

POLICY STRATEGIES IN SITING HAZARDOUS WASTE MANAGEMENT FACILITIES

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ABSTRACT

This paper will focus on the relation between public acceptance of risk and governmental behavior in the case of siting (nuclear) waste in industrial democracies. Recent contributions - mostly in the U.S.A. - concentrate on (the absence of) adequate decision making procedures. New policy instruments have been proposed, especially in the sphere of incentives and compensation. Nevertheless, empirical results do not yet permit us to draw final conclusions about how to resolve siting controversies.

An overall evaluation of research literature, both in the psychological and in the political science field of investigation, led us to focus not merely on the adequacy of policy instruments (which are not infrequently open for different kinds of use), but on the broad range of background assumptions and strategies, that constitute the background scenery of all siting procedures. Yet, social science is confronted with both the public perception of risk as well as the 'policy theories' of those who try to realize a site. We distinguish therefore, after summary of some important findings of public perception research, four approaches that we found to be present in governmental siting strategies in various industrial democracies. We recognize we are not the first to show different approaches exist to 'the siting problem'¹. However, to the best of our knowledge, there has been no attempt to observe the articulation of those approaches in siting practice as a method to point out which factors foster or inhibit effective siting. Nor has the relation between public perception of risk and the different policy strategies available been studied. After the observation of siting approaches (that have to be designated as ideal types) we consider their articulation in real siting cases. Combinations of two or more approaches are called policy strategies. It will be demonstrated that combinations of approaches may lead to an inconsistent policy strategy, because the approaches may be contradictory. We'll conclude by deriving three criteria for assessing the quality of a siting strategy.

THE PUBLIC ACCEPTATION OF WASTE FACILITIES

In many countries efforts to deal with hazardous waste siting decisions are of recent date. As a consequence relatively few studies are available which offer a thorough analysis of siting issues and consequent policy recommendations.

A number of conclusions from psychological research however are of crucial importance for our aim. Most psychological models describe acceptability of risky activities as a trade-off of costs (including risks) and benefits and not solely as an evaluation of risks. This is true for the attitude models but also for the more cognitively oriented decision models. Attitudes are described as a function of the subjective probability of expected consequences and the evaluation of these consequences. Perceived risks and expected benefits are interpreted as hardly separable negative and positive characteristics of a technology. Most studies on large-scale technologies show for most respondents a dominant influence on attitudes of beliefs on threats to health, safety and the environment. With respect to nuclear waste the radiation risk is described as unknown, invisible and dangerous for health and environment, also in the long run, and with reference to genetical effects^{2,3}. These largely intangible effects are frightening for many people. Economic consequences like economic growth, employment and energy tariffs are found to be included in the trade-off but nevertheless these seem to be of secondary importance⁴. Differences between supporters and opponents of nuclear power can be explained as differences in expectations of risks

socio-economic benefits. Their evaluations of consequences, however, is very similar. The dominant influence of safety and environmental risks needs further attention.

The relative importance of the expected benefits of a facility leads to the conclusion that people are not very sensitive for incentives to compensate exposure from waste facilities. As shown in a number of studies proposals to compensate are not effective and even interpreted as bribery^{5,6}. The idea of financial compensation underestimates the magnitude of people's risk assessment and its role in the overall risk-benefit trade-off. As we have shown, the risk assessment dominates the benefit assessment. If potential negative consequences exceed certain levels it will become difficult to compensate with financial means. This conclusion is consistent with prospect theory⁷. It could be derived from this theory that people attribute a higher negative utility to potential loss than to potential gains. Do these findings imply that compensation will never work as a strategy? The answer is probably negative. It is more likely that resistance to compensation only occurs if people really feel threatened. In siting procedures there will always be some locals who are not opposed to the use of nuclear power in general. Usually these supporters find the risks tolerable and strongly stress the economic benefits. From their viewpoint local interests would be served by counteracting siting decisions initiated on the central level. By negotiation socio-economic benefits could be optimized. We suggest that compensation proposals are only adequate in dealing with socio-economic demands.

As risk perception is the real issue for residents, some findings of risk perception research which are especially important to understand people's reactions to risk bearing technologies should be emphasized: An expert's criterion like average yearly fatality rates does not correlate with subjective judgements of seriousness of risk^{8,9}. In other words laymen and experts use different concepts of risk. The consequence might be that experts cannot convince lay-people by reference to their statistics: People tend to strongly overestimate strongly low fatality rates¹⁰. -Qualitative factors as catastrophic potential and unfamiliarity with consequences play a role in judgements of risks^{4,11,12}. As a consequence risks will not easily be accepted. It will be hard for scientists to prove the safety of technologies with these risk characteristics sufficiently. -Feelings of unsafety cannot be neglected. Behind these feelings different patterns of reactions can be hidden, such as a carelessness, a defensive, an accepting or a worried attitude¹³. It will not be efficient to set aside emotional arguments as non-rational. Obviously information supply forms a crucial element in siting procedures. But the information to be given is often of a complex nature, abstract and referring to scientific methods and concepts. In addition the context is difficult: receivers are highly involved, feel threatened and group cohesiveness is not seldom high. Distrust therefore is a natural reaction.

SITING APPROACHES

In siting decisions a lot of controversies do not occur because of public perception of risk only, but also because of the perceptions and attitudes of governmental agents themselves. Our investigation revealed four approaches all dealing with causes for public resistance related to governmental action. It must be noticed that these approaches in their 'pure' form only exist as ideal-types. In social reality they can be recognized in mutual combinations only: those we have called policy strategies. In this paragraph we focus on the approaches separately.

The technical approach

Locals' reactions to siting proposals are often considered to be driven solely or almost exclusively by emotions and fears. Some argue that public emotions and fears are 'natural', as laymen are not capable to understand technical processes and measures to prevent harm for health and the environment. This incapability provides the main cause for emotional reactions and prevents people from judging rationally. Rationality in the technical approach thus is considered primarily as an effect of knowledge. Following this argument emotions and fears become the opposite of rational behavior. Hence, this rationality might also imply that one, just because he is aware of lacking specific knowledge, relies upon experts who are rational by their very profession.

From this view public resistance against a hazardous waste facility seems almost inevitable. Some refer in this respect to experiences in the past; for instance the resistance against the introduction of railways in the 19th century. These experiences show, after all, public opposition to disappear as people get used to the new technology. What are the main characteristics of a siting strategy, merely based on the technical approach:

1. There is no need for delay because of public opposition. Public participation in technological decisions is undesirable, though information transfer may mitigate severe opposition.

2. A rational political process implies that politicians also rely upon experts. Interventions of elected political leaders in matters assigned to as 'technical' may even disturb efficient decision making.

3. Finally, the technical approach is not able to cope with disagreements between experts themselves. In countries like the Netherlands and Sweden, where the scientific community is rather small, cases of environmental policy reveal a single-minded scientific community that hardly tolerates divergencies of opinion. The technical approach has been dominant in policy strategies until the 1960's. Then it began to decline in most industrial countries^{14, 15}. It could suffice as there were no serious doubts. But as soon as questions arose, it proved not able to cope with political conflict. Four events constituted the main cause of its decline:

1. Experts proved to disagree on keystones of fission technology, especially the solution of the waste problem.

2. Resistance against nuclear energy evolved largely, in some countries culminating into a public debate on nuclear energy and the waste problem.

3. Recently in all industrial countries awareness increases about the hazardous waste problem in general. Administrating procedures have proved inadequate to prevent illegal or semi-legal dumping of hazardous waste in urban and rural areas. Superseded by other approaches, the technical approach can still be recognized in various policy strategies, however, as will be shown below.

The market approach

The market approach stands quite differently, though not completely apart from the technical approach. It refers to the common notion that people -despite the fact that they agree a site must be found somewhere- do not accept it in their own neighborhood, because they are selfish. Some have called this phenomenon the NIMBY (Not In My Back Yard) syndrome¹⁶. The line of argument goes back to Olson's theory of collective action and -finally- to the utilitarian principles. Siting a hazardous waste facility brings benefits and costs both to the community near the site and to the community as a whole. But the per capita costs for the local community are much higher than the per capita benefits, while in the meantime costs largely exceed the per capita benefits of people not directly involved. This has some important consequences. The locals, confronted with an unequal burden, are prepared to resist the facility 'till the finish'¹, while no one outside the local group will be prepared to invest as much energy to realize it. Therefore, the locals have a good chance to 'win', which means disposing of a hazardous waste facility becomes very hard if not impossible. Public opposition, however, could be overcome by offering the locals compensation and even reward. Then, also in the case of the local population, benefits would outweigh costs so they could more easily accept the facility.

In practice the market approach marches well together with the technical one. Still, there is one underlying principle that may lead to a rather deviant strategy. The market approach suggests people to be rational, indeed, be it rational in the economic sense. This notion brings about the recommendation to negotiate with locals a fair price for siting a facility. Some form of public participation is considered desirable and even necessary here, while the technical approach finds it the main cause for stagnation. Suggesting free negotiations, however, supposes that both parties are willing to negotiate. This market approach argument raises a difficulty. Locals may consider risks concerning safety and the environment not negotiable. Uncertainties could provide a serious problem here. It is very difficult, if not impossible, to establish a reasonable price. Still, there is one major problem. That is, the perception of environmental and health risks appears to be of more influence on (non) acceptance than the perception concerning economic and social impacts. Therefore, the market approach does not correspond with the main causes for non-acceptance. Offers to compensate may even encourage local suspicion and aggravate conflict. Local authorities may be accused of bribery, and not always without reason. Here we meet, what we refer to as the market approach paradox. Many people consider protection of health and safety one of the primary tasks of the welfare state. Free negotiations between officials and local authorities or citizens, however, suppose the government either to withdraw or to behave itself as a private entrepreneur in a free market. Such behavior might well be considered as illegal, if not in judicial sense, then morally. In order to anticipate such accusations governments may incline to regulate negotiations. In effect the freedom of exchange will be hampered and so will the market approach itself.

Conclusively, the market approach -though partly useful- meets with two problems. It may not be consistent with public perception of threats to health and environment. And, it counters public expectations of the welfare state to protect health and the environment.

The distributional justice approach

This approach, like the one before, points to the fact that siting a hazardous waste repository leads to an unequal spread of gains and burdens. The fact that siting hazardous waste inevitably leads to disturbing equity is considered to be the cause for public resistance. Equity refers not only to the mutually exchangeable merits referred to in the market approach, but also to health and safety of populations and generations: so those aspects that may not be considered negotiable by both parties. Therefore, the distributional justice approach admits equity disturbance may not be compensated because it recognizes equity could not be restored at all. Therefore the utilitarian principle of justice which characterizes the market approach is rejected. Proponents of the distributional justice approach depart from Rawlsian equity principles^{17, 18}. The most important derivation of these is that risks have to be avoided, and, if this is not possible, be spread over the whole population including those (but not exclusively those) who would benefit from a risky activity.

With this argument the distributional justice

approach shifts our attention from the public to the state. For in modern societies the state has the monopoly on the authoritative attribution of values. Now proponents of the distributional justice approach refer to policy research^{17, 19, 20} in order to demonstrate in the case of risky technologies state policies are non consistent at all. In this respect we could mention the many opposed interests which compete for priority on state level, while no interest is capable of excluding the others completely. People are actually confronted with these inconsistencies. In Holland, for instance, one of the safety criteria for siting a nuclear power plant concerns population density in a 13 mile zone around the site. People living within that very zone argue that following government safety regulations their lives are considered less valuable than others. The Dutch government at the same time refers to the absolute safety of nuclear installations and meanwhile admits safety to be relative siting them in low populated areas.

The distributional justice approach with its argument for the implementation of consistent equity principles rejects the free market as mechanism to solve siting problems. The state is seen as the very agent responsible for an equitable outcome of siting procedures. This supposes a long term planning process. Here we arrive at a difficulty. Who we may ask, is to run that planning? Who could impose equity principles on state apparatuses that represent competing interests per definition? If informed consent is to be realized, who will be responsible for the judgement of information and its transfer to the public? In other words: the distributional justice approach imposes the state with a task it may not be able to handle by its very nature as a democratic state. Or, to put it another way: it tends to neglect rather relevant procedural matters. The reason therefore is clear: distributional justice in the Rawlsian sense is a so-called end-state principle. For proponents of the distributional justice approach argue a good or 'just' procedure may not lead to an equitable outcome as well. This phenomenon is called the participation paradox. This however, is not sufficient argument to neglect procedural issues. Therefore, the distributional justice approach, revealing the relevance of state intervention itself, fails to deal (somewhat like the technical approach) with some characteristics of present-day democracies.

The public participation approach

There are many opinions about the rights people have to resist governmental decisions, individually as well as collectively. One issue that may be relevant here is the distinction between direct and indirect democracy. Forms of direct democracy are referenda (e.g. in Sweden), and free negotiations, more 'paternalistic'²¹ procedures for indirect involvement are consultative referenda (e.g. in France), public hearings (e.g. in U.S.) and public inquiries (e.g. in U.K.). All supporters of participation in siting decisions start from the assumption that people are capable of making rational judgements on political matters, which does not mean they always do, however.

To defend their rights people may organize. In siting cases locals often organize themselves into local safety committees that negotiate with public

officials, start judicial procedures, inform the press, call for a referendum, etc. Those groups insist to be taken seriously because they claim to represent the majority of those mostly involved. From this argument a second can be derived. Decision-makers selecting a site need information, and those directly involved could provide information necessary to make the best decision. In many cases locals invoke experts' support in order to collect technical information or to judge the information provided by governmental experts. Participation thus not only stands for a just procedure; it aims to foster a 'just' decision as well. So, supporters of the public participation approach reject what above was mentioned the 'participation paradox'. The word 'just' here possesses two meanings. The first refers to the number of opponents. From the legitimization point of view a 'just' decision is equal to a decision expected to meet with the greatest support. The other meaning of 'just' refers to the involvement of participants. Decision-makers frequently see themselves confronted with lack of time and therefore tend to minimize information. Those involved try to draw public attention. This might contribute to a decision in which all relevant information has been considered seriously.

So in both cases 'justice' may be served by public participation. Still there remain some doubts. The participation approach cannot totally solve the problem of inequality of resources. Some signals from the bottom will not be heard at the top, although they might provide relevant information on environmental aspects. One could argue, therefore, that the participation approach to be effective (e.g. leads to a 'just' decision) could not do without an end-state principle, like the distributional justice approach demands. If not, it would turn into the direction of the market approach with its possibly social undesirable consequences. So the participation approach, is an attempt to combine a procedural (legitimation) and an end-state principle (equity), but its argument against the critique of the distributional justice approach does not sound convincing. However, from the risk perception point of view this approach looks rather attractive, because it allows public demands concerning risk to enter the political agenda.

SITING STRATEGIES

The approaches, mentioned before, all differ on various aspects. But at the same time they appear to be complementary. Therefore, we can jump to the conclusion that in social reality approaches always appear in combination. Such combinations we call policy strategies. Combining different approaches into a policy strategy has two important results. On the one hand -as suggested before- an approach loses a part of its 'initial' meaning. On the other hand combining contradicting approaches may lead to contradictions in siting policy. From the foregoing paragraph one could easily derive for example a strategy including the public participation and the technical approach would almost certainly fail. Here we present some brief examples of different siting strategies. We start (for no reasons but practical ones) with strategies including the technical approach. Next we consider the combinations that embody the public participation approach.

Strategies including the technical approach

Most siting cases include the technical approach, simply because that approach often fits with public officials' beliefs about 'the' public's reactions well. In the U.S.A. we observed two cases both concerning chemical waste. The first ²² revealed the experience in a rural county in the state of Virginia with a facility for household wastes. Gradually the owner of the site became to use it for chemical wastes as well and some firms laid down proposals to create a chemical waste facility. In the beginning the local inhabitants felt no objections. This rapidly changed as soon as became clear that the County Board of Supervisors was up to settle the case in secret. In stead of organizing a public hearing for all locals the Board got in contact with only a few of the nearest inhabitants. When this became public, apathy turned into resistance and the residents organized themselves into a local safety committee. The County Board changed its stand and began to support the locals which largely contributed to their final success. The second ²³ case looks quite similar. Here, a big chemical firm tried to realize a site near Baltimore (Maryland). In the beginning the firm met with modest support from the local and regional officials. The firm wanted to anticipate negative reactions from the public. Therefore it organized information meetings, where it encouraged questions out of the public to prove its credibility. But its proposal was rejected by the County Zoning Commission and at State level a law was proposed containing a prohibition to site a chemical waste facility less than 1500 feet from residence. The firm lobbied the state governor to veto that law that would make further siting procedure impossible. In addition at the public hearings the firm offered a community park at the place of the landfills. But this offer just strengthened public resistance. People got the feeling of being bribed. Ultimately the firm decided to look for another site for its chemical waste.

In both cases the technical approach proves to be dominant. In the Virginia case regional authorities intended to anticipate public opposition trying to settle the case in secret. This proved to be a wrong judgement. For the public became suspicious just because of that move. In the Maryland case the technical approach manifested itself in a somewhat deviant manner. The chemical firm apparently recognized it to be unwise to shun contact with local inhabitants. But in its contacts with the public it manifested a kind of paternalistic behavior. The firm did not offer the opportunity for real public participation. Its intentions became manifest when the firm, with success, lobbied the state governor to veto a law that would have prevented all further endeavours at that site. In both cases we also glimpse the market approach. The Virginia case shows a (secret) contact of county officials with the nearest locals, which might point to an intention to negotiate. The Maryland case shows the firm's intention to compensate the consequences of the facility by offering a community park after the site had been completely filled. This, however, encouraged public suspicion. In Virginia as well as in Maryland endeavors to site a chemical waste facility failed by using a policy strategy including the technical and the market approach. Why did it go wrong?

Three reasons could be put forward:

1) People felt scared or (in the first case) became to feel scared during the siting process.

2) The local public wanted to be taken seriously, which it felt was not the case. People, in short, insisted to be heard.

3) The administrative providence for public participation, the public hearing, in both cases was perverted; in Virginia the authorities tried to avoid it, in the Maryland case the chemical firm tried to alter it into a negotiation table which is not the function of the public hearing as policy instrument. We are -partly because of the data available- not able to stress one of these as the main cause for failure. But, moreover, we like to suggest it to be the combination of reasons what made siting impossible here. To illuminate this we compare these cases with another siting case including the same approaches, yet distinct, because it succeeded.

The case considers siting a nuclear power plant in the south of France, the Departement of Midi-Pyrenées²⁴. France appears to be the country where the technical approach manifests itself in a rather pure form. Highly centralized, and public participation procedures compared with other industrial democracies being only in embryo, siting nuclear power stations till a few years ago could not effectively be opposed to by local initiatives. There still was opposition, but its space to manoeuvre was rather limited. Nevertheless, until 1981 inhabitants with support of a socialist-center majority in the Departmental Council had been able to resist the power plant. Shortly after the socialists came into power, the Council changed its mind. It accepted the plant on condition of written guarantees that it would benefit the region. In February 1982 a delegation of Electricité de France (E.D.F.) and the socialist chairman of the Departmental Council signed an agreement. It contained some measures to prevent environmental damage concerning the fish in the Garonne river, compensation orders to an amount of 1.2 billion francs and the hiring of a fixed percentage of local workers for constructing the plant as well as during its operation period. The agreement also contained a secret paragraph that was published by "Le Monde" two months later. E.D.F. provided the Department over 6 billion payments each year during the operational stage of the plant. The agreement was also brought about easily because the socialist chairman of the Departmental Council was chairman of the environmental finance commission in national Parliament at the same time. It provoked some reactions -especially the secret part- merely because the price was considered too high. In reaction to the generosity of E.D.F. the minister of Energy Affairs stated this case had to be judged as an exception caused by the absence of adequate procedures.

In this case we observe the technical approach, which dominated French environmental and energy policy until 1981 and in fact still does. The French strategy also contains an element of justice, for the state policy is the result of an overall planning process, though centralized and neither open for public participation nor for large parliamentary involvement. This element of 'justice' became more prominent during the

seventies, when the government started to pay compensation to regions that accepted nuclear power plants. It provided people in those regions with a 15% reduction on their electricity bill. This might be considered as the market approach, but here one must realize that all freedom to negotiate -a significant feature of the market approach- was absent. The socialist government expressed the intention to move towards more decentralization and open administrative procedures. But by the spring of 1982 this intention had not yet led to new legislation. Within this context the market approach appeared. The freedom to negotiate was limited to the regional government (e.g. the socialist and radical party leaders); the locals were not asked to express their views at all. Success of this strategy, therefore, was due to the political and administrative context that envisioned the technical as well as some part of the market approach. Besides, in France -although till recently opinion polls showed resistance- some important mass-organizations support nuclear power as a keystone of national industry, in particular the trade-unions and the French Communist party. Nuclear power in France never has been a controversy as it has in other industrial democracies.

From the comparison of cases above the conclusion can be drawn that a strategy combining the technical and market approach is adequate if three negative conditions are equally fulfilled; (1) current administrative practice does not largely consist of the participation approach; (2) nuclear power is not considered as a national controversy; (3) People do not consider the strategy illegitimate. In the French case where some political innovation had been announced by the new socialist government but not yet realized, the market approach could occur rather inhibited and did not counter people's perception of legitimate decision-making. So we may conclude that the combination of these three factors was due to the success of the on the technical and the market approach based policy strategy.

Strategies including the public participation approach

Sweden^{16,25} is still the only industrial country that has decided how to manage its radioactive waste. The decision became necessary, when parliament in 1977 passed a stipulation law holding, a continuation of the use of nuclear energy demanding an "absolutely" safe solution for the waste to be available. The joint electricity companies therefore founded an organization for nuclear fuel safety, K.B.S., which in the same year published a proposal for long term storage in rock formations. Swedish government started a participation procedure that included a request for advice to many organizations within Sweden and other countries. The Swedish Energy Commission decided to use the method of 'Scientific Mediation'. This method in essence intends to clarify technical and scientific divergencies of opinion for politicians and the public in order to settle the dispute politically in the most conscious and reasonable way. Two scientists, a supporter and an opponent of the proposition, wrote down their personal opinion, the opponent being an American (for Swedish government did not expect to find competent opponents within Sweden itself). The result was a common paper where the differences of

opinion including uncertainties were expressed in an open and clear way. In the autumn of 1978 Swedish government decided on a compromise and asked for further geological investigation. At the same time the left-wing and farmers' parties called for a referendum on the further use of nuclear energy which forced the government to resign. The majority of Swedish citizens in the referendum chose for the most moderate alternative that, still, called for a maximum capacity of twelve reactors until 2010 when other fuels would have to displace nuclear energy. On the other hand a site for long-term storage of waste has already been chosen.

This case shows an interesting example of the public participation approach on national level. It was characterized by an open information gathering process and an intensive political debate. One of the arguments put forward concerned the waste problem and especially its implications for future generations. This makes us conclude that the distributional justice approach is also present. Why did the strategy succeed? Firstly, the policy strategy corresponded well with Swedish administrative and political practice which to a large extent contains elements of the public participation and distributional justice approach. Secondly, perception of risk rather fast became a political issue and -finally- people apparently considered the policy strategy was legitimate. The final decision -though in every respect a compromise- corresponds with the general opinion about 'legitimacy', which of course does not mean everyone substantially agreed. We think the Swedish case to be the clearest example of a policy strategy combining the participation and the distributional justice approach.

An example of an other policy strategy including the public participation approach is the Hazardous Waste Siting Facility Act (1980) of the State of Massachusetts. The innovative element in this Act was that the State provides local communities with financial means and expertise so they could independently negotiate a site with a developer. Some authors notice the limited success of this siting strategy is due to the fact that local public feels lumbered with a chemical waste facility. The strategy is a combination of the public participation and the market approach. Government withdraws in order to play a limited -though not unimportant- role in the background of the scene regulating 'free' negotiations. The contradiction appears to be felt by local citizens: negotiations could never be really free as there remain regulations as well. But at the same time regulations are felt necessary because of the need for protection of the environment and the public health. Thus, the government gives the impression that it acknowledges its responsibilities as perceived by the public, but at the same time seems to elude it. This means public perception of risk is acknowledged, but at the same time seems to be neglected. The market approach paradox, as we have called this phenomenon, occurs when a market approach strategy is implemented while at the same time distributional justice is a mere part of administrative practice. Under this condition people's resistance may be aggravated instead of softened, as was originally intended. People may feel the government ignores its responsibility for public health and the environment. This issue

concerns the public perception of legitimate decision-making and has not yet received serious attention in social scientific research. Research on this aspect would probably benefit the understanding of success or failure in siting strategies.

Finally, we should note that the character of public participation differs according to the approaches combined. The market approach, on the one hand, suggests a more direct local intervention, while on the other hand, the distributional justice approach accentuates collective decision making at state (national) level.

CONCLUSIONS

So far we have discussed four ideal type approaches to exist, each dealing with the public perception of risk in a different way. We also showed how these approaches are used by policy makers, that is combined in policy strategies concerning the realization of a site. The description of cases revealed some (by no means all) of the difficulties that rise because the approaches to some extent are contradictory. At this point we can make some concluding remarks. The case studies have obviously demonstrated that two combinations of approaches may lead to policy inconsistencies:

- 1) combining the technical and the public participation approach,
- 2) combining the distributional justice and the market approach.

The first combination may not fit in with the public perception of risk. The second may oppose the expectations people may have of the tasks of a democratic welfare state, e.g. it does not account for public expectations of legitimate decision making. A second conclusion can also be drawn from the cases. Contradictory combinations did not occur merely as part of conscious strategies. Rather the approaches collided if a strategy did not compete with current political and administrative practice. The Massachusetts act for example provides 'free' negotiations against the background of a framework of environmental and health protecting laws. The French case, shows a site attempt to be successful largely because adequate procedures were absent. As indicated before, our observations point to three factors that determine the success or failure of a siting procedure. They refer to (a) congruency of the siting strategy and existing administrative practice (b) the extent to which the strategy accounts for public perception of risk and (c) accounts for public expectations of legitimate decision making. We already suggested that these factors do not occur separately, but are linked with each other. Still the public perception of risk must be considered as the dominant factor. For it is obvious that worried people will more easily doubt the legitimacy of government decisions. If people really are afraid because of the environmental and health impacts they will expect government agencies to treat the siting procedure like an environmental problem, e.g. behave according to environmental laws and regulations. If, on the other hand, people are concerned with the socio-economic impacts they will probably accept a siting procedure according to economic practice. Present findings of risk perception research give rise to the statement that

environmental regulations have to be used in hazardous waste siting procedures. The people involved desire environmental procedures to be followed, just because they provide them with the opportunity of participation and give attention to aspects of equity. To neglect this may aggravate conflict and foster stagnation. Yet, as the Swedish case suggests, a strategy, making use of the public participation and the distributional justice approach, could be even more effective in the long run. However, that demands greater efforts of both governments and highly involved citizens in their aim to reach acceptable solutions for the hazardous waste problem.

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