

MOBILITY PATTERNS PROSPECTS AND THEIR IMPACT ON CLIMATE CHANGEⁱ

Jean-Paul CERON . Centre de recherche interdisciplinaire en droit de l'environnement, de l'aménagement et de l'urbanisme (CRIDEAU : Université de limoges, CNRS, INRA), 32 rue Turgot, 87000 Limoges. ceron@chello.fr

Ghislain DUBOIS. Tourisme Environnement Consultants (TEC)) 89 rue de la République - F. 13 002 Marseille - ghislain.dubois@tec-conseil.com

Introduction

The access to leisure, to tourism, and thus to the mobility they imply are now accepted as an important dimension of welfare. This has not always been the case in western societies. In the industrial society, uses of time such as leisure or even more tourism were not considered as legitimate except for upper social classes: this was clearly expressed by Napoleon saying that a workman can work every day since he eats daily... In 1883, Lafargue's book "le droit à la paresse" was in its time considered as extremely provocative (Lafargue 1970)... Nearer to us it can be recalled that one of the first tasks of WTO has been to obtain a recognition of the right to tourism, a point which is stressed from the Manila declaration on world tourism (1980) to the Global code of ethics for tourism (1999), (Dubois & Ceron 2000).

Today, in industrialised countries, holidays are usually considered as a right and should be accessible to all. Staying at home is largely admitted by public opinion as an indicator of poverty and exclusion: not going on holiday when the majority have the means of financing their leisure and departure is tantamount to being put aside from one of the important times of collective life. The current growth of domestic tourism in developing countries also shows there is a true desire for taking holidays as soon as economic conditions allow to do so.

Within the same period, as this movement is taking place, the impacts of human activities on the environment are increasingly questioned. Throughout these last thirty years, it became gradually admitted that there are global environmental limits to human activities and that environmental problems cannot be solved by relying only on technology but might imply changes in lifestyles. One of the major issues to be tackled is global warming. Transportation is one of the major sources of greenhouse gas and also, owing to the dramatic increase of all forms of human mobility, the most difficult to curb. Its share in French total emissions rose from 8% to 39% between 1960 and 1990 (Fontelle, Chang and Lallemand 1999).

The impacts of human mobility on global warming will certainly have to be addressed and this can be a major threat to tourism, all the more if tourism globally goes on expanding on an annual rate of 4% as WTO prospects suggest (WTO 2001). Given the growing dependence of tourism on transport (transport intensity is growing : (Ceron et Dubois, 2002)) and its contribution to global warming, mitigation policies should seriously question tourism. Will there be in a more or less foreseeable future restraints of some kind or another on travelling ? If so, what are the patterns of leisure time use that are questioned ? Ultimately, to what extent do potential restrictions on tourism question welfare: tourism is after all only one of the uses of leisure time. Are there any elements tending to show that tourism is not bound to expand indefinitely and that people might be willing to substitute it partly by other uses of their leisure time which request less mobility? To what extent can leisure-time policies influence the current trends ?

Tourism research often concentrates on the tourism demand itself (motivations, expectations, purchasing power...), although in industrialised societies, preliminary individual trade offs between tourism and other uses of time are a key factor to explain the volume of tourism demand and its evolution, as well as the impact of tourism / leisure mobility on climate change. The paper tries to explain how, in the case of France, these articulation of times could produce various mobility patterns, which impact differently on climate change : less tourism does not necessary means less impact.

Factors for change : Tourism and the other uses of time

Factors influencing tourism/ leisure mobility demand

Tourism is not, "by nature", bound to expand indefinitely. It can be reminded that only a small part of days off work is devoted to tourism. French employees have roughly 145-150 days off, but the French on average spend 15 to 17 nights on vacation (or 24 to 28 nights if one only takes into account the 62% who left home in 1999) (Insee: vacances survey, SDT survey). Quite roughly, even though leisure time has increased over the last twenty years, the French do not spend more time on holiday and they steadily refuse to see their holidays organised by professionals: the two thirds of the nights they spend in France are taken in the non merchant sector (second homes, friends and family). Travel agencies and tour operators only manage 19% of the domestic demand (including French travelling abroad: SDT survey).

Thus it is not surprising to see some forms of tourism decline: the 57 million nights lost by French domestic tourism from 1983 to 1999 must have had some effect. This is not a new phenomenon as historic studies on French tourism underline (Boyer 1982, 1996), but it shows that not only the places but also the volume of the activity are shaped by long term trends and phenomena.

The evolution of tourism / leisure mobility demand depends on a large number of factors. Its growth cannot be considered as simply coupled with economic growth or with the spreading of the "société de consommation" or of the "société des loisirs", should these be considered as valid concepts. The following factors influencing the tourism demand can be recalled : economic growth and inequalities, demography (including family patterns), conditions of travel (safety...), transport infrastructure development, tourism and leisure supply (how far will liberalisation go and the market sector penetrate the activity), marketing strategies, technologies, the look of society facing amenities linked to tourism (sunshine, sport etc.) and of course two fundamental variables: time resources and disposable income...

The followings insist on one particular factor : in a context where both income and leisure time increase, then, how are the other (than tourism) uses of leisure time evolving, what are the prospects of their competition with tourism and the impact of this on mobility ? More precisely, the methodology of this research is based upon two steps. The objective of this paper is to present the first step of the research:

1. Developing household tourism/leisure mobility patterns relying on the articulation of tourism and other uses of time; calculating the impact of these patterns on climate change;

It will be followed later by an ongoing work devoted to:

2. Assembling these mobility patterns in tourism/ leisure mobility demand scenarios. Each scenario would have a different repartition of these patterns within the French population, according to socio-economic or demographic scenarios.

The uses of time

According to Dumontier & Pan Ké Shon (1999) the uses of time can be divided into four categories :

- Physiological time: roughly half of the day
- Domestic time: about four hours
- Leisure time: four and a half hours
- Working time which widely differs according to categories of people

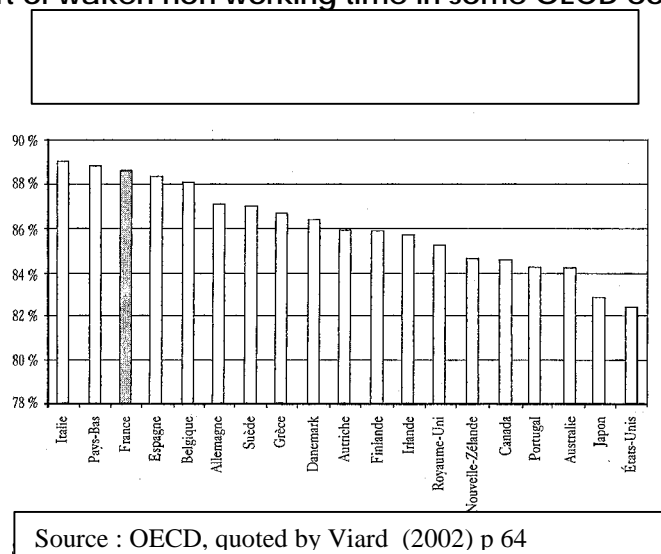
On a scale leading from working time to tourism time, some intermediary categories of time enable leisure. Their share in responding to the demand for leisure could be a key factor explaining the further developments of household mobility.

Working time

Knowing that on the social scale and within a generation, physiological time is not flexible, working time is traditionally considered as a command variable shaping the other categories.

Work occupied 70% of a person's waking life in the 19th century, this figure is now reduced to 14% in France. Since the war we have gained more in life expectancy than we spend at work in our whole life (Viard 2002 p. 44). Even if OECD countries' values and cultures related to work differ, the part of non working time only differ from less than 7% between Italy and the United States.

Figure 1: Part of waken non working time in some OECD countries



It is uncertain whether the trend towards diminishing working hours is going to continue. In most European countries there seems to be a desire for shorter working hours (Viard 2002 p. 76), but there is also a growing pressure on employees to have them work longer: competition linked in particular to globalisation, the threat of unemployment (WTO 1999 p. 118). So, in France during the last decade while time left by work has continued to grow on a global scale, most categories of employees have experienced longer working hours (8h21mn in 1986, 8h29mn in 1999 for employees working on a full time basis) at least till the law bringing down the standard weekly working time from 39 to 35 hours (Dumontier, Pan Ké Shon 1999).

Generally prospects where the time that can be potentially devoted to leisure grows for society as a whole while it diminishes for employees are not excluded and could have serious impacts on tourism: more time to travel for the retired and for students which can contribute to a seasonal spread of holidays on the one hand, the need for short breaks, for a time efficient tourism, for a quick access to destinations on the other

Time left by work: constraints and leisure

The following chart gives the average uses of time in France in 1986 and 1999 on a day basis (less than 15 years old excluded). No need to say that these figures do not correspond to what an "average" person does, because no one can be at the same time a student, an employee and retired. The figures include week ends and vacations, which explains the low figures for working hours. They both point out trends and help to distinguish within the time left by work what is constrained and what is leisure.

Table 1: Average daily uses of time in France in 1986 and 1999

	Homme	Femme	Total actifs occupés	Ensemble

	Actif occupé		Inactif		Active occupée		Inactive					
	1986	1999	1986	1999	1986	1999	1986	1999	1986	1999	1986	1999
Temps physiologique dont	11h22	11h22	12h51	12h39	11h32	11h35	12h42	12h37	11h26	11h28	12h06	12h04
Sommeil	8h31	8h23	9h53	9h34	8h46	8h37	9h47	9h32	8h37	8h29	9h13	9h03
Toilette, soins	46	42	48	46	53	49	56	53	49	45	51	48
Repas dont	2h05	2h16	2h09	2h18	1h54	2h09	1h59	2h12	2h00	2h13	2h02	2h14
<i>repas avec amis, parents, etc.</i>	25	43	20	34	24	38	22	33	25	41	23	37
Temps prof. et de formation¹ dont	6h33	6h22	1h54	1h32	5h15	5h01	59	59	6h00	5h46	3h39	3h23
Travail professionnel	5h53	5h42	23	13	4h43	4h28	10	5	5h23	5h09	2h48	2h32
Trajets domicile-travail	35	37	11	9	28	30	6	5	32	34	20	20
Études	1	1	1h16	1h07	1	0	42	47	1	1	28	29
Temps domestique dont	1h51	1h59	2h45	2h55	3h49	3h48	5h16	4h47	2h41	2h48	3h30	3h26
Ménage, cuisine, linge, courses, etc.	1h00	1h04	1h33	1h35	3h13	3h06	4h26	3h59	1h56	1h58	2h38	2h30
Soins aux enfants et adultes	9	11	5	6	24	27	32	26	16	18	19	18
Bricolage	25	30	30	36	3	4	2	5	16	18	14	18
Jardinage, soins aux animaux	18	14	38	38	9	11	17	18	14	13	19	20
Temps de loisirs dont	2h46	2h57	4h38	5h06	2h00	2h19	3h15	3h57	2h27	2h40	3h07	3h35
Télévision	1h35	1h47	2h22	2h44	1h09	1h24	1h59	2h28	1h24	1h37	1h46	2h07
Lecture	21	16	42	36	19	17	29	30	20	17	27	25
Promenade	11	15	26	32	10	14	16	22	10	14	15	20
Jeux	10	12	18	30	7	6	10	15	8	9	10	16
Sport	10	10	16	15	5	5	4	5	7	8	8	9
Temps de sociabilité (hors repas) dont	51	47	1h04	1h10	48	43	1h09	1h04	49	45	58	56
Conversations, téléphone, courrier	26	13	34	20	26	16	33	22	26	15	31	18
Visites, réceptions	16	26	21	36	17	22	27	33	16	24	20	29
Temps libre (loisirs et sociabilité)	3h36	3h44	5h38	6h15	2h48	3h02	4h24	5h01	3h16	3h25	4h05	4h31
Transport (hors trajets domicile-travail)	39	33	49	38	36	34	38	35	40	34	39	35
Total	24 h	24 h	24 h	24 h	24 h	24 h	24 h	24 h	24 h	24 h	24 h	24 h

Champ : personnes de 15 ans et plus de France métropolitaine

1. La prise en compte des samedis et dimanches pour le calcul de ces moyennes rend surprenant les temps quotidiens de travail ou d'études ; multipliés par 7, ils sont plus conformes au sens commun.

Source : Insee, « emploi du temps » Surveys ; 1986 and 1999

The first point to notice is that physiological time remains much the same over the period. Note that this category includes meals with friends parents etc. which have something to do with leisure and seriously increase: this is significant of an evolution in lifestyles which might impact on tourism : more home centred lifestyles, more local leisure facilities might induce less desire to travel frequently. Basically, as a whole, the time gained by diminishing working hours is devoted to domestic activities and leisure.

Domestic time includes constrained activities and what Dumazedier calls semi leisure (Creux 2001 p.301): do it yourself, gardening. These can be characterised as non merchant work which creates wealth even if it is not accounted for in GDP. People might be more or less compelled to such activities (insufficient revenue) but they practise them under no hierarchical constraint and can express there some creativity (Bonnette-Lucat 2001)

The fact is that time devoted to semi leisure is increasing, including among employees. This, as well as the time devoted to meals with relatives mentioned above and the time to visit them, is significant of a change in the relationship of the French with their home. Housing conditions improve in terms of comfort, larger homes (see figure 3), unifamilial suburban homes with a garden : in France 12 millions households take care of 13.5 millions gardens (Creux 2001 p. 297).

Table 2: Space and comfort indicators for main homes

	1984	2002
per home		
Average space : m ²	82	90
- unifamilial homes	96	108
- flats	65	65
number of rooms	3,8	4,0
average number of people	2,7	2,4
Per person		
Average space : m ²	31	37
Average number of rooms	1,4	1,7
Proportion of unifamilial homes (%)	54,0	56,6

Source , Insee Housing survey

Leisure time and tourism time

This improvement in housing, adapting it to or permitting new leisure activities implies a certain amount of self organisation and do it yourself. It can have important consequences for leisure activities out of the home and for French inbound and outbound tourismⁱⁱⁱ. Seemingly, some home centred activities traditionally seen as constrained can also be considered as pleasant: 53% of men living in a couple and 33% of men living alone find cooking a pleasure (Dumontier, Pan Ké Shon 1999 p2).

Within the activities considered as pure leisure it is obvious that the major gains concern watching TV, which is by far the main activity. Walking, playing games, register more gains than sports do.

Last, the French do not spend more time in mobility for both leisure and work, which does not mean that they do not travel over longer distances with the subsequent environmental impacts it implies (the average speed per trip increased).

What the figures do not show

The highly aggregated figures above do not show the extremely diverse time pattern models. Some differences are traditional and well known (and nevertheless important), other partitions are more or less specific to France, some are just emerging. The specificity of the current period is precisely an individuation of time patterns, compared to the mass models that were previously dominating.

The differences in time use patterns according to PCS are well known and documented, so as their trickling down from one social class to another (Packard 1960, Bourdieu 1979). One should notice here the gradual disappearance of the very specific time use pattern of farmers (which used to influence other inhabitants of rural areas) owing mainly to the dwindling of their number.

There are of course difference between genders. The French specificity is there both deeply cultural (status of women in Latin civilisations) and imbedded into recent history: after the war women started working essentially on a full time basis, which is not to this point the case in neighbouring countries (more part time in Netherlands, more women at home in Germany with a less developed system of child care etc.). Working French women are thus said to have two jobs, at home and outside, and not much leisure. This is changing very gradually with a greater implication of men in domestic tasks (Chenu & Herpin 2002 pp.24 sq).

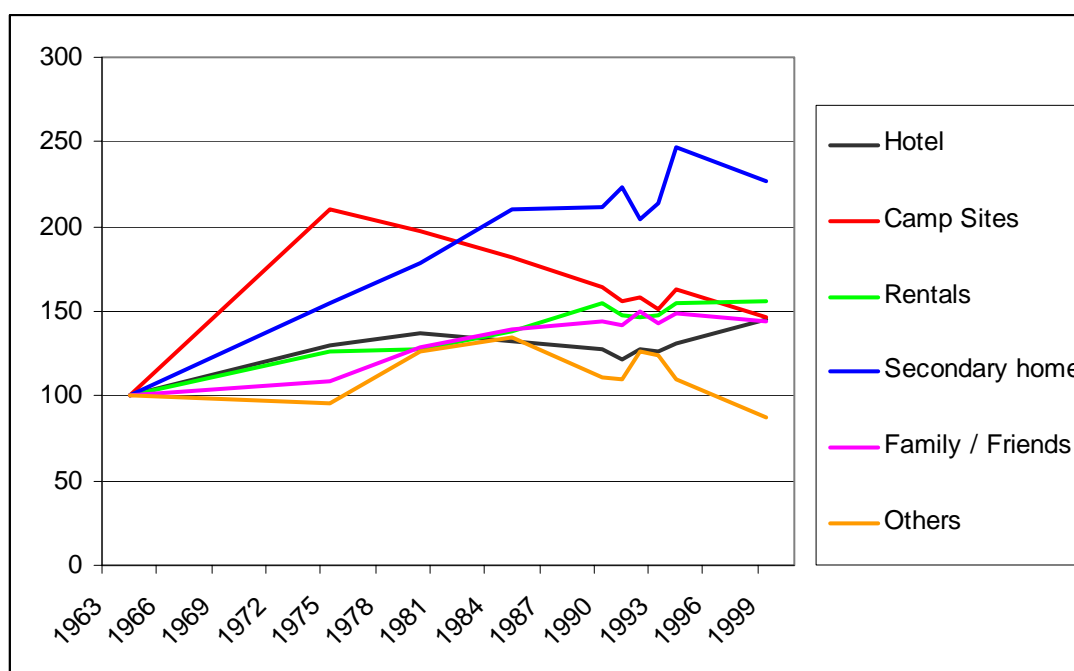
There are also differences according to age which reflect a position towards work but also the experiences the various generations have had with work and leisure. The young and the retired have had a very different relation to leisure. The retired have been integrated into society through work, they have had a progressive access to leisure and holidays. Nothing such occurs with the younger generation which starts working much later and has, previously to work, an experience of the integration into society largely through leisure activities and often tourism. Whereas work was the leading factor structuring a life, this might be much less the case in the future and leisure experiences might to some extent substitute for this.

The leisure time patterns are not only increasingly split between social categories but also much more individualised. Different factors push towards this: the flexibility of working hours which favours more individualistic uses of leisure time since working hours less coincide between the family members (Boulin & Du Tertre 2001), the growing fragility of couples etc.. As a whole, individuals want more and more to decide what they do with their free time.

The borders between the different categories of time are increasingly blurred and porous. More people work at home, sometimes during the week end or while on holiday: 40% admit they work some time during the week-end and 20% during their holidays (Potier 2002 p.26). Reciprocally some people include leisure within their working hours: surfing on the internet, shopping between two meetings... Portable computers, e-mails, cellular phones have within the length of one decade permitted leisure and working time to penetrate each other and the same can be said of places previously devoted to work or to leisure.

This means for instance, that the use of secondary homes should probably be reassessed. There are about 3 million secondary homes in France, they end to accommodate a larger proportion of holiday makers (Figure 14), which would be even greater if mobile homes, caravans that no longer move, upgraded garden sheds etc. that play the role of second homes were included. It is felt that statistics at hand do not reflect correctly the importance of the bi residential life patterns of life that are emerging (Urbain 2002 p 173).

Figure 2 : Evolution of overnight stays by type of accommodations, 1964-1999



Source: Insee, "Vacances Surveys" from 1964 to 1999

At a quite global level, it appears that regional and local development are more and more determined by quality of life assets. Up to now we have been taught that the spatial distribution of French people was linked to natural resources (agricultural endowments, landscape etc.) which have determined (together with political and sociological factors) the location of activities and employment (Braudel 1986). The French population is now shifting to regions that have a strong appeal in terms of leisure, climate etc. which are precisely those it has experienced through its holidays. These assets tend to determine the location of new industries. Firm managers care about where they and their family live, they are also sensitive to the possibility of attracting a good quality labour force. A growing number of employees develop lifelong residential strategies (Viard 2002 c) in which the different places they wish to live in play a central role (in a city centre while students, in the countryside while the children are young, then nearer the town centre when they are in a secondary school, in a great city, near medical facilities when they get old, for instance).

Tourism, which could be described as "leisure elsewhere", will evolve, taking into account all the previous contextual elements. Future studies insist on the fact that it is impossible to predict one determined future. Typically in this case it is very tempting to try and think tourism prospects in terms of alternative scenarios so as to frame the range of their impacts in terms of mobility.

Patterns for tourism / leisure mobility demand

Hypothesis and methodology

Building scenarios is a more or less complicated and sophisticated exercise. This work defines mobility patterns taking into account trends of evolution of tourism and other uses of time, and considering their respective impact on climate change, with limitations :

- We are of course conscious that tourism and leisure mobility depend on a large number of variables (demography, infrastructure choices, urban policies etc.) just as well as on the trends of the uses of time (see above). The followings are built on a caricature of the latter.
- Moreover, while the future of tourism seems highly uncertain, it remains clear that these different patterns of time uses will develop alongside. The question is rather the repartition of these travel patterns in the overall mobility demand, which we did not go so far as to analyse.

As it has already been stressed, on a domestic scale the future of tourism highly depends on how it will share non working time with other leisure activities. We shall consider four types of time use patterns which derive from the present trends described in the first part of the paper.

Five categories of tourism/ leisure mobility are distinguished, they combine in different quantities to build each of the patterns above:

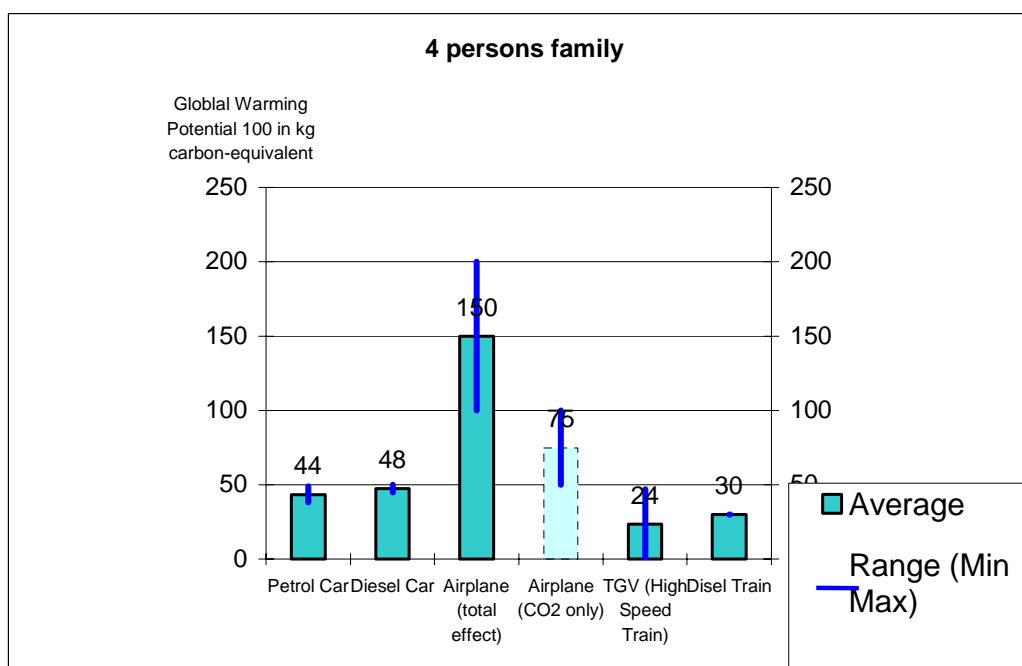
- Very long distance trips, with an average of 6 000 km per trip, taken by plane, which correspond to long stays (1-3 weeks), they have for main motivations, visiting a country, discovering culture, exotism, benefiting from a tropical environment
- Long distance trips, with an average of 1 500 km per trip, which correspond to the conventional vacation patterns of Europeans : a trip to a seaside or a ski resort, taken within the country or in a neighbouring one (mainly Mediterranean). Long distance domestic trips overwhelmingly use the car (more than 80%). We shall admit that the two marginal uses of train and plane neutralise each other which is tantamount, with regards to the impact on climate change, to all these trips using cars. In 2001, on average, 22 days out of home are taken by the French, with 2.4 stays over 4 nights (SDT survey).
- Outings, which can include an overnight stay, with an average of 200 km per trip taken by car. In 2001, the French took 1.7 outing with a night spent out of home, to which daily trips must be added.
- Bi-residential mobility, between main home and secondary home, or, in an extreme scenario, between two main homes, with an average of 500 km per trip, half of which are taken by car, and half by train or other public means of transportation.
- Short distance leisure mobility, within the city of residence or in the immediate neighbouring, with an average distance per week, depending on each pattern, half of which are taken by car, and half by train or other public means of transportation. A person living in France moves more or less 40 kms per day or 14 400 kms per year (Ifen 2002 p 453).

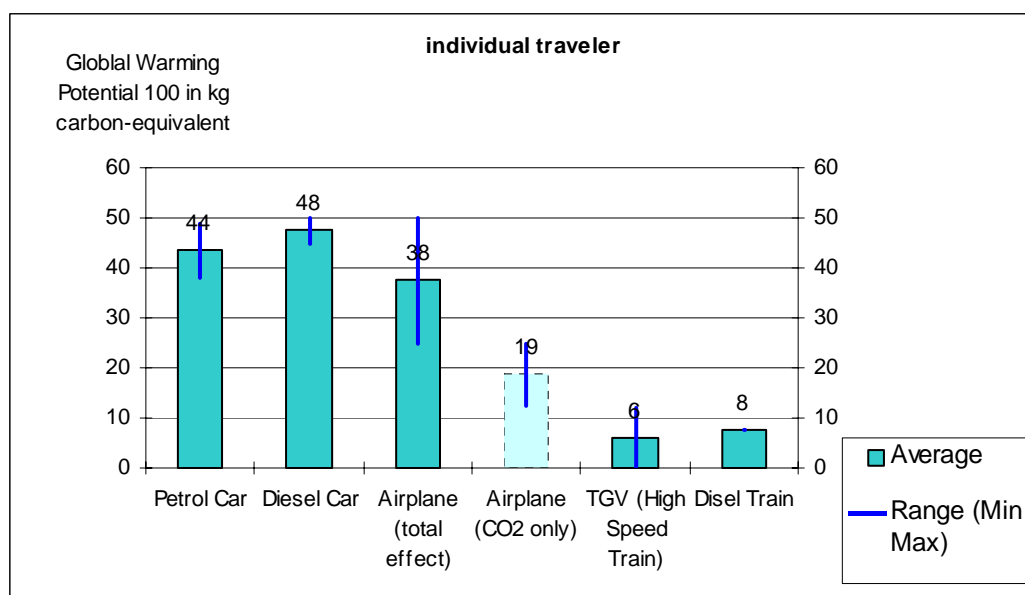
The hypothesis on travel patterns (see following section) enabled to calculate an annual number of km travelled by the household, with a modal repartition depending on the kind of mobility involved.

Three means of transport were then considered with GHG intensities reflecting the impacts assessed in Figure 5. The mobility patterns are based upon a 4 persons household. This choice seriously impacts on GHG emissions: the emissions of the household will be 4 times more important for an airplane trip than in the case of an individual traveller, whereas they would be the same for a road trip. In that perspective, air transport is 3 times more polluting than road, and rail, 0,5 times less polluting than car. The "GHG intensity" coefficients (see Figure 6) synthesize the impacts of different modes of transports and the modal repartition of each kind of mobility (a 0,75 coefficient for bi-residential mobility for instance, since the trips are supposed to be taken by train and by car in equal proportion).

Finally, these approach drove it possible to calculate a "Climate Change Index", which reflects the impacts associated with each patterns. It was not necessary at this step of the research to translate the index in kg-carbone-equivalent, all the more as air transport induce impacts on climate change not associated to gaseous emissions (contrails formations, impacts on Cirrus clouds...).

Figure 3 : Impact on the greenhouse effect of a journey from Paris to Nice, depending on the mode of transport





Source : IFEN based on SNCF, European Environment Agency (Copert III and MEET programmes), IPCC, Airbus Industries, EDF

Remarks. Range : from the most to the least polluting vehicle in each category.

Cars. Variables : age , horsepower , type of journey (motorway or main road)

Planes. variables : type of aeroplane. Two estimations are given: one for the effects of carbon dioxide (CO₂), which are well known, and the other for the impact on the greenhouse effect of all pollutants emitted during the flight ; In this case, the effects of nitrogen oxides, water vapour, sulphur oxides and jet trails are all taken into account .

Trains. Variables :type of energy used to produce electricity for a TGV , from hydraulic power (0 or near 0) to coal (47)

Mobility patterns

The first pattern is a “conventional” one. The family takes 20 to 30 days off away from home including two long distance trips and 6 outings (week ends, short stays or excursions). This pattern includes a moderate use of leisure opportunities near the home, implying 30 km travel per week. All this sums up to 5760 km (figure 6) per adult belonging to the household^{iv}. They mainly travel by car, as it is the case now (near 80%: Ifen 2000 p 39).

The second pattern (“great travellers”, or “Parisian” scenario) pushes tourism to some kind of extreme. The households still take 2 long distance trips but also one far abroad (6000 km per travel). They move frequently for outings but, as a consequence of all this, they tend to travel less for short distance leisure (15 km a week). This leads to the figure of 11380 km.

The third pattern, “home centred”, takes into account the facts that the home, its garden, its semi-urban surroundings constitute an increasingly attractive place for leisure. Thus people stay more at home. They are no longer tempted to go and live elsewhere for a couple of weeks or so : the garden needs watering etc. They are of course still interested by visiting far away exotic destinations, every couple of years, since such trips are rather expensive, which leads to 0,5 trip a year. In the meantime they will still go away for outings : three each year and they move a lot for leisure near the home (60 km). This comes up to 6720 km.

The last pattern is a "bi-residential" one in which it is hard to guess which is the main home and which the second one, since those people spend during the major part of the years 3 days in one and 4 in the other. This roughly implies 40 travels from one home to the other, distant from an average of 250 km. This goes with a travel to exotic destinations every two years, a limited number of 3 short stays per year and a low travel intensity for leisure near the home (15 km). The total distance travelled is in this case 24 380 km.

Results

The results are presented in Figure 6 can be analysed from the perspective of total km travelled and impact on climate change of each mobility pattern, and finally by combining these patterns to draw scenarios of French tourism / leisure mobility demand.

The approach in term of km is not the main objective of our research. However, it enables to address other environmental impacts of transports. For instance, if "great travellers" and "bi-residential" patterns are quite equivalent as regards to climate change, the bi residential pattern might have serious impacts on road congestion (especially on Fridays and Mondays), noise, infrastructure development, while the "great travellers" might cause airport saturation and question air traffic security.

A few lessons can be drawn from the "Climate change index".

- No current trends seem to lead to a decrease of tourism/leisure impacts on climate change. The patterns show these impacts vary from 2,2 to 4,7 times more than the conventional (current) ones;
- Less tourism does not necessarily mean less impacts on the atmosphere. A decline in conventional tourism can be easily offset by a development of bi-residential ways of life, and lead to a high-impact situation. Similarly, the advantage of more home centred leisure in terms of mobility can very easily be offset by the search for increasingly exotic tourism. This recommends to pay more attention in the future to "para-tourism" phenomena, such as outings, excursions, bi-residence....
- Air transport and very long distance mobility play a central role in "Great travellers" and "Home-centred" scenarios, with respectively 77% and 75% of the total impacts, while road transport plays a more important role in the "Conventional" and "Bi-residential" patterns (56% and 35%). The absolute value of air transport associated impacts remains important in the bi-residential pattern. Given the growing propensity of the French to travel abroad, the development of air transport is a serious concern for the future. This confirms the forecasted shift from road transport to air transport as the main contributor to climate change (OECD, 2001).
- The share of short distance mobility in the patterns varies from 2,3% (bi-residential) to 21% (conventional). It is more important in the lowest emissions scenarios, which means its absolute value is quite low. If one add the eventuality, especially in centre cities, of a modal shift to less polluting modes of transportation (bicycles, tramways...), the substitution of tourism by leisure near from home could be a good opportunity for reducing impacts, all the more that this type of leisure occupies a good deal of time, and is quite important for the quality of life and well-being.
- Bi-residential patterns are very costly in terms of emissions (5 times the distance and the impact compared to the conventional one). They remain so even in the case of a reasonable use of the train between the two homes. Their impact is equivalent or slightly superior to that of the high tourism scenario

Assembling the patterns into contrasted scenarios of overall tourism/ leisure mobility demand is still a work in progress. It supposes to cope with serious

coefficients							
Car	1						
Train	0,5						
plane	3						

The dependence of tourism on future transport policies

Tourism contributes significantly to the greenhouse effect, and relies more and more on transport: these two statements show the sensitivity of tourism to future transport policies in the context of a reduction of greenhouse gas emissions under the Kyoto protocol, and furthermore in the context of more restrictive transport policies which might emerge in the future.

For tourism, the level of impact will strongly depend on the mode of distribution of the constraints between miscellaneous stakeholders (economic sectors and countries). Referring to sustainable development implies that the distribution should be fair. The difficulty is that there is no unique criterion by which fairness or equity could be judged. Any judgment on equity depends on the system of values which is mobilized. Boltanski and Thevenot (1991) show that, within a society, different systems of values coexist regarding to which choices can be justified: civic, industrial, merchant, domestic justification contexts, "cités" as they call them.

Referring to a "civic city" context leads to attributing an equal share of emission rights for each inhabitant of the planet. Referring to an industrial context would privilege sharing the emission rights proportionately to GDP so as to minimize the negative impacts on activities. Referring to a domestic context would promote an approach taking into account the rights acquired by previous generations ("grandfathering"): the inhabitants of the North can claim rights on the atmosphere they have been innocently using these last centuries, not knowing that they were compromising mankind's future environment; using the emissions in 1990 for a benchmark as the Kyoto Protocol suggests in fact refers to this last frame.

These examples are just here to show that calling upon equity to share the burden the GHGs linked to tourism or to determine emission rights for tourism can lead to dramatically different results.

It nevertheless seems interesting to dwell on the first reference to an interpretation of equity attributing an equal share of emission rights for each inhabitant of the planet. First because this equity criterion is often put forward as self evident, or at least as a criterion superior to all others. Though nobody really suggests it could be applied immediately, it is more frequently considered that in the long term a worldwide convergence of emissions rates could be a legitimate goal. Secondly because it appears that the consequences of such a criterion for tourism would be absolutely devastating.

1. AN EQUALITARIAN PERSPECTIVE

At present, the use of energy generates roughly 6 billion tones carbon-equivalent for some 6 billion people: one tone per head. Such a rate of emissions leads to a warming of the earth which might induce severe consequences for mankind. Some

argue that reducing the pace of warming to an acceptable level, in the context of a moderate demographic growth would imply diminishing emissions per head by a factor 2, that is to 0,5Tc (see for instance <http://www.manicore.com/documentation/serre/reduction.html>). Since the global warming potential of domestic tourism is somewhat over 5% of the global French contribution, the question is : what could each of us do with the quota of 25kg carbon (5% of 500 kg) equivalent it could devote to his traveling for tourist purposes. Figure 5 shows that this quantity would not even allow a family to travel by car from Paris to Nice; using a train fed by nuclear or other renewable energy would be the only alternative.

Such an approach might be considered as extremist. The theme of an equalitarian access to resources is nevertheless supported by groups of intellectuals both in the North and in the South (Agarwal 1991); one can also recall that radical discourses might be listened to (see, for instance the maximalist interpretations of the precautionary principle), especially when they meet the frustrations, the lack of perspectives large groups of population are confronted with.

Such drastic implications for tourism are difficult to accept, let alone to cope with. Some might say that this leads to question the criterion on the grounds of realism though it remains a valid equity principle. In fact this opinion itself can also be questioned. The main reason for this is that the equalitarian principle does not really allow to determine the level of emissions the present generation could afford. The burden should be shared not only by the all individuals of the present generation, but also fairly between the present and the forthcoming generations. If, as the IPCC scenarios suggest, the world population could range from 6 to 17 billion when the concentration in the atmosphere reaches a level of 450 to 650 ppm (corresponding to 630 to 1080 billion tones of carbon equivalent), abiding by the equalitarian principle would allow for an individual belonging to the present generation to emit from 0,5 to 1,6 Tc. This first means that under such premises, the quantity of emissions we can afford now is largely undetermined (Godard 2003); in other words that this manner of posing the problem does not help much. It secondly shows that in the most permitting scenario (low population combined to high emissions), the rate of emission is not very far from the French reality in 1990 (1,8Tc), but somewhat more for other developed countries : 7 Tc per head in the US, (0,9 Tc in China) according to UNFCCC in 1998. The nuclear origin of electricity in France (which poses other environmental and ethical problems) explains much of the gap with other European countries. From this, one could conclude that the changes in our present way of life should not be as dramatic as the first figures above suggested. A reasonable tourism activity could survive, though at a level lower than the present one and unquestionably this would not avoid breaking with the present trend of a growing transport intensity of the activity.

Finally an equalitarian view of the share of emission rights essentially contributes to show strikingly that the present situation and the present trends are not sustainable, it does not really lead to solutions which must be sought in other directions.

2. THE PROSPECTS OF INTERNATIONAL NEGOTIATIONS

An alternative approach to tackling the problem is to look at "what can be done" at the expense of taking some distance with "what should be done". What can we expect from the negotiation processes within the international community and, taking into account the way they suggest to share the efforts, what could be their effects on tourism?

On the one hand, the Brundtland report refers to "*common but differentiated responsibilities*" which clearly shows a will to introduce an principle of equity into the negotiation process.

On the other hand the characteristics of the international negotiations on climate change do not fundamentally differ from those on other topics such as trade etc. There is no world government that could enforce measures reflecting superior interests of mankind, and equity principles which can stand within a constitutional democratic State cannot be applied in this context. Instead we deal with an assembly of independent states, each of them being lead by its own interests. In such a context any pro-active stakeholder (a State for instance) that would consider itself as a victim of climatic change or wish to counteract the negative effects on climatic change of an activity such as tourism would have to convince its partners to implement measures they are not interested in and thus to compensate them for doing so (Godard 2003). This means that in a context where no superior institution can enforce measures and make the polluter pay as it is the case in a country, the only alternative left is for the victim to pay. This is contradictory with the common sense of equity and anyway not very appealing for any stakeholder conscious of climatic issues.

This divide explains why those who get involved in the discussions on climatic change with the ethical background of the Brundtland report and who wish to progress towards a more sustainable development are rapidly led to look for measures that are acceptable by all major stakeholders, simply because an action that the US, Europe, China etc. have the means to offset the benefits of is of little interest. An acceptable measure can be defined as one to which each stakeholder feels free to agree since he is better off with it than without. Practically, since, as we have seen there is no single vision of equity, the art of the negotiation process consists in combining the different visions and establishing compromises and acceptable trade offs between them. Thus ethics and equity remain present and paid lip service to throughout the negotiation process and if, finally, an acceptable measure can be agreed upon it will be declared equitable... (Godard 2003).

It was legitimate to consider the Kyoto Protocol as the successful outcome of such a process, as long as the USA did not reject it. Notwithstanding this last event, nor the fact that on the contrary the protocol is considered as not sufficient by some important stakeholders (the UK already adopted a 20% reduction target by 2010 beyond the Kyoto protocol and is working towards a 60% cut of carbon dioxide by 2050 (British Secretary of State for Trade and Industry, 2003), it remains interesting to examine its potential implications for tourism

By signing the Kyoto Protocol, France has committed itself to bring back its emissions to the 1990 level. This can be seen as the first step towards reducing emissions in the long run, at a moderate rhythm. In this case also, it is worth while looking at how an expanding tourism activity can cope with such prospects. Naturally this issue

concerns France and Europe where growth prospects are moderate, but also other regions of the world where tourism is expanding at a much higher rate. According to WTO forecasts international tourist arrivals should almost treble within the two next decades and by 2020, 1.6 billion tourists should travel to foreign destinations. The growth should be more moderate in Europe with a rate of 3% and 717 million visitors (WTO 2002). France is not in the worst position to maintain its greenhouse gas emissions at a constant level, nevertheless tourist mobility follows an upward trend. How can this problem be dealt with ?

The latest assessment of greenhouse gas emissions shows that for the moment France complies with the Kyoto objective, releasing 2,1% less (in terms of Global Warming potential) than in 1990. As long as this situation goes on, why should tourism be questioned, and it seems hardly relevant to discuss how to mitigate its impacts. This could go on for some years. But the context appears to change completely if one looks at the long term. If the most ambitious national strategies (UK) are to be extended on an international basis, then it is obvious that tourism will have to diminish seriously its impact.

Calling for technology to rollback ultimate environmental constraints is by no means new (Sachs et al 1973). To what extent can productivity gains, which diminish the quantity of energy used per kilometer, help ?

- As far as cars are concerned , for a given category of vehicle, gains around 25% in energy consumption are expected in the next decade. This gain will be partially offset by safety requirements which increase the weight of cars, and by the consumption of more frequent air cooling equipment. This figure can also be compared to the 31% and 38% increase in holiday and week end distances between 1982 and 1994 (Insee, transport survey).
- As far as planes are concerned, the decrease of energy consumption per passenger.km is roughly 25% from one generation of planes to the next (every 25 years). Before the next technological leap occurs (use of liquid hydrogen), the gains are likely to be less important than previously. OECD believes that during the next twenty years, the contribution of air transport to total greenhouse gas emissions due to energy use will increase from 3% to more than 7%. At world level it could, somewhere between 2010 and 2030, catch up with that of road transport. One can remind that the number of holidays taken by the French in a Foreign country increased from 3.8 to 11 million between 1964 and 1994 (Insee "Vacances" Survey) and that the figure of personal trips of the French, using air transport increased by 16% from 1996 to 2000 (Direction du tourisme, SDT Survey). French tourists cross the border far less frequently than their neighbors of north-western Europe, but nothing indicates that it will continue.

For air and road transport, technical progress does not permit to offset the effect of the increase of tourist movements and it seems it will be even less the case in future decades.

The nearest reaction to come to this problem concerns air transport. Both the White paper of the European Commission on transports and the Royal Commission on pollution in the UK recommend to tax kerosene which since Washington Convention

in 1937 escapes any form of tax. This preferential treatment should not hold indefinitely and, if one considers the suggestion on the Royal Commission i.e. a tax of a hundred euros on each European departure, one can imagine the consequences on low cost companies, on short stays, though long distance flights should be less affected.

Such measures should not suffice to curb in the long run the emissions of tourism and it will be inevitably concerned by the debates on tradable permits. This type of mechanism allowing the more and the less environmentally efficient industries to exchange emission rights is to be set up for the European industry. One can imagine to see tour operators buying extra emission quotas from other sectors so as to maintain their activity.

Conclusion

Tourism necessarily implies mobility. Somehow the impacts of this mobility on the global environment will have to be addressed. Foreseeable technological improvements do not seem sufficient to cope with this issue: technological progress seems to improve much faster the conditions of virtual communications than those of physical travel (Ceron and Dubois, 2002). The answer to this challenge can be sought in two types of directions.

The first is to try to maintain the possibility of travelling largely unrestricted. Meeting global constraints would then mean diminishing the other uses of GHG generating energies even more drastically than expected. When facing the cruel dilemmas this would imply, would people be willing to?

The second direction is to try to have a just as pleasant life with less long distance tourism. We have great difficulties to imagine ways of life radically different from present ones, which is after all surprising if we consider how they have changed and what we have experienced through the last half century (for instance time watching TV^v), and the fact that obviously the pace of change is not slowing down. The key point is the part tourism will take within leisure time. Forward thinking on that point implies that we should admit that leisure activities and the uses of leisure time will probably change considerably over the next decades. The important point is not so much to predict what will change (what is the future of gardening, of reading, of watching TV, of home computer games etc...), but to know that the change will be considerable and might both upset the demand for tourism mobility (pressure towards growth or decline, no one knows...) and allow to rethink the place of tourism mobility within leisure time.

French public policies during the last twenty years (since the short-lived Ministère du temps libre in 1981) have focused essentially on tourism and left aside leisure. They appear to have been led mainly by the search of the economic benefits of tourism (notably the inflow of foreign currencies) and by the effects on employment of shorter working hours ("les 35 heures"). Do they not somehow miss the point of more ambitious leisure / quality of life policies? The need for tourism is often linked to a bad quality of life, to a desire to escape, especially

from urban areas (the Parisian syndrome...). Would a better quality of life (possibility of outdoor recreation, green belts, leisure activities) undermine the need for a tremendous mobility ?

We are living times where technological, economic and social changes are opening new opportunities but also where global constraints must be now dealt with. In a globalised world sustainable mobility is one of the major challenges that has to be faced and tourism mobility is, not alone though, part of the problem.

BIBLIOGRAPHY

STATISTICAL DATA

The text refers to a set of French national enquiries or surveys which are undertaken periodically by the major French statistical institution (INSEE), sometimes in common with ministries (which also can separately conduct surveys. These enquiries/surveys are the following:

- Enquête Vacances (Insee) quoted as “ Insee: vacances survey”
- Enquête Suivi des déplacements touristiques des Français (SDT) (Sofres-ministère du tourisme) quoted as « SDT survey »
- Enquête aux frontières
- Enquête Transports et communications (Insee-Ministère des transports) quoted as « transports survey »
- Enquête Emplois du temps (Insee)
- Enquête Logement (Insee) quoted as « housing survey »

The results of these surveys lead to various publications giving synthetic results or analysing some specific issue the survey documents. Some selected publications can be found in the following bibliography

1. Bonnette-Lucat C. (2001) Figures du rapport entre métier et loisir chez les bricoleurs in Green A.M. ed. Les métamorphoses du travail et la nouvelle société du temps libre : autour de Joffre Dumazedier L’Harmattan, Paris, Montréal. 380p.
2. Agarwal A. (1991) Global warming in an unequal world. A case of environmental colonialism. Centre for science and environment. New Delhi 36p.
3. British Secretary of State for Trade and Industry (2003), Energy White Paper. Our energy future. Creating a low carbon economy, Report presented to Parliament, Norwich: TSO, February 2003.
4. Boltanski L and Thévenot L (1991) De la justification. Les économies de la grandeur. Paris : Gallimard. 483 p
5. Boulin Y. Du Tertre C. (2001). L’impact de la réduction-aménagement du temps de travail sur les usages du temps : conséquences pour les loisirs et le tourisme. Rapport pour le secrétariat d’Etat au Tourisme et le Commissariat général du Plan . IRIS-CNRS-Université Paris Dauphine
6. Bourdieu P. (1979) La distinction. Paris Editions de Minuit. 670p.
7. Boyer M. (1982) Le tourisme. Paris, le Seuil 288p
8. Boyer M. (1996) L’invention du tourisme. Paris, Gallimard 160p.
9. Braudel F. (1986) L’identité de la France Paris : Arthaud-Flammarion 3Vol.

10. Cazes G. Potier F. Un système vacancier Français ? In Viard J. ed. La France des temps libres et des vacances. La Tour d'Aigues : Editions de l'Aube. 226p
11. Ceron, JP and Dubois G (2001) Tourism and sustainable development indicators: two French experiments facing theoretical demands and expectations. In Proceedings of the International Sustainable Development Research Conference, April 5-6 2001. Manchester: University of Manchester.
12. Ceron, JP and Dubois G (2002) Why French Tourism Should pay attention to climate change, Proceedings of the Symposium "Tourism and the Natural Environment", Eastbourne, September 18-20, 2002
13. Commissariat Général du Plan (1998) Réinventer les vacances. La nouvelle galaxie du tourisme. Paris: La Documentation française. 335p.
14. Creux G. (2001) Les pratiques de jardinage dans l'espace des loisirs : une ambiguïté ? in Green A.M. ed. Les métamorphoses du travail et la nouvelle société du temps libre : autour de Joffre Dumazedier L'Harmattan, Paris, Montréal. 380p.
15. Curry N Access to the countryside in England and Wales in L Mermet et P Moquay eds. L'accès du public aux espaces naturels. Hermes-Lavoisier. 2002.
16. Chenu A, Herpin N. (2002) Une pause dans la marche vers la civilisation des loisirs ? Economie et Statistique N° 352-353 pp15-37
17. Department of the environment (1996) Recreation and tourism In Review of the potential effects of climate change in the United kingdom. Second report London: HMSO. (pp.199-209).
18. Dewailly, J. M. and Flament, E. (1993) Géographie du tourisme et des loisirs. Paris : SEDES. 287p.
19. Dubois G. Ceron JP (2000) "A la recherche d'une éthique du tourisme" in Tourisme Durable. Les Cahiers Espaces. 67,. pp 10-30
20. Dumontier F, Pan Ké Shon J. L. (1999) En 13 ans, moins de temps contraints et plus de loisirs. INSEE-Première N° 675. 4p.
21. Dumontier F, Guillemot D. Méda D. (2002) L'évolution des temps sociaux au travers des enquêtes emploi du temps Economie et Statistique N° 352-353 INSEE Paris 13p.
22. Fontelle J.P., Chang J.P., Allemand N. (1999) Inventaire des émissions dans l'air en France, Citepa, août 1999.
23. Godard, O. (2003) L'équité dans les négociations post-Kyoto : critères d'équité et approches procédurales in D4E-MEDD Les engagements futurs dans les négociations sur le changement climatique. Paris La Documentation Française.
24. IFEN (1994) L'environnement en France. édition 1994-1995 Paris: Dunod. 400p.
25. IFEN, (2000), Tourisme, Environnement, Territoires : les Indicateurs. 262 p.
26. IFEN (2002) L'environnement en France. Paris. La découverte. 606p.
27. Lafargue P. Le droit à la paresse. Réfutation du droit au travail de 1948. Paris. Maspéro 1970 153p. Original publication 1883.

28. OECD, (2001) Household tourism travel : trends, environmental impacts and policy responses- Report n°ENV/EPOC/WPNEP(2001)14, Paris: OCDE, 57 p.
29. Packard V. (1960) Les obsédés du standing Paris Calman-Lévy 312p.
30. Potier F. De l'évolution de la mobilité pendulaire à celle des loisirs In Viard J. ed. La France des temps libres et des vacances. La Tour d'Aigues : Editions de l'Aube. 226p
31. Potier La république du temps libre n'est pas une et indivisible In Viard J. ed. La France des temps libres et des vacances. La Tour d'Aigues : Editions de l'Aube. 226p
32. Rouquette C. Taché C. (2002) Les vacances des Français. Résultats de l'enquête « vacances » 1999. INSEE Résultats, collection Société N°4. 38p.
33. Secrétariat d'Etat au tourisme (2000) Repères économiques du tourisme. Paris 113p.
34. Secrétariat d'Etat au tourisme (2002) Mémento du tourisme. Paris. (*yearly editions from 1191 to 2002*)
35. SES, (2002) Les voyages à longue distance des Français en 2000, *SES Infos rapides*, n°143.
36. Transport visions. (2000) Society and lifestyles. Landon publishing ltd London. 80p.
37. Urbain J-D. Les sphères de la mobilité d'agrément. Paradoxes, corrélations tendances. In Viard J. ed. La France des temps libres et des vacances. La Tour d'Aigues : Editions de l'Aube. 226p
38. Viard J. (2002 a) Le sacre du temps libre. La société des 35 heures. La Tour d'Aigues : Editions de l'Aube. 215p.
39. Viard J. (2002 b) Temps libre, vacances, et art de vivre : le triangle des Bermudes des sociétés modernes. In Viard J. ed. La France des temps libres et des vacances. La Tour d'Aigues : Editions de l'Aube. 226p
40. Viard (2002 c) Le temps libre ré-aménageur du territoire In Viard J. ed. La France des temps libres et des vacances. La Tour d'Aigues : Editions de l'Aube. 226p
41. WTO (1999) Changes in leisure time : the impact on tourism. Madrid 151p
42. WTO (2001) Tourism 2020 Vision - Set of the 6 regional reports & "Global Forecast and Profiles of Market Segments" Madrid
43. WTO (2002), Développement durable du tourisme. Contribution au sommet de Johannesburg. Report by the Secretary General of WTO, p 9

ⁱ This paper is linked to a research in progress : Temps hors travail, loisirs , tourisme et mobilités : scénarios à 20-30 ans for the Direction de la recherche des affaires scientifiques et technique. Ministère de l'équipement, des transports et du logement, du tourisme et de la mer.

ⁱⁱ This paper is linked to a research in progress : Temps hors travail, loisirs , tourisme et mobilités : scénarios à 20-30 ans for the Direction de la recherche des affaires scientifiques et technique. Ministère de l'équipement, des transports et du logement, du tourisme et de la mer.

ⁱⁱⁱ For instance N. Curry show that the staggering of outings in the English countryside can be related to the changes in home ownership during the thatcherian period. (Curry 2001)

^{iv} children are not supposed to travel as much, but this is the case in each scenario

^v Who in 1950 would have expected that 50 years later the French would spend on average 2 hours a day watching TV ? (Dumontier , Pan Ké Shon 1999)

^{vi} Who in 1950 would have expected that 50 years later the French would spend on average 2 hours a day watching TV ? (Dumontier , Pan Ké Shon 1999)