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MEGA-PROJECTS PLANNING IN THE CIRCUMPOLAR NORTH ENVIRONMENTAL IMPACTS AND ECO-SOCIAL RELIABILITY EX-ANTE REVIEW OF THE VUOSAARI HARBOR CASE

Contents

Abreviations

AC Administrative Court
CAct Construction Act (370/1958, replaced by LUCAct of 1999)
CCH City Council of Helsinki (highest political decision making body of CH)
CH City of Helsinki
CJ Court of Justice
ECF Environmental Centre of Finland (environmental research centre under MinE)

EDS Environmental Data Service (environmental monitoring results open to anybody through internet browser, interactive communication of impacts in real time)
EIA Environmental impact assessment
EIAAct Environmental Impact Assessment Act (EIAAct, 494/1994)
EP Environmental permit (permit for activities under the provisions of the EPAct)
EPAct Environment Protection Act (EPAct, 86/2000)
EPA Environmental Permit Authority (state permit authority, grants permits under EPAct and WAct)
EU The EU administration
FANC Finnish Association of Nature Conservation (national environmental NGO)
FMA Marine Administration (state traffic department under MinTC for waterways and their traffic)
Finnlines Finnlines Oyj (shipping line having roro- and lolo- traffic from the Baltic to Europe, its subsidiary acts as an operator of the cargo harbors of Helsinki)
GP General Plan (an overall land use plan for a city or municipality, periodically or as a component plan at requirement)
HEC Helsinki Environmental Centre (part of the CH administration)
HMP Harbor Master Plan (overall plan for the Vuosaari harbor and its traffic connections at level subordinated to the EIA process, basis for political decisions on harbor transfer and commitments to further planning)
HPR Helsinki Planning Region (regional planning administration, responsible for regional land use planning)
IDDCS Instruction for Dredging and Dumping of Contaminated Sediments (dredging norm, updated by MinE after a long process by 19.5.2004)
LP Local Plan (land use plan for a particular section of a city or municipality)
LUCAct Land Use and Construction Act (132/1999)
MinE Ministry for the Environment
MinI Ministry of Interior
MinJ Ministry of Justice
MinTC Ministry of Traffic and Communication
Natura The Mustavuori-Östersundom Natura 2000 site no F10100065 (the protection site with boundaries and protected values next to the new harbor, established under the Bird and Habitat directives of EU and NCAct of Finland)
NCAct Nature Conservation Act (1096/1996)
NGO Non governmental organization
PH Port of Helsinki (public utility and harbor keeper of Helsinki under the CH administration)
RA Road Administration (state traffic department under MinTC for roads and their traffic)
RWA Railways Administration (state traffic department under MinTC for railways and their traffic)
REC Regional Environmental Centre (regional environmental authority of the state under MinE, responsible for control of environmental permits, for instance)
RP Regional Plan (an overall regional land use plan periodically or a particular regional plan at requirement)
SAC Supreme Administrative Court
State The government of Finland
TBT Tributyltens (organic ten substances used in antifouling paints for ship hulls)
VHE The Vuosaari Harbor Endeavor (the entirety of initiatives, processes, projects, actors and outcomes associated with initiating, planning, constructing and

	commissioning the new harbor in Vuosaari, with its traffic connections, and with fitting it to its ecological and social environment)
VUOLI	The joint traffic connections construction project of the state traffic administration departments (FMA, RA, RWA)
VUOSA	The Vuosaari harbor construction project of PH under the CH administration
WAct	Water Act (264/1961, legislates, among other things, on permits for construction or any other activity in conditions where impacts on marine, watershed or groundwater conditions are involved; allows WP granting on interest comparison basis, provided that not any absolute hinder under other legislation do exist)
WP	Water Permit (permit for construction, traffic etc. under the provisions of WAct)

Sources (all in Finnish)

www.portofhelsinki.fi

Research interviews by Martti Timonen 2003 … 2006: VUOSA, PH, VUOLI, MinTC, REC, MinE, ECF, planning administration of Helsinki, Vantaa, Sipoo and the Region, experts on birdlife, groundwater, marine environment and fisheries, monitoring (at HUT)

Original EIA material 1994 … 1994: the EIA program of CH and all statements and remarks on it, the EIA report of CH and all statements and opinions on it

VUOSA and VUOLI: project files at their offices, plans, reports, minutes, data banks

SAC: rulings on RP, LP and WP appeals, the rulings include extensive background material

Environmental impacts monitoring 2002 … 2008: monitoring programs, monitoring reports

Port of Helsinki (ed. Mauri Heikkonen) 2008: book on Vuosaari harbor in relation to its environment (Vuosaaren satama ja ympäristö), collection of 15 articles by various experts involved in VHE in one role or another (e.g. Metsäranta, Pulkkinen, Rämä)

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1. Introduction

1.1. Research interest of MPPCN

The Vuosaari Harbor Endeavor (VHE) from Finland has been chosen to one of the cases examined in connection with the Mega-projects Planning in Circumpolar North -research project (MPPCN). In connection with VHE a new large scale cargo harbor was planned and constructed in an ecologically and socially significant and delicate environment. The new harbor has been in operation since 2008. It took over 40 years from initial ideas to harbor opening. The history of VHE, with all its environmentally motivated struggles, conflicts and crises and other nuances, provides an excellent case for the interest of MPPCN to examine how a mega-project becomes deliberated, planned and implemented in such a manner that technical, economic, ecological and social expectations are recognized equally and governed reliably into positive outcomes with minimum harms.

1.2. VHE as an informative mega-project case

Mega-project is commonly conceptualized as a project that involves high costs and has great direct and indirect impacts on the environment, people and economy. By such conceptualization the VHE is definitely a mega-project. The VHE is one of the largest infrastructure projects ever carried out in Finland. The construction of a large scale cargo harbor in the outskirts of Helsinki, with its traffic connections and associated operation and service structures, is the nucleus of the VHE. Additionally the reconstruction of the old harbor sites, such as those in central Helsinki, into residential and business areas and community structure development more widely are essential components of the VHE. Furthermore, the VHE in connection with its network deliberation, planning orchestration and project implementation phases has incorporated other environmentally motivated components, such as upgrading of waste areas, construction of new nature, cleaning of old environmental hazards on dry land and in sea bed sediments, renewal of environmental norms, testing of environmental legislation, creating innovative technical solution and governance practices, all in collaboration between the project owners and the environmental administration, science and other stakeholders.

The investment cost of the new harbor and its traffic connections alone was some 700 M€. The estimated inhabitant area of the new suburbs to be constructed in the freed old harbor traffic areas is some 30 000. In the eastern border area between Helsinki and its neighbor municipalities a development snowballing has been pushed into motion in which some 30 000 inhabitants are being settled into co-living with highly valued nature, cultural heritage and recreation sites. The total employment by the harbor and its related logistic activities is some 4000. The harbor area is 150 ha and the length of traffic tunnels 20 km. In fact the whole capital city region of Finland is recipient in way or another of the social impacts of VHE.

The City of Helsinki is the project owner of the harbor itself and the State of Finland is the project owner of the traffic connections. A large number of private companies and specialist organizations have participated in studies, planning assignments and implementation contracts of VHE. Studies, planning, supervision, management and monitoring have engaged some 100 parties and construction activities some 75 parties so far. Besides the projects of CH and State, VHE has involved projects of the harbor operators in ramping up of their operations, as well as projects of the logistics related and other companies building their businesses in the Vuosaari Harbor Centre. These private projects have engaged another 50 parties. Wide collaboration in various activities has generated new thinking, innovative solutions and precedent cases within the umbrella of sustainable infrastructure development.

The year 2002 was a turning point in the history of VHE. In 1996 the Finnish Ministry of Environment (MinE) had denied ratification of the traffic area plans for the new harbor, as they were in obvious conflict with the Natura 2000 Network site of EU, under planning in the same neighborhood. Regional planning for traffic areas was restarted immediately in 1996, but first in June 2002 could the Supreme Administrative Court (SAC) rule the ratification of the respective regional plan final. That ruling was the most important threshold ruling for the harbor in Vuosaari. Only after this ruling, further planning was on realistic basis again.

At the heights of the legal twisting on the harbor versus Natura, in February 2002, Hukkinen and Roe discussed the prevailing antagonistic set-up in Helsingin Sanomat. They conceptualized Vuosaari harbor and the neighbouring Natura as a single industrial ecosystem, subject to co-evolution and co-management. According to them, deliberations on VHE conventionally had pit the ecological values of Natura against the social benefits obtained from the new harbor, even though one may argue that the maintenance of ecosystem values of of the Natura area in fact requires the harbor. The harbor had been cast as a choice between the preservation of aquatic and terrestrial ecosystems if the harbor is not built versus the enhancement of the economy, employment and housing if the harbor is built. EIA of HMP had concluded that not building the harbor would mostly benefit the aquatic environment, terrestrial flora and fauna, groundwater, and recreation, whereas building the harbor would mostly benefit the economy, employment, housing and services, health and quality of life, scenic values, and air quality. One might infer that the harbor would bring destruction to Natura, and that blocking the harbor from becoming operational would preserve the protected values of Natura. One could, however, anticipate that without the harbor the Natura area would be threatened by the rapid suburban development around it. On the other hand, one is entitled to assume that the harbor could be built and operated in such a way that it in fact secures the ecological values of Natura. The preservation of the values of Natura depends on what happens in its surroundings, the harbor included. The crux is the way how the harbor construction and operation and the Natura area are managed in relation to each other.

During its history VHE has provoked relentless critic for its environmental wrongdoings. In the public polemic the harbor construction has been accused for “raping the environment” and for courting with ecological and human health catastrophe. On the other hand, VHE has been praised for its environmental excellence. The project is advertised as an undertaking that has paid extraordinary attention to the ecological and social concerns. The VHE has been advertised as the most environment friendly harbor construction ever, leading to a model harbor that is in harmony with its eco-social landscape. None of these extreme expressions depicts the truth representatively. The joint technical economic, ecological and social excellence rather appears in a combination of nuanced success and failure features, associated with the processes from the first ideas to the operational readiness, and even more in the final

outcomes. VHE provides excellent material for examining how such success and failure nuances appear in various governance contexts of a particular infrastructure development case.

1.3. Some definitions for the purpose of this study

The above article by Hukkinen and Roe gives a good lead to understanding and defining some fundamental conceptualizations for the purpose of this study.

Expectations: Technical, economic, ecological and social expectations evolve and accumulate along the network deliberations towards a concrete plan, and become recorded as a representative collection of expectations. At a certain point of time deliberations lead to that Plan which is put under public scrutiny in EIA (HMP in this case). In EIA a large number of citizens and institutions have an opportunity to get their expectations on what to achieve and what to avoid recorded. The expectations as in EIA become refined in subsequent plans and public struggles on them. In this study the expectations as in EIA, complemented by redefinitions from the most critical struggles, conflicts and crises in later stages, are taken as the fundamental comparison basis for verification of whether VHE has been governed eco-socially reliably or not.

Endeavor: A project by definition leads thinking to a linear planning-implementation sequence, separation of the project from its environment and separation of the project as the cause and its impacts as the effect. Here the endeavor is understood as the carrier of all those EIA expectations that were associated with the alternative chosen for further steps, plus carrier of expectations resulting from the subsequent planning and implementation struggles, without strict segregation between within and without. VHE here is the entirety of initiatives, processes, projects, actors and outcomes associated with initiating, planning, constructing and commissioning of the new harbor in Vuosaari with its traffic connections, as well as all the transformations in all the ecological and social landscape components, transformed in the same context.

Eco-social landscape (ESL): In usual infrastructure endeavor conceptualizations the endeavor (changing) and the environment (status quo) easily become conceptualized as opponents to each other, as we see in the discussion of Hukkinen and Roe above. Here the endeavor and its components are seen rather as embedded in their ecological and social (eco-social) landscapes. The eco-social landscapes of VHE are conceptualized here as heterogeneous and constantly transforming combinations of multiple ecosystems in human interaction, under social pressures and control attempts. The harbor construction appears just as a peak of social pressures and control attempts in the subjected eco-social landscapes.

Governance: Generally, governance is about the manner in which something significant is developed, guided and controlled towards purpose by methods of management and systems of regulation, with reliance on precaution, learning, institutional evolution, participatory approaches, and awareness of civil society. Here, in addition to the previous, the governance is conceptualized with particular reference to the features most relevant to infrastructure development. In such a conceptualization, initially open network deliberation is expected gradually to narrow the differences and lead to a collectively supported project plan, which then is expected to achieve its goals through project management type of approach dominantly.

Eco-socially reliable governance: Here the governance of VHE is conceptualized eco-socially reliable if it becomes deliberated, planned and implemented in such a manner that technical, economic, ecological and social expectations are recognized equally and governed into positive outcomes with equal attention. If eco-socially reliable, the governance of VHE achieves convergent orientation and trust of the public, meets the socially constructed ecological and social expectations and delivers the harbor for traffic according to the design specifications. Furthermore there must be evidence years after the harbor commissioning that the outcomes enjoy wide acceptance and trust of the public, that no unexpected ecological or social harm has been built-in, and that the harbor performs to specification continually.

1.4. This study

At first this study makes a brief summary of VHE from initial ideas to the harbor opening.

Secondly the expectations resulting from EIA of HMP are investigated thoroughly. These socially constructed expectations form the fundamental reference basis for the outcomes comparison.

Thirdly a brief account is given of how the most crucial expectations of EIA have been influential in the most critical struggles, conflicts and crises of the project and how the initial expectations have become refined in connection with subsequent planning, permitting, implementation and monitoring.

Fourthly the results of the monitoring programs and the other indications of project performance and outcomes are verified and compared to the expectations above.

Finally, based on the above, conclusions are drawn on whether the processes and outcomes give indications of eco-socially reliable governance and if so what have been major contributors to such an achievement.

2. Lessons learned from EIA of HMP

The EIA of the HMP of Helsinki and that of the Kantvik harbor plan by Finnlines and its associates were the first major assessments under the new EIAAct in Finland. Besides being significant for the continuation of VHE, EIA of HMP was referred to be an important reference case of the future EIA practice in general.

EIAAct defines environmental impacts as direct or indirect impacts of an activity or an endeavor on human health, living conditions and wellbeing, on soils, waters, air, climate, vegetation, organisms and biodiversity, on community structure, buildings, landscape, urban view and cultural heritage, on use of natural resources, and on reciprocal relations between the previous ones. In EIA all these impacts must be assessed for all planned alternatives, zero-alternative included and processed into conclusions for decision making.

The EIA program of Helsinki on HMP was introduced to the public according to the legislation. Besides official statements, it obtained some 50 critical remarks from citizens and

their associations. The program was criticized for its alternatives setting, impact area definition, citizens participation and alternatives comparison, for instance. It was claimed that a nationally important project was planned to be assessed in a local context only. REC in its capacity as the coordinating authority accepted the EIA program, however, with some comments. REC stated, for instance, that "the law as present does not demand assessment of harbor activity and related environmental aspects more widely than from the project proponent's own perspective". Importantly, REC emphasized that "the assessment shall pay particular attention to the remarks given by the water and museum authorities and nature conservation associations".

EIA of HMP was carried out and the report produced by the assessment group headed by CH's Director for the Environment. All pertinent departments of the city administration were represented in the group. Neighboring municipalities were represented in the group, too, as were the traffic departments of the state. Citizen and organizations wanted to have their representation in the group, too, but this did not materialize.

A senior officer of REC acted as an advisor to the assessment group. MinE emphasized how the EIA process is separate from the project proponent's planning process and how the role of the coordinating authority is to ensure that these two processes are kept separate. This separation was not questioned in EIA of HMP.

In connection with its EIA, Helsinki carried out a citizen inquiry, besides numerous other investigations, and used its feedback widely in the mathematical model aiding for EIA conclusions. Based on the model, Helsinki concluded that "one concludes in favor of the harbor transfer to Vuosaari if 60 % of the total valuing is put on the human and social impacts and 40 % at maximum is put on the nature impacts".

In several opinions the model and its way of using the citizen inquiry for conclusions was questioned. Critics claimed that the harbor transfer was anyway justified dominantly on techno-economic grounds, without adequate weight on obvious environmental detriments, on their avoidance and mitigation, leave alone monitoring of impacts. Citizens, particularly in Vuosaari and along the traffic connections in Vantaa and Sipoo anticipated a variety of negative impacts in their neighborhood. Some citizen associations and landowners used environmental lawyers in elaboration their opposing statements.

Two separate project proponents had their competing harbor project in progress in the early 90s. Besides CH, Metropolitan Harbor Oy, headed by Finnlines was planning for their competing harbor in Kantvik, west of Helsinki. A real comparison of alternatives as stipulated in EIAAct was not possible because there were two separate project proponents. REC aimed to ensure some comparison anyway. Each proponent had introduced its EIA program separately. But in its conclusions to both of them REC demanded coordination of the EIA report publishing and processing. REC requested EIA reports from both proponents simultaneously and invited statements from the authorities and associations respectively. REC received around 40 opinions on the EIA report of Helsinki only or on both reports together.

EIA of HMP was seen widely as a precedent case that would show the way for future EIAs. Despite of REC's efforts to generate some comparison, EIA of HMP and that of its rival jointly demonstrated the need for an EIA that would assess respective infrastructure endeavors at a higher regional or national level. The EIA report of VHE was blamed to be a bad precedent in terms of its alternatives setting, impact area definition, genuineness of its

public hearing, manipulative way of coming to pre-decided conclusions, lack of real comparison and far too low attention to impact prevention, mitigation and monitoring. These issues demand particular attention in other upcoming EIAs.

REC concluded in its final statement on EIA of HMP that "the assessment takes the feedback of the program sufficiently into account. According to some statements the EIA report is good enough and in conformity with the EIAAct, while some others regard the report as insufficient and biased. Many statements claim that the investigations of the railway alternatives, dumping of the dredging masses and impacts on community structure have been left at too a general level. Most of those submitting opinions oppose the harbor location in Vuosaari. It is positive that the assessment covers the entire endeavor. This makes it possible to form a big picture of the entire endeavor and of its environmental impacts. Taking the planning status into account, the assessment report, despite of its generality, is sufficient."

Even though EIA of HMP was approved by REC, statements and opinions proved that much investigation and twisting was left into the subsequent processes. The eventual future of VHE was seen as a great complication, in which it is impossible yet to foresee all impacts, many impacts involve value based ambiguities, interests of various stakeholders collide, many impact contain uncertainties, and many important issues will unveil only gradually along the upcoming processes. Impacts would materialize in different scales in different points of time in different environments, that themselves are subject to changes all the time. Authorities in concert required more detailed plans, investigations, assessments, prevention, mitigation and monitoring as necessary preconditions.

3. Expectations established in HMP and EIA

3.1. Community structure ambitions and worries

3.1.1 Harbor transfer driving structural development of Helsinki

GP92 of Helsinki reserved a site for the cargo harbor in Vuosaari. The areas of the old West Harbor and North Harbor, as well as their railways junction in Pasila were reserved for housing and business construction. As the traffic areas of the eventual harbor reached outside the Helsinki territory, they were processed further through regional planning and were included in the urban regional plan 1992 of HPR. At the time of EIA in 1994, the ratification of this plan was still pending.

According to GP92, HMP and the EIA report, the harbor transfer, besides advancing the international image of Helsinki as a modern seaside and business city, would bring significant advantages to the community structure development and housing construction in the city. It would contribute to a closer community structure and bring subsequent environmental benefits. The environmental authorities and regional co-operation organizations in their statements were agreeable with this statement, and maintained that the harbor transfer would not only contribute to closer community structure inside Helsinki only but would act as a useful driver for similar development more widely in the region, too.

On the other hand, many statements and opinions claimed that the environmental benefits reaped from reconstruction of the old harbor areas were obviously over-dimensioned and uncertain. It was blamed that the eventual environmental impacts caused by the traffic after reconstruction of the old harbors were neglected in the assessment far too much. Questions were raised, too, whether such housing and business construction is needed in first place. Furthermore, numerous doubts were presented on whether the old harbor areas, where soil had been contaminated by waste tipping at first and then by harbor traffic, could be reasonably, if at all, transferred into healthy and lucrative housing areas.

In the EIA program of CH had justified the harbor transfer by the argument that the present harbor sites would not allow for development of harbor activities in accordance with capacity requirements while such development would be possible at the abandoned shipyard site in Vuosaari. This argument raised claims that the site available in Vuosaari would not allow such development either. In its EIA report CH assured sufficient area for any needful harbor development in Vuosaari by extensive sand filling there. That view was no more challenged in commenting of the actual EIA report. Attention was instead turned into environmental consequences of the extensive sand lifting, transport and filling suggested in the EIA report.

3.1.2 Community structure and planning in a wider perspective

In its EIA report CH described the land use and planning situation at various levels of planning hierarchy. CH also gave indications how the present land use situation and planning status affected VHE planning, and vice versa which implications VHE planning would have at regional, general and local planning levels.

Statements and opinions criticized the EIA report of CH for poor recognition and clarification of the preconditions that the prevailing regional and other land use plans set for planning of the harbor traffic connections. This was referred to be a very serious bottleneck when the so far unorganized land use conditions in the border area of Helsinki, Vantaa and Sipoo and the inertia of the planning hierarchy were both taken into account.

Significance of the harbor transfer issue for the structural development of the southern Finland was widely noted, and the decision makers were alerted to be far-sighted in the subsequent decisions. Views were given on how the outgoing of the harbor from the down town Helsinki facilitates for community structure development there, but doubts were raised whether such development is necessary or sustainable. Views were given how the harbor east of Helsinki would generate structural development in eastern region and prompt the reorganization of land use planning there, but doubts were raised whether such development would be necessary, desirable or sustainable. Respective considerations were given if the new harbor would be located instead west of Helsinki.

Many statements were agreeable with CH’s argument that the harbor transfer to Vuosaari is conducive to community structure that is more compact and obviously more sustainable, too. Several opinions, however, were worried about the car traffic impacts generated by the housing and business construction in the old harbor areas. The EIA report was criticized widely for its negligent attention to all car traffic implications in the down town, caused by such construction.

As far as citizens are concerned, citizens in the down town Helsinki preferred to get the harbor away and those in Vuosaari, Vantaa and Sipoo preferred not to receive it. REC in its statement supported CH by mentioning that the harbor transfer would improve the quality of living environment in the city centre. But still in many opinions doubts were raised on air quality and living quality in residential areas built on contaminated grounds. Detriments to the so far clean, quiet and green residential, nature and recreation areas in Vuosaari, Vantaa and Sipoo, instead, were regarded obvious.

3.2. Critical ecological and social constraints for the harbor in Vuosaari

As far as the ecological and social constraints for the harbor in Vuosaari are concerned, following kind of questions characterize the worries raised in the statements and opinions on the EIA report.

- Which ecological, human health or other environmental constraints must definitively be taken into account in planning, permitting, construction and commissioning of the harbor in Vuosaari, with all its necessary structures, facilities and functions?
- How well such constraints are known, recognized, understood, valued and taken into account in the plans and decision making?

3.2.1. Natura site as neighbor

In a great majority of all statements and opinions, reference was made to the biodiversity protection requirements in general, and to that of the Porvarinlahti-Mustavuori area in particular. Numerous statements and opinions blamed that in its EIA report CH had by-passed the EU's Bird and Nature directives far too lightly. Warnings were raised that the obvious appeal processes, based on these directives and on the respective national legislation, would form a fundamental risk to the total endeavor. The said legislation, together with plans to establish a Natura 2000 Network site in the immediate neighborhood of the considered harbor, was suggested as an obvious hinder that would prevent the harbor construction there. The Natura related processes were believed to prolong harbor plans considerably anyway.

REC joined the nature conservation associations and many others in emphasizing that the EU's Bird and Nature directives were effective and binding in the VHE case, particularly because the Porvarinlahti-Mustavuori area was part of the site being included in the Natura 2000 Network, protected under the provisions of these directives. Harbor users urged the project proponents to include the EU's Bird and Nature directives and the upcoming Natura development in their analysis of the most serious constraints and bottlenecks.

3.2.2. Biodiversity values and their protection more widely

In the citizen inquiry for the EIA report, 60 % of all answerers regarded impacts on nature very significant. Of all answerers, 50 % deemed the significant impacts as negative. Of those who classified themselves as opponents to the Vuosaari harbor, 70 % saw significant impacts on nature negative.

For its EIA report CH collected a summary of relevant biodiversity sites, of their protection status, and of their natural values inventories so far. CH also clarified which nature sites would be covered or otherwise affected by the harbor and its traffic connections.

Statements and opinions on the EIA report throughout noted that the harbor transfer to Vuosaari would cause deprivation of unspoiled nature. Protection of the Porvarinlahti-Mustavuori area, highly valued for its birdlife and grove vegetation, was found most critical and most seriously threatened. It was claimed that even though impacts of the road and railway there would be known, valuing of all impacts would remain difficult.

The Porvarinlahti-Mustavuori area was not the only site highly valued for its biodiversity. Spoiling impacts of the planned harbor on several other bird wetlands, protected islands and other protected marine sites were regarded grossly harmful.

The harbor and its traffic connections were blamed to spoil and split important spheres of nature, from where the whole eastern Helsinki obtains its flora and fauna complementation. It was commonly claimed, too, that despite of earlier conservation attempts and rich study material, all valuable biodiversity sites, especially beyond the Helsinki border, had not yet been researched, inventoried and monitored sufficiently.

3.2.3. Protection of water resources along the harbor road and railway

All land traffic connection alternatives were bound to touch one or another area important for its groundwater resources. CH in its EIA report presented ground water conditions and respective impacts on them in areas were alternative road and railway alignments were proposed. Statements and opinions demanded more detailed ground and rock water investigations and protection proposals, before road and railway alignments could be finally decided and before further planning or permitting could proceed.

Rock and soil construction activities as well as the harbor traffic were in numerous statements and opinions claimed to involve risks of contaminating important, and in the capital city area scarce ground water resources. If tunnel solutions were chosen, their construction was furthermore claimed to involve dangers of dropping ground water and rock water tables, degrading wells and watersheds, drying vegetation at important nature protection sites, and moving foundations and cracking buildings at residential areas of Vantaa.

3.2.4. Protection of the marine environment, water quality and fisheries

In the feedback to the EIA program, the presentation of CH was seen weak on protection the marine environment as a whole, even though voluntary monitoring was going on. In the EIA phase sand lifting and sand filling plans were presented more extensively and the assessment of marine construction impacts was based on rather extensive investigation and monitoring material. Water, environmental and fisheries authorities, however, claimed that impacts of the waterway construction and traffic on the marine ecology were not assessed satisfactorily, that the assessment paid too little attention to impacts on fisheries and fishing, and that blurring impacts of the extensive sand movements were not covered adequately.

Impacts of the marine construction as a whole in connection with VHE raised a real storm of remarks among citizens and their associations, nature conservation and fishing associations, and municipal authorities of Sipoo. Remarks warned of extensive negative impacts of such gigantic sand lifting, filling, dredging and dumping activities. Great worries were expressed of impacts on water currents, water quality, shore erosion, vegetation, ground water, fisheries and fishing. The nature conservation sites of the archipelago were feared to become endangered seriously.

3.2.5. Marine construction vs. poisonous contaminants in sea bed sediments

As regard to the EIA program, water and environmental authorities as well as fisheries and conservation associations paid attention to the fact that the construction of the harbor and its waterway would require large scale dredging in waters that had long time been loaded by contaminants from previous shipyard operations. Particularly, "existence of organic and un-organic poisonous contaminants in the sea bed sediments" was seen obvious. It was feared that "heavy metals and organic contaminants had not yet been investigated sufficiently"

In the EIA report and in the subsequent statements and opinions poisonous contaminants did not obtain as much attention as one may assume on the basis of the related remarks in connection with the EIA program. Some opinions on the EIA report foresaw that permitting of dredging and dumping would occur under the provisions of the upcoming instruction for dredging and dumping of contaminated sediments (IDDCS) that had been under revision but pending already some years. Obviously stakeholders thought that nothing more needed to be said at that time as the upcoming IDDCS and the WP processes eventually would take care of such contaminants anyway.

3.2.6. Living conditions of people: healthiness, wellness, recreation

In connection with the citizen inquiry, 35 % of answerers valued impacts of the harbor transfer on human health and wellbeing very significant. Air pollution, noise and disturbing light, for instance were experienced to have direct influence on wellness of the living environment and indirect influence on people's health. In both respects the impacts were regarded significant.

In the citizen inquiry, in the EIA report, as well as in a great share of statements and opinions, the subject issues were dealt with extensively. Healthiness, wellness and recreation values of the living environment were closely associated with cleanliness, peacefulness, quietness, freshness, or at least minimum levels air of pollution, dust, noise, stinks and other disturbances. Complete absence of unhealthy substances or other risk elements to human life, contact with un-spoilt nature, preserved heritage, opportunities for athletic, social and other hobbies and opportunities for positive esthetic experiencing were linked to healthiness, wellness and recreation values of the living environment, too.

In statements and opinion in general, impacts of the harbor itself on air quality were seen limited. Instead, the emissions and energy consumption of all the traffic, created by the harbor in the new place and by the housing and business in the reconstructed old harbor sites, were seen as very significant environmental impacts. It was blamed that the assessment of these

impacts in the EIA report of CH was far too negligent as compared to the requirements of the respective policies and conventions.

In its concluding statement REC agreed with CH's EIA report and many opinions in assumption that the harbor transfer would improve recreational quality in the down town. On the other hand, numerous opinions doubted air quality improvement in the down town. Many were doubtful of whether contaminated soils and other constraints in the old traffic areas would allow construction of residential areas that would be of high quality in healthiness, wellness or recreational terms.

Many opinions from Vuosaari, Vantaa and Sipoo claimed that in the down town harbor traffic noise and light disturbances would subside in the background. On the contrary, at the new site and along the traffic connections, air pollution, dust, noise and light disturbances would dominate so far relatively quiet and disturbance free areas, areas that should be protected on their own right anyway.

Citizens and their associations in the Sipoo archipelago reasoned that harbor traffic, besides air pollution, noise and light disturbance, would worsen living conditions also in terms of dirt, livelihood changes and heritage sites degradation. All these in concert would cause stress and have negative impact on human heath. In the open archipelago mitigation opportunities for noise and light impacts were regarded impossible.

3.2.7. Compensation issues

In its HMP and in the related EIA report CH made an account of various kinds of sites covered or affected by or otherwise related to the harbor and its traffic connections. If not in CH's possession, HMP was based on reclamation of the necessary traffic areas and relied on related compensation procedures of the legislation.

Prior to HMP and its EIA, CH had pursued nature conservation, and established protection and recreation sites in its eastern boarder area. Vantaa and Sipoo had protection and recreation sites in the same border area, too. Valuable nature and recreation sites were to be covered or impacted by the new traffic areas. CH was prepared to compensate nature lost under the harbor traffic areas and to continue its protection and recreation sites development in its eastern border area otherwise, too.

In great number of opinions on the EIA report it was claimed that any compensatory arrangements would not compensate losses of nature under the harbor traffic areas or degraded in their vicinity. Values of natural sites, affected by VHE were seen impossible to compensate and as a founded reason to prevent the harbor from coming there. The interests of the affected land owners lead them to the same conclusion.

As far as the marine construction is concerned, CH in its EIA report admitted that construction of the harbor and its waterway connections would have local impacts on fisheries and fishing. Fishermen and fishing associations demanded that all impacts to fisheries and fishing must be investigated, monitored and compensated to the full value.

The municipality of Sipoo in its statement demanded that in addition to the harms and losses caused to any party by water blurring under the marine construction, also other harms and

losses to ecology, fishing and recreation must be investigated, monitored and compensated. Similar views were raised by the citizens and their association in the archipelago.

3.2.8. Eco-social landscape as an experienced transformation space

From people's trust and acceptance point of view, in connection with a major infrastructure endeavor such as VHE, it is significant whether citizens experience transformations they foresee in their relevant eco-social landscape as acceptable, or whether they at least can rely on that the project proponents and implementers are serious in paying attention to the valued qualities of their relevant eco-social landscapes.

In the citizen inquiry, 25 % of answerers experienced the impacts of VHE on the landscape as very significant. The respective figures as regard to impacts on sea were 25 %, on cultural heritage 5 %, on recreation 40 %, and on wellness and health 35 %. In opinions on the EIA report qualities such as wholeness, permanence, familiarity, tradition, livelihood carrying form, cultural heritage, naturalness, tranquility, cleanliness, wellness, healthiness, esthetics and similar mind catching qualities seemed to have intermingled in people's mind in their valuing their neighborhood landscape and experiencing VHE as a threat to it.

In its EIA report CH aimed to process all the significant impacts into conclusions for decision making by using a mathematical multi-criteria model. Several opinions, even though they admitted that the model was interesting, cautioned that a great share of experienced impacts, particularly when the whole image of an eco-social landscape was at stake, was not possible to value meaningfully for such a model at all.

CH concluded in its EIA report that landscape impacts would allow the harbor transfer to Vuosaari. CH reasoned, for instance, that one harbor in landscape terms is more favorable than two. The environmental committee of Helsinki noted on the other hand that harbor transfer would end oldest and strongest marine tradition in the down town Helsinki.

Opinions on the EIA report were full of colorful language of how the Vuosaari harbor or its traffic connections are impossible on landscape grounds. Opinions were full of metaphoric expressions describing eventual transformations that VHE would bring to eco-social landscapes experienced critical and threatened. In those metaphoric expressions an overly heavy industrial complex would radically change, split or irrevocably destroy one or another extraordinary landscape, irreparable landscape wholeness or irreplaceable corridor. Several opinions demanded that preservation of wholeness, genuineness, tradition, splendor, and similarly experienced qualities should by no means be replaced by technical or legal arguments.

Opinions revolved around five concentrations of landscape transformation worries: wide eastern landscape wholeness of tranquility and heritage, eastern nature and recreation corridor, Porvarinlahti-Mustavuori-Västerkulla, eastern Vantaa and Sipoo archipelago.

The border area between Helsinki, Vantaa and Sipoo and beyond to east was recognized widely as a clean and tranquil landscape wholeness that mixed valuable countryside, coast, archipelago, nature, culture, recreation, living, and homestead elements well preserved so far. This mix was experienced to be rare and irreparable and therefore to be in need of protection

on its own right. The mega-harbor with all its facilities and traffic would be in gross contradiction with the character of this eco-social landscape wholeness.

The eastern border area was referred to form an indispensable element in the corridor between the northern Sipoonkorpi wilderness and the southern nature, recreation and residential areas. This corridor was regarded as a vital passage for flora and fauna complementation, as well as for human recreation routes to Sipoonkorpi from the south-eastern residential areas of Helsinki. The land traffic connections were feared to close or at least make this corridor less functional.

The Porvarinlahti wetland, Mustavuori grove, Labbacka forest, Vikkulla and Österängen argicultural fields and Västerkulla manor estate were referred to form a valuable landscape entirety in which valuable biodiversity sites, traditional cultural heritage sites, image of clean agriculture, their protection and recreation intermingle in an extraordinary manner. The land traffic connections were believed to transform and split this eco-social landscape too radically.

The city centre of Vantaa in Tikkurila and the Hanaböle fields northwest from it were referred to as highly valued landscapes. Their experienced values had played an important role already in early stages of HMP, when twisting on whether railway connection for the harbor in Vuosaari would be possible at all. In connection with EIA the railway to Tikkurila was seen in gross contradiction to the structural development priorities and adjacent recreation interests of Vantaa. As regard to the Hanaböle agricultural, heritage and recreational landscape, citizens, their associations, and museum authorities saw it as far too valuable to be split by the harbor railway.

The archipelago southeast from Vuosaari belongs to the territory of Sipoo. This archipelago is well known for its recreation values and for its traditional homestead and livelihood character. These features were strongly advertised in statements and opinions on the EIA report. This eco-social landscape was referred to be particularly fragile in facing marine construction and traffic impacts of VHE. Impacts were claimed to cumulate into a serious stress to nature and to people living there and hence to destroy the character of the archipelago in ecological and social terms.

3.2.9. People’s trust and acceptance

At the time of HMP and EIA, an active fraction of citizens was in strong opposition to the harbor transfer and demonstrated their mistrust and in-acceptance at every opportunity. Particularly in n Vuosaari there were individual activists and citizen associations who categorically opposed GP92 of Helsinki that would double the population of the Vuosaari suburb and bring the harbor there. Some citizen associations used great amount of energy in working out thorough statements and media releases. They used environmental experts and lawyers in order to enhance the professional quality of their statements.

In connection with its EIA program CH organized public meetings in major impact areas in down town, in Vuosaari, in Vantaa and Sipoo. Reportedly 131 citizens participated. The program meetings were blamed to have been consultant occasions. CH was blamed to have failed in hearing its citizens at earnest. About 50 citizens submitted their remarks on the EIA program.

As a part of its assessment CH arranged a citizen inquiry in three major impact areas. Altogether 1800 questionnaires were administered, and 26 % of them were returned acceptably. CH used inquiry arguments as inputs to its mathematical multi-criteria model, which CH concluded to support the harbor transfer to Vuosaari. The results of citizen inquiry and conclusion based on them formed an essential part of the EIA report. Besides citizen associations, about 40 citizens submitted their opinions on the EIA report.

The criticism on CH's way of using citizen inquiry results was most fierce in Vuosaari, but critic was raised from down town Helsinki and alongside the traffic connections in Vantaa and Sipoo, too. The inquiry feedback was blamed to have been used manipulatively, biased to justify the pre-decided Vuosaari alternative. Some characterized the EIA report as a mere sales brochure.

In Vuosaari there were individual activists and citizen associations who aimed to prove that the EIA process was not in conformity with the respective environmental legislation, and that the harbor there was impossible because of natural values in general, and because of the Natura plans in particular. In the light of the EIA experience in Vuosaari, a moderate scale of housing increase, buffer zones around the harbor, arranging the harbor traffic shortest way out from the suburb area and preserving nature corridor to the north-eastern wilderness, besides communicative governance approach, seemed to be key issues for earning people's trust and acceptance.

The land traffic connections in the vicinity of the harbor worried citizens around the border junction of all three municipalities, particularly because they would eventually jeopardize natural, recreational, cultural and human health values there. Here EIA was dealing with several road and railway alignment alternatives, and this offered in principle an opportunity for people to experience that they were heard for alternatives selection. Here the traffic route selection between various alignments as well as taking care of prevention and mitigation of harmful impacts in a way that honors people's worries would be key issues for trust and acceptance. But the set up in which and birdlife values were against each other in alignment alternatives limited such an opportunity.

Higher north along the traffic connections, there were several alignment alternatives set out for people's opinions in EIA. Opinions generally, if not opposed the harbor transfer as an unnecessary wastage of tax payers' money, reasoned for impossibility of one alternative or another because of the city structure, cultural heritage, landscape related or recreation reasons. Important for trust and acceptance would be if people could experience that they have been listened, not only heard. After selecting and developing tunnel solutions for the railway, safe construction of the tunnel in continuous reciprocation with people residing along its alignment would be needful for trust and acceptance.

In the countryside and archipelago of Sipoo people mostly demanded a full stop for harbor plans in Vuosaari. The waterway alignments alternatives offered little difference from the people of the archipelago point of view. The difference was mostly related to the navigability vs. construction cost. The marine construction was seen to have wide-spread impacts anyway and mitigation opportunities were seen limited. Compensation issues would bee important anyway if plans were leading to intended marine construction. Here it would be hard to win acceptance also because people were uneasy with their fears of Helsinki pushing its urban community structure eastwards.

4. Regional planning (RP) for co-existence of harbor and Natura

4.1. Background for the Natura conflict in regional planning

REC had concluded in its EIA statement that the local planning of traffic areas, given the wide impacts of the harbor to the environment, to the traffic and to the community structure, requires a ratified land use plan of general character. In practice this statement meant that harbor would be possible only if its traffic areas appeared in a ratified RP with legally final status. Accommodation of the traffic areas of the harbor road and railway had to be accommodated in GP of the eastern Vantaa, too. Naturally they had to appear in respective LPs, too, but at first the RP process.

The EIA process had left the long tunneling under Vantaa to Kerava as the only alternative for the railway beyond Ring III. The harbor road would lead to the end of Ring III from the harbor. In the vicinity of the harbor, mainly ecological arguments made all the railway and road alternatives extremely challenging because of the valued nature protection sites there, and particularly because their inclusion in the Natura 2000 Network had to be taken into account.

RP92, including the first traffic areas for the Vuosaari harbor and its traffic connections had been adopted by the Council of HPR and submitted to ratification in 1992. MinE ratified the traffic area for the harbor itself but denied ratification from the road and railway traffic areas, because the ecological conditions in relation to the protection site preparations there had not been clarified sufficiently (MinE, 1996). SAC denied ratification from all traffic areas and returned RP92, on the part of the harbor traffic areas, to HPR for re-preparation (SAC, 1996). Based on this ruling the RP process for the harbor traffic areas had to be re-started in 1996.

The ratification consideration of MinE had taken so long time as it was waiting until it became clear whether the EU directives would bring any implications on the protection site preparations. Finland joined EU in 1995 and its directives became binding in VHE planning, too. The nature conservation site preparations in the vicinity of the planned harbor were diverted towards the Natura 2000 Network status of EU.

The re-started RP process was difficult because of the ecological conditions around the Porvarinlahti wetlad and Mustavuori grove, because of the ecological and social conditions along the traffic corridor over Österängen and because of the social conditions along the railway tunnel to Kerava. The RP process was conducted under the provisions of CAct. From 1995 onwards the EU's Bird Directive and Nature Directive were applicable and binding and the national NCAct, legislating on the Natura 2000 Network developments, among other things, became effective 1 January 1997. Furthermore, the harbor and waterway construction as well as all tunnel constructions, would be subject to permitting under WAct, and such permissibility had also to be anticipated in connection with RP, too. The waterway had been included in the long term waterway plans of FMA, but whether this was sufficient from the RP's point of view was an issue challenged, too.

4.2. EIA expectations of high relevance in the RP process

EIA of HMP had yielded a wide set of arguments against the harbor in Vuosaari that were relevant material against it in the RP planning context, too. EIA statements and opinions had suggested that while marginal benefits would be reaped in the down town Helsinki, living environments of valuable flora and fauna in a large scale manner and irrevocably would be destroyed in Vuosaari surroundings. Further it had been claimed that as the biodiversity protection here would require complete avoidance of intervening, the idea of harbor transfer should have been fully abandoned, and that any compensatory arrangements would not compensate nature lost under the harbor traffic areas or becoming degraded in their vicinity.

The people's worries on degrading of the conditions in the border area between Helsinki, Vantaa and Sipoo and beyond to east, expressed already in EIA, had particular relevance in the RP context. This area as a whole had been referred widely as a clean and tranquil landscape wholeness that mixed valuable countryside, coast, archipelago, nature, culture, recreation, living, and homestead elements well conserved so far. The preservation of the natural corridor between the Sipoonkorpi wilderness and the southern nature, recreation and residential areas had raised great worries. The harbor road and railway would be possible only by ensuring the corridor availability both for flora, fauna and humans, with minimal degradation to it. People had feared the mega-harbor would be a spearhead project in transforming this eco-social landscape fundamentally. A great number of people were living there, who were keen in preserving the above landscape qualities.

On the other hand, social arguments in connection with EIA, justifying the removal of the old harbors away from the city centre, remained strongly valid. Social concerns were already taken into account after EIA in choosing between traffic alternative beyond Ring III. Accommodation of the ecological expectations in the Porvarinlahti- Mustavuori area, however, was difficult without putting the vegetation values and birdlife values against each other.

4.3. Unusual planning orchestration in concert with RP planning

As soon as the preconditions for the political decisions to locate the new harbor to Vuosaari had been confirmed and decisions made, orchestration of planning accordingly took off to full extend. PH proceeded into detailed planning of the new harbor and the planning department of CH proceeded into LP accordingly. RA, RWA and FMA joined their forces for detailed planning of the harbor road, railway and waterway, in order to define their detailed implementation conditions. The EIA expectations as a whole had confirmed that VHE was bound to face highly demanding ecological and social expectations in all its subsequent planning.

RP was the most important threshold, and at first from 1996 onwards all planning focused on its. But soon planning orchestration in other respects intensified, too. LP, and the harbor, road, railway and waterway plans were brought up to an unusually detailed levels along the RP process. A vast number of studies and investigations were carried out, traffic connection alignments were refined, planning details were elaborated, innovative technical, and impact prevention and mitigation solutions were searched and incorporated into plans. All this work contributed to the legal clearance of RP, too, by producing detailed material.

Already in connection with EIA, CH had been prepared to compensate nature lost under the harbor traffic areas and to continue its protection and recreation sites development in its eastern border area otherwise, too. The harbor itself was planned on a degraded shipyard and

sand fill area. The old waste tip and other degraded areas were in demand of upgrading. Upgrading of such neighboring areas as buffer zones would simultaneously compensate recreation losses. It was important that the Harbor Centre became well connected in functional and visual terms to the rest of Vuosaari. In order to ensure best possible buffering, traffic, service and landscape connections, the LP planning assignment was expanded far beyond the harbor area only. Besides the degraded wasteland and coastal waters of the old shipyard and the other area necessary as the traffic area to the new harbor, the LP planning was expanded to cover the bordering waste tip and land fill areas, too. Also opportunities for new biodiversity protection sites, traffic areas more widely and other community services in the immediate vicinity of the harbor were taken into account in the expanded LP planning.

In retrospect we know that first SAC's ruling in June 2002, rejecting the appeals against RP, gave a firm ground for such a detailed planning that was carried out in concert with the RP process in the particular case of VHE. There was a risk of planning in vain but it did not materialize. Such a concerted planning was fruitful in many ways. Firstly it produced detailed material for reciprocating with the RP planning in its attempts to conclude traffic areas that would best meet the particular requirements. Secondly it confirmed that it would be possible also to implement the subject RP in such a way that ecological and social harms were minimized. This was important in ratification and court processes, but for public trust and acceptance more widely, too. Thirdly it brought detailed planning up to such a level that permit applications and construction work could be started very soon after the full clearance of RP. All this enhanced the eco-social reliability of VHE, by fitting the harbor and its traffic connections into the ecological, social, functional and visual conditions of the particular eco-social landscape in a carefully considered manner.

4.4. Porvarinlahti- Mustavuori and Natura most critical obstacle to RP

The landscape wholeness of the Porvarinlahti wetland, Mustavuori grove, Labbacka forest, Vikkulla and Österängen argicultural fields and Västerkulla manor estate had been referred in EIA as an eco-social landscape, in which valuable biodiversity sites, traditional agricultural heritage, image of clean agriculture, their protection and recreation intermingle in such an extraordinary manner that VHE should never be allowed to destroy it. There was now way for the harbor to come to Vuosaari if these expectations were not seriously reflected in connection with the RP process and in the other planning orchestration in concert with it.

Whether the project proponents had underestimated the EU's Bird and Nature Directives and the upcoming NCAct prior their harbor transfer decisions in 1996, and whether they could have made the RP process smoother by their different action, can be debated. The re-started RP process for the traffic areas was to take six years from 1996 to 2002 before reaching legally valid ruling by SAC. During these six years, interests and values underpinning various demands became weighed and contested. In connection with the RP, LP and detailed planning processes and related legal twisting, the new environmental legislation, particularly the NAct, became thoroughly investigated and interpreted into precedent statements.

REC in its concluding EIA statement had concluded that the land traffic connections of the Vuosaari harbor would have significant negative impacts on the natural wholeness of the valuable Porvarinlahti-Mustavuori area and its biodiversity. This significant weakening claim by REC was a heavy argument against RP and became actively re-circulated actively by the opposition. This had been a view presented in a large number of other statements and

opinions, too. Ecological requirements had to play a dominant role throughout the RP planning, assessments and legal twisting.

The ecological conditions and biodiversity values in the vicinity of the planned harbor were taken care by the NCAct and by the Natura 2000 Network site establishment there accordingly. The kernel of the RP challenge was in conformance of the harbor plans with the new NCAct and coexistence of the harbor with the upcoming Natura. But the land ownership interests intermingled in the same bundle with the biodiversity protection interests. The intermingled disputes escalated into a combined land use and environmental conflict throughout 1996-2002. Here it is important to notice that the Natura 2000 Network site no F10100065 (Mustavuori grove and Östersundom birdlife wetlands) became finally established first in 2000. All critical pieces in connection with the RP processwere in motion and benefited the finalization of each other. RP was under planning, NCAct and its Natura paragraphs were entering into force and in need of precedent interpretation, and Natura was under planning.

RP for the traffic areas of the Vuosaari harbor was subjected to the Natura assessment immediately after NCAct became effective from 1 January 1997. The focus of the assessment was on whether the said RP has such impacts on the Natura site that, alone or in combination with other impact sources endanger the values of the said site.

The Natura assessment was a process in which the protected values in terms of species and their living conditions were thoroughly examined. The harbor planners aimed to demonstrate that harbor and its traffic connections can be planned and constructed so, and traffic arranged so, and impacts mitigated so that no significant weakening of protected values occur. The Natura planners demonstrated that if the harbor was to come there Natura had to be anyway safeguarded for what it was planned. Those opposing the harbor for one reason or another aimed to demonstrate that the harbor, despite of any mitigation, would significantly weaken the natural values that should be anyway protected.

The mixture of various interests and other ambiguities led to an escalation of a lengthy conflict that became finally cleared by SAC's ruling in June 2002. In connection with the long Natura conflict 1996-2002 most of EIA arguments against the new harbor were revisited, in media but in court processes, too. Whatever rights, interests and values were intermingled together, the legal processes boiled down to the issue of whether the eventual harbor weakens significantly the protected values of the new Natura site or not. In order to come into conclusion in this question, at first the boundaries and protected values of Natura had to be established, the implementation plans of the particular RP were brought up to such detailed level that all essential impacts and their mitigation were visible. First then the ruling of whether significant weakening of the protected values occurs could be possible.

Natura and its particular values became ruled final by SAC in 2000. In the concerted planning, the harbor and its traffic became so arranged that any significant weakening of the protected values of Natura by no means would not occur. SAC, for its ruling of June 2002 found, that such an implementation of RP, in terms of the related construction and traffic under strict conditions, prevention and mitigation would be possible that no significant weakening of those particular protected values for what Natura had been established would occur. Hence SAC ruled that MinE's ratification of RP for the traffic areas the Vuosaari harbor in the end 2001 remains final.

But investigations and interpretations had to be brought into very detailed levels before SAC could issues the above ruling. Section 4.5 below aims to depict the most crucial details and motivation of the related legal twisting.

4.5. Legal twisting culminating at the Porvarinlahti railway bridge

In process terms RP of VHE, the Natura FI10100065 and the interpretation of the NCAct were inseparably intertwined. Substantially the focus in the legal contestation was on whether the harbor construction and traffic, or more accurately whether the particular RP for the harbor traffic areas and the related LP for the harbor neighborhood in Helsinki territory were in conformity with the sections 65 and 66 of the NCAct, taking into account the Natura F10100065. SAC in 2002 finally ruled that there was no hinders to the legality of the RP and LP in question. This was a threshold ruling for VHE to proceed.

But the struggle to getting into that ruling from the conflict, involving a complicated bundle of ambiguities, was difficult and time consuming. Ultimately the legal twisting culminated at the planned bridge over the Porvarinlahti wetland bay. The project owners as infrastructure developers have actively pursued towards the final project and financing decisions. A couple of landowners in the immediate vicinity of the harbor have been in devoted opposition and used every opportunity to prevent the harbor from coming to Vuosaari. NCAct and particularly its sections 65 and 66 provided a new source for their appeal argumentation. The nature conservation activists, spearheaded by FANC, have acted as watchmen of the new environmental legislation, aiming to expand the boundaries and the protected values of Natura, to block the harbor from coming to Vuosaari, and to achieve complete case in law interpretation. These opponents and watchmen have pooled together in terms of money and expertise. The environmental authorities and the administrative courts, as a kind of referees, have proceeded with particular care in their legal interpretations, because precedent interpretations were missing and VHE was politically highly interesting. The law had to be interpreted thoroughly as it would yield precedent interpretations anyway.

Significant in this debate is the mixture of scales. RP was an absolute threshold issue to the harbor. The whole harbor transfer could proceed or die here. Both the developers and opponents were well aware of this and were prepared to any lengths in order pursue their most central interest. For opponents it could be the last opportunity to stop the harbor from coming. Two bird species (Sylvia Nisorina and Lanius Cullorio) became focal actants in two extreme scales. On one hand they were local forest birds which were anyway moving their nesting sites along the natural transformations, for instance in the Porvarinlahti bay surroundings. On the other hand they were key actants, being strongly spoken for in the national or even EU level legal context.

It is obvious that different scales of impacts were purposely mixed, and also narrow interest were camouflaged behind ecological argumentation when lobbying support and acceptance to one's perspective in media, courts and people's perceptions. A very interesting question arises at which metaphoric level individuals of the political decision making bodies, for instance, conclude their yes or no choices in decision making situations. "Weakening of natural values" is a metaphoric expression that carries a richness of meanings and reached a status of a valuable social resource in opposing the harbor as a whole. Still the weakening of the natural values might be quite at a different scale ecologically than what is being transmitted message receivers. Significant metaphoric manipulation seems obvious.

The conclusive ruling by SAC in June 2002 ended the legal twisting at the national level. Accordingly, the harbor as per the RP and LP conditions does not cause significant weakening of the particularly protected Natura values and there were no obstacles for construction of the harbor and its traffic connection in the terms of the CAct or any other legislation either. The opponents and watcmen appealed to EU and put the decision making of the Finnish jurisdiction in the VHE case into question there. EU Court closed the case late in 2004 without questioning the rulings of the Finnish jurisdiction in the particular case.

It is obvious that from the very onset differences in interests were so great and the legal interpretation issues at stake so fundamental that planning and decision making fully in negotiation without conflicts would have been unrealistic and even undesirable. SAC's ruling produced the required interpretations and at the same time made the ground firm for the continuation of VHE.

4.6. Birdlife, vegetation and groundwater monitoring committed

As an important outcome of all the planning processes in connection with RP, the project owners committed themselves into extraordinarily extensive monitoring of birdlife and vegetation prior, during and after the construction. The birdlife and vegetation monitoring programs were finalized in 2001 and commenced in 2002.

In some statements on the EIA report permitting of all tunnel construction had been demanded in accordance with the WAct provisions. REC in its concluding statement had joined to this view and cautioned the project owners to be prepared to plan tunnel constructions under the assumption that all of them require permitting according the WAct, besides other construction legislation. The tunnel constructions were planned, permitted and monitored accordingly. The respective WPs stipulated strict conditions and led to extensive monitoring of developments in ground water, watershed conditions, well and soil depressions from 2003 onwards

The water quality and fisheries monitoring in the relevant marine areas continued whole the time since the early nineties.

5. Organization of construction under strict permitting and monitoring

5.1. Construction management

After CHH and the Parliament in the end of 2002 concluded the construction and investment decisions, VHE moved into the project implementation mode from the early 2003 onwards. The state traffic administration departments (RA, RWA and FMA) formed their joint project implementation organization (VUOLI) for construction of the harbor road, railway and fairway, on behalf of State. For these project partners, construction of roads, railways and waterways is routine activity, even though the extensive tunnel construction in sensitive ecological, groundwater, legal and social conditions set particular requirements in this case. PH, on behalf of CH formed its own project organization for the harbor construction within its technical office. The old harbors had been developed, constructed gradually by PH over a long history. The construction of the completely new, large scale harbor was tremendously greater challenge to PH than anything before in their recent history.

The concerted planning in connection with the long RP contestation had brought the plans for the harbor road and railway up to a detailed level and the readiness for their construction was at a good level when the time was ripe for its commencing in early 2003. But as regard to marine construction the situation was different. PH and FMA had submitted their joint application for WP for harbor and waterway construction in 1997. It took until 2002 before SAC could rule it legally final. For FMA waterway construction was routine, but PH was not able to strengthen its project implementation capacity as required by the time marine construction commenced in the early 2003. In May 2003 surprising encountering of alarmingly high contents of organic ten (TBT) substances in sea bed sediments halted dredging and caused a crisis in harbor construction. As alarming TBT contents were found in the harbor area only, construction of the waterway could continue. The joint marine construction arrangement between FMA and PH became dissolved. Impacts monitoring continued as joint operation, however.

The harbor road and railway construction, as well as the waterway construction were continued by VUOLI, being supported by thorough preparations, detailed plans, permit conditions, risk assessments and risk management plans, monitoring programs and public relations activities. Based on these preconditions and extensive project experience, the construction of the harbor road, railway and waterway proceeded in a controlled manner and earned increasingly the appreciation of the general public, too. These construction activities were accompanied by extensive birdlife, vegetations and water conditions monitoring.

But the harbor construction was struggling from summer 2003 onwards in its TBT crisis, being initially able to continue construction activities only in limited areas. But measures to recover from the TBT crisis were taken soon. First step for recovery was the reorganization of the project office of PH. Public relations and legal services were organized as coordinated joint activities together with VUOLI, so was the environmental data bank and its interactive internet service. VUOSA had to grow in competence to master the magnitude of all challenges posed by the TBT crisis, and so it did. Soon problem solution search was going in cooperation a variety of related stakeholders, as described in the following sections.

5.2. Water permits (WP) regulating marine construction

WAct legislates that WP is required as an advance control measure in marine all marine construction. WP is granted by a particular state permit authority EPA (until 2000 Water Court). WP consideration and granting is based on interest comparison and WP has to be granted if no absolute permit hinder exists. By its character interest comparison is a kind of cost-benefit comparison. Permit conditions form essential contents of WP. Their aim of conditions is to direct the implementer to develop its plans so that preconditions for permit granting prevail. Part of permit conditions focus on obligatory monitoring that will facilitate for implementation control. Even though permitting for the harbor and waterway construction is decided under WAct WP has to be also in conformity with the provisions of the EPAct, and NCAct, for instance.

CH had been carrying out voluntary monitoring of the marine environment, water quality and fisheries since 1991 in sea areas eventually being subjected to impacts of the planned harbor, its waterway and traffic. The purpose of the voluntary monitoring was to provide base line data for upcoming planning, permitting and monitoring.

Water and environmental authorities as well the municipality Sipoo, in their EIA statements, had demanded that all harms by marine construction and traffic of the harbor, whether to the marine environment, fisheries or people shall be investigated in detail, prevented, mitigated, monitored and compensated. Citizens and their associations in the archipelago had demanded full stop to the harbor transfer in first place but strictest WP process anyway. Fishermen and fishing associations in connection with EIA had preferred harbor development at the old sites, and demanded that all impacts to fisheries and fishing must be investigated, monitored and compensated to the full value anyway. These issues had to be taken into account in connection with the WP application, processing and granting.

EIA had been carried out in an early planning stage. EIA had met its legal purpose but had been blamed for being superficial as regard to the marine construction components. Much of assessment requirements were loaded into the subsequent detailed panning and permit processes. In its concluding statement, REC had concluded that more elaborate assessments, and prevention and mitigation plans were necessary before any permitting of massive sand lifting, sand filling, dredging and dumping activities could be possible. REC had also demanded that the dumping area of dredging masses had to be transferred into a more suitable place, and that the quality of the dredging masses had to be investigated more closely in order to decide their handling and locating. REC in its concluding EIA statement had also cautioned project proponents to be prepared for the fact that the additional investigations as well as the treatment and disposal of the dredging masses were bound to meet the requirements of the upcoming IDDCS. This norm was under preparation at the time of EIA. Detailed investigations were required for the WP application at latest.

5.3. Original WP - failure in initial dredging - TBT crisis

PH and FMA submitted their WP application to Water Court in 1997. In retrospect we know that the quality of the application fell far short of the expectations of EIA described above. Particularly sediment investigations were unsatisfactory. Despite of all deficiencies Water Court concluded in 1998 to grant a joint WP but with separate sections for the harbor and waterway. Water Court took the deficiencies in sediment investigations into account in the permit conditions. The conditions demanded detailed investigation of the sediment quality and the approval of investigation results by REC before any construction activity could commence. The conditions included also requirements for the monitoring program.

But then a long idle time followed. WP was appealed to AC and then to SAC. As WP had to make sure that there was no absolute hinder existing to permit granting, and as NCAct could be a basis for an absolute hinder, it became obvious that SAC could not finalize its ruling on WP until RP had been ruled final in June 2002. SAC ruled WP final in October 2002 and the last threshold for the construction and investment decisions was removed. Responsible project organizations of PH and FMA moved into construction as described above.

Unfortunately PH had not noted all permit conditions adequately. Despite of four years time from permit granting to its finality, PH had failed to carry out sediment investigations properly. The joint monitoring program with FMA was being updated but otherwise detailed preparations for construction commencing did proceed properly. Just before entering into dredging PH carried out some sediment investigations and submitted them to REC for consideration. PH, however, did not wait REC’s approval before entering into dredging in May 2003. There were watchful eyes of FANC and others ready to recognize that the

dredging was not in conformity with the permit conditions. A great public storm followed. REC stopped dredging with an immediate effect.

The way how the TBT crisis emerged, undermined seriously the public trust on the new harbor in general and on the capability and ethics of its builders in particular. The ecological degradation in terms of major harm to the marine ecology and fisheries, and the human health risking in terms of unhealthy seafood were causing extremely serious concerns. Media reported greatly how the harbor builders lawlessly dredge sediments with alarmingly high TBT contents and spread such poisonous stuff around the coastal waters of Vuosaari, endangering ecology and human heath.

Crisis atmosphere took over. The TBT crisis halted most of the harbor construction, with the highest uncertainty of what was to follow. The dredging in most of the harbor area was blocked until solutions for safe treatment of TBT contaminated sediments could be found. Construction could be only gradually re-opened as much as REC considered safe and interpreted to be in its authority to allow within the provisions of the original WP. As the alarming levels of TBT appeared in the harbor construction area the continuation opportunities of PH were limited whereas FMA could well continue it its waterway construction.

In retrospect we know that the project owners, particularly CH and PH were careless not only in their WP application but in their construction preparations and dredging commencing, too. But the environmental administration failed, too, in two important respects. REC failed in its duties to control that the permit conditions were honored. MinE had failed in up-dating its IDDCS -norm in pace with the increased recognition of TBT substances as greatly harmful substances in all ship building and ship traffic environments.

5.4. TBT crisis and its solution in historical perspective

Laiho (2007) concludes that legislation on contaminated sea bed sediments had been far less developed than on contaminated soils on dry land. TBT-hazards in Vuosaari had not been caused willfully but they had accumulated by mistake, as legislation was lacking behind. Tightened limit values for different treatment options are means for the society to take responsibility of hazards caused by historical carelessness. Knowledge of TBT and related substance was still very limited in 2003 when the TBT crisis of VHE burst out. Technologies required by their cleaning were missing or at least they were excessively expensive to large scale uses.

Only drafts were available of IDDCS during the original WP process 1997-2002 and at the unfortunate commencing of the dredging activities in May 2003. Finalization of IDDCS was to take until 19.5.2004 by MinE. Consideration of treatment options and respective permit conditions from this date onwards could occur on the basis of established limit values and respective guidelines. IDDCS cleared away some uncertainty and confusion that had prevailed among stakeholders when TBT related, widely used chemicals was increasingly recognized as dangerous substances. Since 2004 TBT and related contaminants in sea bed sediments could not any more be underestimated or neglected. The TBT crisis of VHE formed a historical turning point. The failures in commencing of dredging operations lead to collective learning among all stakeholders.

The TBT crisis forced CH and PH into serious reorientation. It alerted REC into extreme vigor for correcting the situation. It expedited MinE in their sluggish norm updating work. And it energized many others among science institutions, expert organizations, opposition, citizenry and media.

In the heights of the TBT crisis CH and PH revised their project approach. The VUOSA project was established, separated from the rest of the city administration, provided with sufficient financial resources, strengthened with experienced expert resources and backed fully by the top of the city administration. The first challenge of VUOSA was to develop such permissible solutions to the TBT treatment that the construction of the harbor to its full readiness was possible.

Permitting of the TBT removal provided excellent opportunities to put the new harbor fundamentally into question again or otherwise to challenge the permitting and related activities. Every permit was appealed to court. The construction work proceeded, despite of numerous appeal processes, on the basis of the action allowances of each permit. In connection with the TBT related WPs, the permit applicants had learned to make there base work and applications so thoroughly that appeals did not change the construction activity in question or prolong directly the total construction period since started. Since all the TBT-related WPs had been ruled final by SAC by 2005, the legal twisting on whether the harbor in Vuosaari was possible or not, was over.

At emergence of the TBT crisis it was not just a couple devoted opponents who wielded mistrust and in-acceptance on the harbor progress. Public hearings in connection with the EIA and RP processes had not emptied people's interest to remark, complain and appeal against the harbor construction. The TBT incident increased antagonism and anger.

All in all, the solutions for the TBT removal, isolation and treatment into harbor structures, along the rest of the harbor construction work, required 7 particular WPs under WAct and 2 other permits under EPAct.

5.5. Innovative "control room" - way out of crisis

The search for TBT removal solutions and their permitting took the years 2003-2005 keeping VUOSA, EPA, REC and the other environmental administration, opposing parties, expert organizations, lawyers, courts and several other parties busy with these processes. The TBT removal and harbor construction activities became expanded in pace with the permit maturity. All the marine construction could be completed so that the harbor was opened to traffic in schedule in November 2008.

When the alarming levels of the TBT substances were recognized in May 2003, the harbor construction soon developed into a kind of research and learning process. The greatest challenge in this context was in finding such an environmentally acceptable, technically possible and economically feasible solution for the combined TBT removal and harbor construction that could allow for permitting, implementation and learning, despite of ambiguities and uncertainties involved.

The "crisis atmosphere" did not last long before VHE was overtaken by "highly innovative brainstorming" in the "extended control room ", as some interviewees put it in the research interviews of 2003. Along the gradually unveiling truth of the quality of sediments and active

search for solutions the organization of VUOSA grew in competence, and so did the responsible environmental administration and other related stakeholder, becoming jointly capable to finding way out from the TBT crisis. That productive period certainly enhanced the eco-social reliability of VHE but produced great benefits for environmental friendly marine construction practices more widely, too.

Immediately after recognition of TBT, REC and PH entered in unusually deep and intensive co-operation between each others, however so that the control role of REC was not corrupted. VUOSA fed in investigation data, operations results and solution proposals. REC allowed expansion of dredging operations as much as it felt safe and considered to be in conformity with the original WP. VUOSA and REC reciprocated also with science and expert organizations and provided feedback to MinE in their IDDCS work. Important part was public relations. REC, VUOSA and MinE, all issued continuously news on developments in the internet. Innovative co-operation between the project implementers, relevant authorities, expert organizations and research institutions led into enhanced norm work, innovative construction and monitoring solutions and best practice publications.

TBT removal involved new solutions that were first time submitted for permit consideration, under changing of reference norms. VUOSA discussed also with EPA in pre-testing of most innovative elements of the solutions, with understanding of the character of the strictly independent permit authority. Impacts of the marine construction on human health, marine environment, water quality and fisheries have received high attention throughout the solution development and respective permitting.

The TBT crisis and all the recovery measures prompted up-to-date knowledge on TBT in sediments, innovative removal and construction solutions, effective mitigation measures and modern monitoring techniques. Importantly, all the TBT related WPs brought significant additional features into the monitoring programs that were up-dated accordingly. In connection with construction implementation, besides more traditionally followed impacts, TBT contents had to be monitored regularly in sediments, mussels and fish. New measuring techniques and practices for some impact indicators had to be introduced, as such techniques for TBT, for instance, had been missing in Finland.

In retrospect we may recognize that the TBT crisis, even though putting the whole harbor construction into question once again, turned into a success story from the eco-social reliability point of view. The remarks on the EIA program had already expected poisonously contaminated sediments in the shipyard waters but then the issue had not become addressed adequately. First the TBT incident of May 2003, draw stakeholders attention to the issue on the level it deserved.

5.6. Strict permitting, monitoring and follow-up

All in all the terrestrial and marine construction activities of VHE became directed by an extensive structure of key decision and permits under the environmental legislation. Rämä (2008) makes a summary of the key decisions and permits. Accordingly 40 decision or permits were so significant that they became appealed to AC and then to SAC, mostly on the basis of the environmental legislation. Besides the above highly contested major decisions and permits, at least a similar amount of less significant permits for particular work sites and particular activities were granted and administered under the provisions of the various

enactments of environmental legislation. Each significant decision or permit set its conditions for the subsequent steps.

CH had been carrying out voluntary monitoring of the developments in the marine environment, water quality and fisheries since 1991, extensive birdlife monitoring since 2002, vegetation monitoring in selected risk zones since 2002 and groundwater conditions and wells monitoring along the railway alignment since 2003, all prior to the construction commencing. The permits expanded the monitoring programs by adding and redefining the monitoring indicators, monitoring practices and the ways to follow up the monitoring results in collective processes. VUOSA and VUOLI incorporated the monitoring reports as an integral part of the environmental data service (EDS) that was open to anybody through the internet.

In good quality monitoring, reciprocal discourse set out in EIA continues so that project owners and other stakeholders continue joint processing of the EIA expectations around concrete plans, actions and impacts. In this reciprocation, monitoring programs become expanded and updated in order to best cover the essentials of the unveiling reality. Initially after harbor decision the EIA feedback did not receive all the attention desirable. It took some time before the project owners, particularly PH, took the EIA feedback properly in the subsequent steps. Certain features of the Natura conflict and of the TBT crisis, for instance, prove that the project owners were rather forced to go back to the EIA feedback and recognize that certain statements would have earned better attention. But by 2003 lessons had been learned and the project owners had chosen the environmental excellence as one of their major goals and reorganized their project governance accordingly since then.

Monitoring is effective when monitoring results are used for corrective measures and improve mitigation outcome. At best monitoring results are used actively as feedback in project management on one hand and for informing project developments and impacts to the public and stakeholders on the other. In their master theses Laiho (2007) and Heikkilä (2007) evaluated VHE's environmental monitoring programs and the usage of their results, in comparison with the respective issues in some other large scale infrastructure projects. They concluded that environmental monitoring in VHE has been extraordinarily extensive, has met the purpose and functioned well, in comparison to experiences fro elsewhere . Monitoring as a whole has consisted of a strong set of voluntary and obligatory monitoring elements. Voluntary monitoring before the construction activities produced valuable base line data. The voluntary programs have been complemented in accordance with the obligatory permit conditions. Monitoring results have been followed up and used for both project management and public information. Besides meeting the needs of VHE, the monitoring programs have served science and other wider interests.

Impacts on vegetation, birdlife, ground water, watersheds, wells, soil depressions, and in terms of noise and trembling have been well monitored under terrestrial construction (Heikkilä, 2007). Impacts, such as spreading of water blurring, physical and chemical water quality, marine vegetation and micro fauna, sedimentation, ten and heavy metal substances in sediments, organic ten substances in mussels, organic ten and mercury substances in fish, spawning of Baltic herring, reproduction of selected fish species, and impacts as experienced by fishermen have been well monitored in connection with marine construction (Laiho, 2007).

Emissions into air have not been monitored during the construction, not direct impacts on human health. Such monitoring might prove more critical in the actual traffic conditions. As regard to effectiveness, VHE abounds of examples in which monitoring feedback has led to

corrective measures. One feature of the effectiveness of monitoring is that since EDS and reciprocity in communication was systematized, VHE earned quickly trust and acceptance of wide audience.

The monitoring results by 2003 gave base line data of conditions before construction activities. The monitoring results of 2003-2008 depict changes in marine environment and fisheries, in birdlife and vegetation, and in conditions of groundwater, watersheds and wells during the construction activities. The monitoring results beyond 2008 eventually tell about the environmental status after completion of the construction activities. So far monitoring data beyond construction completion is limited but accumulates along the coming years.

The birdlife monitoring continues until 2012. The vegetation monitoring continues until 2011 leading to conclusion report then. The monitoring of ground water conditions and potential depressions in the tunnel areas continues until 2015. The monitoring of the marine environment, water quality and fisheries from 2008 onwards continues in the context of the operational monitoring of the harbor traffic.

From 2008 onwards the environmental permit for the harbor operation requires additionally following kinds of monitoring activities for the harbor operation and traffic. In connection with the traffic statistics, traffic of hazardous chemicals and other dangerous cargo shall be particularly monitored and reported. Emissions to air as well as noise levels shall be monitored and controlled. Any changes in the operation characteristics shall be noted in operational monitoring, as shall be any accidents and risk situations, too. Disposal of problem waste shall be continuously organized and monitored.

6. Key lessons learned from VHE

6.1. Fundamental expectations of EIA as basis for the rest of the endeavor

Projects have been typically conceptualized in a linear planning and implementation continuum, in which a project owner produces a project plan, get it assessed in the EIA terms, and if possible and feasible, implements it. In such continuum EIA easily is a one-off gate passing activity without taking seriously advantage of the EIA feedback for the rest of the project.

VHE evolved slowly into HMP. But then its EIA led quickly to the final HMP. Many EIA statements emphasized the multidimensionality of the harbor transfer decision, the importance to bring various perspectives with their underpinning values in the decision making and the necessity to proportionate individual impacts in the wider decision making entirety. Besides the environmental priorities, the structural development of the capital city region towards closer community structure, development of the traffic system as a whole, developing harbor traffic towards increased competition, and socio-economic feasibility of the harbor transfer as a whole were raised as particular reference points in the final decision making. The final HMP aimed to improve the decision making basis by additional socio-economic calculations, for instance. The harbor transfer decision by CCH was made accordingly and it was followed by a set of subsequent decisions and agreements that mobilized implementation planning.

EIA was significant particularly in guiding the selection of road, railway and waterway alignments. But when studying of the EIA material, by already knowing what has passed in

later planning and construction phases, one may recognize that warnings of all difficulties and twisting points were already there. In connection with EIA, authorities demanded in concert additional investigations and assessments, as well as more detailed prevention, mitigation and monitoring plans as preconditions for the harbor decision and beyond it. REC reminded project developers to be well prepared to deeper investigation and assessments in connection with the upcoming planning and permit processes.

The EIA process as whole brought together all pertinent parties within CH and state traffic administration, hence forming coalitions in the project proponent side. Respectively it brought suburban citizen associations, nature conservation associations and prominent landowners into groups that were prepared to use the best environmental lawyers and other experts in challenges the harbor transfer for one motive or another. Co-operation organizations responsible for regional land-use and traffic system developments, as well as environment related authorities were brought into closer understanding of VHE as a whole.

The RP process with all its complication surfaced a great part of the EIA expectations again and triggered related monitoring. Afterwards it has been learned that the responsible project planners and implementers, particularly in the organization of PH, had not fully internalized the EIA expectations. The TBT surprise proved that the environmental authorities were not in full alert either.

Public opinion and hard line opposition forced both the responsible project offices and the pertinent authorities to improve their performance. And they improved to high degree. Gradually most of the expectations resulting from the HMP-EIA process have become taken into account in detailed planning, permitting, implementation, monitoring and collective follow-up. As in 2010, we know that VHE has well met most of the expectations socially constructed in connection with the HMP-EIA phase.

6.2. Complication inherent but approachable

In connection with EIA, the eventual future of VHE was seen as a great a complication, in which it is impossible yet to foresee all impacts, many impacts involve value based ambiguities, interests of various stakeholders collide, many impact contain uncertainties, and many important issues will unveil only gradually along the upcoming processes. Impacts will materialize in different scales, in different points of time, in different environments that themselves are subject to changes all the time.

The phases of VHE confirm the characteristics of complication foreseen in EIA. Abundant material is available of how various kinds of ambiguities, uncertainties and complexities have been approached, resolved successfully or not so successfully. In connection with the RP process the complication was dominated by all kinds of ambiguities. In the TBT crisis, a considerable amount of uncertainties were involved. The railway tunnel construction, instead, was mostly engineering challenge, full of complexities, with various levels of calculable risks involved. The above are examples among a great variety of complications.

It is obvious that most problems have been in the complexity categories and become resolved successfully by best practices of scientific project and risk management. But these tools have had little help alone in the most difficult problem bundles, where ambiguities caused the greatest difficulty. In the Natura conflict, ambiguities played very important role initially and throughout. The role of scientific project management was at its best in continuing stubbornly

the planning orchestration to the unusual levels. This work supported the legal process by producing details of the structures to be constructed and details for the mitigation opportunities as well. In the TBT case uncertainties played most important role. Serious ambiguities were related to the true character of the uncertainties. After recovery from the TBT surprise, scientific expertise gradually alleviated uncertainties for possible solutions.

6.3. Nested strategy governed in extended control rooms

All the complications, even the most difficult ones, have become gradually worked out into solutions that allowed the harbor transfer initiators, project owners and project implementers to pursue towards their ultimate technical and economic goal, the opening of the new harbor. Finally this goal was achieved. But the project pursuers were at first forced by conflicts and crises into such learning that the true characteristics of complication became understood. In subsequent reorientation, the parallel goals in carrying out such a major transformation in such a sensitive eco-social landscape became internalized. The environmental administration and other stakeholders grew also in competence to handle the complication and the parallel goals in their eco-socially reliable governance practice.

Project owners and implementers learned to work in concert with each others and with various authorities and expert organizations. So did the parties who for reason or other wanted to challenge the advancement of VHE, too. Ultimately key people from amongst the project pursuers, opponents, environmental authorities, permit offices, control offices, associations etc. jointly have formed "control rooms", with changing participation, depending on the focus issue of the particular occasion. High stakes and complication has demanded from each participant capacity and courage to search for innovative technical solutions but innovative co-operation, too. Environmental excellence, in fact the eco-social reliability, was gradually the common denominator between the stakeholders. The extended control room that sorted out the TBT crisis is a prime example of such a co-operation.

Respective control rooms could be easily depicted from the RP context in general and from the concerted planning orchestration in connection with it, for instance. The same can be said of the deliberations towards HMP. A list of significant milestones prior the harbor transfer decisions were introduced earlier in this analysis. When such a milestone list was compiled together with several interviewees in summer 2003, one of them expressed himself in the following way.

"The most important turning points can be seen in the fundamental agreements and public decisions. But in true sense, the road to these agreements and decisions has been paved by incredible amount of deliberation, negotiation and interaction in various group combinations."

The background for the above wording was, for instance, in the struggles to find out a possible railway solution to the harbor in Vuosaari. Such a solution had been searched intensively over the years 1991-1994 in formal working groups and committees and informal gatherings, between technical staff and between political decision makers.

Until the harbor transfer decision all processing of issues and perspectives occurred in the network deliberation mode of governance. Since the harbor transfer decision had been made certain parties were made responsible for goal oriented orchestration of the plans and preconditions for the harbor in Vuosaari, without any other alternative. But the future was

only partially in the hands of the responsible project planners. At the heights of the Natura conflict, for instance, a plenty of essential developments occurred in network deliberation, in which the responsible project planners could participate sometimes with their own agenda and other times captives to agendas fully set by others.

Since the implementation decisions were made the terrestrial and marine construction were segregated on their own paths, with responsible organizations each. The terrestrial construction of the harbor road and railway, and also the waterway part of the marine construction, could quite entirely act in the project management mode. But after the TBT incident, the control room sorting the way out of the TBT crisis, had to act also in process orchestration and network deliberation modes. The update of IDDCS, for instance, was an issue of national level interest and VUOSA at its best could be only a deliberation party to MinE. Since 2003 Vuosa had to put aside a great part of the plans made for harbor construction and return thoroughly to the planning orchestration mode, again Simultaneously, however, construction implementation occurred in a limited scale, as allowed by REC within the original plans and WP. And this partial implementation served both the planning orchestration and network deliberation by feeding data of the emerging conditions and experiences.

In the governance of the harbor construction beyond the TBT incidence, all the three governance modes were mixed and the combination of the parties, active in the control room kept changing on daily basis, depending on the issue at focus. The thrust and acceptance of people, ecological and human health and the progress towards the harbor completion, all these were at stake every day. And the extended control room managed to govern all of them reliably to success outcomes. All this is a prime example of eco-socially reliable governance by an extended control room.

6.4. Evolving metaphors as tools for communication and contestation

The following wording by a senior officer in the project owner's organization in a research interview in summer 2003 is indicative to the actual governance of very complicated issues infrastructure development endeavors.

"The real thinking of the key individuals in critical contest situations is known to those individual persons only. The entire history of VHE is so complicated that it is hard, if not impossible to draw any definite flowcharts between influential events and mental models behind them".

Mental models of people are behind people's subscribing to certain perspectives and contesting on behalf of certain perspectives. Appealing metaphors are influential in evolution of mental models. This notion has significance in achieving and maintaining people's trust and acceptance in contested issues.

The promoters of the new harbor could achieve the trust and acceptance of people by a combination of good performance in true action and of good performance in metaphoric contestation. In the implementation phase possibilities to demonstrate good action increased, but unfortunately the most critical contestations were fought in earlier phases and solely in the symbolic world. There appealing metaphors most obviously played significant role.

Throughout VHE the promoters of the new harbor have tried their best in using strongest arguments on behalf of their case. So have done the competitors and devoted opponents, too, promoting their case each, each from their own perspective. Sometimes camouflaging behind another more appealing perspective occurred, too.

EIA provided a medium for all stakeholders, to numerous institutions, and to a great number of citizens to formulate their expectations and get them registered. A majority of argumentation in opinions on the EIA report was against the harbor in Vuosaari, while in the EIA report itself arguments were mostly in favor of the harbor transfer to Vuosaari.

In the RP process, there was the decision already that the harbor will be constructed to Vuosaari, as soon as RP is processed ready. In this connection the argumentation became thoroughly focused on conflict between the harbor and the Natura, and was formulated for the legal contestation at courts plus for getting public understanding on ones perspective.

In connection with TBT crises a tremendous amount of substantial work was done in offices for tailoring a set of solutions and preparing unfailing permit applications for their implementation. At the same time an intensive discussion was going in media, in which the opposition aimed to prove harbor construction too risky because of TBT and irresponsible project management. The project implementers argued how the harbor construction is a safe way for correcting an old hazard.

Even though new arguments in favor of or against VHE were introduced in all major problem situations, some arguments proved long lived and were used repeatedly by circulating them in plans, appeals and media. Gradually most significant metaphors develop into social resources, carrying strongly the perspective that motivates it. An interesting question arises, at which metaphoric level individuals of the political decision making bodies, for instance conclude their yes or no choices in decision making situations.

In light of the analysis so far, it obvious that the different scales of impacts have become purposely mixed for particular interests, in lobbying support and acceptance to one's perspective in media, courts and people's perceptions. "Weakening of natural values" is a metaphoric expression that carried a richness of meanings and reached a status of a valuable social resource in opposing the new harbor. On the other hand, "common good" had obviously similar significance as a social resource in promoting the new harbor. Significant metaphoric manipulation seems obvious.

Interestingly, the metaphoric expression of "spreading of TBT", from action point of view has had to opposite meanings: spreading by action vs. spreading if no action is taken. Here is a clear analogy with the saving Natura by the harbor vs. saving Natura from the harbor (Hukkinen and Roe, 2002).

6.5. Framework for key elements of eco-socially reliable governance

Eco-social reliability here is conceptualized as sustainability materializing tangibly throughout an infrastructure endeavor, in its process and outcomes. Eco-social reliability means the caretaking of the ecological and social concerns equally with the techno-economic project performance ambitions.

Governance of an infrastructure endeavor occurs in nested windows of social construction type of network deliberation, process management type of project planning and techno-scientific project implementation management. Foundations for the eco-social reliability are set in the outer governance windows of network deliberation and planning orchestration. Project implementation, when facing significant and surprising ecological and social concerns, reverts back to these windows again.

The essence of the eco-social reliability is in the sensitivity to and in the wise addressing of ecologically and socially motivated ambiguities.

Eco-social reliability is typically at stake in complicated problem issues and related incidents. When a complicated problem issue emerges it is at first important to place it to the most applicable sub-category of the complication categories and to attempt get resolved respectively. Partially resolved problem often becomes a set of problems in the other sub-categories.

Assumptions are made here, based on experiences from VHE, that technical and economic problems are mostly complexity matters for scientific project management. When ecological and human health matters in the infrastructure context are seriously at stake, then uncertainties play a significant role. Many motives, however, are behind ecological and human health claims, as they are more appealing than narrow interest claims, for instance. When serious contestation emerges then most probably a mixture of socially motivated ambiguities is involved. Unbundling of ambiguities is an obvious key to getting onwards in such situations.

Ambiguities provide the necessary variety of building blocks and their addressing provides the necessary level of consensus that brings the eco-social reliability forward within and between the respective governance windows.

Eco-socially most significant ambiguities frequently combine differences in values, interests, understandings, and precaution attitudes. Such ambiguities in often cases become highly politicized. They demand contestation in a variety of participatory, panning, legal and other forums that jointly form the virtual control room of the endeavor. The analogy of the control room is applicable to all of the governance windows as the focus is on dealing with differences in meanings people bring to issues in collective decision making of a particular endeavor. Most complicated problem bundles require extended control rooms, capable to flexibly moving between various governance windows.

The meaning processing and governance practice that occurs in the virtual control room, if conducive to eco-socially reliability, addresses all the ambiguities, uncertainties and complexities and leads to mutual learning that combines the essential features for goal achievement, ecological care, human-social good and trust optimally, at each point of time. Evolving metaphors, as developing into social resources, act as significant tools for variety and consensus in such learning.