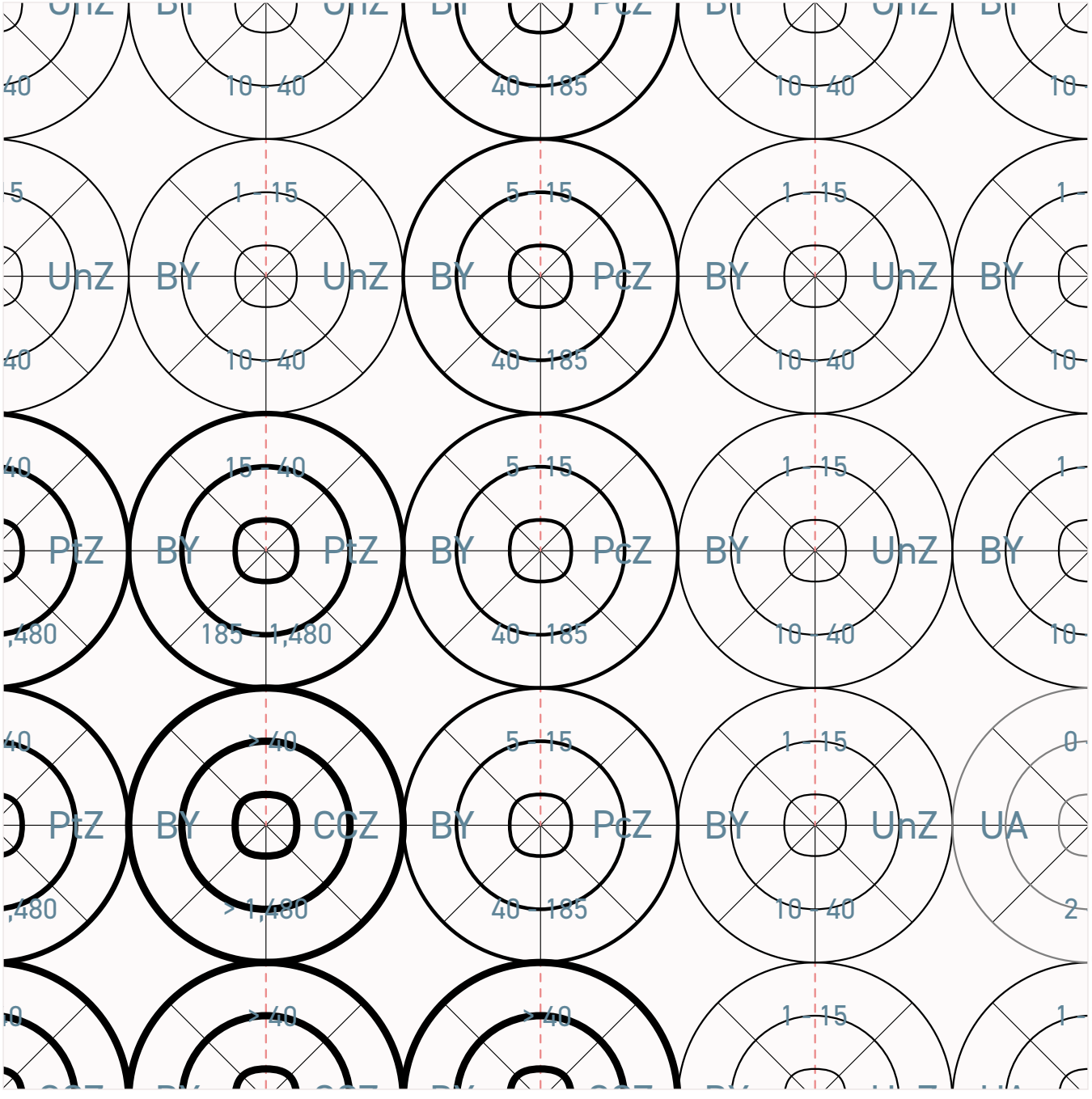
Author: Allyson R. and Lopita D

Vibrant life or Dull matter?

This concept drawing enagages the unfamiliar nature of energy flow.

Nuclear Energy has always been synonymous with power and advancement of society. But it also raises questions of safety and neglect. Nuclear power plants provide energy by using the energy expelled from a nuclear fission reaction. By trying to move away from high carbon emitting energy systems we are moving in the right direction, but at what cost? Is the alternative any better?

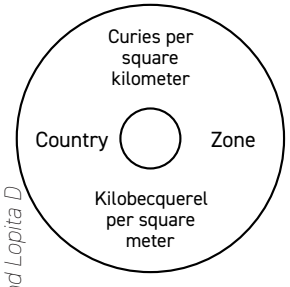
Trying to understand the human impact of the global climatic crisis is paramount. Authors such as Dipesh Chakrabarty and Jane Bennett suggest to stop separating the humans and non-humans, the biotic and abiotic, the "vibrant life" and "dull matter"[1]. I believe that it is our responsibility as a species to become the force of change, to repair our past mistakes and reconnect with other living forms to create a symbiotic relationship, where we all co-depend on our desire for survival. A relationship that is a direct consequence of human interference but for once it will be for the benefit of others as well, not just us.



Countries:
BY- Belarus
UA- Ukraine
RU- Russia

Exclusion Zones:

LaZ- Livable Zone
UnZ- Unnamed Zone
PcZ- Period Control Zone
PtZ0- Permanent Control Zone
CCZ- Confiscated/ Closed Zone



Author: Allyson R. and Lopita D

Human Geological Force

This map shows the nature of the explosion and difference in zoning.

HOW ARE WE RESPONSIBLE?

Human innovation has been accelerated since the industrial revolution. This resulted in a divide amongst the humans and non-humans . We are free to do as we please, as we have learnt to control the world around us, through the advancement in technology. World War II ended with the invention of the atomic bomb which helped conceive a new method of energy production, nuclear energy. The newer non-carbon emitting energy source quickly became popular. This quick rise resulted in unimaginable catastrophes such as the Three Mile Island disaster in 1979 and Chernobyl in 1986[2]. The lack of safety protocols in place was a major human error that resulted in numerous loss of lives and destroyed the ecosystem. On April 26, 1986, a reactor of the Chernobyl Nuclear Power Plant located in today's Ukraine exploded, causing "radioactive material to blanket over 77,000 square miles across Europe and Eurasia"[3]. Due to the restrictions and health risks of permanently inhabiting the area, the thirty-kilometer Exclusion Zone around the Chernobyl power plant has been deserted for thirty-four years, causing social, economic, and environmental consequences.

Author: Allyson R. and Lopita D

Human Geological Force

This zoomed out map shows the vast lands obliterated due to human error.

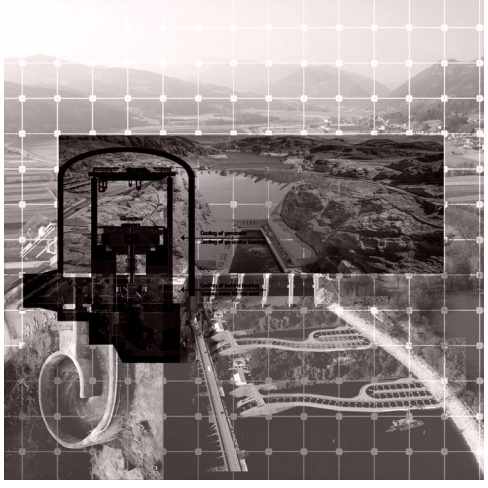
Although the Exclusion Zone is figuratively disconnected from the rest of the world, this site continues to have negative effects on the world. No one wishes to live near a nuclear plant anymore, this inherent fear is deeply embedded within us due to these disasters. The proximity of energy production has a negative effect on the value of the land and although abandoned and forgotten by mankind, these sites have evolved as otherworldly locations for the non-humans. The exclusion zone of Chernobyl has become a great host for biodiversity and a refuge to the surrounding wildlife that was threatened due to human interference[4].

"Homo sapiens have "achieved" an exceptional feat,[5]" states Staicy Alaimo, in Your Shell on Acid and has given us agency through attainment. We are not just a species, we have become "a major geological force" with an imaginable destructive impact towards "non-human creatures and inhuman substances and systems." But we have the ability to transform "obliteration of ecosystems" into reviving new ecosystems in a manner that positively benefits the human and nonhuman species. We live in a geological age of our own-making, and only our actions can change its course. As the Carbon dioxide rises, oceans acidify, and sea levels rise how can we humans mediate a change?

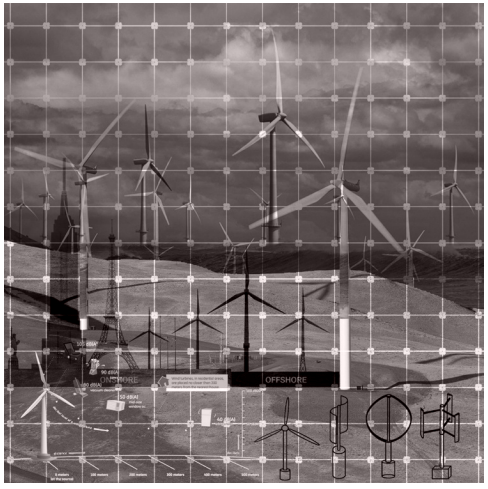
WHAT IS OUR CIVIC DUTY?

Nuclear Fission Energy

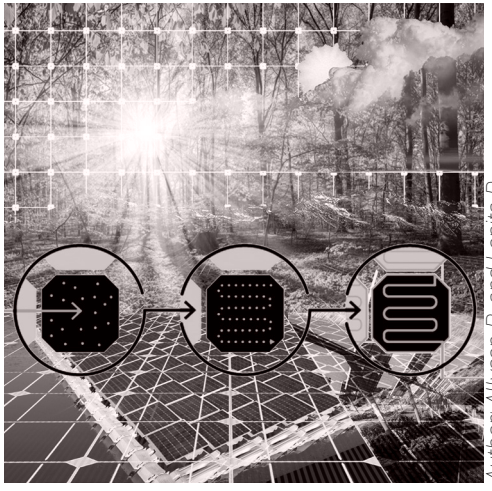
In the 1950s Nuclear Energy was futuristic and seemed like an ideal solution as it did not produce air pollution, the power plant construction created jobs and improved the overall welfare of the community. Nuclear plants were sold to countries like China, India, and Russia with the false promise of nuclear power being cheap, both in terms of economics and the environment[6]. Unknown to some at the time, building and running a nuclear plant can be more costly as it requires high maintenance and waste storage, and there are constant problems with safety and production, as the base ingredient Uranium is hard to mine and difficult to source. The public's support of nuclear technology flipped when there was a sudden burden of waste problems within communities and nuclear reactor accidents occurred.



Hydroelectic Energy



Wind Energy



Author: Allyson R. and Lopita D

Solar Energy

Clean Sources of Energy

Energy production has evolved and these alternatives have proven to be most promising towards a better future.

It is unfortunate, but I think it is necessary for environmental degradation to occur before people can react to it. It is not until then that people have a conscious reaction to the consequences of unsustainable practices. Generally, those reactions are caused due to concerns for personal health. Human intervention has led to the relentless alteration and exploitation of natural landscapes and conscious reactions are desperately needed. We have reached a point of no return and we must act now to avoid a global disaster.

The Chernobyl disaster is a small scale scenario of the path the world is moving towards unless we alter its course.

We have a responsibility to take conscious decisions for the deteriorating situation in front of us and reimagine our way of living and our relationship towards energy.

HOW HAS DESIGN RESPONDED TO PUBLIC PERCEPTION?

Fukushima, Chernobyl and Three Mile Island are a few of the most famous nuclear power plants but they are famous for all the wrong reasons.

Hence nuclear architecture wants to be anonymous. But this was not always the case. Thirty years before the Chernobyl disaster, "the Soviets built the world's first nuclear power plant at Obninsk, just 100km from Moscow"[7]. The benefits of nuclear energy quickly rose to fame within the Soviet Union, as it did not rely on natural resources and geographical location. The first of its kind, it had a very peculiar style, it did not resemble what we would identify as a nuclear plant these days. The typology of a nuclear plant is ingrained within us, into a monolithic impenetrable structure. This promotes a sense of dread to the eyes of the beholder and allows us to give basis to our fear.

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Obninsk

The first of its type, the typology of the plant was very different.

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Hydroelectric Station

A completely unrecognizable power plant.

https://lh3.googleusercontent.com/qgVAwhE-vuM6NwhxzXfx3GHeUgWHBYCiAfCcCUKqUBl6d7SRs-B0552RVGlQDZ/myB8kVSQjE=s151

Nuclear Plant

An instantly recognizable architectural element.

The architectural community's response towards power plants has evolved with public perception. Utilitarian and generally value engineered spaces in the past have slowly evolved. Recently architects have started to incorporate public spaces within them. As a way of integrating civic responsibility and reimagined relationships towards energy production. The hydroelectric power station built in 2011 in Germany by Becker Architekten[8] "designed as a symbolic representation of water dynamics"[9], resembles the energy of water dynamics and mimicking an eroded rock starts to engage the audience in a conversation about clean energy production.

However, the architecture of nuclear power plants has yet to evolve. They generally consist of a containment building, which houses the reactor and cooling systems. The structure largely comprises of steel, which is covered in concrete. Auxiliary buildings such as the turbine and the water inlet support the main building. There is generally a large man-made cooling pond around the plant to release the high temperature of the water after the process. The site also consists of a fuel storage tank and waste storage tank and maintenance and administrative spaces to support the power plant reside on site. This large and elaborate structure ends up dominating the land and the people who live around it[10].

Therefore, the ethics of designing an energy production system is vital. As Stephen Loo talks about how design should be an all-encompassing practice, and how it cannot just be thought of as a building or sculpture for one group of people, but for everyone and everything[11]. I was really drawn to that statement as it refers to design being something bigger than any one person, group, or country. It is true that architecture and design have an effect on defining life at the time and also for future generations as they look back to what we thought was important enough to design for. Architecture is a practice that can help define and remember an era and what was important at that time- such as the pyramids as a burial site in Egypt, the temples in Greece, and the Gothic churches in Europe.

It is important to remember who we are designing for and why it is important and how we as a generation want to be remembered.

It makes us think about designing for everyone and thinking about designing ethically in terms of inclusivity of people, and in terms of building ethically. Design is truly all encompassing and can address a wide variety of issues, and we as architects and designers should take that responsibility seriously and learn to put our egos aside to address these issues.

https://szip-zipper.com/wp-content/uploads/2019/08/CBRN-protective-suits.jpg

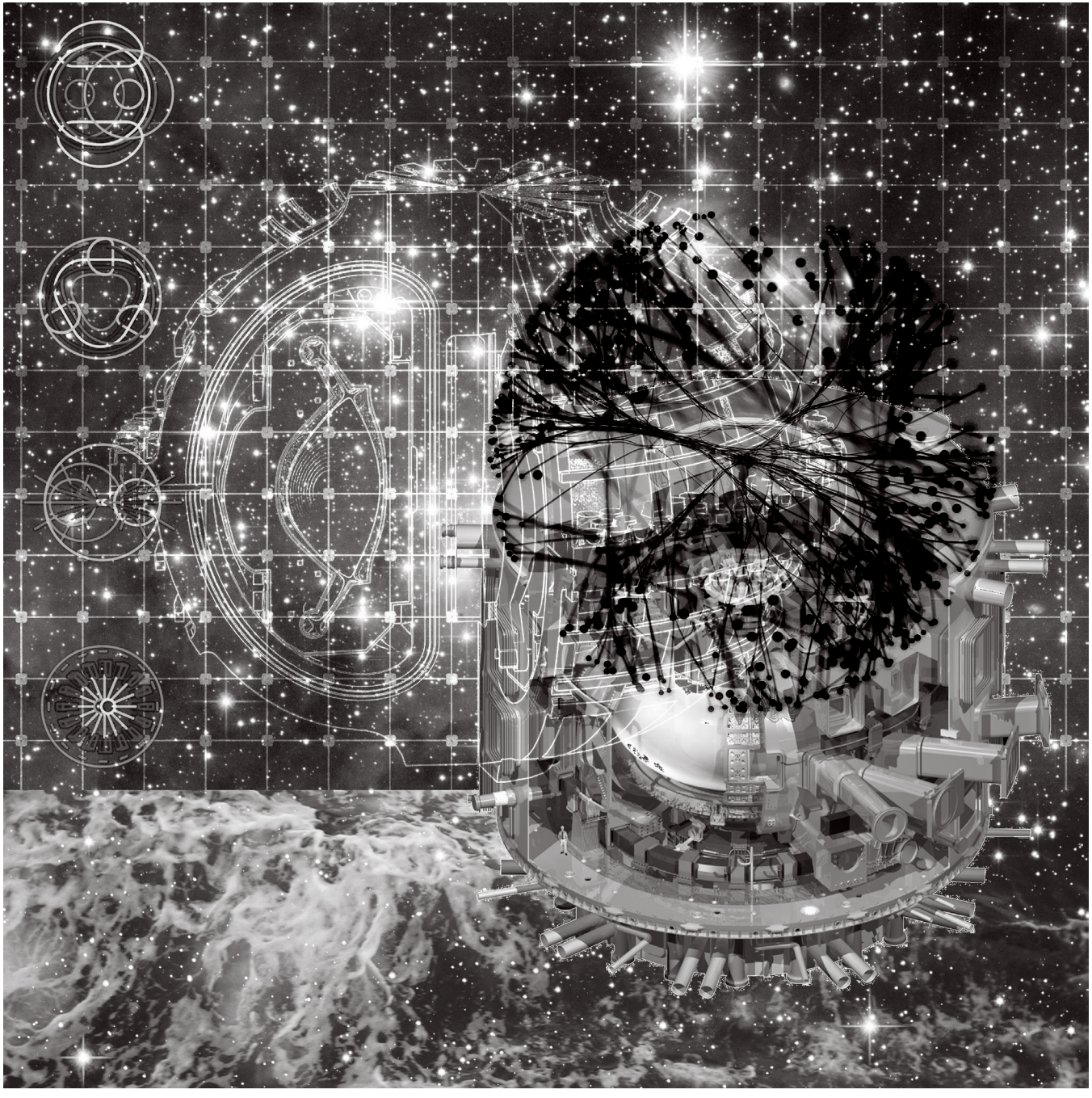
Hazmat Suit

Can only protect you from the radioactive dust, not the radiation itself.

"Can design provide a contribution to the field of ethics?"

- Stephen Loo, Design-ing ethics.

An important aspect of dealing with the radioactivity is the design of the protective gear one wears to deal with the contamination. The construction of the hazmat suit could be helpful in learning ways to protect the body while interacting with radioactive pollution. Radiation is "the energy radiated or transmitted in the form of rays, waves, or particles."[12]Hazmat suits are designed to protect you while dealing with dangerous elements, but it is not completely effective. It only keeps the radioactive and contaminated dust out; it does not protect you from the harmful ionizing effects of radiation. This radiation could lead to DNA breaks and cancer. Only a shield made of "6.6 feet of concrete, or 1.3 feet of lead can protect you."[13]



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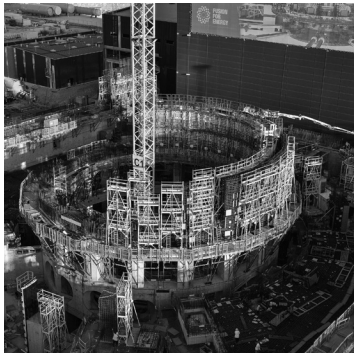
Nuclear Fusion Typology

The reaction that powers the Sun and the stars, a source of virtually limitless energy.



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ITER, France

World's largest nuclear fusion reactor.

After researching how hard it is to keep the radioactivity out of our systems it is important to rediscover our approach to energy so as to avoid dealing with the fallout in the first place.

Nuclear fusion energy is the energy future of energy.

"The reaction that powers the Sun and the stars,"[14] is a potential source of "safe, non-carbon emitting and virtually limitless energy."[15] It only requires isotopes from seawater and produces Hydrogen ions as a byproduct. Currently only in the research phase, it seems very promising. The largest fusion plant is located in the south of France, ITER. It was born in 1985, and is a joint collaboration between the US, EU, Japan, Russia, China, Korea, and India[16]. Still in construction, once complete, it will measure 13 meters across[17]. But to produce enough energy to sustain a large city seems far out of reach and we believe that a more viable option would be to scale down the requirement and the scale of the chamber will help bring the technology closer to the present. Instead of trying to produce enough energy for a whole city why not start at the scale of a house? Our approach to architecture and production needs to change.

Chernobyl Cartographic

Author: Lopita D

Chernobyl is a microcosm of anthropogenic disaster.

WAS CHERNOBYL BECOMING INVISIBLE?

An example of a destructive relationship between a community and energy production is clearly visible while researching the town of Pripyat in Ukraine. Which was previously an agricultural town but was redesigned in 1970,[20] to house the families that supported the Chernobyl Power Plant. Because these workers and their families were important to the Soviet state, no expense was spared on the town's facilities.[21] One was considered lucky to be a part of this community. Unfortunately, the good only lasted that long. On April 26, 1986, the nuclear plant exploded[22] due to human error.

Although the explosion was a quick affair, the aftermath is still experienced, even 34 years later. The explosion resulted in the evacuation of 50,000 people[23] who were forced to leave all their belongings behind within a matter of hours. This rapid drastic change and uncertainty involved caused trauma for all the people involved and generated a sense of mistrust towards the nuclear energy.

The relocated citizens struggled to leave their life behind in Pripyat, and restart. Unemployment rose to due lack of opportunity within the area, leading to voluntary migration further out. The city of Chernobyl was becoming invisible to the public eye.

The release of radionuclides "contaminated more than 200,000 km^2 across Europe."[24] "High levels of radiation were absorbed in primarily open surfaces"[25] like farming and grazing land further adding radioactivity into the food cycle. No one was advised to avoid natural milk and eat vegetables grown in this area and this resulted in a dramatic increase in thyroid cancer.[26]

A visual indicator of the crisis at hand was observed in the "4 km^2 pine forest"[27] an area situated south west of the power plant. All the pine trees absorbed high levels of radiation and burned into a reddish-brown color, hence the name 'Red Forest.' Large areas were cut down and buried as radioactive waste because even with all our technological advances we still have not realized a way of safe disposal of radioactive waste[28]. Immediately after the explosion there was severe loss to wildlife in the area and many thought it would never recover. But the zone has now become a unique sanctuary for biodiversity.

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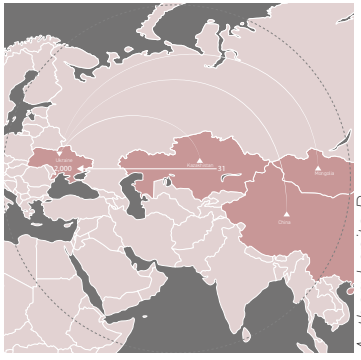
Red Forest

Visual indicator of the crisis at hand.

Human absence has transformed the exclusion zone into a large wildlife sanctuary with a new symbiotic cycle where the radioactive isotopes flow through different abiotic (air, water) and biotic (plants, animals) components. For example, the endangered Przewalski horses that were translocated from Mongolia, Kazakhstan, and China in 1998[29] in hopes to revive their population and curb the spread of radioactive pollen, paradoxical in nature, aided the growth of the population from 31 to 2,000 however the horses were unnecessarily exposed to radiation.

Chernobyl has recently become a popular tourist destination[30] and this is an important acknowledgement of our past actions. But the sad reality is that people living around the Exclusion Zone of Chernobyl live in poverty and with many health issues[31] and are till today dealing with the effects of the explosion. And although there is a decay in radioactivity within the area it is still unsafe for habitation and still requires human intervention to promote a safe and renewed environment.



Author: Lopita D

Translocation of Horse

Power of mankind.

WHAT CAN WE LEARN FROM EVOLUTION?

The Chernobyl disaster resulted in more than "4 million hectares"[32] of forest being radioactively contaminated. This large area of infected land needs serious human intervention before it can become safe for habitation. Our research suggests that a black mushroom called Cryptococcus neoformans eats radiation as a food source and shows promising radiation reducing capabilities[33].

Ekaterina Dadachova discovered that this mushroom synthesizes radioactive material into melanin (also found in human skin) as a food/ energy source. [34]The melanin production protects the fungus from radioactive stress, much like sunscreen for the Sun on human skin. Like plants gravitate towards the sun, the Cryptococcus neoformans gravitates towards the radiation as a source of energy.[35] As most fungi cannot produce food on its own like plants can do through photosynthesis, fungi rely on the mycelium for its rapid growth through food sources for nutrients for the fungi.

https://lh3.googleusercontent.com/mva7Ul33qePC2Kfu7H2K5fSsLymT0ndMgGwO_Lzi9sdH05DppcuxeDRFoLi215rC1b180=s151

Cryptococcus neoformans

Absorb radioation as an energy source.

Mycelium can also be manufactured into a brick as a sustainable and biodegradable alternative. The brick is compressed organic waste into a natural brick.[36] Mycelium are like the roots of the fungus and when dried "can be used as a super strong, water, mold and fire resistant building material"[37]. It fosters a "cradle to grave" attitude towards consumerism, aimed at reducing the waste at the end of life.

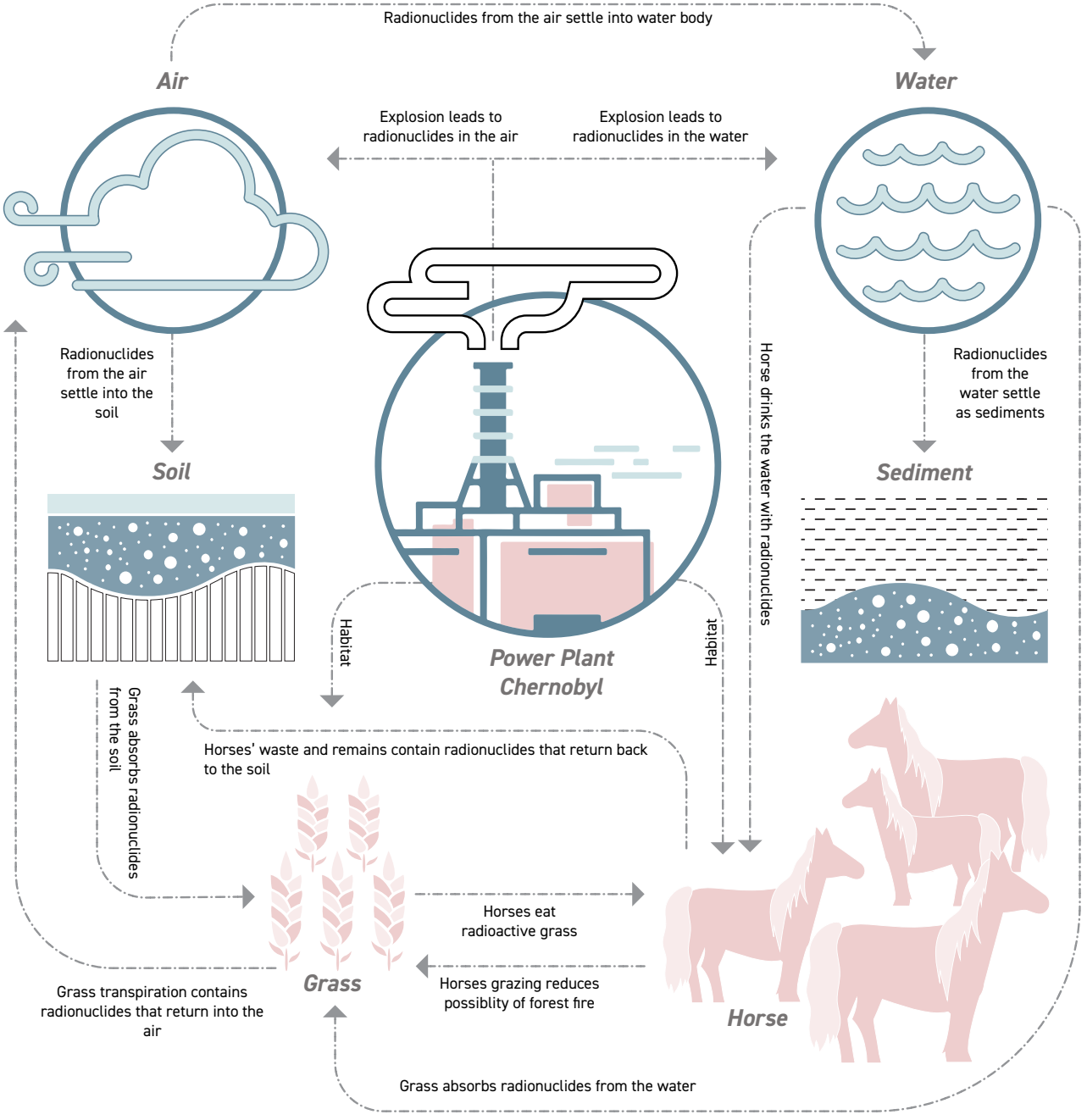
"The buildings and buildings construction sectors combined are responsible for over one-third of global energy consumption and nearly 40% of total direct and indirect Carbon Dioxide emissions."[38] This is an alarming statistic, how can we as architects rectify this lost sense of environmental ethics. Looking at a recent architectural project CopenHill by BIG architects in Copenhagen that was able help reduce our ecological footprint as the "cleanest waste-to-energy power plant in the world"[39] and has a ski slope on its roof to engage the occupants is a great way to start integrating architecture and the production of electricity. It opened in January 2011, this public infrastructure project has a twofold aspect of providing a park and clean energy. As energy and energy production is an integral part of our day to day lives, we believe that the act of making energy should be integrated into the urban environment rather than secluded out in the suburbs.

WHY DO WE DISTANCE OURSELVES?

Catherine Ingraham, in Architecture, Animal, Human: The Asymmetrical Condition provides another aspect to consider with architecture. She addresses the shift of humans away from the animals through architecture. Since the time of the Renaissance, we have begun to distance ourselves from the natural world and into the architectural world[18]. Why do we only use humans in architectural sections for skyscrapers? Would a giraffe not be more appropriate?

The sad truth is that humans privilege themselves above all else.

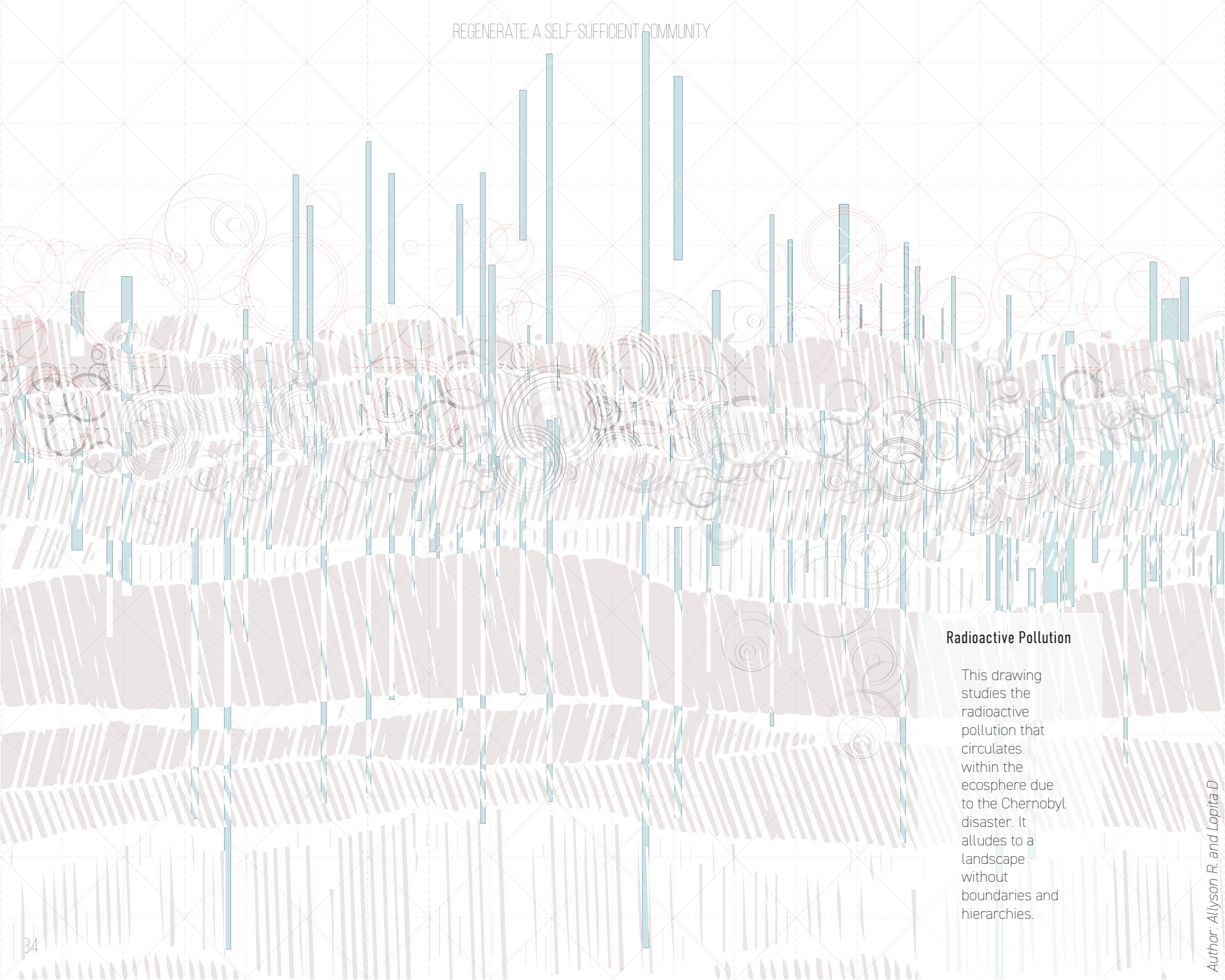
We have become clinical in the view of program division. Energy production and housing are two separate boxes that do not overlap. Ingraham questions the design making decisions with respect to the way we live our lives, plans vs programs and occupant vs designer. We isolate ourselves rather than letting the environment come into our design, we physically barricade the interior from the exterior using windows and doors.



Symbiotic Life Cycle

How radioactivity permeates through the entire ecosystem of Chernobyl.

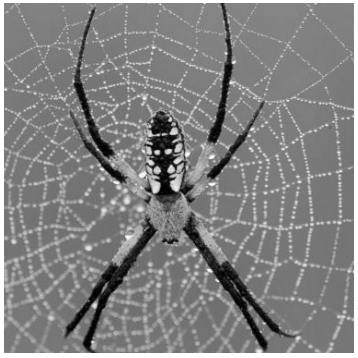
Author: Allyson R. and Lopita D



Radioactive Pollution

This drawing studies the radioactive pollution that circulates within the ecosphere due to the Chernobyl disaster. It alludes to a landscape without boundaries and hierarchies.

Author: Allyson R. and Lopita D



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Spider's Web

Lightweight and extremely strong- inspired cable bridges.

https://lh3.googleusercontent.com/Z8gXkOMkmozX-QWPvNYnwqbW4BxSoKusM3CfXC3VrEhr7alwgsm-F0IigsY_dGk9-uF-VE7Q=s162

Bird's Nest

Small pieces weaved together become structural sound as a whole.- roofs.

"Nature has already solved the problems we face."

-Janine Benyus, American biologist and Biomimetic specialist

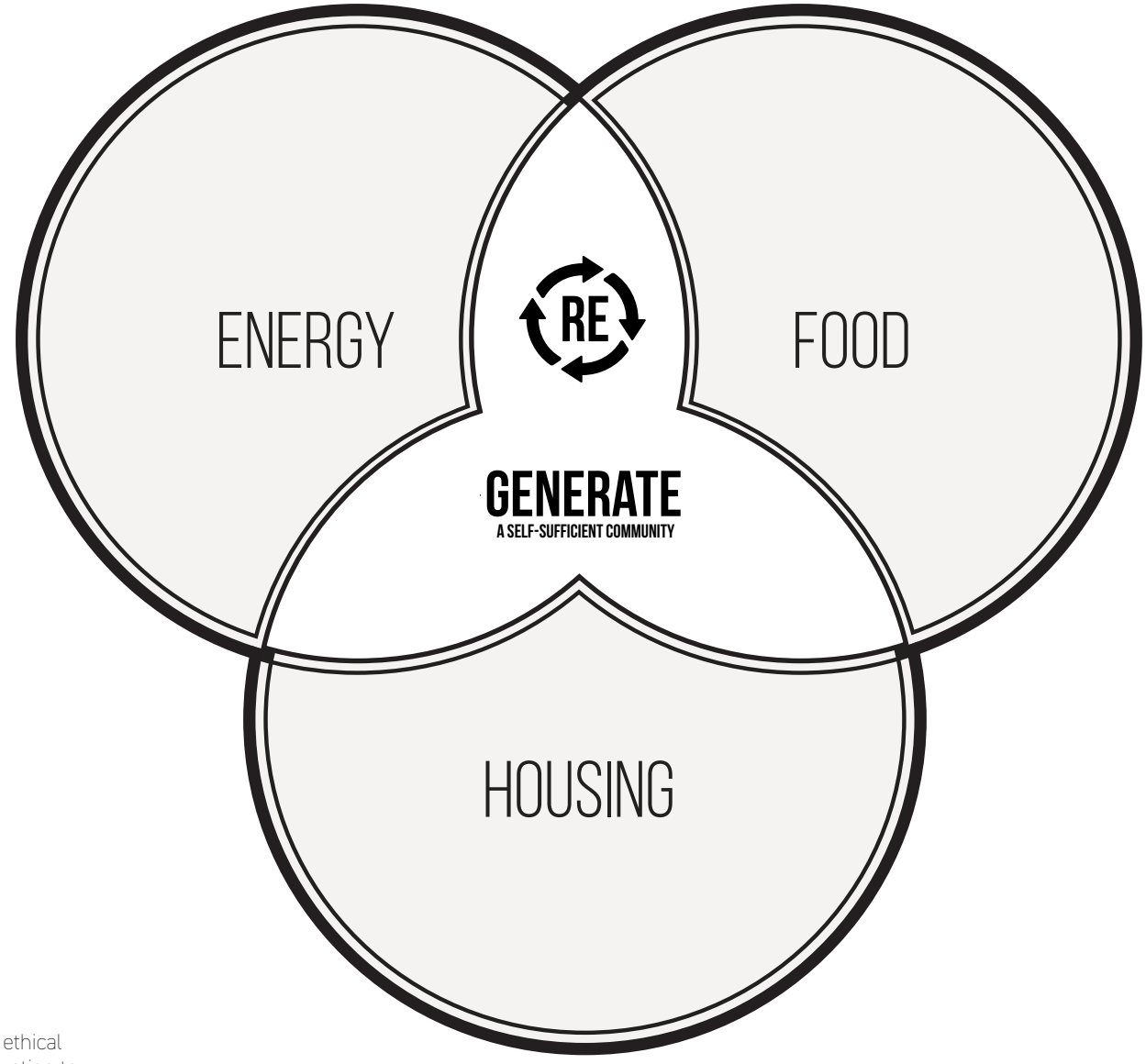
This act of isolation has caused the global crisis of species extinction because we have separated ourselves from them. We also distance ourselves from the learnings from nature, but biomimicry can help push technology further. We need to re-engage with the living world. Thousand years of evolution hold great value of information and can be a great learning tool. Animals base their design on instinct and survival: a swarm of bees building a hive, a bird building her nest, a spider casting its web; an instinct that humans have moved away from, towards a more commercial or formal appeal. Rather than trying to develop new technologies to sequester radioactivity from the land we can use natural organisms such as the Cryptococcus neoformans to absorb the radiation and allow us to return to Chernobyl safely.

HOW CAN WE ADDRESS INDUSTRIAL CAPITALISM?

"We are living textbooks on global warming and nuclear materials, crisscrosssed with interobjective calligraphy."

-Timothy Morton, Hyperobjects: Philosophy and Ecology after the End of the World

Timothy Morton addresses climate change in a thought provoking and enigmatic matter by engaging the reader into addressing the ethics. Would you not save a boy who is in front of incoming traffic? The sense of urgency is immediately relatable and allows us to understand climate change and landscape deterioration as a matter of time. Morton refers to Global warming as "hyperobjects" an entity that is so large and abstract that it is difficult to understand[19]. He asserts that human beings are already cyborgs and are governed by artificial intelligence of industrial capitalism. The anthropogenic time period is manmade, and it is time for self-awareness and self-motivation to change the path and do something about it.



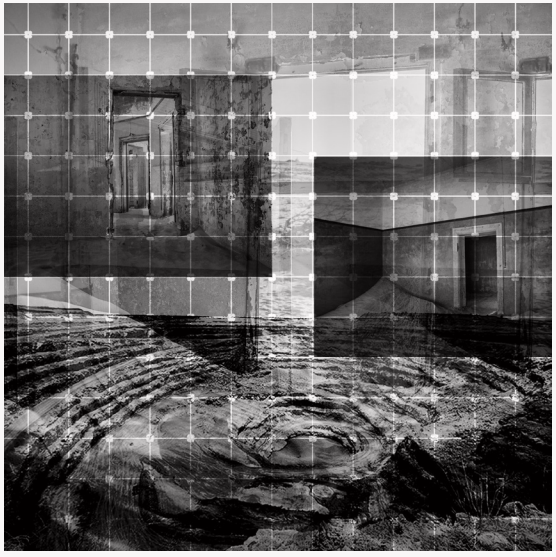
For an ethical hybridization to repair anthropogenic change.

ABANDONED HOUSING TYPOLOGIES

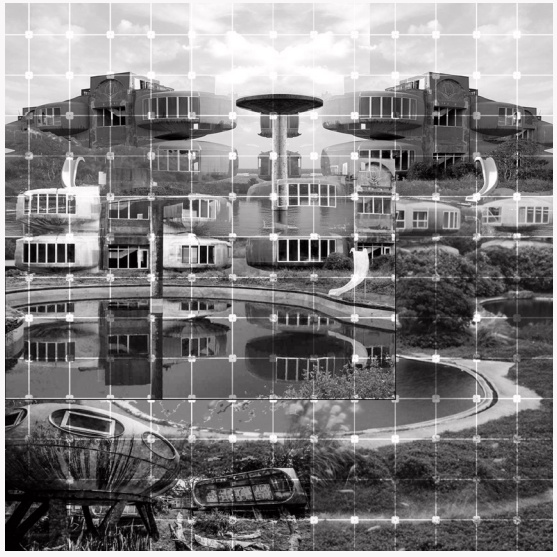
Projects that have manifested into artificial landscapes where nature took over after human abandonment.

Dome Houses

Hashima Island



Sand House

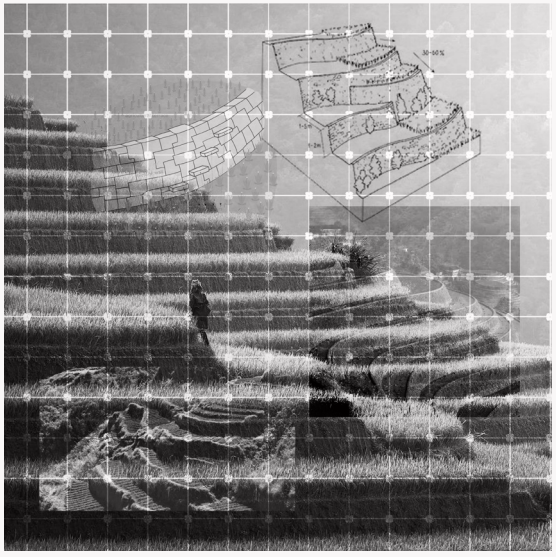


UFO Houses

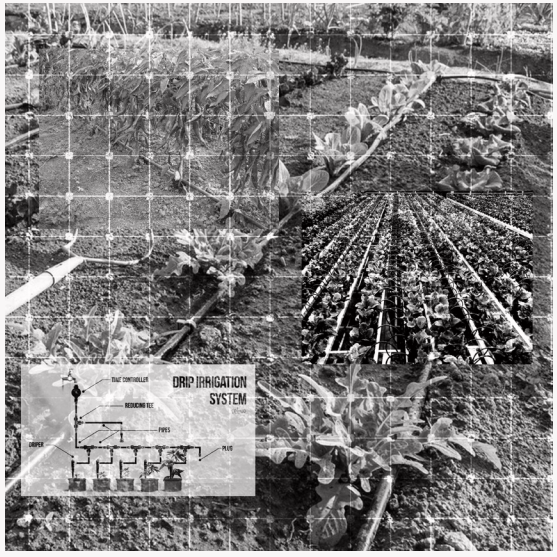
Author: Allyson R. and Lopita D

NATURAL FARMING TYPOLOGIES

Farming has allowed our species to evolve and support the rising populations.

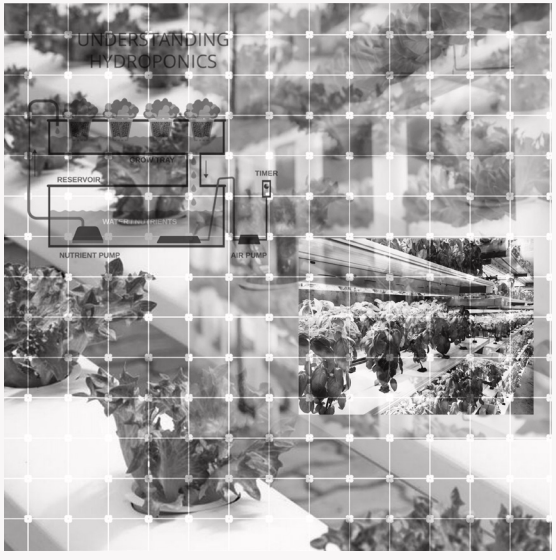


Terrace Farming



Drip Irrigation

Aeroponics



Hydroponics

Author: Allyson R. and Lopita D

PRIPYAT HOUSING

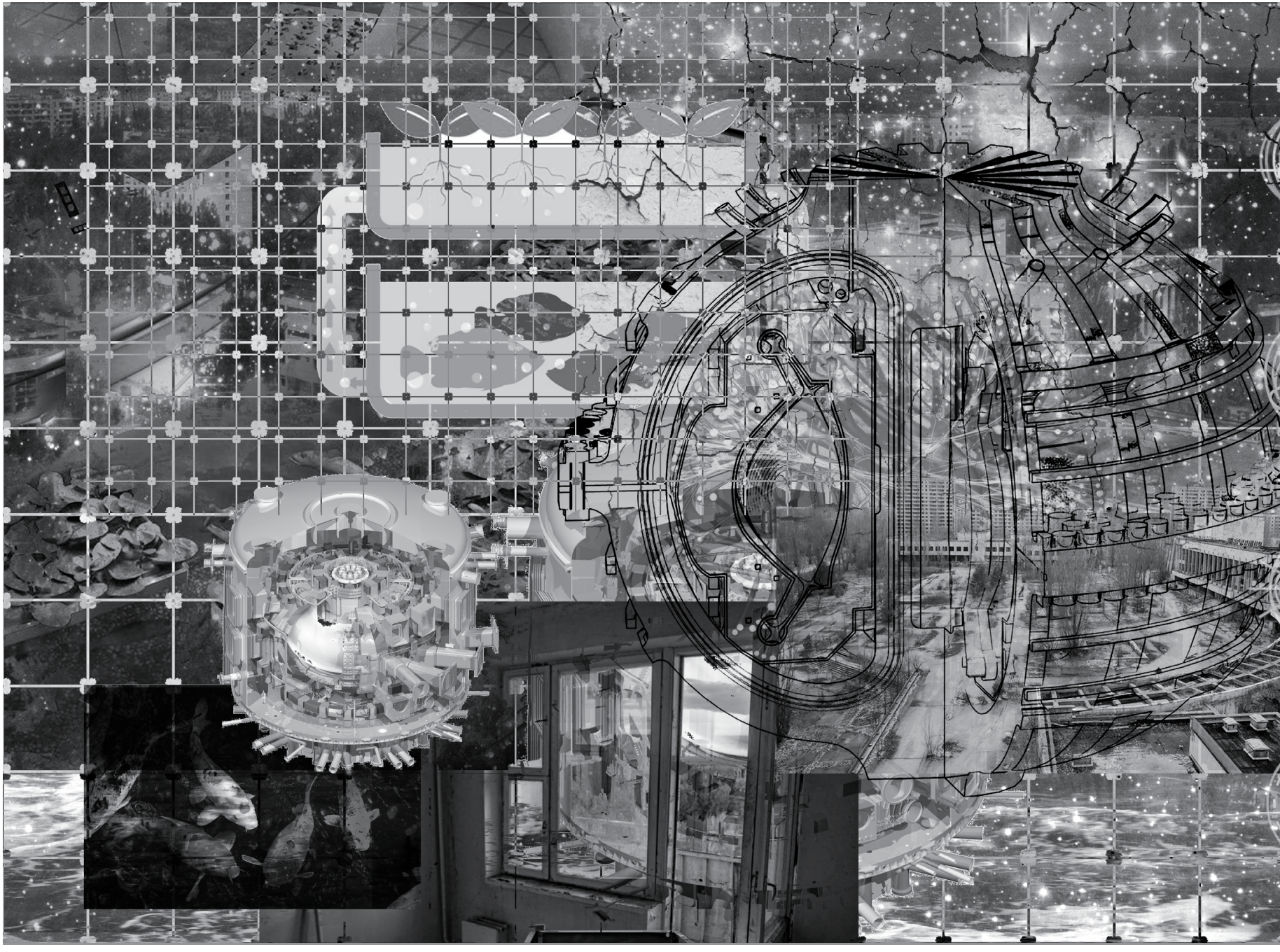
The abandoned site of Pripyat. The peeling walls add to the sense of dread and eerie when one vists the site.

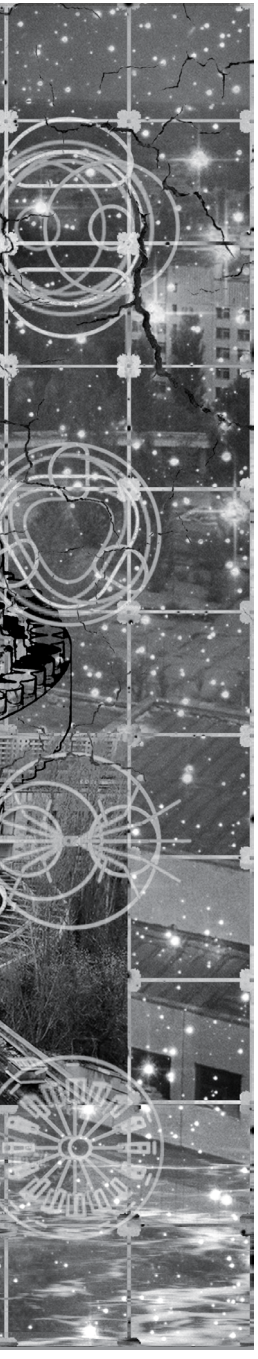
Author: Allyson R. and Lopita D

AQUAPONICS FARMING

The system of life where the plant and fish prosper in a symbiotic relationship.

Author: Allyson R. and Lopita D





Author: Allyson R. and Lopita D

Hybridized Typologies:

A new system of living to respond to our past errors and towards an equitable future.

ReGenerate is a self-sufficient community that we think is the solution for anthropogenic change. As our population increases, our dependence on natural resources also increases tenfold, how can we exist today without destroying tomorrow. Our proposal is a self-sustaining community that is independent of large-scale power production and rural food farming, it must be cohesive and address the well-being of the community through its living environment. ReGenerate is a prototype to repair anthropogenic change and advance towards a safe, localized energy and food producing facility within the fabric of the community. Key building blocks to a self-sufficient community are farming and energy production integrated within housing.

The hybridization of these typologies offer paradigms of what human ingenuity is capable of when it rediscovers its lost sensitivity towards our environment.

We think that if we are more connected with the making, we will be more conscious with the consumption aspect of humanity. This new system of living hopes to integrate working systems of nuclear fusion energy, aquaponics and returning to abandoned housing as a way of intervention into anthropogenic disaster and repairing the scars left on the environment.

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