Decrease Degrees

How to reconsider our relation to heating?

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Under the supervision of Julien Borie, Laurence Pache and Catherine Pradeau.

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Fore- word

Consider heat as a friend! As an existence that envelops, embraces, and reassures you. As something that might provide answers to your interrogations or doubts.

See heat as a provider of love and confidence, as a support in hard times that may help you letting go and free yourself.

Be convinced that heat can bring people together!

These next pages will help you reconsider this invisible friend. This abstract deals with our relation to heating and the resources that are linked to it. How did we, mankind, evolve to be unconcerned beings when it comes to energy use for heating systems?

Heat, my friend, cheers to you!

intro-duction

2021 was not only marked by Covid-19 but also by a huge energy crisis around the whole world. Indeed, China was marked by several power cuts due to power plants that need lots of coals to produce electricity whereas the Chinese government decided to make the country carbon neutral by 2060. Added to that, the coal price rose, which obliged factories to slow down their production. In Europe too, the price of electricity on our bills was pushed up in 2021. Many households could not afford such a raise, which resulted in growing fuel poverty. Unfortunately, if we continue consuming energy as we are doing nowadays, energy shortages will become more frequent, and energy will no longer be the affordable resource that we are used to today.

I will focus on one specific function of energy which is the heating process. I choose this because it is the one that consumes most electricity in our homes, what costs the most and what is fundamental for humans to survive.

In this abstract, the question is, within an international context: to what extent would reconsidering our use of heat as a precious resource provide a solution for saving and sustaining human existence?

First, we will study how heating moved from a vital need to a pleasant and luxury use. Then, we will evoke the importance of making visible the invisible. Finally, we will discuss how making heat and its consumption visible and sensitive may allow mankind to adopt a better behaviour towards the use of heating systems and energy in general.

01

From vital need to unnecessary degrees

Fig 1.

a/

From a fireplace to radiators

WITHOUT HEAT, PEOPLE DIE!

Heat is a vital need to humans' existence. Something we must treasure if we want to survive. In the prehistorical period, men discovered and succeeded in mastering fire. It was a discovery which changed human life and allowed the evolution of our species. It is certainly one of the most important technological inventions ever made by men. Over time and due to evolution, heat and fire have been integrated in our homes. One of the first structures that made it possible was the fireplace[1] . This device engaged specific behaviours and liberated several symbols. First, it allowed men to have access to heat inside houses. Its use obliged humans to only heat one room of the house and only if someone was present, otherwise, without surveillance, it was too dangerous. This aspect already required a responsible behaviour towards the use of heat. Indeed, most of the time, people came together and were reunited near the fireplace and thus avoided unnecessary heating in other parts of the house. It also entailed a social role as it is the source of creation of a "space" around which people can gather, live, and express themselves. The hearth is a symbol of human warmth. For several centuries, going from the Middle Ages to the end of the 20th century, humans experienced closer and real relations

1. *A structure made of bricks, metal or stone that contains fire.*

People came together and were reunited near the fireplace and thus avoided unnecessary heating in other parts of the house. It also entailed a social role as it is the source of creation of a "space" around which people can gather, live, and express themselves. It's a symbol of human warmth.

with each other thanks to the heat of fire. It was a time when people took a moment to discuss, to laugh, to appreciate sociability, something we would like to experience again nowadays. Furthermore, a fireplace also implied physical effort in order to make fire, to keep it on and to shut it off at the end of the day. It required a certain human ability and knowledge to fulfil each task. Looking for fuel[2] to start the fire was the first mission, then managing to carry in the fuel from outside, after that, making the fire, keeping it alive and controlling it were the different tasks to achieve. Obviously, with a fireplace, the use of the body was essential.

After the Second World War, things changed, life changed. Society evolved at a different and quicker pace and people no longer had enough time to start a fire, that's why, with the evolution of industry and the concept of Progress, many devices were produced to liberate people from time-consuming tasks. And therefore objects started acting in our place. Mankind rebuilt a new model of society based on efficiency and overproduction to better and better satisfy our needs which subsequently increased toward more luxury and comfort. The result of that is that our interaction with heat has radically changed because new industrial processes have given easier access to heat without supplying any physical effort. That's why today, we have devices such as radiators[3] that have invaded our homes. Today, our lives do not look like moments around fireplaces. Nowadays, we heat our homes without counting the degrees, we do not pay attention

2. *Wood, coal, turf.*

3. *A complex appliance that generates heat*

any more to our consumption and to a sensible use of fuel. We heat every space all the time. Each room has its own radiator so that it is pleasantly warm, even when we are not in it. The fuel we use (for radiators) is completely hidden, as if it came to us by magic by simply pressing a button. It completes the vision of electricity in the early thirties when the allegory of the *Electricity Fairy*[4] invaded our imaginary. Matthew Crawford[5] speaks of an *"idiot button"*[6], in some way, the image and the conclusion is the same, we have lost our senses. Automatic systems enable us to manage and monitor the heating with additional appliances such as digital programmes or remote controls.

4. The Electricity Fairy is an allegory that embodies the positive and magical vision of the arrival of electricity in our homes. Our lack of knowledge on its existence allowed mankind to contemplate electricity as a magical and positive exploit.

5. Contemporary American philosopher who defines the meaning of work and the place of individuality in modern societies.

6. *TED conference of Matthew Crawford where he explains the fact that nowadays designers try to hide the work, he defines it by a design philosophy that emerged. He takes the example of the oil level in a car which is entirely hidden, without any access to it.*

b/

Such improvements lead to an obvious gap between users and energy for heating systems

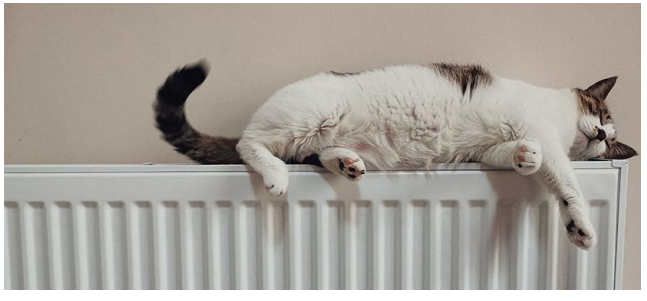
As we saw before, we do not have anything to prove or to do physically, since our access to heat has become easier. It has provoked a real disconnection between the energy necessary to produce heat, the device, and the user. Besides, as we experience each day, heat is invisible to our eyes, current heating systems even hide the process and the heat-producing technique. It is concealed behind a white hood. The result of that is that we only feel the heat, but we no longer wonder where it comes from, how it works and what consumption it implies. This new behaviour has unfortunately led to an unconscious and unreasonable use. The human body is no longer confronted with the notion of effort anymore, it has even adopted a passive posture that consists in only standing in front of the device to feel and receive the heat. Moreover, nowadays, even when we are not at home, we literally stay in touch with our home due to applications on our smartphones or programs. In other words, we can assure ourselves that the cat has enough heat to nap comfortably because we set the heating program on 22 degrees even when we are absent.

Furthermore, radiators evoke something quite clean and sanitized. The white colour and the smooth texture help us understand that this kind of device will be easy to clean and will not have a negative impact on our health. Our imagination sends us these signals because we link automatically white and smoothness to a hospital and

a hygienic environment. On the contrary, the fireplace, mentioned before, is dirtier due to the presence of the resource in its raw state.

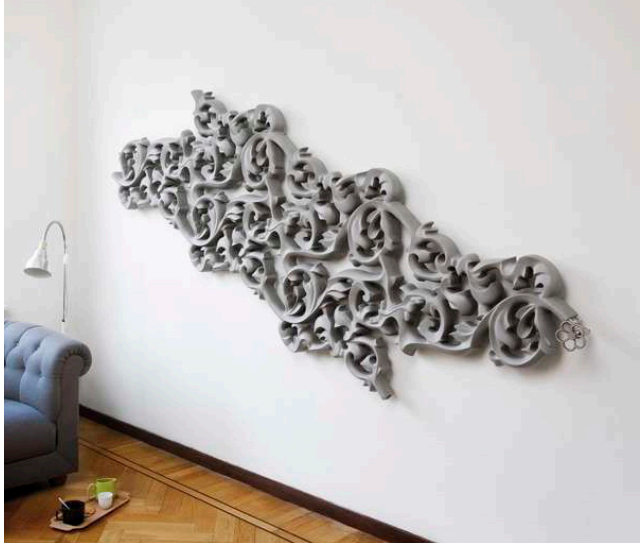
Last but not least, radiators have become more abstract. The device has adopted, in addition to its heating function, a more artistic dimension. The intention is very well illustrated by the example of *Heatwave* by Joris Laarman[7]. Indeed, we observe that the device has a more ornamental dimension. As if it had become an artwork. In this case, we might perhaps focus on the device because it takes a more important place in our home but is it enough to change our perception and adopt a better behaviour towards heat?

Fig 2. Cat on a radiator



7. *A contemporary dutch designer whom is known for his experimental practise based on emerging technologies*

Fig 3. *Heatwave*, Joris Laarman, 2003



02

How to make visible the invisible?

As we saw just before, heat is invisible (to our sight), we can only feel it with our body. We can understand elements such as textures, colours, smells, temperatures, or sounds, that qualify the environment in which we live in, thanks to the use of our sensory receptors. It may induce the idea that without our body perception, we have no clue how to identify the presence of heat. So, we can ask ourselves if making heat perceptible through our eyes and touch might have an impact on our behaviour and manner of using and consuming devices that provide heat. In other words, could visibility raise users' awareness about their energy/heat consumption?

a/

Design can make our consumption in energy visible

The invisibility of heat has interested some designers and artists from all over the world. Indeed, the exhibition *So Watt* by the EDF foundation in 2009[8] gathered designers from Europe and elsewhere to illustrate the energy issues for the future. The aim of the exhibition was to promote new behaviours linked to energy use. How design can offer a new vision of interaction with energy. How it can raise awareness and give us energy saving solutions. *The Power Aware Cord* made by *Static!*, two Swedish designers Anton Gustafsson and Magnus Gyllensward, is one of the projects presented at the event that day. The point is to show, thanks to a blue light system, how much electricity our connected devices consume. To put it differently, when we use a device, which is directly connected to the cord, the latter is going to light up. If the electricity consumption of the device is very high, the light will brightly shine, otherwise, the light will barely gleam. It is a smart indicator for the user to know which device he had better avoid using or at least use less. One other project that drew attention was *In Luce* made by the Italian design agency *Positive Flow* in 2008, the project was built on the idea of showing the consumption of electricity in cities through

8. EDF Foundation is a French organism that fights for a better sustainable future. It looks for greener solutions in education, culture, and energy use. Their slogan is "*S'engager ensemble pour soutenir l'environnement, l'éducation et l'inclusion : C'est notre vision d'un avenir partagé et notre combat en faveur des jeunes générations et des territoires solidaires.* »

If we continue living in this way, we already know that we will run out of oil in 54 years, gas in 63 years and coal in 112 years.

light installations in public spaces. The purpose of the designers was to initiate collective discussion in private and public space around energy issues. One more example is the radiator *Element* by the Swedish group *Static!* made in 2005, it evokes the fact that heat can visually be translated by light. The object itself is composed of several light bulbs that when they shine also produce heat by its incandescence principle. The brighter the light is the more heat is produced by the device. These different examples allowed us to comprehend that design can make visible the invisible in order to raise awareness on our manner of using electric devices. The only thing that might question the ecodesigner is that to make the consumption visible, energy is also needed. It is an aspect that is unfortunate and debatable since, in this case, showing implies consuming. As a responsible designer, that kind of paradox must absolutely be avoided. Nevertheless, despite some inconsistency, the energy consumption is very low, so these projects still make sense when we compare them to the current devices we use nowadays. Indeed, current devices, due to their invisibility, suggest that heat is infinite and thus, that energy is plentiful whereas we know that the resources we currently use such as coal, oil or even gas are finite. If we continue living in this way, we already know that we will run out of oil in 54 years, gas in 63 years and coal in 112 years.

Fig 4. *Multiprise Power-aware Cord*, Static!, 2005

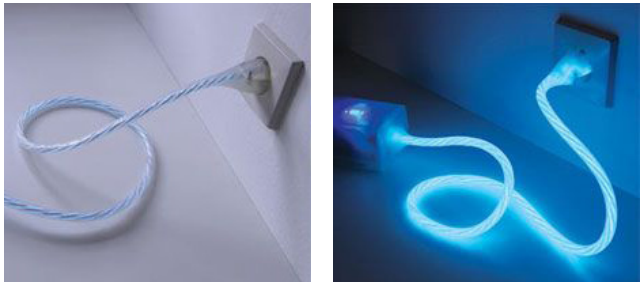


Fig 5. *Project In Luce*, Positive Flow, 2008

Fig 6. *Radiator Element*, Static!, 2005

Fig 7.

b/

Luminous energy: a visible and free solution toward better consumption?

The previous design references made their statement by insisting on the importance of acting with energy consumption in a more responsible and reasonable way thanks to its visibility. That is why the resource of sunlight might be a good energy provider/source. Indeed, sunlight is a free and unlimited resource that can be used by humans to produce natural and green energy. As we know, energy recovered by the sun is quite affordable to anyone which makes it an ideal principle to produce energy from in a responsible and renewable way. In fact, this vision has become more common over the past years as we see more and more houses with solar panels to deliver green electricity. But recently, there have been more and more complaints about its production process. Unfortunately, the solar devices we use to produce energy are not as eco-friendly as we suppose. In fact, in China, many rare-earth metal mines exist that resort to forced work to make solar devices for foreign countries. Many Uighurs are forced to work in mines and factories in horrible conditions to fulfil the task of assembling solar panels to be exported towards European countries. Such facts surely question the social and environmental impact of solar energy. It makes us aware that it is not as renewable and sustainable as we thought. Nevertheless, other solutions seem to exist. In 1991, in Switzerland, two chemistry teachers, Brian O'Regan et Michael Grätzel published an article on a new sustainable principle of solar energy based on photosynthesis, named

later on: *Dye-sensitized solar cell*. This publication was the key element in the development of this research. In 1994, *Solaronix*[9] took a closer look at the discovery and tried to improve the principle so that it could be marketed. It took the company fourteen years to develop a reliable application. The *SwissTech* façade is a crucial step in this research to express the feasibility and viability of the technology. In this project, dye-sensitized solar cells provide electricity for the entire building and prevent overheating in the interior space. It is in this context that producing low-tech and low-cost electricity from solar energy becomes a real responsible feat.

To sum up, we have understood that raising awareness on our behaviour and consumption necessarily involves making it visible. The transparency of the device helps the user better understand what happens when he activates a heating device but it interrogates him on the frequency of its use as well. However is the filter of visibility enough to overcome our recklessness regarding energy?

9. A supplier of solar energy equipment located in Aubonne in Switzerland

Fig 8. Dye sensitized solar cell

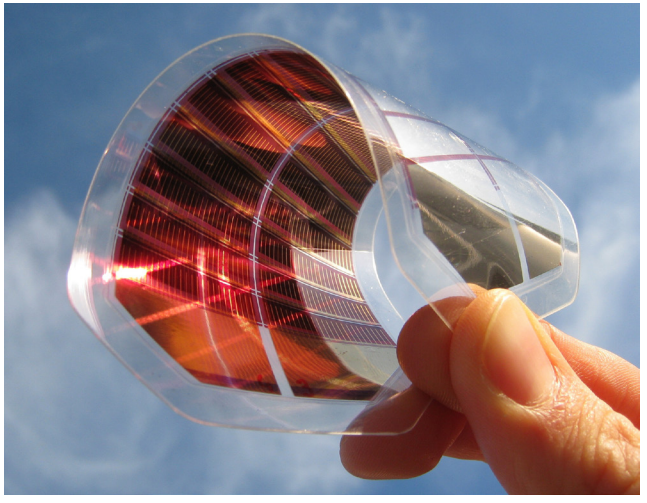
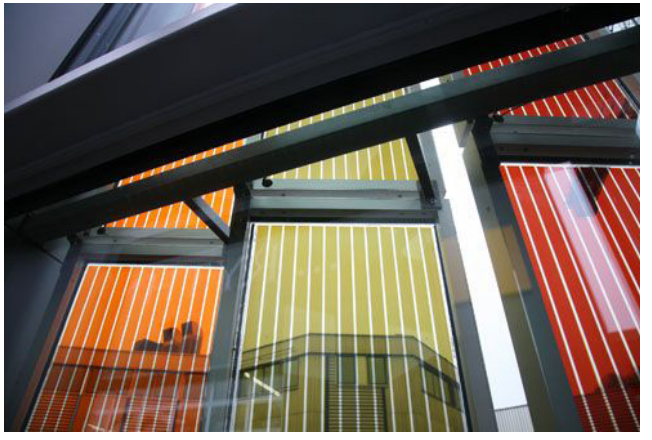
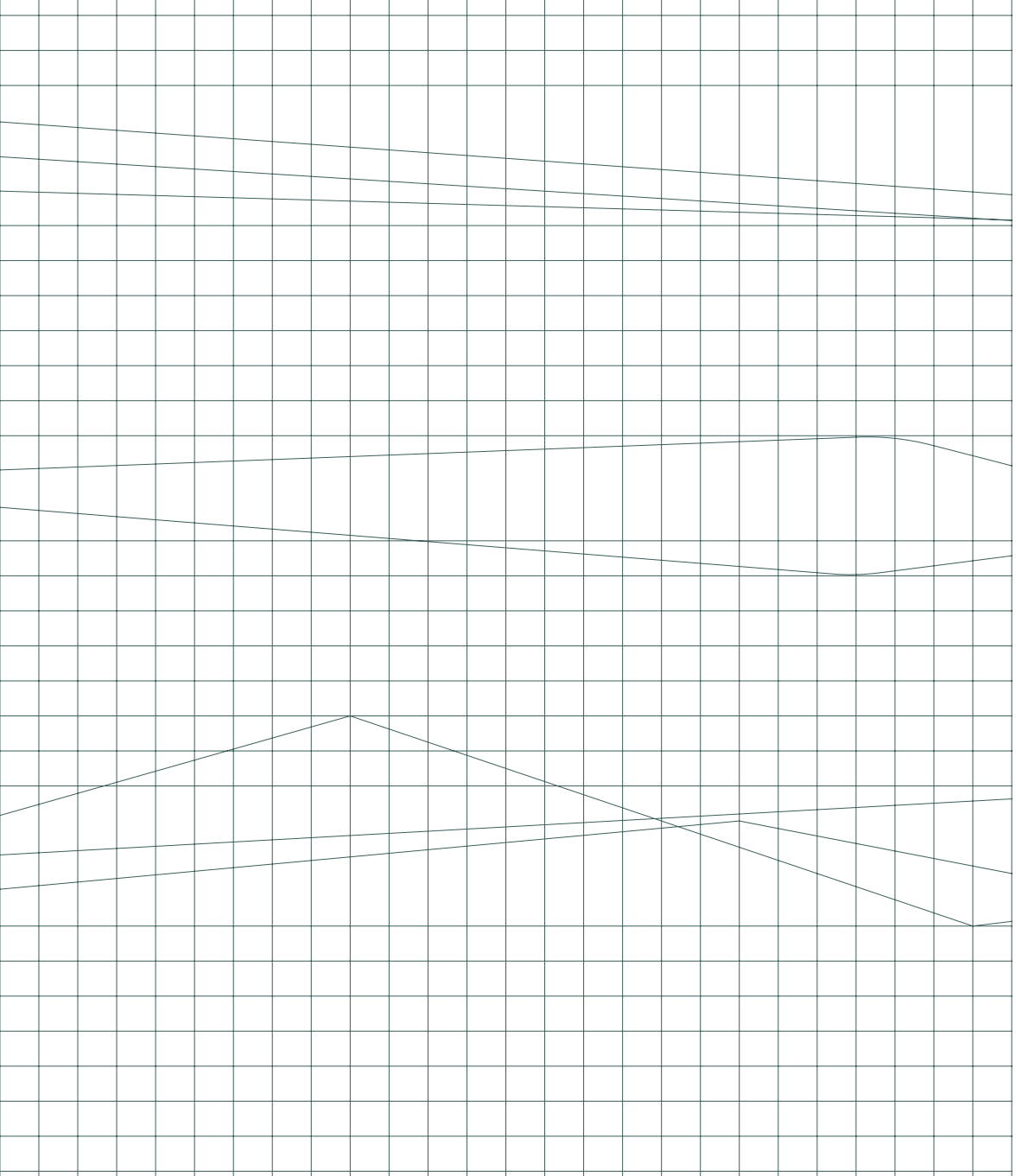


Fig 9. *Swisstech convention center*, façade made by Solaronix in 2014





03

How may visibility and sensitivity help us to adopt a more responsible behaviour towards the use of heating devices and energy in general?

a/

The means of sensitive interaction through our senses.

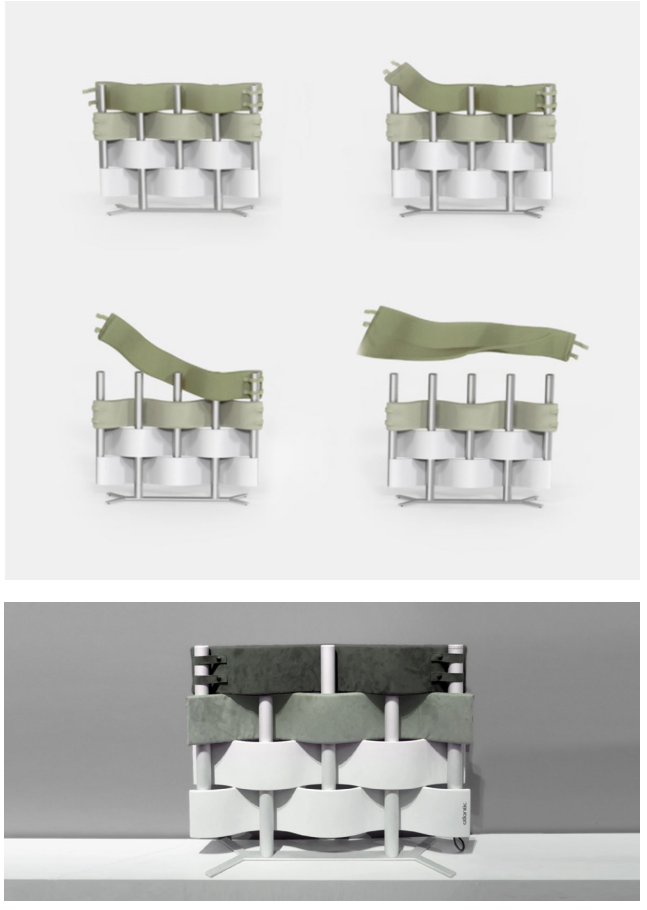
In this last part, we are going to explore better the influence of a sensitive input on energy devices. In which way our senses could provide a more profitable experience of the use of energy and more precisely of heating devices. To illustrate this aspect, Xinyue Yang, an Asian designer made the lamp *Breeze* in 2017. It is an interactive lamp which takes up the principle of natural lighting and extinguishing of fire. Blowing is controlling in this case because when you blow on it slowly, the light is going to shine dimly. If you blow harder, it is going to shine very brightly and once you blow very strongly, it is going to switch off as if you blew out a natural fire. Also, this device can light up other *Breeze* lamps by just connecting them by touch. This device interrogates our relation to energy that may be softer and more respectful. It is a poetic vision of interaction with light and a whole different experience is revealed to us. Furthermore, the project *Natte*[10], made by the French design studio *NonCommun* in 2016, reveals an interesting function that might help the user to be more implied and responsible in his actions. Indeed, the radiator is composed of two principal components whose base is made of a set of inox heating tubes, around which ones some radiant panels covered by felt, a textile that imprisoned heat, are intertwined. The purpose of the device is to give the chance to the user to go and pick his piece of felt, entirely warmed up, he wants to wrap himself in it in order

to have a more intimate and personal interaction with heat and warmth. Those examples tend to prove that a sensitive relation with heat might provide a more reasonable behaviour. In that case, making the experience with the device more poetic, may help people reduce their consumption because they might be captivated by the manner of using it. This leads us to the hypothesis that to live an experience to the fullest, our interaction needs to be relevant and meaningful. How can we be sure a device will fulfil this demand?

10. Won the price of "Jury's favourite" at the Atlantic contest in 2017. The topic of the contest was to design the radiator of tomorrow.

Fig 10. *Breeze*, Xinyue Yang, 2017

Fig 11. *Natte*, Noncommun, 2016



b/

The gesture draws the shape

If heating devices could be used in a more sensitive and transparent way, would it directly influence our gestures and behaviours? Would that epitomize the fact that our gestures might have a decisive impact on the shape? And then, which place would be reserved to our gestures. Let us take an example to illustrate those interrogations. The project *Kipinä* made by the Finish designer Riku Toivonen in 2019 deals with the ways of making and controlling fire in a primitive way in order to see how these methods and interactions with the raw matter can be integrated into our modern and current society. We can ask ourselves what came first in the design process: the gesture or the shape? The gesture may have helped him to draw these specific shapes and objects, otherwise, they would have been less organic. To say it in other words, if the designer denies the defects or the imperfections of the human body, he is likely to creates shapes that will not match with the shapes of the human body. That is why, a handling or a gesture can sketch new devices. The user of the device adopts an active attitude, his gestures allow the object to fulfil its function. Moreover, Tim Brown[11] speaks about the importance of acting and practising to better understand what we are doing. He said *"I was thinking with my hands, using physical props as*

11. CEO of IDEO, an American design firm created in 1991 and which invented the first Apple mouse and Palm V

"I was thinking with my hands, using physical props as a springboard for my imagination. This shift from physical to abstract and back again is one of the most fundamental processes by which we explore the universe, unlock our imaginations, and open our minds to new possibilities"

a springboard for my imagination. This shift from physical to abstract and back again is one of the most fundamental processes by which we explore the universe, unlock our imaginations, and open our minds to new possibilities"[12] . When we only use our head to understand the world around us, we omit essential experiences. Indeed, our hands are our first relation to the world, they help us to have access to the essence of an object, we understand its existence in all its dimensions.

12. Tim Brown, *Change by design*, chapter four, "Building to think, or the power of prototyping", 2009

Fig 12. *Kipina*, Riku Toivonen, 2019

c/

Less is more

If we approve the perception that a gesture can draw the shape of a device, it means such as Ludwig Mies Van Der Rohe[13] said in the early thirties that *"Less is more"*[14], because ornamental and superfluous elements would not appear in the design of shapes. We understand in that case that gestures induce the right shape for human's use. Thus, the design will be centred on human needs rather than on a mere aesthetic approach. If this is applied to the principle of heating, it may be more interesting to propose a design that will serve human beings and not only a space. Therefore, there would be less energy loss due to big spaces where heat can quickly escape. Design can be a method and a remodel how to deal with heating in our homes. A solution to improve the way we consume energy to heat our homes might be to consider heating less in order to heat better?

13. German Architect (1886-1969) well known for his modern vision on simple and pure constructions. his favourite materials were concrete, steel and glass.

14. *"Less is more"*, this sentence became a worldwide quote and even a design method

Fig 13.

conclu-sion

In this abstract, we have tried to figure out whether reconsidering our use of heat as a precious resource may provide a solution for saving and sustaining human existence. Heating has indeed gone through major transformations, from the use of raw matter to that of autonomous devices that do not require any human effort to provide heat. If a more reasonable consumption of energy for heating is to be adopted, designers must conceive objects that make heat that is invisible, visible. Put the focus not only on using a heating device but rather on experiencing it. Last but not least, perhaps we do not need to consume less but mainly better.

"Energy costs are getting higher, and the cheapest energy is the energy you don't use"[15]

15. Quote by Paul Pettipas, Nova Scotia Home Builders' Association

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Iconography

Fig 1. Engraving of a Middle Age fireplace

Fig 7. Rare metal mine in *Xinjiang* (China), © Sebastian Pichler

Fig 13. Ludwig Mies van Der Rohe, © DR Werner Blaser

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