

# REFLECTIONS ON HOW THE NETHERLANDS COULD RESOLVE ITS MAIN LONG-TERM ISSUES,

An Engineer's Point-of-View

*Lex A. van Gunsteren*

*February 2023*

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*“When a man, for whatever reason, has the opportunity to lead an extraordinary life, he has no right to keep it to himself”*

Jacques Ives Cousteau

The era of the sixties and seventies of the last century has been a period of happiness in my life. The Netherlands had successfully recuperated from the war. The country had developed into an attractive place to live in. Christian values, like tolerance and helping others that cross one's path, were still prevailing in all layers of the society. A work week of six days separated work from rest. Freedom of choice was allowed in almost every aspect as long as others were not affected. Race discrimination was unheard of. Immigrants from former colony Indonesia were wholeheartedly welcome.

Nowadays, half a century later, the situation is profoundly different. The population has almost doubled. The celebration of the traditional Santa Claus and Black Peter is considered to be an act of race discrimination. Ethical norms are no longer determinant for the choices people make, but laws, rules and regulations. Everything is acceptable as far as it remains within the law. Bureaucracy and egoism have become dominant features. As a result, the country has lost much of its attractiveness.

Overpopulation is the main cause of the demise, not race discrimination. When rats are locked up in a small space, they try to kill each other. Humans act in a similar way by starting wars, like Hitler did by claiming what he called Lebensraum.

Evert van Benthem, the glorious winner of the Eleven Towns skating tours of 1985 and 1986, emigrated in 2000 to Alberta Canada, where he runs with his family two farms of together 300 cows. He regards his decision to emigrate to be a super step in his life.

Is emigrating the only option to escape from the country's continuous decline? What could be done to reverse the downward trend? Imagine I had unlimited power, what would I do? My response to that question is the subject of this book.

# WAR MEMORIES

I was born on the 9th of October 1938. On a Sunday during the afternoon service of our Reformed Church. Being born on a Sunday is believed to bring luck. Lucky, I have been indeed. I was the only one that remained unharmed in the shooting incident on the 7th of September 1944 that left one dead and three of our family injured.

The launching of V2 rockets taking place from Wassenaar where we lived intensified in the summer of 1944. Sometimes, the rocket fell back leaving behind a big crater. Our mother decided to move the family to Leiden because she feared that the Allies could bomb the area of the V2-launches. That fear was justified. The neighbourhood Bezuidenhout of The Hague was bombed by the Allies on the third of March 1945.

As part of moving the family to Leiden, our father drove us via the farmer van het Hul in the Haarlemmermeer who supplied us grain and wheat (dairy products were supplied by the farmer van Bohemen in Stompwijk). We were driving on the road approaching the viaduct of the crossing with the N44, when a fighter plane of the RAF appeared in the air. As our car could not be distinguished from German army cars, our father wanted to get shelter under the viaduct. However, a German army car was already parked there. Parking our car full of food aside a German army car would be asking for trouble. Our father stopped, therefore, a bit later. A bit too late. Immediately after our father had shouted "They are coming!", machine gun firing started. Sitting in the middle of the front row, I made myself as small as I could. The bullets, both right and left of me, all missed me. My sister Mies (4/4/1937) and our father were both injured in a foot. My brother Herman (16/12/1940) was injured in both legs. He lost three toes of one leg. In the other leg, a bullet went completely through the ankle. The retarded growth of that leg necessitated to put an ever-thicker block under his foot. The nurse who had taken care of my grandfather van Gunsteren until he passed away, was sitting with Herman on her lap on the back row. She was instantly killed by bullets in her head and stomach. Herman, screaming loudly, was pulled out of the car by our father through the back window that he had crushed with his fist. A farmwoman brought me to her nearby farm where I got a glass of milk.

Our mother, who had stayed in Wassenaar with my brother Frans (12/5/1942), took care of the wounded after they left the hospital. Our father and my sister Mies recovered well, but Herman, not yet four years old, had to endure a very hard time during his three months stay in the hospital.

I felt a responsibility for my four years younger brother Frans that has remained ever since. I pulled him into the cellar when the sirens of air alarm went off and I protected him against Herman's attacks of anger.

Our parents were preoccupied with surviving the hunger winter in which 25 thousand people would die from starvation. Attention from the part of our mother comprised little more than inspecting the toilet to see if I had diarrhoea, which was the condition for getting some rice from the sack she preserved as an ultimate reserve. I learned to be on my own and to mistrust authorities that tell me what to do. That attitude did not disappear instantly after the war, as is illustrated by a conversation in the waiting room of Bangkok International Airport. When I sat down in the last unoccupied chair, a German woman addressed me in a harsh commanding tone: "Dieser Stuhl ist besetzt", whereupon I replied: "Ja, denn ich sitz drauf. Die Zeit ist vorbei dass die Deutschen entscheiden können wo man sitzt." Her commanding manner had reminded me of the war and evoked my inappropriate response.

When on the fifth of May 1945 the German occupation came to an end, I felt as if a heavy sack of potatoes was taken from my back, making me aware that freedom is an essential prerequisite for feeling well and is worth fighting for.

These and many other war memories have shaped my views on peace and war. I offer them to later generations as an inheritance of my reflections and recommendations for action.

*Noordwijk, February 2023*

*Lex A. van Gunsteren*

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# INTRODUCTION

## *The changed environment*

The environment in which the government of The Netherlands has to operate has changed dramatically by the Covid19 epidemic and the outbreak of the Ukrainian war. The world before these events will never come back. Our systems for managing the country though - tax legislation, defence, food supply, infrastructure, education, health care - are inadequate to cope with these environmental changes. They address the issues of the past, not those of the present and the future. It so could happen that refugees entering the country had to sleep under the open sky.

The public is more than ever dissatisfied with the short-sighted way the government is dealing with the challenges of today. The confidence of the public in our politicians is at an historic low.

The Ukrainian war unfolding in the East of Europe reminds me of my own experiences in the second world war, arousing strong feelings of déjà vu and l'histoire se répète, as the French say.

The Ukraine war that started with the Russian invasion on the 24th of February, 2022, has so far evolved along strikingly similar patterns of the second world war.

1919-1939: Germany secretly building up a huge military force, vastly outnumbering the Allies	1990-2022: Russia restoring military strength after collapse of the Soviet Union in the early nineties
1936-1938: Germany invading Austria and Czechoslovakia	2014: Russia invading Donbas and the peninsula Crimea
1939: Germany invading Poland; beginning of the second world war	2022: Russia invading Ukraine; beginning of the Ukraine war
1940: Battle of Britain, <i>never in the field of human conflict was so much owed by so many to so few</i> (Churchill)	2022: Ukraine holding out against all odds, <i>gaining respect and support of the West European countries and the USA</i>

After the turning point of the Battle of Britain, in which Göring's air force failed to attain the air supremacy required for an invasion of England, five years of terrible suffering elapsed before the war came to an end by Germany's surrender. Likewise, the Ukrainian war must be expected to last several years before peace negotiations will have any chance of success.

How will the Dutch government proceed in those years?

Will the suffocating *Quest for Control* continue to dominate the political debate (van Gunsteren, H.R., 1976, p. 154)?

Will the emphasis on the URGENT displayed so far, along with paying only piecemeal attention to the IMPORTANT, continue to prevail (Figure 1)?

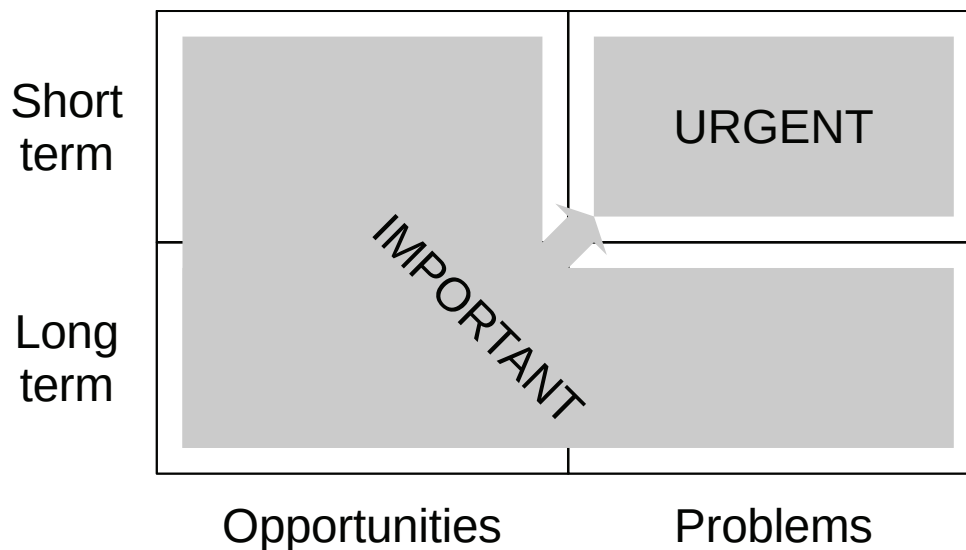


Figure 1: To acquire public funding, the issue has first to be moved from the IMPORTANT to the URGENT.

Ministers are usually held accountable by members of Parliament for the way they dealt with the URGENT, on what they did, but much less on the IMPORTANT, on what they did not do but should have done.

### ***The need of systems thinking***

The complexity of the main political issues requires systems thinking for their solution. A system is a whole that cannot be divided into independent parts (Ackoff, 1994, pp. vii and 21). The performance of a system is not the sum of the performance of its parts taken separately, but the product of their interactions. Ackoff calls the complex system of interrelated problems a mess. A mess cannot be handled effectively by breaking it down into its constituent parts and solving each part separately. The way problems and their solutions interact is much more important than how they act independently of each other.

Politicians tend to ignore the need of systems thinking for resolving long-term issues. They seem to be unaware that every solution of a problem generates several new problems. The result is that the measures they enact provide only short-term relief.

For example, the Minister of Economic Affairs issued a set of measures to achieve a transition from fossil to electric energy usage. When, as a result, the demand of electrical energy began to

rise, the infrastructure of electrical cables got soon overloaded. Requests from enterprises to be connected to the network had to be put on a waiting list.

For approval of human drugs extensive testing on side effects is required, but our Minister of Economic Affairs could unpunished ignore the side effects of his counterproductive intervention. Obviously, the transition towards electrical energy usage has to be suspended until the required upgrading of the cable network is completed.

Other crises – immigrants, farmers, inflation, energy prices, health care, housing, education – are invariably approached by the government with similar ignoring of unintended negative side effects.

It would be naïve to expect politicians to learn and make a serious effort to acquire agility in systems thinking. A more promising approach seems to be to show how systems thinking is incorporated in the art of engineering design and apply that way of thinking to the main long-term political issues.

### ***The mindset of an engineer***

Theodore von Kármán, the famous pioneer in aerodynamics, guided by his father who feared his talented son to become a mathematical freak, contrasts the difference between a scientist and an engineer as follows:

*The scientist explores what is; The engineer creates what not has been.*

The essence of systems thinking, namely that the performance of a system is determined by the connectiveness of its parts, is well-reflected in the *engineer's ideal of Caesar's war chariot which never fails but at the end of its lifetime disintegrates completely into dust*. If one bolt were to remain, then that bolt would have been constructed too conservatively and that would have had adverse weight implications. Unnecessary weight impairs the effectiveness of the chariot, which Caesar would never accept.

The engineer uses mathematical modelling, the virtual world, to get insight in his design problem. His solution in the physical world is a piece of hardware that serves a function.

To illustrate the point, the design process of a nuclear powered 20,000 HP tugboat is described in the Appendix.

Could addressing the main governmental issues with the mindset of an engineer help to resolve them? I will explore this approach in the format of a thought experiment.

Suppose I were an almighty autocratic leader of the country without having to worry about forthcoming elections, what would I do? How I would proceed in regard of the main governmental issues is described in the chapters that follow.



# ENERGY

## *Climate change and energy generation*

My view on climate change and energy generation is described in the following note that I wrote for a meeting on the subject in Eindhoven on the 29th April 2019.

### **1. Climate**

Climate changes have taken place in the past and will continue to occur in the future. We have to accept that as a fact of life. It is an illusion to believe that we can do anything to significantly influence the occurrence of climate change. It is simply not realistic to expect that China, India, the US and the whole continent of Africa will ever agree to limit their CO<sub>2</sub> emissions to an extent that requires severe sacrifices in the welfare of their inhabitants.

Political infeasibility is not the only roadblock. The validity of the mathematical models underlying the IPCC- propositions is extremely weak. Their theories have so far failed to pass the reality test, i.e. the confirmation of the predictions from those theories by appropriate measurements (Van Gunsteren, L.A., 2011). The measurements, as far as currently available, indicate that the theories substantially overestimate the consequences of the CO<sub>2</sub> emissions. The predicted rising of the sea level, for instance, has so far not taken place.

A third consideration against limiting CO<sub>2</sub> emissions is that CO<sub>2</sub> is essential to keep the earth green. Lots of CO<sub>2</sub> in the air might ultimately lead to deserts becoming green fertile areas.

Conclusion: we should not try to influence climate change but adapt ourselves to its consequences.

### **2. Energy**

Principally, there are three ways to save energy:

1. *Abstain* from using energy; the ultimate energy saving is the “clochard” under a bridge over the Seine. One piece of bread per day is all he needs.
2. *Slow down* the energy consuming activities and processes: slower cars, slower airplanes, slower heating up our CV, etc.
3. *Information*: If my CV has the information that I will not come home today, a lower “Soll”-temperature can be set.

To abstain and slowing down processes constitute concessions to our welfare that will not get much political support. Information can still provide some savings to compensate for the rising demand of energy. That the demand will not increase is actually an optimistic assumption.

To meet the current demand of energy, three main options are available:

1. Fossil energy: oil and gas
2. Nuclear energy
3. Green energy: windmills, solar cells, et cetera.

Green energy can never cover more than some 15 to 20 %. The bulk has to come from fossil and nuclear. If we want to get rid of fossil sources of energy, we have to accept nuclear energy generation. There is nothing wrong with that. When sufficient attention is paid to quality assurance and control<sup>1</sup>, nuclear is a “clean” energy source without any serious disadvantage. Radio-active waste can be stored deep in the earth. When the thorium reactor will be further developed we can even become independent from uranium.

Conclusion: the energy problem can be solved by a controlled transition from fossil to nuclear energy generation.

### 3. The idiosyncrasy explained

Why don't we accept the foregoing two conclusions: 1) adapt to climate change, don't try to influence it, and 2) accept nuclear energy generation? Why do we pursue policies instead that lead to a staggering waste of resources and efforts?

Because *we tend to let our personal interests prevail over the general interests of the community at large*. Let me describe some illustrative examples.

#### Example 1: The Delta works

After the flooding of 1953, in which 1836 inhabitants of the province Zeeland lost their life, the cabinet of Prime Minister Joop den Uyl had to decide in the early seventies on a long-term solution that would prevent such a disaster to happen ever again. The population of Zeeland wanted a closure of the Ooster-Schelde, but environmental pressure groups insisted that the Ooster-Schelde would remain open in view of the habitat.

The compromise reached was a dam having sliding doors that could be closed during a heavy storm. The cabinet Den Uyl was saved. At the cost of some \$ 7 billion tax payer's money, but who cares? The construction took place in the period 1976-1986. During that period, I was director of Corporate Planning and R&D of the Royal Boskalis Westminster Group, one of the five partners in the joint venture Dosbouw responsible for the execution. What was our expert opinion on the project?

An awkward project from an engineering point of view! Fitness for purpose, preventing a flood to happen ever again, could be attained at half the cost. The maintenance would become a serious problem after a few decades. The know-how obtained from the project would be unsellable, since a market for dams with sliding doors does not exist.

This insider's view was a taboo, undiscussable because it was against our own interest. The project provided years of work for our company. It offered an ideal learning environment for our young engineers and it was a nice showpiece to impress potential customers. Good reasons to abstain from any negative communication to the outside world.

<sup>1</sup> *Quality assessment* is the set of rules and regulations to define and ensure the quality of a product. Quality control is related to the fulfillment of the rules and regulations in operations.

**Example 2: The F35, Joint Strike Fighter**

The largest military program ever, costing close to US\$ 1 trillion, is a complete failure from an engineering design point of view. It is a typical example of the multi-purpose pitfall in engineering design (van Gunsteren, 2013, pp.29-32). The aeroplane was qualified in the presentation of the 2008-RAND-report as 'next to useless' since in visual range combat it 'can't turn, can't climb, can't run'. Nevertheless, the programme goes on and warnings of seasoned engineers are ignored. Too many people have been bribed or have otherwise a personal interest in its continuation.

**Example 3: Windmills in the North Sea**

Similar to the case of the Delta Works. Siemens and offshore companies have years of work and get an ideal training site for their engineers.

A deplorable side effect is that the windmills constitute an extra roadblock for creating the potentially governmental goldmine of an airport island in the North Sea to relieve Schiphol Airport (van Gunsteren, 2003).

**Example 4: The Netherlands on/off gas**

In the seventies the policy was: all households on gas, four decades later: all households off gas. Nice creation of work for installation companies, but actually an enormous waste that must ultimately be financed by the tax paying citizens.

What would be the personal interest of the climate scientists? Evidently, that the subject remains a hot issue justifying large research funds to be made available for it. Their job security is directly affected. No wonder that the climate sceptics are predominantly retired professors who have nothing to lose.

Politicians tend to be addicted to being in the limelight. When going into retirement, the climate discussion enables them to stay in the limelight, like Al Gore in the US and Ed Nijpels in The Netherlands.

To defend their case, these climate preachers have to resort to all kinds of false arguments and doubtful tactics.

Their main argument is: 90% of the climate scientists supports their view. They divide their audience into experts who agree with them and laymen who disagree. The experts are authorised to determine what is good for us and the laymen should shut up. It is no surprise that after such a ballot, 90% of the climate scientists supports their view. Apart from this manipulation, it is an illusion to think that the validity of a mathematical theory can be assessed through democratic voting.

Other manipulations are: measuring parameters within the measurement accuracy, changing the circumstances in the period between two consecutive measurements.



Climate sceptics are accused of irresponsible behaviour in regard to the interests of future generations.

Such arguments and tactics are an indication of a weak cause. The issue becomes a belief, a religion that does not need any validation.

The following personal experience illustrates the point. I presented a paper on probabilistic network planning with mitigations on-the-run at the Project Management Congress April 10-12, 2019 of Delft University of Technology. I opened my presentation with a question to the audience: Do you agree or disagree with the proposition “The project manager of a complex construction project should pay particular attention to activities on the Critical Path”? The Critical path is the path through the network that is determinant for the duration of the entire project according to a deterministic Critical Path Method (CPM) calculation. Only two people in the audience disagreed with the proposition. All others agreed with it. I then explained that several paths require equally particular attention. There simply is no such thing as “The” Critical Path (Van Gunsteren, L.A., 2011, pp.27-29).

In science, majorities can be - and indeed often are- wrong. That a majority of climate scientists supports the IPCC-conclusions does not mean anything.

#### **4. The future**

The laws of physics cannot be circumvented. Sooner or later, the insight will break through that mankind cannot control climate change. It will be later rather than sooner. Only harsh consequences can turn around the currently prevailing views. Ordinary citizens have to become aware that the climate gospel is significantly affecting their level of welfare before we can have any hope that a change of policy will come around.

Similarly, nuclear energy generation will only become acceptable again when fossil energy sources become unaffordable for the ordinary citizen.

As long as we can afford the luxury of ideosyncracies in both matters, any change of policy is not to be expected.

So far, my note of 29th of April 2019. At present, three and a half years later, the point has been reached that ordinary citizens cannot pay their energy bills anymore. The response of the Minister of Economic Affairs has been to introduce a price cap up to the level of average energy consumption for households. The government will subsidise the difference between the market price of oil and gas and the price cap. Estimates on the cost of the price cap vary between € 5 billion (0.5% of GNP) and € 15 billion (1.5% of GNP), depending on the future market price of oil and gas. Implementation will not be easy. Where to draw the line for the price cap is dominating the public debate.

Not a word is to be found on the roots of the problem, namely the unbalance of supply and demand and its obvious solution of accepting nuclear energy generation.

The measures taken so far by the government will provide only short-term relief since they are addressing symptoms rather than causes. '*Kurieren am Symptom*', as the Germans put it.

### ***Acceptance of nuclear power generation***

The Minister of Economic Affairs announced in December 2022 the government's intention to build two new nuclear reactors on the premises of the only one left in Borssele. This constituted 180 degrees change of policy. The election programme of the Minister's party (D66) five years earlier stated even that the only reactor still working should be closed prematurely.

The three reactors in Borssele would produce 10-13% of the demand of electrical energy.

The autocratic leader of our thought experiment would go further by allocating new nuclear plants in Limburg and Groningen. The country would then have 9 reactors divided over 3 sites, producing 30-39% of the demand of electrical energy. Anything less than this lacks the critical mass required to become a serious alternative for fossil energy generation. France, for instance, has 56 reactors, divided over 18 sites.



# INFLATION

## *Investments vs. expenses*

Inflation increases whenever governments spend consistently more than their income from taxes and other sources like fines for over speeding and excise duties on fuel. The response of the government on the Covid19 epidemic has been to spend billions of Euros as if 'the trees grow into heaven' as a Dutch proverb calls it. As a result, inflation has risen to record heights. Low- and medium-income groups cannot bear anymore the cost of their households.

The response of the government has been the same as in the energy crisis: compensating those who are most affected. Again, 'Kurieren am Symptom'.

## *The flight of capital*

Attempts to reduce the deficit boil down to stealing from pension funds, enterprises and wealthy individuals. The predictable effect on the long-term will be that these will emigrate to elsewhere. For instance, Unilever and Shell already moved their headquarters from Amsterdam to London. The Royal Boskalis Westminster N.V. changed ownership recently from stock market to HAL Holding N.V., enabling to follow suit whenever deemed necessary by its owner. What would the autocratic leader of our thought experiment do about inflation?

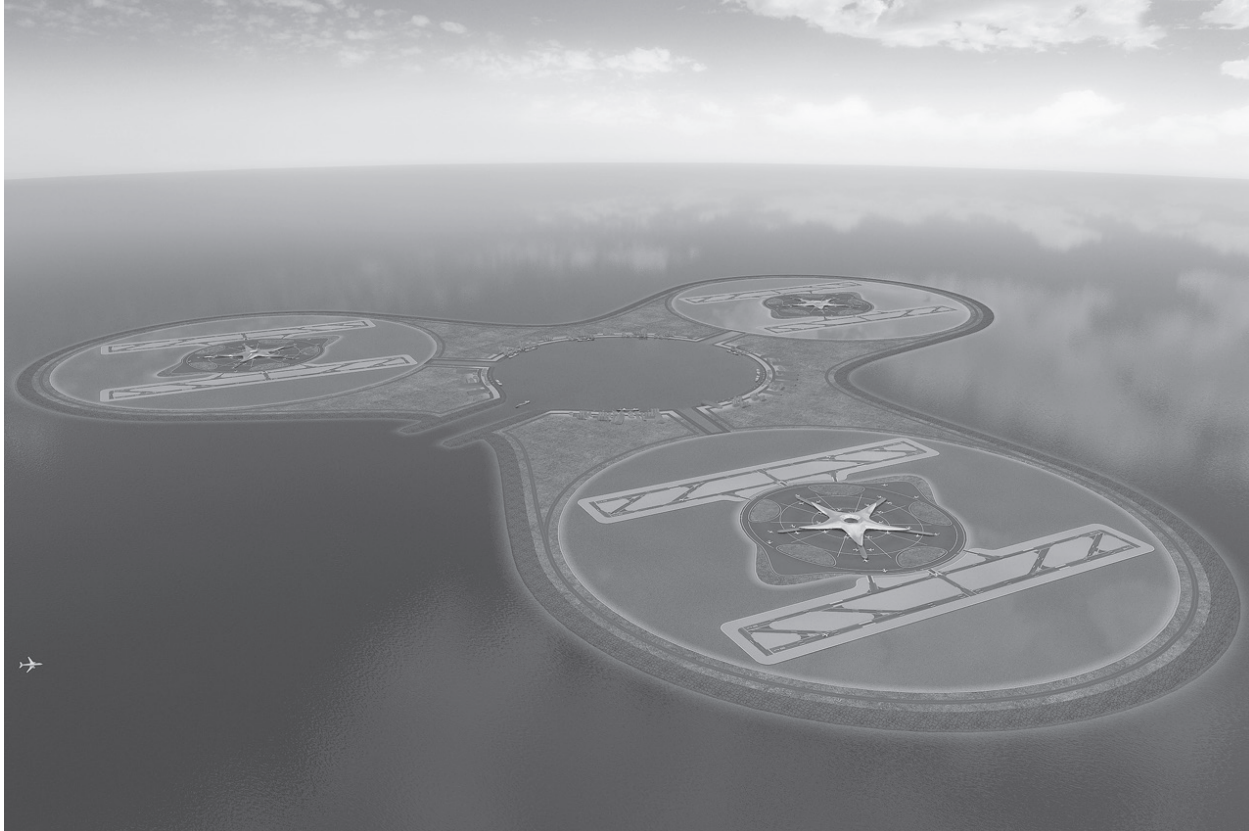
First of all: distinguishing investments from expenses. Investments are payments with the prospect of a financial return in the future. Expenses do not generate a financial return. They constitute sunk cost.

## *Artificial airport island in the North Sea*

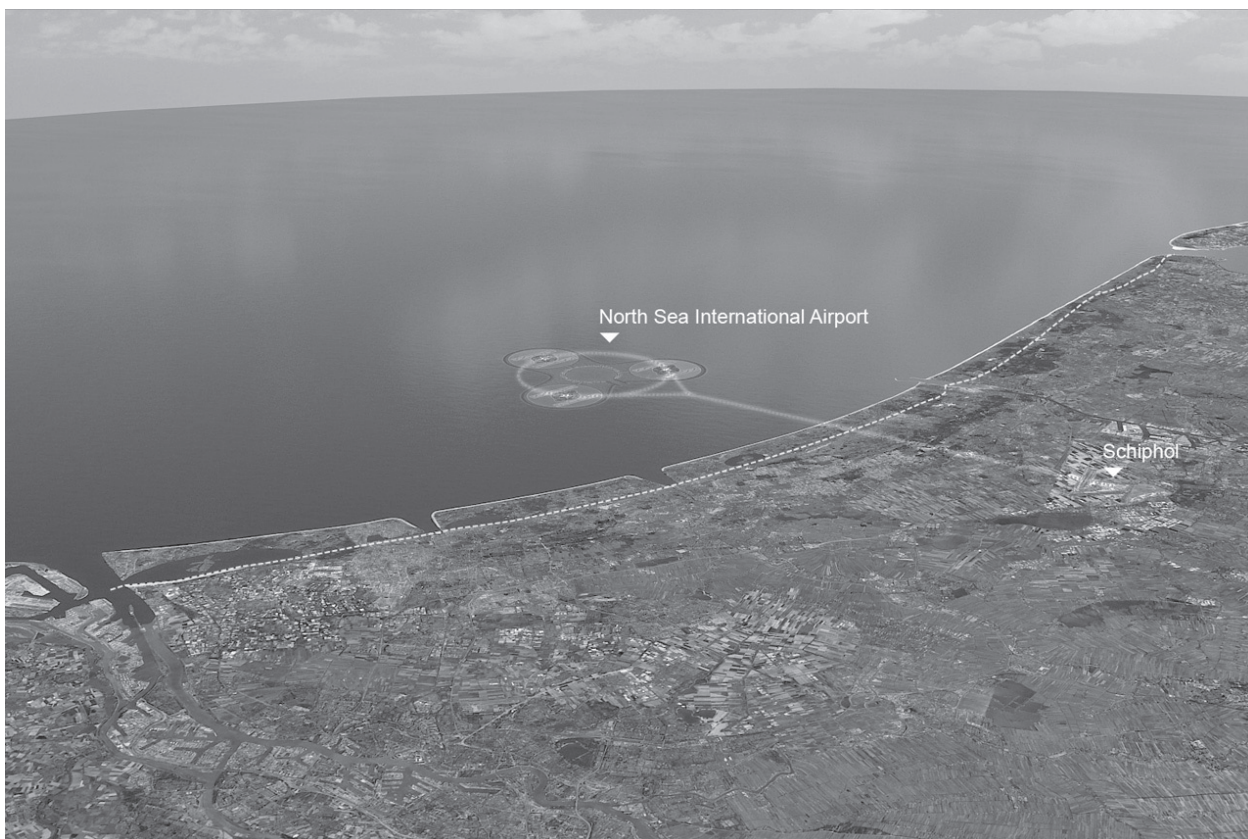
The autocratic leader of our thought experiment would aim at opportunities with a high Return on Investment (ROI), like creating an artificial airport island in the North Sea (van Gunsteren, 2003; Binnekamp, 2005, pp. 91-96)<sup>2</sup>.

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<sup>2</sup> The idea is not new. The engineering company Hydrodynamic of Boskalis was already founded in 1968 to conduct feasibility studies of alternative designs of the island. The company's director Cor Stigter submitted two propositions to a consortium of 18 interested parties. Shell not being one of them is probably why it did not come to execution.



*Figure 2: North Sea International Airport as envisioned by Royal Haskoning & Van Oord in 2008.*



*Figure 3: North Sea International Airport as envisioned by Royal Haskoning & Van Oord in 2008. (Google map)*



Amsterdam Schiphol Airport is faced with the dilemma:

1. To remain a hub, an airport for intercontinental flights, the number of flight movements (landings and take-offs) per year has to be above a threshold in the order of 600 thousand flight movements.
2. To limit environmental effects, noise and air pollution, the number of flight movements per year has to be kept below a threshold in the order of 400 thousand flight movements.

Both thresholds are clearly incompatible, causing an endless debate on the compromise that has to be reached.

The dilemma could be resolved once and for all by an airport island in the North Sea, about 35 kilometres from the coast, connected by a shuttle and a tunnel to the present Schiphol. The return on the investment of about 40 billion Euros was estimated in a TUD-MIT workshop in 2001 to be around  $ROI=0.16$  (van Gunsteren, L.A., 2003). The concept of an artificial airport island has already successfully been applied in Hongkong and Japan. Competing European airports - London, Paris, Frankfurt - cannot follow suit since they do not have a sea in the vicinity of the city.

Rotterdam harbour is the gate to Europe for transport over land and sea, a goldmine for the Dutch government. An artificial North Sea island could make Amsterdam Schiphol Airport also the gate to Europe for transport through the air. Another goldmine for the Dutch government, generating revenues in the order of € 6 billion per year, instead of a never-ending headache dossier<sup>3</sup>.

A similar long-term opportunity in which a unique location is exploited is the Ocean Thermal Energy Conversion (OTEC) opportunity for the Dutch Kingdom related island Curaçao.

### ***The OTEC- opportunity***

Ocean thermal energy conversion produces energy from temperature differences in tropical ocean waters.

Energy from the sun heats the surface water of the ocean. In tropical regions, surface water can be much warmer than deep water. This temperature difference can be used to produce electricity and to desalinate ocean water. OTEC-systems use a temperature difference of at least 20 degrees Celsius to power a turbine to produce electricity. Warm surface water is pumped through an evaporator containing a working fluid. The vaporised fluid drives a turbine generator. The vaporised fluid is turned back to a liquid in a condenser cooled with cold ocean water pumped from deeper in the ocean. OTEC-systems using seawater as a working fluid can use the condensed water to produce desalinated water.

Attempts to develop and refine OTEC technology started in the 1880s. In 1881, Jacques Arsene d'Arsonval, a French physicist, proposed tapping the thermal energy of the ocean. His student, Georges Claude, built the first OTEC plant, in Matanzas, Cuba in 1930. The system generated 22 kW of electricity with a low-pressure turbine. The plant was later destroyed in a storm.

In 1935, Claude constructed a plant aboard a 10,000-ton cargo vessel moored off the coast of Brazil. Weather and waves destroyed it before it could generate net power (i.e. the amount of power generated after subtracting power to run the system).

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<sup>3</sup> A breakwater could be located adjacent to the South-West of the island to break the waves from North-Western storms lashing the dikes of the Southern coastline.

In 1956, French scientists designed a 3 MW plant for Abidjan Ivory Coast. The plant was never completed, because new finds of large amounts of cheap petroleum made it uneconomical.

A European initiative EUROCEAN - a privately funded joint venture of 9 European countries already active in offshore engineering - was active in promoting OTEC from 1979 to 1983. In those years, I represented its member Boskalis Westminster Group. Initially, a large-scale offshore facility was studied. Later a 100-kW land-based installation was studied combining land-based OTEC with Desalination and Aquaculture (ODA).

In July 2016, the Virgin Islands Public Services Commission approved Ocean Thermal Energy Corporation's application to become a Quality Facility. The company is thus permitted to begin negotiations with the Virgin Islands Water and Power Authority (WAPA) for a Power Purchase Agreement (PPA) pertaining to an OTEC plant on the island of St. Croix. This would be the world's first commercial OTEC plant.

Until recently, OTEC could not compete with fossil energy generation. The world market price of oil and gas is increasing at such a rate that OTEC might become economically viable. The cost price of OTEC, on the other hand, is decreasing as a result of technological progress.

The Netherlands is in a favourable position to reap the benefits of this development. First, the cluster of offshore engineering competence at and around Delft University of Technology: Spin-off company Bluerise, Allseas, MSC-Gusto, MARIN, NACO, Damen Shipyards et cetera. Second, historical ties with Curaçao, one of the few locations in the world having a water depth of over 1000 metres near its coast and a difference of at least 20 degrees Celsius of temperatures in surface and deep layers in the ocean.

OTEC, generating zero CO<sub>2</sub> emission, is the greenest of all green energy sources but is completely ignored in the gospel of the climate priests. Why? My guess is: because, as mentioned before, there are only three places in the world where the water depth near the coast is over 1000 metres and the temperature difference of deep and surface layers of the ocean is more than 20 degrees Celsius.

OTEC technology is at a level where windmill technology was two decades ago. There is still room for improvement by means of dedicated R&D.

The autocratic leader of our thought experiment would order an updating of the prospects of OTEC and open a dialogue on the matter with the government of Curaçao.

Investing in promising projects, like the North Sea artificial island and the OTEC-opportunity can contribute to keeping inflation under control, but by no means resolve the issue.

Expenses that are actually unnecessary luxuries should be refrained from. Example 4 of my note of 29th of April, 2019 - all households on gas followed four decades later by the opposite: all households off gas is such an unnecessary luxury. Like digging holes and filling them up again in endless succession. Unemployment can be avoided this way, but at the price of rising inflation and decreasing purchasing power of consumers. Expenses of the government should be scrutinised by asking the question "If not financial return, what else do we get in return?" Discussions in Parliament, however, tend to be about the division of the pie of public funds rather than how to get a pie at all.







# FARMING

## *The Nitrogen crisis*

The Nitrogen crisis evoking unprecedented protests from farmers and sympathising citizens, is caused by the lack of systems thinking of the cabinet and trying to reach a compromise instead of synthesis as the situation clearly requires. The autocratic leader of our thought experiment would follow a completely different line of thinking, based on the concept of an idealised design (Ackhoff, 1994, pp. 100-101).

## *Planning backward*

Strategic decision making is usually focused on trying to go from where one is to where one wants to be at an arbitrarily selected point in the future. The concept of an idealised design, by contrast, is focused on working backward from where one wants to be right now to where one is right now.

We and our environments change in unpredictable ways between now and then. Implementation of effective planning should consist of continuous efforts to close the gap between where we want to be and where we are *at that time*.

It is easier to find a path through a maze by working from the exit to the entrance than from the entrance to the exit. The working back-principle is *called dynamic programming* by mathematicians, since it enables to solve previously difficult to solve problems in which the origin and destination were known, but how to get from one to the other was not.

Let us consider how an idealised design of farming would look like.

Idealised design of the country's farming

### **Where we want to be**

The population density of The Netherlands is among the highest in the world. As a corollary, terrain is a scarce resource. We want to have that scarce resource be utilised in diversified biological family-run farming, at a size enough to feed 20 million people, thereby making the country independent from other nations for feeding the population and preventing a disaster such as the hunger winter of 1944 to ever happen again.

### **Where we are**

The Netherlands is not only among the highest population density in the world, but is also the world's second largest exporter of food products, yielding revenues in the order of € 90 billion per year. These two features of the current situation are incompatible.

Export of food products should be limited to a level that does not affect the diversified biological farming needed for inland consumption.

The autocratic leader of our thought experiment would issue a directive to the relevant Ministries to support diversified biological farming by means of rules and regulations as well as direct subsidies. This offers farmers a prospect enabling them to continue life as a farmer. In this way, the Nitrogen crisis will automatically evaporate in due time.

Continuous interactive planning efforts to close the gap between where we want to be and where we are could be entrusted to a working group of experts and stakeholders.

# DEFENCE OF TERRITORY

## *How a herd is managed in the wild*

Many species of mammals – apes, dolphins, whales, horses, wolves and many more – live in groups to increase their chances of survival (van Gunsteren, L.A., 2012, pp. 14-18). Such a group is called a herd, a band, or a pack. Humans also organise themselves in groups, which we call organisations, corporations, tribes, and nations.

The leader of the herd, the Alpha, is not the nicest animal of the herd. It is the member of the herd that provides the best chances of survival. The Alpha determines the ranking, the ‘pecking order’ in the herd. The ranking, in turn, is determinant for privileges like drinking and eating first.

## *The war paradox*

The first priority of the Alpha is leading his Betas in defending the territory of the herd, animals or humans alike.

Hence, what we may call the *War paradox*:

*The prerequisite for long-lasting peace is to maintain a credible military force at all times.*

The deterrent has to be sufficiently trustworthy to prevent any potential intruder to get the idea that he could win an imminent war.

During the cold war after the second world war, the balance of military power of the East block and the NATO-states has been the basis of 70 years of peace. After the collapse of the Soviet Union, defence budgets eroded year after year. Peace was taken for granted. Lessons from the second world war were forgotten or ignored. Conscription was made dormant in 1997, not for strategic reasons, but for the simple reason that active conscription was considered to be too costly. The NATO norm of spending on defence is at least 2 percent of the Gross National Product (GNP), but we spend only 1.2 percent. We rely for our security entirely on the Americans (who are spending 4% of their GNP).

The outbreak of the Ukrainian war at our borders has been a wake-up call, a reminder that peace should never be taken for granted. The erosion of defence expenditure of the past decades seems to have come to an end. Let us hope this change will be stable. But even then, the country is too small to defend itself. When a herd is too small to survive on its own, it has to team up with another herd, in this case Germany. Close collaboration with Germany’s military forces has been rightfully adopted as our main defence strategy. To be an attractive partner

includes both weaponry and operations. For example, purchasing the German Eurofighter Typhoon plane instead of the American F35 Joint Strike Fighter and establishing joint divisions that can instantly be put into action.

What would the leader of our thought experiment do?

- Taking the initiative to build a *nuclear-powered submarine*.
- Establishing an active *social conscription* obliging every citizen, male or female, between 17 and 30 years of age to serve during 12 to 24 months in the navy, the army, the air force or in hospitals and elderly homes. During their service, the drafted citizens would receive the same remuneration as their permanent colleagues.

# IMMIGRANTS

## *Schiphol City*

The transfer of landings and take-offs to an artificial airport island in the North Sea offers the opportunity of allocating new functions on the premises of the present Schiphol. For example, the intake of immigrants.

Schiphol City could develop in the same way as we have seen in Almere. A centre for intake of immigrants could be built, offering immigrants a roof over their head and class rooms for learning Dutch or English language and singing the national hymn *Wilhelmus* and Santa Claus songs. Immigrants would have to pass an exam in Dutch or English language and Dutch history before getting a permit to settle down elsewhere in the country.

Immigrants should be obliged to deliver their contribution to the *social conscription* before getting final permission to stay. When immigrants become aware that they have to earn their permit to stay in the country instead of getting one unconditionally, their number will drastically decrease.

## *The housing crisis*

Immigrants having acquired the status of approval to stay in the country cannot exercise their right simply because they cannot get a house due to the current shortage in the real estate market. The measures taken to cope with the housing crisis are counterproductive. The general policy is to make life difficult for house owners who do not live themselves in their house but own it as an investment. The transfer tax is 2% for inhabitants, but 8% for investors. In some regions selling one's property is subjected to further restrictions that discourage investors to invest their money in real estate. Project developers who are prepared to invest in housing for immigrants cannot find a suitable location as a result of the prevailing "*not in my back yard*" attitude of inhabitants of the envisaged neighbourhoods. The policy of making life difficult for investors who could contribute significantly to the long-term solution of the housing crisis is in conflict with plain common sense and hard to explain to immigrants who are willing to make a genuine effort to integrate.

The autocratic leader of our thought experiment would forbid interventions that violate general property rights. He or she would decide to implement *in parallel* the options of North Sea island and Social Conscription. The housing crisis would then automatically come to an end by means of using the terrain of the present Schiphol that becomes available for temporary housing of immigrants. A substantial decrease of their number would be attained by the condition for getting a permanent permit to stay of participating in the Social Conscription, as would be mandatory for all Dutch citizens.



# INTEGRATION OF AUTOCRATIC AND DEMOCRATIC VALUES

The British got their Churchill to lead the country through the second world war. Let us hope the Dutch too will get once such an enlightened Prime Minister with that kind of individual prominence.

The things to-do-list for such an enlightened Prime Minister includes developing his or her vision on:

- Building *two new nuclear reactors* on the premises of the present one in Borssele.
- Building *two new clusters of 3 reactors each* in Groningen and Limburg.
- Building a *nuclear-powered submarine*.
- An *artificial airport island* in the North Sea.
- Utilising the available terrain for *diversified biological farming* to feed the country's own 20 million inhabitants and allowing only what is left for the export of food products.
- A *social conscription* for all citizens between 17 and 30 years of age to serve 12-24 months in the military or health care institutions.
- The *OTEC-opportunity* for the former colony Curaçao.
- Conducting an updated feasibility study of the proposition of a *nuclear-powered salvage tug*.

He or she must be wholeheartedly be convinced that his or her vision is the right thing to do and be able to say: "Trust me, this is what we have to do for our long-term survival and welfare". As long as such a charismatic leader has not yet emerged, the current short-sightedness of our politicians will prohibit the execution of the actions that are necessary to reap the benefits of these long-haul opportunities.

The actual list of things-to-do can be different, which is quite all right provided they reflect the three main strategies:

1. Social conscription
2. Nuclear energy utilisation where possible
3. Artificial airport island in the North Sea.





# INNOVATION

Innovation is often proposed as a panacea to cope with the various crises the government is confronted with. This widely prevailing view is an illusion.

*Innovation*, defined as the first application of an invention – the first evidence that someone is prepared to pay for it – is a *game of excellence* since only one can be the first. An inner drive to excel is a prerequisite for the successful conversion of inventions into innovations. The paradox of management of innovation is that innovation cannot be managed directly. Innovation requires creativity and inductive thinking that cannot be imposed top-down. It is useless to order someone to be creative. The motivation to be creative has to come from within. Creativity requires psychological freedom and psychological safety. All one can do is making circumstances conducive to innovation by measures that facilitate, but by no means guarantee, innovation to happen.

The road from idea to application in the market is paved with roadblocks that are difficult to overcome. To steer a promising idea around potential obstructions requires persistence and creativity at all four stage gates of the process of technological innovation. Governmental support is only relevant at the fourth stage gate related to legislation and infrastructure.

<b>Required</b>	<b>Phase</b>
	<b>Discontent</b> With status quo
<b>Inventor</b> Imagination & Inductive thinking	
	<b>Invention</b> New technical trick
<b>Product Champion</b> Persistence & Courage	
	<b>Innovation</b> First commercial application
<b>Commercialisation</b> Sales & Manufacture	
	<b>Diffusion</b> Renewal
<b>Governmental Support</b> Legislation & Infrastructure	
	<b>Progress</b> Scale & prosperity

Figure 4. Stage gates of the process of technological innovation

***The rational view of innovation***

Donald Schön (1977) has coined the term rational *view of innovation* to describe the belief that innovation is a manageable process in which risks are controlled by justification and review. His assertion is that the rational view of innovation ignores or violates actual experience and is, therefore, a myth. My experience of a lifetime involvement in technological innovation confirms this view.

Innovating endeavours based on the erroneous rational view of innovation are bound to fail. Technological innovation is not a saving angel for resolving the current crises.

Innovating capability is relevant, however, to induce *resilience*, the feature of a community to cope effectively with changed environmental circumstances. For example, the research and development on vaccines intensified worldwide after the outbreak of the Covid19 epidemic and produced new vaccines years earlier than so far usual in the pharmaceutical industry.

# EPILOGUE

*“We are living in an interminable succession of absurdities imposed by the myopic logic of short-term thinking.”*

Jacques Yves Cousteau

## ***Implementation***

Implementation of the recommended actions has to be done in *parallel* in view of their interconnectedness, as is summarised in the table at the end of this section.

It is *all or nothing* to be effective. The package as a whole has to be subject of approval by the Parliament, possibly preceded by an informative referendum. That requires courage and vision, in particular from the part of the Prime Minister. As long as these qualities are lacking, the attractiveness of the country as a place to live will continue to decline.

A nation gets the government it deserves. As long as we accept the current short-sightedness displayed by the government, the demise of the country will remain unavoidable.

I am convinced that the package of my recommendations could still reverse the negative trend. However, considering the way critical opponents of the climate gospel are treated, I must expect a similar response, calling me arrogant, irresponsible, naïve, et cetera. In other words, shooting at the pianist to avoid paying proper attention to the content of the message.

I feel that I nevertheless have to publish my view to avoid repetition of the post-war famous words “Wir haben es nicht gewusst”.

*Interconnectedness of strategies and issues*

<b>Strategies:</b> <b>Issues:</b>	Social conscription	Nuclear energy utilisation where possible	Airport island in the North Sea
Excessive price of oil and gas	-	++ Reducing the deficit	+ Reducing the deficit
Inflation, purchasing power	-	++ Reducing the deficit	++ Additional airport tax
Farming, food supply	++ Season workers availability	++ Glasshouse farming viability	-
Defence of territory	++ Strengthen partnership with Germany	+ Reducing the deficit	-
Immigrants	++ Enabling to earn permit	+ Reducing the deficit	++ Intake of immigrants
Health care	++ Hands on beds in hospitals	+ Reducing the deficit	-
Youngsters criminality	++ Re-education by marines	-	-
Polarisation	++ Facilitates dialogue	-	-
Illiteracy	++ Teachers availability	-	-

++ = great impact

+ = moderate impact

- = no impact

# APPENDIX

## ***Design of a nuclear-powered 20,000 HP tugboat***

It is 1961. The expectations for nuclear power generation are high. After successful application of nuclear power generation on submarines, the United States had built the NS Savannah, a nuclear-powered merchant ship, to get experience with nuclear power generation on ships outside the realm of the military. The Netherlands, at that time a world market leader in ship building, wished to keep up with these promising developments. A project was launched to design and build a nuclear-powered tanker. The tanker, known as ENEA-tanker, would be built at the Wilton Feijnoord Shipyard in Schiedam.

The professor of ship design at the Faculty of Maritime Engineering of Delft University of Technology, Prof. Ir H.E. Jaeger, had serious reservations against the proposal. Why spend R&D funds on building such a large ship when only the propulsion aspects are of interest? The purpose of the project was to get experience with commercial nuclear ship propulsion. The lowest budget for that purpose is achieved by building the smallest ship for the smallest possible nuclear power installation. The latter was estimated to be in the order of 20,000 HP (14.3 MW). The ENEA-tanker also would have that power installed. What is a lot of power installed in the smallest possible hull? That is a tugboat! Hence, professor Jaeger proposed to design and build a nuclear-powered tugboat instead of a tanker.

The board of management of Wilton Feijnoord was, understandably, not pleased with the idea, but promised to cooperate. The design of the ENEA-tanker – in particular the reactor and engine room – would be made available to facilitate the design of a nuclear-powered tugboat. Other expert parties offered help:

- The reactor centre ECN in Petten;
- The Netherlands Ship Model Basin (now called MARIN) in Wageningen;
- TNO in Delft;
- Smit International tugboat company, Rotterdam (at present the division Towage & Salvage of the Royal Boskalis Westminster Group).

Professor Jaeger himself would select a student to make the design supported by these reputable parties.

So, I found myself somewhat later asking my father, who financed my study, if he would mind about a half year's delay in getting my degree. He didn't.<sup>4</sup> So, I started studying, thinking, and finally designing.

Studying, because I did not know anything about nuclear power plants.

Thinking, because of the great complexity of the task at hand. So far, the most powerful salvage tug in the world - the Zwarte Zee - had almost 10,000 HP installed. I had to design a tugboat for 20,000 HP, an enormous leap from the current state-of-the-art, with the additional requirement of a nuclear reactor instead of a simple diesel engine.

The main challenge of ship design is to cope with Archimedes' law:

*The weight of the ship equals the weight of the displaced water.*

The downward gravitational force equals the upward buoyancy force. The size of the tugboat must be enough to carry the weight of the reactor, its lead inner layer of protection against radio active radiation and its outer layer of reinforced concrete. The thicknesses of these two layers constitute design variables within the constraint of the maximum allowed radioactive radiation. The main dimensions of the hull and the block coefficient (i.e. the ratio of the underwater volume to the circumscribing rectangular block) constitute the remaining design variables. The design could then be made in an iterative conversation with the situation (Schön, Donald A., 1983).

By Christmas 1962, I could present my design to the Steering Committee that consisted of professor Jaeger and the managing directors of ECN, MARIN, TNO and Smit International Tugboat Company.

The Committee was pleased with the result. The size, a length of about 90 metres, was far less than initially expected. The Savannah had twice that length at about the same power of 20,000 HP. In spite of the relatively small size, my tugboat was designed as a two-compartment ship. In the case of a collision, two adjacent compartments could be flooded without sinking or capsizing. The propulsive performance - 200 tons bollard pull and a free running speed of 19 knots - would be better than any competitor in the world.

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<sup>4</sup> My mother also contributed financially to my study at Delft University of Technology. She opened an account at the university book store where I could buy any book that I expected to be interesting. One of the books I purchased was the Dover Publication Theory of Flight by Richard von Mises, 1959. The sections on momentum theory, pp.326-355, made me to disagree with the view prevailing among propulsion experts that momentum theory, inaugurated by W.J.M. Rankine in 1865, is not of any use in propulsion design since it does not provide information on the shape of the propulsion device. A reappraisal of momentum theory became the main theme of my Ph.D. Thesis in 1973.

The Committee asked me what my view was on nuclear-powered merchant ship propulsion. My answer was: absolutely feasible provided the number of ships remains limited. Application on a large scale could sooner or later lead to a collision like the oil tanker Cape Valdez caused by its drunk captain. The resulting oil spill was disastrous for the nature of Alaska. But worse would have been if instead of an oil spill a meltdown had happened as in Chernobyl and the Russian submarine 'Kursk'.

These accidents happened a half century ago. Technology has progressed in the meantime and awareness is growing that nuclear energy generation must be accepted if we want ever to become independent from fossil energy.

It is time, therefore, to reconsider to build a 20,000 HP nuclear-powered tugboat. A conventional 20,000HP tugboat already exists (van Gunsteren and Vlas, 2022, pp. 25-33).

### ***Lessons-learned from the NS Savannah experience***

The NS Savannah was named after the SS Savannah that marked the transition from sail to steam ship propulsion in 1818. The NS Savannah was expected to mark the transition from diesel engine to nuclear-powered *commercial* ship propulsion.

The *technical* transition from petroleum to nuclear-powered ship propulsion was marked by the submarine Nautilus in 1955 that outperformed existing submarines to such an extent that propulsion not only of submarines but of all US Navy sizable war ships, in particular aircraft carriers, became nuclear-powered. Their safety track- record over a half century has been excellent.

Russia and Canada have put a hundred nuclear-powered icebreakers into service. The first one, the *Lenin*, was operated in the period of 1959-191989.

Ice breaking requires huge ammounts of energy, which makes nuclear powering a viable proposition.

The purpose of the NS Savannah was to demonstrate the feasibility of nuclear-powered merchant ships.

From a technical point-of-view, the NS Savannah was a great success. She was capable of circling the earth 14 times at 20 knots without refuelling and using only 35 kilogrammes uranium.

This technical success inspired other nations to follow suit. Wikipedia (Nuclear marine propulsion) summarises the history of nuclear-powered merchant ships as follows:

- Mutsu, Japan (1970-1992, never carried commercial cargo, rebuilt as diesel engine powered *RV Mirai* in 1996)
- Otto Hahn, Germany (1968-1972; re-powered with diesel engine in 1979)
- NS Savanna, United States (1962—1972)
- Sevmorput, Russia (1988-present)



At hindsight, we can conclude that the main cause of the failure to attain commercial viability has been *public perception*. Before getting permission to enter a port, months in advance negotiations with port authorities turned out to be necessary. Access was denied to the Suez Canal and the Panama Canal. The considerable associated cost and lack of flexibility would kill any commercial proposition. The public at large is aware of what happened with the atom bombs on Hiroshima and Nagasaki 6 and 8 of August 1945 and draws the irrational conclusion that nuclear energy generation is an undesirable evil that should be avoided no matter what. As long as this *nuclear-phobia* prevails, nuclear-powered merchant ships will remain a utopia.

The public perception, however, is shifting rapidly. People are beginning to realise that to sustain our level of welfare, the choice is either *fossil or nuclear*. If we want to get rid of the dependence on fossil energy we must accept utilisation of nuclear energy.

A second lesson-learned from the NS Savannah experience is to avoid falling into the *multi-purpose pitfall* (van Gunsteren 2013, pp.29-32). The Savannah's hybrid purpose of a freighter and a cruise ship made it uneconomical from the outset.

Crude oil prices are expected to increase and the cost of marine nuclear energy generation to decrease. The proposition of a nuclear-powered salvage tug to become economically feasible is only a matter of time.

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## *Drawings*

1. *Algemeen plan*, Zijaanzicht
2. *Lijnenplan*
3. *Algemeen plan*, Tanktop, Tussendek
4. *Algemeen plan*, Hoofddek, Sloependek, Bakdek
5. *Bewerkt grootspant*
6. *Machinekamer*
7. *Opstelling reactor compartiment*
8. *Opstelling apparaten in reactor compartiment*

# THE AUTHOR

**Lex A, van Gunsteren** (1938) is a business consultant, lecturer and innovator in marine propulsion. He graduated as a naval architect and received his PhD from Delft University of Technology, where in 1981 he was appointed as Professor in Management of Technology. He was, as professor of the Erasmus University Rotterdam, one of the pioneers of the Rotterdam School of Management, rated in the eighties as the number one of the top-ten European business schools.

After his military service as an officer in the ship design unit of the Royal Netherlands Navy, Lips Propeller Works employed him, initially as an industrial scientist and later in various managerial positions. In the shipbuilding group IHC Holland, he was managing director of their shipyard Gusto, specialised in offshore equipment. In the late seventies and early eighties, he served as director of corporate planning and R&D in the Royal Boskalis Westminster Group.

He founded the innovation company Van Gunsteren & Gelling Marine Propulsion Development for the further development of his invention of the slotted nozzle (duct with a slot at the front), which ultimately led to the successful application of the wing nozzle (duct with a slot at the rear). He served on various boards for monitoring R&D funds, among others as vice chairman of the board of the Dutch Foundation for Technical Sciences 'STW'.

Since 1997, he lectures, at Delft University, computer aided support in architecture, urban planning and project management. His publications include eight patents and ten books. His latest article was published in 2020, his latest book in 2022.



# NEDERLANDSTALIGE SAMENVATTING

## ***De neergang van de Nederlandse samenleving***

Het tijdperk van de jaren zestig en zeventig van de vorige eeuw is een periode van gelukkig zijn voor mij geweest. De wederopbouw had Nederland tot een aantrekkelijke plaats om in te leven gemaakt. Christelijke waarden, zoals helpen wie op je pad komt, werden gerespecteerd in alle lagen van de bevolking. Een werkweek van zes dagen was de norm voor de scheiding tussen werk en rust. Vrijheid van keuze was geoorloofd in vrijwel elk opzicht zo lang anderen maar niet worden gehinderd. Ras discriminatie was niet aan de orde. Immigranten, spijtoptanten van de voormalige kolonie Indonesië, waren van harte welkom.

Heden ten dage, een halve eeuw later, is de situatie ingrijpend veranderd. De bevolking is bijna verdubbeld. De viering van het traditionele Sinterklaasfeest wordt gezien als een daad van ras discriminatie. Ethische normen zijn niet meer bepalend voor de keuzes die mensen maken. Alles is geoorloofd zo lang niet wettelijk verboden. Bureaucratie en egoïsme zijn dominante kenmerken van de samenleving geworden. Daardoor heeft het land veel van zijn aantrekkelijkheid verloren.

Overbevolking is de hoofdoorzaak van de neergang, niet ras discriminatie. Wanneer ratten in een kleine ruimte worden opgesloten, proberen zij elkaar te doden. Mensen doen dat evenzo door oorlogen te voeren.

Evert van Benthem, de glorieuze winnaar van de Elfstedentochten van 1985 en 1986, immigreerde in 2000 naar Alberta Canada. Daar runt hij met zijn familie twee boerderijen van tezamen 300 koeien. Hij ziet zijn besluit om te emigreren als een super stap in zijn leven.

Is emigreren de enige optie om te ontkomen aan de voortdurende neergang van het land? Wat zou de neerwaartse trend kunnen doen keren? Mijn antwoord op deze vraag is het onderwerp van deze verhandeling.

## ***Oorlogsherinneringen***

Ik ben geboren op 9 oktober 1938. Op zondag tijdens de middagdienst van onze gereformeerde kerk. Een zondagskind dat geluk brengt. Geluk heb ik inderdaad gehad. Ik was de enige die ongedeerd bleef in de beschieting op 7 september 1944 die een dode en drie gewonden van onze familie tot gevolg had.

De V2-lancerings die in de omgeving van ons huis in Wassenaar plaats vonden, namen sterk toe in de zomer van 1944. Soms viel de raket terug en sloeg dan een flinke krater in de bodem. Maar het grootste gevaar dat onze moeder vreesde was dat de lanceerlocaties doelwit zouden

worden van bombardementen van de geallieerden. Die vrees was gerechtvaardigd, zoals later is gebleken uit het bombardement van het Bezuidenhout op 3 maart 1945. Daarom gingen we naar Leiden verhuizen.

Een verhuisrit vond plaats met vijf inzittenden: voorin onze vader links aan het stuur, ik in het midden en mijn zus Mies (4/4/1937) rechts. Achterin: mijn broer Herman (16/12/1940) op schoot van de verpleegster diacones die grootvader van Gunsteren tot zijn overlijden had verzorgd. De rit ging via boer van 't Hul in de Haarlemmermeer die ons tarwe en graan leverde (melkproducten werden aan ons geleverd door boer van Bohemen in Stompwijk). Toen wij het punt naderden waar nu de A4 en de A44 samen komen - de A4 was er toen nog niet -, verscheen een jachtvliegtuig van de RAF in de lucht. Dat vliegtuig zou zeker gaan schieten op onze auto die vanuit de lucht niet van een legerwagen was te onderscheiden. Onze vader wilde daarom schuilen onder het viaduct van de A44, maar daar stond al een Duitse militaire auto. Daarnaast gaan staan met een auto vol levensmiddelen was natuurlijk de goden verzoeken, dus reden we nog een eindje door. Op voldoende afstand van het viaduct stopte onze vader om te kijken wat het vliegtuig ging doen. Vrijwel meteen nadat hij was uitgestapt, riep hij "Ze komen!" Toen de mitrailleurs begonnen te knetteren, maakte ik mij zo klein mogelijk want de kogels vlogen om mijn oren. Mies en ik kropen de auto uit. Zij had daar meer moeite mee dan ik, want ze had een kogel door een voet gekregen, evenals onze vader die ook door een kogel in een voet was getroffen. Een ogenblik later begon Herman luidkeels te schreeuwen. Onze vader hinkelde op zijn niet geraakte voet naar het achterraampje, sloeg dat in met een vuist en trok Herman door het raam naar buiten. Herman was getroffen aan beide benen. Een kogel was boven de hiel dwars door zijn onderbeen gegaan, waardoor dat been slechts vertraagd kon groeien en er een steeds dikker blok onder zijn schoen moest worden gemaakt. Van de andere voet waren drie tenen afgeschoten. De verpleegster was door kogels in het hoofd en de buik op slag dood.

Ik werd door een boerin naar haar nabij gelegen boerderij gebracht. Daar kreeg ik een glas melk. Hoe de drie gewonden naar het ziekenhuis werden afgevoerd heb ik daardoor slechts gedeeltelijk gezien.

Onze moeder, die met mijn broer Frans (12/5/1942) in Wassenaar was gebleven, verzorgde de gewonden nadat die uit het ziekenhuis waren gekomen. Onze vader en Mies herstelden voorspoedig, maar Herman, nog geen vier jaar oud, kreeg het heel zwaar te verduren tijdens zijn drie maanden verblijf in het ziekenhuis.

Ik voelde een verantwoordelijkheid voor mijn vier jaar jongere broer Frans die altijd is gebleven. Ik trok hem de kelder in wanneer er luchtalarm was en beschermde hem tegen woede aanvallen van Herman.

Onze ouders werden geheel in beslag genomen door de inspanningen om de hongerwinter door te komen die aan 25 duizend mensen het leven zou gaan kosten. Ik was op mijzelf aangewezen en leerde autoriteiten te wantrouwen die mij vertellen wat ik doen moet.

De bevrijding op 5 mei 1945 voelde alsof een zak aardappelen van mijn rug werd gehaald. Het maakte mij bewust dat vrijheid essentieel is om je goed te voelen en het waard is om voor te vechten.

### ***De veranderde omgeving***

De Covid 19 epidemie en de Ukraine oorlog hebben de wereld onomkeerbaar veranderd. Maar onze systemen om het land te besturen - belastingheffing, landsverdediging, voedselvoorziening, infrastructuur, onderwijs, gezondheidszorg, immigratie – zijn ongeschikt om met deze veranderingen op een effectieve wijze om te gaan.

De Ukraine oorlog vertoont opvallende gelijkenis met de uitbraak van de tweede wereldoorlog. Na het keerpunt van de Battle of Britain duurde het nog vijf jaar van onnoemelijk leed voordat Duitsland zich overgaf en er een einde kwam aan de oorlog.

Evenzo moet worden verwacht dat het enige jaren zal duren voordat vredesonderhandelingen enige kans van slagen hebben en er een einde komt aan de Ukraine oorlog.

Hoe zal de regering tewerk gaan in deze jaren?

Zal de verstikkende *roep om controle* het politieke debat blijven kenmerken?

Zal de nadruk op het URGENTE, i.e. de korte-termijn problemen, als tot dusver aan de dag gelegd, blijven domineren boven het BELANGRIJKE, i.e. de lange-termijn problemen en de korte- en lange-termijn kansen?

### ***De noodzaak van systeemdenken***

De complexiteit van de belangrijke politieke problemen vereist *systeemdenken* om tot een oplossing te komen. Een systeem is een geheel dat niet kan worden verdeeld in onafhankelijke delen. De wijze waarop hun oplossingen interacteren is veel belangrijker dan hoe zij acteren onafhankelijk van elkaar.

Politici plegen de noodzaak van systeemdenken te negeren. Zij lijken zich niet bewust te zijn dat elke oplossing van een probleem nieuwe problemen met zich mee brengt. Het gevolg is dat hun maatregelen slechts op korte-termijn effect sorteren.

Bijvoorbeeld, de Minister van Economische Zaken nam een serie maatregelen om transitie van fossiel naar elektrisch energiegebruik te bewerkstelligen. Toen dientengevolge de vraag naar elektrische energie begon te stijgen, dreigde het netwerk van elektrische kabels overbelast te geraken. Aanvragen van ondernemingen om te worden aangesloten werden op een wachtlijst gezet.

Voor goedkeuring van geneesmiddelen is uitgebreid testen op bijwerkingen vereist, maar onze Minister van Economische Zaken kon ongestraft de neveneffecten van zijn contraproductieve



interventie negeren. De transitie naar elektrisch energiegebruik moet natuurlijk worden opgehouden tot de capaciteit van het kabelnetwerk voldoende is verhoogd.

Andere crises - immigranten, boeren, inflatie, energieprijzen, gezondheidszorg - worden onveranderlijk net zo aangepakt zonder rekening te houden met onbedoelde neveneffecten.

Het zou naïef zijn om te verwachten dat politici de moeite zullen nemen zich vaardigheid in systeemdenken eigen te maken. Een meer belovende benadering is te laten zien hoe systeemdenken is verankerd in ingenieursontwerp en deze denkwijze toe te passen op de belangrijke lange-termijn politieke problemen.

### ***De denkwijze van een ingenieur***

Het verschil tussen een wetenschapper en een ingenieur is:

*The scientist explores what is;  
The engineer creates what not has been.  
(Theodore von Kármán)*

De ingenieur gebruikt wiskundige modellen, de virtuele werkelijkheid, om inzicht te krijgen in zijn ontwerpogave, maar zoekt de uiteindelijke oplossing altijd in veranderingen in de fysieke werkelijkheid, de 'hardware'.

Zou toepassing van de ingenieursdenkwijze op de belangrijke lange-termijn politieke problemen kunnen leiden tot een bevredigende oplossing?

Ik onderzoek deze vraag in het formaat van een gedachte-experiment.

Veronderstel dat ik een almachtige autocratische leider zou zijn zonder zich zorgen te hoeven maken over komende verkiezingen, wat zou ik dan doen?

Hoe ik tewerk zou gaan ten aanzien van de belangrijke lange-termijn politieke problemen, wordt beschreven in deze verhandeling.

De kern is hoofdstuk 7: Integratie van autocratische en democratische waarden.

De Engelsen hadden hun Churchill om het land door de oorlog te loodsen. Laten we hopen dat de Nederlanders ooit een premier zullen krijgen met een dergelijke individuele prominentie.

Het ‘things-to-do’ lijstje van de Verlichte Premier omvat het ontwikkelen van zijn of haar visie op:

- Bouwen van *twee nieuwe kerncentrales* naast de huidige kerncentrale in Borssele.
- Bouwen van *twee nieuwe clusters van elk 3 kerncentrales* in Groningen en Limburg.
- Bouwen van *een kernenergie aangedreven onderzeeboot*.
- Een *luchthaven eiland* in de Noordzee.
- Benutten van het beschikbare terrein voor *biologische landbouw* voldoende om 20 miljoen inwoners te voeden en slechts toestaan wat dan nog over is voor export van voedselproducten.
- *Sociale dienstplicht* voor burgers tussen 17 en 30 jaar om te dienen 12 tot 24 maanden in marine, leger en luchtmacht of in ziekenhuizen en verzorgingstehuizen.
- De OTEC-opportunity voor de *voormalige kolonie Curaçao*.
- Een *updated feasibility study* van een *atoomsleepboot*.

Hij of zij moet van harte overtuigd zijn om te kunnen zeggen: “Geloof mij, dit is wat we moeten doen voor ons lange-termijn overleven en welstand.”

Zo lang zo’n charismatisch leider nog niet naar boven is gekomen, verhindert de huidige kortzichtigheid van onze politici de uitvoering van de acties die nodig zijn om de vruchten te plukken van deze kansen.

De aanbevolen acties moeten in parallel worden uitgevoerd met het oog op hun onderlinge samenhang <sup>5</sup>. Het is *alles of niets* om effectief te zijn. Het hele pakket moet worden goedgekeurd door het Parlement, mogelijk voorafgaand door een informatief referendum. Dat vereist moed en visie, in het bijzonder van de Minister-President.

Een land krijgt de regering die het verdient. Zo lang wij de huidige kortzichtigheid van de regering accepteren, blijft de neergang onvermijdelijk.

5 De tabel op bladzijde 36 laat de samenhang zien van:

1. Sociale dienstplicht invoeren
2. Waar mogelijk kernenergie toe passen in plaats van fossiele energie
3. Luchthaven eiland bouwen in de Noord Zee.

REFLECTIONS ON HOW THE NETHERLANDS COULD RESOLVE ITS MAIN  
LONG-TERM ISSUES,

An Engineer's Point-of-View / L.A. van Gunsteren

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The book, including 8 drawings of a nuclear powered salvage tug, can be purchased by sending an email to [reflections-on-governmental-issues@proton.me](mailto:reflections-on-governmental-issues@proton.me), whereupon the copy will be forwarded to the address of delivery specified by the buyer.

*“When a man, for whatever reason, has the opportunity to lead an extraordinary life, he has no right to keep it to himself”*

Jacques Ives Cousteau

The era of the sixties and seventies of the last century has been a period of happiness in my life. The Netherlands had successfully recuperated from the war. The country had developed into an attractive place to live in. Christian values, like tolerance and helping others that cross one's path, were still prevailing in all layers of the society. A work week of six days separated work from rest. Freedom of choice was allowed in almost every aspect as long as others were not affected. Race discrimination was unheard of. Immigrants from former colony Indonesia were wholeheartedly welcome.

Nowadays, half a century later, the situation is profoundly different. The population has almost doubled. The celebration of the traditional Santa Claus and Black Peter is considered to be an act of race discrimination. Ethical norms are no longer determinant for the choices people make, but laws, rules and regulations. Everything is acceptable as far as it remains within the law. Bureaucracy and egoism have become dominant features. As a result, the country has lost much of its attractiveness.

Overpopulation is the main cause of the demise, not race discrimination. When rats are locked up in a small space, they try to kill each other. Humans act in a similar way by starting wars, like Hitler did by claiming what he called Lebensraum.

Evert van Benthem, the glorious winner of the Eleven Towns skating tours of 1985 and 1986, emigrated in 2000 to Alberta Canada, where he runs with his family two farms of together 300 cows. He regards his decision to emigrate to be a super step in his life.

Is emigrating the only option to escape from the country's continuous decline? What could be done to reverse the downward trend? Imagine I had unlimited power, what would I do? My response to that question is the subject of this book.

# WAR MEMORIES

I was born on the 9th of October 1938. On a Sunday during the afternoon service of our Reformed Church. Being born on a Sunday is believed to bring luck. Lucky, I have been indeed. I was the only one that remained unharmed in the shooting incident on the 7th of September 1944 that left one dead and three of our family injured.

The launching of V2 rockets taking place from Wassenaar where we lived intensified in the summer of 1944. Sometimes, the rocket fell back leaving behind a big crater. Our mother decided to move the family to Leiden because she feared that the Allies could bomb the area of the V2-launches. That fear was justified. The neighbourhood Bezuidenhout of The Hague was bombed by the Allies on the third of March 1945.

As part of moving the family to Leiden, our father drove us via the farmer van het Hul in the Haarlemmermeer who supplied us grain and wheat (dairy products were supplied by the farmer van Bohemen in Stompwijk). We were driving on the road approaching the viaduct of the crossing with the N44, when a fighter plane of the RAF appeared in the air. As our car could not be distinguished from German army cars, our father wanted to get shelter under the viaduct. However, a German army car was already parked there. Parking our car full of food aside a German army car would be asking for trouble. Our father stopped, therefore, a bit later. A bit too late. Immediately after our father had shouted "They are coming!", machine gun firing started. Sitting in the middle of the front row, I made myself as small as I could. The bullets, both right and left of me, all missed me. My sister Mies (4/4/1937) and our father were both injured in a foot. My brother Herman (16/12/1940) was injured in both legs. He lost three toes of one leg. In the other leg, a bullet went completely through the ankle. The retarded growth of that leg necessitated to put an ever-thicker block under his foot. The nurse who had taken care of my grandfather van Gunsteren until he passed away, was sitting with Herman on her lap on the back row. She was instantly killed by bullets in her head and stomach. Herman, screaming loudly, was pulled out of the car by our father through the back window that he had crushed with his fist. A farmwoman brought me to her nearby farm where I got a glass of milk.

Our mother, who had stayed in Wassenaar with my brother Frans (12/5/1942), took care of the wounded after they left the hospital. Our father and my sister Mies recovered well, but Herman, not yet four years old, had to endure a very hard time during his three months stay in the hospital.

I felt a responsibility for my four years younger brother Frans that has remained ever since. I pulled him into the cellar when the sirens of air alarm went off and I protected him against Herman's attacks of anger.

Our parents were preoccupied with surviving the hunger winter in which 25 thousand people would die from starvation. Attention from the part of our mother comprised little more than inspecting the toilet to see if I had diarrhoea, which was the condition for getting some rice from the sack she preserved as an ultimate reserve. I learned to be on my own and to mistrust authorities that tell me what to do. That attitude did not disappear instantly after the war, as is illustrated by a conversation in the waiting room of Bangkok International Airport. When I sat down in the last unoccupied chair, a German woman addressed me in a harsh commanding tone: "Dieser Stuhl ist besetzt", whereupon I replied: "Ja, denn ich sitz drauf. Die Zeit ist vorbei dass die Deutschen entscheiden können wo man sitzt." Her commanding manner had reminded me of the war and evoked my inappropriate response.

When on the fifth of May 1945 the German occupation came to an end, I felt as if a heavy sack of potatoes was taken from my back, making me aware that freedom is an essential prerequisite for feeling well and is worth fighting for.

These and many other war memories have shaped my views on peace and war. I offer them to later generations as an inheritance of my reflections and recommendations for action.

*Noordwijk, February 2023*

*Lex A. van Gunsteren*

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# INTRODUCTION

## *The changed environment*

The environment in which the government of The Netherlands has to operate has changed dramatically by the Covid19 epidemic and the outbreak of the Ukrainian war. The world before these events will never come back. Our systems for managing the country though - tax legislation, defence, food supply, infrastructure, education, health care - are inadequate to cope with these environmental changes. They address the issues of the past, not those of the present and the future. It so could happen that refugees entering the country had to sleep under the open sky.

The public is more than ever dissatisfied with the short-sighted way the government is dealing with the challenges of today. The confidence of the public in our politicians is at an historic low.

The Ukrainian war unfolding in the East of Europe reminds me of my own experiences in the second world war, arousing strong feelings of déjà vu and l'histoire se répète, as the French say.

The Ukraine war that started with the Russian invasion on the 24th of February, 2022, has so far evolved along strikingly similar patterns of the second world war.

1919-1939: Germany secretly building up a huge military force, vastly outnumbering the Allies	1990-2022: Russia restoring military strength after collapse of the Soviet Union in the early nineties
1936-1938: Germany invading Austria and Czechoslovakia	2014: Russia invading Donbas and the peninsula Crimea
1939: Germany invading Poland; beginning of the second world war	2022: Russia invading Ukraine; beginning of the Ukraine war
1940: Battle of Britain, <i>never in the field of human conflict was so much owed by so many to so few</i> (Churchill)	2022: Ukraine holding out against all odds, <i>gaining respect and support of the West European countries and the USA</i>

After the turning point of the Battle of Britain, in which Göring's air force failed to attain the air supremacy required for an invasion of England, five years of terrible suffering elapsed before the war came to an end by Germany's surrender. Likewise, the Ukrainian war must be expected to last several years before peace negotiations will have any chance of success.

How will the Dutch government proceed in those years?

Will the suffocating *Quest for Control* continue to dominate the political debate (van Gunsteren, H.R., 1976, p. 154)?

Will the emphasis on the URGENT displayed so far, along with paying only piecemeal attention to the IMPORTANT, continue to prevail (Figure 1)?

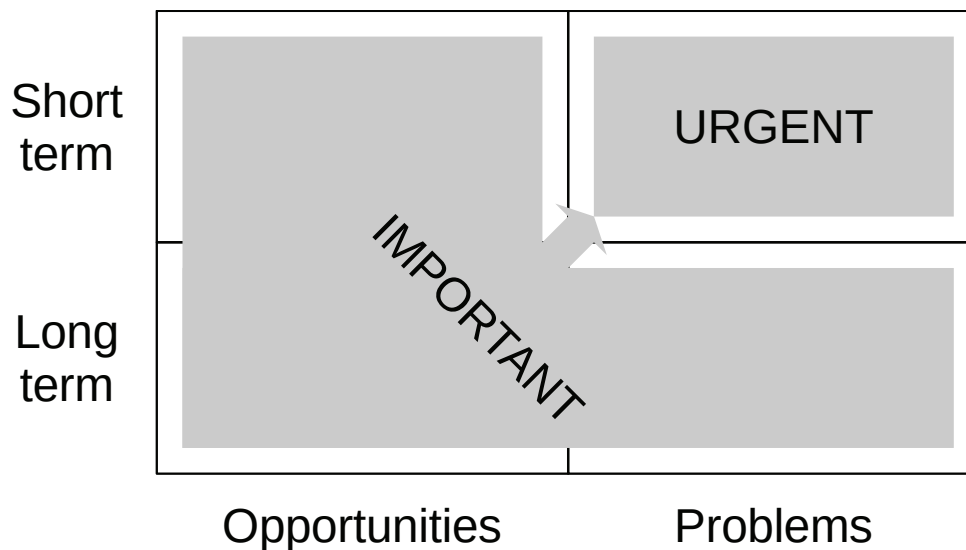


Figure 1: To acquire public funding, the issue has first to be moved from the IMPORTANT to the URGENT.

Ministers are usually held accountable by members of Parliament for the way they dealt with the URGENT, on what they did, but much less on the IMPORTANT, on what they did not do but should have done.

### ***The need of systems thinking***

The complexity of the main political issues requires systems thinking for their solution. A system is a whole that cannot be divided into independent parts (Ackoff, 1994, pp. vii and 21). The performance of a system is not the sum of the performance of its parts taken separately, but the product of their interactions. Ackoff calls the complex system of interrelated problems a mess. A mess cannot be handled effectively by breaking it down into its constituent parts and solving each part separately. The way problems and their solutions interact is much more important than how they act independently of each other.

Politicians tend to ignore the need of systems thinking for resolving long-term issues. They seem to be unaware that every solution of a problem generates several new problems. The result is that the measures they enact provide only short-term relief.

For example, the Minister of Economic Affairs issued a set of measures to achieve a transition from fossil to electric energy usage. When, as a result, the demand of electrical energy began to

rise, the infrastructure of electrical cables got soon overloaded. Requests from enterprises to be connected to the network had to be put on a waiting list.

For approval of human drugs extensive testing on side effects is required, but our Minister of Economic Affairs could unpunished ignore the side effects of his counterproductive intervention. Obviously, the transition towards electrical energy usage has to be suspended until the required upgrading of the cable network is completed.

Other crises – immigrants, farmers, inflation, energy prices, health care, housing, education – are invariably approached by the government with similar ignoring of unintended negative side effects.

It would be naïve to expect politicians to learn and make a serious effort to acquire agility in systems thinking. A more promising approach seems to be to show how systems thinking is incorporated in the art of engineering design and apply that way of thinking to the main long-term political issues.

### ***The mindset of an engineer***

Theodore von Kármán, the famous pioneer in aerodynamics, guided by his father who feared his talented son to become a mathematical freak, contrasts the difference between a scientist and an engineer as follows:

*The scientist explores what is; The engineer creates what not has been.*

The essence of systems thinking, namely that the performance of a system is determined by the connectiveness of its parts, is well-reflected in the *engineer's ideal of Caesar's war chariot which never fails but at the end of its lifetime disintegrates completely into dust*. If one bolt were to remain, then that bolt would have been constructed too conservatively and that would have had adverse weight implications. Unnecessary weight impairs the effectiveness of the chariot, which Caesar would never accept.

The engineer uses mathematical modelling, the virtual world, to get insight in his design problem. His solution in the physical world is a piece of hardware that serves a function.

To illustrate the point, the design process of a nuclear powered 20,000 HP tugboat is described in the Appendix.

Could addressing the main governmental issues with the mindset of an engineer help to resolve them? I will explore this approach in the format of a thought experiment.

Suppose I were an almighty autocratic leader of the country without having to worry about forthcoming elections, what would I do? How I would proceed in regard of the main governmental issues is described in the chapters that follow.



# ENERGY

## *Climate change and energy generation*

My view on climate change and energy generation is described in the following note that I wrote for a meeting on the subject in Eindhoven on the 29th April 2019.

### **1. Climate**

Climate changes have taken place in the past and will continue to occur in the future. We have to accept that as a fact of life. It is an illusion to believe that we can do anything to significantly influence the occurrence of climate change. It is simply not realistic to expect that China, India, the US and the whole continent of Africa will ever agree to limit their CO<sub>2</sub> emissions to an extent that requires severe sacrifices in the welfare of their inhabitants.

Political infeasibility is not the only roadblock. The validity of the mathematical models underlying the IPCC- propositions is extremely weak. Their theories have so far failed to pass the reality test, i.e. the confirmation of the predictions from those theories by appropriate measurements (Van Gunsteren, L.A., 2011). The measurements, as far as currently available, indicate that the theories substantially overestimate the consequences of the CO<sub>2</sub> emissions. The predicted rising of the sea level, for instance, has so far not taken place.

A third consideration against limiting CO<sub>2</sub> emissions is that CO<sub>2</sub> is essential to keep the earth green. Lots of CO<sub>2</sub> in the air might ultimately lead to deserts becoming green fertile areas.

Conclusion: we should not try to influence climate change but adapt ourselves to its consequences.

### **2. Energy**

Principally, there are three ways to save energy:

1. *Abstain* from using energy; the ultimate energy saving is the “clochard” under a bridge over the Seine. One piece of bread per day is all he needs.
2. *Slow down* the energy consuming activities and processes: slower cars, slower airplanes, slower heating up our CV, etc.
3. *Information*: If my CV has the information that I will not come home today, a lower “Soll”-temperature can be set.

To abstain and slowing down processes constitute concessions to our welfare that will not get much political support. Information can still provide some savings to compensate for the rising demand of energy. That the demand will not increase is actually an optimistic assumption.

To meet the current demand of energy, three main options are available:

1. Fossil energy: oil and gas
2. Nuclear energy
3. Green energy: windmills, solar cells, et cetera.

Green energy can never cover more than some 15 to 20 %. The bulk has to come from fossil and nuclear. If we want to get rid of fossil sources of energy, we have to accept nuclear energy generation. There is nothing wrong with that. When sufficient attention is paid to quality assurance and control<sup>1</sup>, nuclear is a “clean” energy source without any serious disadvantage. Radio-active waste can be stored deep in the earth. When the thorium reactor will be further developed we can even become independent from uranium.

Conclusion: the energy problem can be solved by a controlled transition from fossil to nuclear energy generation.

### 3. The idiosyncrasy explained

Why don't we accept the foregoing two conclusions: 1) adapt to climate change, don't try to influence it, and 2) accept nuclear energy generation? Why do we pursue policies instead that lead to a staggering waste of resources and efforts?

Because *we tend to let our personal interests prevail over the general interests of the community at large*. Let me describe some illustrative examples.

#### Example 1: The Delta works

After the flooding of 1953, in which 1836 inhabitants of the province Zeeland lost their life, the cabinet of Prime Minister Joop den Uyl had to decide in the early seventies on a long-term solution that would prevent such a disaster to happen ever again. The population of Zeeland wanted a closure of the Ooster-Schelde, but environmental pressure groups insisted that the Ooster-Schelde would remain open in view of the habitat.

The compromise reached was a dam having sliding doors that could be closed during a heavy storm. The cabinet Den Uyl was saved. At the cost of some \$ 7 billion tax payer's money, but who cares? The construction took place in the period 1976-1986. During that period, I was director of Corporate Planning and R&D of the Royal Boskalis Westminster Group, one of the five partners in the joint venture Dosbouw responsible for the execution. What was our expert opinion on the project?

An awkward project from an engineering point of view! Fitness for purpose, preventing a flood to happen ever again, could be attained at half the cost. The maintenance would become a serious problem after a few decades. The know-how obtained from the project would be unsellable, since a market for dams with sliding doors does not exist.

This insider's view was a taboo, undiscussable because it was against our own interest. The project provided years of work for our company. It offered an ideal learning environment for our young engineers and it was a nice showpiece to impress potential customers. Good reasons to abstain from any negative communication to the outside world.

<sup>1</sup> *Quality assessment* is the set of rules and regulations to define and ensure the quality of a product. Quality control is related to the fulfillment of the rules and regulations in operations.



**Example 2: The F35, Joint Strike Fighter**

The largest military program ever, costing close to US\$ 1 trillion, is a complete failure from an engineering design point of view. It is a typical example of the multi-purpose pitfall in engineering design (van Gunsteren, 2013, pp.29-32). The aeroplane was qualified in the presentation of the 2008-RAND-report as 'next to useless' since in visual range combat it 'can't turn, can't climb, can't run'. Nevertheless, the programme goes on and warnings of seasoned engineers are ignored. Too many people have been bribed or have otherwise a personal interest in its continuation.

**Example 3: Windmills in the North Sea**

Similar to the case of the Delta Works. Siemens and offshore companies have years of work and get an ideal training site for their engineers.

A deplorable side effect is that the windmills constitute an extra roadblock for creating the potentially governmental goldmine of an airport island in the North Sea to relieve Schiphol Airport (van Gunsteren, 2003).

**Example 4: The Netherlands on/off gas**

In the seventies the policy was: all households on gas, four decades later: all households off gas. Nice creation of work for installation companies, but actually an enormous waste that must ultimately be financed by the tax paying citizens.

What would be the personal interest of the climate scientists? Evidently, that the subject remains a hot issue justifying large research funds to be made available for it. Their job security is directly affected. No wonder that the climate sceptics are predominantly retired professors who have nothing to lose.

Politicians tend to be addicted to being in the limelight. When going into retirement, the climate discussion enables them to stay in the limelight, like Al Gore in the US and Ed Nijpels in The Netherlands.

To defend their case, these climate preachers have to resort to all kinds of false arguments and doubtful tactics.

Their main argument is: 90% of the climate scientists supports their view. They divide their audience into experts who agree with them and laymen who disagree. The experts are authorised to determine what is good for us and the laymen should shut up. It is no surprise that after such a ballot, 90% of the climate scientists supports their view. Apart from this manipulation, it is an illusion to think that the validity of a mathematical theory can be assessed through democratic voting.

Other manipulations are: measuring parameters within the measurement accuracy, changing the circumstances in the period between two consecutive measurements.

Climate sceptics are accused of irresponsible behaviour in regard to the interests of future generations.

Such arguments and tactics are an indication of a weak cause. The issue becomes a belief, a religion that does not need any validation.

The following personal experience illustrates the point. I presented a paper on probabilistic network planning with mitigations on-the-run at the Project Management Congress April 10-12, 2019 of Delft University of Technology. I opened my presentation with a question to the audience: Do you agree or disagree with the proposition “The project manager of a complex construction project should pay particular attention to activities on the Critical Path”? The Critical path is the path through the network that is determinant for the duration of the entire project according to a deterministic Critical Path Method (CPM) calculation. Only two people in the audience disagreed with the proposition. All others agreed with it. I then explained that several paths require equally particular attention. There simply is no such thing as “The” Critical Path (Van Gunsteren, L.A., 2011, pp.27-29).

In science, majorities can be - and indeed often are- wrong. That a majority of climate scientists supports the IPCC-conclusions does not mean anything.

#### **4. The future**

The laws of physics cannot be circumvented. Sooner or later, the insight will break through that mankind cannot control climate change. It will be later rather than sooner. Only harsh consequences can turn around the currently prevailing views. Ordinary citizens have to become aware that the climate gospel is significantly affecting their level of welfare before we can have any hope that a change of policy will come around.

Similarly, nuclear energy generation will only become acceptable again when fossil energy sources become unaffordable for the ordinary citizen.

As long as we can afford the luxury of ideosyncracies in both matters, any change of policy is not to be expected.

So far, my note of 29th of April 2019. At present, three and a half years later, the point has been reached that ordinary citizens cannot pay their energy bills anymore. The response of the Minister of Economic Affairs has been to introduce a price cap up to the level of average energy consumption for households. The government will subsidise the difference between the market price of oil and gas and the price cap. Estimates on the cost of the price cap vary between € 5 billion (0.5% of GNP) and € 15 billion (1.5% of GNP), depending on the future market price of oil and gas. Implementation will not be easy. Where to draw the line for the price cap is dominating the public debate.

Not a word is to be found on the roots of the problem, namely the unbalance of supply and demand and its obvious solution of accepting nuclear energy generation.

The measures taken so far by the government will provide only short-term relief since they are addressing symptoms rather than causes. '*Kurieren am Symptom*', as the Germans put it.

### ***Acceptance of nuclear power generation***

The Minister of Economic Affairs announced in December 2022 the government's intention to build two new nuclear reactors on the premises of the only one left in Borssele. This constituted 180 degrees change of policy. The election programme of the Minister's party (D66) five years earlier stated even that the only reactor still working should be closed prematurely.

The three reactors in Borssele would produce 10-13% of the demand of electrical energy.

The autocratic leader of our thought experiment would go further by allocating new nuclear plants in Limburg and Groningen. The country would then have 9 reactors divided over 3 sites, producing 30-39% of the demand of electrical energy. Anything less than this lacks the critical mass required to become a serious alternative for fossil energy generation. France, for instance, has 56 reactors, divided over 18 sites.



# INFLATION

## *Investments vs. expenses*

Inflation increases whenever governments spend consistently more than their income from taxes and other sources like fines for over speeding and excise duties on fuel. The response of the government on the Covid19 epidemic has been to spend billions of Euros as if 'the trees grow into heaven' as a Dutch proverb calls it. As a result, inflation has risen to record heights. Low- and medium-income groups cannot bear anymore the cost of their households.

The response of the government has been the same as in the energy crisis: compensating those who are most affected. Again, 'Kurieren am Symptom'.

## *The flight of capital*

Attempts to reduce the deficit boil down to stealing from pension funds, enterprises and wealthy individuals. The predictable effect on the long-term will be that these will emigrate to elsewhere. For instance, Unilever and Shell already moved their headquarters from Amsterdam to London. The Royal Boskalis Westminster N.V. changed ownership recently from stock market to HAL Holding N.V., enabling to follow suit whenever deemed necessary by its owner. What would the autocratic leader of our thought experiment do about inflation?

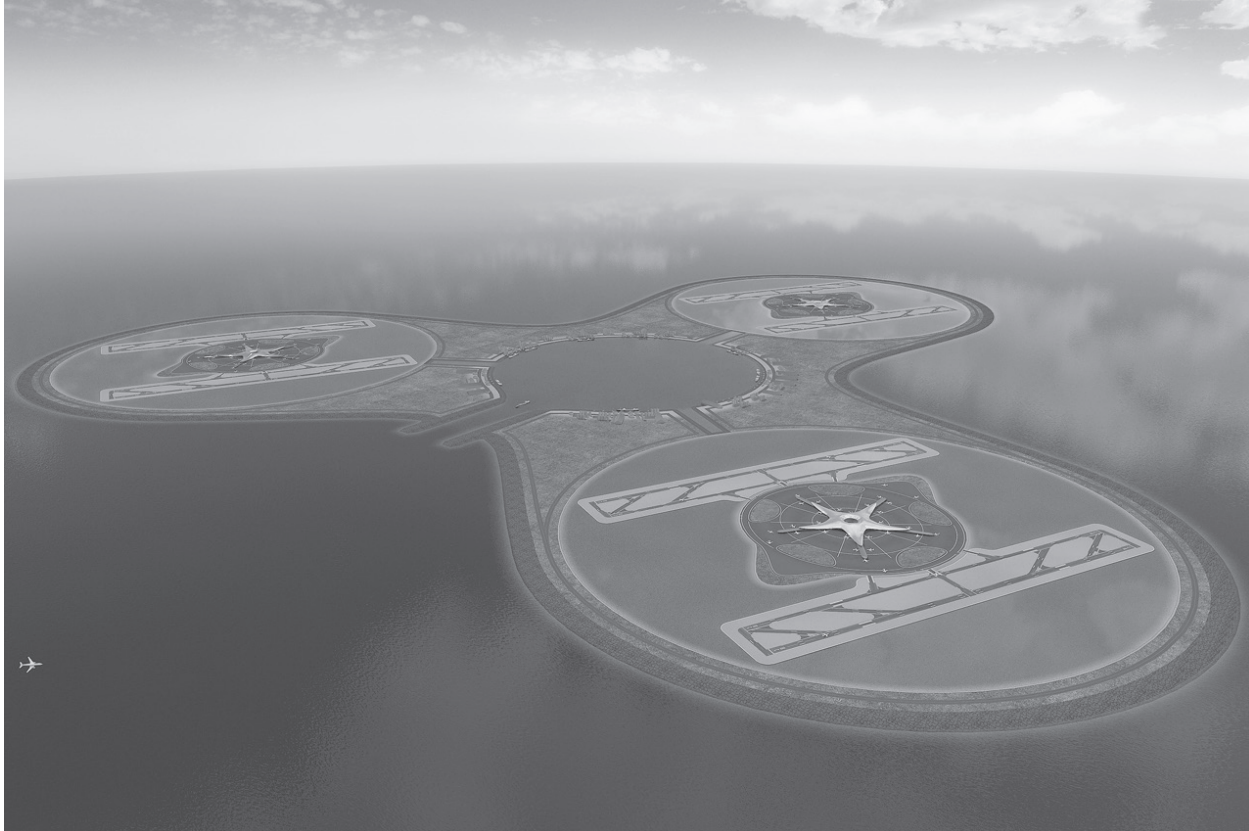
First of all: distinguishing investments from expenses. Investments are payments with the prospect of a financial return in the future. Expenses do not generate a financial return. They constitute sunk cost.

## *Artificial airport island in the North Sea*

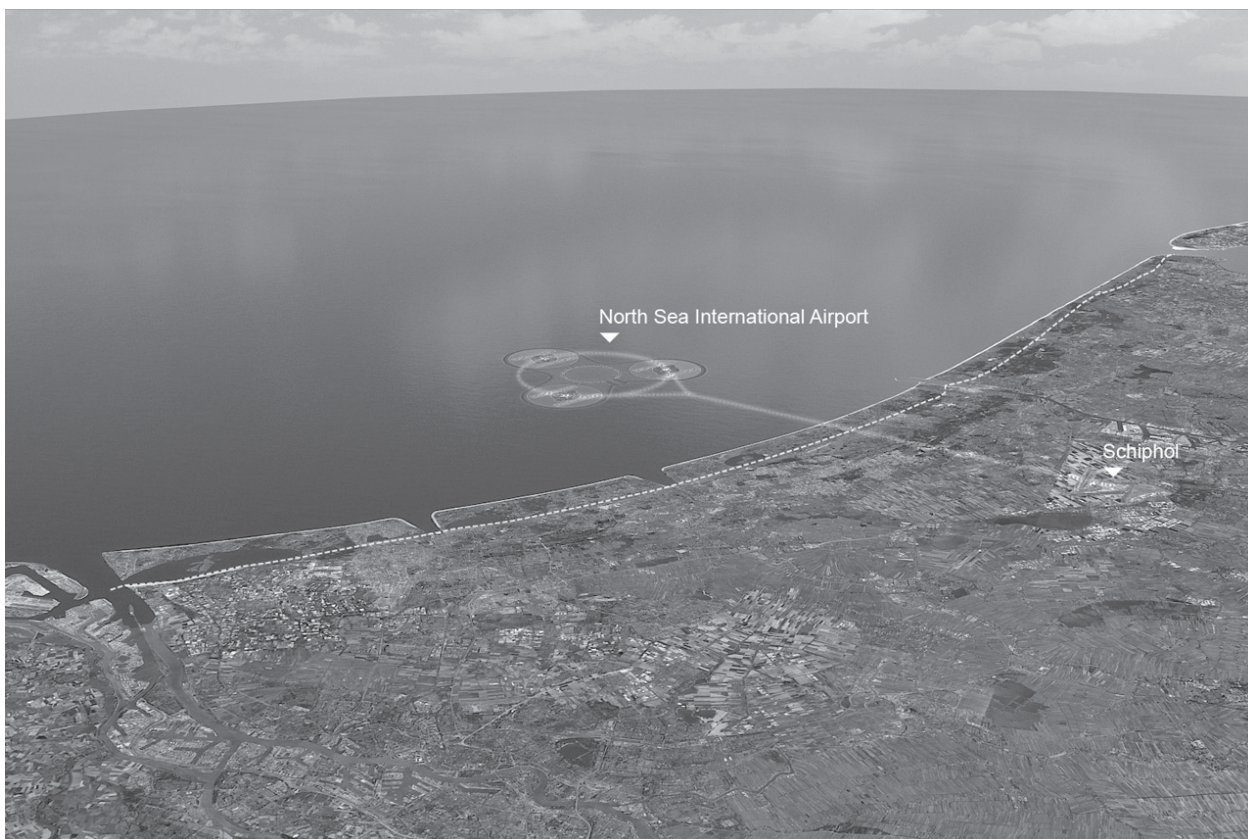
The autocratic leader of our thought experiment would aim at opportunities with a high Return on Investment (ROI), like creating an artificial airport island in the North Sea (van Gunsteren, 2003; Binnekamp, 2005, pp. 91-96)<sup>2</sup>.

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<sup>2</sup> The idea is not new. The engineering company Hydrodynamic of Boskalis was already founded in 1968 to conduct feasibility studies of alternative designs of the island. The company's director Cor Stigter submitted two propositions to a consortium of 18 interested parties. Shell not being one of them is probably why it did not come to execution.



*Figure 2: North Sea International Airport as envisioned by Royal Haskoning & Van Oord in 2008.*



*Figure 3: North Sea International Airport as envisioned by Royal Haskoning & Van Oord in 2008. (Google map)*



Amsterdam Schiphol Airport is faced with the dilemma:

1. To remain a hub, an airport for intercontinental flights, the number of flight movements (landings and take-offs) per year has to be above a threshold in the order of 600 thousand flight movements.
2. To limit environmental effects, noise and air pollution, the number of flight movements per year has to be kept below a threshold in the order of 400 thousand flight movements.

Both thresholds are clearly incompatible, causing an endless debate on the compromise that has to be reached.

The dilemma could be resolved once and for all by an airport island in the North Sea, about 35 kilometres from the coast, connected by a shuttle and a tunnel to the present Schiphol. The return on the investment of about 40 billion Euros was estimated in a TUD-MIT workshop in 2001 to be around  $ROI=0.16$  (van Gunsteren, L.A., 2003). The concept of an artificial airport island has already successfully been applied in Hongkong and Japan. Competing European airports - London, Paris, Frankfurt - cannot follow suit since they do not have a sea in the vicinity of the city.

Rotterdam harbour is the gate to Europe for transport over land and sea, a goldmine for the Dutch government. An artificial North Sea island could make Amsterdam Schiphol Airport also the gate to Europe for transport through the air. Another goldmine for the Dutch government, generating revenues in the order of € 6 billion per year, instead of a never-ending headache dossier<sup>3</sup>.

A similar long-term opportunity in which a unique location is exploited is the Ocean Thermal Energy Conversion (OTEC) opportunity for the Dutch Kingdom related island Curaçao.

### ***The OTEC- opportunity***

Ocean thermal energy conversion produces energy from temperature differences in tropical ocean waters.

Energy from the sun heats the surface water of the ocean. In tropical regions, surface water can be much warmer than deep water. This temperature difference can be used to produce electricity and to desalinate ocean water. OTEC-systems use a temperature difference of at least 20 degrees Celsius to power a turbine to produce electricity. Warm surface water is pumped through an evaporator containing a working fluid. The vaporised fluid drives a turbine generator. The vaporised fluid is turned back to a liquid in a condenser cooled with cold ocean water pumped from deeper in the ocean. OTEC-systems using seawater as a working fluid can use the condensed water to produce desalinated water.

Attempts to develop and refine OTEC technology started in the 1880s. In 1881, Jacques Arsene d'Arsonval, a French physicist, proposed tapping the thermal energy of the ocean. His student, Georges Claude, built the first OTEC plant, in Matanzas, Cuba in 1930. The system generated 22 kW of electricity with a low-pressure turbine. The plant was later destroyed in a storm.

In 1935, Claude constructed a plant aboard a 10,000-ton cargo vessel moored off the coast of Brazil. Weather and waves destroyed it before it could generate net power (i.e. the amount of power generated after subtracting power to run the system).

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<sup>3</sup> A breakwater could be located adjacent to the South-West of the island to break the waves from North-Western storms lashing the dikes of the Southern coastline.

In 1956, French scientists designed a 3 MW plant for Abidjan Ivory Coast. The plant was never completed, because new finds of large amounts of cheap petroleum made it uneconomical.

A European initiative EUROCEAN - a privately funded joint venture of 9 European countries already active in offshore engineering - was active in promoting OTEC from 1979 to 1983. In those years, I represented its member Boskalis Westminster Group. Initially, a large-scale offshore facility was studied. Later a 100-kW land-based installation was studied combining land-based OTEC with Desalination and Aquaculture (ODA).

In July 2016, the Virgin Islands Public Services Commission approved Ocean Thermal Energy Corporation's application to become a Quality Facility. The company is thus permitted to begin negotiations with the Virgin Islands Water and Power Authority (WAPA) for a Power Purchase Agreement (PPA) pertaining to an OTEC plant on the island of St. Croix. This would be the world's first commercial OTEC plant.

Until recently, OTEC could not compete with fossil energy generation. The world market price of oil and gas is increasing at such a rate that OTEC might become economically viable. The cost price of OTEC, on the other hand, is decreasing as a result of technological progress.

The Netherlands is in a favourable position to reap the benefits of this development. First, the cluster of offshore engineering competence at and around Delft University of Technology: Spin-off company Bluerise, Allseas, MSC-Gusto, MARIN, NACO, Damen Shipyards et cetera. Second, historical ties with Curaçao, one of the few locations in the world having a water depth of over 1000 metres near its coast and a difference of at least 20 degrees Celsius of temperatures in surface and deep layers in the ocean.

OTEC, generating zero CO<sub>2</sub> emission, is the greenest of all green energy sources but is completely ignored in the gospel of the climate priests. Why? My guess is: because, as mentioned before, there are only three places in the world where the water depth near the coast is over 1000 metres and the temperature difference of deep and surface layers of the ocean is more than 20 degrees Celsius.

OTEC technology is at a level where windmill technology was two decades ago. There is still room for improvement by means of dedicated R&D.

The autocratic leader of our thought experiment would order an updating of the prospects of OTEC and open a dialogue on the matter with the government of Curaçao.

Investing in promising projects, like the North Sea artificial island and the OTEC-opportunity can contribute to keeping inflation under control, but by no means resolve the issue.

Expenses that are actually unnecessary luxuries should be refrained from. Example 4 of my note of 29th of April, 2019 - all households on gas followed four decades later by the opposite: all households off gas is such an unnecessary luxury. Like digging holes and filling them up again in endless succession. Unemployment can be avoided this way, but at the price of rising inflation and decreasing purchasing power of consumers. Expenses of the government should be scrutinised by asking the question "If not financial return, what else do we get in return?" Discussions in Parliament, however, tend to be about the division of the pie of public funds rather than how to get a pie at all.







# FARMING

## *The Nitrogen crisis*

The Nitrogen crisis evoking unprecedented protests from farmers and sympathising citizens, is caused by the lack of systems thinking of the cabinet and trying to reach a compromise instead of synthesis as the situation clearly requires. The autocratic leader of our thought experiment would follow a completely different line of thinking, based on the concept of an idealised design (Ackhoff, 1994, pp. 100-101).

## *Planning backward*

Strategic decision making is usually focused on trying to go from where one is to where one wants to be at an arbitrarily selected point in the future. The concept of an idealised design, by contrast, is focused on working backward from where one wants to be right now to where one is right now.

We and our environments change in unpredictable ways between now and then. Implementation of effective planning should consist of continuous efforts to close the gap between where we want to be and where we are *at that time*.

It is easier to find a path through a maze by working from the exit to the entrance than from the entrance to the exit. The working back-principle is *called dynamic programming* by mathematicians, since it enables to solve previously difficult to solve problems in which the origin and destination were known, but how to get from one to the other was not.

Let us consider how an idealised design of farming would look like.

Idealised design of the country's farming

### **Where we want to be**

The population density of The Netherlands is among the highest in the world. As a corollary, terrain is a scarce resource. We want to have that scarce resource be utilised in diversified biological family-run farming, at a size enough to feed 20 million people, thereby making the country independent from other nations for feeding the population and preventing a disaster such as the hunger winter of 1944 to ever happen again.

### **Where we are**

The Netherlands is not only among the highest population density in the world, but is also the world's second largest exporter of food products, yielding revenues in the order of € 90 billion per year. These two features of the current situation are incompatible.

Export of food products should be limited to a level that does not affect the diversified biological farming needed for inland consumption.

The autocratic leader of our thought experiment would issue a directive to the relevant Ministries to support diversified biological farming by means of rules and regulations as well as direct subsidies. This offers farmers a prospect enabling them to continue life as a farmer. In this way, the Nitrogen crisis will automatically evaporate in due time.

Continuous interactive planning efforts to close the gap between where we want to be and where we are could be entrusted to a working group of experts and stakeholders.

# DEFENCE OF TERRITORY

## *How a herd is managed in the wild*

Many species of mammals – apes, dolphins, whales, horses, wolves and many more – live in groups to increase their chances of survival (van Gunsteren, L.A., 2012, pp. 14-18). Such a group is called a herd, a band, or a pack. Humans also organise themselves in groups, which we call organisations, corporations, tribes, and nations.

The leader of the herd, the Alpha, is not the nicest animal of the herd. It is the member of the herd that provides the best chances of survival. The Alpha determines the ranking, the ‘pecking order’ in the herd. The ranking, in turn, is determinant for privileges like drinking and eating first.

## *The war paradox*

The first priority of the Alpha is leading his Betas in defending the territory of the herd, animals or humans alike.

Hence, what we may call the *War paradox*:

*The prerequisite for long-lasting peace is to maintain a credible military force at all times.*

The deterrent has to be sufficiently trustworthy to prevent any potential intruder to get the idea that he could win an imminent war.

During the cold war after the second world war, the balance of military power of the East block and the NATO-states has been the basis of 70 years of peace. After the collapse of the Soviet Union, defence budgets eroded year after year. Peace was taken for granted. Lessons from the second world war were forgotten or ignored. Conscription was made dormant in 1997, not for strategic reasons, but for the simple reason that active conscription was considered to be too costly. The NATO norm of spending on defence is at least 2 percent of the Gross National Product (GNP), but we spend only 1.2 percent. We rely for our security entirely on the Americans (who are spending 4% of their GNP).

The outbreak of the Ukrainian war at our borders has been a wake-up call, a reminder that peace should never be taken for granted. The erosion of defence expenditure of the past decades seems to have come to an end. Let us hope this change will be stable. But even then, the country is too small to defend itself. When a herd is too small to survive on its own, it has to team up with another herd, in this case Germany. Close collaboration with Germany’s military forces has been rightfully adopted as our main defence strategy. To be an attractive partner

includes both weaponry and operations. For example, purchasing the German Eurofighter Typhoon plane instead of the American F35 Joint Strike Fighter and establishing joint divisions that can instantly be put into action.

What would the leader of our thought experiment do?

- Taking the initiative to build a *nuclear-powered submarine*.
- Establishing an active *social conscription* obliging every citizen, male or female, between 17 and 30 years of age to serve during 12 to 24 months in the navy, the army, the air force or in hospitals and elderly homes. During their service, the drafted citizens would receive the same remuneration as their permanent colleagues.

# IMMIGRANTS

## *Schiphol City*

The transfer of landings and take-offs to an artificial airport island in the North Sea offers the opportunity of allocating new functions on the premises of the present Schiphol. For example, the intake of immigrants.

Schiphol City could develop in the same way as we have seen in Almere. A centre for intake of immigrants could be built, offering immigrants a roof over their head and class rooms for learning Dutch or English language and singing the national hymn *Wilhelmus* and Santa Claus songs. Immigrants would have to pass an exam in Dutch or English language and Dutch history before getting a permit to settle down elsewhere in the country.

Immigrants should be obliged to deliver their contribution to the *social conscription* before getting final permission to stay. When immigrants become aware that they have to earn their permit to stay in the country instead of getting one unconditionally, their number will drastically decrease.

## *The housing crisis*

Immigrants having acquired the status of approval to stay in the country cannot exercise their right simply because they cannot get a house due to the current shortage in the real estate market. The measures taken to cope with the housing crisis are counterproductive. The general policy is to make life difficult for house owners who do not live themselves in their house but own it as an investment. The transfer tax is 2% for inhabitants, but 8% for investors. In some regions selling one's property is subjected to further restrictions that discourage investors to invest their money in real estate. Project developers who are prepared to invest in housing for immigrants cannot find a suitable location as a result of the prevailing "*not in my back yard*" attitude of inhabitants of the envisaged neighbourhoods. The policy of making life difficult for investors who could contribute significantly to the long-term solution of the housing crisis is in conflict with plain common sense and hard to explain to immigrants who are willing to make a genuine effort to integrate.

The autocratic leader of our thought experiment would forbid interventions that violate general property rights. He or she would decide to implement *in parallel* the options of North Sea island and Social Conscription. The housing crisis would then automatically come to an end by means of using the terrain of the present Schiphol that becomes available for temporary housing of immigrants. A substantial decrease of their number would be attained by the condition for getting a permanent permit to stay of participating in the Social Conscription, as would be mandatory for all Dutch citizens.





# INTEGRATION OF AUTOCRATIC AND DEMOCRATIC VALUES

The British got their Churchill to lead the country through the second world war. Let us hope the Dutch too will get once such an enlightened Prime Minister with that kind of individual prominence.

The things to-do-list for such an enlightened Prime Minister includes developing his or her vision on:

- Building *two new nuclear reactors* on the premises of the present one in Borssele.
- Building *two new clusters of 3 reactors each* in Groningen and Limburg.
- Building a *nuclear-powered submarine*.
- An *artificial airport island* in the North Sea.
- Utilising the available terrain for *diversified biological farming* to feed the country's own 20 million inhabitants and allowing only what is left for the export of food products.
- A *social conscription* for all citizens between 17 and 30 years of age to serve 12-24 months in the military or health care institutions.
- The *OTEC-opportunity* for the former colony Curaçao.
- Conducting an updated feasibility study of the proposition of a *nuclear-powered salvage tug*.

He or she must be wholeheartedly be convinced that his or her vision is the right thing to do and be able to say: "Trust me, this is what we have to do for our long-term survival and welfare". As long as such a charismatic leader has not yet emerged, the current short-sightedness of our politicians will prohibit the execution of the actions that are necessary to reap the benefits of these long-haul opportunities.

The actual list of things-to-do can be different, which is quite all right provided they reflect the three main strategies:

1. Social conscription
2. Nuclear energy utilisation where possible
3. Artificial airport island in the North Sea.



# INNOVATION

Innovation is often proposed as a panacea to cope with the various crises the government is confronted with. This widely prevailing view is an illusion.

*Innovation*, defined as the first application of an invention – the first evidence that someone is prepared to pay for it – is a *game of excellence* since only one can be the first. An inner drive to excel is a prerequisite for the successful conversion of inventions into innovations. The paradox of management of innovation is that innovation cannot be managed directly. Innovation requires creativity and inductive thinking that cannot be imposed top-down. It is useless to order someone to be creative. The motivation to be creative has to come from within. Creativity requires psychological freedom and psychological safety. All one can do is making circumstances conducive to innovation by measures that facilitate, but by no means guarantee, innovation to happen.

The road from idea to application in the market is paved with roadblocks that are difficult to overcome. To steer a promising idea around potential obstructions requires persistence and creativity at all four stage gates of the process of technological innovation. Governmental support is only relevant at the fourth stage gate related to legislation and infrastructure.

<b>Required</b>	<b>Phase</b>
	<b>Discontent</b> With status quo
<b>Inventor</b> Imagination & Inductive thinking	
	<b>Invention</b> New technical trick
<b>Product Champion</b> Persistence & Courage	
	<b>Innovation</b> First commercial application
<b>Commercialisation</b> Sales & Manufacture	
	<b>Diffusion</b> Renewal
<b>Governmental Support</b> Legislation & Infrastructure	
	<b>Progress</b> Scale & prosperity

Figure 4. Stage gates of the process of technological innovation

***The rational view of innovation***

Donald Schön (1977) has coined the term rational *view of innovation* to describe the belief that innovation is a manageable process in which risks are controlled by justification and review. His assertion is that the rational view of innovation ignores or violates actual experience and is, therefore, a myth. My experience of a lifetime involvement in technological innovation confirms this view.

Innovating endeavours based on the erroneous rational view of innovation are bound to fail. Technological innovation is not a saving angel for resolving the current crises.

Innovating capability is relevant, however, to induce *resilience*, the feature of a community to cope effectively with changed environmental circumstances. For example, the research and development on vaccines intensified worldwide after the outbreak of the Covid19 epidemic and produced new vaccines years earlier than so far usual in the pharmaceutical industry.

# EPILOGUE

*“We are living in an interminable succession of absurdities imposed by the myopic logic of short-term thinking.”*

Jacques Yves Cousteau

## ***Implementation***

Implementation of the recommended actions has to be done in *parallel* in view of their interconnectedness, as is summarised in the table at the end of this section.

It is *all or nothing* to be effective. The package as a whole has to be subject of approval by the Parliament, possibly preceded by an informative referendum. That requires courage and vision, in particular from the part of the Prime Minister. As long as these qualities are lacking, the attractiveness of the country as a place to live will continue to decline.

A nation gets the government it deserves. As long as we accept the current short-sightedness displayed by the government, the demise of the country will remain unavoidable.

I am convinced that the package of my recommendations could still reverse the negative trend. However, considering the way critical opponents of the climate gospel are treated, I must expect a similar response, calling me arrogant, irresponsible, naïve, et cetera. In other words, shooting at the pianist to avoid paying proper attention to the content of the message.

I feel that I nevertheless have to publish my view to avoid repetition of the post-war famous words “Wir haben es nicht gewusst”.

*Interconnectedness of strategies and issues*

<b>Strategies:</b> <b>Issues:</b>	Social conscription	Nuclear energy utilisation where possible	Airport island in the North Sea
Excessive price of oil and gas	-	++ Reducing the deficit	+ Reducing the deficit
Inflation, purchasing power	-	++ Reducing the deficit	++ Additional airport tax
Farming, food supply	++ Season workers availability	++ Glasshouse farming viability	-
Defence of territory	++ Strengthen partnership with Germany	+ Reducing the deficit	-
Immigrants	++ Enabling to earn permit	+ Reducing the deficit	++ Intake of immigrants
Health care	++ Hands on beds in hospitals	+ Reducing the deficit	-
Youngsters criminality	++ Re-education by marines	-	-
Polarisation	++ Facilitates dialogue	-	-
Illiteracy	++ Teachers availability	-	-

++ = great impact

+ = moderate impact

- = no impact

# APPENDIX

## ***Design of a nuclear-powered 20,000 HP tugboat***

It is 1961. The expectations for nuclear power generation are high. After successful application of nuclear power generation on submarines, the United States had built the NS Savannah, a nuclear-powered merchant ship, to get experience with nuclear power generation on ships outside the realm of the military. The Netherlands, at that time a world market leader in ship building, wished to keep up with these promising developments. A project was launched to design and build a nuclear-powered tanker. The tanker, known as ENEA-tanker, would be built at the Wilton Feijnoord Shipyard in Schiedam.

The professor of ship design at the Faculty of Maritime Engineering of Delft University of Technology, Prof. Ir H.E. Jaeger, had serious reservations against the proposal. Why spend R&D funds on building such a large ship when only the propulsion aspects are of interest? The purpose of the project was to get experience with commercial nuclear ship propulsion. The lowest budget for that purpose is achieved by building the smallest ship for the smallest possible nuclear power installation. The latter was estimated to be in the order of 20,000 HP (14.3 MW). The ENEA-tanker also would have that power installed. What is a lot of power installed in the smallest possible hull? That is a tugboat! Hence, professor Jaeger proposed to design and build a nuclear-powered tugboat instead of a tanker.

The board of management of Wilton Feijnoord was, understandably, not pleased with the idea, but promised to cooperate. The design of the ENEA-tanker – in particular the reactor and engine room – would be made available to facilitate the design of a nuclear-powered tugboat. Other expert parties offered help:

- The reactor centre ECN in Petten;
- The Netherlands Ship Model Basin (now called MARIN) in Wageningen;
- TNO in Delft;
- Smit International tugboat company, Rotterdam (at present the division Towage & Salvage of the Royal Boskalis Westminster Group).

Professor Jaeger himself would select a student to make the design supported by these reputable parties.

So, I found myself somewhat later asking my father, who financed my study, if he would mind about a half year's delay in getting my degree. He didn't.<sup>4</sup> So, I started studying, thinking, and finally designing.

Studying, because I did not know anything about nuclear power plants.

Thinking, because of the great complexity of the task at hand. So far, the most powerful salvage tug in the world - the Zwarte Zee - had almost 10,000 HP installed. I had to design a tugboat for 20,000 HP, an enormous leap from the current state-of-the-art, with the additional requirement of a nuclear reactor instead of a simple diesel engine.

The main challenge of ship design is to cope with Archimedes' law:

*The weight of the ship equals the weight of the displaced water.*

The downward gravitational force equals the upward buoyancy force. The size of the tugboat must be enough to carry the weight of the reactor, its lead inner layer of protection against radio active radiation and its outer layer of reinforced concrete. The thicknesses of these two layers constitute design variables within the constraint of the maximum allowed radioactive radiation. The main dimensions of the hull and the block coefficient (i.e. the ratio of the underwater volume to the circumscribing rectangular block) constitute the remaining design variables. The design could then be made in an iterative conversation with the situation (Schön, Donald A., 1983).

By Christmas 1962, I could present my design to the Steering Committee that consisted of professor Jaeger and the managing directors of ECN, MARIN, TNO and Smit International Tugboat Company.

The Committee was pleased with the result. The size, a length of about 90 metres, was far less than initially expected. The Savannah had twice that length at about the same power of 20,000 HP. In spite of the relatively small size, my tugboat was designed as a two-compartment ship. In the case of a collision, two adjacent compartments could be flooded without sinking or capsizing. The propulsive performance - 200 tons bollard pull and a free running speed of 19 knots - would be better than any competitor in the world.

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<sup>4</sup> My mother also contributed financially to my study at Delft University of Technology. She opened an account at the university book store where I could buy any book that I expected to be interesting. One of the books I purchased was the Dover Publication Theory of Flight by Richard von Mises, 1959. The sections on momentum theory, pp.326-355, made me to disagree with the view prevailing among propulsion experts that momentum theory, inaugurated by W.J.M. Rankine in 1865, is not of any use in propulsion design since it does not provide information on the shape of the propulsion device. A reappraisal of momentum theory became the main theme of my Ph.D. Thesis in 1973.



The Committee asked me what my view was on nuclear-powered merchant ship propulsion. My answer was: absolutely feasible provided the number of ships remains limited. Application on a large scale could sooner or later lead to a collision like the oil tanker Cape Valdez caused by its drunk captain. The resulting oil spill was disastrous for the nature of Alaska. But worse would have been if instead of an oil spill a meltdown had happened as in Chernobyl and the Russian submarine 'Kursk'.

These accidents happened a half century ago. Technology has progressed in the meantime and awareness is growing that nuclear energy generation must be accepted if we want ever to become independent from fossil energy.

It is time, therefore, to reconsider to build a 20,000 HP nuclear-powered tugboat. A conventional 20,000HP tugboat already exists (van Gunsteren and Vlas, 2022, pp. 25-33).

### ***Lessons-learned from the NS Savannah experience***

The NS Savannah was named after the SS Savannah that marked the transition from sail to steam ship propulsion in 1818. The NS Savannah was expected to mark the transition from diesel engine to nuclear-powered *commercial* ship propulsion.

The *technical* transition from petroleum to nuclear-powered ship propulsion was marked by the submarine Nautilus in 1955 that outperformed existing submarines to such an extent that propulsion not only of submarines but of all US Navy sizable war ships, in particular aircraft carriers, became nuclear-powered. Their safety track- record over a half century has been excellent.

Russia and Canada have put a hundred nuclear-powered icebreakers into service. The first one, the *Lenin*, was operated in the period of 1959-191989.

Ice breaking requires huge ammounts of energy, which makes nuclear powering a viable proposition.

The purpose of the NS Savannah was to demonstrate the feasibility of nuclear-powered merchant ships.

From a technical point-of-view, the NS Savannah was a great success. She was capable of circling the earth 14 times at 20 knots without refuelling and using only 35 kilogrammes uranium.

This technical success inspired other nations to follow suit. Wikipedia (Nuclear marine propulsion) summarises the history of nuclear-powered merchant ships as follows:

- Mutsu, Japan (1970-1992, never carried commercial cargo, rebuilt as diesel engine powered *RV Mirai* in 1996)
- Otto Hahn, Germany (1968-1972; re-powered with diesel engine in 1979)
- NS Savanna, United States (1962—1972)
- Sevmorput, Russia (1988-present)

At hindsight, we can conclude that the main cause of the failure to attain commercial viability has been *public perception*. Before getting permission to enter a port, months in advance negotiations with port authorities turned out to be necessary. Access was denied to the Suez Canal and the Panama Canal. The considerable associated cost and lack of flexibility would kill any commercial proposition. The public at large is aware of what happened with the atom bombs on Hiroshima and Nagasaki 6 and 8 of August 1945 and draws the irrational conclusion that nuclear energy generation is an undesirable evil that should be avoided no matter what. As long as this *nuclear-phobia* prevails, nuclear-powered merchant ships will remain a utopia.

The public perception, however, is shifting rapidly. People are beginning to realise that to sustain our level of welfare, the choice is either *fossil or nuclear*. If we want to get rid of the dependence on fossil energy we must accept utilisation of nuclear energy.

A second lesson-learned from the NS Savannah experience is to avoid falling into the *multi-purpose pitfall* (van Gunsteren 2013, pp.29-32). The Savannah's hybrid purpose of a freighter and a cruise ship made it uneconomical from the outset.

Crude oil prices are expected to increase and the cost of marine nuclear energy generation to decrease. The proposition of a nuclear-powered salvage tug to become economically feasible is only a matter of time.

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## *Drawings*

1. *Algemeen plan*, Zijaanzicht
2. *Lijnenplan*
3. *Algemeen plan*, Tanktop, Tussendek
4. *Algemeen plan*, Hoofddek, Sloependek, Bakdek
5. *Bewerkt grootspant*
6. *Machinekamer*
7. *Opstelling reactor compartiment*
8. *Opstelling apparaten in reactor compartiment*

# THE AUTHOR

**Lex A, van Gunsteren** (1938) is a business consultant, lecturer and innovator in marine propulsion. He graduated as a naval architect and received his PhD from Delft University of Technology, where in 1981 he was appointed as Professor in Management of Technology. He was, as professor of the Erasmus University Rotterdam, one of the pioneers of the Rotterdam School of Management, rated in the eighties as the number one of the top-ten European business schools.

After his military service as an officer in the ship design unit of the Royal Netherlands Navy, Lips Propeller Works employed him, initially as an industrial scientist and later in various managerial positions. In the shipbuilding group IHC Holland, he was managing director of their shipyard Gusto, specialised in offshore equipment. In the late seventies and early eighties, he served as director of corporate planning and R&D in the Royal Boskalis Westminster Group.

He founded the innovation company Van Gunsteren & Gelling Marine Propulsion Development for the further development of his invention of the slotted nozzle (duct with a slot at the front), which ultimately led to the successful application of the wing nozzle (duct with a slot at the rear). He served on various boards for monitoring R&D funds, among others as vice chairman of the board of the Dutch Foundation for Technical Sciences 'STW'.

Since 1997, he lectures, at Delft University, computer aided support in architecture, urban planning and project management. His publications include eight patents and ten books. His latest article was published in 2020, his latest book in 2022.



# NEDERLANDSTALIGE SAMENVATTING

## ***De neergang van de Nederlandse samenleving***

Het tijdperk van de jaren zestig en zeventig van de vorige eeuw is een periode van gelukkig zijn voor mij geweest. De wederopbouw had Nederland tot een aantrekkelijke plaats om in te leven gemaakt. Christelijke waarden, zoals helpen wie op je pad komt, werden gerespecteerd in alle lagen van de bevolking. Een werkweek van zes dagen was de norm voor de scheiding tussen werk en rust. Vrijheid van keuze was geoorloofd in vrijwel elk opzicht zo lang anderen maar niet worden gehinderd. Ras discriminatie was niet aan de orde. Immigranten, spijtoptanten van de voormalige kolonie Indonesië, waren van harte welkom.

Heden ten dage, een halve eeuw later, is de situatie ingrijpend veranderd. De bevolking is bijna verdubbeld. De viering van het traditionele Sinterklaasfeest wordt gezien als een daad van ras discriminatie. Ethische normen zijn niet meer bepalend voor de keuzes die mensen maken. Alles is geoorloofd zo lang niet wettelijk verboden. Bureaucratie en egoïsme zijn dominante kenmerken van de samenleving geworden. Daardoor heeft het land veel van zijn aantrekkelijkheid verloren.

Overbevolking is de hoofdoorzaak van de neergang, niet ras discriminatie. Wanneer ratten in een kleine ruimte worden opgesloten, proberen zij elkaar te doden. Mensen doen dat evenzo door oorlogen te voeren.

Evert van Benthem, de glorieuze winnaar van de Elfstedentochten van 1985 en 1986, immigreerde in 2000 naar Alberta Canada. Daar runt hij met zijn familie twee boerderijen van tezamen 300 koeien. Hij ziet zijn besluit om te emigreren als een super stap in zijn leven.

Is emigreren de enige optie om te ontkomen aan de voortdurende neergang van het land? Wat zou de neerwaartse trend kunnen doen keren? Mijn antwoord op deze vraag is het onderwerp van deze verhandeling.

## ***Oorlogsherinneringen***

Ik ben geboren op 9 oktober 1938. Op zondag tijdens de middagdienst van onze gereformeerde kerk. Een zondagskind dat geluk brengt. Geluk heb ik inderdaad gehad. Ik was de enige die ongedeerd bleef in de beschieting op 7 september 1944 die een dode en drie gewonden van onze familie tot gevolg had.

De V2-lancerings die in de omgeving van ons huis in Wassenaar plaats vonden, namen sterk toe in de zomer van 1944. Soms viel de raket terug en sloeg dan een flinke krater in de bodem. Maar het grootste gevaar dat onze moeder vreesde was dat de lanceerlocaties doelwit zouden

worden van bombardementen van de geallieerden. Die vrees was gerechtvaardigd, zoals later is gebleken uit het bombardement van het Bezuidenhout op 3 maart 1945. Daarom gingen we naar Leiden verhuizen.

Een verhuisrit vond plaats met vijf inzittenden: voorin onze vader links aan het stuur, ik in het midden en mijn zus Mies (4/4/1937) rechts. Achterin: mijn broer Herman (16/12/1940) op schoot van de verpleegster diacones die grootvader van Gunsteren tot zijn overlijden had verzorgd. De rit ging via boer van 't Hul in de Haarlemmermeer die ons tarwe en graan leverde (melkproducten werden aan ons geleverd door boer van Bohemen in Stompwijk). Toen wij het punt naderden waar nu de A4 en de A44 samen komen - de A4 was er toen nog niet -, verscheen een jachtvliegtuig van de RAF in de lucht. Dat vliegtuig zou zeker gaan schieten op onze auto die vanuit de lucht niet van een legerwagen was te onderscheiden. Onze vader wilde daarom schuilen onder het viaduct van de A44, maar daar stond al een Duitse militaire auto. Daarnaast gaan staan met een auto vol levensmiddelen was natuurlijk de goden verzoeken, dus reden we nog een eindje door. Op voldoende afstand van het viaduct stopte onze vader om te kijken wat het vliegtuig ging doen. Vrijwel meteen nadat hij was uitgestapt, riep hij "Ze komen!" Toen de mitrailleurs begonnen te knetteren, maakte ik mij zo klein mogelijk want de kogels vlogen om mijn oren. Mies en ik kropen de auto uit. Zij had daar meer moeite mee dan ik, want ze had een kogel door een voet gekregen, evenals onze vader die ook door een kogel in een voet was getroffen. Een ogenblik later begon Herman luidkeels te schreeuwen. Onze vader hinkelde op zijn niet geraakte voet naar het achterraampje, sloeg dat in met een vuist en trok Herman door het raam naar buiten. Herman was getroffen aan beide benen. Een kogel was boven de hiel dwars door zijn onderbeen gegaan, waardoor dat been slechts vertraagd kon groeien en er een steeds dikker blok onder zijn schoen moest worden gemaakt. Van de andere voet waren drie tenen afgeschoten. De verpleegster was door kogels in het hoofd en de buik op slag dood.

Ik werd door een boerin naar haar nabij gelegen boerderij gebracht. Daar kreeg ik een glas melk. Hoe de drie gewonden naar het ziekenhuis werden afgevoerd heb ik daardoor slechts gedeeltelijk gezien.

Onze moeder, die met mijn broer Frans (12/5/1942) in Wassenaar was gebleven, verzorgde de gewonden nadat die uit het ziekenhuis waren gekomen. Onze vader en Mies herstelden voorspoedig, maar Herman, nog geen vier jaar oud, kreeg het heel zwaar te verduren tijdens zijn drie maanden verblijf in het ziekenhuis.

Ik voelde een verantwoordelijkheid voor mijn vier jaar jongere broer Frans die altijd is gebleven. Ik trok hem de kelder in wanneer er luchtalarm was en beschermde hem tegen woede aanvallen van Herman.

Onze ouders werden geheel in beslag genomen door de inspanningen om de hongerwinter door te komen die aan 25 duizend mensen het leven zou gaan kosten. Ik was op mijzelf aangewezen en leerde autoriteiten te wantrouwen die mij vertellen wat ik doen moet.



De bevrijding op 5 mei 1945 voelde alsof een zak aardappelen van mijn rug werd gehaald. Het maakte mij bewust dat vrijheid essentieel is om je goed te voelen en het waard is om voor te vechten.

### ***De veranderde omgeving***

De Covid 19 epidemie en de Ukraine oorlog hebben de wereld onomkeerbaar veranderd. Maar onze systemen om het land te besturen - belastingheffing, landsverdediging, voedselvoorziening, infrastructuur, onderwijs, gezondheidszorg, immigratie – zijn ongeschikt om met deze veranderingen op een effectieve wijze om te gaan.

De Ukraine oorlog vertoont opvallende gelijkenis met de uitbraak van de tweede wereldoorlog. Na het keerpunt van de Battle of Britain duurde het nog vijf jaar van onnoemelijk leed voordat Duitsland zich overgaf en er een einde kwam aan de oorlog.

Evenzo moet worden verwacht dat het enige jaren zal duren voordat vredesonderhandelingen enige kans van slagen hebben en er een einde komt aan de Ukraine oorlog.

Hoe zal de regering tewerk gaan in deze jaren?

Zal de verstikkende *roep om controle* het politieke debat blijven kenmerken?

Zal de nadruk op het URGENTE, i.e. de korte-termijn problemen, als tot dusver aan de dag gelegd, blijven domineren boven het BELANGRIJKE, i.e. de lange-termijn problemen en de korte- en lange-termijn kansen?

### ***De noodzaak van systeemdenken***

De complexiteit van de belangrijke politieke problemen vereist *systeemdenken* om tot een oplossing te komen. Een systeem is een geheel dat niet kan worden verdeeld in onafhankelijke delen. De wijze waarop hun oplossingen interacteren is veel belangrijker dan hoe zij acteren onafhankelijk van elkaar.

Politici plegen de noodzaak van systeemdenken te negeren. Zij lijken zich niet bewust te zijn dat elke oplossing van een probleem nieuwe problemen met zich mee brengt. Het gevolg is dat hun maatregelen slechts op korte-termijn effect sorteren.

Bijvoorbeeld, de Minister van Economische Zaken nam een serie maatregelen om transitie van fossiel naar elektrisch energiegebruik te bewerkstelligen. Toen dientengevolge de vraag naar elektrische energie begon te stijgen, dreigde het netwerk van elektrische kabels overbelast te geraken. Aanvragen van ondernemingen om te worden aangesloten werden op een wachtlijst gezet.

Voor goedkeuring van geneesmiddelen is uitgebreid testen op bijwerkingen vereist, maar onze Minister van Economische Zaken kon ongestraft de neveneffecten van zijn contraproductieve

interventie negeren. De transitie naar elektrisch energiegebruik moet natuurlijk worden opgehouden tot de capaciteit van het kabelnetwerk voldoende is verhoogd.

Andere crises - immigranten, boeren, inflatie, energieprijzen, gezondheidszorg - worden onveranderlijk net zo aangepakt zonder rekening te houden met onbedoelde neveneffecten.

Het zou naïef zijn om te verwachten dat politici de moeite zullen nemen zich vaardigheid in systeemdenken eigen te maken. Een meer belovende benadering is te laten zien hoe systeemdenken is verankerd in ingenieursontwerp en deze denkwijze toe te passen op de belangrijke lange-termijn politieke problemen.

### ***De denkwijze van een ingenieur***

Het verschil tussen een wetenschapper en een ingenieur is:

*The scientist explores what is;  
The engineer creates what not has been.  
(Theodore von Kármán)*

De ingenieur gebruikt wiskundige modellen, de virtuele werkelijkheid, om inzicht te krijgen in zijn ontwerpogave, maar zoekt de uiteindelijke oplossing altijd in veranderingen in de fysieke werkelijkheid, de 'hardware'.

Zou toepassing van de ingenieursdenkwijze op de belangrijke lange-termijn politieke problemen kunnen leiden tot een bevredigende oplossing?

Ik onderzoek deze vraag in het formaat van een gedachte-experiment.

Veronderstel dat ik een almachtige autocratische leider zou zijn zonder zich zorgen te hoeven maken over komende verkiezingen, wat zou ik dan doen?

Hoe ik tewerk zou gaan ten aanzien van de belangrijke lange-termijn politieke problemen, wordt beschreven in deze verhandeling.

De kern is hoofdstuk 7: Integratie van autocratische en democratische waarden.

De Engelsen hadden hun Churchill om het land door de oorlog te loodsen. Laten we hopen dat de Nederlanders ooit een premier zullen krijgen met een dergelijke individuele prominentie.

Het ‘things-to-do’ lijstje van de Verlichte Premier omvat het ontwikkelen van zijn of haar visie op:

- Bouwen van *twee nieuwe kerncentrales* naast de huidige kerncentrale in Borssele.
- Bouwen van *twee nieuwe clusters van elk 3 kerncentrales* in Groningen en Limburg.
- Bouwen van *een kernenergie aangedreven onderzeeboot*.
- Een *luchthaven eiland* in de Noordzee.
- Benutten van het beschikbare terrein voor *biologische landbouw* voldoende om 20 miljoen inwoners te voeden en slechts toestaan wat dan nog over is voor export van voedselproducten.
- *Sociale dienstplicht* voor burgers tussen 17 en 30 jaar om te dienen 12 tot 24 maanden in marine, leger en luchtmacht of in ziekenhuizen en verzorgingstehuizen.
- De OTEC-opportunity voor de *voormalige kolonie Curaçao*.
- Een *updated feasibility study* van een *atoomsleepboot*.

Hij of zij moet van harte overtuigd zijn om te kunnen zeggen: “Geloof mij, dit is wat we moeten doen voor ons lange-termijn overleven en welstand.”

Zo lang zo’n charismatisch leider nog niet naar boven is gekomen, verhindert de huidige kortzichtigheid van onze politici de uitvoering van de acties die nodig zijn om de vruchten te plukken van deze kansen.

De aanbevolen acties moeten in parallel worden uitgevoerd met het oog op hun onderlinge samenhang <sup>5</sup>. Het is *alles of niets* om effectief te zijn. Het hele pakket moet worden goedgekeurd door het Parlement, mogelijk voorafgaand door een informatief referendum. Dat vereist moed en visie, in het bijzonder van de Minister-President.

Een land krijgt de regering die het verdient. Zo lang wij de huidige kortzichtigheid van de regering accepteren, blijft de neergang onvermijdelijk.

5 De tabel op bladzijde 36 laat de samenhang zien van:

1. Sociale dienstplicht invoeren
2. Waar mogelijk kernenergie toe passen in plaats van fossiele energie
3. Luchthaven eiland bouwen in de Noord Zee.

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